3.3 BOUNDARY WATERS CANOE AREA WILDERNESS

3.3.1 Summary
This section discloses the effects that the sound of harvest activities would have on wilderness users. Alternative 1, the no action alternative, would not generate additional noise impacts because there would be no vegetation management activities with this alternative. Alternatives 4 and 2 would result in more harvest noise that could be heard in the BWCAW than would Alternative 3. Most of the harvest noise would occur during the winter when recreation use is low. The amount of noise would be small in scope, often not noticeable above ambient noises present at a given wilderness location within audible hearing distance of harvest activity, although at some locations it would likely be discernible as noise generated by mechanized equipment.

3.3.2 Introduction

Issue - Vegetation management adjacent to the (BWCAW)
The public raised concerns that vegetation management (timber harvest) and associated use and construction of temporary roads near the BWCAW would negatively affect wilderness qualities, the visitor’s experience and the ecological integrity of the wilderness.

The sound of timber harvest activities could impact wilderness visitor solitude in some locations. This analysis will show the estimated number of summer and winter days when timber harvest activities may be heard from wilderness travel routes and campsites. The duration (short, medium or long term) and type of noise (high, medium or low based on distance from the noise) expected to be heard at wilderness campsites and travel routes will also be considered.

Vegetation management activities would not be visually noticeable from within the BWCAW. The visual effects of vegetation management activities on recreation (including wilderness entry points) and scenery are disclosed in Sections 3.10 and 3.12. Effects to the ecological integrity of the wilderness will be addressed in other resource sections of the Glacier EIS.

Background – Wilderness Character

The USDA Forest Service has developed guidelines and methods for wilderness monitoring. The purpose of monitoring is to provide managers with a tool they can use to answer key questions about wilderness character and stewardship, such as: what is the current state of wilderness character, how is it changing over time, and how do stewardship actions affect and best preserve wilderness character? The guidelines and methods are documented in the General Technical Report Monitoring Selected Conditions Related to Wilderness Character: A National Framework. This report defines the four qualities of wilderness as:

- *Untrammeled* – wilderness is essentially unhindered and free from modern human control or manipulation.

- *Natural* – wilderness ecological ecosystems are substantially free from the effects of modern civilization.

- *Undeveloped* – wilderness is essentially without permanent improvements or modern human occupation.
• **Outstanding opportunities for solitude or a primitive and unconfined type of recreation** – wilderness provides outstanding opportunities for people to experience solitude or primitive and unconfined recreation, including the values of inspiration and physical and mental challenge.

The fourth quality, outstanding opportunities for solitude or a primitive and unconfined type of recreation, directly relates to how timber harvest noise impacts could affect opportunities for solitude provided by and expected in a wilderness setting. Harvest activity noise may affect visitors’ sense of solitude. “Solitude” is defined as “the quality or state of being alone or remote from society”. (Webster’s Third New College Dictionary, page 2170) This quality should be analyzed if proposed harvest units are located within noise impact distance of specific wilderness trails or lakes where visitor presence is likely. Therefore, noise impacts will be used to analyze effects to wilderness.

The “untrammeled” and “undeveloped” qualities of wilderness listed above will not be addressed in this analysis because none of the proposed activities occur within the wilderness or would impact the “untrammeled” and “undeveloped” qualities of wilderness. The “natural” quality, or effects to the ecological integrity of the wilderness, will be addressed in other resource sections in the Glacier EIS.

### 3.3.3 Analysis Methods

The analysis for the wilderness resource utilizes two indicators to highlight and compare the differences between the alternatives’ potential effects:

**Indicator 1: Number of harvest units within one mile of wilderness recreation sites**

This indicator highlights the difference between alternatives by identifying the number of harvest units within 1 mile of specific BWCAW sites (lakes and trails) that may be affected by harvest activity noise, and compares how the effects generated by each alternative would differ.

In order to measure noise from harvest units that may affect wilderness sites it is necessary to review some definitions and standards for measuring noise.

- **Sound** – A physical phenomenon; a vibration that can be measured and recorded (Predicting Impact of Noise on Recreationists, USFS Publication #67).
- **Noise** – Any sound that is undesired or that interferes with something to which one is listening (Webster’s Third New College Dictionary, page 1533).
- **Decibel (dBA)** – The commonly used unit for measuring sound pressure levels (MPCA Guide to Noise Control in Minnesota, page 17).
- When the distance is doubled from a “point” source, the sound level decreases by six decibels (MPCA Guide to Noise Control in Minnesota, page 17).
- A doubling of sound energy sources yields an increase of three decibels (MPCA Guide to Noise Control in Minnesota, page 7).
- There are several other variables that can influence sound levels that have not been taken into account when calculating this analysis. These variables are site specific and include temperature, humidity, wind, topography, vegetation, and the frequency (Hz) of harvest machinery sound.

For the purpose of this analysis, the following terms referring to noise impact are defined. (The terms below to describe “scope” are taken from page 5 of the MPCA Guide to Noise Control.)

- **“short-term”** equals 1-60 days
• “medium-term” equals 61-90 days
• “long-term” equals 91 days or longer
• “small in scope” equals 30-60 decibels (example: secluded woods is 30 decibels, and a library is 50 decibels)
• “moderate in scope” equals 61-90 decibels (example: heavy truck traffic is 80 decibels)
• “wide in scope” equals 90 decibels or louder (example: a jointer/planer is 100 decibels. A chainsaw is at the high end of moderate or the low end of wide in scope at 90 decibels).

See Project Record documents 6C-011 and 6C-012 for rationale and definitions of time periods and scope of noise used throughout this document.

A recent study measured the decibel levels of various harvest machinery in regards to operator safety (Forestry Vibration and Noise Study-University of Washington, page 15). Using information from this study, a distance measurement can help determine the effects of timber harvest noise on wilderness recreation sites.

