Appendixes

Appendix 1.B
State Environmental Quality Review Act
Long Form

617.20
Appendix A
State Environmental Quality Review
FULL ENVIRONMENTAL ASSESSMENT FORM

Purpose: The full EAF is designed to help applicants and agencies determine, in an orderly manner, whether a project or action may be significant. The question of whether an action may be significant is not always easy to answer. Frequently, there are aspects of a project that are subjective or unmeasurable. It is also understood that those who determine significance may have little or no formal knowledge of the environment or may not be technically expert in environmental analysis. In addition, many who have knowledge in one particular area may not be aware of the broader concerns affecting the question of significance.

The full EAF is intended to provide a method whereby applicants and agencies can be assured that the determination process has been orderly, comprehensive in nature, yet flexible enough to allow introduction of information to fit a project or action.

Full EAF Components: The full EAF is comprised of three parts:

Part 1: Provides objective data and information about a given project and its site. By identifying basic project data, it assists a reviewer in the analysis that takes place in Parts 2 and 3.

Part 2: Focuses on identifying the range of possible impacts that may occur from a project or action. It provides guidance as to whether an impact is likely to be considered small to moderate or whether it is a potentially-large impact. The form also identifies whether an impact can be mitigated or reduced.

Part 3: If any impact in Part 2 is identified as potentially-large, then Part 3 is used to evaluate whether or not the impact is actually important.

THIS AREA FOR LEAD AGENCY USE ONLY

DETERMINATION OF SIGNIFICANCE -- Type 1 and Unlisted Actions

Identify the Portions of EAF completed for this project: ☑ Part 1 ☑ Part 2 ☑ Part 3

Upon review of the information recorded on this EAF (Parts 1 and 2 and 3 if appropriate), and any other supporting information, and considering both the magnitude and importance of each impact, it is reasonably determined by the lead agency that:

☐ A. The project will not result in any large and important impact(s) and, therefore, is one which will not have a significant impact on the environment, therefore a negative declaration will be prepared.

☐ B. Although the project could have a significant effect on the environment, there will not be a significant effect for this Unlisted Action because the mitigation measures described in PART 3 have been required, therefore a CONDITIONED negative declaration will be prepared.*

☒ C. The project may result in one or more large and important impacts that may have a significant impact on the environment, therefore a positive declaration will be prepared.

*A Conditioned Negative Declaration is only valid for Unlisted Actions

2012 Unit Management Plan Amendment

Name of Action

Olympic Regional Development Authority

Name of Lead Agency

Robert W. Hammond

Print or Type Name of Responsible Officer in Lead Agency

Director of Planning and Construction

Title of Responsible Officer

Signature of Responsible Officer in Lead Agency

Signature of Preparer (If different from responsible officer)

12/26/12

Date

website

PART 1--PROJECT INFORMATION
Prepared by Project Sponsor

NOTICE: This document is designed to assist in determining whether the action proposed may have a significant effect on the environment. Please complete the entire form, Parts A through E. Answers to these questions will be considered as part of the application for approval and may be subject to further verification and public review. Provide any additional information you believe will be needed to complete Parts 2 and 3.

It is expected that completion of the full EAF will be dependent on information currently available and will not involve new studies, research or investigation. If information requiring such additional work is unavailable, so indicate and specify each instance.

Name of Action 2012 Unit Management Plan Amendment

Location of Action (include Street Address, Municipality and County)

Whiteface Mountain Ski Center, Rte. 86, Wilmington, NY, Essex County

Name of Applicant/Sponsor Olympic Regional Development Authority

Address 2634 Main Street

City / PO Lake Placid State NY Zip Code 12946

Business Telephone 518-302-5332

Name of Owner (if different)

Address

City / PO State Zip Code

Business Telephone

Description of Action:

Public Safety Radio Communications System – Little Whiteface Ski Patrol Building" (PSRCS/SP Building) involves the replacement of the antiquated existing Little Whiteface Ski Patrol Building, plus the addition of components needed for a public safety radio communications system.

Please Complete Each Question--Indicate N.A. if not applicable

A. SITE DESCRIPTION

Physical setting of overall project, both developed and undeveloped areas.

1. Present Land Use: ☐ Urban ☐ Industrial ☐ Commercial ☐ Residential (suburban) ☐ Rural (non-farm)
   ☑ Forest ☐ Agriculture ☐ Other _____

2. Total acreage of project area: 2910 acres.

APPROXIMATE ACREAGE	PRESENTLY	AFTER COMPLETION
Meadow or Brushland (Non-agricultural)	261 acres	262 acres
Forested	2649 acres	2646 acres
Agricultural (Includes orchards, cropland, pasture, etc.)	_____ acres	_____ acres
Wetland (Freshwater or tidal as per Articles 24,25 of ECL)	_____ acres	_____ acres
Water Surface Area	_____ acres	_____ acres
Unvegetated (Rock, earth or fill)	_____ acres	_____ acres
Roads, buildings and other paved surfaces	_____ acres	_____ acres
Other (Indicate type) _____	_____ acres	_____ acres

3. What is predominant soil type(s) on project site? _____
   a. Soil drainage: ☑ Well drained 5 % of site ☑ Moderately well drained 5 % of site.
   ☑ Poorly drained 90 % of site
   b. If any agricultural land is involved, how many acres of soil are classified within soil group 1 through 4 of the NYS Land Classification System? _____ acres (see 1 NYCRR 370).

4. Are there bedrock outcroppings on project site? ■ Yes ☐ No
   a. What is depth to bedrock 0 (in feet)

5. Approximate percentage of proposed project site with slopes:
   ☑ 0-10% 2 % ☐ 10- 15% 8 % ☑ 15% or greater 90 %

6. Is project substantially contiguous to, or contain a building, site, or district, listed on the State or National Registers of Historic Places? ☐ Yes ■ No

7. Is project substantially contiguous to a site listed on the Register of National Natural Landmarks? ☐ Yes ■ No

8. What is the depth of the water table? NA (in feet)

9. Is site located over a primary, principal, or sole source aquifer? ☐ Yes ■ No

10. Do hunting, fishing or shell fishing opportunities presently exist in the project area? ■ Yes ☐ No

11. Does project site contain any species of plant or animal life that is identified as threatened or endangered? ☐ Yes ☒ No

According to:

Identify each species:

12. Are there any unique or unusual land forms on the project site? (i.e., cliffs, dunes, other geological formations?

☐ Yes ☒ No

Describe:

13. Is the project site presently used by the community or neighborhood as an open space or recreation area?

☒ Yes ☐ No

If yes, explain:

Skiing, Hiking and Mt. Biking

14. Does the present site include scenic views known to be important to the community? ☒ Yes ☐ No

High Peaks

15. Streams within or contiguous to project area:

West Branch Au Sable River

a. Name of Stream and name of River to which it is tributary

Lake Champlain

16. Lakes, ponds, wetland areas within or contiguous to project area:

b. Size (in acres):

17. Is the site served by existing public utilities? ☒ Yes ☐ No

a. If YES, does sufficient capacity exist to allow connection? ☒ Yes ☐ No

b. If YES, will improvements be necessary to allow connection? ☐ Yes ☒ No

18. Is the site located in an agricultural district certified pursuant to Agriculture and Markets Law, Article 25-AA, Section 303 and 304? ☐ Yes ☒ No

19. Is the site located in or substantially contiguous to a Critical Environmental Area designated pursuant to Article 8 of the ECL, and 6 NYCRR 617? ☐ Yes ☒ No

20. Has the site ever been used for the disposal of solid or hazardous wastes? ☐ Yes ☒ No

B. Project Description

1. Physical dimensions and scale of project (fill in dimensions as appropriate).

a. Total contiguous acreage owned or controlled by project sponsor: 2910 acres.

b. Project acreage to be developed: 0.03 acres initially; 0.03 acres ultimately.

c. Project acreage to remain undeveloped: 2650 acres.

d. Length of project, in miles: NA (if appropriate)

e. If the project is an expansion, indicate percent of expansion proposed. _____ %

f. Number of off-street parking spaces existing _____; proposed _____

g. Maximum vehicular trips generated per hour: _____ (upon completion of project)?

h. If residential: Number and type of housing units:

	One Family	Two Family	Multiple Family	Condominium
Initially				
Ultimately				

i. Dimensions (in feet) of largest proposed structure: _____ height; _____ width; _____ length.

j. Linear feet of frontage along a public thoroughfare project will occupy is? _____ ft.

2. How much natural material (i.e. rock, earth, etc.) will be removed from the site? 0 tons/cubic yards.

3. Will disturbed areas be reclaimed ☒ Yes ☐ No ☐ N/A

a. If yes, for what intended purpose is the site being reclaimed?

Sideslopes of Access Road Development

b. Will topsoil be stockpiled for reclamation? ☒ Yes ☐ No

c. Will upper subsoil be stockpiled for reclamation? ☒ Yes ☐ No

4. How many acres of vegetation (trees, shrubs, ground covers) will be removed from site? 0 acres.

5. Will any mature forest (over 100 years old) or other locally-important vegetation be removed by this project?

☐ Yes ☒ No

6. If single phase project: Anticipated period of construction: _____ months, (including demolition)

7. If multi-phased:

   a. Total number of phases anticipated 1 (number)

   b. Anticipated date of commencement phase 1: 1 month _____ year, (including demolition)

   c. Approximate completion date of final phase: 3 month _____ year.

   d. Is phase 1 functionally dependent on subsequent phases? ☐ Yes ☒ No

8. Will blasting occur during construction? ☒ Yes ☐ No

9. Number of jobs generated: during construction 15; after project is complete 1

10. Number of jobs eliminated by this project 0 .

11. Will project require relocation of any projects or facilities? ☐ Yes ☒ No

    If yes, explain:

12. Is surface liquid waste disposal involved? ☐ Yes ☒ No

    a. If yes, indicate type of waste (sewage, industrial, etc) and amount _____

    b. Name of water body into which effluent will be discharged _____

13. Is subsurface liquid waste disposal involved? ☐ Yes ☒ No Type _____

14. Will surface area of an existing water body increase or decrease by proposal? ☐ Yes ☐ No

    If yes, explain:

15. Is project or any portion of project located in a 100 year flood plain? ☐ Yes ☒ No

16. Will the project generate solid waste? ☒ Yes ☐ No

    a. If yes, what is the amount per month? NA tons

    b. If yes, will an existing solid waste facility be used? ☒ Yes ☐ No

    c. If yes, give name Wilmington Landfill ; location Town of Wilmington

    d. Will any wastes not go into a sewage disposal system or into a sanitary landfill? ☐ Yes ☒ No

e. If yes, explain:

17. Will the project involve the disposal of solid waste? ☐ Yes ☒ No

    a. If yes, what is the anticipated rate of disposal? _____ tons/month.

    b. If yes, what is the anticipated site life? _____ years.

18. Will project use herbicides or pesticides? ☐ Yes ☒ No

19. Will project routinely produce odors (more than one hour per day)? ☐ Yes ☒ No

20. Will project produce operating noise exceeding the local ambient noise levels? ☐ Yes ☒ No

21. Will project result in an increase in energy use? ☐ Yes ☒ No

    If yes, indicate type(s)

22. If water supply is from wells, indicate pumping capacity _____ gallons/minute.

23. Total anticipated water usage per day _____ gallons/day.

24. Does project involve Local, State or Federal funding? ☒ Yes ☐ No

    If yes, explain:

New Communications System on Little Whiteface has Federal Funding secured by Essex County

25. Approvals Required:

			Type	Submittal Date
City, Town, Village Board	☐ Yes	☐ No		
City, Town, Village Planning Board	☐ Yes	☐ No		
City, Town Zoning Board	☐ Yes	☐ No		
City, County Health Department	☐ Yes	☒ No		
Other Local Agencies	☐ Yes	☐ No		
Other Regional Agencies	☐ Yes	☐ No		
State Agencies	☒ Yes	☐ No	NYS DEC	4/2013
			APA	4/2013
Federal Agencies	☐ Yes	☐ No		

C. Zoning and Planning Information

1. Does proposed action involve a planning or zoning decision? ☐ Yes ☒ No

If Yes, indicate decision required:

☐ Zoning amendment ☐ Zoning variance ☐ New/revision of master plan ☐ Subdivision

☐ Site plan ☐ Special use permit ☐ Resource management plan ☐ Other

2. What is the zoning classification(s) of the site?

3. What is the maximum potential development of the site if developed as permitted by the present zoning?

4. What is the proposed zoning of the site?

5. What is the maximum potential development of the site if developed as permitted by the proposed zoning?

6. Is the proposed action consistent with the recommended uses in adopted local land use plans? ☐ Yes ☐ No

7. What are the predominant land use(s) and zoning classifications within a ¼ mile radius of proposed action?

8. Is the proposed action compatible with adjoining/surrounding land uses with a ¼ mile? ☒ Yes ☐ No

9. If the proposed action is the subdivision of land, how many lots are proposed? _____

   a. What is the minimum lot size proposed? _____

10. Will proposed action require any authorization(s) for the formation of sewer or water districts? ☐ Yes ☒ No

11. Will the proposed action create a demand for any community provided services (recreation, education, police, fire protection?

