

**Draft**  
**Generic Environmental Impact Statement**  
**for the Proposed**  
**Lewis County ATV Trail System**

**May 2008**

**DGEIS Prepared for:**  
**Lewis County, as Lead Agency**  
**Lewis County Court House**  
**7660 North State Street**  
**Lowville, New York 13367-1396**

**For further information, contact:**  
**Richard J. Graham, County Attorney**  
**(315) 376-5282**

Accepted by Lead Agency

Date: May 15, 2008

Public Hearing

Date: June 5, 2008

Deadline for Receipt of Comments

Date: June 17, 2008

DGEIS Prepared by:



*Engineers • Environmental Scientists • Planners • Landscape Architects*

**290 Elwood Davis Road**  
**Box 3107**  
**Syracuse, New York 13220**

## Table of Contents

<u>Section</u>	<u>Page</u>
Preface.....	1
Summary.....	1
Glossary of Terms.....	2
1.0 General Description of Proposed Action.....	4
2.0 Background ..	6
3.0 Public Need and Benefits .....	8
4.0 Project Description .....	9
4.1 Purpose .....	9
4.2 Project Features .....	9
4.3 Permits and Approvals Required .....	10
4.4 Future Implementation Steps.....	10
5.0 Environmental Setting, Potentially Significant Adverse Environmental Impacts, and Proposed Mitigation Measures.....	11
5.1 Vegetation, Wildlife, and Ecologically Sensitive Areas .....	11
5.1.1 Vegetation.....	11
5.1.2 Wildlife .....	15
5.1.3 Ecologically Sensitive Areas .....	19
5.2 Historic and Archaeological Resources .....	20
5.3 Surface Water Resources.....	21
5.4 Wetlands.....	24
5.5 Soils.....	25
5.6 Noise.....	29
5.7 Air .....	35
5.7.1 Emissions.....	35
5.7.2 Dust.....	41
5.7.3 Odor .....	43
5.8 Transportation Facilities and Traffic.....	44
5.9 Recreational Activities.....	45
5.10 Growth and Character of the Community.....	49
5.11 Community Services .....	51
5.12 Visual Resources .....	52

## Table of Contents - Continued

<u>Section</u>	<u>Page</u>
6.0 Unavoidable or Inadequately Mitigated Adverse Impacts.....	54
7.0 Irreversible and Irretrievable Commitments of Resources.....	55
8.0 Effects on the Use and Conservation of Energy.....	56
9.0 Alternatives Analysis .....	57
9.1 No Action Alternative .....	57
9.2 Alternative 1 – Alternative Routes on County Reforestation Areas.....	57
9.3 Alternative 2 –Private Development of Trail System.....	58
10.0 Cumulative Impacts.....	59
11.0 Future Expansion .....	60
12.0 Bibliography.....	61

### Tables

Table 1 – Common Sound Levels.....	30
Table 2 – Approximate Addition of Sound Levels.....	33

### Figures

Figure 1 – Project Location	
Figure 2 – Proposed Trail System	
Figure 3A – Cronk Road Reforestation Trail Area 1	
Figure 3B – Barnes Corners Trail Area 2	
Figure 3C – Jackson/Parker Roads Trail Area 3	
Figure 3D – New Bremen County Reforestation Trails Area 4	
Figure 3E – Turin and Marty’s Trail System Area 5	
Figure 3F – Town of Greig Trails Area 6	
Figure 3G – North and South Holmes Reforestation Trails Area 7	
Figure 3H – Culpepper Road and Tug Hill Inn Trail Area 8	
Figure 3I – Culpepper Road Reforestation Trail Area 9	

## Table of Contents - Continued

### Appendices

Appendix A – Agency Correspondence

Appendix B – Ecological Resource Assessment Report

Appendix C – Lewis County Recreational Trails Plan – ATV Trails

Appendix D – Tug Hill Region ATV Economic Impact Study

## **Preface**

The use of All Terrain Vehicles (“ATV’s”) as a recreational activity has become increasingly popular both nationally and statewide. Lewis County has certainly felt the impact from this increased interest in outdoor motorized sports due to its vast natural resources. The Lewis County Board of Legislators has determined that is in the public’s interest to take the initiative in managing this activity through the creation of a County-wide ATV trail system. The County believes that a coordinated trail system will help to identify and manage the safe and responsible use of existing resources as well as set forth consistent parameters for managing future development. The first step in assembling such a system is to perform an analysis of the potential environmental impacts that may result. This Draft Generic Environmental Impact Statement (DGEIS) was therefore prepared at the Legislators’ request as part of that analysis.

## **Summary**

Lewis County is proposing the development of a County-wide system of trails and roads for use by all-terrain vehicles (ATVs). This system is analogous to the long-standing snowmobile trail network in place within Lewis County for many years. The purpose of this proposed ATV system is to capture additional tourism revenues during the non-winter months, by providing a destination for ATV owners where they can ride a County-wide system of well-managed, safe, and environmentally sound trails.

In accordance with the requirements of the State Environmental Quality Review Act (“SEQRA”), Lewis County has assumed Lead Agency status for environmental impact review purposes, and has decided to prepare a Draft Generic Environmental Impact Statement (“DGEIS”) for the project. This DGEIS identifies and evaluates the potentially significant environmental impacts associated with the operation and use of such a network, including potential impacts to air, land and water resources, wetlands, wildlife, historic sites, community character and community services. Where necessary, impact mitigation methods or actions have been identified and incorporated into the

review process. Once this DGEIS is deemed complete and adequate for public review, it will be publicly posted to allow receipt of public and agency comments for Lead Agency response.

## **Glossary of Terms**

### Abbreviations and Acronyms:

ATV:	All terrain vehicle
BMP:	Best management practice
CO:	Carbon monoxide
dB:	Decibel, a unit of sound pressure
dB(A):	A-weighted decibel scale; unit used to measure the loudness of sound, weighted towards the sound frequencies to which the human ear is most sensitive (20 Hz – 20,000 Hz)
DGEIS:	Draft Generic Environmental Impact Statement
EPA:	Environmental Protection Agency
Ft:	feet
HC:	hydrocarbon
Hrs:	hours
Hz:	Hertz – number of wave cycles occurring in one second
M:	meter
NO <sub>x</sub> :	nitrogen oxides
NAAQS:	National Ambient Air Quality Standards
NYSDEC:	New York State Department of Environmental Conservation
NYSOPRHP:	New York State Office of Parks, Recreation, and Historic Preservation
NYSORVA:	New York State Off-Road Vehicle Association

OHV: Off-highway vehicle

PM: Particulate matter, PM<sub>10</sub> is the fraction smaller than 10 microns and PM<sub>2.5</sub> is the fraction smaller than 2.5 microns

SAE: Society of Automotive Engineers

SEQRA: State Environmental Quality Review Act

SO<sub>2</sub>: Sulfur dioxide

USDA: United States Department of Agriculture

VOC: volatile organic compounds

## 1.0 General Description of Proposed Action

Lewis County (Figure 1) proposes to establish a County-wide trail system that is capable of supporting use by ATVs. This proposed trail system is a natural outgrowth of the County's longstanding history as a destination for lovers of outdoor motorized recreation. While an extensive network of snowmobile trails currently exists within the County in this regard, few of those snowmobile trails are open to ATV use during the non-winter months. In light of the significant growth in ATV sales nationwide and statewide over the last decade and the proliferation of ATV riders within the County during that same period, the County has identified a need – from an environmental and health and safety standpoint – to provide an organized, marked system of trails upon which ATV enthusiasts can legally ride.

The proposed Lewis County ATV Trails Plan incorporates the use of County reforestation lands and trails across private parcels of land that will be opened to the public. Additionally, the trail system will incorporate connecting town and county roadways (some that are currently permitted for ATV use and others that may be opened in the future, as necessary to connect with existing trails). The end result is intended to form a network of trails that cover a large expanse of the County.<sup>1, 2</sup>

Expansion of the trail system is expected in the future as a result of the County's cooperative efforts in working with local town governments, private landowners, local ATV trail clubs, the New York State Off-Highway Recreational Vehicle Association (NYSORVA), and other groups or individuals affiliated with the ATV industry. This DGEIS is intended to evaluate the overall environmental impacts of a County-wide ATV trail system, but future trail segments proposed for inclusion into the County's trail

---

<sup>1</sup> Several towns have opened their roadways to ATVs under the auspices of the New York State Vehicle & Traffic Law Section 2405(1), whereby these municipalities have determined that "it is otherwise impossible for ATVs to gain access to areas or trails adjacent to the highway" without use of the public roadways.

<sup>2</sup> Initially the proposed system's scope included NYSDEC truck trails. These trails have been removed from this proposal as a result of NYSDEC's recent decision to close these trails to ATVs.

system (whether privately or publicly owned) will undergo site-specific environmental evaluations if considered for addition to the existing trail system. A description of the scope of these necessary reviews and evaluations is included in Section 11.0 of this DGEIS.

The proposed action consists of the development of a unified trail system in Lewis County for use by all-terrain vehicles, including four wheelers and dirt bikes. It is Lewis County's expectation that such development will help make the County a destination location for ATV owners, in much the same way that snowmobile owners view the County today. Additionally, by placing the trail system under the County's authority and supervision, potential environmental impacts and public safety issues can be managed utilizing the combined resources of the County and local municipalities. The goal of the proposed action is to provide a safe, environmentally sound trail system that provides a trail network offering a diverse array of riding experiences which include as many different areas of the County as possible.