Rationale for the one-mile distance from harvest units: Four harvest machines, which is the average used on Kawishiwi District harvest units (Akeson, 2007), operating in one location create a “point” source of noise averaged to be 93 decibels 2 feet from the source. The formula of reducing the decibel level by 6 when the distance from the source is doubled results in a reduction in the sound level to 38 decibels at approximately ¼ mile, 30 decibels at approximately ½ mile, and 24 decibels at 1 mile (See Project Record documents 6C-009 and 6C-010 for decibel calculation tables). A secluded woods has a decibel level of 30 (MPCA Guide to Noise Control in Minnesota, page 5). At an approximate distance of one-mile from timber harvest activity, not taking into account vegetation, wind, or topography, the sounds associated with the activity may still be discernible under some conditions but would not be louder than the surrounding natural environment.

To identify wilderness recreation sites that would be affected by harvest activity noise, a one-mile radius was projected out from each site to identify harvest units proposed within the one-mile radius. See Project Record document #6C-034 for map used to project a one-mile radius from affected sites.

Indicator 2: Estimated number of days needed to harvest units that may affect wilderness recreation sites

This indicator will show how many days harvest activity noise may impact wilderness recreation sites during the summer and winter seasons. This indicator highlights the difference between alternatives based on the estimated number of days that harvest activity may impact wilderness recreation sites.

It is important to note that this indicator relies on the estimated number of days needed to complete harvest operations. This estimate is based on the experience and knowledge of field staff on the Kawishiwi Ranger District (Akeson, personal communication). The actual number of harvest days can be influenced by the forest type, shape and operability of terrain on each unit, logging company priorities, type of equipment, weather, seasonal road restrictions and market conditions.

Based on estimates from the District Timber Sale Administrator and the District Forester, 2 acres/day is a good average for determining the length of time needed for harvest on typical Kawishiwi District harvest units.
The MPCA Guide to Noise Control in Minnesota document, the “Forestry Vibration and Noise Exposure Project” from the University of Washington, and information from District employees on machinery types and duration of use on a typical timber sale, have allowed us to quantify the potential effects of noise on wilderness recreation sites.

After a search of scientific literature related to harvest activity noise and impacts to wilderness character, the closest reference found focused on noise impacts from helicopter over-flights of popular western wilderness areas such as the Grand Canyon (Aesthetic, Affective, and Cognitive Effects of Noise on Natural Landscape Assessment). This article emphasized the undesirable sounds of urbanization and technological intrusion that can occur in wilderness areas from aerial sight-seeing, which would likely be evaluated as negative by those wanting to escape the same types of noise found in urban areas.

Although consideration of intrusions on solitude from helicopter noise is useful to understand the negative effects of mechanized sound on a wilderness setting, comparison of aircraft noise with ground level harvest activity would produce sounds of different frequency and magnitude and therefore would not correlate well with an analysis of harvest outside of a wilderness area and its impacts to solitude. Because none of the reference material available focused specifically on the affects of harvest activity noise on adjacent wilderness areas, the Superior National Forest monitoring program has been monitoring the amount and kinds of sound, including harvest activity, mineral exploration, roads, construction on private land, and other noises, at selected locations in the BWCAW beginning in 2008.

3.3.4 Analysis Area

The area analyzed for direct and indirect effects includes specific BWCAW lakes and trails that are within one mile of harvest units, displayed in Table 3.3-1. These BWCAW lakes and trails are located outside of the project area boundary, but within one mile of it. This analysis area was chosen because visitor presence is more common on lakes with designated campsites than forested areas not along travel routes, and noise associated with the project is not expected to be noticeable further than one mile from the noise source.

Although visitor use does occur in more remote areas of the wilderness, few people travel off of established routes because of the brushed-in character of the wilderness forest. The mandatory permit system requires visitors to enter the wilderness at an established entry point. The permit system also limits the amount of use to protect wilderness resources and provides a means for monitoring visitor travel patterns (Forest Plan, pg. 3-55). Most visitors come to the BWCAW to travel on canoe routes, portages and hiking trails.

This analysis recognizes that very few people recreate in those areas of the wilderness off of commonly established routes, therefore all measurements of harvest activity noise are related to the wilderness sites identified. In the case of wilderness lands immediately adjacent to the boundary, where harvest activity may be within ¼ mile or less from these lands, the decibel level from the noise may be higher than “small in scope”.

The area analyzed for cumulative effects includes a one mile zone around the perimeter of the Project Area boundary. Sound generated from all land ownerships is considered for cumulative effects. The cumulative effects analysis area includes recreation sites located within the BWCAW.
This analysis area boundary was selected because the most likely impact of timber harvest activity on wilderness visitors would be noise, and the effects beyond one mile of the noise source are usually negligible (see Example under Indicator 1).

The time period for the direct, indirect, and cumulative effects analysis is ten years. This time period was selected because the impacts are directly related to the amount of time needed to implement the vegetation management activities and supporting transportation system. The vegetation management activities, if implemented, would likely be completed within the next ten years.

3.3.5 Affected Environment

The Glacier Project Area is located in Lake and St. Louis Counties approximately 5 to 20 miles south and east of Ely. Arterial roads in the project area include the Fernberg Road (Lake County 18), the Kawishiwi Trail (Lake County 16), and State Highway 1. Some of the larger lakes and rivers within or bordering the project area include Greenstone, Ojibway, Triangle, White Iron, Farm, Moose, Fall, Snowbank and the Kawishiwi River.

The Vicinity Map (Figure 1-1) displays the location of the project area. The project area boundary encompasses about 90,000 acres of land with mixed ownership. Approximately 47,000 acres (52 percent) of the project area is on National Forest System land.

Both federal and non-federal lands in the project area have produced and continue to produce goods and services for area commerce. Common developments and activities include private homes, resorts and outfitters, boat accesses on numerous lakes, camps and recreational trails. The area also supports wood products harvested from State, federal, County and private lands, as well as hydro power production on the Kawishiwi River system and mineral exploration in the southern region of the project area.

