# 3.4 TRANSPORTATION

Several items are introduced, discussed, and summarized in this section. Road density levels discussed are for MA 1.1 of the project area, and are compared to those established by the Forest Plan (page IV-111). For each alternative, the amount and type of proposed road improvements (reconstruction and maintenance), as well as any new road construction, temporary road construction, decommissioning, closures, and other related features (culverts, berms, and gates) is summarized here. Proposed expansion of the Gauthier Gravel Pit is also discussed. Access for passenger vehicles, ATVs, and snowmobiles has also been considered in this analysis. Refer to Sections 2.4.1.3 and 2.5.1.3 in Chapter 2 for a description of the proposed transportation system activities.

## 3.4.1 Methodology

Road density is measured as a ratio of miles of road per square mile of land. Following a recent road inventory for the project area, road density for MA 1.1 of the project area was calculated by dividing the miles of known existing roads on Forest System lands by the corresponding acreage [e.g., (143.1 miles/39.7 sq. miles) = 3.6 miles/sq. mile].

### 3.4.1.1 Measurement Indicators

A number of indicators are used to compare the transportation effects across alternatives. These indicators are tied to miles of road and road density, type and amount of proposed road improvement or development (reconstruction, maintenance, or construction), miles of road decommissioning, miles of open and closed roads, the number of culverts or other drainage crossing devices needed, and the number of road closure devices recommended (berms or gates).

## 3.4.2 Transportation in the Affected Environment

This area is regularly used for recreational purposes, especially during hunting seasons.

***Definitions***

**Forest System Road** -- A classified forest road under the jurisdiction of the Forest Service, which is placed on the Forest's transportation system inventory, records, and maps.

**New Road Construction --** An activity that results in the addition of forest system or temporary road miles.

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

**Unclassified Road –** Roads on National Forest System lands that are not managed as part of the forest transportation system.

**Road Maintenance --** The ongoing upkeep of a road necessary to retain or restore the road to the approved road management objective.

**Road Reconstruction --** An activity that results in the improvement or realignment of an existing system road.

**Road Decommissioning --** Activities that result in the stabilization and restoration of unneeded roads to a more natural state.

**Road Density --** The measure of the degree to which the length of road miles occupies a given land area; for example, 1 mile/square mile is one mile of road within a given square mile of land.

Vehicle parking and camping associated with hunting activities regularly occurs along Forest Roads (FR) 730 & 733. There are also several private and recreational lease camps within the project area. As such, road use is normally heaviest during hunting seasons, but roads do receive some use throughout most of the year by both passenger vehicles and ATVs, along with snowmobiles during winter.

Current and proposed access is being managed in accordance with the Forest Plan (pages IV-56-61). This management would include such things as maximizing the use of existing roads, and constructing short stretches of road to avoid private property (Forest Plan, pages IV-56 & 57). In addition, the Forest Plan

recognizes in the management prescription for MA 1.1 that "[T]he even-aged silvicultural system used for aspen and softwoods results in clearcuts accessed by many temporary roads" (Forest Plan p. IV-104). These roads would be closed and revegetated following use.

The project area encompasses parts of MA 1.1, 8.1, 9.2, & 9.3. The management prescription for road density in MA 1.1 is 2 ½ to 3 ½ miles of collector and local roads per square mile (refer to Table 1.3.1 in Chapter 1 or Forest Plan, page IV-111). The Forest Plan did not establish specific road density objectives for the remaining MAs.

In MA 1.1 of the project area there are approximately 143.1 miles of existing roads on Forest System lands, and an unknown amount of non-system private roads. Most of these roads originated from past management activities, or were developed to access private property.

There are also two county roads (Gauthier and Old M-45) and one United States Highway (US-45) in the project area. During winter, the Gauthier road and US-45 are plowed, but no Forest Roads in the project area are plowed unless needed to facilitate timber harvest or other management activities.

Both open and closed low standard (maintenance level 1 & 2) system roads are open to ATV use unless signed closed to such use. ATV use is prohibited on maintenance level 3 & 4 main collector system roads, such as FR 730 and most of FR 733. Where appropriate, passenger vehicle use is allowed on open Forest Roads (see Map G in Appendix A for locations of existing open and closed roads).

Open and closed low standard system roads are not maintained on an annual basis and are comprised of native surface material. Many of these low standard system roads in the project area are growing over with brush, have some rutting, wet pockets, or drainage crossings that are in need of drainage structure (culvert) replacement, upgrading, or decommissioning of the crossing and related road segment altogether.

#### 3.4.2.1 Area of Potential Effect

The bounds used for the transportation analysis is the project area. This area was selected because the most immediate (within 5-7 years) direct and indirect effects and management of the transportation system would occur within the confines of the project area.

### 3.4.3 Direct, Indirect, and Cumulative Effects on Transportation

Effects related to roads are addressed and recognized as impacts to other resources such as wildlife, soils, fisheries/aquatics, and recreation. To help support the analysis of these other resources, the effects described here focus on providing information on road development needs, vehicle access, and road density estimates for the project area. Refer to Table 3.4.1 below and the following discussion of effects by alternative.

The location of the proposed transportation management activities for each action alternative and the long-term transportation plan shown in Table 3.4.1 below can be found on Maps H, I, and J in Appendix A.

Unless currently signed or posted otherwise, ATV use would be allowed on closed roads under all alternatives.

**Table 3.4.1. Summary of Existing and Proposed Transportation System by Alternative.**

*(All data in miles unless noted otherwise)*

| Measurement Indicator | Alt. 1 (Existing Condition) | Alt. 2 | Alt. 3 | Alt. 4 | Long Term Plan |
|---|---|---|---|---|---|
| Construction [1] | 0 | 1.1 | 1.4 | 1.4 | 1.4 |
| Reconstruction [2] | 0 | 10.1 | 16.0 | 16.0 | 25.2 |
| Maintenance [3] | 0 | 43.1 | 67.2 | 67.2 | 89.6 |
| System [4] | 114.8 | 61.5 | 31.6 | 31.6 | - |
| Forest System Roads | | | | | |
| *Open* | 18.5 | 15.9 | 14.7 | 14.7 | 12.7 |
| *Closed* | 96.3 | 99.9 | 101.5 | 101.5 | 103.6 |
| **Total** | ***114.8*** | ***115.8*** | ***116.2*** | ***116.2*** | ***116.2*** |
| Unclassified Roads | | | | | |
| *Open* | 1.8 | 0 | 0 | 0 | 0 |
| *Closed* | 26.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| **Total** | ***28.3*** | ***1.5**** | ***1.5**** | ***1.5**** | ***1.5**** |
| Planned Decommissioning | 0 | 26.9 | 26.9 | 26.9 | 26.9 |
| Temporary Roads (approximate) | 0 | 2.4 | 6.5 | 6.5 | - |
| Road Density in MA 1.1 (mi/sq. mi.) | 3.6 | 2.9 | 2.9 | 2.9 | 2.9 |
| **Other Features** | | | | | |
| Estimated Culverts Needed | 0 | 10 | 17 | 17 | 19 |
| Estimated Berms Needed | 0 | 12 | 22 | 22 | 30 |
| Estimated Gates Needed | 0 | 2 | 2 | 2 | 2 |

[1] Roads being constructed to implement proposed projects, with a segment needed to avoid private property.

[2] Roads being reconstructed to implement proposed projects.

[3] Roads being maintained to implement proposed projects.

[4] Roads identified as being necessary for long-term management, but not needed to implement proposed projects.

***** Roads identified as no longer needed for long-term management, but are being used to access existing recreational leases, or are under special-use permit to access private property.

### 3.4.3.1 Direct/Indirect Effects on Roads of Alternative 1

No road construction, reconstruction, maintenance, decommissioning, or road closures would occur under this alternative. Open and closed roads would remain at 20.4 miles and 122.7 miles respectively. As a result, this alternative would have no effect on the existing road density in the project area, which would remain at 3.6 miles per square mile. Refer to Sections 3.3, 3.5, 3.6, and 3.8

(wildlife, soils, fisheries/aquatics, and recreation) for the corresponding effects related to no action in regard to the existing transportation system.

### 3.4.3.2 Direct/Indirect Effects on Roads of Alternative 2

This alternative is tied to developing and maintaining a long-term transportation system that allows management of National Forest System lands and provides for public access while meeting other resource objectives. The type and amount of transportation projects necessary to implement this alternative are shown above in Table 3.4.1.

The proposed road construction, reconstruction, and maintenance is not expected to increase use of the area, but would improve the condition of the roads for Forest users. The proposed road closures and decommissioning would reduce access by passenger vehicles; however, access to these areas by ATV or foot travel would still be available as it is currently.

Because proposed temporary roads do not currently exist and would be closed and revegetated after the timber is removed, they are not expected to change or affect current or future use and access by Forest users.

Expansion of the Gauthier Gravel Pit would provide needed resources for proposed and future transportation projects. A gravel source in the immediate area would help reduce road costs by not having to haul the gravel in from a source farther away. Having gravel available to improve roads would also help to provide a better experience for Forest users.

Refer to Sections 3.1, 3.3, 3.5, 3.6, 3.7, and 3.8 (Vegetation, Wildlife, Soils, Fisheries/Aquatics, Botany, and Recreation/Visuals) for the corresponding direct and indirect effects related to the proposed transportation system management under this alternative.

### 3.4.3.3 Direct/Indirect Effects on Roads of Alternatives 3 and 4

Because Alternative 4 proposes to treat nearly the same areas as Alternative 3, the access needed and transportation system management being proposed for Alternative 4 is the same as that for Alternative 3.

The proposed transportation system management for these alternatives would allow for the proposed management of National Forest System lands while providing for public access. Implementation of the proposed transportation projects in either of these alternatives would help achieve the long-term transportation goal for the project area much faster than Alternative 2. This is because more miles of needed road construction, reconstruction, and maintenance would be accomplished with these alternatives. This comparison can be made by referring to Table 3.4.1, which also shows the type and amount of transportation projects necessary to implement each alternative.

Effects on use and access would be the same as described for Alternative 2, with the exception of the additional 0.3 mile of road construction. This road construction is expected to have a positive effect on long-term management of National Forest System lands and on public access. This is because it would provide access to and continued use of the affected area while avoiding undesired road use through private property.

Effects of the proposed Gauthier Gravel Pit expansion would also be the same as described for Alternative 2.

Refer to Sections 3.1, 3.3, 3.5, 3.6, 3.7, and 3.8 (Vegetation, Wildlife, Soils, Fisheries/Aquatics, Botany, and Recreation/Visuals) for the corresponding direct and indirect effects related to the proposed transportation system management under these alternatives.

In summary, transportation projects proposed under the action alternatives would have no significant direct or indirect effects on transportation. These projects are not

expected to significantly alter or diminish current use and access either.

#### 3.4.3.4 Past, Present, and Reasonably Foreseeable Future Actions

**Past Actions**

Over the years an extensive road system has developed throughout the project area. This road system has been utilized for timber harvest, access to private lands, and for recreational use and access.

Because the majority of the timber harvest in the project area is done during the winter months, the road system was built to a low design standard. Over time many of the roads have started to naturally grow over with vegetation, with some becoming impassible to motorized travel.

**Present Actions**

Many of the existing low standard roads proposed for use under the action alternatives are rutted and/or becoming overgrown with vegetation. These roads would not be usable for timber harvest activities without some reconstruction or maintenance work.

Other than unclassified roads, roads identified as no longer needed for long-term management of the project area would be decommissioned and removed from the transportation system. Those roads identified as necessary for long-term management of forest resources would remain on, or be added to, the transportation system.

**Reasonably Foreseeable Future Actions**

The long-term access management strategy for the project area would be to continue to use as much of the existing road network as possible to limit the amount of new road construction needed. Future management activity would be analyzed on a project-by-project basis.

Future projects may involve road reconstruction, maintenance, decommissioning, obliteration, or closures. Some new road construction may also be needed, but it is expected to be minimal. This is because the analysis associated with this project looked specifically at developing or maintaining the minimum and most efficient transportation system necessary to accomplish current and long-term management objectives.

The Forest Service has future plans to resurface Forest Roads 730 and 733, which would be dealt with under a separate project. There are no known state, county, or township roadway improvement projects anticipated in the next 5 years.

#### 3.4.3.5 Cumulative Effects on Roads of All Alternatives

The boundary chosen to address cumulative effects on the transportation system is the project area. This is the scale at which the data was collected, the transportation plan was prepared, and where the effects of the proposed alternatives would reach.

As mentioned, effects related to roads are generally addressed and recognized as impacts to other resources such as wildlife, soils, fisheries/aquatics, and recreation. Road management would improve the condition and usability of roads for Forest users, but maintaining, improving, or decommissioning roads ultimately has effects on the other resources mentioned. Therefore, there are not any additional cumulative effects on the roads or the transportation system themselves.

# 3.5 SOIL RESOURCES

## 3.5.1 Methodology

**Definitions**

* See Glossary in Appendix F

**The Ecological Classification System (ECS)**

The ECS for the ONF was used as a basis for analyzing this project in the context of ecosystem management. The ECS is an information system with the capability to identify, organize, and describe ecologically similar land units for interdisciplinary analysis and prediction of the natural resource response to management activities.

The ECS takes into account 3 integrated components: Landform; Soils; and Vegetation. The hierarchical levels of this system provide an effective means of determining land capability and predicting resource response to management activities at many levels of planning, including the project level to which this EIS applies.

On a broad scale, the project area falls into the Southern Superior Uplands Section of the National Ecological Hierarchy (McNab and Avers 1994).

On a more local scale, the ECS has 3 Sub-levels of hierarchy:

1) Landtype Association (LTA);

2) Ecological Landtype (ELT);

3) Ecological Landtype Phase (ELTP).

The LTAs provide the broad spatial arrangement for regional or broad project level analysis (landscape), such as applies to this project. The ELT level is for local landscape planning and is not applicable for this project. The ELTPs are more site-specific and applicable at the individual project or timber sale level, such as during implementation of the proposed activities.

Reference “Application of the Ecological Classification System,” FY 1996 M&E Report, pages 83-85, for the relationship of the ECS to landscape, community, and population levels of planning, and the current status of the program on the ONF.

**Timber Harvest**

The following timber harvest methods were grouped together because they were estimated to have similar intensities of ground disturbing activities, and similar volumes and objectives of harvesting the trees.

It was determined to combine all treatment types with a clearcut activity (113, 113R, 113/plant). This type of harvest activity is a regeneration harvest method that is interpreted as having the greatest amount of overall ground disturbance, and in general the highest impact on the soils involved within the stand. This is because machinery would travel over the largest percentage of surface area, but with the least amount of repetitive traffic (over the same travel ways) as machine operators usually have the flexibility to spread out the traffic over a wider area.

All treatments with individual tree selection (151), improvement (210), and commercial thinning (220) harvest methods would be grouped as a maintenance harvest. This type of harvest activity would be interpreted as having the least amount of overall ground disturbance and in general the least impact on the soils involved. Machinery would travel over the least percentage of surface area within the stand itself, but have the highest impact on the skid trails and roads because the travel ways are restricted to only certain routes. These skid roads may be designated beforehand so as to reduce impact on the residual trees and avoid sensitive soils or areas. These main travel ways would also be used again in future harvests.

All treatments with shelter wood-seed (131) or removal (143) harvest types would also be grouped as a regeneration harvest method, but this type of harvest activity would be interpreted as having a moderate amount of

ground disturbance. This is because the amount of timber removed and traffic patterns are typically between a clearcut and selection.

**Roads Development**

For the purposes of this analysis, all road construction and reconstruction is considered to have negative (detrimental) effects on the soil resource directly on or near the road corridors. All road closures and decommissioning are considered to have a beneficial effect on the soils involved.

**Old Growth**

Generally, the more acres proposed for classified old growth, the less the potential for long-term impact on the soil resources. However, there is no proposed classification of additional old growth in any of the alternatives, so there are no effects to analyze.

**Watershed and Soil Projects**

The higher the number of watershed improvement or soil/site rehabilitation projects, the greater the long term benefit on the soil resources. This is because the objectives of these projects are for the specific purpose of improving or rehabilitating soil and water resource damage.

**Other**

All other activities or connected actions included in the action alternatives were considered to either have a neutral effect on the soil resources, or are insignificant enough to not warrant analysis.

**Soil Effects Analysis**

Four main soil disturbance factors were analyzed when determining potential effects from proposed activities. These factors are:

1) Soil erosion;
2) Compaction;
3) Rutting; and
4) Productivity.

These disturbance factors are described in the Soils Specialist Report in the project file.

#### 3.5.1.1 Measurement Indicators

There are three primary measures used to compare alternatives relative to these soil effects. Each of these measures is evaluated by LTA to determine their potential for effects to the soils.

1) Road development – this includes miles of construction, reconstruction, maintenance, decommissioning, and closure;
2) Type of harvest activity and acres harvested;
3) The number of watershed/soil improvement or restoration projects proposed.

### 3.5.2 Soil Resources in the Affected Environment

The proposed Baltimore VMP lies primarily within LTA 19, while some of the steep river and stream valleys lie within LTA 20 (see Figure 3.5.1 and Table 3.5.1 below for LTA locations and acreages).

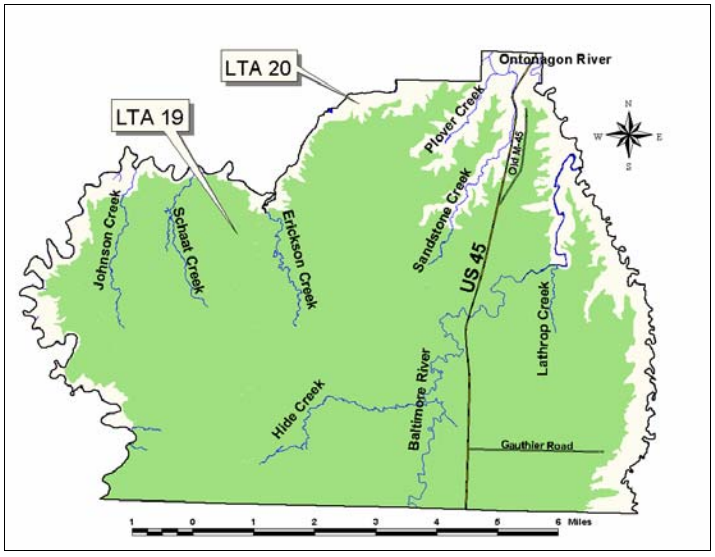


**Figure 3.5.1. Land Type Associations (LTAs) in the Baltimore Project Area.**

**Table 3.5.1. Acreage Totals by LTA in Baltimore Project Area.**

| LTA | Acres (all ownerships) |
|---|---|
| 19 | 30,264 |
| 20 | 5,519 |
| Water | 126 |
| **Total** | **35,909** |

The following is a generalized description of these LTAs and overview of how ELTPs can affect proposed project activities. Detailed descriptions of LTAs 19 and 20, as well as the individual ELTPs that lie within, are located in the project file.