☒ Yes ☐ No

a. If yes, is existing capacity sufficient to handle projected demand? ☒ Yes ☐ No

12. Will the proposed action result in the generation of traffic significantly above present levels? ☐ Yes ☒ No

a. If yes, is the existing road network adequate to handle the additional traffic. ☐ Yes ☐ No

D. Informational Details

Attach any additional information as may be needed to clarify your project. If there are or may be any adverse impacts associated with your proposal, please discuss such impacts and the measures which you propose to mitigate or avoid them.

E. Verification

I certify that the information provided above is true to the best of my knowledge.

Applicant/Sponsor Name Robert W. Hammond Date 4/19/2013

Signature

Title Director Planning and Construction

If the action is in the Coastal Area, and you are a state agency, complete the Coastal Assessment Form before proceeding with this assessment.

PART 2 - PROJECT IMPACTS AND THEIR MAGNITUDE

Responsibility of Lead Agency

General Information (Read Carefully)

! In completing the form the reviewer should be guided by the question: Have my responses and determinations been **reasonable?** The reviewer is not expected to be an expert environmental analyst.

! The **Examples** provided are to assist the reviewer by showing types of impacts and wherever possible the threshold of magnitude that would trigger a response in column 2. The examples are generally applicable throughout the State and for most situations. But, for any specific project or site other examples and/or lower thresholds may be appropriate for a Potential Large Impact response, thus requiring evaluation in Part 3.

! The impacts of each project, on each site, in each locality, will vary. Therefore, the examples are illustrative and have been offered as guidance. They do not constitute an exhaustive list of impacts and thresholds to answer each question.

! The number of examples per question does not indicate the importance of each question.

! In identifying impacts, consider long term, short term and cumulative effects.

Instructions (Read carefully)

a. Answer each of the 20 questions in PART 2. Answer **Yes** if there will be **any** impact.

b. **Maybe** answers should be considered as **Yes** answers.

c. If answering **Yes** to a question then check the appropriate box(column 1 or 2)to indicate the potential size of the impact. If impact threshold equals or exceeds any example provided, check column 2. If impact will occur but threshold is lower than example, check column 1.

d. Identifying that an Impact will be potentially large (column 2) does not mean that it is also necessarily **significant**. Any large impact must be evaluated in PART 3 to determine significance. Identifying an impact in column 2 simply asks that it be looked at further.

e. If reviewer has doubt about size of the impact then consider the impact as potentially large and proceed to PART 3.

f. If a potentially large impact checked in column 2 can be mitigated by change(s) in the project to a small to moderate impact, also check the **Yes** box in column 3. A **No** response indicates that such a reduction is not possible. This must be explained in Part 3.

	1 Small to Moderate Impact	2 Potential Large Impact	3 Can Impact Be Mitigated by Project Change
Impact on Land			
1. Will the Proposed Action result in a physical change to the project site? NO ☐ YES ☒			
Examples that would apply to column 2			
• Any construction on slopes of 15% or greater, (15 foot rise per 100 foot of length), or where the general slopes in the project area exceed 10%.	☒	☐	☐ Yes ☒ No
• Construction on land where the depth to the water table is less than 3 feet.	☐	☐	☐ Yes ☐ No
• Construction of paved parking area for 1,000 or more vehicles.	☐	☐	☐ Yes ☐ No
• Construction on land where bedrock is exposed or generally within 3 feet of existing ground surface.	☒	☐	☐ Yes ☒ No
• Construction that will continue for more than 1 year or involve more than one phase or stage.	☐	☐	☐ Yes ☐ No
• Excavation for mining purposes that would remove more than 1,000 tons of natural material (i.e., rock or soil) per year.	☐	☐	☐ Yes ☐ No

	1 Small to Moderate Impact	2 Potential Large Impact	3 Can Impact Be Mitigated by Project Change	
• Construction or expansion of a santary landfill.	☐	☐	☐ Yes	☐ No
• Construction in a designated floodway.	☐	☐	☐ Yes	☐ No
• Other impacts:	☐	☐	☐ Yes	☐ No

2. Will there be an effect to any unique or unusual land forms found on the site? (i.e., cliffs, dunes, geological formations, etc.)

☒ NO ☐ YES

• Specific land forms:	☐	☐	☐ Yes	☐ No

Impact on Water

3. Will Proposed Action affect any water body designated as protected? (Under Articles 15, 24, 25 of the Environmental Conservation Law, ECL)

☒ NO ☐ YES

Examples that would apply to column 2

• Developable area of site contains a protected water body.	☐	☐	☐ Yes	☐ No
• Dredging more than 100 cubic yards of material from channel of a protected stream.	☐	☐	☐ Yes	☐ No
• Extension of utility distribution facilities through a protected water body.	☐	☐	☐ Yes	☐ No
• Construction in a designated freshwater or tidal wetland.	☐	☐	☐ Yes	☐ No
• Other impacts:	☐	☐	☐ Yes	☐ No

4. Will Proposed Action affect any non-protected existing or new body of water?

☒ NO ☐ YES

Examples that would apply to column 2

• A 10% increase or decrease in the surface area of any body of water or more than a 10 acre increase or decrease.	☐	☐	☐ Yes	☐ No
• Construction of a body of water that exceeds 10 acres of surface area.	☐	☐	☐ Yes	☐ No
• Other impacts:	☐	☐	☐ Yes	☐ No

	1 Small to Moderate Impact	2 Potential Large Impact	3 Can Impact Be Mitigated by Project Change	
5. Will Proposed Action affect surface or groundwater quality or quantity? ☒ NO ☐ YES				
Examples that would apply to column 2				
• Proposed Action will require a discharge permit.	☐	☐	☐ Yes	☐ No
• Proposed Action requires use of a source of water that does not have approval to serve proposed (project) action.	☐	☐	☐ Yes	☐ No
• Proposed Action requires water supply from wells with greater than 45 gallons per minute pumping capacity.	☐	☐	☐ Yes	☐ No
• Construction or operation causing any contamination of a water supply system.	☐	☐	☐ Yes	☐ No
• Proposed Action will adversely affect groundwater.	☐	☐	☐ Yes	☐ No
• Liquid effluent will be conveyed off the site to facilities which presently do not exist or have inadequate capacity.	☐	☐	☐ Yes	☐ No
• Proposed Action would use water in excess of 20,000 gallons per day.	☐	☐	☐ Yes	☐ No
• Proposed Action will likely cause siltation or other discharge into an existing body of water to the extent that there will be an obvious visual contrast to natural conditions.	☐	☐	☐ Yes	☐ No
• Proposed Action will require the storage of petroleum or chemical products greater than 1,100 gallons.	☐	☐	☐ Yes	☐ No
• Proposed Action will allow residential uses in areas without water and/or sewer services.	☐	☐	☐ Yes	☐ No
• Proposed Action locates commercial and/or industrial uses which may require new or expansion of existing waste treatment and/or storage facilities.	☐	☐	☐ Yes	☐ No
• Other impacts:	☐	☐	☐ Yes	☐ No

	1 Small to Moderate Impact	2 Potential Large Impact	3 Can Impact Be Mitigated by Project Change	

6. Will Proposed Action alter drainage flow or patterns, or surface water runoff?
   ■ NO ☐ YES

Examples that would apply to column 2

• Proposed Action would change flood water flows	☐	☐	☐ Yes	☐ No
• Proposed Action may cause substantial erosion.	☐	☐	☐ Yes	☐ No
• Proposed Action is incompatible with existing drainage patterns.	☐	☐	☐ Yes	☐ No
• Proposed Action will allow development in a designated floodway.	☐	☐	☐ Yes	☐ No
• Other impacts:	☐	☐	☐ Yes	☐ No

IMPACT ON AIR

7. Will Proposed Action affect air quality?
   ■ NO ☐ YES

Examples that would apply to column 2

• Proposed Action will induce 1,000 or more vehicle trips in any given hour.	☐	☐	☐ Yes	☐ No
• Proposed Action will result in the incineration of more than 1 ton of refuse per hour.	☐	☐	☐ Yes	☐ No
• Emission rate of total contaminants will exceed 5 lbs. per hour or a heat source producing more than 10 million BTU's per hour.	☐	☐	☐ Yes	☐ No
• Proposed Action will allow an increase in the amount of land committed to industrial use.	☐	☐	☐ Yes	☐ No
• Proposed Action will allow an increase in the density of industrial development within existing industrial areas.	☐	☐	☐ Yes	☐ No
• Other impacts:	☐	☐	☐ Yes	☐ No

IMPACT ON PLANTS AND ANIMALS

8. Will Proposed Action affect any threatened or endangered species?
   ■ NO ☐ YES

Examples that would apply to column 2

• Reduction of one or more species listed on the New York or Federal list, using the site, over or near the site, or found on the site.	☐	☐	☐ Yes	☐ No

	1 Small to Moderate Impact	2 Potential Large Impact	3 Can Impact Be Mitigated by Project Change	
• Removal of any portion of a critical or significant wildlife habitat.	☐	☐	☐ Yes	☐ No
• Application of pesticide or herbicide more than twice a year, other than for agricultural purposes.	☐	☐	☐ Yes	☐ No
• Other impacts:	☐	☐	☐ Yes	☐ No

9. Will Proposed Action substantially affect non-threatened or non-endangered species?

☒ NO ☐ YES

Examples that would apply to column 2

• Proposed Action would substantially interfere with any resident or migratory fish, shellfish or wildlife species.	☐	☐	☐ Yes	☐ No
• Proposed Action requires the removal of more than 10 acres of mature forest (over 100 years of age) or other locally important vegetation.	☐	☐	☐ Yes	☐ No
• Other impacts:	☐	☐	☐ Yes	☐ No

IMPACT ON AGRICULTURAL LAND RESOURCES

10. Will Proposed Action affect agricultural land resources?

☒ NO ☐ YES

Examples that would apply to column 2

• The Proposed Action would sever, cross or limit access to agricultural land (includes cropland, hayfields, pasture, vineyard, orchard, etc.)	☐	☐	☐ Yes	☐ No
• Construction activity would excavate or compact the soil profile of agricultural land.	☐	☐	☐ Yes	☐ No
• The Proposed Action would irreversibly convert more than 10 acres of agricultural land or, if located in an Agricultural District, more than 2.5 acres of agricultural land.	☐	☐	☐ Yes	☐ No

	1 Small to Moderate Impact	2 Potential Large Impact	3 Can Impact Be Mitigated by Project Change
• The Proposed Action would disrupt or prevent installation of agricultural land management systems (e.g., subsurface drain lines, outlet ditches, strip cropping); or create a need for such measures (e.g. cause a farm field to drain poorly due to increased runoff).	☐	☐	☐ Yes ☐ No
• Other impacts:	☐	☐	☐ Yes ☐ No

IMPACT ON AESTHETIC RESOURCES

11. Will Proposed Action affect aesthetic resources? (If necessary, use the Visual EAF Addendum in Section 617.20, Appendix B.)
☒ NO ☐ YES

Examples that would apply to column 2			
• Proposed land uses, or project components obviously different from or in sharp contrast to current surrounding land use patterns, whether man-made or natural.	☐	☐	☐ Yes ☐ No
• Proposed land uses, or project components visible to users of aesthetic resources which will eliminate or significantly reduce their enjoyment of the aesthetic qualities of that resource.	☐	☐	☐ Yes ☐ No
• Project components that will result in the elimination or significant screening of scenic views known to be important to the area.	☐	☐	☐ Yes ☐ No
• Other impacts:	☐	☐	☐ Yes ☐ No

IMPACT ON HISTORIC AND ARCHAEOLOGICAL RESOURCES

12. Will Proposed Action impact any site or structure of historic, prehistoric or paleontological importance?
☒ NO ☐ YES

Examples that would apply to column 2			
• Proposed Action occurring wholly or partially within or substantially contiguous to any facility or site listed on the State or National Register of historic places.	☐	☐	☐ Yes ☐ No
• Any impact to an archaeological site or fossil bed located within the project site.	☐	☐	☐ Yes ☐ No
• Proposed Action will occur in an area designated as sensitive for archaeological sites on the NYS Site Inventory.	☐	☐	☐ Yes ☐ No

	1 Small to Moderate Impact	2 Potential Large Impact	3 Can Impact Be Mitigated by Project Change	
• Other impacts:	☐	☐	☐ Yes	☐ No

IMPACT ON OPEN SPACE AND RECREATION

13. Will proposed Action affect the quantity or quality of existing or future open spaces or recreational opportunities?
☐ NO ☒ YES

Examples that would apply to column 2

• The permanent foreclosure of a future recreational opportunity.	☐	☐	☐ Yes	☐ No
• A major reduction of an open space important to the community.	☐	☐	☐ Yes	☐ No
• Other impacts:	☐	☐	☐ Yes	☐ No

IMPACT ON CRITICAL ENVIRONMENTAL AREAS

14. Will Proposed Action impact the exceptional or unique characteristics of a critical environmental area (CEA) established pursuant to subdivision 6NYCRR 617.14(g)?
☒ NO ☐ YES

List the environmental characteristics that caused the designation of the CEA.

