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15. SUBJECTS OF NOTE

15.5 ACCESS

15.5.1 Introduction

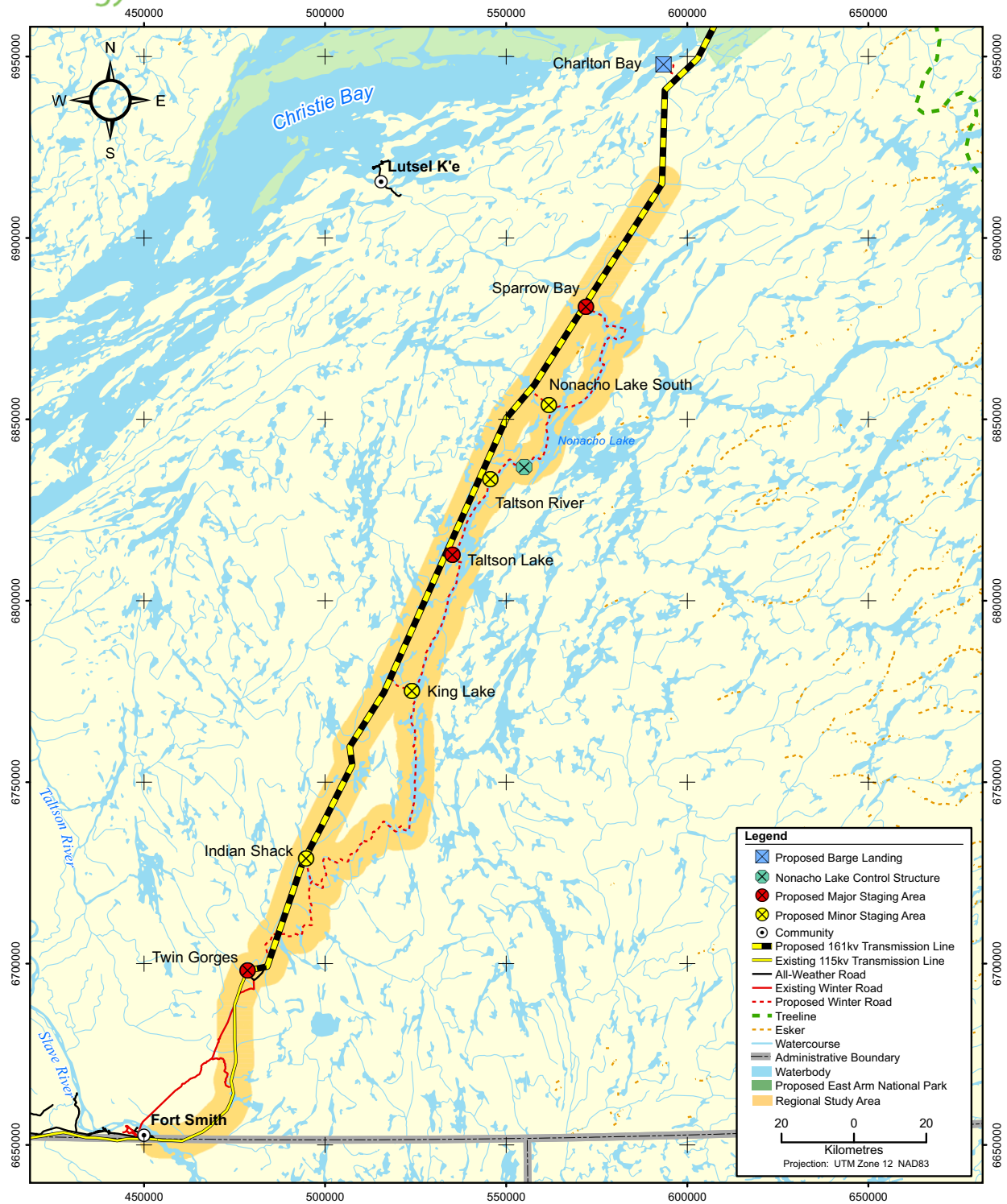
The purpose of the Subject of Note (SON): Access was to meet the Terms of Reference (ToR) for the Taltson Developer's Assessment Report (DAR) (Mackenzie Valley Environmental Impact Review Board [MVEIRB] 2008a).

Access by humans to pristine areas may cause a number of effects. The effects to wildlife caused by linear corridors (e.g., roads, seismic lines, transmission lines, pipeline corridors, and railways) may include individual disruption, social disruption, habitat avoidance, habitat disruption, direct and indirect mortality, and population effects (Jalkotzy et al. 1997). Of the various linear corridors, roads probably have the greatest effect on wildlife, beyond that of direct habitat loss. In particular, hunting from roads can be the primary source of disturbance for wildlife (Jalkotzy et al. 1997), and this may increase with the construction of new roads. For example, James and Stuart-Smith (2000) found some evidence that human harvesting of caribou was more likely to occur near linear corridors in northeastern Alberta, while elk are more frequently seen along roads within parks with hunting restrictions (Jalkotzy et al. 1997). Hunting from winter roads in the Northwest Territories (NWT) has been documented by Ziemann (2007); the harvesting of caribou, moose, wolf and wolverine from the Tibbitt to Contwoyto winter road was recorded, as well as other land uses, such as ice fishing, firewood cutting, and sightseeing.