### LTA 19

The interior of LTA 19 is a nearly level, ancient glacial lake plain, with predominantly silty and clayey soils, and small, localized areas of sandy and loamy till. It contains very few organic soils.

These fine-textured soils are deep, moderately well to somewhat poorly drained. Water movement through the soil is very slow and water availability for plant use is moderate to high. Natural fertility is high.

Effective rooting depth is less than 10 feet and depth to bedrock is greater than 10 feet as the bedrock geology is deeply buried by the surficial deposits. Windthrow hazard is moderate, natural stability is high, compactibility is moderate, and erodability is high.

Climax vegetation is composed of eastern hemlock/northern white cedar/sugar maple, with yellow birch, ironwood, American elm and ash. White spruce, black spruce, and balsam fir would make up a minor component. Northern white cedar, American elm, and ash would be most prevalent on the wetter sites. Eastern White Pine is also known to be a component on this LTA.

Present vegetation is dominated by aspen and spruce/fir, with smaller amounts of northern hardwoods. This is because logging, great amounts of disturbance, or fire in the early 1900s caused regression to aspen or aspen/birch and maple with spruce/fir in the understory. Logging without burning resulted in mixed sugar and red maple with some spruce/fir, basswood and red oak.

On this LTA, aspen will succeed in one generation to spruce/fir or maple, which will succeed to eastern hemlock/northern white cedar/sugar maple after several more generations.

### LTA 20

LTA 20 consists of very steep and unstable river valleys. Commonly there is evidence of past and active landslides, slumps, soil creep, and erosional features. Soils in this LTA are quite variable, but in the project area they are primarily stratified clay and silt.

It is because of the landform and unstable soil characteristics that no ground disturbing projects are proposed in this LTA. This LTA, however, contains the primary portions of all the Wild and Scenic River Corridors within the Project area and also the Forest.

Soils are well to moderately well drained and are fine textured; however, this LTA frequently has poorly drained stratified alluvial soils in the bottoms and floodplains. Overall natural fertility is high and water availability is medium.

Present vegetation within the project area consists of aspen and mixed conifers with lowland conifers and hardwoods in the bottomlands, although across the Forest this LTA encompasses many different soil and Habitat Types.

### ELTPs

ELTPs provide site capability information, specific species productivity, road and landing location suitability, equipment operating periods, plant competition, site preparation alternatives, specific wildlife habitats, species relationships, and more.

Some ELTPs, such as non-forested areas, steep slopes, or organic wetlands, are not suitable for logging. These ELTPs would be avoided during any timber harvest activities to protect the soil resources.

Some of these ELTPs within the project area do not have any proposed activities planned to occur on them, but are included as they are part of the scope of cumulative effects analysis, and/or they have sensitive properties and are adjacent to proposed projects. Table C-2 in Appendix C contains brief descriptions of the ELTPs that occur within the project area that may have proposed activities on them, or that may affect the proposed activities (i.e., harvest or operability limitations due to riparian ELTPs). This table also lists the suitability for vegetation management and operational design criteria for these ELTPs. Some of the project design criteria related to soils and aquatics were developed using ELTP interpretations.

#### 3.5.2.1 Area of Potential Effect

The bounds of analysis for determining direct and indirect effects of proposed activities would be by LTA within the project area boundary (refer to Figure 3.5.1). Potential direct and indirect effects of erosion, compaction, rutting, and site productivity are reasonably confined to the soil directly beneath where the disturbance factors are taking place (such as machinery operations or skidding of logs). These effects may extend to adjacent LTA edges in some instances, such as increase runoff into the dissected valleys (LTA 20), but not to an extent where the effect would transcend outside the project area.

Each LTA has its own unique ecological characteristics and capabilities and are affected differently to some extent from surface operations, but the LTAs do not interact with each other (i.e., compaction in one LTA does not cause adjacent LTAs to be compacted, nor does it affect a neighboring LTA to react differently to compaction).

### 3.5.3 Direct, Indirect, and Cumulative Effects on Soil Resources

For the purposes of this analysis, timber harvesting and road development activities would be assumed to have the greatest impact on the soils in the project area. In general, the higher the overall harvest acreage and the higher acres in clearcut harvests, as well as higher amounts of road development, the greater the potential is for detrimental effects on the soils. The reasoning for these effects assumptions are detailed below in the direct effects analysis for Alternative 2.

#### LTA 20

Although the current analysis data shows a very minor amount of proposed treatment activities occurring within LTA 20, this can likely be attributed to mapping scale and distortion errors. The majority of road maintenance and reconstruction activities that appear to occur in LTA 20 can also be attributed to these errors. Although there may be small sections of harvest areas and road activities that may fall within LTA 20, the projects that are proposed within LTA 20 would primarily be for protection of the soil resources.

Under all action alternatives, the proposed activities that are known to be within LTA 20 include road decommissioning (0.5 mile) and road maintenance (0.1 mile). The proposed decommissioning would close a road entering LTA 20, which would reduce the potential for soil erosion and resource damage. The proposed road maintenance would repair a rutted road leading to a parking area and canoe landing within the Ontonagon River floodplain near the US-45 Military Hill Bridge. This would reduce erosion and sedimentation into the river.

When the treatment areas are laid out on the ground the boundaries will be corrected to exclude the slopes of LTA 20 as much as possible. Ground delineation of proposed treatment activities that are adjacent to, but not within, LTA 20 will follow riparian protection design criteria (see Appendix C). This will maintain a buffer between the treatment area and the edge of the valley slope, which should

prevent any adverse soil effects from affecting the slopes.

Because of these reasons, LTA 20 will not be analyzed further in respect to effects on the soil resources for this project.

### 3.5.3.1 Direct/Indirect Effects on Soil Resources of Alternative 1

#### Soil Erosion

***Timber Harvest***

Because there are no logging and associated ground disturbing activities with this alternative, no additional erosion potential would be created by this alternative. Natural erosional forces would continue on a small scale as it has since the glaciers retreated. Additionally, any erosion that is now occurring would continue and slowly decline as the land naturally recovers stability.

***Road Development***

All watershed and road related activities that would rehabilitate, or are needed to repair, historical damage and prevent future erosion would not be completed at this time. All road-related erosion would continue to occur due to unrestricted passenger or recreational vehicle traffic in sensitive areas on open roads.

Roads that would remain in poor condition under this alternative may restrict access for wildfire prevention and suppression. A wildfire could expose areas of bare soil or make some soils hydrophobic (water repellant), which could initiate erosion in a few areas where there are steep slopes.

#### Soil Compaction

***Timber Harvest***

There is no logging and associated activities proposed with this alternative, therefore, no soil compaction would occur. Natural soil formation processes would continue and historical compaction, if any, would remain and continue to be naturally mitigated.

***Road Development***

Decommissioning of sensitive or poorly located existing roads to protect the soil resource from soil compaction would not occur at this time. Soil compaction from unrestricted passenger or recreational vehicle use on or off roads and trails may continue to occur.

#### Rutting

***Timber Harvest***

Under this alternative no rutting would occur on roads or in the forest from logging and associated ground disturbing activities because there is none proposed.

***Road Development***

Decommissioning of sensitive or poorly located existing roads to protect the soil resource from rutting would not occur. Soil rutting from unrestricted passenger vehicle use may occur or continue to occur on or off roads and trails.

#### Soil Productivity

***Timber Harvest***

There would be no impact to forest site productivity under this alternative because there is no logging and associated activities proposed. Natural soil formation processes would continue, and biomass and organic matter would continue to accumulate in the surface horizons and be incorporated into the soil. Mineralization and nutrient accumulation from weathering and atmospheric deposition would also continue.

***Road Development***

No proposed road development would also allow natural soil formation processes to continue. Roads would continue to naturally revegetate and biomass and organic matter would continue to accumulate in the surface horizons and be incorporated into the soil.

### 3.5.3.2 Direct/Indirect Effects on Soil Resources of Alternative 2

With the exception of minor amounts of the proposed transportation projects that are known to be in LTA 20, all other proposed projects under this alternative are planned within LTA 19.

#### Soil Erosion

Fine textured soils such as those that comprise the majority of LTA 19, have high erosion potential. The percolation rates are slow and the fine particles are easily displaced and transported by rainfall. However, all of the areas proposed for harvest and road development under this alternative are located on level to gently rolling terrain, which greatly reduces the erosion hazard.

##### *Timber Harvest*

The primary type of management activity under this alternative would be clearcut harvests. Some clearcuts as proposed under this alternative, however, would result in retention of selected residual trees or tree species and potentially slightly less ground disturbance would occur. Because the majority of these clearcuts would occur in the winter, disturbance to the groundcover under the snow is much less likely to occur. This intact groundcover is essential for preventing erosion.

While short-term and minor erosion has occurred during past timber sales in the project area and may occur in the future, no long-term erosion was noted and the sales were approved for closure normally (inspection reports from West Hide II and Victoria South Sales are located in the project file).

LTA 19 has high fertility soils and any exposed soil, such as in skid trails or log landings, quickly becomes re-vegetated and stabilized usually within 3 growing seasons (personal observation - Robert J. Wagner, Soils Scientist). Post harvest regeneration survey data, compartment records, and silvexam data of the above mentioned timber sales have also documented rapid regeneration of aspen and re-growth of vegetative cover after harvest (these items are located in the project file).

Furthermore, installation of erosion control structures, implementation of ELTP specific design criteria, and careful sale administration have demonstrated effectiveness at preventing and reducing the potential for erosion.

Design criteria are in place to help facilitate revegetation and minimize the potential for soil erosion. In addition, any soil damage occurring within the sale area during harvesting activities would be corrected by the equipment operators under direction from the sale administrator before the sale contract is terminated.

##### *Road Development*

In all new road construction and reconstruction the potential for erosion is increased due to the larger areas of exposed soil both on and along the road grade. New road construction, however, would not be located on steep slopes and would follow the applicable design criteria. As a result, the potential for erosion would be reduced.

In addition, road construction or reconstruction is now done with greater sensitivity to the soil resources, and reconstruction usually takes place on old roadbeds. It is also more carefully planned and engineered and better drainage structures are utilized than those used in the past. As a result, the long-term potential for erosion and impacts to soil resources is substantially less.

This alternative proposes to close and decommission more miles of roads than are being constructed or re-constructed. Closed and decommissioned roads inhibit the type and intensity of road use by restricting use to only ATVs or foot traffic and prevent use by passenger vehicles. It can also prevent vehicle use of roads in sensitive soil areas where erosion is more likely to occur. In some cases use by all motorized vehicles may be prevented as the roadbed brushes in. Therefore, if the proposed road development actions were implemented the overall erosion potential in LTA 19 would be lessened.

All of these factors indicate that no significant erosion would occur (lasting only one or two growing seasons and not affecting any streams

or wetlands) from implementation of this alternative.

### Soil Compaction

Field observations, sale inspection reports, and experiences from past management activities in similar ELTPs within LTA 19, including those in the West Hide II and Victoria South Sales, have not documented any significant compaction of soils outside of existing roads and main skid trails (inspection reports for these sales are located in the project file).

#### *Timber Harvest*

Because of microsite differences in soil moisture and textures, incidental soil compaction may occur in spot areas outside of major skid trails, but this potential is less with clearcut treatments due to the dispersed traffic patterns. If compaction does occur, it is typically minor and limited or isolated to these spot areas. Seasonal freezing and thawing cycles would also minimize compaction effects.

Because the design criteria and proper sale administration have shown well-established results in past timber sales in the area, the long-term compaction potential from treatment activities is extremely low.

#### *Road Development*

Road construction would compact additional areas of LTA 19 (e.g. roadbeds). Road reconstruction may further compact soils on the old roadbed that may have begun to recover naturally. However, these roads are likely to be used again for future management and appropriated for that use and not timber production. Reference the discussion on road activity effects in the Erosion section above as these factors affect compaction potentials in a similar manner.

Because of these reasons, it is unlikely that implementation of this alternative would result in detrimental soil compaction (where tree regeneration and growth would be reduced by more than 15%), except possibly in a few isolated spots.

### Rutting

Some minor amounts of rutting has occurred in past timber sales in LTA 19, but it was primarily on roads and main skid trails. Minor amounts of rutting may also occur under this project, but it too would be expected to be primarily on roads and main skid trails.

#### *Timber Harvest*

Because of the high proportion of the area being traversed by machinery and microsite differences in the landform, incidental soil rutting may also occur in isolated spots of clearcut treatment areas. This rutting is expected to be limited and isolated to just small areas. Overall, however, the potential for rutting is less in clearcut treatment areas because main skid trails occupy only a very small portion of the sale unit area, and machinery is not confined to specific travel corridors. Stocking surveys, timber sale inspection reports, or field observations have not documented that any tree growth or regeneration has been affected by rutting outside of roads and main skid trails (final inspection reports for West Hide II and Victoria South Sales are located in the project file).

Design criteria, ELTP season of operation guidelines (see Table C-2 in Appendix C), and careful sale administration would be in place to reduce or prevent this type of soil resource damage. Sale administration tools available to protect the soil resource include halting operations until soil conditions improve, and requiring the contractor to repair ruts within the timeframe of the sale.

#### *Road Development*

Reference the discussion on road development effects in the Erosion section above as these factors affect rutting potentials in a similar manner.

Because of these reasons, it is unlikely that implementation of this alternative would result in detrimental soil rutting (where tree regeneration and growth will be reduced by more than 15%) off of main roads and trails, except possibly in a few isolated spots.

**Soil Productivity**

Most of the soils in LTA 19 are fertile, have very fine textures, and contain large nutrient reserves. Therefore, long-term site productivity concerns are less in this LTA. Studies are, however, being conducted within the project area to determine effects on the long-term productivity of clay soils from clearcutting and biomass removal, soil compaction, and organic layer removal.

***Timber Harvest***

Stands proposed for clearcut treatments would have the harvested tree's bole removed, and in some cases most of the larger branches and small residual trees would also be removed. Small ground vegetation and ground cover would not be removed.

Stands on identical ELTPs in LTA 19 have been clearcut and successfully regenerated in past timber sales. Compartment records and history data for these stands all show that the stands are growing and regenerating in a productive manner.

Disturbances such as windthrows or clearcutting accelerate decomposition and nutrient release to the soil by overturning the horizons and putting the organic matter in contact with more oxygen above and nutrient-rich soil horizons beneath (Oliver and Larson 1996). The design criteria would require that all the remaining non-merchantable trees cut, as well as tops, chips, and slash, be evenly scattered around the site to promote better decomposition and reduce the potential for any detrimental site productivity effects.

***Road Development***

Road construction may likely reduce site productivity on the soil where the new roadbed is located. Reconstructed roads would maintain poor site productivity on the roadbed due to both new soil disturbances and increased use from harvesting equipment; however, this would present no change in the present land area affected, and these roads would likely be used again for future management.

Decommissioning of roads would gradually improve site productivity on the old roadbeds. This would occur through natural processes as equipment and vehicle use of the roadbed subsides and vegetation begins to re-grow.

Closing roads would keep passenger vehicles off the road surface and give access to non-motorized or ATV traffic only. Because these vehicles are smaller and much lighter than passenger vehicles, the disturbed roadbed would be narrower and less surface area would be affected, limiting any reduction in site productivity.

Because of these reasons, implementation of this alternative would not significantly reduce soil productivity (where tree regeneration and growth would be reduced by more than 15%) off of main roads and trails.

### 3.5.3.3 Direct/Indirect Effects on Soil Resources of Alternative 3

The same discussions, soil types/LTA, and ecological and management principles found in the Alternative 2 analyses also apply to Alternative 3. Please refer to the discussions under Alternative 2 above for the four main soil effects (erosion, compaction, rutting, and productivity). Refer to Tables 2.7.1 and 2.7.3 in Chapter 2 for a detailed listing of the differences between the alternatives for the proposed harvest activity acreage and proposed transportation activity mileage.

Alternative 3 proposes basically the same types of treatment activities as in Alternative 2, but the amount of activity (number of treatment acres and miles of road development) is higher. Also, all associated actions, such as site preparation for regeneration, would commensurately follow treatment type increases or decreases.

Except for the addition of the proposed invasive plant treatment, which is not expected to affect soil resources, all other non-harvest proposed actions and watershed/soil rehabilitation activities would remain the same.

Overall, Alternative 3 has about 2,455 more acres proposed for timber treatment and 30.3 more miles of proposed road development (construction, reconstruction, and

maintenance) than Alternative 2. Therefore, the overall potential for any negative effects to the soil resources would be expected to be greater than analyzed in Alternative 2. Combining all proposed treatment acres, however, the acreage proposed for treatment under this alternative still only represents about 15% of the total project area. Additionally, treatment of the sale areas would likely be spread out over a 5-year period, which amounts to about 3% of the total area being harvested at any one time.

The proposed design criteria and sale administration practices would remain the same under this alternative. These practices have proven successful in the past and will be assumed to have continued success in the future. A greater potential for adverse effects exists compared to Alternative 2, however this potential remains very small.

#### 3.5.3.4 Direct/Indirect Effects on Soil Resources of Alternative 4

The same discussions, soil types/LTA, and ecological and management principles found in the Alternative 2 analyses also apply to Alternative 4. Please refer to the discussions under Alternative 2 above for the four main soil effects (erosion, compaction, rutting, and productivity). Refer to Tables 2.7.1 and 2.7.3 in Chapter 2 for a detailed listing of the differences between the alternatives for the proposed harvest activity acreage and proposed transportation activity mileage.

Much like Alternative 3, Alternative 4 proposes basically the same types of treatment activities as in Alternative 2, but the number of treatment acres and miles of road development is higher than Alternative 2. All associated actions for timber treatment would also commensurately follow treatment type increases or decreases.

When compared with Alternative 2, Alternative 4 has about 2,430 more acres proposed for timber treatment and the same 30.3 more miles of road development as in Alternative 3.