## 2.0 Background

Lewis County has a long history of providing an extensive network of trails for the purpose of snowmobile riding within the County and surrounding region by linking with the statewide system of trails developed, maintained, or funded by local, County, and State governments in partnership with snowmobile clubs and club members. With the advent of the all-terrain vehicle (four-wheelers and dirt bikes), a demand emerged for the development of a similar trail network system which could accommodate riders. Lewis County recognized this demand as an opportunity to further expand the tourist economy within the County similar to that experienced with the snowmobile community and decided that it was in the County's interest to pursue development of an integrated trail system.

The County legislature determined that it would prepare a Generic Environmental Impact Statement (GEIS) to thoroughly evaluate the potential environmental impacts associated with the creation of a County-wide ATV trail system. A GEIS is a type of environmental impact analysis that deals in a broad-based or conceptual way with a number of related or similar actions in a single geographic area which may have common impacts or may impact the same set of resources. A GEIS identifies the important elements of the natural resource base, discusses in general terms the constraints and consequences of narrowing future options, and can serve as a base for general projections for future activity or patterns of activities.

It is anticipated that the current proposed base network of ATV trails within the County would be expanded in the future. This expansion will require the County to conduct a series of analyses of as-yet-unknown, site-specific impacts which are too speculative to be properly assessed as part of the current proposed network. The County wishes to create a template for future decision making regarding these expansion opportunities, in order to bring consistency and predictability to the trail expansion process. By providing a broad-based analysis of ATV trail impacts, this GEIS is intended to: organize and economize the County's decision process; establish

criteria for simplifying future impact assessment pursuant to SEQRA; enhance sound environmental planning by allowing consideration of mitigation and alternatives at an early juncture when there is greater flexibility; providing early guidance on significance determinations; and providing public disclosure of agency considerations used in environmental decision making.

### **3.0 Public Need and Benefits**

Many members of the public both within Lewis County and from outside the County and the State of New York own ATV's and desire places to ride them either individually or as part of organized outings with other like-minded persons. Currently, ATV use in Lewis County is poorly regulated and is conducted either illegally on non-approved trails on public lands or on a loose-knit system of private trails and town roads opened to ATVs with limited or no environmental or safety controls and limited connections with the rest of the system.

The establishment of a trail system as proposed here is expected to result in significant inflows of tourist dollars as people from outside of the region learn about the system and choose to spend their recreational dollars in Lewis County. The model for this type of tourism has already been verified through the existence of the snowmobile riders that travel from many areas outside the northeast to ride in Lewis County. A study performed by Camoin Associates for the Cooperative Tug Hill Council (Camoin, 2006) estimated that the ATV use at that time was contributing approximately \$35.2 million in direct and indirect revenues to the Tug Hill Region. This study further estimated that revenues would increase approximately \$14.1 million with a 25% increase in ridership.

The needs of the non-ATV riding public are also noted in this instance. This segment of the public population will benefit from a more controlled system which keeps riders on designated trails, maintains and regulates the trails such that they are not sources of environmental damage and provide a safer, more enjoyable riding experience.

## **4.0 Project Description**

### **4.1 Purpose**

As stated previously, the purpose of this action is to develop an interconnected network of ATV trails and road segments that is managed in such a way as to mitigate potential environmental damage, improve rider and public safety, and increase tourist revenues within Lewis County.

### **4.2 Project Features**

The project has several elements which will function together to support the project purpose. These include the following:

Creation of a dedicated Trails Coordinator – Lewis County has already established the position of Trails Coordinator and staffed it. This position is responsible for managing the trail system and coordinating with relevant municipal and County agencies, the public, and the County Legislature regarding system needs and budgetary considerations.

Development of marked trails and trailhead areas with specified signage – Formalization of the trail system in this manner will serve to enhance the ATV experience, encourage compliance by the ATV riding community with the established regulations developed by the Trails Coordinator office.

Development of Cooperative Relationships with Towns – In order to ensure adequate support and management of the proposed system, the County will seek to develop cooperative relationships with the host towns to share in the management and maintenance of the system.

#### 4.3 Permits and Approvals Required

Certain trail segments and/or trailhead areas may require some types of permits from either NYSDEC or the US Army Corps of Engineers in those instances where stream crossings must be constructed or where NYSDEC Freshwater Wetland Adjacent Areas must be crossed. The off-road trails on the County reforestation properties (Figures 3A through 3I) have been inspected for these types of issues and the locations and specific structure needs have been identified and cataloged. Possible permits required for the implementation and maintenance of the trail system include the following:

##### NYSDEC Permits

Article 15 Stream Disturbance Permits

401 Water Quality Certification

Article 24 Freshwater Wetland Permits (Adjacent Areas only)

#### 4.4 Future Implementation Steps

The system proposed by this action is intended to be dynamic and have the ability to grow through the addition of new, privately owned trails and other municipal roads, as appropriate. Because these additions have yet to occur and have yet to be identified, specific details about them are unavailable at this time, and it is not possible to conduct the necessary environmental review for them within this specific document. Fortunately, the GEIS methodology is designed to accommodate this circumstance by examining general environmental impacts of the ATV trail system at present and providing a template for site-specific environmental reviews for future additions. The process for assessing and adopting new trail sections is provided in the Trails Plan (Lewis County, 2007) and Section 11.0 of this DGEIS.

## 5.0 Environmental Setting, Potentially Significant Adverse Environmental Impacts, and Proposed Mitigation Measures

### 5.1 Vegetation, Wildlife and Ecologically Sensitive Areas

#### 5.1.1 *Vegetation*

##### **Environmental Setting**

Vegetation within Lewis County is quite variable depending on the specific location within the County. There are two main hardiness zones within the County, Zone three (Northern portion) and Zone four (Southern portion). A hardiness zone depicts the annual average minimum temperature over a span of years. The lowest annual temperature can be a determining factor as to what plants can survive in that geographical area. Lewis County has an average annual minimum temperature between -20 to -40 degrees Fahrenheit. The difference in hardiness can determine the composition of a forest due to species not being able to survive below a certain temperature.

Soil composition and characteristics directly determine the species of vegetation that are able to survive in an area as well. Lewis County, as described in the soils section above, has a wide variety of soils within its incorporated borders.

Vegetation in the western portion of Lewis County (Tug Hill Region) is comprised mainly of mixed hardwood, deciduous forest and agricultural fields. Tree species in this region are mainly from the genus of maple (*Acer*), beech (*Fagus*), and cherry (*Prunus*), with some areas of white pine (*Pinus strobus*) mixed in.

Groundcover within this area is dominated by saplings of the tree species listed above, as well as various species of *Rhubus*. A large percentage of the trails in this region are found within mature hardwood forests that have minimal groundcover. The ground is covered with years of leaf litter. Existing trails in this region appear to have been used for numerous years, as they are mostly void of vegetation, except for a center strip of grass between the areas of tire treading. Trail bordering vegetation appears in good condition; riders appear to be staying on existing trails.

The eastern half of the County (Adirondack Foothills Region) is dominated by species that are more tolerant of a sandier, more acidic soil with minimum annual temperatures on the lower side of the spectrum for Lewis County. Most of the trail system in this region is located within County Reforestation lands that are pine plantations. The most common species of pine in this region are Scotch and Red. Very little groundcover is found in this region except the various species of *Rhubus*. Pine needle litter covers the ground acting as a defense to erosion.

Both the Tug Hill Region and the Adirondack Foothills region have wetland or water resource areas within them. These areas tend to have denser groundcover than that found in upland areas. Wetland and water resource areas within Lewis County and the proposed trail corridors consist of small creeks, scrub-shrub wetlands, emergent wetlands, and forested wetlands.

Federal threatened and endangered species lists were consulted to determine if any plant species identified by the US Fish & Wildlife Service (USFWS) are reported to exist in Lewis County. This list does not contain any plant species so federally

designated. An inquiry was submitted to the NYSDEC Natural Heritage Program to determine whether any State listed threatened or endangered plants species were reported in the areas proposed for off-road trails. Their response identified Jacobs Ladder (*Polemonium vanbruntiae*) as a possible species of concern. This plant species is considered rare in New York State. As a result, field visits were made to all of the proposed off-road trail locations to check for the presence of this species. The species was observed at the Culpepper Road Trail location adjacent to the current trail. Copies of the agency correspondence are provided in Appendix A.

### **Potential Significant Environmental Impacts**

The most common and probably most discernible potential environmental impact of ATV use on vegetation within the trail system is the destruction of vegetation. This can occur directly by ATV riders running over existing vegetation, which has the potential to snap, break, or uproot groundcover. The construction of trails by mechanical and man-powered tools can cause impacts to the vegetation in the immediate trail vicinity.

Indirectly, ATV traffic can cause compaction of soil in the immediate area, compromising root and pore space in soil that is needed for vegetation to perform daily life functions. A secondary result of bare soil due to the destruction of vegetation is the possibility of soil erosion.

Another potential impact of ATV use on vegetation is the spread of non-native or invasive species throughout the trail system. ATV's can be driven in one part of the state on one day

and the next day be transported to another portion of the state. If proper decontamination techniques are not followed the potential for non-native seeding is present. Invasive species seeds can be in dried mud on the ATV or within cracks and wheel wells, allowing for the easy dispersal of unwanted or invasive vegetation. Experience with the existing informal system has shown that the dispersal of invasive species has not been an issue to date and it is anticipated that with the modest increase of use expected with this action that this experience will continue. The site inspection performed on the proposed off-road trails did not identify the presence of invasive species with the exception of reed canary grass at two locations. This species is common throughout Lewis County and is spread in a variety of ways such as agricultural practices, logging operations, and by birds. Its presence at these two locations cannot be definitively attributed to ATV use.