As in any area of the State, the Glacier Project Area has a typical amount of sound producing activities where people go about their business to reside, recreate, and make a living. The project area’s proximity to the Boundary Waters Canoe Area Wilderness (BWCAW) increases the amount of activity in the area as many businesses and entry point developments are in place to accommodate wilderness visitors. Although the entire project area is outside the BWCAW, it is likely that activities inside the project area have and will continue to carry over into portions of the wilderness due to the adjacency of the project area and the wilderness. The Glacier Project does not propose any activities within the BWCAW.

The Boundary Waters Canoe Area Wilderness is located in the northern third of the Superior National Forest in northeast Minnesota. Approximately 1 million acres in size, it extends nearly 150 miles along the international boundary adjacent to Canada’s Quetico Provincial Park and is bordered on the west by Voyageur’s National Park. The BWCAW contains over 1,200 miles of canoe routes, 15 hiking trails, and approximately 2,000 designated campsites. Approximately half of the project area boundary is immediately adjacent to the BWCAW. The total length of the BWCAW boundary is 568 miles. The Glacier Project is adjacent to approximately 58 miles, or 10 percent, of the BWCAW boundary.

The Forest Plan includes direction for managing the wilderness. The Plan states “To achieve the objectives for management of the BWCAW, the wilderness has been divided into four management areas. The desired future conditions of both the physical and social aspects of the resources differ
Glacier Project

slightly between management areas.” (See Forest Plan pp. 3-40 through 3-47.) These management areas pertain only to land within the wilderness and they provide a context for the type of experience visitors can expect.

The desired social conditions of the four management areas (MA) include:

● Pristine wilderness. Areas of pristine wilderness provide outstanding opportunities for isolation and solitude, relatively free from the evidence of contemporary human activities.

● Primitive wilderness. This area provides an excellent opportunity for isolation and solitude, relatively free from the sights and sounds of humans. The frequency of encountering others is low.

● Semi-primitive non-motorized wilderness. Opportunities for experiencing isolation and solitude are moderate to low. The frequency of encountering others in the area is moderate.

● Semi-primitive motorized wilderness. Opportunities for experiencing solitude and isolation are low. Motorized watercraft are permitted and will be noticeable along major travel routes and portages and near major entry points. The frequency of encountering others is moderate to high.

The majority of the project is adjacent to semi-primitive non-motorized and semi-primitive motorized management areas. Some harvest is proposed to occur adjacent to the primitive MA which borders the northeast end of Fall Lake in alternatives 2 and 4 as described in section 3.3.6.1. Two other primitive management areas adjoin the project area boundary further east along the Fernberg Corridor (County 18), although no harvest activity would occur within one mile of these areas. Table 3.3-1 shows the management area of each wilderness recreation site within one mile of proposed harvest units.

3.3.6 Environmental Consequences

3.3.6.1 Direct and Indirect Effects

Alternative 1 (No Action)

Alternative 1 would not harvest any timber therefore no additional harvest noise during the summer or winter and no affect to visitors at wilderness recreation sites. There would be no direct, indirect, or cumulative effects from the Glacier Project under alternative 1.

Continued Impacts under All Alternatives

Existing and foreseeable future noise impacts from multiple sources within and adjacent to the project area would continue to impact the solitude of BWCAW visitors. Included would be noise from vehicle traffic on roads and entry points near the wilderness, motorboat traffic on motorized lakes inside the wilderness and outside but near the wilderness, noise generated by landowners with property adjacent to wilderness including individual homeowners, resorts, outfitters and camps. Timber harvest activity on federal land (Tomahawk Project) and other ownership including state, county and private industry lands would continue.

Other noises continuing to impact wilderness solitude include USFS aircraft on fire detection flights, aerial law enforcement and wildlife surveys, aircraft to support US Border Patrol and Canada’s Quetico Provincial Park operations, and emergency motorized use for search and rescue and firefighting operations.
Alternatives 2, 3, and 4

Indicators 1 and 2

Table 3.3-1 identifies wilderness lakes and trails within one mile of proposed harvest units. Effects to wilderness solitude will be measured based on the amount and duration of noise that may be heard from the identified sites. Table 3.3-1 also identifies the management area for each of the lakes and trails.

<table>
<thead>
<tr>
<th>BWCAW Recreation Site</th>
<th>Management Area</th>
<th>Alt. 1</th>
<th>Alt. 2</th>
<th>Alt. 3</th>
<th>Alt. 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Little Gabbro Lake</td>
<td>SPNM**</td>
<td>0</td>
<td>7 harvest units 137 winter harvest days</td>
<td>0</td>
<td>7 harvest units 137 winter harvest days</td>
</tr>
<tr>
<td>Gabbro Lake</td>
<td>SPNM</td>
<td>0</td>
<td>2 harvest units 60 winter harvest days</td>
<td>0</td>
<td>2 harvest units 60 winter harvest days</td>
</tr>
<tr>
<td>South Kawishiwi River</td>
<td>SPNM</td>
<td>0</td>
<td>19 harvest units 153 winter harvest days 13 all-season days</td>
<td>0</td>
<td>19 harvest units 153 winter harvest days 13 all-season days</td>
</tr>
<tr>
<td>South Farm Lake</td>
<td>SPM***</td>
<td>0</td>
<td>8 harvest units 70 winter harvest days 18 all-season days</td>
<td>5 harvest units 41 winter harvest days 17 all-season days</td>
<td>8 harvest units 70 winter harvest days 18 all-season days</td>
</tr>
<tr>
<td>North Kawishiwi River</td>
<td>SPNM</td>
<td>0</td>
<td>3 harvest units 58 all-season days</td>
<td>0</td>
<td>3 harvest units 58 all-season days</td>
</tr>
<tr>
<td>accessed by Farm Lake</td>
<td>SPM And PM****</td>
<td>0</td>
<td>9 harvest units 51 winter harvest days 45 all-season days</td>
<td>1 harvest unit 6.5 all-season days</td>
<td>9 harvest units 51 winter harvest days 45 all-season days</td>
</tr>
<tr>
<td>Fall Lake</td>
<td>SPNM</td>
<td>0</td>
<td>6 harvest units 58 all-season harvest days</td>
<td>5 harvest units 46 all-season harvest days</td>
<td>6 harvest units 58 all-season harvest days</td>
</tr>
<tr>
<td>Wood Lake</td>
<td>SPNM</td>
<td>0</td>
<td>4 harvest units 105 all-season</td>
<td>3 harvest units 53 all-season</td>
<td>5 harvest units 137 all-season</td>
</tr>
<tr>
<td>North Kawishiwi</td>
<td>SPNM</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 3.3-1: Number of Harvest Units* within One Mile of Wilderness Sites and Number of Days Needed to Complete Harvest