Although the total acreage proposed for treatment under Alternative 4 is nearly the same as Alternative 3, more of the acres are proposed for intermediate cuts (which have less impact on the soils) rather than clearcuts. As a result, this alternative would not create any large-scale open areas greater than 40 acres.

Because the total acres being treated are nearly the same as Alternative 3, the overall potential for any negative effects to the soil resources would still be greater than analyzed in Alternative 2, but less than that of Alternative 3. However, with implementation of the proposed design criteria and sale administration practices, the potential is still small.

Alternative 4 also proposes the invasive plant treatment, and introduces one additional project – conifer planting in some of the riparian influence areas. This conifer planting could help deter erosion in riparian influence areas by creating the potential to have down large woody debris for the long-term. This large woody debris can slow and redirect water flows, which helps to reduce the potential for soil erosion. All other non-harvest proposed actions and watershed/soil rehabilitation activities would remain the same.

#### 3.5.3.5 Cumulative Effects of All Action Alternatives on Soil Resources

The bounds of analysis for the cumulative effects were determined to be the same as that for the direct and indirect effects, which are the LTAs that occur within the project area (refer to Figure 3.5.1). The reasoning for this is the same as that given in the direct and indirect effects section. Furthermore, because analysis has indicated negligible erosion potential into streams from activities proposed under the action alternatives for this project, there would be no transportation of sediments downstream and out of the LTAs involved.

**Past Actions**

Native Americans have occupied this area intermittently prior to the early 1800s. Impacts associated with early periods of human settlement dealt primarily with subsistence living activities and natural disturbances.

During that time they likely had intentionally or accidentally burned some areas, cleared some land for villages and crops, and cut some trees. There were probably numerous naturally caused fires within the last several thousand years as well. The effect of these actions was probably minimal as evidenced by the abundant and thickly forested landscape the early explorers discovered in the early 1800s.

Since that time, LTA 19 was likely severely impacted from historical land uses that dealt with two primary activities that occurred during the late 1800s and early 1900s: exploitative logging practices and associated activities, and the resulting uncontrolled slash/debris wildfires. As a result, what was once productive forestland became barren scrubland. Archeological records and nearby existing pastures and farmland provide evidence that there was also some clearing of land for homesteads and farming.

Evidence of these past activities still remains in some areas, such as ruts in the woods and on old roads, erosion and sedimentation on stream crossings, and wetland hydrology disruptions from improper road locations.

The intense fires removed much of the surface organic matter along with most of the nutrients in the surface soil horizons, and killed much of the regeneration and parent tree seed sources. As a result, site productivity was greatly reduced and the effects of this are very evident today.

Over time, aspen with its fine seeds and wide areas of seed distribution eventually colonized these areas. The over-mature aspen stands existing today are the remnants of this colonization. As the aspen begins to die off and fires are no longer a major factor in the succession of these forests, many sites are succeeding to northern hardwoods.

Nutrient stores and organic matter have also been rebuilding and forests are returning to a more productive status. Examination of aerial photographs and on-the-ground inspections have shown that stands harvested at the turn of the century are again productively growing trees. Areas of aspen harvested 10 to 15 years ago in the Winter Storm and LTSP sales have increased in basal area enough to show no signs of reduced productivity from any soil damage, and there was no extensive erosion or compaction noted in these past sale's final inspection reports or in compartment examinations of this area.

There is also a greater forested area today than there was 80-90 years ago. Thus, it can be concluded that organic matter is continuing to accumulate and nutrients are being deposited and recycled in the ecosystem.

**Present Actions**

Present day activities that may affect the soil and site productivity include:

- Timber harvest;
- Road building and use;
- Motorized access for recreation, administration, etc.;
- Dispersed camping; and
- Clearing of land for homes, camps, and farms.

Current amounts of timber harvesting and road development are much less than historical amounts. The current proposal also differs from historical management due to the application of refined resource protection standards, guidelines, and restrictions that are being developed as new environmental laws and increased knowledge and information from research about riparian areas become available. Furthermore, today's ecosystem management principles have modified and blended standard silvicultural practices to help mimic natural disturbances and maintain or enhance natural diversity.

To better protect soil resources, roads are now being designed by engineers and repaired and/or reconstructed according to strict environmental protection specifications. Sale activity is also carefully monitored through sale administration practices.

It is unlikely the long-term cumulative effects of clearcutting would cause any measurable declines in site productivity on the soils in the

project area. Current research and scientific knowledge indicates that this type of harvesting, at least over the short-term, would maintain an organic and nutrient surplus on the site and therefore not affect site productivity (Grigal and Bates 1997, pp. 213-222).

A long-term study of productivity on clay soils continues on the Ottawa National Forest. The above-mentioned items and trends suggest a reduction of the potential impacts on the soil and site resources from present-day human activities over historical activities. Therefore, the potential for cumulatively negative impacts to the soil resource from present land management activities would likely be negligible.

**Reasonably Foreseeable Future Actions**

Future activities are not expected to be appreciably different in content and scale than is occurring at present. Potential future projects that are most likely to occur on Forest System lands within 15 years after completion of these proposed projects in LTA 19 of the project area could include activities such as timber harvest, minor construction and maintenance of recreation sites and trails, and road reconstruction, maintenance, decommissioning, obliteration, re-routing, or closure.

These future management activities would be expected to continue to follow design criteria and BMPs that are intended to prevent detrimental effects of erosion, rutting, compaction, and productivity.

There is also likely to be some future timber harvesting and associated roadwork on private lands within the next 15 years; however, private land acreage comprises a minor amount of the project area and is not experiencing a rapid rate of development. Furthermore, most of the private land in the project area that is under the Commercial Forest Act (CFA lands) has been harvested in the recent past (approximately 15–20 years ago). It is not expected that any large-scale harvesting from these parcels would occur for at least 20-30 more years. Some of the private land within the project area is owned by Upper Peninsula Power Company (UPPCO), and they are currently planning some future harvest activities on certain parcels, but these are expected to be implemented at a fairly small scale across the landscape.

The anticipated future harvest activities on private lands are not expected to significantly impact soil resources because they should not add to the temporary openings that would occur if this project were implemented. This is due to the long range time period (as stated above) in which they may be harvested. This delay in harvest times would allow temporary openings created by the proposed projects to fill in as the area becomes naturally reforested.

Soil resource protection measures enforced on private lands by the Michigan DNR are also expected to continue to be implemented. These protection measures should also minimize the potential for any cumulative soil resource damage.

Due to reasons already cited, any future soil resource damage that may occur is expected to be much less than damage in the past. Additionally, soil and water improvement projects performed in conjunction with other forest management activities should continue to help repair any past damage over the long-term. Therefore, it can be reasonably assumed that impacts to the soil resource from any future land management activities would likely be negligible and no significant, long-term soil resource damage would occur. It can also be assumed that natural recovery from the damaging effects of turn of the century logging would continue to progress over time.

# 3.6 FISHERIES, AQUATICS, AND RIPARIAN ENVIRONMENTS

## 3.6.1 Methodology

The greatest potential impact to the fisheries, aquatic, and riparian environments is directly or indirectly related to roads. Consequently, the measures used to estimate effects also relate to roads. These measures are GIS-based and estimate the potential for roads to intercept and re-direct water into streams and wetlands.

In general, low numbers in these measures suggest a low risk of disruption to the natural hydrologic regime or aquatic communities.

### 3.6.1.1 Measurement Indicators

- Total road miles;
- Road miles open to passenger vehicles;
- Number of road/stream crossings;
- Road density (mi/sq. mi);
- Road miles within steep landscapes and within 328 feet of a stream; and
- Road miles through wetlands.

### 3.6.1.2 Linked Objectives

The fisheries, aquatic, and riparian resources are linked to the stated objective to identify and rectify problems that are impairing aquatic resources in the project area so as to maintain or enhance watershed and habitat conditions that sustain viable populations of terrestrial and aquatic species.

## 3.6.2 Fisheries, Aquatic, and Riparian Environments in the Affected Environment

The Baltimore VMP lies within the Ontonagon, South Branch Ontonagon, East Branch Ontonagon, and Middle Branch Ontonagon 5th level watersheds. Within the project area these watersheds are divided into seven 6th level subwatersheds. These consist of the West Branch Ontonagon River – Victoria Reservoir, West Branch Ontonagon River, Ontonagon River, South Branch Ontonagon River, East Branch Ontonagon River, Middle Branch Ontonagon River, and Baltimore River Subwatersheds (see Figure 3.6.1).

***Definitions***

**HUC --** Hydrologic Unit Code.

**Potadromous** -- Of, or having to do with fish species who live in large freshwater lakes, but migrate to and spawn in tributary streams.

**"D" slope** – Slopes ranging from 19%-35%.

**"E" slope** – Slopes ranging from 36%-55%.

**"F" slope** – Slopes greater than 55%.

(**Note:** A 100% slope is equal to a 45-degree angle.)

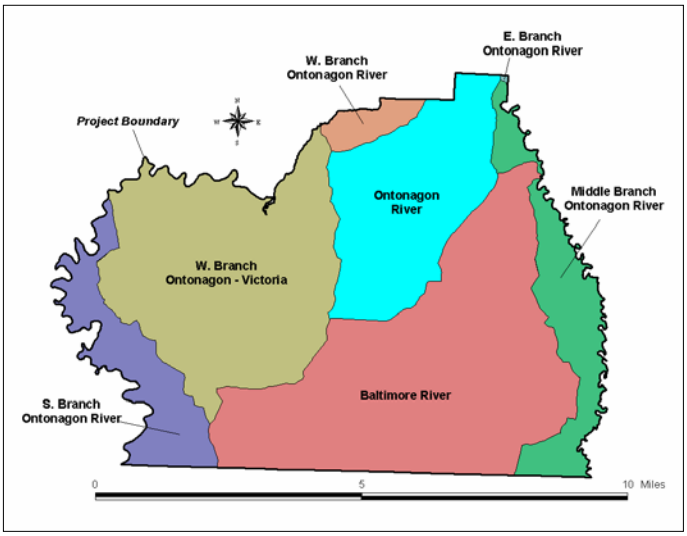


**Figure 3.6.1. Subwatersheds (6th level HUCs) in the Baltimore Project Area.**

There are approximately 236 miles of streams within the project area, 40 miles with permanent flow and 196 miles of seasonal flow (stream map in project file). The streams flow largely through National Forest System land, only 44 miles flow through private land. There

are 119 acres of lakes and ponds within the project area, mostly beaver associated ponds. There are nearly 2900 acres of Ecological Landtype Phase (ELTP) defined wetlands in the project area.

Due to the severe timber harvests of the 1800's, and recent (within the past several decades) aspen management within riparian areas and natural disturbances such as beaver activity, there is a general lack of large, mature, long-lived trees in some riparian areas. These trees are important for long-term large woody debris recruitment to aquatic and terrestrial portions of riparian areas, soil and bank stability, water temperature control, microclimate moderation, and habitat continuity.

### South Branch Ontonagon River Subwatershed

#### *Streams, Ponds, and Wetlands within Project Area*

This subwatershed forms the western edge of the project area and contains part of the Wild & Scenic River (WSR) corridor for the South Branch Ontonagon Study River.

Within the project area, one mile of unnamed permanently flowing streams and 18 miles of unnamed seasonally flowing streams flow into the South Branch within this subwatershed.

There are six small, unnamed ponds in this subwatershed with a combined surface area of 10 acres. There are also 379 acres of ELTP defined wetlands in this subwatershed.

Important fish species of the South Branch Ontonagon River include smallmouth bass and walleye (Juetten 1973).

#### *Road/Aquatic Interactions within South Branch Subwatershed*

As identified in the project road inventories located in the project analysis files, there are a number of roads with rutting and pothole problems that have developed from past management activities and current ATV use. This results in contribution of sediment to streams and wetlands and impaired wetland function where these features occur at stream or wetland crossings. Some closed, grassed-in roads cross small seasonally flowing drainages with dips rather than culverts to avoid beaver problems at crossings, which reduces risk of blow-outs and sedimentation.

### West Branch Ontonagon – Victoria Subwatershed

#### *Streams, Ponds, and Wetlands within Project Area*

This subwatershed contains part of the WSR corridor for the West Branch Ontonagon designated recreational river. It also borders the Victoria Reservoir.

There are 12 miles of permanently flowing streams in this subwatershed, consisting of Johnson and Schaat Creeks flowing into the West Branch, and Erickson Creek flowing into Victoria Reservoir. There are also 71 miles of unnamed seasonally flowing streams within this subwatershed.

There are 48 small lakes and ponds with a combined surface area of approximately 78 acres, and about 1,102 acres of ELTP defined wetlands in this subwatershed.

Biological surveys in 1998 of sites on the West Branch Ontonagon River, both above and below the reservoir, indicated habitat conditions were "good" at both locations (Doepke 1998). Fish species found in the river during these surveys included white suckers, smallmouth bass, mottled sculpins, longnose dace, yellow perch, and a darter (sp.).

Victoria Reservoir is a fairly good fishery that is a popular site with anglers. Fish species in Victoria Reservoir include walleye, northern pike, smallmouth bass, yellow perch, black crappie, bluegill, rock bass, pumpkinseed sunfish, common white sucker, northern muskellunge, golden shiner, and trout perch (GLIFWC 2002 and USFS 1995 fish surveys). Walleye spawn in the river below the reservoir (FERC 1995), and it is reported that lake sturgeon also used the West Branch

Ontonagon River as a spawning area historically (MDNR 1991). Sturgeon spawning habitat in the Ontonagon River is generally good from Irish Rapids (approximately 4 air miles north of Victoria Reservoir), upstream to Victoria Reservoir.

### *Road and Trail/Aquatic Interactions within West Branch - Victoria Subwatershed*

Road route number 01066173 has flooding due to beaver activity and a couple other roads have evidence of past flooding although dams were removed. As identified in the project road inventories located in the project analysis files, some roads have rutting and potholes with effects as previously described in the South Branch Subwatershed discussion. Some closed, grassed-in roads cross small seasonally flowing drainages with dips rather than culverts to avoid beaver problems at crossings, which reduces risk of blow-outs and sedimentation.

## West Branch Ontonagon River Subwatershed

### *Streams, Ponds, and Wetlands within Project Area*

There are no permanently flowing streams and about four miles of unnamed seasonally flowing streams within this subwatershed. There are no lakes or ponds and only about two acres of ELTP defined wetlands.

### *Road/Aquatic Interactions within West Branch Subwatershed*

There are no known road/aquatic interactions within this subwatershed.

## Ontonagon River Subwatershed

### *Streams, Ponds, and Wetlands within Project Area*

There are nearly eight miles of permanently flowing streams within this subwatershed consisting of Rockland Creek, Plover Creek, Sandstone Creek and the Ontonagon River. Rockland Creek flows into the Ontonagon River from the north and would not be influenced by proposed activities.

There are 10 small lakes and ponds with a combined surface area of seven acres, and 384 acres of ELTP defined wetlands in this subwatershed.

Lake sturgeon are known to have spawned in the Ontonagon River historically (Slade and Auer 1997). Currently, MDNR is stocking juvenile lake sturgeon in the Ontonagon River just downstream from the Old Victoria Road Bridge, which is between Irish Rapids and Victoria Reservoir. Surveys to date have not indicated successful lake sturgeon spawning here; however, the U.S. Forest Service continues to examine the Ontonagon River and one of its tributaries, the Baltimore River, for naturally spawned juvenile lake sturgeon.

### *Road/Aquatic Interactions within Ontonagon Subwatershed*

U.S. Highway 45 parallels Sandstone Creek through a mass wasting area and the road's steep fillslope enters the creek's floodplain. This constrains channel migration, restricts woody material recruitment, increases mass wasting risk, and increases sedimentation. Michigan Department of Transportation recently completed work to improve the highway and off-road drainage, and to reduce mass wasting risk.

As identified in the project road inventories located in the project analysis files, some roads have rutting and potholes with effects as previously described (see South Branch Subwatershed discussion).

## East Branch Ontonagon River Subwatershed

### *Streams, Ponds, and Wetlands within Project Area*

The permanently flowing East Branch Ontonagon River flows through the

subwatershed for less than one mile. There are no lakes, ponds, or wetlands within the subwatershed in the project area.

From far upstream (Sparrow Rapids, near Kenton) down to its confluence with the Middle Branch Ontonagon River, the East Branch Ontonagon River is generally a warmwater stream with few trout (Juetten 1973). However, this is an important migration route for potadromous species swimming upstream from Lake Superior to spawn in the generally cold headwaters.

#### *Road/Aquatic Interactions within East Branch Ontonagon Subwatershed*

There are no roads associated with aquatic resources within the subwatershed in the project area.

### Middle Branch Ontonagon River Subwatershed

#### *Streams, Ponds, and Wetlands within Project Area*

This subwatershed contains the WSR corridor for the Middle Branch Ontonagon designated Wild River. The designation ends at the Forest proclamation boundary, which is upstream from the East Branch Ontonagon River confluence. There is one mile of permanently flowing streams (Middle Branch Ontonagon River), and 15 miles of seasonally flowing streams within the subwatershed.

There are two small ponds with a combined surface area of two acres, and 132 acres of ELTP defined wetlands in this subwatershed.

Below the confluence with Trout Creek, the Middle Branch is basically a warm water stream. Nevertheless, it is host to migrating potadromous species in the spring (steelhead) and fall (brown trout and both coho and chinook salmon). Potadromous brown trout and salmon ascend the Middle Branch to near Agate Falls where they find suitable spawning gravel (Miller, no date).

#### *Road/Aquatic Interactions within Middle Branch Ontonagon Subwatershed*

U.S. Highway 45 crosses the Middle Branch Ontonagon River at the watershed's mouth. A small road accesses the Middle Branch upstream from the US-45 Bridge and is causing erosion and sedimentation in the river downstream from the WSR designated segment. Vehicle use in the floodplain also increases sedimentation.

Beaver have constructed dams on road route number 0513430 and Forest System Road (FSR) 715. ATV traffic continues to travel over or around the dams and is causing erosion and sedimentation in the seasonally flowing stream.

As identified in the project road inventories located in the project analysis files, some roads have rutting and potholes with effects as previously described (see South Branch Subwatershed discussion). There are also some culverts functioning poorly due to size, age, or debris. Some closed, grassed-in roads cross small seasonally flowing drainages with dips rather than culverts to avoid beaver problems at crossings, which reduces risk of blow-outs and sedimentation.