One issue to be considered is that most of these trails will be used by multiple types of recreation. Hikers and mountain bikers could all potentially have access to the trail system, if they are not already being used by them. While impacts to vegetation by ATV riders are possible as discussed above, similar types of impacts may be imposed by these other trail users albeit at slower rates. The potential for significant damage to vegetation by a combination of activities, other than ATV riding, is just as possible as potential damage by ATV's.

### **Proposed Mitigation Measures**

Potential mitigation measures relative to the disturbance of vegetation are as follows and are also contained in the formal Trail Plan (Lewis County, 2007):

- Keep trails narrow, reducing the amount of tire tread disturbance.
- Maintain trails for fallen trees, by keeping trail clear; new trails will not be created.
- Use education to discourage off-trail travel and increase awareness of the ATV's potential to spread invasive species and encourage the use of proper decontamination methods prior to travelling to an ATV trail destination and before leaving it.
- Post trail markers to inform riders of the proper trail location.

### 5.1.2 *Wildlife*

#### **Environmental Setting**

Throughout Lewis County, numerous types of wildlife habitat are available. The mixed landscape of mature forest, agricultural fields, stages of successional land, and various types of surface water provide adequate habitat for almost any possible wildlife inhabitant of New York State. Species range from mammals, like whitetail deer and black bear, to numerous species of breeding song birds and waterfowl, as well as various species of warm and cold water fish.

Federal threatened and endangered species lists were consulted to determine which animal species may be present within

Lewis County. The only Federally-listed species is the Indiana Bat (*Myotis sodalis*). This species inhabits trees containing some feature that provides roost areas for the bats. These features include loose or shreddy bark, broken or split trunks, or other openings or crevices suitable for use as daytime roosting areas. Correspondence with the NYSDEC Natural Heritage Program did not identify any State listed animal species. All correspondence related to the threatened and endangered species is provided in Appendix A.

### **Potentially Significant Environmental Impacts**

Specific impacts of recreational activities on wildlife are difficult to document, in part, due to the complex interactions that take place among wildlife, their environment, and humans. Kuss (et. al, 1990) and Vaske (et. al., 1995) identified five major issues that make it difficult to assess these impacts:

- Recreational activity generates multiple, interrelated environmental and behavioral responses in wildlife
- Relationships between user density and impact severity are complex and unpredictable
- Wildlife responses to recreational activity varies both among and within species
- Group size, behavior, and equipment type can effect the impacts of a given recreational activity; and

- Impacts of recreational activities can differ with season and location

Previous studies on impacts of human recreational activities to wildlife have shown a wide degree of variability in their results. For example, studies of ATV impacts on breeding bird activity in the Nash Stream Forest, located in New Hampshire, resulted in a finding of no negative impacts during the first year of ATV activity (Foss, 2006). The researchers involved in this study caution that these results were obtained in only the first year of ATV activity, when ridership levels were rather low. In another study, Graves, Servheen, and Godtel (2003) found that grizzly bears avoided areas within 250-900 meters from ATV trails, and that they were less likely to spend time near trails with high motorized usage (~5 trips/day on average) than trails with low motorized usage. Black tail deer were also found to avoid areas with high levels of ATV traffic, by moving to areas free from such traffic, but that were still within their home range (Ferris and Kutilek, 1989). Given the types of species present in the Lewis County area and their demonstrated adaptation to man and his activities, the levels of use expected (15-35 trips per day on average) for any given trail segment is not expected to significantly impact these species.

It is possible that some direct mortality may occur with respect to smaller animal species (amphibians, reptiles, and small mammals such as squirrels and rabbits) much the same as that which occurs on the public roadways. It is anticipated that the mortality rates would be less than that experienced on a public road due to the slower speeds and better visibility associated with ATV's and would not be significant.

Since tree removals are not anticipated as part of the development of this system, impacts to the Indiana Bat are not expected to occur.

### **Proposed Mitigation Measures**

Requiring proper muffling of motors, keeping machines on the designated trails, and implementation of the controls identified in the Trail Plan (Lewis County, 2007) will properly reduce the potential disruptive impacts (primarily noise) to wildlife resulting from trail use by ATVs. As has been demonstrated by Lewis County's direct experience with the snowmobile system, wildlife is both adaptable and sustainable in the presence of motorized trail systems. Adherence to posted speed limits and adaptive modification of the system in response to observed effects will address potential animal mortality.

Direct mortality of smaller animals will be mitigated through the use of educational materials including signage along the trails and information at the kiosks situated in trailhead areas. Should sections of the trail become identified as exhibiting a noticeably higher rate of such mortality then either speed restrictions with additional signage or potentially closure of the trail segment will be implemented.

### 5.1.3 Ecologically Sensitive Areas

#### **Environmental Setting**

Lewis County with its largely rural character is home to many unique and ecologically sensitive areas. An example of these is Whetstone Gulf and other similar gorges and gulfs on the Tug Hill plateau which are home to unique vegetative habitats and unusual geologic features. Additionally, the NYSDEC Natural Heritage program identified two other types of ecological communities including marsh headwater streams and rocky headwater streams.

#### **Potentially Significant Environmental Impacts**

If the ATV trail system were to cross these habitats without the use of bridges or other suitable crossing methods, there would be potentially significant impacts associated with such crossing including reduction in water quality, vegetative impacts, and impairment of flows. A review of the assessment performed on the proposed off-road segments identified one location where impacts to these stream habitats are on-going. The identified area is a portion of the Culpepper Road trail (Figure 3H) which is the same location where the Jacob's Ladder was found.

#### **Proposed Mitigation Measures**

The trail segment containing the unimproved crossing will be removed from the proposed system and an alternative non-impacting route will be developed.

## 5.2 Historic and Archaeological Resources

### **Environmental Setting**

Lewis County is an area rich in history and associated cultural resources. Many structures and locations are already identified as national or state historic sites, many more are eligible for such designation and yet more site remains as yet undiscovered.

### **Potentially Significant Environmental Impacts**

The development of an ATV trail system comprised of existing legally opened roads, County Reforestation Area trails and private trails could have an impact on cultural and historical resources if such use resulted in physical disturbance of the structures or sites. Such disturbance is not anticipated in the course of development and management of the proposed trail system. Should areas require grading to either place a parking area or grade a trail, then the potential exists for the disturbance of historic and archeological resources. Available mapping provided by the NYSOPRHP on their website was reviewed to determine if either listed historic sites were present in these off-road trail areas. None of the proposed off-road trail areas were found to either contain listed historic sites or to be in or near areas of archeological sensitivity. On-road segments of the system were not evaluated since the potential for ATV impacts to such resources on these roads is no different than existing vehicle traffic, and is considered to be minimal.

### **Proposed Mitigation Measures**

In order to avoid impact to historic and archeological resources, the County will consult with the New York State Office of Parks, Recreation,

and Historic Preservation (NYSOPRHP) to determine if any proposed disturbance will affect these resources. Should such potential disturbance be identified, the trail will either be moved to a location where such disturbance is not required or such resources are determined by NYSOPRHP to not exist.

### 5.3 Surface Water Resources

#### **Environmental Setting**

Lewis County has numerous surface water resources ranging from small ponds and brooks to rivers and lakes. A large portion of Lewis County is within the Black River Drainage Basin. The Black River drains a large portion of the southwestern Adirondacks, beginning in Herkimer County and meandering west into Oneida County. Once in Oneida County, the Black River turns northwest crossing through Lewis County and Jefferson County before contributing water to Lake Ontario. The remaining southwest section of Lewis County drains in a southern fashion and is within the Mohawk River watershed.

#### **Potentially Significant Environmental Impacts**

ATV usage around and in surface water has the potential to cause pollution of these resource areas. Possible pollution factors to take into account include the introduction of soil into a surface water system by way of eroding stream beds, wetland floors, and upland areas. Hydrocarbons can be introduced into surface water by means of residual gasoline or another petroleum product on the outside of the motors and fill ports, or greased parts within the wheels of ATV's. Driving ATV's through surface water may also allow for the deposition of non-native species into a water course. A specific impact to streams includes degradation due to

introduction of sediment into the water column. Sediment can have a deleterious effect on stream health as indicated by changes in stream biota including both fish and macroinvertebrates. Direct contamination of water via contact with petroleum based substances can also affect the biological integrity of surface waters through the introduction of toxic substances that can adversely affect or destroy such organisms. The introduction of invasive plant species can significantly alter the biological productivity of stream ecosystems and reduce both plant and animal diversity associated with such areas.

### **Proposed Mitigation Measures**

The county-wide trail system will include no wet crossings. All water/wetland crossings will be made by bridges which completely span the resource. Where such spans are determined to be too lengthy, the trail will be routed to a location which can be crossed in this way or avoid the resource altogether. The trail crossing approach areas will be developed to preclude avoidance of the bridge structures and the use of these structures will be monitored when the trails are open. Individuals found to be bypassing these structures will be ordered to leave the County system. Best management practices (BMPs) will be employed for the construction of stream crossings whenever physical disruption to the surface water resources within Lewis County occur due to ATV vehicles. These BMPs include, but are not necessarily limited to:

- Check trail system for excessive crossing of streams and other surface waters on a regular basis during the open season.

- Use of silt fences at construction sites where appropriate and as necessary to help protect nearby water resources from siltation during storm events.
- All stream or surface water crossings will be constructed during times of low flow.
- Revegetation of construction areas as soon as possible after completion to minimize erosion and stormwater runoff impacts.
- Kiosks will relay the importance of keeping ATV's clean in terms of possible invasive species and remnants of petroleum products.
- Route existing trails that presently travel through streams and other surface water, around that resource until bridges or other pollution controlling structures can be built.

All of the off-road segments of the proposed trail system were inspected to determine if any stream crossings were present. The findings of these physical inspections are provided in Appendix B. The only such area was identified on the system adjacent to the North-South Road (Figure 3G). This area was identified as requiring improved structures to cross an un-named stream. If these structures cannot be constructed then this trail segment will be closed.