<table>
<thead>
<tr>
<th>BWCAW Recreation Site</th>
<th>Management Area</th>
<th>Alt. 1</th>
<th>Alt. 2</th>
<th>Alt. 3</th>
<th>Alt. 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lake One</td>
<td>SPNM</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2 harvest units</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>38 winter harvest days</td>
<td></td>
<td>38 winter harvest days</td>
</tr>
<tr>
<td>South Farm Ski Trail</td>
<td>SPM</td>
<td>8</td>
<td>70 winter harvest days</td>
<td>5 harvest units</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>18 all-season days</td>
<td>41 winter harvest days</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>17 all-season days</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>18 all-season days</td>
<td></td>
</tr>
</tbody>
</table>

*Some harvest units affect more than one wilderness site. See Summary Table 3.3-3 for total harvest units and estimated days needed for harvest affecting wilderness sites.

**SPNM – semi-primitive non-motorized management area.

***SPM – semi-primitive motorized management area

****PM – primitive management area

The Decibel Calculation for Example Timber Harvest Operations (see Glacier Project Record) lists the noise generated from example timber harvest operations. The calculations do not account for variables such as wind speed and direction, vegetation, or topography that may reduce or increase decibel levels in some locations.

Wilderness sites within one mile of harvest activity:
(See decibel calculation, scope of noise impacts, and duration of harvest activity summaries in Analysis Methods section to review how impacts to wilderness recreation sites were calculated).

Little Gabbro Lake: Alternatives 2 and 4 each have seven harvest units totaling 274 acres within one mile of the lake. Estimated days needed for harvest is 137 and all units would be winter harvest only to mitigate effects to solitude for the majority of visitors who travel the area during the summer season. Of the seven units within one mile of Little Gabbro Lake the nearest is ½ mile away. The decibel calculation table (project record) shows this would result in a harvest activity noise level of 30 decibels (small in scope), at locations on Little Gabbro Lake.

The Little Gabbro Lake entry point parking lot is also within ½ mile of the lake, so some impacts to solitude could also be generated from visitors starting or ending their wilderness vacation. Little Gabbro Lake, Gabbro Lake and the South Kawishiwi River are all used in winter by skiers and dog-sledders. These groups may experience impacts to solitude from harvest activity noise. The duration of noise impacts would be long term (defined as 91 days or more needed to harvest units) but the activity would likely spread out over more than one year and at 30 decibels (small in scope) would not have a strong audible impact on the visitor’s sense of solitude. The Tomahawk Project also has eight harvest units within one mile of Little Gabbro Lake which could be harvested between now and 2013.
**Gabbro Lake**: Alternatives 2 and 4 have two harvest units totaling 119 acres within one mile of Gabbro Lake. Estimated days needed for harvest is 60 (short term) and all units would be winter harvest only. The nearest unit to Gabbro Lake is ¼ mile away which from the decibel calculation table corresponds with less than 30 decibels. The Tomahawk Project has one harvest unit approximately one mile from Gabbro Lake which would not likely contribute to audible impacts on wilderness solitude at that distance due to a projected sound level of 24 decibels (small in scope), or less than a quiet woods.

**South Kawishiwi River**: Alternatives 2 and 4 have 19 harvest units totaling 331 acres (305 acres winter, 27 acres all-season) within one mile of the wilderness portion of the South Kawishiwi River. Estimated days needed for winter harvest is 152, or long term in duration, and 13 all-season days considered short term. Five of the harvest units are approximately ¼ mile from the wilderness portion of the river where a decibel level of 38 (small in scope) could be heard.

Other than 13 harvest days which could occur during summer or winter, the majority of effects to wilderness visitor solitude would be mitigated by the season of harvest (winter) when use is low relative to summer. Other activities near the South Kawishiwi River portion of the BWCAW are important to note; a quarter mile segment of Lake County 23 (Spruce Road) is within ¼ mile of the river where noise from passenger vehicles could be heard. The Tomahawk Snowmobile Trail passes within a ¼ mile of the wilderness in this area, where particularly on weekends noise impacts from sleds could affect the solitude of winter visitors. There are also private parcels of land within ½ mile of the wilderness in this area where activity on these lands could impact wilderness solitude. These ongoing activities adjacent to the South Kawishiwi River are mentioned to provide context to the area surrounding this portion of the BWCAW where on most occasions visitors would experience the solitude of a semi-primitive non-motorized wilderness, but on other occasions the sound generated by normal activities on adjacent lands may also be heard.

**South Farm Lake**: Alternatives 2 and 4 have eight harvest units totaling 175 acres (35 acres all-season, 140 acres winter) within one mile of South Farm Lake. Estimated days needed for the one summer harvest unit are 18 days, which is a short duration of potential noise impacts, and 70 days or a medium duration for the remaining seven winter harvest units. The closest harvest unit to the wilderness portion of the lake is ¼ mile where a decibel of 38 (small in scope), or an audible noise less than conversational speech, could impact wilderness solitude.