Examples that would apply to column 2

• Proposed Action to locate within the CEA?	☐	☐	☐ Yes	☐ No
• Proposed Action will result in a reduction in the quantity of the resource?	☐	☐	☐ Yes	☐ No
• Proposed Action will result in a reduction in the quality of the resource?	☐	☐	☐ Yes	☐ No
• Proposed Action will impact the use, function or enjoyment of the resource?	☐	☐	☐ Yes	☐ No
• Other impacts:	☐	☐	☐ Yes	☐ No

	1 Small to Moderate Impact	2 Potential Large Impact	3 Can Impact Be Mitigated by Project Change	

IMPACT ON TRANSPORTATION

15. Will there be an effect to existing transportation systems?

☒ NO ☐ YES

Examples that would apply to column 2

• Alteration of present patterns of movement of people and/or goods.	☐	☐	☐ Yes	☐ No
• Proposed Action will result in major traffic problems.	☐	☐	☐ Yes	☐ No
• Other impacts:	☐	☐	☐ Yes	☐ No

IMPACT ON ENERGY

16. Will Proposed Action affect the community's sources of fuel or energy supply?

☒ NO ☐ YES

Examples that would apply to column 2

• Proposed Action will cause a greater than 5% increase in the use of any form of energy in the municipality.	☐	☐	☐ Yes	☐ No
• Proposed Action will require the creation or extension of an energy transmission or supply system to serve more than 50 single or two family residences or to serve a major commercial or industrial use.	☐	☐	☐ Yes	☐ No
• Other impacts:	☐	☐	☐ Yes	☐ No

NOISE AND ODOR IMPACT

17. Will there be objectionable odors, noise, or vibration as a result of the Proposed Action?

☒ NO ☐ YES

Examples that would apply to column 2

• Blasting within 1,500 feet of a hospital, school or other sensitive facility.	☐	☐	☐ Yes	☐ No
• Odors will occur routinely (more than one hour per day).	☐	☐	☐ Yes	☐ No
• Proposed Action will produce operating noise exceeding the local ambient noise levels for noise outside of structures.	☐	☐	☐ Yes	☐ No
• Proposed Action will remove natural barriers that would act as a noise screen.	☐	☐	☐ Yes	☐ No
• Other impacts:	☐	☐	☐ Yes	☐ No

	1 Small to Moderate Impact	2 Potential Large Impact	3 Can Impact Be Mitigated by Project Change	

IMPACT ON PUBLIC HEALTH

18. Will Proposed Action affect public health and safety?
☒ NO ☐ YES

• Proposed Action may cause a risk of explosion or release of hazardous substances (i.e. oil, pesticides, chemicals, radiation, etc.) in the event of accident or upset conditions, or there may be a chronic low level discharge or emission.	☐	☐	☐ Yes	☐ No
• Proposed Action may result in the burial of "hazardous wastes" in any form (i.e. toxic, poisonous, highly reactive, radioactive, irritating, infectious, etc.)	☐	☐	☐ Yes	☐ No
• Storage facilities for one million or more gallons of liquefied natural gas or other flammable liquids.	☐	☐	☐ Yes	☐ No
• Proposed Action may result in the excavation or other disturbance within 2,000 feet of a site used for the disposal of solid or hazardous waste.	☐	☐	☐ Yes	☐ No
• Other impacts:	☐	☐	☐ Yes	☐ No

IMPACT ON GROWTH AND CHARACTER OF COMMUNITY OR NEIGHBORHOOD

19. Will Proposed Action affect the character of the existing community?
☒ NO ☐ YES

Examples that would apply to column 2

• The permanent population of the city, town or village in which the project is located is likely to grow by more than 5%.	☐	☐	☐ Yes	☐ No
• The municipal budget for capital expenditures or operating services will increase by more than 5% per year as a result of this project.	☐	☐	☐ Yes	☐ No
• Proposed Action will conflict with officially adopted plans or goals.	☐	☐	☐ Yes	☐ No
• Proposed Action will cause a change in the density of land use.	☐	☐	☐ Yes	☐ No
• Proposed Action will replace or eliminate existing facilities, structures or areas of historic importance to the community.	☐	☐	☐ Yes	☐ No
• Development will create a demand for additional community services (e.g. schools, police and fire, etc.)	☐	☐	☐ Yes	☐ No

	1 Small to Moderate Impact	2 Potential Large Impact	3 Can Impact Be Mitigated by Project Change
• Proposed Action will set an important precedent for future projects.	☐	☐	☐ Yes ☐ No
• Proposed Action will create or eliminate employment.	☐	☐	☐ Yes ☐ No
• Other impacts:	☐	☐	☐ Yes ☐ No

20. Is there, or is there likely to be, public controversy related to potential adverse environment impacts?

☒ NO ☐ YES

If Any Action in Part 2 Is Identified as a Potential Large Impact or If you Cannot Determine the Magnitude of Impact, Proceed to Part 3

Part 3 - EVALUATION OF THE IMPORTANCE OF IMPACTS

Responsibility of Lead Agency

Part 3 must be prepared if one or more impact(s) is considered to be potentially large, even if the impact(s) may be mitigated.

Instructions (If you need more space, attach additional sheets)

Discuss the following for each impact identified in Column 2 of Part 2:

1. Briefly describe the impact.

2. Describe (if applicable) how the impact could be mitigated or reduced to a small to moderate impact by project change(s).

3. Based on the information available, decide if it is reasonable to conclude that this impact is **important**.

   To answer the question of importance, consider:

   - The probability of the impact occurring
   - The duration of the impact
   - Its irreversibility, including permanently lost resources of value
   - Whether the impact can or will be controlled
   - The regional consequence of the impact
   - Its potential divergence from local needs and goals
   - Whether known objections to the project relate to this impact.

An Environmental Impact Statement has been developed and is included as part of the UMP process.

Reset

Appendix 3.A8.a
Whiteface Mountain Trails and Slopes Handbook Summer Operations

WHITEFACE

Whiteface Mountain
Trails and Slopes Handbook
Summer Operations

List of Sections

Equipment Use and Training
Storm Water Erosion and Sediment Control
Trail Maintenance
Bicknell's Thrush Habitat Management Plan and Development Standards

Whiteface Mountain
Trails and Slopes Handbook
Summer Operations

Introduction: The Maintenance of trails and slopes is a multi-seasonal project. Our ability to make snow and groom the trails efficiently in the winter is directly related to our summer maintenance program, removal of rocks, stumps and high spots help us to cover the trails with snow more quickly, it also helps prevent tillers and tracks from damage on thin snow areas. The brushing of the trails, maintenance of fences and signs all aid in improving our snow surface product, which in the end will please our skiing guests. This booklet will help you understand principles and procedures in the Trail Maintenance Department.

Equipment Use and Training

Overview:
The Trail Maintenance department works with a variety of motorized equipment, ranging from chain saws to excavators and bull dozers. **Staff should never run any piece of equipment unless they have first read the operators manual, completed specific training for the equipment, and have been assigned that piece of equipment by their supervisor. All training must be documented through your department head and the training officer. Operating heavy equipment is only allowed by the Department head when training and title allows.**
All pieces of mechanical equipment require daily maintenance such as lubrication oil checks etc. Operators are responsible to complete these tasks.

Chainsaw:
All staff operating Chain saws must have completed an approved chainsaw training course. These courses are provided and coordinated through the department head and management.
Anyone operating a chain saw with out Personal Protective equipment will be disciplined.

Chipper:
All staff operating the chipper must have been through the chipper training and be familiar with all safety features on the machine.

ATV: Anyone operating an ATV is required to go through specific ATV training with your supervisor or training officer. DOT approved helmets are required at all times.

Heavy Equipment: Heavy Equipment to include trucks, bulldozers, excavator's backhoes etc., require specific training and authorization by your supervisor.

Storm Water Erosion and Sediment Control:

Overview:
All new trail construction and expansions projects will have a formal Storm Water Pollution Prevention Plan (SWPPP). While the work will be inspected by Management Staff for compliance it is the responsibility of everyone to ensure that SWPPP is executed. Since Maintenance Staff is constantly on the site, they are the key to the success of the SWPPP. After the completion of the new trail construction and expansion the SWPPP will remain in place until re-vegetation is complete. After re-vegetation is complete the temporary SWPPP devices will be removed, but the permanent devices and controls will remain in place. The following items focuses on the maintenance of the permanent devices.

1) Water bars are designed to collect runoff on ski trails and to divert the water to the side of trails to avoid erosion. Water bar maintenance involves inspecting and cleaning water bars, too ensure that water flows unhindered and does not jump the water bar and run down the trail. If a water bar is compromised, it must be cleaned and reestablished, if this cannot be done by hand, a machine must be used. Always leave the trail level after establishing a water bar.
2) All culvert ends must be maintained and inspected. Inspection involves looking for and removing obstructions such as logs dirt rocks etc. observing the integrity of the culvert header is also important.
3) Many areas have silt traps designed into the storm water system, Silt traps are cleaned monthly and after rain events of 0.5 inches or more. The department supervisor has forms to be filled out to document this process.
4) If a maintenance operation requires earth to be disturbed, proper erosion control methods must be used. Devices such as water bars, silt traps and silt fence must be used in accordance with the Best Management Practices. ORDA's Office of Planning and Construction must be notified it new temporary erosion and sediment control devices are needed. Anywhere that soil is disturbed revegetation must occur quickly. No more than 600 slope feet or one acre of trail can be exposed at one time. After trails are graded and smooth, Whiteface uses a special mix of grass seed (Adirondack Mix), once the seed is spread straw is spread on top at a coverage of about 75 to 80 percent. Do not spread the straw too thick. Whiteface uses only straw as mulch, hay SHALL NOT used to mulch ski trail.
5) All brooks are inspected annually and any fallen trees are bucked up and removed to prevent them from lodging in culvert heads. **If you observe erosion or see maintenance needed on water bars, culverts or silt traps, repair immediately or notify your supervisor immediately**

Trail Maintenance

Trail Grading: Grading of the trail is important in that it has an end result which helps us to save on snowmaking costs, prevents expensive damage to grooming machines, and keeps our guests happy with a good product.

Most trail grading is accomplished when the trail is built; blasting and machine work is designed to level the trail and to create a consistent "fall line". Occasionally in the maintenance process we will reshape trails and areas where dirt or rocks consistently come through the snow. Any work that is done on a trail must be cleaned up, leveled and re-vegetated. Always consider what will be left behind, which will make snowmaking and grooming more difficult.