## 5.4 Wetlands

### **Environmental Setting**

Wetlands are a resource that are generally prized for their diversity of plant and animal life, their function with respect to water quality as well as their function in attenuating stormwater runoff and flooding. Preservation of wetlands is therefore important to ensure the continuation of these benefits provided by these resources.

All proposed off-road trails within County Reforestation Land and trails to be incorporated into the County Trail System located on land owned by other individuals or entities were assessed during the month of October, 2007 for the presence of wetlands. The findings of this review are provided in Appendix B. Four of the areas observed did not have any wetland resources within at least 50-feet of the trail system. These wetland free areas include the Barnes Corners Trails (Figure 3B), Jackson/Parker Roads Trails (Figure 3C), New Bremen County Reforestation Trails (Figure 3D), and Culpepper Road Reforestation Trail (Figure 3I). The remaining proposed trail parcels were observed to have wetland resources either adjacent to the trail or the trail layout went directly through the resource area. The figures for these trail segments (Figures 3A, 3B, 3E, 3F, 3G, and 3H) show the portions of these trails that will be relocated to avoid these wetland impacts.

### **Potentially Significant Environmental Impacts**

ATV traffic has the potential to cause impacts to the soil, water quality, and vegetation within a wetland resource area thereby affecting the wetland functions and values if allowed to drive through or immediately adjacent to wetlands. Soils can become puddled or be subject to

substantial compaction, the water within the wetland can become turbid and sediment laden from the stirring up of the soils and petroleum compounds on the machines can be flushed into the water, thereby contaminating it. Vegetation can be permanently removed or altered in its composition by repeated ATV impacts.

### **Proposed Mitigation Measures**

The only way that ATVs can cross wetlands without impacting them would be on a bridge over these resources. Since such bridging of wetlands would be infeasible, the only alternative is to avoid the wetland impact through re-routing of the ATV on upland areas to bypass the wetland. By their definition, ATV's are capable of operating on a variety of terrain and can therefore typically be routed in such a way as to avoid crossing wetlands. In those areas where a bridge or realignment is not feasible the trail section will be closed.

## 5.5 Soils

### **Environmental Setting**

Due to the wide-reaching nature of the proposed county trail system, a wide variety of soil types is likely to be found along the proposed trail corridor. The Lewis County NY Soil Survey Report (USDA, 1960) provides information on soil management, soil types, and soil mapping. It should be noted that detailed soil maps are not available for large portions of the county, which include parts of the Tug Hill Plateau area in the western section of the county, as well as the Adirondack Foothills, which make up a large part of the eastern section of the county. This report does include maps and figures that show general trends in soil

associations across the county. This general soils information is summarized in the paragraph below.

The Tug Hill Plateau area, located in the southwestern portion of the County, is mapped in Forest Group 7 - an area dominated by very stony soils that range from very poorly drained to well drained. The eastern portion of the county, located within the Adirondack Foothills, is mapped in Forest Group 12 – an area dominated by coarse textured, generally shallow soils, formed from glacial till, but interspersed with rock outcrops, peat, and sandy or gravelly outwash. The large area located between the Tug Hill Plateau and the Adirondack foothills contains an even wider variety of soil types with varying structure and drainage characteristics. The majority of these soils are found in Forest Soil Groups 1, 6, 9 and 11, where soil drainage ranges from very poorly drained to well drained, and soil depth ranges from generally deep to areas containing exposed bedrock (USDA, 1960).

### **Potentially Significant Environmental Impacts**

Many types of outdoor recreation, from hiking, horseback and mountain bike riding to ATV riding, have the potential to compact soils and cause soil erosion. Research has shown that hiking and ATV riding both have the potential to cause similar impacts to soils and vegetation. These impacts include destruction of vegetation, loss of forest floor litter, the exposure and destruction of plant root networks, soil erosion, and soil compaction (Marion, 1998; Foltz and Meadows, 2007).

With regard to ATV operation, soil compaction is often caused by the downward force on an ATV creating pressure on the underlying ground surface, which reduces the size of the airspaces between soil particles, thus compressing the soil. Soil displacement, on the other hand,

may occur when ATV tires spin or slide across the soil surface. Soil displacement may lead to the exposure and destruction of plant roots, and soil erosion. The degree to which these impacts are caused depends on a large variety of factors, including: slope, soil type, frequency and duration of precipitation events, amount of ATV usage occurring in a specific area, vegetation type, and elevation. A study conducted by the USDA Forest Service Stream Systems Technology Center found that the physical characteristics of ATVs (for example, size, weight, and type of tires) did not play a significant role in the severity of impacts to natural resources (Foltz and Meadows, 2007).

Trail construction and reconstruction activities also have the potential to cause soil erosion if vegetation is removed, soil is displaced, and drainage considerations are not properly taken into consideration and planned for accordingly.

In general, soils with a moderate to high moisture content, and a high mineral content of varying particle size, are most prone to compaction, and those that have a narrower range of particle sizes, mostly in the silt and fine sands range, tend to be more likely to erode (Marion, 1998).

### **Proposed Mitigation Measures**

During new trail construction or trail reconstruction, mitigation measures that will be used to reduce soil erosion may include: removing vegetation from the smallest practicable area, managing surface water runoff to deflect runoff from areas of exposed soils, and reestablishing vegetation as soon as possible. General maintenance techniques that may be used to reduce soil erosion along active trails include: re-grading the trail or installing ditches to facilitate surface water runoff, installing

water bars to direct surface water runoff to a desired location, installing surface-hardening materials (such as gravel), installing bridges, setting reduced speeds, rerouting the trail segment, or closing the trail (Lewis County, 2007). The trail plan identifies the use of routine inspection to assess if problem soils are present on any segment of the trail system. Should such soils be identified then the segment can be subject to engineering improvements to stabilize the soil or the trail segment can be relocated to more suitable soils. This adaptive maintenance approach will provide effective control of potential soil displacement without the needless costs of laboratory analysis of soils.

Best management practices (BMPs) will be employed whenever physical disruption to the natural environment occurs as a result of trail construction, reconstruction, or maintenance. These BMPs include, but are not necessarily limited to:

- Constructing stream crossings during periods of low flow
- Constructing stream crossings at a 90-degree angle to the stream
- Stabilizing stream banks with natural materials such as wood or stone whenever stabilization is needed
- Limiting the amounts of cut and fill whenever practicable
- Using natural materials whenever feasible to blend human-made structures into the surrounding area
- Limiting the size of parking areas to the minimum size practicable

- Locating parking areas/trailheads where minimal tree cutting and soil cuts and fills are needed
- Locating parking areas/trailheads where they are screened from nearby roadways and residences by wooded buffer areas
- Establishing new trails on existing former roads or skidder trails whenever possible to reduce the amount of vegetation clearing required

The county's trail system monitoring plan (Appendix C to the county recreational trails plan) includes provisions for monitoring for soil erosion. This plan calls for periodic monitoring of the trail system to identify areas where deficiencies in the physical structure of the trail (including areas of soil erosion) exist. The information gathered through the annual monitoring program will be used to prioritize maintenance needs.

## 5.6 Noise

### **Environmental Setting**

Noise can be defined as “any sound that is undesired or interferes with one's hearing of something” (Merriam-Webster, 2007). Sound levels that interfere with normal activities are typically considered to be undesired and objectionable. The effect of noise on people can vary from being intrusive to causing physical damage (i.e. hearing loss).

The perceived loudness of a sound is typically measured in units called decibels (dB). The A-weighted dB(A) decibel scale is weighted

towards the portion of the sound frequency spectrum (20 Hz to 20,000 Hz) to which the human ear is the most sensitive (NYSDEC, 2001). Noise levels of some common sounds and their effects on humans are presented in Table 1, below.

<b>Table 1 – Common Sound Levels</b>		
<b>Common Sounds</b>	<b>Noise level (dB)</b>	<b>Effect</b>
Rocket launching pad (no ear protection)	180	Irreversible hearing loss
Carrier deck jet operation Air raid siren	140	Painfully loud
Thunderclap	130	
Jet takeoff (200 ft) Auto horn (3 ft)	120	Maximum vocal effort
Pile driver Rock concert	110	Extremely loud
Garbage truck Firecrackers	100	Very loud
Heavy truck (50 ft) City traffic	90	Very annoying Hearing damage (8 hrs)
Alarm clock (2 ft) Hair dryer	80	Annoying
Noisy restaurant Freeway traffic Business office	70	Telephone use difficult
Air conditioning unit Conversational speech	60	Intrusive
Light auto traffic (100 ft)	50	Quiet
Living room Bedroom Quiet office	40	
Library	30	Very quiet
Soft whisper (15 ft)		
Broadcasting studio	20	
	10	Just audible
	0	Hearing begins

(Source: Seattle Department of Planning and Development, 2007)

Outdoor noise levels are typically regulated by local municipal noise ordinances. With regard to specific noise regulations for ATV operation, New York State Vehicle and Traffic Law (Article 48-C – Rules for

Operation of All Terrain Vehicles) specifies that all ATVs must be equipped with a muffler system that meets federal noise standards set forth in the Code of Federal Regulations. The federal noise emission standard (40CFR205.166) for ATVs is 82 dB(A) at a distance of 15m (49.2 ft.) from the ATV. Much debate exists in the public arena as to the practicality of enforcing this noise limit, due to the rigorous sound test procedures specified in the federal regulations. Many of the sound testing parameters outlined in these regulations simply cannot be easily duplicated in the field where ATV riding takes place.