In summer there are motorized day use and overnight permits available on South Farm Lake as well as a cabin owner. County Road 16 is less than ¼ mile from the lake. The Tomahawk Snowmobile Trail crosses a drainage to the lake on a route continuing off the end of County Road 16. Due to the presence of motorized vehicles on the road, motorboats on the lake in summer and snowmobiles on the Tomahawk Trail in winter, occasional impacts to the wilderness character of solitude could occur during summer or winter.

Winter use on the lake includes skiing and dog-sledding. The majority of harvest within one mile of the lake would have the potential to affect winter users the most because seven of the eight units are winter harvest only. South Farm Lake is not a destination for dog-sledders but instead a route used to travel further into the wilderness where they could quickly put noise associated with harvest activity
behind them. Impacts to solitude of skiers using the South Farm Ski Trail will be discussed later in this section.

Alternative 3 has five harvest units totaling 117 acres (82 acres winter, 35 acres all-season) within one mile of South Farm Lake. Estimated time needed to complete harvest would be 18 all-season days and 41 winter harvest days, both of which would have short term impacts on wilderness solitude. The closest harvest unit to the wilderness portion of the lake is ¼ mile where a decibel of 38 (small in scope), or an audible noise less than conversational speech, could impact wilderness solitude.

North Kawishiwi River accessed by Farm Lake: Alternative 2 and 4 have three harvest units totaling 115 acres of all-season harvest within one mile of the North Kawishiwi River as it exits Farm Lake. Estimated time needed to complete harvest of the three units would be short term at 58 days. The closest harvest unit to the wilderness portion of the river is approximately 1/3 mile, corresponding to 35 decibels (small in scope), or less than conversational speech.

The general character of the area around this BWCAW entry point includes cabin owners less than ¼ mile from the wilderness boundary on Farm Lake, a lake which is well developed with private homes and resorts. Although the three harvest units within one mile of the North Kawishiwi River may contribute impacts to visitor solitude near the wilderness boundary, they would be of short duration and intensity and would likely not be different from the ambient motorized sounds already present in this area.

Fall Lake: Alternatives 2 and 4 have nine harvest units totaling 193 acres (90 all-season harvest, 103 winter) within one mile of the wilderness portion of Fall lake. Estimated days for winter harvest units would be 52 days or short in duration, and estimated days for summer harvest units would be 45 days, also of short duration. The closest harvest units in alternatives 2 and 4 are approximately 1/3 mile from the wilderness portion of Fall Lake, where a decibel level of 35 (small in scope) could impact wilderness visitor solitude.

Located on the southwest end of Fall Lake is the city of Winton, as well as many year round and seasonal residences along the lake’s shores up to the northeast ¼ of the lake which is in a semi-primitive motorized wilderness management area. The U.S. Forest Service Fall Lake Campground is adjacent to the wilderness boundary and serves as a boat landing and entry point for many wilderness visitors. BWCAW permits for this entry point, required between May 1 and September 30, include 14 over-night paddle permits/day, 11 over-night motor permits/week, and 65 day use motor permits/week. Fall Lake Campground is also a popular entry point for dogsled, ski and ice-fishing activities during the winter season.

Bordering Fall Lake on the east side is a primitive management area that is adjacent to the project area boundary. This end of Fall Lake allows boats with up to 25 horsepower motors adjacent to the primitive MA. Other than the semi-primitive motorized portion of Fall Lake there are no other wilderness recreation sites frequented by wilderness visitors within one mile of harvest units. Therefore, if harvest activity was noticed by wilderness visitors in this area it would likely be heard by people on the lake, where sounds from motorboats and the Fall Lake campground already dominate activities in the area.
Summer harvest activity at 35 decibels for 45 days would not contribute appreciably more noise to the surrounding environment on this portion of Fall Lake considering the presence of motorboats and activities at Fall Lake Campground including noise from motor vehicles.

Winter harvest near the wilderness portion of Fall Lake from 52 days of activity at 35 decibels would be short term and small in scope. Other winter motorized sounds common to this part of Fall Lake include snowmobiles that can be ridden right up to wilderness boundary signs that are set in the ice as well as cars and trucks that frequent the public landing area of the campground.

Alternative 3 has one unit totaling 13 acres of all-season harvest within one mile of the wilderness portion of Fall Lake. Located on the east side of County Road 182, this unit is approximately ½ mile from Fall Lake with a short term harvest of 7 days generating a decibel level of 30 (small in scope), or similar to a quiet woods.

**Wood Lake:** Alternatives 2 and 4 have six harvest units totaling 116 acres of all-season harvest within one mile of the lake. Estimated days needed to harvest the units would be 58, or short in duration. The nearest harvest unit to Wood Lake is approximately ¾ mile where a decibel level of 28 (small in scope), similar to the sound level of a secluded woods could be expected.

The Wood Lake BWCAW entry point allows two overnight paddle permits/day. The lake is sometimes used by day-use anglers, but mostly wilderness canoe parties beginning or ending their trip. Visitors may already hear motorboats on Tofte Lake or vehicle traffic on the Fernberg Road, both of which are within one mile of Wood Lake. With the nearest harvest unit located ¾ mile from Wood Lake generating an audible noise level of 28 dBA, it is unlikely that harvest activity sounds would heard by visitors on Wood Lake.

Alternative 3 has five harvest units totaling 92 acres of all-season harvest within one mile of Wood Lake. Estimated days needed to harvest the units would be 46, or short in duration. The nearest harvest unit to Wood Lake is approximately ¾ mile away where a decibel level of 28 (small in scope), similar to the sound level of a secluded woods could be expected.