Another key element of trail grading is rock picking, this is done by hand and sometimes by machine. There are always rocks to pick, whenever you see a rock in a ski trail it should be moved if you cannot move it call your supervisor

Mowing: Mowing on all ski trails is done at least annually; in areas where it allows machines are used; in all other areas trails are mowed by hand with scythes.

Brushing: Trails edges are brushed regularly, often this is done with a chainsaw and a pole saw. The object is to remove branches and trees which will interfere with skiers and snow cats in the winter. Whenever possible trees should be chipped, when cutting brush cut as low to the ground as possible, when limbing trees, branches should be cut tight to the trunk, do not leave protruding sticks. **Notice in areas above 2800' in elevation specific techniques are required, this is detailed in the environmental section of the booklet.**

Trenching: There are multiple types of underground utilities at Whiteface; always call to have utilities marked before any digging or grading.

Environmental: We are an outdoor industry the integrity and the beauty of the outdoors is a part of our product, we should always use practices that are environmentally friendly.
Whiteface is a part of the Adirondack Forest Preserve. All tree cutting must be accounted for, and approved through a permit process. **Do not cut any trees unless you have specific approval from your supervisor.**

Attached is a General Construction Plan which details some best practices in trail maintenance and construction. The plan addresses many environmental issues surrounding trail construction and work. Whenever more than 1/3rd acre of land is disturbed, we must develop a storm water plan specific to the project.

Bicknell's Thrush Habitat Management Plan and Development Standards:

Overview:

Whiteface is committed to the protection of the habitat of the Bicknell's Thrush. This effort requires the assistance of all Trail Maintenance Staff. In order to facilitate the Bicknell's Thrush Habitat Management Plan and Development Standards, Whiteface has identified the demark of the 2800 Feet elevation with signs which read:

"*NOTICE all maintenance and construction in areas above 2800' are subject to strict guidelines. Consult with Whiteface Management or Trails Department Head before proceeding.*"

It is important that the following standards be applied in these areas to ensure the program success. If you have questions about trail work above 2800' ask your supervisor for further clarification.

Objectives:

The objective for the Habitat Management Plan and Development Standards is to ensure that Bicknell's Thrush habitat is recreated in the most efficient and effective manner. Additionally, it is important that opportunities for new habitat are identified and developed.

Whiteface Mountain has established a Habitat Management Plan for all ski trails and lift lines above the 2800' elevation level. This plan is designed to preserve and create high elevation habitat for the Bicknell's Thrush.

Continued Field Surveys to Monitor Progress

Since there are no pre-existing standards to objectively determine success, the standards presented in this program are subject to change and modifications based on stakeholder observations and continuing recommendations, therefore, the opinions from WFM Operations Staff is very important to the success of the program. Please communicate to your supervisor any positive observations and thoughts on making this program a success.

The current recommended timeline and measures to objectively determine success are as follows:

- Pre-Construction Gross Vegetation Survey – This survey is completed and is on record at WFM Administrative Offices.
- Post-Construction Annual Visual Vegetation Survey Gross - This survey is done annually, it is an informal visual survey.
- Post-Construction Gross Vegetation Survey – This survey is done at five (5) year intervals and is performed with the same formal documentation as the Pre-Construction Gross Vegetation Survey.

Pre-Construction Survey

A Pre-Construction Gross Vegetation Survey (GVS) has been conducted in the region of the new trail development to identify species of trees and potential Bicknell's Thrush Habitat (BITH). In the specific areas of new construction, transects were established at existing BITH monitoring points. The GVS results were recorded on data sheets which include the BITH monitoring points. These data sheets shall be used as the Baseline for progress monitoring.

Post-Construction Surveys

Post-Construction Surveys include an Annual Visual Survey and a periodic Gross Vegetation Survey.

The Annual Visual Surveys are to be conducted during routine seasonal maintenance. These surveys should be an element of your daily activities and should include recommendations to the Trail Operations Supervisor for facilitating vegetation growth. Observations and efforts need to be included in the Daily Operations Report.

The Gross Vegetation Survey is targeted for five (5) year periods. This survey shall be a formal survey and shall include the support of the DEC. This survey will use the same practices as used in the Pre-Construction Gross Vegetation Survey. The results from this survey will be used to determine future survey schedules.

Timeline and Measures to Objectively Determine Success

At the conclusion of the Post-Construction Survey progress will be assessed. The conditions of the progress may require changes to the program. Please make sure that your Trails and Slopes Handbook is the most current version.

Construction and Maintenance Techniques

- Trails will be flagged before construction to the width of skiable terrain. After the initial cut to the flagging, areas will be marked where additional cutting (5'-8') will need to occur to provide for establishment of new habitat. This far edge of new habitat will be marked with a permanent type marker.
- We anticipate that balsam fir will grow quickly in the areas where construction takes place, but to ensure progress Whiteface will plant seedlings in the first year after construction. In the event that habitat creation is not successful, Whiteface will consult with interested groups to evaluate options to ensure that habitat is being created.
- No tree cutting or brushing can occur in these areas between May 15th and August 1st
- When trails are brushed, care must be made to leave a "feathered" edge of dense brush on the trail edges. See Diagram
- When cutting, or maintaining glades, efforts will be made to disturb existing under story as little as possible.

Gross Vegetation Survey Standards

The following text provides direction and guidance for the application of a Gross Vegetation Survey.

1. Locate a preselected BITH census point.
2. Run a tape measure from this point, following a distinct compass direction that These transects will be 10' wide and extend across the trail, to a distance of 20' into the woods past the trail edge on both sides. generally follows the contour of the slope, towards and into the nearest trail. At the trail edge, block off one 10 x 10 m plot in the trail and one 10 x 10 m plot in the woods adjacent the trail. Measure off additional 10 x 10 m plots 20 and 40 m into the forest from the trail edge (Figure 1). If the transect does not cross the trail edge perpendicularly, place the plots on the side of the transect that keeps the plot in the cover type intended.

3. In the 10 x 10 m plots, count all the trees over 1.4 meters, measure their height and diameter at 1.4 meters.
4. In the each 10 x 10 m plot, randomly place a total of 10 1 x 1 m sub-plots in this fashion. Consider the trail edge as zero meters along the transect (horizontal axis). At 0, 2, 4, 6, and 8 meters on this axis, place two plots randomly along a vertical axis traveling the 10 m up or down the plot. Thus there will be two plots each about 0, 2, 4, 6, and 8 meters from the trail edge, both towards the trail center and the forest interior. (Regression analysis can be used to analyze these data).
5. In each 1 x 1 m plot, count all large seedlings 10cm to 1.4 m high.
6. If time or effort permits, repeat with a similar schema for small seedlings (those under and equal to 10cm).
7. Repeat for each of the eight BITH Survey.

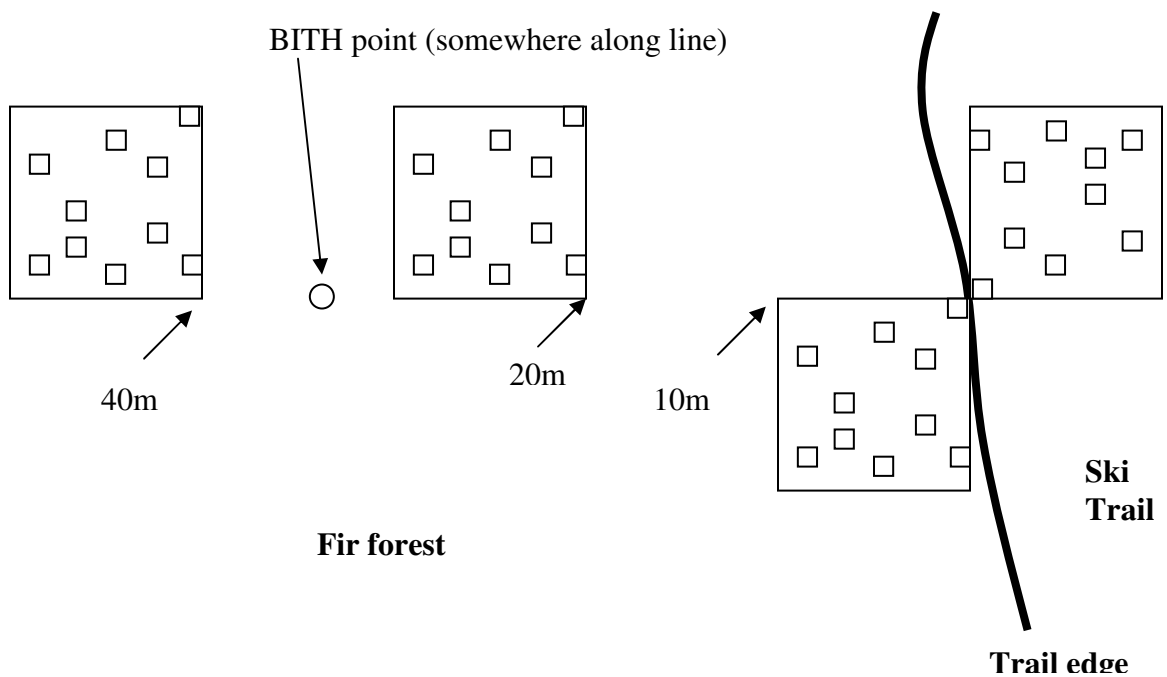

Figure #1

Figure# 1 - Proposed transect design includes a 60 meter transect with two 10 x 10 meter plots at the trail edge and two interior 10 x 10 m plots, one at 20 m one at 40 m from the trail edge.

Analysis will include:

1. Are forest edge densities different than interior densities?
   An analysis of variance, comparing the various BITH sites; furthest interior plots with the edge plots.
2. How far into the forest interior does the trail cut influence?

Regression analysis looking at seedling densities within1x1 subplots. Comparing the edge plots with the interior plots, or do an overall regression and see where no more change is detected

3. How far out into the trail are we getting "feathering" of the seedlings?
   Regression analysis of seedlings from trail edge towards center of trail.

Measurements will include:

1. Identity and number of woody stems growing in each plot
2. Canopy height in each plot.
3. Measure diameter and height of each stem.
4. Count seedlings under the cut-off

Appendix 3.A8.b
Use of Whiteface Mountain by Bicknells' Thrush and other Montane Forest Bird Species

2004 End-of-Season Report
2005 End-of-Season Report
2006 End-of-Season Report
2008 End-of-Season Report

Distribution

Jay Rand
Mike Pratt
Bob Hammond

ADIRONDACK COMMUNITIES & CONSERVATION PROGRAM

September 16, 2004

9/19/04

Mr. Ted Blazer
Olympic Regional Development Authority
218 Main St.
Lake Placid, NY 12946

Dear Mr. Blazer,

Enclosed please find our end-of-season report detailing the activities undertaken by WCS to assess Bicknell's thrush on Whiteface Mtn. Your support enabled us to survey a total of 27 locations on the mountain, in order to examine presence/absence and relative abundance of Bicknell's thrush in existing ski trails, existing glades, proposed ski trails, proposed glades, and control areas. We found Bicknell's thrush in existing ski trail and control sites, as well as a variety of other high elevation boreal species, indicating the importance of this mountain in providing habitat for this and other birds.

Bicknell's thrush is a species of special concern in New York State and has been identified as the nearctic Neotropical migrant of highest conservation priority in the Northeast. This work provides critical information for an important species and we greatly appreciate the contribution of ORDA to make this survey possible. Thank you very much for your financial and logistical support, as well as your participation in planning meetings and willingness to engage in this project. All are much appreciated and we look forward to continuing the survey next summer.