### Baltimore River Subwatershed

#### *Streams, Ponds, and Wetlands within Project Area*

This subwatershed contains a small segment of the WSR corridor for the Middle Branch Ontonagon designated Wild River. There are 19 miles of permanently flowing streams within this subwatershed consisting of Baltimore River, Hide Creek, Lathrop Creek, and a couple of short unnamed streams. There are 55 miles of seasonally flowing streams within the subwatershed.

There are 15 small lakes and ponds with a combined surface area of 23 acres, and 876 acres of ELTP defined wetlands in this subwatershed.

The Upper Baltimore River (above M-28) is considered a good trout stream. Small

sturgeon have also been hooked by fisherman at the mouth of the Baltimore River (phone conversation, Eric Larson 12/19/00).

***Road/Aquatic Interactions within Baltimore Subwatershed***

Lathrop Creek has several problematic stream crossings that are fairly heavily used to access camps and private property. The FSR 715 crossing has a blown-out beaver dam associated with it and the culvert is undersized creating an aquatic organism migration barrier. The road approaches to the crossing are in fairly good condition.

The Route Number 0514216 crossing has a small wooden bridge across the channel that constricts the channel. The road approaches have rutting and erosion that is directly entering the stream.

The FSR 710 crossing consists of a ford that degrades water quality, and use of this ford by motorized vehicles violates State Law (MCL 324.81133). The road approaches are delivering sediment to the stream and the road was constructed immediately adjacent to the channel constricting the natural flow pattern. A small intermittently flowing stream that enters Lathrop Creek near the ford has a small unauthorized wooden bridge across the channel.

Beaver have partially dammed a culvert at the FSR 734 and Hide Creek crossing creating an aquatic organism migration barrier.

As identified in the project road inventories located in the project analysis files, some roads have rutting and potholes with effects as previously described (see South Branch Subwatershed discussion). Some closed, grassed-in roads cross small seasonally flowing drainages with dips rather than culverts to avoid beaver problems at crossings, which reduces risk of blow-outs and sedimentation.

### 3.6.2.1 Area of Potential Effects

**Fisheries and Aquatics**

The analysis area for the fisheries and aquatics direct and indirect effects, including those associated with water and riparian habitat, is the hydrologic system within the project area (refer to Figure 3.6.1).

**Riparian**

The analysis area for the riparian direct and indirect effects is the riparian ecotones within the project area because this is the area where riparian structure and function occurs. The analysis utilized Ottawa National Forest Ecological Classification & Inventory (EC&I), ELTPs, GIS information, topographic maps, aerial photos, and stand maps, as well as field review.

Ilhardt et al. (2000) identify geomorphology as a likely surrogate for some functions that can be easily measured, either directly on the ground or from existing data. The ONF uses ELTPs, considered with riparian functions (described in specialist report in project file), to delineate the riparian functional ecotones. The riparian areas associated with the project area's ponds, permanently flowing streams, intermittent streams, and wetlands have been delineated (refer to Table C-1 in Appendix C).

Riparian function includes biodiversity of plants and animals, and in the Baltimore VMP this includes habitat for woodcock and grouse. Specifically, woodcock and grouse require some young alder components in riparian areas. This characteristic is lacking in some locations within the project area.

Riparian function also includes large, long-lived trees for shading and microclimate, and future large woody debris recruitment. Some riparian areas along Erickson Creek, Baltimore River, and Lathrop Creek, and some of their seasonally flowing tributaries are lacking some function characteristics. These riparian areas currently have small young trees or are in an open condition due to past aspen management. To maintain appropriate riparian function, these riparian areas should be managed for large trees and shade that can be maintained for the long term.

## 3.6.3 Direct, Indirect, and Cumulative Effects on Fisheries, Aquatic and Riparian Environments

### 3.6.3.1 Effects on Fisheries, Aquatic and Riparian Environments of Alternative 1

**Table 3.6.1. Summary of Effects of Alternative 1 on Measurement Indicators for Fisheries, Aquatic, and Riparian Environments.**

| Measurement Indicators | Subwatersheds (6th level HUCs) in the Baltimore Project Area | | | | | | |
|---|---|---|---|---|---|---|---|
| | ***S. Branch. Ontonagon River*** | ***W. Branch Ontonagon-Victoria*** | ***W. Branch Ontonagon River*** | ***Ontonagon River*** | ***E. Branch Ontonagon River*** | ***Middle Br. Ontonagon River*** | ***Baltimore River*** |
| Total road miles | 9 | 58 | 1 | 26 | 0.1 | 13 | 60 |
| Road miles open to passenger vehicles | 2 | 9 | 0 | 13 | 0.1 | 3 | 14 |
| Number of road/stream crossings | 12 | 107 | 0 | 38 | 0 | 5 | 53 |
| Road density (mi/sq. mi) | 2 | 4 | 1 | 3 | 5 | 3 | 3 |
| Road miles within steep landscapes and 328 ft. of streams | 0.4 | 1 | 0 | 2 | 0 | 0.2 | 1 |
| Road miles through wetland | 1 | 5 | 0 | 2 | 0 | 0.5 | 3 |

**NOTE:** Throughout the remainder of the aquatics section the measures of miles of road may differ from those found in the transportation section. This is because the aquatics analysis must consider all roads in the project area, not just Forest System roads, to adequately analyze the potential hydrologic and biological effects of each alternative. The aquatics section road totals include all those GIS defined roads.

No new ground disturbing activities would occur under this alternative, although some road maintenance would occur. Existing activities would continue and there would be no changes from the existing state of the aquatic and riparian resources. Roads would remain in their present state. With no active management, it is expected that over the long term, stream conditions would improve as sediment sources heal and trees die and fall into the streams providing large woody debris. However, Lathrop Creek would not improve due to the chronic sediment sources at three stream crossings.

Riparian areas currently lacking young alder would continue to lack young alder for woodcock and grouse riparian habitat.

In general, the lack of large trees in riparian areas would continue in the short-term. In the long-term, large trees would develop naturally in riparian areas and would begin contributing large woody debris to streams.

### 3.6.3.2 Effects on Fisheries, Aquatic and Riparian Environments of Alternative 2

**Table 3.6.2. Summary of Effects of Alternative 2 on Measurement Indicators for Fisheries, Aquatic, and Riparian Environments.**

| Measurement Indicators | Subwatersheds (6th level HUCs) in the Baltimore Project Area | | | | | | |
|---|---|---|---|---|---|---|---|
| | *S. Branch. Ontonagon River* | *W. Branch Ontonagon-Victoria* | *W. Branch Ontonagon River* | *Ontonagon River* | *E. Branch Ontonagon River* | *Middle Br. Ontonagon River* | *Baltimore River* |
| Total road miles | 8 | 47 | 1 | 24 | 0.1 | 11 | 49 |
| Road miles open to passenger vehicles | 2 | 8 | 0 | 9 | 0.1 | 2 | 11 |
| Number of road/stream crossings | 10 | 78 | 0 | 33 | 0 | 3 | 49 |
| Road density ($mi/mi^2$) | 2 | 3 | 1 | 3 | 5 | 2 | 2 |
| Road miles within steep landscapes and 328 ft. of streams | 0.4 | 0.3 | 0 | 2 | 0 | 0.1 | 1 |
| Road miles through wetland | 1 | 1 | 0 | 2 | 0 | 0.4 | 2 |

This alternative was designed to meet the Purpose and Need as described in Chapter 1, while meeting all resource objectives. Site-specific design of this alternative would maintain riparian function and protect macroinvertebrate and fish habitat parameters. Specific management activities were based on concepts from Palik et al. (2000, pages 233-254).

**Roads**

Under this alternative all of the indicators of potential aquatic impact would decrease, or in some cases remain unchanged. The total number of road miles would decrease by 16%, and the miles of road open to passenger vehicles would decrease by 22%, due to road decommissioning and closures. This would reduce the total road density by 14% (refer to

Table 3.6.2). These decreases would reduce the risk of sedimentation having negative impacts on the aquatic resources in the project area. Over time, these decommissioned roads would become overgrown with vegetation. This would slow water moving down the road surfaces and trap sediments before they can reach streams and wetlands. The decommissioned roads may continue to be used by ATVs, which would somewhat reduce the amount and effectiveness of the re-vegetation and prolong the recovery period.

The number of road/stream crossings would decrease by 20%, and the miles of road within steep landscapes and 328 feet (100 meters) of streams would decrease by 17% (refer to Table 3.6.2). Roads on steeper topography would likely modify the hydrology more and over a larger area than roads on gentle topography. Therefore, to determine road miles having risk to hydrology modification, streams were buffered at 328 feet (100 meters) for the locations where they passed through steeper ELTPs (D, E, and F slopes and LTA 20). The 100 meters is an average distance based on professional judgment. Within this distance hydrologic modification is expected to occur in these landscapes.

The number of stream crossing and roads within steep landscapes and within 328 feet of streams are the most direct measures of the potential for road impacts on streams, such as sedimentation or the introduction of invasive species. The substantial decrease in these indicators would be highly beneficial to streams by reducing sediment sources, alterations in hydrologic regime, and access points for exotic species.

The miles of road through wetlands would decrease by 44%. Roads can have major impacts on the hydrologic regimes of wetlands. By altering drainage patterns, roads can cause wetland areas to increase or decrease depending on how the road cuts the wetland. Below the road, wetlands would decrease as flow is cut off. Above the road, wetlands increase in size as water builds up and spreads out due to flow being blocked by the road. Roads also increase wetland sedimentation, which reduces wetland function. This alternative would reduce the road miles through wetlands and would improve proper drainage patterns.

In order to avoid beaver conflict, some intermittent drainage crossings on closed roads would continue to be managed as vegetated dips rather than installing culverts. These crossings would be utilized in frozen condition only, which complies with State regulations (MCL 324.81133) and State BMPs (MI-DNR, 1994 pp 21-22). Some roads would be reconstructed, which would include reshaping to allow for appropriate surface water flow. In addition, some small culverts would be replaced or installed to improve flow, but roads with severe and chronic beaver conflict would be decommissioned to eliminate this problem.

A portion of the angler and canoeist access road near the U.S. 45 Ontonagon River Bridge would be decommissioned to reduce erosion and floodplain impact from passenger vehicles. Vehicle parking would be provided at a location away from the river to avoid impacts.

The decommissioning of two Lathrop Creek crossings (Route Number 0514216 and FSR 710) would reduce sediment and improve channel condition and aquatic resources. Reconstructing the FSR 715 crossing with an appropriate sized culvert would allow for aquatic organism migration and reduce sedimentation. At all three crossings approaches would be stabilized, slopes reshaped and seeded, and water bars installed where needed to divert runoff.

The beaver dam at the FSR 734 and Hide Creek crossing would be removed through road maintenance.

**Riparian**

Specific actions have been incorporated into the design of the project to further protect water resources through riparian management (refer to Table C-1 in Appendix C).

Riparian function for woodcock and grouse habitat would be improved where young tag alder is currently lacking in riparian habitat. Small openings of ¼ acre or less would be

created within tag alder riparian areas for tag alder regeneration. These openings would be 15 feet or more from the stream banks. This would provide sufficient bank buffer and prevent erosion and sediment, particularly since the openings would be small with no ground disturbance.

In general, the lack of large, long-lived trees in riparian areas would continue in the short-term. In the long-term, these trees would develop naturally in riparian areas and would begin contributing large woody debris to streams.

**Fisheries**

This alternative would improve habitat for fish and other aquatic animals by reducing sediment through closing and decommissioning roads, decreasing the number of road stream crossings, decreasing roads in steep lands adjacent to streams, decreasing roads in wetlands, and reshaping roads to reduce erosion. Fish passage would be improved and flooding and road failure caused by beaver would be reduced by replacing undersized culverts and utilizing vegetated dips instead of culverts where appropriate.

The decommissioning of two stream crossings on Lathrop Creek and the reconstruction of one crossing would help to improve fish habitat and fish migration in one of the most important fisheries in the project area.

All these improvements should benefit the coldwater fisheries. There is some evidence that the reach of the West Branch Ontonagon River below Victoria Reservoir, the Middle Branch Ontonagon River, and the Baltimore River below O Kun de Kun Falls might once again support spawning sturgeon as habitat conditions recover.

Finally, open area analysis indicates stream channels and fish habitat would not be altered by the effects of timber harvest under this alternative.

### 3.6.3.3 Effects on Fisheries, Aquatic and Riparian Environments of Alternative 3

As compared to Alternative 2, road miles would increase slightly in the South Branch Ontonagon subwatershed due to 0.3 mile of road construction around private property to access proposed treatment stands. However, the measurable road density would remain unchanged because this is a minor increase in total road miles compared to the total acres in this subwatershed. Road effects would otherwise be the same as Alternative 2.

Effects on riparian resources, and fish and macroinvertebrate habitat, would be the same as Alternative 2.

**Open Area Analysis**

Open area was analyzed for all the project subwatersheds, including the full subwatersheds beyond the project boundary, except the East Branch Ontonagon because a very small amount of the project area is within this large subwatershed (less than 1%). Conditions within all the analyzed subwatersheds do not exist that would result in changed flow characteristics, stream channels, and fish habitats from the proposed actions. However, due to the large amount of clearcut acreage creating open conditions, this alternative has the most risk of changes to aquatics systems than all other alternatives.

The open area analysis was completed only for Alternative 3 because it would result in the largest amount of open area. Because Alternative 3 is within the thresholds levels, all alternatives with less clearcut acreage would also be within the thresholds, and therefore, would not result in changed stream channels and flow characteristics. Results are displayed below in Table 3.6.3, and documentation of this open area analysis, including specific activities and assumptions used in the analysis, is included in the project file.

Open land, recent clear-cuts, and young aspen forests up to 15 years of age cause altered snow accumulation and runoff rates resulting in increased flood peaks with stream erosion and sedimentation (Verry, 1992, pp.

12-13). Verry explains that combinations of open land and young forest areas that increase flood peaks do not occur until rotation ages are routinely reduced to 50 years (a two percent per year harvest rate) and open areas exceed 30 percent.

**Table 3.6.3. Summary of Open Area Analysis for the Project Area (Alternative 3).**

| Subwatershed | Subwatershed Acres | Sum of open acres | % of subwatershed open |
|---|---|---|---|
| S. Branch Ontonagon River | 20,935 | 3,158 | 15 |
| W. Branch Ontonagon –Victoria | 13,457 | 2,709 | 20 |
| W. Branch Ontonagon River | 1,666 | 335 | 20 |
| Ontonagon River | 8,730 | 1,906 | 22 |
| Middle Branch Ontonagon River | 22,362 | 2,290 | 10 |
| Baltimore River | 17,922 | 4,047 | 23 |

(Shown is the total number of acres per subwatershed. The open acres per subwatershed consider and include open area that would be created by Alternative 3.)

**Fisheries**

This alternative has the greatest number of clearcut acres and may have somewhat more of a chance to affect stream habitat. However, any proposed treatment near streams would follow riparian guidelines and consider the Forestwide Vegetative Management General Direction for timber sales within 200 feet of Michigan Department of Natural Resources-designated trout waters less than 18 feet wide, which suggests converting aspen to another cover type that is not attractive to beaver (Forest Plan, page IV-93). Implementation of the riparian guidelines and Forestwide Vegetative Management General Direction would be expected to protect fisheries and stream habitat and alleviate any measurable effects.

Effects of the proposed transportation and watershed improvement projects would be the same as those described for Alternative 2.

### 3.6.3.4 Effects on Fisheries, Aquatic and Riparian Environments of Alternative 4

Effects on aquatic and riparian resources and fish and macroinvertebrate habitat would be the same as Alternative 3 with the following exceptions: there would be fewer acres of clearcutting resulting in a lower number of acres in an open condition and less risk to aquatic resources.

Planting long-lived conifer species in riparian influence areas would enhance the riparian function of large woody debris (LWD) for the long-term.

**Fisheries**

This alternative has slightly less clearcut acres than Alternative 2, but the effects of proposed timber management and transportation and watershed improvement projects are expected to be the same as those described for Alternative 2, with the exception of the following:

The proposed riparian influence area planting along the Baltimore River would help to increase

the availability of large woody debris for this river in the long-term. Large woody debris in the river can be important cover and resting areas for lake sturgeon during their spawning runs. Fish habitat overall would also be improved through the planting and development of long-lived conifers in riparian influence areas because this contributes to shading and bank stabilization.

### 3.6.3.5 Cumulative Effects on Fisheries, Aquatic and Riparian Environments of All Alternatives

The cumulative effects analysis area for fisheries, aquatics, and riparian resources are the entire South Branch Ontonagon, West Branch Ontonagon – Victoria Reservoir, West Branch Ontonagon, Ontonagon, Middle Branch Ontonagon, and Baltimore River 6th Level subwatersheds (see Figure 3.6.2). The subwatershed scale was chosen because sediments are carried downstream, and activities occurring anywhere in the watershed catchment would be reflected at the mouth of the catchment's mainstream. Going to a larger watershed scale, such as 5th level watershed, would be too large and the effects would be "diluted."

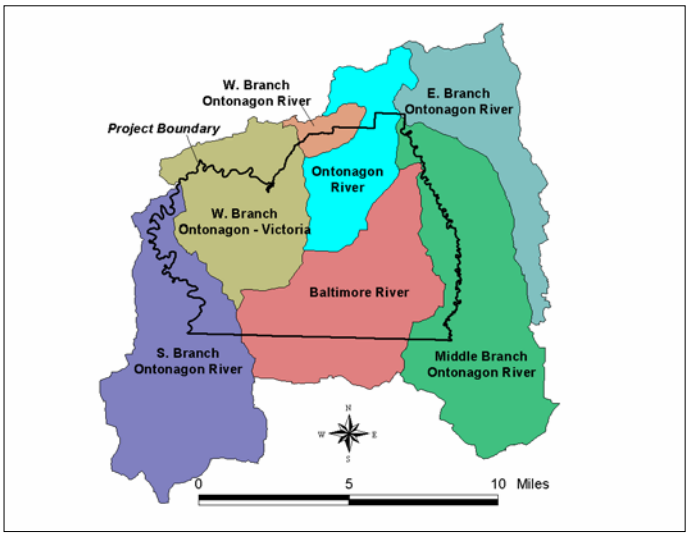


**Figure 3.6.2. Fisheries and Aquatic Cumulative Effects Area for the Baltimore Vegetative Management Project.**

**Past Actions**

Past impacts to water resources and macroinvertebrate and fish habitats are those associated with timber harvest, railroad construction, road construction and reconstruction, utility corridors, farming, and dam management.