**North Kawishiwi River north of Lake One:** The stretch of river referred to by “North Kawishiwi River north of Lake One” is located in Township 63N, Range 9W, sections 16, 19, 20 and 21. This portion of the river was chosen because although the Kawishiwi River is long, only the stretch of river in these four sections is within one mile of proposed harvest units.

Alternative 4 has five units totaling 273 acres of all-season harvest within one mile of this stretch of the North Kawishiwi River. Estimated days needed to harvest these units would be 137, or long in duration. The nearest harvest unit to the river is ¼ mile, where an audible noise level of 38 dBA (small in scope) may be heard. Alternative 2 has four units totaling 209 acres of all-season harvest within one mile of the North Kawishiwi River. Estimated days needed to harvest these units would be 105, or long in duration. The nearest harvest unit to the river is ¼ mile, where an audible noise level of 38 dBA (small in scope) may be heard. Alternative 3 has three units totaling 105 acres of all-season harvest within one mile of the river. Estimated time needed for harvest would be 53 days, or
short in duration. The nearest harvest unit ½ mile from the river could generate a noise level of 30 dBA (small in scope), similar to the decibel level of a secluded woods.

**South Farm Ski Trail**: Alternatives 2 and 4 have eight units totaling 175 acres (140 winter, 35 all-season) within one mile of the trail. Estimated number of days needed for winter harvest would be 70, or medium in duration, and 18, or short in duration for all-season harvest. The nearest harvest unit is approximately ¼ mile away, where the audible noise level generated may be 38 dBA (small in scope). Alternative 3 has four units totaling 107 acres (78 winter, 35 all-season) within 1 mile of the trail. Estimated number of days needed for winter harvest would be 39, or short in duration, and 18 all-season days, also short in duration. The nearest harvest unit to the trail is ½ mile, where noise levels generated could be 30 dBA, or small in scope.

The South Farm Ski Trail is one of the few BWCAW trails managed for skiing. The 7 mile trail is kept clear of fallen trees every year but is not mechanically groomed due to its wilderness location. It receives light use, mainly by local skiers who live nearby. The trailhead is located adjacent to the Tomahawk Snowmobile Trail where sounds from snowmobiles are prevalent. Noise levels generated by harvest activity may be audible ½ to ¾ mile into the wilderness along the trail, similar to what is generated by the snowmobile traffic. Beyond ¾ mile the usual sounds of the winter woods would most likely prevail.

**Lake One**: Alternative 4 has two units totaling 75 acres of winter harvest within one mile of the eastern-most portion of Lake One. Estimated days needed to harvest the units would be 38, or short-term in duration. The nearest harvest unit to Lake One is ½ mile, where an audible noise level of 30 dBA (small in scope), similar to a secluded woods, may be heard.

The eastern most section of Lake One where harvest activity may be heard is more than a mile from the common summer travel route or wilderness campsites. It is unlikely that sound from winter harvest of the two units would be heard by wilderness visitors on this portion of Lake One.

**Summary of Noise Effects**

<table>
<thead>
<tr>
<th>Table 3.3-2. Summary Comparison of Indicators 1 and 2 by Alternative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicator</td>
</tr>
<tr>
<td>Number of harvest units that may affect wilderness recreation sites</td>
</tr>
<tr>
<td>Estimated days needed to harvest units that may affect wilderness recreation sites.</td>
</tr>
</tbody>
</table>

A further summary and analysis of affects to the wilderness sites identified near enough to harvest units to experience harvest activity noise can be seen in Table 3.3-3.
Table 3.3-3. Scope and Duration of Sound affecting Wilderness Sites

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Alt. 1</th>
<th>Alt. 2</th>
<th>Alt. 3</th>
<th>Alt. 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of BWCAW sites affected by harvest noise by alternative</td>
<td>0</td>
<td>9</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Duration of harvest affecting BWCAW sites by alternative</td>
<td>0</td>
<td>Short = 4</td>
<td>Short = 5</td>
<td>Short = 5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Medium = 2</td>
<td>Medium = 0</td>
<td>Medium = 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Long = 3</td>
<td>Long = 0</td>
<td>Long = 2</td>
</tr>
<tr>
<td>Scope of noise heard at affected sites by alternative</td>
<td>0</td>
<td>Small = 9</td>
<td>Small = 5</td>
<td>Small = 10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Moderate = 0</td>
<td>Moderate = 0</td>
<td>Moderate = 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Wide = 0</td>
<td>Wide = 0</td>
<td>Wide = 0</td>
</tr>
</tbody>
</table>

Table 3.3-3 illustrates that alternatives 2 and 4 are similar in their affects to wilderness sites. Both alternatives include three locations where harvest activity noise may be of long duration (greater than 90 days), two locations of medium duration (61 to 90 days), and approximately 50% of sites experiencing a short duration (1 to 60 days) of exposure. All of alternative 3 sites would experience short duration exposure to harvest activity noise.

Table 3.3-3 also illustrates that the scope of noise in all action alternatives would be small (between 30 and 60 decibels) for all of the wilderness sites within one mile of harvest activity noise.

Harvesting the units in all action alternatives could occur anytime over a 10 year period. It may be spread out over 10 years or all occur within 2 to 3 years depending on accessibility into and operability of harvest units, market conditions, and the financial benefit to the harvest operator. Impacts to solitude over the 10 year period would be of less duration if some units are harvested concurrently.

Table 3.3-2 under alternatives 2 and 4, both of which propose harvest units near or adjacent to the wilderness boundary, indicates that the majority of the harvest activity would occur in winter. Winter harvest, when visitor use is low relative to summer, is the primary mitigation used to lessen impacts on the wilderness character of solitude. According to the 2005/2006 National Visitor Use Monitoring Survey, 98% of visits to the BWCAW across the entire Forest occurred during the summer season and 2% during winter.