During the scoping exercises, concerns were raised about the possible effects of winter road construction and access (MVEIRB 2008). Winter roads would be pioneered for the Taltson Hydroelectric Expansion Project (the Project) in 2009, and operated between 2009 and 2012. These winter roads would facilitate access to an area that is currently difficult to access by snowmachine, and impossible by car or truck. New access to these areas may change land use patterns, both during construction, and after construction (i.e., when the winter roads would not be maintained, but the corridor would remain). Winter roads for the Project can be divided into four groups:

- the re-commissioned Fort Smith to Twin Gorges winter road in the southern sector;
- the proposed Twin Gorges to Nonacho Lake winter road and associated spurs to the six southern sector laydown areas;
- the proposed narrow winter roads connecting the six southern sector laydown areas to the transmission line route; and
- the proposed spur roads connecting the northern sector laydown areas to the Tibbitt to Contwoyto winter road.

The TOR refers specifically to the effects of access on the southern sector winter roads emanating from Fort Smith (MVEIRB 2008). The scope of this assessment includes all winter roads used for access from Fort Smith to Nonacho Lake (MVEIRB 2008) (see Figure 15.5.1).



The construction of the transmission line is based upon three sectors:

- the southern sector – constructed by winter roads originating in Fort Smith;
- the Great Slave Lake sector – constructed from barge landing points on Great Slave Lake; and
- the northern sector – constructed via winter road from Yellowknife, the Tibbitt to Contwoyto winter road.

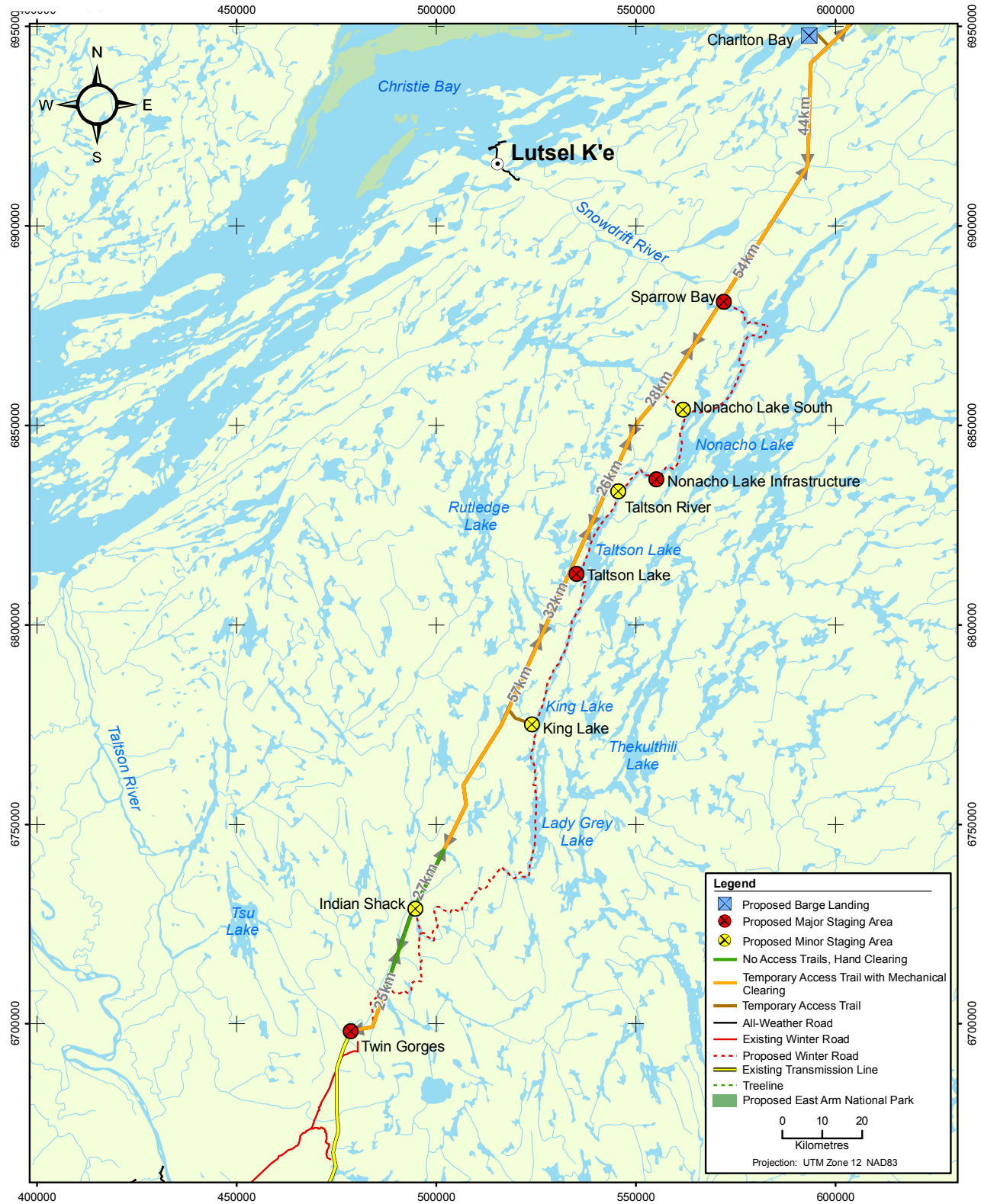
No winter roads are proposed in the Great Slave Lake sector. The proposed roads within the southern and northern sectors are detailed below.

15.5.1.1 SOUTHERN SECTOR WINTER ROADS

The approximately 60 km winter road alignment from Fort Smith to Twin Gorges has not been used as a winter road for approximately 17 years (although it has been used for access by snowmobile). This winter road would be restored to provide access to Twin Gorges. A second winter road would be constructed to provide access to the six laydown areas between Twin Gorges and Nonacho Lake. The primary function of this approximately 250 km winter road would be to transport materials to the laydown areas between Twin Gorges and Nonacho Lake. Traffic would mainly consist of haul trucks.