Sincerely,

Michele

Michale Glennon
Wildlife Conservation Society

7 Brandy Brook Avenue, Suite 204, Saranac Lake, NY 12983 tel 518.891.8872 fax 518.891.8875 web www.wcs.org/adirondacks

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ST. CATHERINES WILDLIFE SURVIVAL CENTER

Use of Whiteface Mountain by Bicknell's Thrush and other Montane Forest Bird Species

2004 End-of-season report submitted to:
Olympic Regional Development Authority
218 Main Street
Lake Placid, NY 12946

Submitted by:
Michale Glennon and Leslie Karasin
Wildlife Conservation Society
7 Brandy Brook Ave, Suite 204
Saranac Lake, NY 12983
518-891-8872
mglennon@wcs.org

September 16, 2004

Executive Summary: The Wildlife Conservation Society (WCS) was contracted by the Olympic Regional Development Authority (ORDA) to assess the use of Whiteface Mtn. by Bicknell's thrush (*Catharus bicknelli*), determining, at a minimum, the presence or absence of the species at a number of locations on the mountain. A species of special concern in New York State, Bicknell's thrush makes use of high elevation conifer forest such as that found on Whiteface and other Adirondack peaks for breeding and nesting habitat during the summer months. Proposed ski trail expansion on Whiteface has raised concerns about the potential for impacts of new trail development on Bicknell's thrush habitat. We surveyed a total of 27 sample points on the mountain in 5 categories: (1) existing glade, (2) proposed glade, (3) existing trail, (4) proposed trail, and (5) control areas. Study points were sampled using standard point count methods to monitor the presence of Bicknell's thrush (BITH) and 4 other high elevation bird species: blackpoll warbler (BLPW), Swainson's thrush (SWTH), winter wren (WIWR), and white-throated sparrow (WTSP). These 5 species are also monitored on an annual basis by Mtn. Birdwatch, a volunteer, long-term monitoring program for montane forest birds that are particularly susceptible to climate change and other stresses in the northeast. We found no significant differences in the total number of individuals, total number of species, total number of Mtn. Birdwatch species, or total number of Bicknell's thrush detected among existing ski trails, existing glades, proposed ski trails, proposed glades, and control areas. Our sample sizes for some forest types were small due to the configuration of habitat on the mountain itself, and so future monitoring will help to further elucidate patterns. We believe that our power to detect statistical differences was good for total birds and total species, but was not as good for individual species differences due to higher variability at the individual species level. Preliminary analyses of the first year's data show that existing ski trails and glades do not differ statistically in terms of abundance or species richness for montane forest birds including Bicknell's thrush. Some trends appeared in the data, however, showing that control areas may have higher total bird abundance and

higher diversity of bird species than existing ski trails and glades. Glading, in particular, may be detrimental to habitat quality for Bicknell's thrush.

Introduction

The Bicknell's thrush is a species of great interest in the northeastern United States, both for birders and scientists alike. The species breeds in high elevation conifer forests, primarily above 3000 ft., on mountaintops from the Catskills to northern Maine. It is among the most rare and probably most threatened species in North America, and is ranked as the nearctic Neotropical migrant of highest conservation priority in the Northeast (Rimmer *et al.* 2001).

Bicknell's thrush habitat in the U.S. consists of montane forests dominated by balsam fir (*Abies balsamea*), with lesser amounts of red (*Picea rubens*) and black spruce (*Picea mariana*), white birch (*Betula papyrifera*), mountain ash (*Sorbus americana*), and other hardwood species. It is adapted to naturally disturbed habitats and historically probably sought out patches of regenerating forest caused by fir waves, wind throw, ice and snow damage, fire, and insect outbreaks, as well as the chronically disturbed stunted conifer forests found at high elevations in the northeast (Rimmer *et al.* 2001). Highest densities of the species are often found in continually disturbed (high winds, heavy winter ice accumulation) stands of dense, stunted fir on exposed ridgelines or along edges of human-created openings, or in regenerating fir waves (Rimmer *et al.* 2001). More than 90% of birds are believed to breed in the U.S. (versus Canada), with the Adirondacks containing the largest area of its montane breeding habitat, followed by NH, ME, VT, and the Catskills.

Bicknell's thrush wintering habitat is even more restricted than its breeding habitat, with the species occurring regularly on only 5 islands in the Greater Antilles. It prefers mesic to wet broadleaf montane forests in the Dominican Republic, Haiti, Cuba, Jamaica, and Puerto Rico. Large-scale loss and degradation of wintering habitat pose the greatest threat to the long-term viability of this species (Rimmer *et al.* 2001).

Bicknell's thrush is not well-sampled by traditional bird monitoring methods due to its preference for high elevation habitat and its uncommon mating system. Both males and females mate with multiple partners, multiple paternity is common, and more than one male often feeds nestlings at a given nest. These characteristics make it poorly sampled by bird count methods that rely on more common territorial mating systems found in many bird species. Estimates of breeding densities for the species are unreliable at best (Rimmer *et al.* 2001). Though estimation of breeding densities are difficult to obtain, Bicknell's thrush is believed to be vulnerable to extinction and has been added to the Red List of Threatened Species by the World Conservation Union. As a habitat specialist of high elevation conifer forests, it is susceptible to a number of threats on the breeding grounds including pollution (acid rain, mercury), recreational development, cell tower construction, wind power development, and climate change.

This report details the first of three seasons of field work conducted by the Wildlife Conservation Society to examine the potential impacts of ski area development on breeding habitat for Bicknell's thrush and other montane forest species on Whiteface Mtn. in the Adirondacks of New York State.

Study Area

Whiteface Mtn. is located in the high peaks region of the Adirondacks and contains approximately 1,020 acres of suitable Bicknell's thrush breeding habitat, with approximately 27 acres of suitable habitat within the proposed Tree Island Pod expansion area. Elevations in the high peaks region range from 1,000 – 5,300 ft. The study site is characterized by spruce-fir forest at high elevations and transitions into a mix of softwood and hardwood species including paper birch and red maple (*Acer rubrum*) at low elevations.

Methods

We used standard point count methods to assess presence/absence and relative abundance of BITH and other high elevation bird species on Whiteface Mtn. (Ralph *et al.* 1995, Rosenstock *et al.* 2002, Thompson 2002). In a previous report to ORDA by the Vermont Institute of Natural Science, distance sampling methods were suggested as a means by which to obtain density estimates of BITH on Whiteface Mtn. However, authors of that report and several others discussed the limitations of the distance sampling approach in providing reliable density estimates, both because of the unique characteristics of the Bicknell's thrush mating system, and also due to the difficulty of meeting stringent assumptions of distance sampling methods (Farnsworth *et al.* 2002, Ralph *et al.* 1995, Rimmer *et al.* 2004, Rosenstock *et al.* 2002, Thompson 2002). Rimmer *et al.* (2004), in their draft report to ORDA, mention that these limitations, coupled with the single-site study design of the work on Whiteface, mean that distance sampling methods used in this study are unlikely to produce statistically defensible results. In an effort to make the best attempt possible, given these constraints, to obtain reliable information on BITH and other species, we adopted a point count method that allows for calculation of densities for individual species, if adequate detections are made. Standard distance sampling methods require that the distance to each bird detected be accurately estimated, a requirement that we felt was challenging given the conditions of the habitat we were working in and the known difficulties in meeting this and other assumptions of distance sampling. Farnsworth *et al.* (2002) describe a technique whereby densities of individual species may be calculated from standard point count data collected in a series of time intervals, given that researchers used a fixed radius for point counts (suggested radius = 50 m). We had more confidence in our ability to detect whether birds were within or outside of a 50 m radius, than in our ability to accurately estimate exact distances to all birds heard. Therefore, we used a standard 10 minute point count method that would allow for future calculations of density given adequate numbers, but required only that we determine whether birds were within or outside of 50 m. This point count method enables us to determine presence/absence, and relative abundance among different site on the mountain.

We conducted all sampling on Whiteface Mtn. between June 11th and June 16th, 2004. We established sampling points in 5 different treatment types: (1) existing glades (n=1), (2) proposed glades (n=3), (3) existing trails (n=4), (4) proposed Tree Island Pod trail area (n=5), and (5) control areas (n=14) for a total of 27 sample points (Figure 1). Configuration of habitat on the mountain limited us to small sample sizes within several of the treatment types (i.e., existing glades, proposed glades, existing trails). To ensure that individual birds are counted only once at each sample point, standard methods require that sample points be approximately 200-250 m apart. This distance precluded us from having more than a few points within some of our treatment types. Battles *et al.* (1992, 2003) have conducted prior work on Whiteface Mtn. to examine trends in red spruce decline and tree community dynamics. In anticipation that habitat data collected at these points may one day be useful to this study, we conducted point counts at two locations also used by Battles *et al.* (1992, 2003) in one of our control areas that overlapped with their study sites.

We sampled all points between the hours of 4:30 and 6:30 am, during the time in which Bicknell's thrush is believed to be most vocal. At each sample point, bird were recorded by species, time period of detection (i.e., 0-3 minutes, 3-5 minutes, 5-10 minutes), activity (i.e., singing, calling, individual seen), and whether or not they were within 50 m of the observer. In the interest of safety, two observers were present on each sampling route, but only one observer was responsible for data collection. Due to very cold temperatures on the morning of 6/11/04 and the probable effect on singing activity of BITH and other species, we resampled two of our point transects (proposed trail and one control area) on 6/16/04. Data from these two samples was averaged in all analyses. Standard point count methodology dictates that each point should be sampled only once each season (Ralph *et al.* 1995). Counts can be repeated, however, if a particular goal dictates good estimates of the bird community at specific locations (Ralph *et al.* 1995). We felt that because the determination of the presence of Bicknell's thrush was critical to this study, and because it is likely that the temperature on the morning of 6/11/04 is likely to have resulted in decreased singing activity, a second sample of the location on a warmer day was appropriate.

Results

Numbers of detections of all species were far below minimal standards required for calculating densities by distance sampling. In lieu of densities, we calculated relative abundances for Bicknell's thrush and the 4 other montane bird species. We used analysis of variance (ANOVA; Zar 1999) to test whether there were differences in the total number of individual birds, the total number of species, the total number of Mtn. Birdwatch species, and the abundance of individual species (BITH, BLPW, SWTH, WIWR, and WTSP) among the treatment types. One type, existing glades, could not be included in the analysis because we had only one sample point within an existing glade, and variance cannot be calculated from a single sample. We tested normality of variables and homogeneity of variances to ensure that we had not violated the assumptions of ANOVA. An analysis of variance allows for the test of whether there are differences in

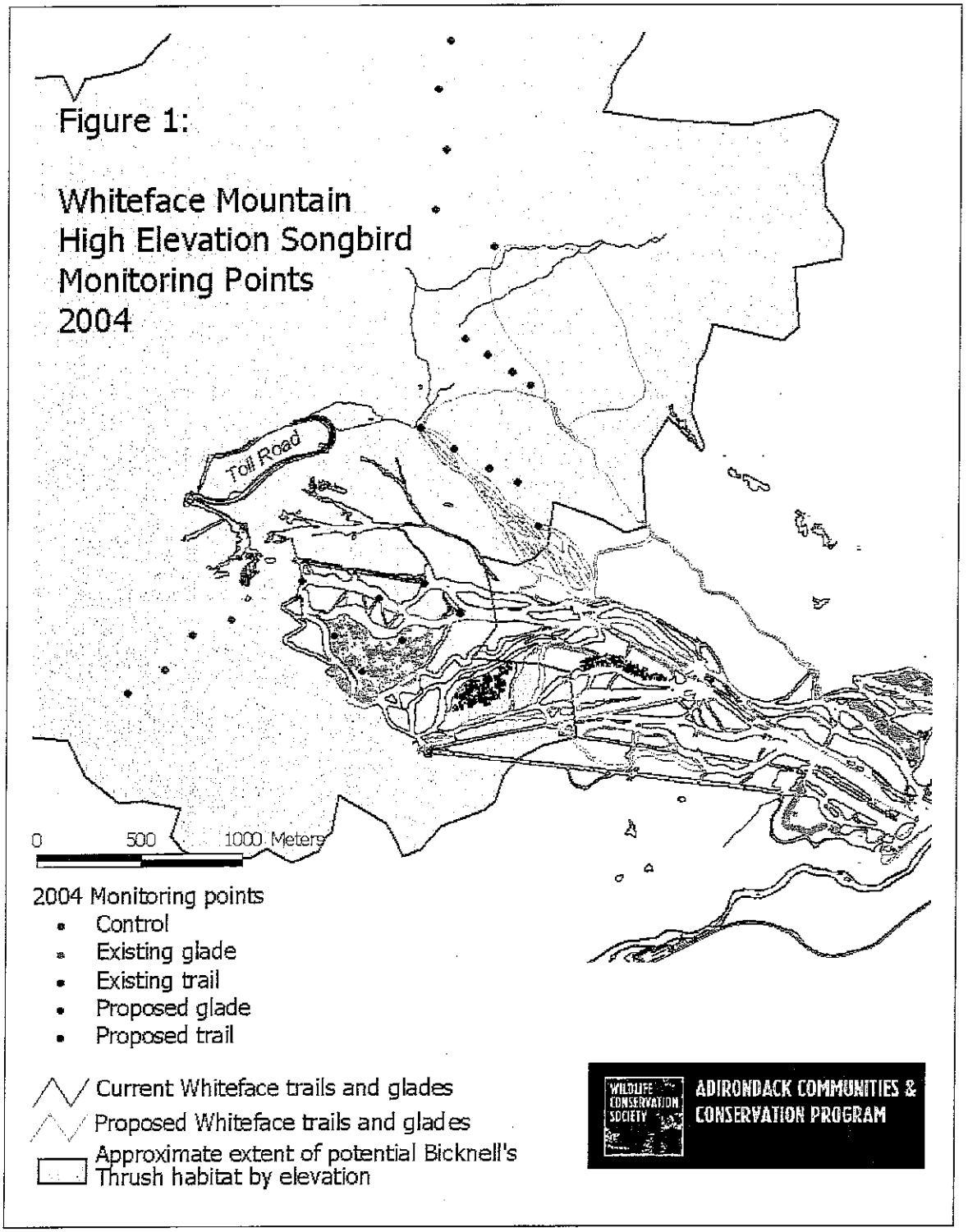


Figure 1:
Whiteface Mountain
High Elevation Songbird
Monitoring Points
2004
Toll Road
0
500
1000 Meters
2004 Monitoring points
Control
Existing glade
Existing trail
Proposed glade
Proposed trail
Current Whiteface trails and glades
Proposed Whiteface trails and glades
Approximate extent of potential Bicknell's Thrush habitat by elevation
WILDLIFE CONSERVATION SOCIETY
ADIRONDACK COMMUNITIES & CONSERVATION PROGRAM