The early logging era resulted in massive clearcut acreage. Drastically reduced tree stocking would have caused a temporary increase in groundwater due to reduced evapotranspiration rates and altered snow accumulation regimes. Channel flow regimes would have been altered as a result. These altered flow regimes would have contributed to bank erosion and increased sedimentation.

The early logging era also resulted in loss of riparian vegetation. This occurred as a result of clearcutting trees right up to the edge of streams, lakes, and wetlands. These actions would have greatly reduced LWD recruitment for both in-stream benefits as well as on the ground.

Large woody debris is important in dissipating stream energy by creating such things as plunge pools. The LWD increases channel complexity in terms of hydraulics and habitat for fish and macroinvertebrates. It is also important for numerous functional needs for quality fish and macroinvertebrate habitat, such as providing refuges for fish during periods of high flow.

Large woody debris lying on the ground aids in disrupting overland flow of water and allows sediments to settle before the water enters stream channels. The LWD also reduces the energy in flowing water, thereby reducing erosion risk. Loss of trees in riparian influence areas would have also resulted in increased stream temperatures due to loss of shade. This would make the habitat unsuitable for fish species such as trout that require cold water.

Activities during the logging era resulted in conversion of riparian tree species from long-lived species such as white pine and red pine, to short-lived species such as aspen. An increase in aspen has subsidized beaver populations with resultant damage due to flooding, which includes saturated or flooded roads and blocked culverts.

Railroads were constructed during the early logging era to transport logs and most were subsequently abandoned. The construction of railroad grades resulted in some sedimentation that negatively impacted streams and wetlands. The natural hydrology of wetlands was also disrupted by railroad grades passing through them. Some of these railroad grades continue to be used as roads and trails and continue to interfere with wetland natural flow regimes.

The early logging era and road building was far less sensitive to environmental concerns than today. Water resource protection has been increased since National Forest management began in the mid 1930s. Since implementation of the Forest Plan in 1986, standards and guidelines (Forest Plan, pages IV 34-36) for protection of soil and water resources have been followed. The reforestation of land since the early logging era, as well as the development and implementation of water resource protection standards and guidelines, has allowed for an improving trend in condition as these ecosystem elements recover.

Early farming often cleared forests and riparian areas for crop management. Livestock pastures were often developed along streams for livestock watering. This crop and livestock management resulted in increased stream sedimentation as well as altered flow regimes from increased open area.

Dams within each watershed alter the flow regimes within the rivers. Flows can highly fluctuate throughout the year, and high flows are often sustained for long durations, which is uncharacteristic of natural conditions. This has resulted in increased bank erosion and sediment yields along all the streams and rivers affected. Dams also had an impact on the total amount of suitable habitat to native potadromous species such as lake sturgeon, and even some sub-stocks of lake trout.

U.S. 45 was recently reconstructed near Sandstone Creek in the Ontonagon Subwatershed in order to improve slope stability and lower stream sediment. The bridge over the Ontonagon River was replaced a number of years ago, which has allowed for improved floodplain use with less sedimentation during high flows.

Spring runoff in 2002 generated unusual streamflow conditions due to snowmelt timing from increased temperatures coupled with rain-on-snow events. Many streams throughout the Ottawa National Forest flooded with peaks up to 500-year events. Flooding increased sedimentation due to an increase in stream and road erosion.

The illegal Rainbow Family National Gathering was held within the South Branch Ontonagon River Subwatershed during the 2002 summer with an estimated 7000 to 8000 participants. The site was unsuitable for this level/intensity of camping and gathering activity due to soil conditions. Streambank erosion and sedimentation increased along one tributary and is expected to continue for several years due to the extent of the impacts.

**Present Actions**

Current activities influencing water resources and macroinvertebrates and fish habitats, including soil erosion resulting in stream sedimentation, consist of timber harvest and associated road activities, open and closed roads, dispersed recreation sites, ATV use, farming, and utility corridors.

Current harvest activities follow Forest Plan standards and guidelines. Michigan's BMPs (MI-DNR 1994) are also utilized and are designed to minimize impacts to water quality.

Present harvesting and management activities, as compared to historical activities, indicate a trend of reduced impacts to water resources, including erosion and resulting sedimentation. Using present management, lakes, drainages and wet areas would be protected by buffers that act as filter strips.

The harvest actions proposed are less intensive than actions that occurred in the late 1800s and early 1900s when trees were harvested right up to the edge of streams, lakes, and wetlands, and vast acreages were clearcut. Evidence of this trend of reduced impacts includes:

- Present levels of harvest activities are far less intensive than those of the late 1800s and early 1900s.

- Advances in scientific knowledge about ecosystem principles, forest management, and water, riparian, and fishery sciences through research, and application of those findings on NFS lands.
- Federal environmental protection laws such as the Clean Water Act and State Best Management Practices for private forestland management.

Currently there is logging on private lands in the cumulative effects analysis area (outside of project area).

Farming has substantially reduced in the subwatersheds over the years and is now mostly limited to the "hole in the donut" area, which is an area outside the Forest proclamation boundary located at the project's southern edge. These farms contribute to open area condition and were included in the open area analysis previously described. Some livestock pastures continue to exist along some streams contributing to riparian function loss and sedimentation, although greatly reduced from the past. Logging on National Forest System lands and private lands also occurs throughout the cumulative effects analysis areas and was considered in the open area analysis.

ATV riders commonly use the analysis area throughout the summer with use peaking during hunting season. They often utilize National Forest roads closed to passenger vehicles, which can contribute to sediment risk because complete revegetation of these roads cannot occur with ATV disturbance. However, this risk is greatly reduced with road closure to passenger vehicles because they create much more disturbance than ATVs. The subwatershed portions within the "hole in the donut" area adjacent to the project area are privately owned and ATV use is likely high on these lands because it is unregulated.

**Reasonably Foreseeable Future Actions**

Potential future influences to water resources and aquatic organisms would also be associated with timber harvest and road construction (federal, state, county, and private). The ONF treats about 1.2 percent of the Forest annually through timber sale activity (2001 M&E Report, revised June 2003, page 51), and this trend is likely to continue. The ATV use and farming is also expected to continue in the future.

The State of Michigan is proposing to construct a snowmobile bridge across the Ontonagon River upstream from the U.S. 45 Bridge utilizing the remaining old bridge abutment. Construction would require the appropriate permitting process and the bridge would be constructed to minimize impacts on the floodplain. The purpose of the project is to remove snowmobile traffic across the existing bridge to improve safety.

The Bond Falls relicensing agreement should result in flows that more closely resemble a natural condition. The affected streams and rivers are expected to have less bank erosion and sedimentation.

**Summary**

Based upon the above discussion with the direct and indirect effects, there is no evidence of major adverse impacts either individually or cumulatively on the water or riparian systems resulting from the proposed activities within each action alternative. There are numerous small impacts, both positive and negative, throughout the subwatersheds. However, looking at trends, the area appears to be continuing in a recovery mode from the late 1800s/early 1900s logging era.

Alternative 2 would move the subwatersheds toward recovery faster than Alternative 1 (No Action) due to road closure and decommissioning, as previously described in the direct and indirect effects section. Alternative 4 would also move the subwatersheds toward recovery faster due to road closure and decommissioning, and riparian influence area planting. Alternative 3 has the most risk due to the amount of clearcutting, although it is within the open area threshold, and does not move the subwatersheds toward recovery as fast as Alternative 4 due to the lack of riparian influence area planting.

# 3.7 BOTANICAL RESOURCES: RARE AND NON-NATIVE INVASIVE PLANTS

## 3.7.1 Methodology

**Sensitive Plants**

Rare plants are primarily discussed in the biological evaluation (BE) or specialist report located in the Baltimore project file.

Field surveys were conducted in the Baltimore project area during spring, summer, and fall blooming seasons in 1997, 1998, 1999, and 2002. About 3,040 additional acres are scheduled for survey in spring, summer, and fall of 2003. Survey results, which include habitat descriptions and observed species lists, are in the project file. Michigan Natural Features Inventory database, which shows known occurrences of listed plants, was also checked for the project area (5/2003).

The effects of the proposed alternatives on rare plants are evaluated through a risk assessment, resulting in a determination for each Regional Forester's Sensitive species (RFSS). The determination must be one of the three following statements:

1) "No impact," which may include beneficial impacts;

2) "May impact individuals of a species, but not likely to cause a trend to federal listing or a loss of viability;"

3) "Likely to result in a trend to federal listing or loss of viability."

**Non-native Invasive Plants (NNIP)**

A specialist report on non-native invasive species was prepared and is summarized in this chapter. NNIP surveys have not been conducted in the project area. However, during rare plant surveys, observed NNIP were recorded. Subsequent to the scoping package, an infestation of a high priority weed, glossy buckthorn, was found in the project area. The effects of the proposed alternatives on the glossy buckthorn are evaluated with a risk assessment which considers two factors:

***Definitions***

***** See Glossary in Appendix F

***Factor 1:*** The likelihood of undesirable plant species, including noxious weeds species, spreading to or within the project area; and

***Factor 2:*** The consequences of undesirable plant establishment in the project area.

(Procedures for risk assessment factors and rating determination are described in Appendix E.)

The direct, indirect, and cumulative effects of each alternative were used to determine these levels.

### 3.7.1.1 Measurement Indicators

Measurement indicators for rare plants are the determinations of the biological evaluation. Indicators for NNIP are acres of the glossy buckthorn infestation that would be treated, and the results of the NNIP risk assessment.

### 3.7.1.2 Linked Objectives

Rare plants are linked to the project's purpose and need to protect and enhance habitat for endangered, threatened, and sensitive plant and wildlife species because several Sensitive plants occur in the project area.

Limiting the introduction and spread of non-native invasive plants is linked to the MA direction to provide vegetative diversity that would support viable populations of existing native mammals, birds, reptiles, and amphibians; and protect and enhance habitat for endangered, threatened, and sensitive plant and wildlife species.

## 3.7.2 Botanical Resources in the Affected Environment

**Rare Plants**

The project area was logged over in the late 1800s to early 1900s. Currently, forest types within the project area are primarily second growth aspen, mixed deciduous-coniferous woods (e.g., aspen-white birch-white spruce-fir), lowland hardwoods, northern hardwoods, and mixed conifers. Potential rare plant habitats include: mixed northern hardwoods, both rich and poorer sites, and both moister and drier sites; mixed coniferous-deciduous upland woods (e.g. aspen-pine-red maple); upland cedar woods; cedar, mixed conifer, and black ash swamps; hemlock woods; aspen woods; aspen-conifer woods; lowland hardwood-conifer wet woods (e.g. aspen-fir); creeks and drainages/shallow water; intermittent (vernal) and permanent ponds; beaver/sedge meadows; stream banks; alder thickets; white pine woods; red pine woods; white spruce woods; upland brush; and old roads.

All of these habitats occur elsewhere across the Forest and on adjacent private lands, and are not limited to this project area. These areas provide potential habitat for 49 of the 57 Regional Forester's Sensitive plants known or considered likely to occur on the Forest.

No habitat for federally listed or proposed, or threatened or endangered plants is believed to occur in the Baltimore project area, or on the Ottawa. No federally listed or proposed, or threatened or endangered plants were observed in the field surveys. Three Regional Forester's Sensitive plants are known to occur on Forest System lands in the project area as follows:

1) *Pterospora andomeda,* giant pinedrops, occurring in mixed deciduous-coniferous woods (also known to occur just north of the project area);

2) *Cypripedium arietinum,* ram's-head ladyslipper, occurring in a moist aspen-fir stand with an open understory (also known to occur just north of the project area); and

3) *Orobanche uniflora*, one-flowered broomrape, known to occur in the Baltimore River floodplain and wet rich woods in the north end of the project area.

More information about these populations is given in the BE.

No state-listed plants were observed (except those also listed as RFSS, above). If any rare plants are found during the 2003 surveys, appropriate protective design criteria would be added to the project and an addendum to the BE prepared. Examples of protective measures that might be applied are dropping proposed treatments from a stand containing a population, or putting a no-treatment buffer zone around a population.

In addition to the Sensitive plants, ten sites of a watch plant, northern wild comfrey (*Cynoglossum virginianum* var. *boreale)*, are known within the project area. This plant was previously on the RFSS list, due to its national abundance ranking. However, this ranking was downgraded, and the State of Michigan does not list this plant as rare. The Forest completed a risk evaluation for this plant and determined that criteria for RFSS listing were not met. All but one of the ten sites are outside stands proposed for treatment under any action alternative, or are within areas included as riparian buffers under the proposed design criteria.

This plant uses transitional and somewhat-disturbed areas, and the populations are expected to persist in the project area under all alternatives. Therefore, no further discussion will occur.

**Non-native Invasive Plants (NNIP)**

No Federally-listed noxious weeds are known to occur on the Ottawa National Forest. The Michigan Noxious Weeds Act of 1941 includes a different list of plant species. None of the Michigan noxious weeds known to occur on the Ottawa National Forest are particularly abundant or considered to present a risk to local agriculture.

The Ottawa National Forest is also concerned with other invasive non-native plants that are aggressively replacing native vegetation within the Forest. The Forest Botany staff has developed a list of 44 non-native invasive plants of concern, which includes the state list, plus these additional species. Many widespread or naturalized non-native plants are not included on this list. This list is included in the project file.

Ottawa NNIP of concern known to occur in the project area includes 17 terrestrial species (see Table E-1 in Appendix E). Of these, only glossy buckthorn is considered a high priority NNIP. Little information is available as to the exact location or extent of the other infestations.

In the project area, these plants are mainly associated with open, disturbed sites such as roadsides, skid trails, and off-road vehicle and snowmobile trails. Of the NNIP in the project area, the glossy buckthorn and exotic thistles are most likely to spread from their existing locations farther into forested habitats and wetlands. Open-area invasive plants (e.g., spotted knapweed) could also spread in and from the project area into uninfested parts of the Forest, and replace native plant communities in open areas (e.g., wildlife openings).

Gravel pits can be a source of NNIP that are spread when the gravel is used in other areas. Ottawa NNIP of concern at the Gauthier Gravel Pit include: spotted knapweed, yellow hawkweed, Queen Anne's lace, and reed canary grass (other naturalized non-native plants were also present, such as plantains and oxeye daisy). The first three of these generally stay in open disturbed areas and are unlikely to spread beyond the roadside where the gravel is used. Reed canary grass occurs in wetter areas, and could be spread to roadside ditches and adjacent wetlands by gravel use. Because none of these four weeds is a high priority weed for the NNIP program on the Ottawa, and there is no practical way to sterilize gravel without the use of herbicides (which are not an option for this project), no treatment of the gravel is proposed.

The glossy buckthorn infestation, which is of highest concern, was first observed during field surveys for rare plants in late 2002. The full extent of the infestation has not yet been determined, but it appears to be centered on two shrub thicket wetlands, and to extend from there into moist woods. The main area mapped to date (see Figure 3.7.1) lies primarily along roads. This is partially due to our mapping because we have mostly checked for the weed from the roads and have not canvassed the adjacent woods. However, the roads can also be corridors for spread of this shrub.

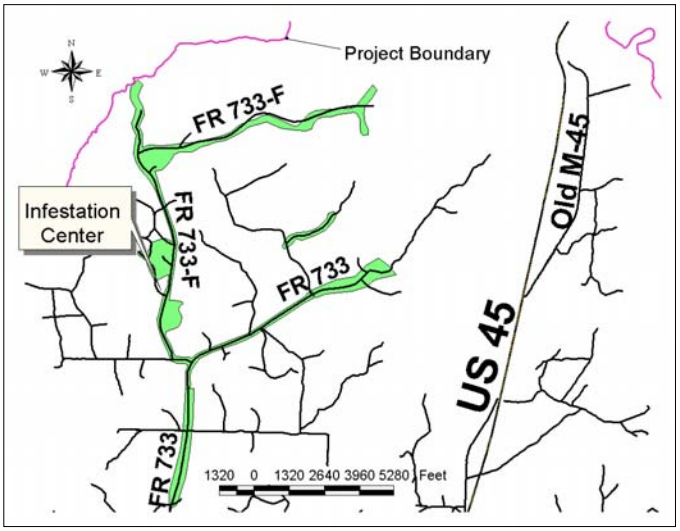


**Figure 3.7.1. Main Known Area of Glossy Buckthorn Infestation.**

According to the element stewardship abstract for glossy buckthorn, this shrub can grow to 23 feet tall (Converse, 1984). It is native to North Africa, Asia, and Europe, and has competitive advantages over native shrubs. This is because it reaches seed-bearing age quickly, produces lots of seeds, uses birds and mammals and possibly flooding for seed dispersal, has long growing seasons (e.g., leafing out prior to natives and retaining leaves longer into fall), and has strong re-sprouting capabilities. It can also form dense thickets and crowd out native species.

In the project area, this shrub is degrading habitat and decreasing plant diversity. This aggressive shrub will continue to invade natural habitats in the project area, including

wetland and upland deciduous or coniferous woods.

Impacts of such an infestation may include changes in shrub composition to an even-aged thicket of buckthorn, with loss of native shrubs and a likely change in the herbaceous vegetation as well.

Control options for glossy buckthorn include: girdling (e.g., mechanical or with a flame torch); pulling or digging out plants; cutting (reduces growth but does not kill plants); raising the water table in areas where it has been lowered, to flood out the shrubs; and herbicides (Converse 1984; Haber 2001). There are no biological controls available currently.

In the Baltimore project, raising the water table is not feasible at the buckthorn location and the shrubs are too numerous and large for digging to be a practical option. A determination was made to not consider the use of herbicides for this project because chemical weed control was not included in project scoping. Therefore, only mechanical control options are included in Alternatives 3 and 4 (The infestation was found after scoping had begun for this project, so there are no treatments included in the Proposed Action). Herbicide use, however, is likely to be a viable option in the near future, and it may be more effective and efficient to use herbicides.

Like the proposed mechanical treatment, herbicide control would be labor-intensive and involve handling individual stems. Herbicide control is thought to be more effective than girdling because re-sprouting can be a problem with mechanical treatment (Haber 2001). As with any treatment, follow-up treatment may be required to control new sprouts.

A small burdock infestation is also of concern because it occurs very close to a rare plant, *Orobanche uniflora* (one-flowered broom-rape), in the project area. The burdock plants were pulled in 2002 (under a categorical exclusion), and the infestation is scheduled for continuing mechanical removal.