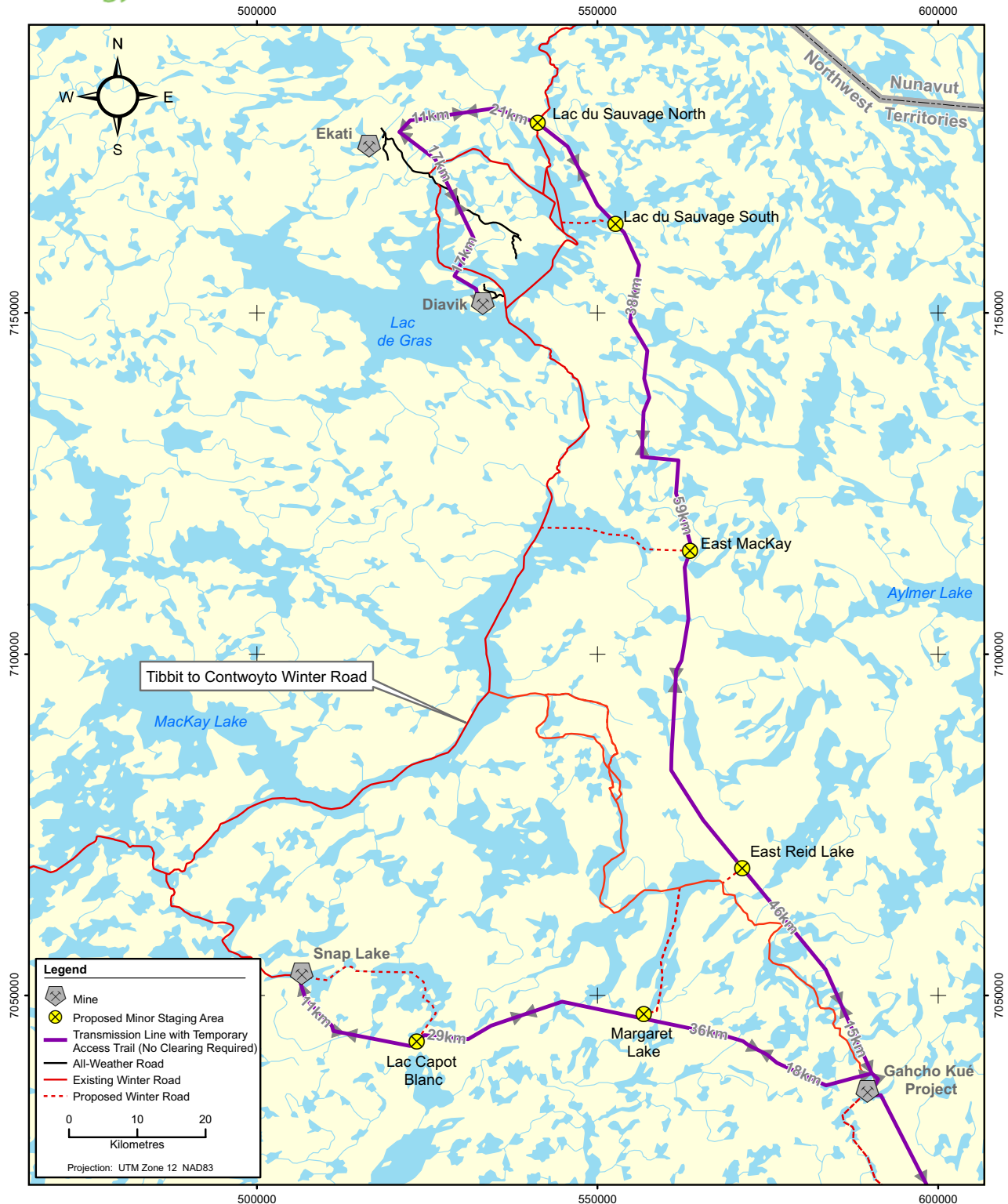
Narrow winter roads, or temporary access trails, would commence at the laydown areas and would proceed to, and then within, the transmission line route right-of-way (ROW). The temporary access trails are expected to be approximately 5 m wide, and would allow small-vehicle access along the transmission line route. These temporary access trails would be contained within the transmission line ROW, except where detours around topographic features are required. These winter roads would be used within both the boreal and tundra sections of the transmission line route, and would transport workers and materials (to which helicopters would provide a supporting role).

Most of the boreal section of the transmission line ROW would be mechanically cleared to the ground, for a total width of 15 m to 30 m. Other areas (e.g., within the proposed East Arm National Park boundaries, or where topography makes winter roads difficult to build and maintain) would be selectively hand cleared, retaining all vegetation below 3 m in height; an exception would be the footprint for each tower, which would be cleared to the ground for a 15 m radius. Clearing of these other areas would not utilize temporary access trails (see Figure 15.5.2).



15.5.1.2 NORTHERN SECTOR WINTER ROADS

Spur roads would be constructed to connect the Tibbitt to Contwoyto winter road with the six laydown areas required in the northern sector of the transmission line. Some of these spur roads may be extensions of existing spur roads (e.g., those to the Snap Lake Mine and the Gahcho Kué Project), or emanate directly from the Tibbitt to Contwoyto winter road. For example, an access road to the Snap Lake Mine departs from the Tibbitt to Contwoyto winter road approximately 300 km from Yellowknife (at MacKay Lake). From the Snap Lake Mine, a second spur would be required to reach the Lac Capot Blanc laydown area. The driving distance between the Tibbitt to Contwoyto winter road and the Lac Capot Blanc laydown area would be approximately 65 km. By contrast, the Lac du Sauvage south laydown area would be accessible via a spur road of 5 km or less from the Tibbitt to Contwoyto winter road at approximately 380 km from Yellowknife (see Figure 15.5.3).