In 1998, the Society of Automotive Engineers established a more practical sound testing procedure for use on ATVs and other OHVs. Testing procedure SAE 1287 is a stationary test that is more easily administered in the field than the “pass-by” sound test referenced in the federal regulations. In general, this test involves taking the sound measurement 20-inches from the exhaust opening while the ATV is revved to ½ its maximum RPM speed. This testing procedure has been adopted by many states, including Wisconsin, California, Pennsylvania, Minnesota, and Michigan. In these states, ATV noise emissions limits range from 94 dB(A) in Michigan, to 99 dB(A) in Pennsylvania and Minnesota (as measured using the SAE 1287 sound testing procedures).

The proposed Lewis County ATV trails travel through county reforestation lands, on local roadways, and over privately owned lands. Consequently, a variety of noise-generating activities also take place in these areas. Sources of noise along and adjacent to the trail corridors include motor vehicles, farming equipment, logging equipment, and ATVs that are currently operated in these areas.

## Potentially Significant Environmental Impacts

The degree of noise impacts experienced by a receptor is dependent upon a number of factors, including the distance between the receptor and the noise source, topography, temperature, humidity, wind speed and direction, vegetation, the loudness of the sound produced, and the receptor's own perception of what he or she considers to be a loud or objectionable noise. When assessing noise impacts, several characteristics of sound must be taken into account, such as sound level reduction over distance and the additive effects of multiple sound sources (NYSDEC, 2001).

The decrease in sound levels over distance follows the "inverse square law." At distances greater than 50 feet from a sound source, the sound level is reduced by 6 dB(A) for every doubling of the distance (NYSDEC, 2001). For example, a sound level of 80 dB(A) at a distance of 50 feet from a sound source would be reduced to 74 dB(A) at a distance of 100 feet from the sound source. At 200 feet from the sound source, this noise level would be further reduced to 68 db(A).

Another important factor that must be considered is the additive effects of multiple sounds. If, for example, four ATVs are riding in a group, and each produces a sound level of 85 dB(A), the resulting sound level would not equate to the mathematical addition of the individual sound levels (i.e.,  $85 \text{ dB(A)} \times 4 = 340 \text{ dB(A)}$ ). The following table is provided in the NYSDEC's Program Policy document for Assessing and Mitigating Noise Impacts (2001) to assist in determining the effects of multiple sound sources:

<b>Table 2 – Approximate Addition of Sound Levels</b>	
<b>Difference Between Two Sound Levels</b>	<b>Add to the Higher of the Two Sound Levels</b>
1 dB or less	3 dB
2 to 3 dB	2 dB
4 to 9 dB	1 dB
10 dB or more	0 dB

For example, to calculate the total sound level produced by three ATVs operating in a group, an evaluation of the differences between the three sound levels would need to be made. If the sound levels of the three ATVs were 89 dB, 91 dB and 94 dB, the difference between the two lowest sound levels would be determined first ( $91 \text{ dB} - 89 \text{ dB} = 2 \text{ dB}$ ). According to the table above, 2 dB should be added to the higher of the two sound levels ( $2 \text{ dB} + 91 \text{ dB} = 93 \text{ dB}$ ). The next step involves determining the difference between the combined sound level of 93 dB for the first two ATVs, and the sound level of the loudest ATV, at 94 dB ( $94 \text{ dB} - 93 \text{ dB} = 1 \text{ dB}$ ). According to the table above, 3dB should be added to the higher of these two sound levels ( $3 \text{ dB} + 94 \text{ dB}$ ), resulting in a total sound level for all three ATVs operating in a group at 97 dB.

There will be impacts (due to the large difference between ambient noise levels and that of an ATV or ATVs), but the noise impacts will be fleeting in much the same way that automobile noise from moving traffic is fleeting. It should be noted that the impact of noise is rapidly mitigated with distance from the noise source as previously shown..

Two primary areas of concern regarding noise impacts along the proposed trail system are the potential impacts upon humans and potential impacts upon wildlife. Adjacent residents and other recreational trail users comprise the human component of concern.

As previously stated in Section 5.5, recreational conflicts are often the result of goal interference, that is, when the behaviors or actions of one recreational user (or group of users) interferes with the goals of another recreational user (or users). For example, if the goal of a group of birdwatchers is to enjoy the peacefulness and serenity of the forest on a parcel of county reforestation land, and that goal is interrupted by a group of ATVs that pass by on the trail, there is a high likelihood that the group of birdwatchers will feel impacted by the noise generated from the ATVs. The degree of impact felt by different members of the group will vary, based on their personal tolerances (FHWA, 1994). It is expected that such receptors may choose to relocate to more suitable locations for their particular activity thereby removing the conflict.

### **Proposed Mitigation Measures**

In order to minimize potential noise impacts, the County will require that all riders maintain their exhaust systems in proper condition. All ATV's shall be equipped with factory installed or equivalent mufflers which are compliant with the federal noise emission standard which requires that vehicles have a noise reading of 82 dB at a distance of 15 meters from the vehicle. Any machines found operating without proper exhaust systems will be banned from the system until repair is made and documented.

## 5.7 Air

### 5.7.1 *Emissions*

#### **Environmental Setting**

The Clean Air Act requires the EPA to set emissions standards (National Ambient Air Quality Standards – NAAQS) for airborne pollutants that may be harmful to public health and the environment. EPA has set NAAQS for six principal pollutants, which are called "criteria" pollutants. These include: sulfur dioxide, nitrogen dioxide, ozone, carbon monoxide (CO), particulate matter (PM) less than 2.5 microns (micrometers) in size, and lead. The NYSDEC is responsible for monitoring the state's air quality to determine if it is in compliance with the NAAQS for six these criteria pollutants. A description of these criteria pollutants, and their health affects, is found below (EPA, 2002<sup>(b)</sup>, NYSDEC, 2007<sup>(b)</sup>):

- Ozone: Ground-level ozone is formed by a complex chemical reaction of Volatile Organic Compounds (VOCs) and nitrogen oxides (NO<sub>x</sub>) in the presence of heat and sunlight. VOCs are emitted from a variety of sources, including motor vehicles, factories, chemical plants, refineries, and other industrial sources. Nitrogen oxides are emitted from combustion processes, including motor vehicles and other types of equipment, and power plants. Repeated exposure to concentrations of ozone above National Ambient Air Quality Standards (NAAQS) can cause respiratory problems in humans, foliage damage in crops, trees,

and other plants, and can reduce crop yields and foliage growth rates.

- Carbon Monoxide (CO): CO is an odorless, colorless, non-irritating gas that is produced by the incomplete combustion of fuel. The largest source of CO is motor vehicle emissions. CO interferes with the blood's capacity to carry oxygen. Health effects at high concentrations range from decreased mental functions to death. Persons with heart and respiratory diseases are susceptible to the most severe health risks from CO exposure.
  
- Particulate Matter (PM): Particulate matter is generated from sources of combustion (including motor vehicle engines, power-generating plants, industrial and manufacturing operations), and fugitive emissions (such as dust from vehicle operation over unpaved roads, and wind erosion of soils from cropland and construction sites). Other natural sources of PM include pollen from plants and smoke from wildfires. PM is typically classified into two different categories, depending on particulate size. PM<sub>10</sub> includes PM with particle sizes equal to and less than 10 microns in size. PM<sub>2.5</sub> includes PM with particles ranging in size from greater than 2.5 microns to less than 10 microns. Inhalation of particulate matter at high doses can aggravate respiratory and cardiovascular diseases. In addition, PM emissions contribute to the impairment of visibility, mostly in urban areas. The components of particulate matter

may also contribute to acid deposition, nitrification of soils, and eutrophication of surface water resources.

- Sulfur dioxide (SO<sub>2</sub>): SO<sub>2</sub> is a colorless gas that is highly soluble in water, forming sulfurous acid. The major sources of this pollutant are from the combustion of fossil fuels (coal and oil-fired power plants), ore smelters and oil refineries. Human exposure to sulfur dioxide at concentrations above the NAAQS may result in respiratory problems. Plant exposure to SO<sub>2</sub> may result in foliage damage and growth suppression.
  
- Nitrogen dioxide (NO<sub>2</sub>): Nitrogen dioxide is a highly corrosive gas that is produced from the reaction of atmospheric nitrogen and oxygen during the burning of fuel (coal, oil, gas). Human exposure to NO<sub>2</sub> above the NAAQS may result in respiratory problems. NO<sub>2</sub> contributes to the formation of acid rain, and consequently may affect aquatic organisms, plant growth and nutrient availability in some soils.

The NYSDEC monitors air quality at approximately 80 locations across the state. None of the air monitoring stations is located within Lewis County. However, five such stations are located in the counties immediately surrounding Lewis County. Geographic areas where levels of one or more criteria pollutants are consistently above the NAAQS are called “nonattainment areas.” There currently exist nonattainment areas for ozone and particulate matter within New York State. The nearest nonattainment area is Jefferson County, which borders Lewis

County to the west. This is a nonattainment area for 8-hour ozone. All of the particulate matter nonattainment areas are located in the New York metropolitan area.

Emissions from ATVs, along with other types of off-road recreational vehicles, such as snowmobiles and off-road motorcycles, have been found to contribute to nonattainment of NAAQS for carbon monoxide, particulate matter, and ozone (Federal Register, 2000). As a result of this finding, the U.S. Environmental Protection Agency (EPA) was required, under section 213 (a)(3) of the Clean Air Act, to establish emissions standards for such vehicle types. In November of 2002, the EPA published its final rule on emissions standards for several groups of nonroad engines, including ATV engines. (Federal Register, 2002). ATV exhaust emission standards for hydrocarbons (HC), carbon monoxide (CO), and nitrogen oxides (NO<sub>x</sub>) were established by this rule. These new emission standards apply to ATV models produced in the year 2006 or later (EPA, 2002). At full implementation (in 2030), EPA expects “a 75-percent reduction on HC emissions, 82-percent reduction in No<sub>x</sub> emissions, 61-percent reduction in CO emissions and a 60-percent reduction in direct PM emissions” (Federal Register, 2002) from the off-road vehicles regulated by this law. It is important to note that the emissions from ATVs represent less than 3 percent of total emissions from all mobile sources (EPA, 2002b).