#### 3.7.2.1 Area of Potential Effects

The direct and indirect effect analyses for all sensitive plant species were conducted at the project area scale because this is where the direct and indirect effects would occur.

Invasive plant analyses were also conducted at the project area scale; although effects are not limited to this area, we do not have enough inventory information for exotic invasive plants to analyze effects on a broader scale.

(Refer to BE for discussion of effects to RFSS.)

### 3.7.3 Direct, Indirect, and Cumulative Effects on Botanical Resources

**Table 3.7.1. Comparison of Determinations for RFSS Plants by Alternatives.**

| | Alternative | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| Number of taxa with "no impact" determination | 48 | 42 | 39 | 42 |
| Number of taxa with "may impact individuals" determination | 1 | 7 | 10 | 7 |

**Table 3.7.2. Comparison of Risk Assessment for Spread and Treatment of Glossy Buckthorn by Alternative.**

| | Alternative | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| Overall risk | high | high | low | high |
| Acres treated | 0 | 0 | ~300 | ~55 |

#### 3.7.3.1 Direct/Indirect Effects on Botanical Resources of Alternative 1

**Sensitive Plants**

The BE determined that Alternative 1 could have impacts on individuals of giant pinedrops

(*Pterospora andromeda)*. For this plant, Alternative 1 may impact individuals, but is not likely to cause a trend to federal listing or loss of viability.

Alternative 1 would have no impact on any other Regional Forester's Sensitive plants or their habitat.

**Non-native Invasive Plants (NNIP)**

NNIP in the Gauthier Gravel Pit would persist, but under this alternative would not be spread by use of gravel in the project area. There are no activities proposed in this alternative that would help to control the known infestations, or limit their spread. Natural processes such as dispersal of seeds by wind and wildlife could facilitate spread.

Glossy buckthorn occurs on 300-some acres in the project area, and nothing would be done in this alternative to slow its spread. Expansion is likely and adverse effects occur when buckthorn replaces native shrub communities.

Expansion of the infestation would continue to decrease the habitat quality in the wetlands for rare plants and wildlife (e.g., berries have a laxative effect on birds). As the buckthorn forms a dense thicket, light and other ground level conditions would change, reducing the likelihood of other plants occurring there. For example, Vitt (2003) found that *Viola conspersa* under buckthorn cover averages 5-6 leaves and few if any flowers, while typically this violet has up to 50 leaves and many blooms.

### 3.7.3.2 Direct/Indirect Effects on Botanical Resources of Alternative 2

**Sensitive Plants**

The BE determined that Alternative 2, including implementation of design criteria, could have impacts on individuals of the following species: goblin fern (*Botrychium mormo),* a lichen (*Cetraria aurescens),* rams-head ladyslipper (*Cypripedium arietinum),* fairy bells *(Disporum hookeri),* one-flowered broomrape *(Orobanche uniflora),* broad beech fern (*Phegopteris hexagonoptera),* and giant pinedrops. For these species, Alternative 2 may impact individuals, but is not likely to cause a trend to federal listing or loss of viability.

Alternative 2 would have no impact on the other Sensitive plants or their habitat.

**Non-native Invasive Plants (NNIP)**

None of the known NNIP sites would be treated; however, several design criteria are recommended in order to slow the spread of glossy buckthorn in the project area. These design criteria are listed in Chapter 2, Section 2.8.

Expansion of the glossy buckthorn infestation is likely and adverse effects occur when buckthorn replaces native shrub communities. Although the design criteria should help prevent proposed timber harvests from spreading the glossy buckthorn, the infestation is expected to continue to spread on its own, as in Alternative 1. Refer to Vegetation Section (page 3-41) for more detail.

***Timber Harvest***

Proposed harvest activities would introduce more vehicles than currently into the project area, including off-road tree harvesting equipment. This could move seeds in greater quantities and to more places than in Alternative 1. However, many of the places the seeds would be moved to are intact forest communities where establishment of NNIP is not likely. Establishment of NNIP is most likely in road areas, skid trails, and landings where the intact vegetation and soils may be disturbed.

The type of harvest could affect opportunities for weeds to become established. Selection harvest and thinning maintain shaded conditions, which restricts many sun-loving weeds. Shelterwood and removal harvests would open the canopy more and perhaps allow weeds to establish. Clearcutting creates open conditions favored by many weeds, but subsequent aspen regeneration is typically dense and would likely prohibit establishment of weeds.

The canopy-opening harvests in forest types other than hardwoods (with dense and rapid

gap-infilling by sugar maple) and aspen (dense suckering), may have the greatest potential for weed establishment. This is because sunny gaps would be created without dense regeneration to compete with weeds.

***Roads***

Approximately 1.1 mile of new road construction is proposed. Most of this would be in areas that are currently intact native forest, with few if any NNIP present. Therefore, there are unlikely to be any NNIP seeds in the seed bed and native colonizer plant species could be expected to establish on road edges. However, NNIP could be introduced to the areas on road building equipment or in fill material.

Road maintenance and reconstruction areas are likely already infested with NNIP, as are similar roads throughout the Forest and State. Thus, there would be little change due to these proposed activities, although some new weed species could be introduced.

Use of gravel from the Gauthier Pit could spread NNIP. These would mainly stay on roadsides except for the reed canary grass, which could move into wet road ditches or adjacent wetlands.

***Wildlife projects***

Proposed maintenance of wildlife openings and roadside mowing may spread invasive plant seeds. Other proposed activities (e.g., conifer planting, tag alder cutting, snag and large woody debris creation) would have little effect on NNIP occurrence in the project area.

***Watershed projects***

Stream crossing repair, decommissioning, and culvert installations could spread seeds via the equipment used. This activity could disturb the bank that may contain NNIP seeds, and create new exposed soil surfaces for vegetation to colonize. Seeding on restoration areas may inadvertently spread weed seed because seed mixes often contain weed seeds; however, the project design criterion (Chapter 2, Section 2.8) to use locally native seed should ameliorate this risk.

***Recreation projects***

Hardening recreation sites could also have these effects, but the parking areas are along roadsides which are likely already infested with weeds.

To reduce the potential for spreading NNIP by the above mentioned activities, several design criteria are recommended (from the Guide to Noxious Weed Prevention Practices, USDA FS 2001), and are also listed in Chapter 2, Section 2.8.

### 3.7.3.3 Direct/Indirect Effects on Botanical Resources of Alternative 3

**Sensitive Plants**

The BE determined that Alternative 3, including implementation of design criteria, could have impacts on individuals of the following species: goblin fern, pale moonwort *(Botrychium pallidum),*Rocky Mountain sedge *(Carex backii),* a lichen, rams-head ladyslipper, fairy bells, one-flowered broomrape, Canada mountain ricegrass *(Oryzopsis canadensis),* broad beech fern, and giant pinedrops. For these taxa, Alternative 3 may impact individuals, but is not likely to cause a trend to federal listing or loss of viability.

Alternative 3 would have no impact on the other Sensitive plants or their habitat.

**Non-native Invasive Plants**

As in Alternative 2, activities proposed under this alternative could spread undesirable plants via equipment use, road mowing, stream crossing work, gravel pit use, and so on. Except for the glossy buckthorn infestation, other effects are also comparable to Alternative 2.

### *Timber Harvest*

Modifying the harvest prescriptions in some stands would not be expected to greatly affect the risk of introducing or spreading NNIP either.

### *Roads*

There is more road reconstruction and maintenance proposed here, but the effects on weed spread are comparable to Alternative 2 because these areas are typically already infested.

### *Glossy buckthorn*

Under this alternative, the full 300-plus acre extent of the infestation on federal lands (refer to Figure 3.7.1) would be treated by mechanical girdling and stem burning. All stems over 4.5 cm diameter would be girdled, and smaller stems treated with a flame torch to kill the stems without ground disturbance. This is because any ground disturbance would favor germination of buckthorn seeds in the seed bank. The flame torch would only be used when the fire danger is low.

Girdling (by flame or hand) may not be effective if conducted between December and March (WI DNR 2003), but could be conducted in any other month. The design criteria (Chapter 2, Section 2.8) to slow the spread of glossy buckthorn in the project area are also recommended here.

The proposed glossy buckthorn treatment would not totally eradicate the infestation, but would curtail its expansion. Re-sprouting and germination of seeds in the seed bank would ensure there would still be glossy buckthorn in the project area. However, the proposed girdling would slow the spread and allow native shrubs and herbs to compete with it, further helping to slow its expansion and eventually eradicate this plant.

The main change to the infested area from the proposed girdling would be a short-term increase in sun to the ground layer. This effect would be temporary as more shrubs and herbs fill in.

## 3.7.3.4 Direct/Indirect Effects on Botanical Resources of Alternative 4

### Sensitive Plants

The BE determined that Alternative 4, including implementation of design criteria, could have impacts on individuals of the following species: goblin fern, a lichen, rams-head ladyslipper, fairy bells, one-flowered broomrape, broad beech fern, and giant pinedrops. For these plants, Alternative 4 may impact individuals, but is not likely to cause a trend to federal listing or loss of viability.

### Non-native Invasive Plants

Effects are comparable to Alternatives 2 and 3, except for the glossy buckthorn infestation. This alternative includes treatment of only some of the glossy buckthorn infestation (see Figure 3.7.2). Only the infestation centers (approximately 55 acres total) in Compartment 82, Stand 51 and the vicinity of Stands 13, 85, and 95, would be treated using the same methods as described in Alternative 3. The same design criteria (Chapter 2, Section 2.8) recommended for Alternatives 2 and 3 are also recommended here.

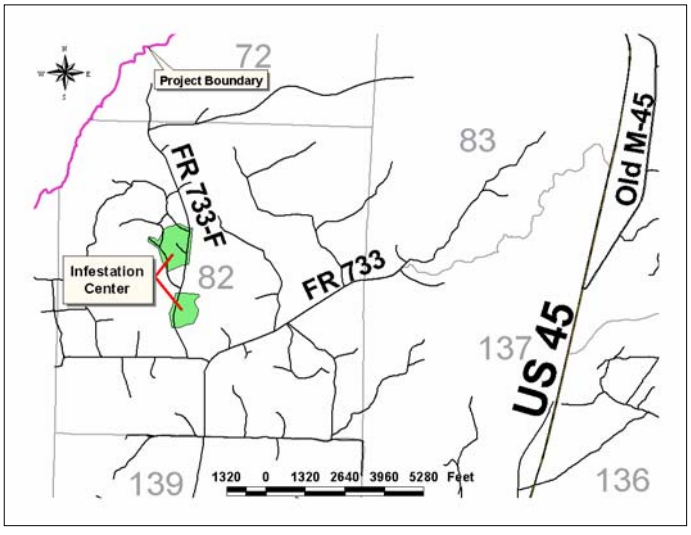


**Figure 3.7.2. Alternative 4 - Glossy Buckthorn Treatment Area.**

Expansion of the glossy buckthorn and adverse effects on plant communities are likely. Although the weed treatment and design criteria should help prevent proposed timber harvests from spreading the glossy buckthorn and slow the natural spread of the infestation, it is still expected to continue spreading.

### 3.7.3.5 Cumulative Effects on Botanical Resources

The analysis area for cumulative effects for sensitive plants is the entire Ottawa National Forest because habitat occurs across the Forest and the plants are sparse and widely scattered.

Invasive plant analyses were conducted at the project area scale; although effects are not limited to this area, we do not have enough inventory information for exotic invasive plants to analyze effects on a broader scale.

#### Past Actions

Past activities in the project area have likely supported invasive plant persistence and expansion. Timber harvest in the project area has caused ground disturbance, and disturbed areas are prime habitat for non-native invasive plants. In addition, road use in the project area has maintained roadside areas as open sites for invasive plants.

#### Present Actions

Across the Forest there are numerous ground-disturbing activities occurring and planned for the near future. These activities include timber harvest, road construction, gravel pit use, and recreation site development and improvement. Other ongoing activities that can spread NNIP include natural processes and human-assisted activities such as off-road vehicle use of roads and trails. All these activities can create favorable conditions for the establishment and spread of NNIP.

#### Reasonably Foreseeable Future Actions

The Forest is beginning to address the NNIP problem as a few buckthorn shrubs (estimated as less than 50) in the road rights-of-way on FR 733 and FR 733-F are scheduled for girdling or digging in the summer of 2003, under a road maintenance categorical exclusion. This may slow the spread along the infestation edge, but would provide no real control.

Gravel from the Gauthier Pit could be used by the County, spreading weed seeds. However, these weeds should mainly stay on roadsides except for the reed canary grass, which could move into wet road ditches or adjacent wetlands.

It is reasonable to assume that coordinated action with other agencies to address the NNIP problem would occur in the foreseeable future. This is because NNIP are an emerging issue and state and federal agencies are giving increasing attention to the problem. For example, Michigan has formed an Invasive Plant Council, and the Region is working on policy for equipment washing for timber harvest as well as considering guidelines for other weed vectors, which suggests that future NNIP efforts will be increasing.

Future weed treatment by the Forest is likely to increase, and remain focused on NNIP that invade the forest understory. Future actions may be expected to address NNIP and not have additional cumulative effect, or at least to have decreasing cumulative impacts.

#### Alternative 1

Past actions have contributed to the infestations of NNIP, and this alternative would not fix the problem. Continued lack of treatment would allow the number of NNIP and their extent to increase in the project area and across the Forest.

Although no management activities would occur under this alternative, ongoing activities in the project area would support invasive plant persistence and expansion. For example, continued road use in the project area would maintain roadside areas as open sites for invasive plants. Off-road vehicle use of older

roads and trails could spread seeds. When these seeds are deposited within intact forest, the dense shade and existing native plants usually prevent successful establishment of the invasives. When these seeds fall in open, disturbed areas, they are more likely to successfully establish.

**Alternative 2**

Although no treatment of NNIP infestations would occur under this alternative, the scheduled glossy buckthorn treatment for the summer of 2003 in the road rights-of-way on FR 733 and FR 733-F may slow the spread along the infestation edge, but would provide no real control. The proposed design criteria would still be applied to minimize the potential for spread; however, some spread of NNIP species is likely within the project area.

**Alternatives 3 and 4**

Because little NNIP control has occurred on the Forest in the past, total eradication of NNIP infestations is unlikely. The proposed glossy buckthorn treatments would, however, be beneficial to curtail its expansion, and the roadside buckthorn treatment scheduled for 2003 would help slow the infestation edge.

In summary, ongoing Forest management activities as well as those on other ownerships, continue to present opportunities for NNIP invasion and spread.

# 3.8 RECREATION/VISUALS

## 3.8.1 Recreation in the Affected Environment

The Forest Plan has identified Recreation Opportunity Spectrum (ROS) settings across the Forest that allow for many recreational activities and experiences (Forest Plan, pages VI-F-1 to F-8). The recreational objective in the majority of the project area is to feature a variety of recreational opportunities within a roaded natural motorized recreation environment (Forest Plan, pages IV-103 and IV-107).

Recreation uses in the area include both motorized and non-motorized use such as hunting and fishing, canoeing and kayaking, dispersed camping, fall color touring, hiking the North Country National Scenic Trail (NCT), waterfall and wildlife viewing, mountain biking, snowmobiling, snowshoeing, and mushroom and berry picking.

Camping use in the area is heavy during deer, bear, and grouse hunting seasons, and is concentrated primarily along Forest Roads 730 and 733. A typical archery and gun deer season sees a myriad of motor homes, tent camps, and camper trailers parked along these roads at the junctions of various connecting road branches. Forest Road 710 also sees heavy use during the hunting seasons by private camp owners, their guests, and other individual hunters that are utilizing an undeveloped turn-around area at the road entrance for vehicle and trailer parking.

The NCT meanders across nearly 10 miles of the project area and receives moderate use by hikers with some increase use from deer and bear hunters in the fall. O Kun de Kun Falls on the Baltimore River east of U.S. Highway 45 is also accessed via the NCT. This segment of trail receives moderate use during the snow-free seasons, and is also used in the winter by snowshoers, cross country skiers, and snowmobilers.

The hiker will find uninterrupted hiking distances that provide increased solitude and an increased challenge. Wooden suspension bridges across the Baltimore River and the Middle Branch of the Ontonagon River add to a unique hiking opportunity.

Auto touring along U.S. Highway 45 and Forest Road 730 increases during the fall color season. Other recreational use of these roads during the summer and fall seasons involves berry picking and access for deer, bear, and grouse hunting.

Over 8 miles of State Snowmobile Trail #3 passes through the project area, with approximately 2.5 of those miles lying on private land. The existing trail crosses U.S. Highway 45 in several locations and a portion of the trail parallels the highway within the highway right-of-way, creating a hazardous situation for motorists and snowmobilers alike.

East of the Military Hill bridge on U.S. Highway 45 where the East and Middle Branches of the Ontonagon River system intersect, a poor quality undeveloped access road exits. This access road sees moderate use by fisherman at the rivers' confluence, and occasionally serves as a dispersed camping site. It is also an entry and exit point utilized by canoeists and kayakers. Near the confluence of the East and Middle Branch the bank and floodplain turn into alluvial sand and somewhat hardened shoreline.

### 3.8.1.1 Recreation Area of Potential Effects

The area used to determine the effects of the alternatives on recreation is the project area itself. This is because the effects to the recreational resources from the proposed activities are not expected to extend outside of the project area.

## 3.8.2 Direct/Indirect Effects on Recreation

### 3.8.2.1 Direct/Indirect Effects on Recreation of Alternative 1

As a result of this alternative, there would be no enhancements made to recreational opportunities. Current activities described above would continue to occur.

Without timber harvest activity, the even-aged forest types are likely to decline. As a result, hunting populations of white-tail deer and ruffed grouse may also decline, which could reduce recreational hunting opportunities and success.

Recreationists utilizing the access road and parking area at the confluence of the East and Middle Branches of the Ontonagon River would not be provided with a quality area to park for fishing access or launching canoes or kayaks.

Re-routing Snowmobile Trail #3 would not occur. The congestion between snowmobilers and motorists along U.S. Highway 45 would continue.

No vegetative management activities would occur in the proximity of the NCT. This would leave the area adjacent to the trail undisturbed, but as trees continue to die, break apart, and fall to the ground along the trail, there may be a need for increased trail maintenance.