15.5.1.3 OTHER ACCESS ISSUES

During public hearings for the Project (MVEIRB 2008a), few concerns were raised regarding the proposed winter road spurs from the Tibbitt to Contwoyto winter road (i.e., northern sector winter roads). Public use of the Tibbitt to Contwoyto winter road has been monitored since 2003 through a checkpoint at Dome Lake, and current land use has been documented (Ziemann 2007). Further, the Project winter road spurs from the Tibbitt to Contwoyto winter road would be shorter (30 km or less), are predicted to have a negligible environmental effect relative to the winter roads in the southern sector (as the clearing of trees is not required), and would be farther from the nearest community (the first spur leaves the Tibbitt to Contwoyto winter road approximately 300 km from Yellowknife). For these reasons, the proposed northern sector winter roads are anticipated to have negligible effects on the existing environment, and were not assessed further.

Other issues related to the proposed new winter roads include effects to navigability and aviation safety, effects to traditional land use, and effects to fish. Rivers and lakes in the Taltson watershed have been traditionally used as travel routes. The proposed winter roads, instream works, and barge landing points may affect the navigability of these routes through the blocking or alteration of rivers. Aircraft frequently use major rivers as a navigation guide, raising concerns about the safety hazards introduced by a transmission line. Traditional trails and portages may be affected as a result of the forest clearing and construction of facilities proposed for the Project. Finally, concerns were raised regarding the effect that winter road traffic may have on fish beneath the winter road.

15.5.2 Spatial Boundary of the Assessment

The spatial scope of the assessment of local and regional effects (i.e., effects study area) of improved access included the following (see Figure 15.5.1):

- the proposed southern sector winter roads, which include a 5 km buffer to include the area where people might hunt, trap or fish from the winter roads by snowmachine or snowshoe;
- the Fort Smith to Twin Gorges winter road;
- the Twin Gorges to Nonacho Lake winter road;
- the spur roads connecting the Twin Gorges to Nonacho Lake winter road to the six proposed laydown areas; and
- the temporary access trails connecting the staging areas to the transmission line route and along the length of the transmission line route.

All of these roads are contained within the Taiga Shield Ecozone and are located south of the treeline (see Figure 15.5.1). Also included in the study area is the transmission line route, with a 100 m buffer, which was used to assess effects of this structure on navigability and aviation safety.

15.5.3 Valued Components and Assessment Endpoints

Five Valued Components (VCs) were selected to represent the potential issues of concern, including effects to wildlife harvesting, to water quality at river crossings, and to traditional land users who harvested in the area prior to the construction of the proposed winter roads. These VCs and their associated assessment endpoints are presented in Table 15.5.1.

Table 15.5.1 — Valued Components and Assessment Endpoints

Valued Component	Assessment Endpoints
Fish	Persistence of fish abundance and distribution
Moose	Persistence of moose abundance and distribution
Caribou	Persistence of caribou abundance and distribution
Land use activities	Continued opportunities for hunting and trapping
People	Continued air and surface navigability

Source: MVEIRB 2008

15.5.4 Pathways Analysis

A key component of the assessment process was to identify and focus on the areas where the Project may influence the physical and biological environment, after mitigation has been considered. This involved assessing how each of the Project components may affect VCs. A linkage between a Project component and a VC is required to create a valid pathway. For example, the winter roads could be used to hunt caribou, and vegetation clearing may reduce wildlife habitat. Potential pathways through which the Project could affect VCs were identified through a review of comments received during the MVEIRB public scoping sessions. These sessions were held in Łutsel K'e, Fort Resolution, Fort Smith, Hay River, and Yellowknife in November and December 2007. Potential pathways were identified from the scoping process conducted by the Mackenzie Valley Land and Water Board, which included the consultation of government, regulatory, and aboriginal agencies. Further issues were also derived from Dézé Energy Corp. (Dézé) public information sessions held in Hay River, Fort Providence and Fort Smith in March 2004 (reported in Rescan 2004). Pathways that did not lead to VCs were not considered further.

15.5.4.1 MITIGATION

Mitigation refers to practices used to eliminate or reduce environmental effects from Project pathways. Effects remaining after mitigation are referred to as residual effects. Mitigation has been divided into two categories:

- mitigation practices – refer to any activity, strategy, or practice used to reduce or avoid a negative effect (e.g., managing camp waste)
- mitigation design features – refer to any Project component either designed or incorporated into the Project to eliminate or reduce a negative effect (e.g., changing the transmission line route to avoid sensitive areas)

A summary of the mitigation practices and design features to limit effects associated with access is provided in Table 15.5.2. The key mitigation practice that would be used to reduce effects from access involves restricting public use of all southern sector winter roads (see Figure 15.5.1). These winter roads are intended to be private, and access would only be permitted to vehicles involved in Project construction. The general public would not be permitted access to these roads. Gates at the beginning of the Fort Smith to Twin Gorges winter road (on the east side of the Slave River), as well as at the beginning of the Twin Gorges to Nonacho Lake winter road (at Twin Gorges), would be installed to control access.