### **Potentially Significant Environmental Impacts**

Implementation of the county-wide ATV trail system will generate vehicle emissions from three different sources: the equipment used to construct trail/trailhead areas (for example,

small loaders, dump trucks, powered brush cutters, bulldozers), the vehicles used to transport the ATVs to the trailhead areas, and the ATVs operating on the trails.

Emissions from trail construction equipment are expected to be temporary and minor, due to the limited amount of time during which the trail and related facilities will be under construction.

Emissions from highway vehicles transporting ATVs to the trailhead areas are expected to increase, compared to the existing conditions where no formal trailheads currently exist. Emissions from these vehicles may have an affect on local vegetation, wildlife, and humans. These affects are not anticipated to be significant, since the size of the trailhead parking areas will be limited to accommodate only a few cars, so as not to allow the trails to get too crowded.

ATVs and other off-highway vehicles generate emissions containing hydrocarbons, carbon monoxide, particulate matter, and nitrogen oxides, as well as other pollutants that contribute to ground-level ozone formation. According to the EPA, 2-stroke ATV engines produce a significantly higher amount of total airborne pollutants and have greater fuel consumption than their 4-stroke counterparts (EPA, 2002 <sup>(b)</sup>). The EPA's adoption of emission standards for non-road vehicles was done with the intention of moving the ATV industry towards the production of 4- stroke engines, and away from 2-stroke engines to meet the new emission standards (Federal Register, 2002). EPA estimated that in 2002, prior to the adoption of the rule on non-road vehicle emissions, approximately 80% of all ATV's sold in the U.S. were 4-stroke models. This number is expected to grow in response to this

rulemaking. It should be noted that these emissions are already present under the current ATV usage. Adoption of the current informal system by the County is expected to result in some gradual increase in emissions as use of the system grows but the increase in these emissions will be attenuated by the continued improvement in vehicle emissions as mandated by EPA.

With regard to the potential affects of emissions from ATVs on vegetation, wildlife, and humans, one factor that must be taken into consideration is the amount of gasoline used by ATVs, since emissions are a direct result of fuel consumption. On average, ATVs may only consume 20-30 gallons of fuel annually (Minnesota Department of Natural Resources, 2002) Consequently, the annual emissions contributions from ATVs are significantly less than that of other mobile sources, such as cars and trucks. In 2000, it was estimated that recreational non-road vehicles contributed approximately 2-3 percent to hydrocarbon, nitrogen oxide, and carbon monoxide emissions from all mobile sources (EPA, 2002<sup>(b)</sup>).

Any impacts to vegetation, wildlife, or humans, from exhaust emitted by ATVs operated along the trail system, are anticipated to be minor in nature and extent. It is anticipated that in the future, as a result of the EPA's 2002 emission standards, ATV manufacturers will continue to make improvements in engine technology that will result in increased fuel efficiency, improved fuel combustion, and decreased emissions. It should be noted that the heaviest trail usage is expected to be during weekends and holidays. Emissions are not expected to be maintained at high levels (i.e. such as those that would occur on a highway with constant traffic). The emissions

anticipated from ATV use are approximately 10-20% of those emitted by snowmobiles (EPA, 2002a).

### **Proposed Mitigation Measures**

Given the small number of ATVs operated in Lewis County as compared with the numbers of cars and trucks, the comparatively low frequency of ATV operation and the comparatively low overall emissions output from ATVs, the potential environmental impacts from ATV exhaust emissions are not significant. Considering current emissions requirements for ATVs and future required compliance targets, potential ATV air impacts are anticipated to be minor when compared to overall vehicle emissions region-wide, therefore, no mitigation measures beyond the federally required emissions standards for ATV engines are proposed at this time.

Construction equipment, including heavy machinery and trucks, will not be allowed to idle excessively during any trail construction-related activities and will be required to be compliant with federal standards relative to emissions from such equipment.

#### *5.7.2 Dust*

### **Environmental Setting**

The EPA uses the term “fugitive” dust to describe dust that is produced from the mechanical disturbance of granular material that is exposed to the air. The term fugitive is used because this dust is not discharged to the atmosphere in a confined flow stream (EPA, 1995).

The county-wide ATV trail system utilizes county reforestation areas, private lands, and local roads as the basis for the trail system. Some of the activities that currently take place in these areas generate fugitive dust, such as logging on county reforestation lands, ATV riding on private trails, and general vehicle traffic traveling on local unpaved roads

### **Potentially Significant Environmental Impacts**

The potential exists for the development of dust on some of the trails within the County Reforestation areas. This is anticipated to be minimal due to the typical presence (as observed during the walkovers of the off-road trails) of overstory vegetation which provides shade and minimizes drying due to sunlight and will serve to reduce the amount of dust generated under most conditions. Other trail users (hikers and bikers) may find dust to be a nuisance and may avoid use of these lands for their enjoyment.

### **Proposed Mitigation Measures**

Whenever possible, trailhead/parking areas will be located in areas where vegetative buffers exist, or can be established, between the parking area and the adjacent roadway to help trap fugitive dust and minimize the movement of fugitive dust from the parking area into the adjacent roadway or onto adjacent properties. If fugitive dust becomes problematic in these areas, or on segments of the trails, the county will consider making surface improvements to these areas, such as by adding gravel.

Dust generated during any trail/trailhead construction activities will be minimized or eliminated through the use of dust control agents or water.

### 5.7.3 Odor

#### **Environmental Setting**

Some types of internal combustion engines can produce noticeable odors which are released in the tailpipe emissions. Some people may find these odors objectionable should they be exposed to them.

The proposed trail system may result in concentration of such odors along the trail in instances where multiple riders are present. Other trail users would then be exposed to these emissions.

#### **Potentially Significant Environmental Impacts**

It is not expected that significant odors will be produced along the trail corridor. This is because nearly all current ATVs are powered by four stroke engines which typically do not emit odoriferous exhaust like the 2-cycle engines associated with some older ATVs and dirt bikes. Even if such engines are present within the pool of trail riders utilizing the system, the distribution and effect of such odors are expected to be brief, transient and restricted to the area within the trail. Exhaust odors will typically dissipate quickly under most atmospheric conditions (Minnesota DNR, 2002)

## **Proposed Mitigation Measures**

Many of the potential odors from ATVs can be prevented through diligent maintenance of the ATV motors. The County will provide educational materials at trailheads, on the trail website, and through ATV clubs regarding the proper maintenance of ATV motors to reduce or eliminate objectionable odors.

### 5.8 Transportation Facilities and Traffic

#### **Environmental Setting**

Lewis County has a well developed system of roadways consisting of a mix of local, county and state highways ranging from four lane expressways to rural two-lane roads. This system of roadways is supported by funds from the local, state and federal levels of government for the purpose of maintenance and improvement of this transportation system. Although the system is expected to continue to draw riders from throughout the northeast, it is reasonable to assume that the majority of ATV miles ridden will accrue to local and regional residents.

#### **Potentially Significant Environmental Impacts**

The proposed trail system's use of local and county roadways may create the need for additional maintenance on those roads where ATV use is proposed. Increased tourist traffic may also have an effect on traffic in the area, although this impact is unlikely given that the use is on-going and the County is merely exerting control over the existing use.

## **Proposed Mitigation Measure**

The County will work with the Towns to monitor roadway use and impacts resulting from the trail use and identify maintenance and improvement needs as they arise. These needs will be used to identify funding needs which will be incorporated into the County and Town budgets. It is anticipated that these funds will be derived from sales and room tax proceeds generated by tourism associated with the ATV system.

### 5.9 Recreational Activities

#### **Environmental Setting**

Lewis County owns 57 parcels of county reforestation land with a total area of 4,122 acres. County reforestation lands are located in the towns of New Bremen, Pinckney, Montague, Lyonsdale, Greig, and Watson (see Figure 2 for locations). ATV trails are proposed for several of these parcels as shown on Figures 3A through 3I.

County Law Section 219 (1) sets forth provisions pertaining to the use of county reforestation lands. According to this law, counties are directed to “maintain said lands for purposes of watershed protection, development of oil and gas retrieval, the production of timber and forest products and for recreation and kindred purposes.” This law does not make reference to specific types of recreational activities that are allowed upon such lands. Historically, Lewis County has allowed all types of recreational activities on its reforestation lands, including but not limited to, hiking, wildlife viewing, mountain biking, horseback riding, cross-country skiing, snowmobiling, jeep riding, and ATV riding.

#### **Potentially Significant Environmental Impacts**

Even though the ATV trails plan is focused on off-road vehicle use, the county must remain cognizant of the fact that segments of these trails, which traverse public lands, will be shared by a variety of recreational users. In addition, the county “must ensure that ATV use does not interfere with the availability of the trails for other public uses, such as skiing and biking” (Sheridan, 2002). As a result of this shared use, conflicts among trail users may occur.