The lack of harvest or road work activity could adversely impact berry-picking opportunities. This is because the presence of raspberries and blackberries is likely to decline without ground disturbance and open areas, which provide exposed mineral soil and allows sunlight to reach the ground, enhancing the establishment and growth of these plants.

People auto touring would continue to see the same conditions as are presently occurring; however, over time they may experience a reduction in the variety of forest types and wildlife species available for viewing.

### 3.8.2.2 Direct/Indirect Effects on Recreation of All Action Alternatives

**North Country Trail**

A variety of vegetative management activities are planned along several different locations adjacent to the NCT. Of the approximate 11 miles of NCT in the project area, a total of 1.3 miles of trail is adjacent to or falls within units proposed for timber management.

Compared to even-aged management, selection harvest would leave a more constant tree canopy cover for trail users. Impacts to hikers using the trail during periods of harvest activity would include the sight and sound of logging equipment and the removal of trees along certain portions of the trail. During harvest activities, safety of trail users would be provided for by placing signs at locations where the trail intersects sale areas and roads being used for harvest activities (see Design Criteria for Action Alternatives, Chapter 2, Section 2.8). This would alert trail users of activities in the immediate area.

Any summer harvest activities along the portion of the NCT from U.S. Highway 45 east to O Kun De Kun Falls would be limited to weekdays because weekend trail use in this area tends to be higher (refer to Design Criteria for Action Alternatives, Section 2.8). Limiting operations to weekdays should help to eliminate user conflicts and provide a safer, more pleasant hiking experience.

Buffering of clearcut harvest units along the NCT with an un-harvested strip of vegetation 66 to 150 feet wide would occur under Alternatives 2 and 4, but not under Alternative 3. Design Criteria for Action Alternatives would be adhered to for all units.

There may also be a slight increase of trail use by dispersed campers and hunters as a result of rehabilitating parking areas and landings under the action alternatives.

Following is a comparison of the action alternatives in regard to the NCT:

*Alternative 2*

- Buffer strip incorporated;
- Number of clearcut units along NCT: 4 (refer to Figure 3.1.5 in Vegetation, Section 3.1.3.2);
- Short-term - more uniform tree canopy cover during harvest for the trail user;
- Tree blazes or markers easier to place on trail; ease in identifying trail location;
- Reduced potential for trail damage during harvest activity;
- Long-term - aspen component reduced within strip; "conifer" or "hardwood" corridor may result;
- Climax forest would eventually occur within strip;
- Hunters, trail users, and wildlife viewers would see micro habitat of closed canopy for associated wildlife and game species within buffer;
- Higher potential for large hazard trees and increased maintenance along the NCT.

*Alternative 3*

- No buffer strip incorporated;
- Number of clearcut units along NCT: 4 (refer to Figure 3.1.7 in Vegetation, Section 3.1.3.3);
- Provides open area and break in the wooded canopy for trail user;
- Fully portrays aspen management activity prescribed for the area;
- Hunters, trail users, and wildlife viewers would likely see species dependant upon early successional habitat;
- Short-term - increase in trail maintenance is likely.
- Site of associated logging slash left to decay and return to the forest floor.

*Alternative 4*

Same as Alternative 2 except for the following:

- Number of clearcut units along NCT: 1 (refer to Figure 3.1.8 in Vegetation, Section 3.1.3.4).

**Dispersed Parking and Camping and Gate Relocation**

Deteriorated parking areas would be hardened to improve dispersed parking and camping opportunities along FR 730 and 733, and near the entrance to Forest Road 710. The parking and camping areas improved would be located parallel to the roadways to provide a more pleasant recreating experience by eliminating muddy camping areas, getting stuck during wet fall seasons, rutting of unhardened surfaces, and parked vehicles and campers blocking road gates. This would help to better accommodate the publics' use and need for these parking and camping areas, which has been demonstrated by increased use on these roads.

These improvements would also complement and enhance recreation visitor opportunities in conformance with the designated Recreation Opportunity Spectrum (ROS) class (Forest Plan, Page IV-107).

The gate on Forest Road 710 would also be moved back to its original location, approximately 300 feet east of U.S. Highway 45. Relocating the gate would eliminate road deterioration from passenger vehicles and trailers rutting the roadbed during wet periods.

**Recreational Quality and Temporary Displacement of Forest Recreationists**

Under the action alternatives, harvesting operations may have some short-term effects on recreational quality because of increased noise and visual intrusion. Logging equipment noise and increased truck traffic on Forest and county roads would increase during the life of the timber sales, which may have an impact on visitor satisfaction while recreating in the project area.

Hunters and other recreationists may also be displaced in the short-term from areas being harvested; however, selection and implementation of an action alternative would likely improve habitat for species associated with hunting. Clearcuts of aspen and thinning of hardwoods would create openings and regenerate vegetation favored by deer and grouse populations into the foreseeable future. This would allow the area to continue to sustain viable populations of frequently sought after game species. As a result, hunters and other recreationists would benefit in the long-term.

Under Alternatives 3 and 4, access to stands for regeneration or harvest activities would be scheduled on the same transportation system used for the snowmobile trail (FR 734). To alleviate any potential dual-use conflict, harvest activities needing to utilize FR 734 could occur during the summer operating season, or use during the winter months would coordinate to temporarily groom the trail alongside FR 734, as the road corridor is wide enough to accommodate this. This should provide for the safe passage of winter recreationists on State Snowmobile Trail #3.

**River Access and Associated Vehicle Parking**

The access road leading east from U.S. Highway 45 to the parking area would be rehabilitated and hardened to stabilize the roadway and parking area. This rehabilitation and hardening would provide for water runoff leading down from the highway to the parking area and would level the potholes.

From the parking area to the confluence of the East and Middle Branches the road would be rehabilitated, decommissioned, and converted to a trail for non-motorized use only. A natural barricade would be installed just east of the parking area to prevent damage by motorized vehicles beyond this point.

These activities would provide improved access to the water and preserve a stable walkway and a more natural trail, which should increase recreational opportunities for fishermen and those wishing to carry in and launch their canoes or kayaks at the rivers' confluence. This could, however, have some impact on the public who is familiar with the existing roadway leading directly down the river's edge at the confluence of the two rivers.

This rehabilitation work is consistent with Management Area 9.3 direction to provide for public health and safety and to protect the resource (Forest Plan, Page IV-209).

**Open and Closed Roads**

Total miles of roads open to passenger vehicles would decrease from the current level under all of the action alternatives to protect the road beds from excessive damage.

In conjunction with Forest Plan direction for Management Area 1.1 to provide for a safe recreating experience and protect the environment and investments (Page IV-107), Forest Road 710 would be rehabilitated and a portion of it decommissioned. This rehabilitation, which includes decommissioning the road crossing on Lathrop Creek, would enhance ATV use for recreationists and deter ATVs from driving through Lathrop Creek. Continued access to the area would be provided via a reconstructed and approved crossing on Forest Road 715.

**Solitude**

Solitude would be impacted during timber harvest activities under any of the action alternatives. This is expected to be short-term in nature and the impacts would end when the harvest activities are over.

Solitude in the area would remain about the same in the long-term, as none of the above recreational activities are expected to increase dramatically.

### 3.8.3 Visuals in the Affected Environment

The Forest Plan establishes specific Visual Quality Objectives (VQOs) for MA 1.1 (Page IV-109). VQOs are used to plan for the management of National Forest System lands

within the context of timber management and public visual perception. The Forest Plan directs visuals along the North Country Trail to be managed according to Sensitivity Level 1 and that the trail itself be managed according to the 1982 Comprehensive Plan for Management and Use prepared by the National Park Service (Forest Plan, p. IV-27).

The National Park Service prepared a companion document to the Comprehensive Plan for the NCT – "A Handbook for Trail Design, Construction, and Maintenance (USDI-NPS, 1996). In the discussion on Design Considerations for Users there is a portion on Open Space which states that the trail should be routed so that some portions are "in the open" so that users can "view the landform and natural features from a variety of perspectives" (USDI-NPS, 1996, p. 18). The Handbook further states that "[I]t is desirable that the trail provides a representative view of the area through which it passes" (USDI-NPS, 1996, p. 18).

VQOs are determined and assigned from the viewing point of concern, depending on the resource involved. The objectives vary depending upon the amount of visual variety in the landscape (variety class), and the level of use (sensitivity level) along travel routes, use areas, and water bodies. VQOs applicable to the project area fall into four general categories for management:

1) **Retention** – Management activities are not visibly evident. Activities may only repeat form, line, color and texture which are found frequently in the characteristic landscape. Reductions in contrast to form, line, color and texture should be present only during project activities or shortly thereafter.

2) **Partial Retention** – Management activities remain visually subordinate to landscape character. Reductions in contrast to line, form color and texture should be accomplished within the first year or as soon after the project completion as possible.

3) **Modification** – Management activities may dominate the original characteristic landscape but must borrow from naturally established line, form color and texture so as to appear natural or compatible to the natural surroundings.

4) **Maximum Modification** – Human activity may dominate the characteristic landscape but should appear as a natural occurrence when viewed as background area.

Most landscape visibility in the project area is limited to the immediate foreground (0-300 feet) by vegetation and topography. Wetland breaks, logging activity, and travel corridors may offer more expansive views.

Generally, considerable change can take place in the positive or natural appearing elements even under Retention VQO if the change achieves desirable variety and follows the principles of landscape design, such as proper scale and arrangement of these elements (USDA Forest Service 1980, page 7).

#### 3.8.3.1 Visuals Area of Potential Effects

The areas used to determine the effects of the alternatives on visuals is the Retention area along part of U.S. Highway 45 and the Wild and Scenic river corridors, and the Partial Retention area along the North Country Trail. This is because these are the more sensitive areas where visuals would be of greatest concern.

### 3.8.4 Direct/Indirect Effects on Visuals

#### 3.8.4.1 Direct/Indirect Effects on Visuals of Alternatives 1, 2, and 4

Visual analysis has shown there would be no immediate effects to visuals as viewed from the North Country Trail or any of the Wild and Scenic River segments. This is because the proposed clearcut treatments in Alternatives 2

and 4 would incorporate a buffer along the trail and could not be viewed from the trail, or the rivers (refer to Figure 3.1.5, page 3-41 and Figure 3.1.8, page 3-51 in the Vegetation Section). Other proposed treatments along the trail in Alternatives 2 and 4 would have no effect on visuals because these treatments would be designed to meet Partial Retention in the foreground and Modification in the middleground and background.

In Alternatives 1 and 4 there would be no effect on visuals along U.S. Highway 45 because there are not any clearcuts proposed in this area. In Alternative 2 there would be no effects on visuals along the highway because the clearcut with residual trees would be designed to meet Partial Retention in the foreground and Modification in the middleground and background.

#### 3.8.4.2 Direct/Indirect Effects on Visuals of Alternative 3

There would be no effects to visuals as viewed from the Wild and Scenic River segments or the highway, the same as Alternatives 2 and 4. Because of the even-aged emphasis of this alternative, there would be an effect to visuals along the North Country Trail where a total of approximately 5,000 linear feet would be treated with clearcuts or clearcuts with residual trees to regenerate aspen (refer to Figure 3.1.7, page 3-47 in Vegetation Section). The proposed clearcut treatments would occur along four separate segments of the trail. Going from north, to south, to east across the project area, the approximate length of each segment of trail affected is as follows (refer to Figure 3.1.7 in Vegetation Section, page 3-47): 2,000 feet, 1,700 feet, 900 feet, and 400 feet.

As stated in the National Forest Landscape Management Agriculture Handbook, Volume 2, Chapter 5 - Timber, forest type dominated by shade-intolerant species, or types in which the intolerants are to be favored over the tolerants, usually cannot be managed using uneven-aged techniques-at least not without great difficulty and expense. Typical examples of such forest types include aspen-birch and northern hardwoods that are dominated by cherry, ash, and similar species (USDA Forest Service 1980, page 17).

These treatments would not meet the visual objective of Partial Retention because the clearcuts would not be subordinate to the characteristic landscape. These treatments would, however, support and meet the management prescription for MA 1.1 by helping to maintain potential conditions for moderate to high populations of game species, and moderate to high amounts of aspen types along with associated timber products and habitat conditions (Forest Plan, page IV-103). An additional part of this management prescription calls for providing an appearance that is predominantly forested with frequent temporary openings (Forest Plan, page IV-103).

When considered with the forested areas along other portions of the trail, the proposed clearcut treatments would provide such temporary openings and maintain the aspen types, associated habitat conditions, and vegetative diversity for viewing along the trail. These treatments would also support part of the DFC for MA 1.1, which indicates the combination of openings and forest cover is habitat for diverse plant and animal species (Forest Plan, page IV-104), which would also provide for a variety of viewing opportunities along the trail.

### 3.8.5 Cumulative Effects on Recreation

#### 3.8.5.1 Cumulative Effects on Recreation of All Alternatives

The project area serves as the bounds of analysis for cumulative effects. The project area and associated trail corridors is the scale that would be immediately impacted by implementing any of the alternatives.

Recreation opportunities in the forest environment are mostly dependent on vegetation, abundance of wildlife, water access, access via roads and trails, and developed and dispersed sites. Refer to the

cumulative effects sections of Vegetation (3.1.3), Wildlife (3.3.3), Transportation (3.4.3), and Aquatics (3.6.3) for effects on these resources.

Recreational hunting and fishing are dependent on game and fish populations, with water quality and habitat going hand in hand. Canoeing and kayaking are dependent on water access and stream bank protection that provides for safe footing, along with river access and routes that do not damage the resource or riverbank.

**Past Actions**

The North Country Trail within the project area has been available for hikers since the mid to late 1980s. Logging in the area has affected hikers and hunters using the North Country Trail with temporary disruptions, but has provided long-term enhanced habitat for populations of game species for wildlife viewing and hunting.

Hunting in the project area has been a tradition for over 50 years. Hunting camps on private property have been accessed across National Forest System lands under special use permits for many years.

Canoeing on the Middle, South, and West Branches of the Ontonagon River has long been a prime recreational activity in the area, with increasing use from out of state tourists.

**Present Actions**

Current activities with the potential to affect recreation in and around the proposed project area include logging and the Long-Term Site Productivity research project. The Long-Term Site Productivity project is an area of research within the project boundary where hunters are asked to refrain from baiting deer and bear in this area to avoid introducing non-native plants to the research plots. A Forest Supervisor Closure Order was not implemented, but the researcher's requests have been honored by some hunters.

Occasional use of the North Country Trail by hikers, mountain bikers, ATVs, and snowmobiles would continue. This trail has segments intended for use by hikers only (Forest Plan, page IV-27); however, there is currently no Forest Supervisor Closure Order to prevent other use. Other uses pose conflicts between motorized and non-motorized users and the motorized and mountain bike use has degraded the trail by skinning tree bark and rutting the trail surface.

**Reasonably Foreseeable Future Actions**

Potential projects that are likely to occur in the area include timber harvest on public and private lands, road work to provide better road conditions, trail work to rehabilitate trail surfaces and remove hazards to continue providing a safe hiking experience, and management of dispersed and developed recreation activities.

Activities such as vegetative management may occur under future harvest activities (refer to Vegetation, Sections 3.1.3.5 and 3.1.3.6). Aspen management would continue to provide habitat for white-tail deer and ruffed grouse, which in turn would assist in meeting one of the objectives for MA 1.1 - to maintain potential conditions for moderate to high populations of game species such as deer and ruffed grouse and nongame species such as golden-winged warbler (Forest Plan, page IV-103).

An increase in ORV and ATV use for pleasure riding and hunting activities may occur, and the potential exists for the snowmobile trail to be utilized by ORVs and ATVs in the future.

The MDNR has recently proposed constructing a snowmobile bridge across the Ontonagon River just east of U.S. Highway 45 at Military Hill. The proposed bridge would compliment the proposed trail re-route under this project because it too would alleviate a hazardous situation between snowmobiles and motorists. Snowmobilers currently have to drive across the existing highway bridge to cross the river.

Implementing the proposed projects with the prescribed design criteria would not increase the potential for impacts to recreation in the project area.

The general trend of a slight increase in tourism in the area would be expected to

continue, but with more emphasis on motorized recreation. As a result, the area could experience a positive economic effect from the increase in recreation visitor days.

## 3.8.6 Cumulative Effects on Visuals

### 3.8.6.1 Cumulative Effects on Visuals of Alternatives 1, 2, and 4

Over time there would be an effect to visuals as viewed from the North Country Trail or any of the Wild and Scenic River segments from all the aspen stands succeeding or being converted to long-lived conifers and hardwoods (see Vegetation Section, pages 3-41 & 52, and Wild and Scenic Rivers Section, pages 3-125 & 126). Without the variety of vegetation characteristics in these areas, large-scale monotony would occur. Visually, it is important to consider various elements that create a pleasing sequence of views to avoid such large-scale monotony (USDA Forest Service 1980, page 125). This pleasing sequence of views eventually would be lacking with these alternatives.

### 3.8.6.2 Cumulative Effects on Visuals of Alternative 3

In approximately 15 years the clearcut treatments along the North Country Trail under this alternative would begin to meet Partial Retention and add to the visual quality, variety, and sequence of views along the trail. These treatments would maintain the aspen type and create distinctive vegetation and a variety of habitat conditions along the trail (refer to Vegetation Section, pages 3-47, 48, & 52 and page 3-120 of this section).

These treatments, which are along 9% of the NCT that lies in the project area, would be consistent with the past management along the trail. Currently 18% of the aspen along the trail is young aspen, and approximately 9% of this was regenerated since 1981.

# 3.9 HERITAGE RESOURCES

The National Environmental Policy Act (NEPA) and the National Historic Preservation Act (NHPA) Section 106, guide the management of heritage resources on the National Forests. The NHPA governs how federal agencies identify, evaluate for significance, and manage heritage resources under NEPA. Section106 directs federal agencies to consult with Native American organizations and knowledgeable individuals who attach religious and cultural significance to traditional sites (designated as traditional cultural properties). Consideration to preserve heritage resources must be incorporated into vegetation management, research, environmental education and public participation.

The Ottawa National Forest meets the requirements of Section 106 of the NHPA through a program designed to inventory lands that may be affected by any project meeting the definition of "federal undertaking" (NHPA Section 301(7)). This inventory combines background research, records searches, use of historic aerial photographs, and field survey under the direction of a qualified archaeologist to identify heritage resources within the scope of effects of the proposed project.