The harvest units in each alternative occur at different locations along the project area/wilderness boundary, therefore no one area would be more impacted than what was disclosed in the site specific analysis. Harvest units north of the North Kawishiwi River, those near the South Kawishiwi River, and the units near the wilderness boundary south of Little Gabbro Lake in alternatives 2 and 4 would be of long duration, although sound carrying into the wilderness from these locations would be small in scope at 38 dBA.

A determination that impacts from noise on the BWCAW would be minimal is consistent with the Forest Plan roads analysis (Tab 9A Doc 005 3.11.2.0 #9940 Superior National Forest Roads Analysis, p. A-5). The Roads Analysis was used in the Forest Plan revision and disclosed the potential effects to recreation from noise caused by developing, using and maintaining roads. The
Glacier Project

roads analysis concludes that the Superior has a “heavily forested and rolling landscape” and that this decreases the noise people would hear from vehicle traffic. The ability of heavily forested landscapes to reduce noise impacts would likely mitigate sound impacts generated by harvest operations also.

It is important to note that harvest operations typically occur between 7:00 am and 6:00 pm. During daylight hours is when the activities of wilderness visitors as well as environmental noise such as wind and waves often contribute more to measurable decibel levels at wilderness recreation sites than harvest activity occurring within one mile of a particular site. During evening hours after 6:00 pm, when many wilderness visitors pause and other environmental noises have lessened, there would be no noise associated with harvest activity to compromise wilderness solitude.

It is also important to note that once harvest activity is completed for the day or all units scheduled for harvest are complete, the noise stops. This is in contrast to other noises mentioned in the site specific analysis with the potential to affect wilderness solitude including motor vehicle and motorboat traffic, as well as activities occurring on private land which would likely continue into the foreseeable future. There would not be long-term noise effects beyond the time needed to complete each harvest unit under any of the action alternatives.

Noise from non-harvest restoration (NHR) activity is not expected to be heard by wilderness users and therefore would not contribute to impacts on wilderness solitude.

3.3.6.2 Cumulative Effects

Past, on-going and future projects that may contribute impacts to wilderness character include vegetation management in the Tomahawk Project Area, prescribed burning in the BWCAW, current mineral exploration activities and the Forest-wide Travel Management Project. In addition, vegetation management, mineral exploration, and recreation activities on state, county, and private land may also impact wilderness character. Known activities that may contribute to cumulative affects are listed below.

Tomahawk Project: The Glacier Project Area and the Tomahawk Project Area (Decision Notice signed Sept. 17, 2004) overlap along the wilderness boundary for approximately 5 miles (See map “Display of Tomahawk and Glacier Harvest Units Based on Glacier Alternative 2” in project record). Current timber harvesting activities already occurring from the Tomahawk Project near or adjacent to the wilderness boundary may continue until 2013. Site specific mitigation measures to lessen impacts on recreation and wilderness resources as well as to enhance the visual quality of Tomahawk harvest units are located in Appendix B, p. 4-5 and 15-16 of the Tomahawk Decision Notice.

The Tomahawk Project Area includes 7 winter harvest units totaling 153 acres that are within 1 mile of Little Gabbro Lake in the BWCAW. Estimated time needed to harvest these units is 77 days. Where the two projects overlap, the combined duration of harvest would be 137 days for Glacier harvest units in alternatives 2 and 4, and 77 harvest days for Tomahawk units. The result would be 214 harvest days, or long term in duration for this area. The nearest harvest unit is ½-mile from Little Gabbro Lake where the audible sound level would be 30 decibels (small in scope) or similar to a secluded woods.

The overlap in space and time of harvest units from the Tomahawk and Glacier Projects on lands near the BWCAW would result in cumulative effects to the length of time that harvest activity could
be heard above the ambient environmental noises found in wilderness. Specifying winter harvest of these units when visitor use is very low relative to summer use is the primary mitigation used to lessen impacts on the wilderness character of solitude. According to the 2005/2006 National Visitor Use Monitoring Survey, 98% of visits to the BWCAW across the entire Forest occurred during the summer season and 2% during winter.

**Harvest on other Ownership:** The State of Minnesota currently has harvest plans scheduled for 2007 and 2008 within the project area. Most of these plans take place within the “Triangle Area” (a.k.a. “Crocket Lake Area” to the MNDNR). They propose to manage the vegetation on 1,218 acres through mostly regeneration harvest methods (e.g., clear cut). As of 2007, 872 acres of these acres are planned, and 346 acres are already sold (under contract). The DNR timber plans may be offered for sale between July 1, 2007, and June 30, 2008. Timber sold may be harvested immediately, or up to five years after the date of sale. Lake County is planning 334 acres of timber harvest in the Glacier Project Area within the next ten years.

None of the harvest units in the Crocket Lake area are within one mile of the BWCAW, therefore cumulative effects of State harvesting are not expected to impact or add to effects from Glacier management activities on the wilderness resource.

**Prescribed Burning in the BWCAW:** The Final Environmental Impact Statement (FEIS) for BWCAW Fuels Treatment involves prescribed burning in the wilderness to reduce hazardous fuel conditions built up during a 1999 windstorm that affected approximately 477,000 acres of the Superior National Forest including the BWCAW. Effects to wilderness character including impacts to solitude from BWCAW fuels treatment are addressed in the BWCAW Fuels Treatment EIS, Volume 1, pages 2-66 and 2-67.

Most of the impacts to wilderness visitors would be from fire suppression activities associated with machinery noise from motorized watercraft, helicopters and airplanes. Various gravel pits along the Fernberg Road would be utilized as temporary helispots where helicopters and ignition devices would be fueled. Ground traffic would increase along project area roads for crew and equipment shuttles, aviation support and other logistical needs. The effects would be short term in duration (typically 1-4 days), and most often occur in spring or fall when visitor use is low.