A great deal of literature exists in the field of outdoor recreation regarding user conflicts in recreation areas. Trail-user conflicts can occur in a variety of ways, including conflicts among different types of recreation groups (for example between hikers and ATV riders), between groups of people participating in the same type of recreational use (for example between different groups of mountain bike riders), between trail-users and trail managers, and with other users of the recreational resource (Watson, 2001). Cordell and Tarrant (2002) found that the rise in recreational user conflicts can be attributed to the increasing demand for most forms of outdoor recreation, and the increase in technology-driven recreational activities, such as ATV riding, mountain biking, and jet-skiing. One study emphasizes that conflict does not always have negative effects, such as when conflict reveals that something within the existing trail system needs attention, which then forces a management response (Hammit and Schneider, 2000).

Two different philosophies on the cause of recreation conflicts currently exist. The cognitive approach proposes that conflicts occur as a result of one individual's actions/behaviors interfering with the recreational goals of another individual (Gibbons and Ruddell, 1995). The normative approach proposes that conflicts between recreational users occur as a result of the different social values held by the different user groups,

independent of physical presence or actual contact between them (Vaske, et. al., 1995, 2000). Recreational land managers must gain an understanding of the potential underlying causes for recreational conflicts if they are to be proactive in avoiding and managing such conflicts.

### **Proposed Mitigation Measures**

In 1994, at the request of the National Recreational Trails Advisory Committee, the Federal Highway Administration put together a report that summarized the available literature on trail-user conflicts on multiple use trails. The purpose of this work was to “produce a synthesis of the existing research to foster understanding of trail conflicts, identify promising approaches for trail sharing, and identify gaps in current knowledge” (FHWA, 1994). This report identified 12 principles for minimizing conflicts on multiple use trails. The county’s approach to promoting cooperation among trail users and minimizing potential conflicts has been adapted from these 12 principles and is outlined below:

1. Recognize that recreation conflict does not stem from an inherent incompatibility among different trail activities, but rather goal interference caused by one individual’s (or group’s) behaviors interfering with the recreational goals of another individual (or group).
2. Provide adequate trail opportunities for a variety of trail experiences to allow users to choose the conditions that are best suited to the experiences they desire and to disperse use to minimize number of user contacts. This will be accomplished by developing a trail system that covers a large area of the county, passes through diverse natural

areas, includes a variety of difficulty levels, and connects a variety of interesting destinations.

3. Involve users as early as possible in trail plan development and address developing conflicts quickly, with the participation of those affected. This will be accomplished by taking into consideration public comments gathered during the SEQRA process for the ATV trails plan, and keeping open lines of communication between county trail managers and trail users as trail development continues into the future.
4. Understand user needs, motivations, desired experiences, and values. This will be accomplished by conducting user surveys, and keeping open lines of communication between trail managers and trail users.
5. Identify the actual sources of conflict (get beyond emotions and stereotypes as quickly as possible, and get to the roots of any problems that exist) and work with all parties involved to reach mutually agreeable solutions. This will be accomplished by conducting user surveys, and keeping open lines of communication between trail managers and trail users.
6. Actively and aggressively promote trail etiquette. This will be accomplished by engaging in a public education campaign that involves posting essential information on the county's website and on informational kiosks at trailheads, and providing educational materials to local ATV clubs to disseminate to their members.

7. Encourage positive interaction among different users. This may be accomplished through the formation of a trail advisory council, or holding trail-building or maintenance projects involving different user groups.
8. Employ management approaches that leave the environment as natural as possible to enhance high-quality trail experiences. The county's ATV Trail Plan sets forth trail management objectives that focus on leaving the trails as natural as possible, and limiting signage to the minimum amount necessary so that it does not detract from the trail user experience.
9. Monitor the effectiveness of management decisions and implemented programs on a regular basis to determine if conflicts are being addressed. The county's ATV Trail Plan contains provisions for ongoing monitoring of the trail system.

#### 5.10 Growth and Character of the Community

##### **Environmental Setting**

The proposed action is not expected to result in significant growth in the community. Much of the riding being done today will continue under the proposed action and it is anticipated that the riding community will utilize the same lodging, dining, and other services left idle by the snowmobiling economy in the non-winter months. The proposed action is not expected to create significant numbers of jobs, in the short term, but rather keep the ones that are currently here and possibly increase the value of those existing jobs.

The Camoin Study indicated that for the four county Tug Hill region, the total direct impact of ATV use on the Tug Hill economy includes \$23.1 million in sales for local businesses. Those local businesses would then be able to support employment of 564 individuals who earn \$7.9 million in wages. The study also quantified the indirect and induced impacts of this spending. Indirect impacts include purchases by local businesses from other Tug Hill region producers of goods and services. Induced impacts are a factor of the wages that the businesses that benefit from the indirect impacts pay to their employees, who in turn, spend a portion of their earnings in Tug Hill. The indirect and induced impacts of ATV account for an additional \$12.2 million, supporting employment for 137 individuals who earn wages of \$3.5 million. Thus, the total economic impact of ATV spending in Tug Hill, as calculated by the sum of the direct, indirect and induced impacts, is approximately \$35.2 million supporting employment of 701 individuals.

### **Potentially Significant Environmental Impacts**

Development of this proposed trail system has the potential to increase tourism to the area during the non-winter months, however, this proposal is simply applying structure, rules and environmental improvements on currently on-going ATV ridership in the area. Although some increase in ridership may ensue from the improvements offered by the County this increase is expected to be incremental and should not result in significant demands for growth in services such as hotels, gasoline retailers, etc. As noted in Section 5.8, the County will monitor growth resulting from increases in riders and will assist the local communities in planning for any resultant demands associated with such growth.

## **Proposed Mitigation Measures**

There are no significant environmental impacts identified therefore no mitigation is necessary.

### 5.11 Community Services

#### **Environmental Setting**

Lewis County has a well developed system of services and infrastructure which service the current snowmobile tourism that has been underway for many years now. The development of additional tourism related to the implementation of the proposed county-wide trail system will require the use of these services.

#### **Potentially Significant Environmental Impacts**

Use of the county-wide ATV trail system may create demand for additional community services such as emergency response, policing, signage, etc. Designated enforcement resources are anticipated to be required as part of the proposed trail system. Although some of the infrastructure and equipment base utilized to fulfill this purpose during the snowmobile season may be utilized during the ATV season, some increase in required resources is likely (i.e. converting seasonal positions to year-round positions).

#### **Proposed Mitigation Measures**

The County will monitor the impacts to community services, identify needs and develop solutions to address those needs. Funding will be

identified on an annual basis to assist local municipalities and County departments with meeting the needs created by this proposed trail system.

## 5.12 Visual Resources

### **Environmental Setting**

Lewis County possesses many areas considered to be scenic due to its rural nature and the varied topography present within the county. Some people may consider the appearance of the ATVs as aesthetically unpleasant. Many of the proposed trail areas traverse bucolic, rural areas where vehicular movement is limited and typically restricted to the public roads.

### **Potentially Significant Environmental Impacts**

The proposed trail system will not affect scenic vistas as it does not require significant modifications of the landscape, such as large building projects, clear-cutting of timber, or removal of vegetation. The proposed trail system does utilize many miles of public road as part of the system interconnections, and ATVs will therefore be routinely visible to the public along these routes. However, such visual impacts are no different than the appearance of cars, trucks, farm equipment, etc. on these same roadways. Other users of the county reforestation areas will be subjected to seeing ATVs in those areas and may find them aesthetically unpleasant much the same way that some hikers or walkers would find the appearance of mountain bikes objectionable, but this innate conflict is not expected to be significant, and in any event can be mitigated per the guidelines discussed in Section 5.9.

## **Proposed Mitigation Measures**

No significant impacts have been identified and therefore mitigation measures are not necessary.

## 6.0 Unavoidable or Inadequately Mitigated Adverse Impacts

Several unavoidable impacts are associated with this proposed action. Impacts to land resources, noise, air, and community resources will be created by this proposed action. These impacts include the following:

- Generation of noise;
- Air emissions;
- Need for additional community resources;
- Potential impacts to land via erosion, and;
- Vegetative impacts

However, in all instances, adequate mitigation is identified for these impacts.

## **7.0 Irreversible and Irretrievable Commitments of Resources**

The development of the County's trail system will result in the commitment of resources which are irreversible and irretrievable. Enforcement of the system rules will require resources from the County Sheriff's office above those currently required. Funding and materials for trail construction and maintenance are a further resource commitment which is not retrievable. Some equipment and personnel utilized to regulate the snowmobile community can be readily applied to the regulation of the ATV community but some additional commitment of resources is likely necessary in the form of conversion of positions from seasonal to year-round and acquisition of equipment better suited to the ATV system.

Although the trails systems will occupy and modify some land resources these commitments are neither irreversible nor irretrievable, as simple discontinuance of trail use will allow these areas to naturally revert.

## **8.0 Effects on the Use and Conservation of Energy**

ATV's consume energy during operation. Maintenance activities will also require the use of petroleum-based fuels. The potential does exist to increase the overall use of energy in the County. These increases are expected to be quite small compared to the overall use of these same types of resources by cars and trucks. It is anticipated that the existing energy infrastructure within Lewis County can handle the anticipated usage required by the ATV community. The same resources that serve the snowmobile community's energy needs during the winter months will be able to service the ATV community as well during the summer months without the need for increased storage capacity for petroleum fuels.

## 9.0 Alternatives Analysis

### 9.1 No Action Alternative

Under this alternative, the ATV use currently experienced within Lewis County would continue unmanaged and uncoordinated. It is possible that the amount of riding would actually decline under this scenario due to conflicts with residents and property owners resulting from inconsistent standards of use by the riding community and the associated closure of trails by the landowners.

This alternative would not result in the creation of dedicated trails on the County reforestation lands, rather, ATV use of these properties would continue regardless of the legality of such use. Additionally, mitigation measures to protect the environment would not be in place and substantially greater net impact would be expected.