## 3.9.1 Methodology

The initial phase of Cultural Resources Reconnaissance is to conduct pre-field research consisting of literature-based geomorphology analysis, environmental setting, and previous surveys and sites recorded in or near project boundary. The second phase of cultural resources survey is to identify the heritage resources situated within or adjacent to the proposed survey area.

For the Baltimore VMP the process of archaeological site identification in the field was carried out using a combination of surface reconnaissance and shovel tests.

The Cultural Resource Reconnaissance's (CRR's) during the 2002-2003 field seasons for the Baltimore VMP were conducted in accordance with the National Historic Preservation Act of 1966 and fall within the guidelines of NHPA Section 106.

## 3.9.2 Heritage Resources in the Affected Environment

A variety of heritage resource sites have been shown to be highly dependent on environmental factors. For example, logging camps of the late nineteenth century are associated with nearly level ancient glacial lake plains. Historic and prehistoric sites are strongly associated with major water features. Other sites such as 20th-century logging, settlement, and historic sites show limited dependence on environmental factors. However, these historic sites are closely associated with known or identifiable transportation features such as roads and railroad grades.

As of 2002, one prehistoric and twenty-seven historic sites were identified within Baltimore VMP. Sites found during the 2003 field season and any additional sites discovered during project implementation will be protected.

### 3.9.2.1 Area of Potential Effect

The analysis of effects to Heritage Resources is conducted at the project area scale, more specifically the sites located within the project area. This is because this is where the effects can be identified.

## 3.9.3 Direct/Indirect and Cumulative Effects on Heritage Resources

### 3.9.3.1 Effects on Heritage Resources of All Action Alternatives

Activities are proposed on the nearly level glacial lake plain as mentioned above; therefore there may be impacts to heritage resources by alteration of associated landscapes that could impact the integrity of a historic/prehistoric site. Reconstruction or

alteration of roads and railroad grades would have similar impacts to associated heritage resources.

Heritage Resource sites or features within the project area will be protected as mandated under Section 106 of the National Historic Preservation Act. Measures outlined under the guidelines of the Memorandum of Agreement between the ONF and Michigan SHPO (regulations at 36 CFR 800.2c(1)), protect the integrity of any discovered heritage resources within the project area from any adverse effects. Heritage resource sites or features that are discovered during project implementation will be protected. Eligibility of sites for nomination to the National Register of Historic Places would be determined on a case-by-case basis.

Because of these protection measures, no direct, indirect, or cumulative effects to heritage resources are anticipated from the alternatives outlined in this document.

# 3.10 WILD AND SCENIC RIVERS

## 3.10.1 Wild and Scenic Rivers in the Affected Environment

The Forest Plan specifies management corridors as ¼ mile from the normal high water mark on either side of the designated (MA 8.1) and study (MA 9.2) rivers (Forest Plan, page IV-187.4 and IV-202). Half of the width of the corridors for these rivers (one side of the river) are within the project area, although the rivers themselves are outside the project area.

**MA 8.1**

The existing vegetation on National Forest System land in MA 8.1 in the project area (4% of the project area) is almost evenly divided between aspen (45%) and hardwoods (40%), with small amounts of spruce, balsam fir (10%), and white pine or hemlock (4%). The remaining 1% is upland or lowland brush and openings.

The desired future condition for the area is to maintain or enhance the values for which the river was designated under the WSRA. Rivers adjoining the project area that are within MA 8.1 are as follows:

**West Branch Ontonagon - *Recreational River***

The West Branch Ontonagon Designated Recreational River's flow is controlled by a dam where the river begins at the east end of Lake Gogebic. The flow level becomes low during the summer in order to maintain Lake Gogebic's water elevation.

Flow from its confluence with the South Branch Ontonagon River to Victoria Reservoir is also controlled by the regulated flow of the South Branch entering the river. These water levels are maintained higher and the South Branch contributes significantly to flow levels of the 4.6 miles of the West Branch that is adjacent to the project area. The recreational designated segment ends at the Victoria Reservoir, which has flow regulated by the Victoria dam.

Water quality is considered excellent although natural turbidity can be quite high decreasing water clarity due to the surrounding landscape's soil clay content (USDA Forest Service 1989, pages 44-54). Sediment from roads can increase this condition.

The West Branch Ontonagon Designated Recreational River is influenced by Johnson and Schaat Creeks and their tributaries within the West Branch – Victoria Subwatershed (refer to Aquatics, Section 3.6.2).

**Middle Branch Ontonagon - *Wild River***

The Middle Branch Ontonagon Designated Wild River's flow is controlled by the dam at Bond Falls, which can leave the summer water levels for the 13.5 mile segment adjacent to the project area quite low. There is limited river access and numerous log jams resulting in little if any canoeing. The river segment adjacent to the project area is most notable for its salmon and steelhead fishing (USDA Forest Service 1989, pages 31-32).

Water quality is generally good although natural turbidity can be high, particularly during storm and spring runoff events, decreasing water clarity. The steep gorge landscape tends to be unstable in places with past and active landslides, soil creep, and mass wasting commonly contributing sediment to the river system. Sediment from roads can also increase turbidity.

The Middle Branch Ontonagon Designated Wild River is influenced by all the streams within the Baltimore and Middle Branch Subwatersheds within the project area (refer to Aquatics, Section 3.6.2).

**MA 9.2**

The vegetation on National Forest System land in MA 9.2 of the project area (3% of the project area) is dominated by aspen (62%), with the remainder comprised of spruce-balsam fir-aspen or cedar (21%), and a small amount of northern hardwood (12%). The remaining 5% consists of upland and lowland brush and openings.

The emphasis for MA 9.2 is interim protection of the study river corridors to retain the

characteristics for which they are being considered for designation under the WSRA. The river adjoining the project area that is within MA 9.2 is as follows:

**South Branch Ontonagon - *Study River***

The South Branch Ontonagon Study River's flow is controlled by a dam at the origin of the Cisco Branch Ontonagon River, which becomes the South Branch after its confluence with Tenmile Creek, and by a dam and diversion flume at Bond Falls Flowage. The 11.8 mile segment of the river that is adjacent to the project area is wide with a fairly consistent flow through the year.

Water quality is considered excellent providing for both a warm and cold water fishery (USDA Forest Service 1989, p. 39). Where the river and its tributaries flow through clay soils, water clarity decreases as natural turbidity from suspended clay particles increases. This condition is most prominent during spring runoff or after large rainfall events. Turbidity can also be increased with sediment contributions from roads.

The South Branch Ontonagon Study River is influenced by all the streams within the South Branch Ontonagon Subwatershed within the project area (refer to Aquatics, Section 3.6.2).

#### 3.10.1.1 Area of Potential Effect

The aquatics analysis areas for direct and indirect effects on the Wild and Scenic Rivers are all the streams within the South Branch Ontonagon, West Branch Ontonagon-Victoria, Middle Branch Ontonagon, and Baltimore River Subwatersheds within the project area. This is because all of these streams are tributaries to these designated or study rivers. Streams within the West Branch Ontonagon and Ontonagon Subwatersheds do not flow into designated or study rivers.

The existing conditions of the influencing stream networks are previously described in the Aquatic section. Adverse effects to these streams are generally associated with the transportation system.

### 3.10.2 Direct/Indirect and Cumulative Effects on Wild and Scenic Rivers

#### 3.10.2.1 Direct/Indirect Effects on Wild and Scenic Rivers of Alternative 1

**Vegetation**

No vegetative management is proposed in any of the river corridors in any of the alternatives, so the effects from all alternatives would be the same. With any alternative, forest vegetation would appear natural with little evidence of human activities as described in the desired future condition for these areas. The rivers would retain the outstandingly remarkable resource values for which they were designated or are being studied.

Barring any major natural disturbances, the forested areas would continue to progress into later stages of succession. In the short- to mid-term (0-15 years), there would be little change from current conditions. In the long term (20+ years), the aspen forest types would eventually succeed into hardwood or conifer types and open areas that are able to support forest types would continue to fill in with tree species.

**Transportation System**

All roads on Forest Service lands within the Wild and Scenic River corridors would remain in their existing condition with access only by foot travel, ATV, or snowmobile in the winter. The related effects would be very minimal because no additional roads would be planned in these areas, and very few miles of road currently exist in these areas.

**Fisheries, Aquatics, and Riparian Environments**

There would be no changes to the existing condition. The current sediment contributions routed into the Rivers are not unreasonably diminishing the Outstandingly Remarkable Values. This is due to the downstream dilution effects of this small amount of sediment entering the large river systems.

**Recreation**

***South Branch Ontonagon Study River***

There are no new recreational projects proposed in the western portion of the project area near this study river. No developed hiking or snowmobile trails lie within the South Branch corridor.

There is minimal motorized recreation that occurs near the South Branch. This use would be associated with access to hunting or recreational lease areas, and would pose no unreasonable disturbance to the Study River. Any possible sediment contribution would be negligible. Minimal canoeing or kayaking activity occurs on the South Branch, and there would be no detrimental affects to the river.

***West Branch Ontonagon Designated Recreational River***

There are no recreation projects planned or any known motorized recreational uses in the West Branch River corridor. This is mainly because there are no roads in this area.

The only recreational activity likely to occur in this area would be by canoeists or kayakers who would enter the area from the south or west via the South Branch or West Branch of the Ontonagon River. Any overnight camping along the river bank by these users is expected to be minimal, and any possible sediment contribution would be negligible. This type of use would be compatible with the Recreational Designation of this section of river.

***Middle Branch Ontonagon Designated Wild River***

The Middle Branch sees very little canoeing or kayaking traffic as the water tends to be shallow for a great percentage of the year. This usually results in many small fords and rapids which make canoeing difficult. This minimal canoeing or kayaking activity would not pose any detrimental affects to the river.

There are a few existing roads in this area that provide ATV or snowmobile access for hunting and fishing, or for private land owners and recreational lease camp users. Use of these roads should not have any damaging effects to the river because use is expected to remain at current levels.

The only other known recreational activity that occurs within the Middle Branch corridor is use of the North Country National Scenic Trail.

### 3.10.2.2 Direct/Indirect Effects on Wild and Scenic Rivers of Alternative 2

**Vegetation**

Effects would be the same as those described for Alternative 1 under section 3.10.2.1.

**Transportation System**

Roads that are not needed would be decommissioned. Any remaining roads would be unclassified for the purpose of providing access to private lands and recreational lease camps. The unclassified roads would remain in their existing condition and be closed to passenger vehicles, with access only by foot travel, ATV, or snowmobile in the winter.

The related effects of these remaining roads on Wild and Scenic Rivers and their corridors would be very minimal because no additional roads are planned in these areas, current use is relatively light, and even fewer miles of road would exist due to decommissioning.

**Fisheries, Aquatics, and Riparian Environments**

***South Branch Ontonagon Study River***

Sediment contribution to the tributary streams would be slightly less due to reduced road miles and stream crossings. A small amount of road decommissioning and one stream crossing decommissioning would occur within the river corridor.

All culvert installation and road reconstruction work would adhere to BMPs with minimal local effects. Riparian areas adjacent to streams and wetlands would be protected as described in the project's riparian design criteria (Table C-1 in Appendix C). This would limit sedimentation in streams and wetlands. Wetlands would continue to store and

conserve water, providing water to streams and enhancing summer flow.

Water clarity and flow within the study river would not be noticeably enhanced due to the large river and small contribution the analysis area makes to this river.

As a result of Alternative 2, there would be no unreasonable diminishment of water quality, free-flowing condition, or the Outstandingly Remarkable Values for which this river is being studied.

***West Branch Ontonagon Designated Recreational River***

Sediment contribution to the Johnson and Schaat Creeks and their tributaries would be reduced due to road decommissioning and reduced stream crossings (8 crossings eliminated). Some road decommissioning would occur in steep landscapes near streams, which would further reduce sediment potential. A small amount of road decommissioning and one stream crossing decommissioning would occur within the river corridor.

All culvert installation and road reconstruction work would adhere to BMPs with minimal local effects. Road miles through wetlands would be reduced (from 5 to 1), which reduces sediment and improves wetland function including regulating flow.

Water clarity and flow within the designated river would not be noticeably enhanced due to the large river and small contribution the analysis area makes on this river.

As a result of Alternative 2, there would be no unreasonable diminishment of water quality, free-flowing condition, or the Outstandingly Remarkable Values for which this river was designated.

***Middle Branch Ontonagon Designated Wild River***

Sediment contribution to some streams would be reduced due to road decommissioning and reduced stream crossings (6 crossings would be eliminated). Some of the road decommissioning would occur in mass wasting prone landtypes (such as LTA 20) within the river corridor, which would reduce sediment potential.

Two of the Lathrop Creek (a tributary to the Middle Branch) crossings would be decommissioned and the third crossing would be reconstructed to reduce erosion and sedimentation (refer to Map H in Appendix A). Two of the crossings are associated with steep adjoining landtypes and sediment reduction should be fairly large locally at these crossings.

All culvert installation and road reconstruction work would adhere to BMPs with minimal local effects. Road miles through wetlands is also reduced (from 3.5 to 2.4), which reduces sediment and improves wetland function including regulating flow.

Water clarity and flow within the designated river would not be noticeably enhanced due to the large river and small contribution the analysis area makes on this river.

As a result of Alternative 2, there would be no unreasonable diminishment of water quality, free-flowing condition, or the Outstandingly Remarkable Values for which this river was designated.

**Recreation**

The effects of recreation on Wild and Scenic Rivers and their corridors would be the same as described for Alternative 1 under section 3.10.2.1.

### 3.10.2.3 Direct/Indirect Effects on Wild and Scenic Rivers of Alternative 3

**Vegetation**

Effects would be the same as those described for Alternative 1 under section 3.10.2.1.

**Transportation System**

The effects of roads on Wild and Scenic Rivers and their corridors would be the same as described for Alternative 2 under section 3.10.2.2.

**Fisheries, Aquatics, and Riparian Environments**

Effects would be the same as described for Alternative 2 under section 3.10.2.2.

**Recreation**

The effects of recreation on Wild and Scenic Rivers and their corridors would be the same as described for Alternative 1 under section 3.10.2.1.

### 3.10.2.4 Direct/Indirect Effects on Wild and Scenic Rivers of Alternative 4

**Vegetation**

Effects would be the same as those described for Alternative 1 under section 3.10.2.1.

**Transportation System**

The effects of roads on Wild and Scenic Rivers and their corridors would be the same as described for Alternative 2 under section 3.10.2.2.

**Fisheries, Aquatics, and Riparian Environments**

Effects would be the same as described for Alternative 2 under section 3.10.2.2, except for the following:

Planting long-lived conifer species in riparian influence areas of tributaries to the Middle Branch Ontonagon River would enhance the

riparian function of large woody debris for the long-term; however, water clarity and flow within the designated river would not be noticeably enhanced due to the large river and small contribution the analysis area makes on this river.

**Recreation**

The effects of recreation on Wild and Scenic Rivers and their corridors would be the same as described for Alternative 1 under section 3.10.2.1.

### 3.10.2.5 Cumulative Effects on Wild and Scenic Rivers of All Alternatives

**Vegetation**

No cumulative effects are expected. This is because there are no direct and only minor indirect effects, and no known future activities planned.

**Transportation System**

Under the long-term transportation plan, roads in the Wild and Scenic River corridors that are not needed would be decommissioned. The only roads remaining in these areas would be unclassified for the purpose of providing access to private lands and recreational lease camps. Related effects would be the same as those described for Alternative 2 under section 3.10.2.2.

**Fisheries, Aquatics, and Riparian Environments**

There are no cumulative effects from the proposed activities because they are designed to protect or enhance the study and designated rivers. Because of this, the water quality, free-flowing condition, and the Outstandingly Remarkable Values for each river would not be diminished.

New hydropower license for all of the dams on the designated rivers has recently been issued. This new license includes provisions that will help to ameliorate some of the flow problems noted above. The effects of those flow changes in concert with the effects from this project are not expected to have cumulative effects.

**Recreation**

An expansion bridge was constructed in 1990 where the NCT crosses the Middle Branch Ontonagon River (prior to designation) to provide hikers with a safe passage across the river. No further construction is planned for the trail or for any other recreation projects in the vicinity of the river. Continued use of the trail in this area should not have any damaging effects to the river.

The proposed recreational activities, as well as the past, present, and foreseeable future recreation activities, would not impact the study and designated rivers; therefore, there would be no cumulative effects.

# 3.11 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

An irreversible commitment of resources refers to the loss of production of use of a resource due to a land use decision that, once executed, cannot be changed. An irretrievable commitment of resources applies to losses of production or use of renewable resources for a period of time.

## 3.11.1 Soil Productivity

Best Management Practices would be used to avoid soil productivity losses from proposed timber harvesting and associated road/skid trail construction. Road construction is proposed in all action alternatives. Temporary roads, landings, and skid trails would constitute an irretrievable commitment of resources even though they would be recontoured.

The soil mixing and disturbance that would be associated with temporary construction would lower soil productivity. While plant and tree growth on these sites would occur over the short term, full productivity recovery would take decades to hundreds of years. In the same context, the permanent road construction proposed in all action alternatives would constitute an irreversible commitment of a resource. Refer to the **SOIL RESOURCES** and **TRANSPORTATION** sections of this chapter for details.

## 3.11.2 Scenic Resources

Irretrievable changes in the existing appearance of the landscape would occur under the action alternatives. These changes would become progressively less noticeable as vegetation recovered in harvested areas and along roads. Refer to the **RECREATION/VISUALS** section of this chapter for analysis of this topic.

## 3.11.3 Wildlife

The loss or modification of habitat for certain species is an irretrievable commitment of resources. As vegetation recovers this habitat would recover. However, the time frame for this to occur may be as long as several decades. For further details on the effects to wildlife species refer to the **WILDLIFE** section of this chapter and the **BIOLOGICAL ASSESSMENT** and **BIOLOGICAL EVALUATION** (located in the project file).

## 3.11.4 Public Access

Restricting public motorized access results in an irretrievable loss of some use in the area. To the degree that public vehicles are denied use of some roads, that amount and duration or potential use is lost. Each of the action alternatives restricts public access to some degree due to resource concerns and other management goals. Refer to **WILDLIFE, TRANSPORTATION, SOIL RESOURCES,** and **RECREATION/VISUALS** sections of this chapter for further details.

## 3.11.5 Licenses and Permits

Stream crossing permits would be coordinated with the Michigan Department of Environmental Quality for any instream work (i.e., installing culverts and hardening stream crossings).