the means observed for more than 2 different treatment types. We used a commonly accepted *P* value of 0.05 to denote statistical significance; values ≤ 0.05 are considered statistically different. We found no statistical differences in the total number of birds observed, the total number of species observed, or the total number of Mtn. Birdwatch species observed (Table 1). The only individual species difference that was statistically significant was that for SWTH, which was higher in abundance in the proposed trail area than in the proposed glade.

Table 1. Mean and statistical difference observed for 9 response variables among areas of proposed glade, existing trail, proposed trail, and control areas on Whiteface Mtn. Superscripts denote statistical differences.

Response variable	Proposed glade	Existing trail	Proposed trail	Control	*P* value
Total birds	5.00	7.50	6.60	8.39	0.162
Total # species	4.00	6.00	4.80	5.75	0.439
Total # Mtn. Birdwatch species	2.00	3.00	3.20	3.68	0.098
Bicnkell's thrush (BITH)	0.00	0.25	0.80	0.68	0.430
Blackpoll warbler (BLPW)	0.67	0.50	0.40	1.21	0.183
Swainson's thrush (SWTH)	0.33^{a}	1.00	1.60^{b}	1.21	0.043
Winter wren (WIWR)	1.33	1.50	1.20	1.11	0.799
White-throated sparrow (WTSP)	0.67	1.00	1.00	1.25	0.844

In the interest of knowing whether there were differences in bird communities found in any kind of ski trail versus the undisturbed forested areas on the mountain, we also conducted an analysis in which we lumped the existing glade and trail data into one category (ski trails) and compared it against a second category comprising all of the areas which at this time are undeveloped including the proposed Tree Island Pod points, the proposed glade points, and the control points. When comparing existing trails to currently uncut forest areas, we again found no statistical differences in total number of birds, total number of species, total number of Mtn. Birdwatch species, or individual abundance of BITH, BLPW, SWTH, WIWR, and WTSP.

Though no statistical differences were detected among treatment types, control areas did demonstrate a trend of higher total abundance, higher Mtn. Birdwatch species richness (Figure 2), and higher abundances of blackpoll warbler and white-throated sparrow (Figure 3). Other species showed different patterns, with Bicknell's thrush and Swainson's thrush found in highest abundance in the proposed expansion area, and winter wren in highest abundance in existing trail areas (Figure 3).

Figure 2. Differences in Total Abundance, Species Richness, and Mt. Birdwatch Species Richness among Trail and Non-trail areas on Whiteface Mtn.

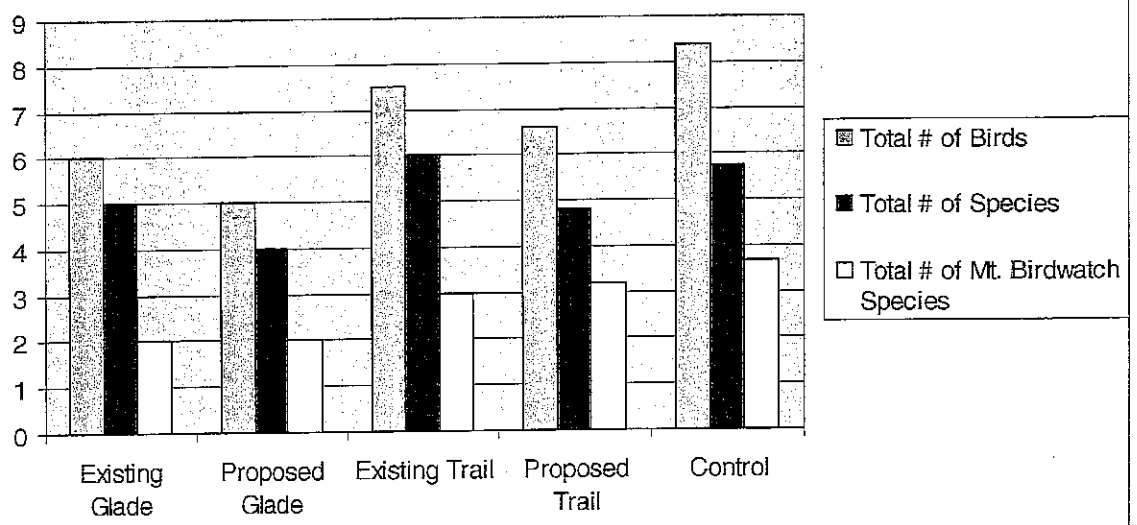
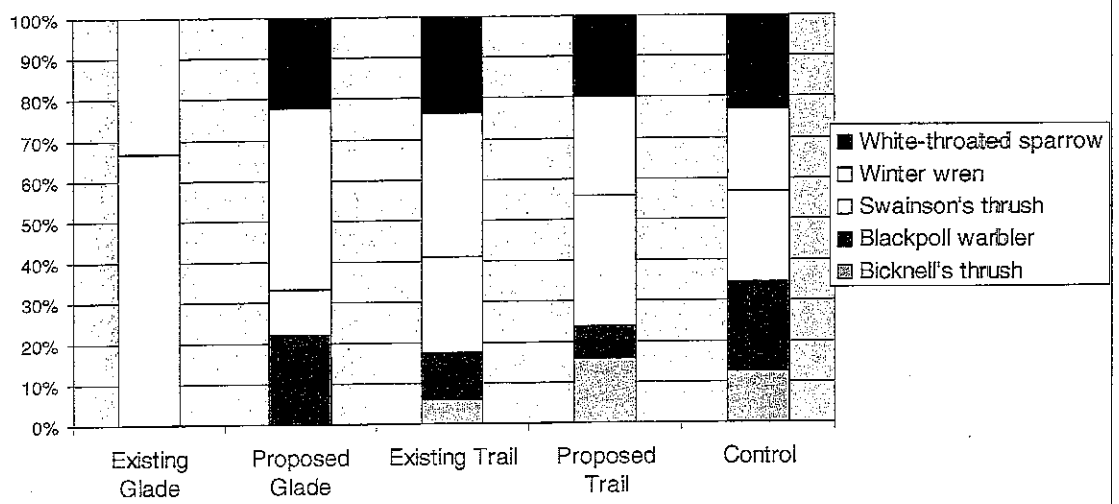


Figure 3. Proportional Representation of Bicknell's thrush, Blackpoll warbler, Swainson's thrush, Winter wren, and White-throated sparrow on Trail and Non-trail areas on Whiteface Mtn.



Visual examination of the community structure among different treatment types reveals that control areas appear to have a more even distribution of birds among species than do existing trails, proposed glades, and existing glades. An even distribution of species representation implies a more diverse community of birds in these areas. A statistical test of these patterns revealed that diversity and evenness are, in fact, highest in control areas but differ statistically only from proposed glades ($P < 0.009$ and $P < 011$, respectively).

Existing glades could not be included in that analysis because we had only one sample point.

Discussion

We have completed the field work for the first year of a three-year study to determine the potential impacts of ski area development on habitat for Bicknell's thrush and other montane forest birds. We sampled a total of 27 points on Whiteface Mtn. in June of 2004, though the configuration of Bicknell's thrush habitat on the study site, combined with the requirements of point count sampling, constrained us to small sample sizes for some treatment types. In particular, the amount of existing gladed area on the mountain at elevations high enough to provide potential Bicknell's thrush habitat was small and allowed for only one point within this type. Similarly, we were able to sample only 3 points in the proposed glade and 4 points in the existing trail due to constraints of the habitat and the time required to reach these points, even when camping overnight on the mountain. Our primary concern, however, was to address the potential impacts of ski development within the proposed expansion area, or Tree Island Pod, and to establish a series of sample points within this area that can be compared to control areas on the mountain not open to development. We were able to sample 5 points within the Tree Island Pod itself, and a total of 14 points within 3 different control areas on the mountain. Getting to more than 5 points on a transect within the Tree Island Pod would be difficult within the 2 hour time window of 4:30 to 6:30 am that is generally used for observations of Bicknell's thrush. Likewise, the area of the Tree Island Pod itself is not large, and placing more points within it would be challenging without resulting in points closer than the recommended 200 m minimum between sample points on a transect to avoid double counting of individuals.

One of the potential results of low sample sizes in any statistical analysis is a low power to detect differences. Statistical power is defined as the ability to detect a statistical difference, if one is present. Our power was good for detecting differences in the total number of birds, the number of total species, and the number of Mtn. Birdwatch species observed. Our power was lower, however, for detecting individual species differences because the variability at the individual species level is much higher. Therefore, the conclusions drawn from this initial year must be taken with some caution. It is our hope that future sampling in the summers of 2005 and 2006 will allow us to reduce some of the variability in observed species differences and thereby increase our statistical power to detect differences between types.

Given the caveats mentioned, there are interesting patterns in the data obtained from year 1 of this study. We found no statistical differences in the total number of birds, total species richness, or Mtn. Birdwatch species richness among existing glades, proposed glades, existing trails, proposed trails, and control areas. Likewise, we found few differences in the abundances of Bicknell's thrush, blackpoll warbler, Swainson's thrush, winter wren, and white-throated sparrow among these treatment types. The Vermont Institute of Natural Science has been studying the impacts of ski area development on Bicknell's thrush on Stratton and Mansfield mountains for a number of years (Rimmer *et*

al. 2004). Preliminary results from their analyses indicate that there are few differences in population and reproductive parameters for Bicknell's thrush between existing ski areas and control areas on those 2 mountains. This study, much more extensive than our own, has examined differences in reproductive success, survivorship, and nest predation for Bicknell's nesting near or along existing ski trails versus those nesting in uncut controls and found very few differences among observed parameters between ski areas and controls. It appears that ski areas are not negatively impacting Bicknell's thrush survival or nest success on these 2 mountains. Whether these same results would be obtained for other montane forest species is unknown. Our preliminary data, however, appear to show that relative abundances of the montane species we studied are similar in existing trail and control areas on Whiteface Mtn.

It is important to note that most of the human-related activity occurring on Whiteface and other ski areas occurs during the winter months when most bird species are absent. It may be that direct effects of humans are minimal during the summer months when breeding activity is occurring, and that loss of habitat and other human impacts on the wintering grounds may be much more critical to the long-term survival of Bicknell's thrush. One of the most common results of habitat fragmentation, such as that created by ski trails, is increased predation created by better access for predators along habitat edges. Rimmer *et al.* (2004) have not detected this pattern on Stratton and Mansfield mountains, however. Nest success and predation rates appear similar in ski trail areas and in controls (Rimmer *et al.* 2004). This may be due to the fact that the generalist predators such as raccoons or coyotes that are more common in fragmented habitats at low elevations are less prevalent at high elevations where Bicknell's thrush commonly nests. Red squirrels are the most significant nest predator for Bicknell's thrush, and squirrels appear to be more evenly disbursed throughout the landscape than are more generalist predators which concentrate along and use edges as travel corridors.