### 9.2 Alternative 1 – Alternative Routes on County Owned Reforestation Lands

The proposed routes on County Owned Reforestation Lands have been evaluated under this DGEIS to determine the most environmentally benign route for them. Existing trails and roads have been used where available to minimize potential environmental impacts associated with the development of new trails through these areas. In all cases other potential routes have been determined to present environmental challenges that either can not be adequately mitigated or are too severe to satisfy the project goals in an environmentally responsible manner.

### 9.3 Alternative 2 – Private Development of Trail System

Under this alternative the trail system would be developed, managed and maintained by a series of private ATV membership groups in the same way as snowmobile trails are currently done. Under this type of system, a portion of the NYS registration fees collected from the ATV owners is distributed to these groups to assist them in managing and maintaining the trail system. These groups also typically collect a fee to augment the state released funds and may in some cases require riders to be registered with them to utilize the trail segments for which they are responsible.

Currently, New York State does not have any mechanism for the redistribution of registration fees to such clubs for the purpose of trail construction and maintenance. Without the necessary funds the clubs can not undertake the development and maintenance of a trail network similar to the one contained in the proposed action. Such groups would also lack standing to designate roadway sections as open for ATV use under the specified section of the NYS Vehicle Traffic Law (VTL) to link sections of their system together.

Under this alternative, the ability to manage environmental impacts would be substantially reduced as there would be few governmental mechanisms for either identifying such impacts or mitigating them. SEQRA would not typically apply to any of these privately developed systems due to the absence of direct municipal involvement and would therefore not provide its usual protection of environmental resources. As a result, this alternative could be expected to result in more environmental damage than the proposed alternative.

## 10.0 Cumulative Impacts

Repeated use of trails can result in long-term impacts resulting from the cumulative effect from many vehicles moving over the same area. In recognition of this possibility the Recreational Trails Plan (Lewis County, 2007) establishes numerous procedures for monitoring trail damage and adopting methods to either correct the condition and continue to use the trail or to identify which sections of trail require either temporary or permanent closure (See the “ATV Trail System Management” and “Trail Maintenance Objectives and Maintenance Guidelines” sections of the Trail Plan) . Diligent use of this plan will properly mitigate these potential cumulative impacts and result in a durable, stable trail system capable of handling the anticipated use without long-term, cumulative environmental damage.

## **11.0 Future Expansion**

As noted in Section 2 of the Scoping Document, the Lewis County ATV Trail System is expected to add trail segments as they become available. Since the site specific attributes of any such additions are unknown at this time, the Generic Environmental Impact Statement option has been selected to assess the current proposed system's impacts and establish a template for future environmental review of new trail segments as they are identified. New trail segments proposed for addition to the system will be assessed for the same issues covered in this GEIS on a site-specific basis; such site-specific reviews will be appended as a supplement to this document. The future review of additional trail segments will build on the work contained in this GEIS to identify the individual attributes of each proposed new segment and assess the cumulative effects of these segments in conjunction with the rest of the trail system.

## 12.0 Bibliography

Camoin Associates, 2006. Tug Hill Region ATV Economic Impact Study

Cordell, H.K. and M.A. Tarrant. 2002. *Socio-6: Forest-based outdoor recreation*. Southern Forest Resource Assessment Draft Report. Available online at:  
< <http://www.srs.fs.usda.gov/sustain/draft/socio6/socio6.htm> >

(EPA 1995) United States Environmental Protection Agency. 1995. Compilation of Air Pollutant Emission Factors Volume I: Stationary Point And Area Sources. Office of Air Quality Planning and Standards, Office of Air and Radiation. Ap-42 Fifth Ed.

(EPA, 2002) Environmental Protection Agency. Regulatory Announcement – Frequently Asked Questions from ATV Riders. Document No. EPA420-F-02-0378.

(EPA, 2002<sup>(b)</sup>) Environmental Protection Agency, November 8, 2002. Final Rule for Cleaner Large Industrial Spark-Ignition Engines, Recreational Marine Diesel Engines, and Recreational Vehicles – Final Rulemaking Documents and Fact Sheets (accessed at < <http://www.epa.gov/otaq/regs/nonroad/2002/cleanrec-final.htm>>, 8/15/07)

(Federal Register, 2000) Federal Register, Vol. 65 No. 236, Thursday December 7, 2000, Proposed Rules – Control of Emissions From Nonroad Large Spark Ignition Engines, Recreational Engines, (Marine and Land Based), and Highway Motorcycles.

(Federal Register, 2002) Federal Register Vol. 67, No. 217, Friday, November 8, 2002. Final Rule - Control of Emissions From Nonroad Large Spark Ignition Engines, Recreational Engines, (Marine and Land Based), and Highway Motorcycles.

(Ferris and Kutilek, 1989) Ferris, R.M., and M.J. Kutilek, Ph.D. 1989. Response of Black-tailed Deer to Off-Highway Vehicles in Hollister Hills State Vehicular Recreation Area, Hollister, California.

(FHWA, 1994) Federal Highway Administration. 1994. *FHWA Report No. FHWA-PD-94-031 Conflicts on Multiple-Use Trails: Synthesis of the Literature and State of the Practice*. (Available online at < <http://atfiles.org/files/pdf/conflicts.pdf> >)

(Foltz and Meadows, 2007) Foltz, Randy B. and Dexter L. Meadows, Impacts of ATV Traffic on Undesignated Trails, 2007,  
< [http://www.stream.fs.fed.us/news/streamnt/apr00\\_2.htm](http://www.stream.fs.fed.us/news/streamnt/apr00_2.htm) >, accessed 7/25/07

(Foss, 2006) Foss, C.R. 2006. A preliminary Investigation of Impacts of AV Activity on Breeding Birds in the Nash Stream Forest, Coos County, New Hampshire.

(Gibbons and Ruddell, 1995) Gibbons, S. and E. Ruddell. 1995. The effect of goal orientation and place dependence on select goal interferences among winter backcountry users. *Leisure Sciences* 17, 3: 171-183.

(Graves, et. al., 2003) Graves, T.A., C. Servheen, and D. Godtel. *Spatial and Temporal Response of Grizzly Bears to Recreational Use on Trails*. In 2003 Proceedings of the International Conference on Ecology and Transportation, edited by C. Leroy Irwin, Paul Garrett, and K.P. McDermott. Raleigh, NC: Center for Transportation and the Environment, North Carolina State University, 2003.

(Hammit and Schneider, 2000) Hammit, W.E., and I.E. Schneider. 2000. "Recreation Conflict Management". Trends in Outdoor Education, Leisure, and Tourism, edited by W.C. Gartner and W.D. Lime, 347-356. New York: CABI Publishing

Lewis County, 2007. Lewis County Recreational Trails Plan – ATV Trails

(Kuss, et. al., 1990) Kuss, F.R., A.R. Graefe, and J.J. Vaske. 1990. Visitor Impact Management: A Review of Research. National Parks and Conservation Association, Washington, D.C.

(Marion, 1998) Marion, Jeffrey, Recreation Ecology Research Findings: Implications for Wilderness and Park Managers, 1998,  
< <http://www.cnr.vt.edu/forestry/cpsu/rececol.html> >, accessed 7/30/07

(Merriam-Webster, 2007) Merriam-Webster's Online Dictionary, no date provided, "Noise," < <http://www.m-w.com/cgi-bin/dictionary> >, August 21, 2007.

(Minnesota Department of Natural Resources, 2002) Minnesota Department of Natural Resources. 2002. White Earth Forest ATV/OHM Trail Project Environmental Assessment Worksheet.

NYSDEC. 2001. *Assessing and Mitigating Noise Impacts*. Program Policy

(NYSDEC, 2007) NYSDEC, History of State Forest Program, no date provided, < <http://www.dec.ny.gov/lands/4982.html>>, accessed 8/13/07.

NYSDEC, 2007<sup>(b)</sup> New York State Department of Environmental Conservation Air Resources, no date provided,  
< <http://www.dec.ny.gov/dardata/airmon/parameterpage1.htm> >

(Seattle Department of Planning and Development, 2007) Seattle Department of Planning and Development, DPD's Noise Abatement Program "What is Noise?", May 24, 2005,  
<[http://www.seattle.gov/dpd/Enforcement/Noise Abatement/What Is Noise /default.asp](http://www.seattle.gov/dpd/Enforcement/Noise%20Abatement/What%20Is%20Noise/default.asp)>, accessed 8/21/07.

(Watson, 2001) Watson, A.E. 2001. "Goal interference and social value differences: understanding wilderness conflicts and implications for managing social density." USDA Forest Proceedings RMRS-P 20: 62-67.

(USDA, 1960) United States Department of Agriculture Soil Conservation Service in cooperation with Cornell University Agricultural Experiment Station. 1960. Soil Survey Lewis County New York: U.S. Government Printing Office, Washington, D.C.

(Sheridan, 2002) Sheridan, Julie M., Assistant Solicitor General. Informal Opinion No. 2002-1

(Vaske, 2000) Vaske, J., P. Carothers, M. Donnelly and B. Baird. 2000. Recreation conflict among skiers and snowboarders. *Leisure Sciences* 22, 4: 297-313.

(Vaske, 1995) Vaske, J., M. Donnelly, K. Wittmann and S. Laidlaw. 1995. Interpersonal versus social-values conflict. *Leisure Sciences* 17, 3: 205-222.

(Vaske et. al., 1995) Vaske, J.J., D.J. Decker, and Michael J. Manfredo. 1995. Human dimensions of wildlife management: an integrated framework for coexistence. Pp. 33-49 in R.L. Knight and K.J. Gutzwiller, eds. *Wildlife and Recreationists: Coexistence through Management and Research*. Island Press, Washington, D.C.