Table 15.5.2 — Pathways and Proposed Mitigation to Reduce Effects

Project Component	Pathways	Pathway Duration	Valued Component	Mitigation
Fort Smith to Twin Gorges winter road Twin Gorges to Nonacho Lake winter road Temporary access trails	Increased hunting and fishing leading to change in abundance and distribution	Construction Operation	Moose Caribou Fish	Public use of the southern sector winter roads would not be permitted The entrance to the winter road would be blocked at the end of each hauling season (e.g., March) through the use of gates Following construction (e.g., March 2011), the winter roads would no longer be constructed or maintained, and slash would be placed across the lower portages to discourage use
Fort Smith to Twin Gorges winter road Twin Gorges to Nonacho Lake winter road Temporary access trails	Noise from recreational snowmobiles leading to change in wildlife distribution	Construction Operation	Moose Caribou	Public use of the southern sector winter roads would not be permitted The entrance to the winter road would be blocked at the end of each hauling season (e.g., March) with gates, snow berms, and slash Following construction (e.g., March 2011), the winter roads would no longer be constructed or maintained, and slash would be placed across the lower portages to discourage use
Fort Smith to Twin Gorges winter road Twin Gorges to Nonacho Lake winter road Temporary access trails	Noise from winter roads leading to changes in fish distribution	Construction	Fish	Public use of the southern sector winter roads would not be permitted The entrance to the winter road would be blocked at the end of each hauling season (e.g., March) through the use of gates Following construction (e.g., March 2011), the winter roads would no longer be constructed or maintained, and slash would be placed across the lower portages to discourage use
Fort Smith to Twin Gorges winter road Twin Gorges to Nonacho Lake winter road Temporary access trails	Change in navigability of rivers, lakes, and trails	Construction Operation	Land use activities	As per Transport Canada (2008) requirements for minor work, the following mitigation would be implemented at all winter road crossings: Be constructed under frozen conditions All portions of the crossing (including debris) would be removed from the limits of the waterway prior to open-water conditions The bed of the waterway would not be altered Minimum flows of 4 m ³ /s would be maintained within Trudel Creek, to maintain navigability

Project Component	Pathways	Pathway Duration	Valued Component	Mitigation
				<p>As per Transport Canada (2008) requirements for minor work, the following mitigation would be implemented during transmission line construction:</p> <p>Users of the waterway would be provided with safe passage</p> <p>No cables would be submerged</p> <p>Barge landing sites would not interfere with navigable waters</p> <p>Overhead cables would meet CSA Standards for Overhead Systems (CSA 2006)</p> <p>Portage trails interrupted by the Project infrastructure would be re-routed</p> <p>Transmission towers would not be placed on trails</p>
Fort Smith to Twin Gorges winter road Twin Gorges to Nonacho Lake winter road Temporary access trails	Increased access leading to changes in land use activities	Construction and Operation	Land use activities	Portage trail at Nonacho Lake Control Structure would be disturbed, but disturbed sections of the trail would be replaced Public access would not be permitted on new winter roads
Fort Smith to Twin Gorges winter road Twin Gorges to Nonacho Lake winter road Temporary access trails	Erosion at water crossings leading to change in fish abundance and distribution	Construction	Fish	DFO Operational Statements for Ice Bridges and Snow Fills in the NWT would be followed (DFO 2007a) Roads would avoid steep slopes Cut trees may be placed on steep slopes to reduce erosion potential Erosion and Sediment Control Environmental Management Plan would be developed and adhered to Disturbance to riparian zones would be avoided where practical stream crossing locations would consider bank stability and erosion potential Recreational use of construction vehicles would not be permitted Environmental sensitivity training for all staff would include a unit on erosion and sediment control
Fort Smith to Twin Gorges winter road Twin Gorges to Nonacho Lake winter road Temporary access trails	Water withdrawal leading to change in fish distribution	Construction	Fish	DFO Operational Statements for water withdrawal in the NWT would be followed (DFO 2005)

Project Component	Pathways	Pathway Duration	Valued Component	Mitigation
Transmission line	Change in aviation safety	Construction and Operation	Land use activities	Transmission lines and towers would follow applicable guidelines for aviation safety, as outlined in Aerodrome Standards and Recommended Practices (Transport Canada 2005) and Standards for Overhead Systems (CSA 2006) Average tower height would be 22 metres

Notes: CSA = Canadian Standards Association; DFO = Fisheries and Oceans Canada;

Access to the southern sector winter roads would primarily be limited by ice conditions on the Slave River, which provides the only point of ground access to these winter roads. Records from the Mackenzie River crossing at Fort Providence indicate that the average opening date between 2001 and 2006 was December 23 for small traffic (less than 5 tonnes [t]), and January 20 for heavy traffic (greater than 60 t) (Department of Transportation [DOT] 2008). Average closing date between 2001 and 2006 was April 18 (DOT 2008). Opening and closing dates for an ice road crossing the Slave River are expected to be equivalent or less, indicating a maximum access period of 116 days between December 23 and April 18. At the end of each hauling season, the Twin Gorges to Nonacho Lake winter road would be blocked by gates, snow berms, and slash across the road.

At the end of the 2012/2013 winter road season (i.e., February or March 2013), the start of the Fort Smith to Twin Gorges winter road would be permanently blocked by placing slash across the entrance. This would limit access to all the proposed winter roads in future years.