Though we did not detect statistical differences among the ski trail and control types examined, there were some apparent trends of higher species diversity and higher overall numbers of birds in control areas than in existing trails. This may be due to the fact that the control areas have larger expanses of continuous habitat, allowing a larger number of birds to find suitable nesting habitat within them. Some bird species are sensitive to forest edges, and though we did not observe strong patterns in individual species differences in this study, it is possible that species such as blackpoll warbler or Swainson's thrush will make use of edges but nest preferentially in unfragmented habitat.

It is worth noting that we detected no Bicknell's thrush in the existing glade area, and that we detected highest abundance of Bicknell's thrush in the proposed Tree Island Pod area. Rimmer *et al.* (2004) stress that glade creation may effectively eliminate suitable Bicknell's thrush habitat by removing the dense subcanopy structure favored by this species. The Tree Island Pod area, in contrast, is in an area of the mountain that has a very dense subcanopy, a habitat characteristic favored by Bicknell's thrush. We look forward to continuing this work and further elucidating these patterns during the next two summers.

Acknowledgements

The Wildlife Conservation Society acknowledges the generous financial support of the Olympic Regional Development Authority in allowing us to conduct this important work. We also acknowledge the in kind support provided by the Adirondack Park Agency, the New York State Department of Environmental Conservation, and the Vermont Institute of Natural Science.

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Use of Whiteface Mountain by Bicknell's Thrush and other Montane Forest Bird Species

2005 End-of-season report submitted to:
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October 18, 2005

Executive Summary: The Wildlife Conservation Society (WCS) was contracted by the Olympic Regional Development Authority (ORDA) to assess the use of Whiteface Mtn. by Bicknell's thrush (*Catharus bicknelli*), determining, at a minimum, the presence or absence of the species at a number of locations on the mountain. A species of special concern in New York State, Bicknell's thrush makes use of high elevation conifer forest such as that found on Whiteface and other Adirondack peaks for breeding and nesting habitat during the summer months. Proposed ski trail expansion on Whiteface has raised concerns about the potential for impacts of new trail development on Bicknell's thrush habitat. In the summer of 2004, we surveyed a total of 27 sample points on the mountain in 5 categories: (1) existing glade, (2) proposed glade, (3) existing trail, (4) proposed trail, and (5) control areas. This summer, 2 additional survey locations were added to improve sample sizes within the proposed construction area for a total of 29 sample points. Study points were sampled using standard point count methods to monitor the presence of Bicknell's thrush (BITH) and 4 other high elevation bird species: blackpoll warbler (BLPW), Swainson's thrush (SWTH), winter wren (WIWR), and white-throated sparrow (WTSP). We combined data from the 2004 and 2005 seasons, allowing for larger sample sizes in all treatment types. Similar to last year, we found no significant differences in species richness, diversity, or evenness of Mt. Birdwatch species, or in the total number of Bicknell's thrush detected among existing ski trails, existing glades, proposed ski trails, proposed glades, and control areas. As stated previously, we believe that our power to detect statistical differences was good for richness, diversity, and evenness, but was not as good for individual species differences due to higher variability at the individual species level. Analysis of our second year of data shows that existing ski trails and glades do not differ statistically in terms of abundance or species richness for montane forest birds including Bicknell's thrush. Some trends appeared in the data, however, similar to our results from the 2004 season. Observed trends demonstrated that control areas and uncut forest in the proposed expansion area may have higher total bird abundance and higher diversity of bird species than existing ski trails and glades. We

again did not find Bicknell's thrush in areas of existing glades on Whiteface Mt. Glading, in particular, may be detrimental to habitat quality for Bicknell's thrush.

Introduction

The Bicknell's thrush is a species of great interest in the northeastern United States, both for birders and scientists alike. The species breeds in high elevation conifer forests, primarily above 3000 ft., on mountaintops from the Catskills to northern Maine. It is among the most rare and probably most threatened species in North America, and is ranked as the nearctic Neotropical migrant of highest conservation priority in the Northeast (Rimmer *et al.* 2001).

Bicknell's thrush habitat in the U.S. consists of montane forests dominated by balsam fir (*Abies balsamea*), with lesser amounts of red (*Picea rubens*) and black spruce (*Picea mariana*), white birch (*Betula papyrifera*), mountain ash (*Sorbus americana*), and other hardwood species. It is adapted to naturally disturbed habitats and historically probably sought out patches of regenerating forest caused by fir waves, wind throw, ice and snow damage, fire, and insect outbreaks, as well as the chronically disturbed stunted conifer forests found at high elevations in the northeast (Rimmer *et al.* 2001). Highest densities of the species are often found in continually disturbed (high winds, heavy winter ice accumulation) stands of dense, stunted fir on exposed ridgelines or along edges of human-created openings, or in regenerating fir waves (Rimmer *et al.* 2001). More than 90% of birds are believed to breed in the U.S. (versus Canada), with the Adirondacks containing the largest area of its montane breeding habitat, followed by NH, ME, VT, and the Catskills.

Bicknell's thrush wintering habitat is even more restricted than its breeding habitat, with the species occurring regularly on only 5 islands in the Greater Antilles. It prefers mesic to wet broadleaf montane forests in the Dominican Republic, Haiti, Cuba, Jamaica, and Puerto Rico. Large-scale loss and degradation of wintering habitat pose the greatest threat to the long-term viability of this species (Rimmer *et al.* 2001).

Bicknell's thrush is not well-sampled by traditional bird monitoring methods due to its preference for high elevation habitat and its uncommon mating system. Both males and females mate with multiple partners, multiple paternity is common, and more than one male often feeds nestlings at a given nest. These characteristics make it poorly sampled by bird count methods that rely on more common territorial mating systems found in many bird species. Estimates of breeding densities for the species are unreliable at best (Rimmer *et al.* 2001). Though estimation of breeding densities are difficult to obtain, Bicknell's thrush is believed to be vulnerable to extinction and has been added to the Red List of Threatened Species by the World Conservation Union. As a habitat specialist of high elevation conifer forests, it is susceptible to a number of threats on the breeding grounds including pollution (acid rain, mercury), recreational development, cell tower construction, wind power development, and climate change.

This report details the second of three seasons of field work conducted by the Wildlife Conservation Society to examine the potential impacts of ski area development on breeding habitat for Bicknell's thrush and other montane forest species on Whiteface Mtn. in the Adirondacks of New York State.

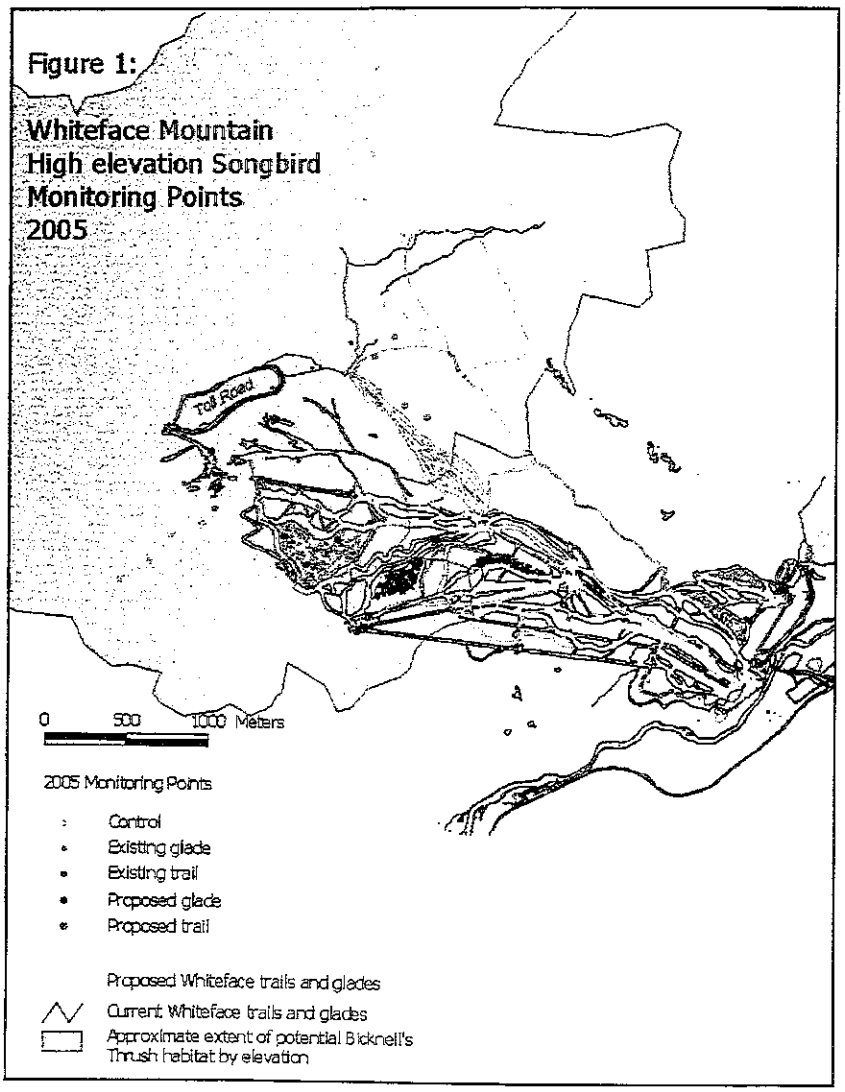
Study Area

Whiteface Mtn. is located in the high peaks region of the Adirondacks and contains approximately 1,020 acres of suitable Bicknell's thrush breeding habitat, with approximately 27 acres of suitable habitat within the proposed Tree Island Pod expansion area. Elevations in the high peaks region range from 1,000 – 5,300 ft. The study site is characterized by spruce-fir forest at high elevations and transitions into a mix of softwood and hardwood species including paper birch and red maple (*Acer rubrum*) at low elevations.

Methods

We used standard point count methods to assess presence/absence and relative abundance of BITH and other high elevation bird species on Whiteface Mtn. (Ralph *et al.* 1995, Rosenstock *et al.* 2002, Thompson 2002). In a previous report to ORDA by the Vermont Institute of Natural Science, distance sampling methods were suggested as a means by which to obtain density estimates of BITH on Whiteface Mtn. However, authors of that report and several others discussed the limitations of the distance sampling approach in providing reliable density estimates, both because of the unique characteristics of the Bicknell's thrush mating system, and also due to the difficulty of meeting stringent assumptions of distance sampling methods (Farnsworth *et al.* 2002, Ralph *et al.* 1995, Rimmer *et al.* 2004, Rosenstock *et al.* 2002, Thompson 2002). Rimmer *et al.* (2004), in their report to ORDA, mention that these limitations, coupled with the single-site study design of the work on Whiteface, mean that distance sampling methods used in this study are unlikely to produce statistically defensible results. In an effort to make the best attempt possible, given these constraints, to obtain reliable information on BITH and other species, we adopted a point count method that allows for calculation of densities for individual species, if adequate detections are made. Standard distance sampling methods require that the distance to each bird detected be accurately estimated, a requirement that we felt was challenging given the conditions of the habitat we were working in and the known difficulties in meeting this and other assumptions of distance sampling. Farnsworth *et al.* (2002) describe a technique whereby densities of individual species may be calculated from standard point count data collected in a series of time intervals, given that researchers used a fixed radius for point counts (suggested radius = 50 m). We had more confidence in our ability to detect whether birds were within or outside of a 50 m radius, than in our ability to accurately estimate exact distances to all birds heard. Therefore, we used a standard 10 minute point count method that would allow for future calculations of density given adequate numbers, but required only that we determine whether birds were within or outside of 50 m. This point count method enables us to determine presence/absence, and relative abundance among different site on the mountain.