Acreage of scheduled prescribed burns in the wilderness within one to five miles of the Project Area outlined in the BWCAW Fuels Treatment EIS for 2007 which have not been completed include: 955 acres north of Fall Lake along the 4-mile portage to Basswood Lake, 1092 acres near Wind Lake and 580 acres near Wood Lake. Also scheduled for 2008 are 1457 acres near Boot Lake and 1751 acres near Basswood Lake in 2010. Firefighting resources, funding and weather conditions all need to come together at one time for completion of these burns, therefore all dates are approximate.

**Mineral Exploration:** Currently three groups have been authorized to drill prospecting holes in the project area. An environmental analysis was conducted on the proposal. On November 27, 2007, Kawishiwi District Ranger Mark E. Van Every issued three Decision Notices and Findings of No Significant Impact on the Environmental Assessment for Kawishiwi Minerals. The nearest drill site to the BWCAW is approximately 1 1/2 miles. Significant issues identified through public scoping include road access and noise impacts to the BWCAW, a nearby campground, and some summer recreation residences. Alternative 3 was selected to be implemented and this alternative limits exploration activities to winter when BWCAW and other recreational use is low. Therefore, fewer people would be impacted by the noise. The decision indicates that mineral exploration noise may
be heard in the wilderness near the South Kawishiwi River area (entry point 32). The decision notices include direction for noise abatement measures that would reduce the impact of the noise to private residences and other recreation visitors. The desired social condition outlined in the Forest Plan under BWCAW Management Direction (page 3-66, Table BWC-1) for this area is Semi-primitive Non-motorized where opportunities for experiencing isolation and solitude are moderate to low. See respective Decision Notices for Franconia Minerals Corporation, Encampment Resources LLC, and Duluth Metals Corporation available on the Forest Service web page at www.fs.fed.us/r9/superior.

Cumulative effects of noise and therefore impacts to wilderness solitude from mineral exploration and Glacier Project Area harvest activity would not increase the decibel level of noise in the area. The noise, if heard at all, would remain small in scope. There could be an increase in the number of winter days that noise is heard from exploration or harvest operations depending on whether the timing of activities is concurrent or separate. Timber harvest activities are expected to be completed within ten years and mineral exploration activities are expected to be completed within five years. Therefore, there would be only short-term, minor effects, if any, to wilderness character contributed by minerals exploration activity.

**Forest-wide Travel Management Project (TMP):** This proposal addresses Off-Highway Vehicle (OHV) travel management on existing National Forest System roads and National Forest System trails. The proposal also addresses those routes not currently authorized or available for OHV travel. Additionally the proposal addresses the future management of unclassified roads, whether to designate them as National Forest System roads, National Forest System trails, potential special use authorization routes, or to decommission roads not needed for long-term resource management.

The Glacier Project Area includes a small portion of the roads considered in the Travel Management Project (see Travel Management Project Alternative 3 Proposed Action within Glacier Project Area, Project Record). In the TMP proposed action, no new roads within the Glacier PA are proposed to be open to ATVs, roads not needed for long term resource management would be closed and unclassified roads near the BWCAW with the potential to invite unauthorized motorized use in the wilderness would be decommissioned or closed to motorized use. Therefore, the travel management project would reduce the cumulative effects of sound on the wilderness character of the BWCAW. See Transportation Section 3.16 for a summary of Travel Management proposed road actions in the Glacier Project Area.

**Conclusion of Direct, Indirect, and Cumulative Effects**

District recreation and wilderness staff met on November 13, 2007 to review potential effects to wilderness character from proposed Glacier Project vegetation management as well as other activities such as mineral exploration, motor use on lakes and roads, and activities on other lands to provide context to the setting and general character of project area land adjacent to the BWCAW. In a number of locations, sound from outside the BWCAW can be heard from travel routes and campsites within the wilderness.

For instance, traffic on the Fernberg Road can be heard on occasion from Wood Lake and portions of the north Kawishiwi River. Timber harvest on non-federal lands north of the North Kawishiwi River and adjacent to Lake One has been heard in the wilderness, and motorboat use on Farm, South Farm, Triangle, Tofte, Greenstone, Pickerel, Fall, Moose, and Snowbank Lakes is also likely to be heard from...
some wilderness locations. In addition, Forest Service aircraft can be heard flying routine patrols and are very active during times of high fire danger and active fire suppression. Because activities exist adjacent to the BWCAW that generate mechanical noises that have been heard in the past and will likely be heard into the foreseeable future, some wilderness visitors will continue to experience sounds that may lessen their feeling of solitude when near the boundary of the BWCAW.

Based on the existing character of activities outside the wilderness and management area direction adjacent to the boundary (primarily semi-primitive non-motorized) within the wilderness, visitors aware of their surroundings would expect less isolation and solitude in areas closer to the wilderness boundary than in more remote locations of the wilderness. As cited in the examples of other noise generating activities in the project area adjacent to or within the BWCAW, these sounds are part of the landscape surrounding the wilderness and in most cases are unavoidable.

Noise generated through timber harvest would not have long-lasting effects and most units within one mile of wilderness recreation sites would be harvested during winter when visitor use is significantly lower than in summer. Across the Forest, BWCAW visitor use during the summer season accounts for 98% of total annual wilderness visits (2005/2006 National Visitor Use Monitoring Survey), therefore winter harvest of units near the BWCAW is expected to be an effective mitigation measure designated to lessen the effects of noise on wilderness visitor solitude.

Because of the variety of activities within the project area, including harvest on other ownership, that generate motorized sounds similar to harvest activity noise, it is expected that the addition of Glacier Project management activities, which would create temporary noise, would not add new or different types of noise, nor would the noise be more constant or frequent, than existing noises already heard from the site specific wilderness locations noted in this analysis. Therefore the Glacier Project would not produce adverse direct, indirect or cumulative effects that would change the existing character of the BWCAW.
This page intentionally blank.