15.5.5 Pathway Validation

Project environmental effects occur when there is a pathway between a Project component or activity and a VC. Pathway validation is the process of screening each pathway to assess its expected contribution to the overall Project residual effects to VCs after mitigation. In the pathway validation step, knowledge of the Project design and mitigation practices are applied to the pathways to assess how each pathway is affected by mitigation. Some pathways may not be affected by mitigation, but others may be reduced or eliminated completely. Each potential pathway was evaluated to determine if it could lead to a change in various components of the environment that could affect a VC. Each potential pathway was evaluated and characterized as follows:

- a valid pathway that could contribute to residual effects to a VC;
- a minor pathway that would involve a change, but have a negligible effect on a VC (e.g., the loss of a small amount of wildlife habitat, or a short-duration stressor such as blasting noise, but have little effect on the population); or
- an invalid pathway that would not result in residual effects to a VC.

Invalid and minor pathway analysis is summarized in Table 15.5.3. Supporting information to justify why a pathway was determined to be invalid or minor is provided below. Invalid and minor pathways were not carried forward into the effects assessment.

Table 15.5.3 — Summary of Pathway Validation

Pathway	Project Phase	Validation
Change in aviation safety	Construction Operation	Invalid
Erosion at water crossings leading to change in fish abundance and distribution	Construction	Minor
Water withdrawal leading to change in fish distribution	Construction	Minor
Change in navigability of rivers, lakes, and trails	Construction Operation	Minor
Noise from recreational snowmobiles leading to change in wildlife distribution	Construction Operation	Minor
Increased hunting and fishing leading to change in abundance and distribution	Construction Operation	Minor
Increased access leading to changes in land use activities	Construction Operation	Minor
Noise from winter roads leading to changes in fish distribution	Construction	Minor

15.5.5.1 INVALID PATHWAYS

Invalid pathways are pathways that would not result in residual effects to a VC. Evidence is provided below to explain why the pathway was determined to be invalid. These invalid pathways would not be considered further.

15.5.5.1.1 Change in Aviation Safety

Pilots often use rivers and transmission lines as navigation guides. There are existing controlled and uncontrolled airstrips in the region, and aircraft on floats and skis may access much of the study area. Concerns were raised regarding the effects to aviation safety as a result of the proposed transmission line (MVEIRB 2008).

The hazards to aviation safety from transmission lines are well understood in the aviation industry, and appropriate mitigation has been developed. For example, aviation charts illustrate the location of all major transmission lines, and it is anticipated that the Project transmission line would be added to future editions of these maps. Transmission lines and towers in the vicinity of airstrips would be constructed following the applicable guidelines for aviation safety, as outlined in the Aerodrome Standards and Recommended Practices (Transport Canada 2005). Further mitigation is provided in the Standards for Overhead Systems (CSA-C22.3, CSA 2006), which requires visual aids along transmission lines at river crossings. Finally, the transmission line would generally be less than 25 m above ground level (although some large spans may require higher towers). As a result of these existing mitigation actions, the presence of the Project transmission line and towers are not expected to present a hazard to aviation. Therefore, this pathway was determined to be invalid.

15.5.5.2 MINOR PATHWAYS

Minor pathways are those that would involve a change, but have a negligible effect on the VC. Evidence is provided below to examine why the changes resulting from each pathway would result in a negligible effect. Minor pathways were not carried forward to the effects assessment.

15.5.5.2.1 Erosion at Water Crossings Leading to Change in Fish Abundance and Distribution

It is possible for erosion to occur at various water crossings during the refurbishing of the former road alignment from Fort Smith to Twin Gorges and construction of the road from Twin Gorges to Nonacho Lake. The following mitigation practices would be implemented to reduce or eliminate erosion:

- avoiding steep slopes,
- placing cut trees on slopes that have erosion potential,
- considering bank stability and erosion potential during construction,
- prohibiting the use of recreational vehicles by gates at Slave Lake and Twin Gorges, and
- stopping road maintenance after 2012.

Additionally, Fisheries and Oceans Canada (DFO) has specific operation statements for ice bridges and snow fills, overhead line construction, and water withdrawal (DFO 2007a; DFO 2005). When followed, these mitigation practices would reduce erosion potential. Therefore, the pathway analysis for erosion due to the winter roads was determined minor.

15.5.5.2.2 Water Withdrawal Leading to Change in Fish Distribution

DFO has issued guidance documents outlining the suggested protocol for water withdrawal at winter roads, and for construction and operation of ice bridges. The Protocol for Winter Water Withdrawal in the NWT (DFO 2005) and the Operational Statement for Ice Bridges and Snow Fills (DFO 2007a) would be followed. DFO stated that adverse effects to fish and fish habitat would be mitigated if a Project adheres to the DFO Operational Statements and guidelines. Therefore, this pathway was determined to be minor.

15.5.5.2.3 Changes to Navigability of Rivers, Lakes and Trails

Effects to navigable waters are possible through four Project components:

- Nonacho Lake Control Structure and the Twin Gorges facilities causing changes to hydrology, winter road crossings;
- transmission cables spanning rivers and lakes; and
- barge landings.

The proposed changes to the hydrology regime of the Taltson River have the potential to affect navigability (see Section 14.3 – Project Description, for a summary of changes to Taltson River hydrology).

The Taltson River is used infrequently for navigation (see Section 9.6.5). Because of the Project's isolation from Great Slave Lake (due to both distance and unnavigable rapids on the lower Taltson River), only small vessels (e.g., canoes) could penetrate the study area. The overall effect of the changes to navigability resulting from an altered hydrological regime was determined to be negligible.

The existing facilities at Twin Gorges (South Valley Spillway and the Twin Gorges Plant) present a current and historic impediment to navigation. These facilities would not change under the Project; therefore, there would be no alteration to baseline navigability. The Nonacho Lake Control Structure would undergo modifications (see Section 6.3.2), but these modifications would have a minimal effect on current navigability.

With regards to winter road crossings of navigable waters, construction methods would adhere to Transport Canada's Navigable Waters Protection Division requirements for "minor work" (Transport Canada 2008). Therefore, there would be no changes to the navigability of rivers, lakes or trails.

The overhead transmission cable crossings would not constitute minor work as cables would be present within 1,000 m of a lake, and several waterways of greater than 15 m would be crossed (Navigable Waters Protection Division 2008). The overhead transmission line would span all navigable waters and is not expected to change navigability. In addition, all crossings would be located in areas that are difficult to access (i.e., accessible by canoe only). Therefore, the effect of the overhead transmission line was determined to be negligible.

Landings for the construction barges would not be located in areas that impede passage of navigable waters. Therefore, the effect of the barge landings was determined to be negligible.

There are some portage routes within the study area that may be affected. Several portages, such as the trail from Fort Reliance to Parry Falls on the Lockart River, and Pike's Portage connecting Great Slave Lake to Artillery Lake, would be crossed by the transmission line. The minimum height of the towers would be 22 m, and the transmission line must maintain a minimum height of 6 m above vegetation. Transmission towers would not be placed on the trails. As such, no changes to the navigability of these trails are predicted.

One known portage at the outflow of Nonacho Lake is expected to be interrupted at the site of the Nonacho Lake control structure. The portage crossing the rapids at the outflow of Nonacho Lake is currently aligned over areas that would be disturbed by the proposed upgrades to the Nonacho Lake control structure, as well as associated spoil piles and laydown areas at this site. No heritage resources were identified on the trail (see Section 15.13 – Heritage Resources). The beginning and end of the portage would not be disturbed, and it is proposed that sections of this portage trail be re-routed as required to maintain access. Therefore, the effects to existing travel routes were considered to be negligible and this pathway was determined to be minor.

15.5.5.2.4 Noise from Recreational Snowmobiles Leading to Change in Wildlife Distribution

Noise from recreational snowmobiles on the new southern sector winter roads may cause disturbance to wildlife such as caribou and moose. It is anticipated that these effects should be limited by restricting access to the southern sector winter roads to Project vehicles. In this way, many of the concerns regarding effects due to improved access would likely be mitigated. A summary of anticipated noise attenuation distances from Project construction is provided in Appendix 12C. Noise from helicopter operations, which is a similar or greater source of noise to snowmachines, is anticipated to reach background levels within 2.5 km. The helicopter noise may still be audible at this distance as its character would be different from natural sounds.

The winter road from Fort Smith to Nonacho Lake would be closed with locked gates in two locations (Slave River and Twin Gorges), and only Project vehicles would be permitted to use the road. Further, the entrance to the winter road at the Slave River would be blocked at the end of each hauling season, and would be permanently blocked following construction (as requested by ENR 2007a). Despite these measures, it is anticipated that some unauthorized use of the winter roads may occur either at the end of each winter road season, or during the operations period when the winter road is no longer maintained. If this occurs, there may be minor periodic influences on moose and caribou distribution within 5 km of the winter roads. However, the number of recreational snow machines is anticipated to be low, and the effect is predicted to be negligible. Therefore, this pathway was determined to be minor, and was not assessed in the effects analysis.

15.5.5.2.5 Increased Hunting and Fishing Leading to Change in Abundance and Distribution

The proposed southern sector winter roads could open new areas that were previously inaccessible to hunters. However, the old winter road alignment from Fort Smith to Twin Gorges is currently accessible in winter by snowmobile. Thus, the Project would only augment snowmobile access for the regions beyond Twin Gorges, approximately 60 km drive from Fort Smith. Further, Dézé intends to control use of the proposed winter roads. By limiting the use of the road to vehicles involved in Project construction and restricting the use of the roads by the public, many of the concerns regarding effects due to improved access should be mitigated. The winter road from Fort Smith to Nonacho Lake would be closed with locked gates in two locations (Slave River and Twin Gorges), and only Project vehicles would be permitted to use the road. Further, the entrance to the winter road at the Slave River would be blocked at the end of each hauling season, and permanently blocked following construction (as requested by ENR 2007a). Despite these measures, it is anticipated that some unauthorized use of the winter roads may occur, leading to some hunting in previously inaccessible areas.

In addition to the proposed mitigation, information on the densities and distribution of caribou and moose indicate that there would be no clear advantage to using the Twin Gorges to Nonacho Lake winter road for hunting. With regards to moose, there is little overlap between the winter road season and the moose hunting season. The winter access road for the Project would typically be in operation from late January or early February through March. As the moose hunting season for resident hunters lasts from September 1 to January 31 (ENR 2007b), there is limited opportunity for resident hunters using the winter access road to harvest moose within the study area. Further, the Taiga Shield Ecozone (in which the Twin Gorges to Nonacho Lake

winter road lies) likely has a lower density of moose than the Taiga Plain Ecozone (in which Fort Smith is located). Moose select areas of thick vegetation, willows and young forest; these areas are less common within the Taiga Shield Ecozone, which is characterized by extensive rock outcrops of the Precambrian Shield (Cluff 2005). Aerial surveys indicated an average of 2.75 moose per 100 square kilometres (km²) in the Taiga Shield Ecozone at the North Arm of Great Slave Lake compared to 3.99 moose per 100 km² in the adjacent Taiga Plain Ecozone (Cluff 2004). With regards to caribou, the southern extent of the Bathurst caribou range ends near the southern end of Nonacho Lake (approximately 350 km driving distance from Fort Smith). Satellite collar records from this herd indicate that their presence in this region is irregular. With regard to changes to fishing patterns, this would be limited to the winter season, and would only be improved for areas past Twin Gorges, or over 60 km from Fort Smith.

Increased access is expected to result in a minor change in the abundance and distribution of caribou, moose and fish within the study area. Mitigation practices should limit access to winter roads, and the naturally low density of moose and caribou suggests that travel into this area by hunters may not be an effective hunting strategy. Unauthorized access would likely be associated with the periodic harvesting of caribou, moose and fish. However, the number of animals harvested should be within the range of current conditions, and have a negligible effect on persistence of their respective abundance and distribution. Construction activity and helicopter operations are anticipated to cause noise levels above background criteria, but these effects are limited to the three year construction period. In addition, these effects would be seasonal (most construction activity taking place during the winter), and would not extend beyond the regional study area. Therefore, this pathway was determined to be minor.

15.5.5.2.6 Increased Access Leading to Change in Land Use Activities

During the scoping sessions for the Project, concerns were raised regarding the potential effects that increased access may have on the way of life of Aboriginal persons who harvest in the vicinity of the development. It is known that Aboriginal peoples have historically harvested fish and wildlife in this region, and continue to practice traditional land use activities. For example, Łutsel K'e Dene First Nation (2002) reported that caribou are hunted in the vicinity of the Project, and traplines extending from Łutsel K'e to Nonacho Lake, which intercept the transmission line route and winter roads, are used to harvest marten, mink, wolverine, wolf, fox, and lynx.

The winter roads proposed for the Project would improve access during the trapping season (January to March). However, Dézé intends to control access to the winter roads. Further, the winter roads are only accessible when the Slave River is frozen, and would be blocked with slash at the end of construction. Although some unauthorized access is expected to result in the periodic harvesting of fish and wildlife, changes to traditional land use practices are anticipated to be minor. The number of animals harvested, as well as the number and frequency of new users entering the study area, should be within the range of baseline conditions and have a negligible effect on the continued opportunity for traditional use of resources. Therefore, this pathway was determined to be minor.

15.5.5.2.7 **Noise from Winter Roads Leading to Changes in Fish Distribution**

The vehicular traffic associated with the winter road has the potential to create an acoustic disturbance to fish. Stewart (2003) conducted a literature review to evaluate effects of noise and vibration on fish at winter road crossings in the Mackenzie River area. The results of the review indicated that although there is little information available, heavy trucks are not likely to generate sound pressure high enough to result in physical damage to fish or to cause alarm response. However, species with sensitive hearing (such as suckers and minnows) may avoid ice roads (Stewart 2003). Mainstream Aquatics Ltd. (2005) performed further assessment of the noise effects in the Mackenzie River area; the results of this review supported Stewart (2003). Although the noise produced by heavy trucks was within the hearing range of fish in the vicinity of winter crossing, the effects of the noise on fish were expected to be minimal and to not result in any physical damage. Further, fish typically occupy deep water areas during the winter months, where attenuation would further reduce noise levels. Therefore, noise effects would result in negligible changes to fish health and distribution, and the pathway was considered minor.

15.5.6 **Residual Effects Analysis**

No valid pathways related to access were identified. As such, a residual effects analysis was not required for SON Access.

15.5.7 **Uncertainty**

The primary source of uncertainty in the pathways analysis presented here is the efficacy of the proposed mitigation practices and designs for controlling access during and after the winter hauling season, and following the construction phase. Although a range of strategies is anticipated to restrict access to the winter roads, it remains likely that some unauthorized use of winter roads could occur. The mitigation suggested is expected to be successful at stopping unauthorized cars and trucks, but ultimately there are few physical barriers that can permanently block snowmachines. Other measures, such as signs, public meetings, and staffed checkpoints on the winter road may be required to control access by snowmachines.

Another source of uncertainty in the assessment of effects of access on the environment is the development of reasonably foreseeable future Projects in the study area. The reasonably foreseeable future Projects, are provided in Chapter 10 – Methods; however, none were identified within the study area for this subject of note.

15.5.8 **Monitoring**

Three categories of monitoring were identified in the TOR, as follows:

- Compliance inspection: monitoring the activities, procedures, and programs undertaken to confirm the implementation of approved design standards, mitigation, and conditions of approval and company commitments.
- Environmental monitoring: monitoring to track conditions or issues during the development lifespan, and subsequent adaptation of Project management.
- Follow-up monitoring: programs designed to verify the accuracy of effect predictions, to reduce uncertainty, and to determine the effectiveness of mitigation.

If monitoring or follow-up were to detect effects beyond those predicted, unanticipated effects, or the need for improved or modified design features, then adaptive management would be implemented. This may include increased monitoring, changes in monitoring plans, or additional mitigation.

Dezé would hire environmental monitors during the Project construction phase to oversee issues such as camp waste disposal, human-wildlife conflicts, and management of any unanticipated Project conflicts with wildlife. The objective of this environmental monitoring would be to track issues as they arise, and to suggest subsequent adaptive management. To test the effectiveness of the proposed mitigation (i.e. follow-up monitoring), unauthorized use of the proposed winter roads from Fort Smith to Twin Gorges and from Twin Gorges to Nonacho Lake would be documented by the environmental monitors. Further, any evidence of wildlife harvesting, ice fishing, recreational snowmobiling, firewood harvesting, camping, or any other such activities would be recorded. Similar monitoring is conducted by ENR on the Tibbitt to Contwoyto winter road (see Ziemann 2007).