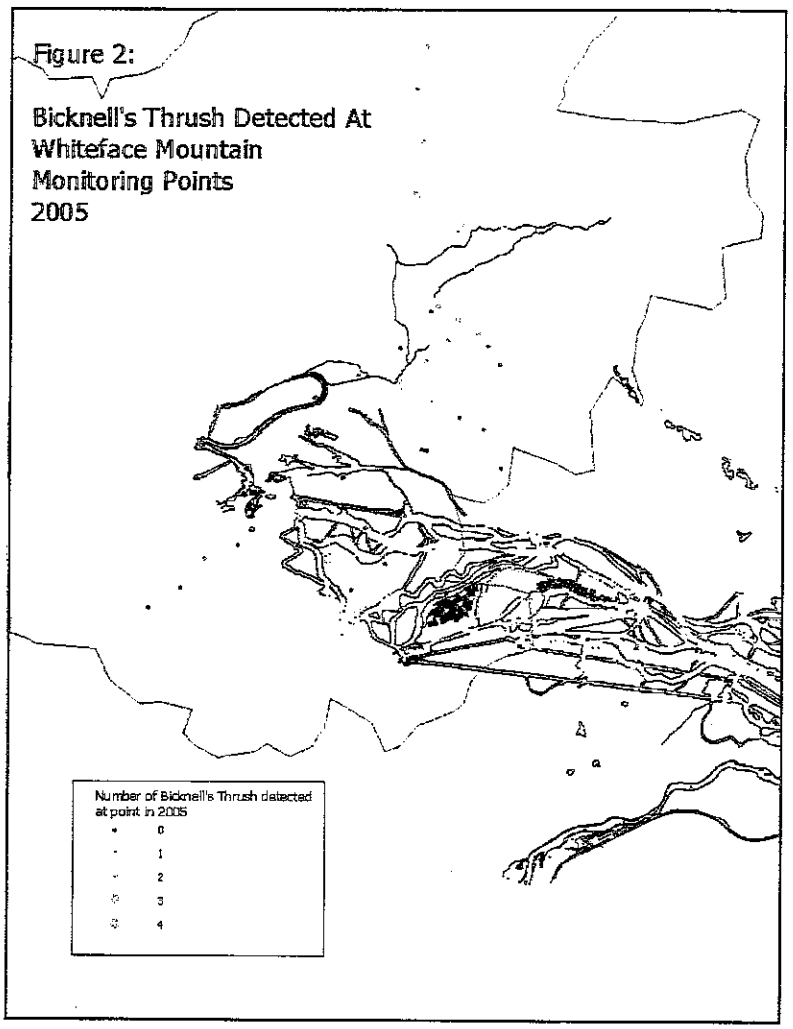
We conducted all sampling on Whiteface Mtn. between June 6th and June 10th of this year. We returned to established sampling points in 5 different treatment types: (1) existing glades (n=1), (2) proposed glades (n=3), (3) existing trails (n=4), (4) proposed Tree Island Pod trail area (n=7), and (5) control areas (n=14), adding 2 additional points within the proposed expansion area for a total of 29 sample points (Figure 1). Configuration of habitat on the mountain limited us to small sample sizes within several of the treatment types (i.e., existing glades, proposed glades, existing trails). To ensure that individual birds are counted only once at each sample point, standard methods require that sample points be approximately 200-250 m apart. This distance precluded us from having more than a few points within some of our treatment types. Battles *et al.* (1992, 2003) have conducted prior work on Whiteface Mtn. to examine trends in red spruce decline and tree community dynamics. In anticipation that habitat data collected at these points may one day be useful to this study, we conducted point counts at two locations also used by Battles *et al.* (1992, 2003) in one of our control areas that overlapped with their study sites.



We sampled all points between the hours of 4:20 and 6:30 am, during the time in which Bicknell's thrush is believed to be most vocal. At each sample point, bird were recorded by species, time period of detection (i.e., 0-3 minutes, 3-5 minutes, 5-10 minutes), activity (i.e., singing, calling, individual seen), and whether or not they were within 50 m of the observer. In the interest of safety, two observers were present on each sampling route, but only one observer was responsible for data collection.

Results

Numbers of detections of all species were far below minimal standards required for calculating densities by distance sampling. In lieu of densities, we calculated relative abundances for Bicknell's thrush and the 4 other montane bird species. We used analysis of variance (ANOVA; Zar 1999) to test whether there were differences in the number, diversity, and evenness of Mtn. Birdwatch species, and the abundance of individual species (BITH, BLPW, SWTH, WIWR, and WTSP) among the treatment types. One type, existing glades, could not be included in the analysis because we had only one sample point within an existing glade, and variance cannot be calculated from a single sample. We tested normality of variables and homogeneity of variances to ensure that we had not violated the assumptions of ANOVA. An analysis of variance allows for the test of whether there are differences in the means observed for more than 2 different treatment types. We used a commonly accepted *P* value of 0.05 to denote statistical significance; values $\leq$ 0.05 are considered statistically different. We found no statistical differences in the abundance, richness, diversity, or evenness of Mtn. Birdwatch species observed (Table 1). The only individual species difference that was statistically significant was that for SWTH, which was higher in abundance in the proposed trail area than in the control area. Figure 2 depicts the locations on Whiteface Mt. at which Bicknell's thrush was detected.



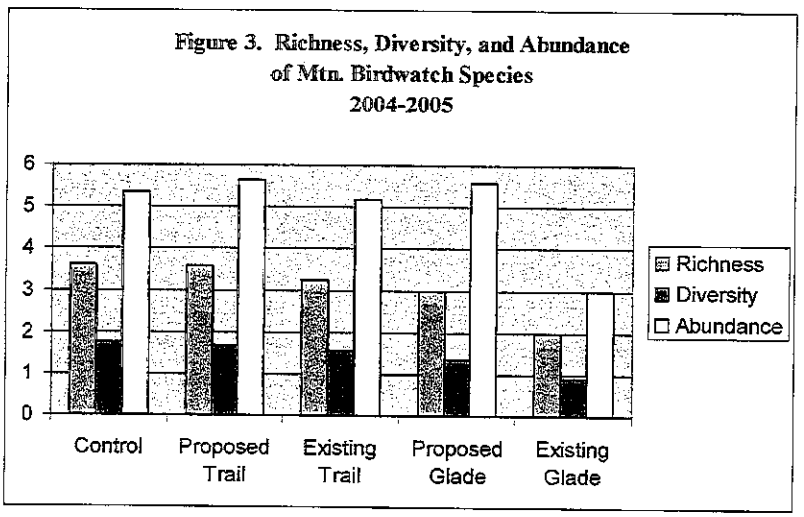
In the interest of knowing whether there were differences in bird communities found in any kind of ski trail versus the undisturbed forested areas on the mountain, we again conducted an analysis in which we lumped the existing trail data into one category (ski

trails) and compared it against a second category comprising all of the areas which at this time are undeveloped including the proposed Tree Island Pod points, the proposed glade points, and the control points (no trails). When comparing existing trails to currently uncut forest areas, we again found no statistical differences in total abundance, richness, diversity, or evenness of Mtn. Birdwatch species, or individual abundance of BITH, BLPW, SWTH, WIWR, and WTSP.

Table 1. Mean and statistical difference observed for 9 response variables among areas of proposed glade, existing trail, proposed trail, and control areas on Whiteface Mtn. Superscripts denote statistical differences.

Response variable	Proposed glade	Existing trail	Proposed trail	Control	*P* value
Total # individuals	5.167	5.625	5.583	5.339	0.972
Richness of Mtn. Birdwatch species	3.00	3.25	3.58	3.63	0.559
Diversity of Mtn. Birdwatch species	1.37	1.57	1.67	1.76	0.341
Evenness of Mtn. Birdwatch species	59.12	66.98	70.98	76.04	0.388
Bicnkell's thrush (BITH)	0.50	0.63	0.83	0.73	0.909
Blackpoll warbler (BLPW)	0.83	0.75	0.92	1.14	0.628
Swainson's thrush (SWTH)	0.83	1.13	1.50[a]	0.86[b]	0.040
Winter wren (WIWR)	1.67	1.50	1.58	1.30	0.581
White-throated sparrow (WTSP)	1.33	1.63	0.75	1.30	0.252

Though no statistical differences were detected among treatment types, control areas and as-yet-uncut trail areas demonstrated a trend of slightly higher abundance, richness, and diversity than existing trails and glades (Figure 3). Examining species representation amongst types showed, similar to 2004, that existing glades appear to be somewhat lower in species richness than the other types (Figure 4).



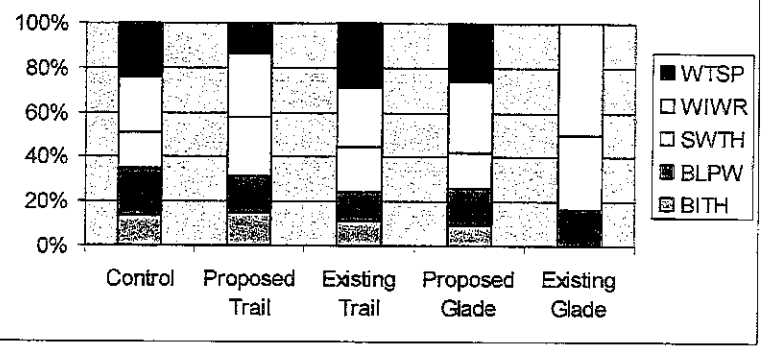
Control areas, along with proposed and existing trails and proposed glades appear to have a more even distribution of birds among species than do existing glades. An even distribution of species representation implies a more diverse community of birds in these areas.

Discussion

We have completed a second year of field work as part of a three-year study to determine the potential impacts of ski area development on habitat for Bicknell's thrush and other

montane forest birds. This year, we sampled a total of 29 points on Whiteface Mtn., though the configuration of Bicknell's thrush habitat on the study site, combined with the requirements of point count sampling, constrained us to small sample sizes for some treatment types. In particular, the amount of existing gladed area on the mountain at elevations high enough to provide potential Bicknell's thrush habitat was small and allowed for only one point within this type. Similarly, we were able to sample only 3 points in the proposed glade and 4 points in the existing trail due to constraints of the habitat, geographical constraints related to our need to space the points more than 200 meters apart from one another, and the time required to reach these points, even when camping overnight on the mountain. Our primary concern, however, was to address the potential impacts of ski development within the proposed expansion area, or Tree Island Pod, and to establish a series of sample points within this area that can be compared to control areas on the mountain not open to development.

Figure 4. Species Composition 2004-2005



One of the potential results of low sample sizes in any statistical analysis and an issue we raised subsequent to last year's field season is a low power to detect differences. Statistical power is defined as the ability to detect a statistical difference, if one is present. Our power was generally good for detecting differences in the total number, diversity, and evenness of Mtn. Birdwatch species observed. Our power was lower, however, for detecting individual species differences because the variability at the individual species level is much higher. Therefore, the conclusions drawn from these data must again be taken with some caution. Because we have sampled for 2 years, however, and because our primary interest is in the differences among the different types of trail and non-trail areas on the mountain, we were able to pool the data from 2004 and 2005 and therefore increase our statistical power to some degree.

Given the caveats mentioned, there are interesting patterns in the data obtained from years 1 and 2 of this study. We found no statistical differences in the total number, diversity, and evenness of Mtn. Birdwatch species among existing glades, proposed glades, existing trails, proposed trails, and control areas. Likewise, we found few differences in the abundances of Bicknell's thrush, blackpoll warbler, Swainson's thrush, winter wren, and white-throated sparrow among these treatment types. As we discussed last year, the Vermont Institute of Natural Science has been studying the impacts of ski area development on Bicknell's thrush on Stratton and Mansfield mountains for a number of years (Rimmer *et al.* 2004). Results from their analyses indicate that there are few differences in population and reproductive parameters for Bicknell's thrush between

existing ski areas and control areas on those 2 mountains. This study, much more extensive than our own, has examined differences in reproductive success, survivorship, and nest predation for Bicknell's nesting near or along existing ski trails versus those nesting in uncut controls and found very few differences among observed parameters between ski areas and controls. It appears that ski areas are not negatively impacting Bicknell's thrush survival or nest success on these 2 mountains. Whether these same results would be obtained for other montane forest species is unknown. Our preliminary data, however, appear to show that relative abundances of the montane species we studied are similar in existing trail and control areas on Whiteface Mtn.

It is important to note that most of the human-related activity occurring on Whiteface and other ski areas occurs during the winter months when most bird species are absent. It may be that direct effects of humans are minimal during the summer months when breeding activity is occurring, and that loss of habitat and other human impacts on the wintering grounds may be much more critical to the long-term survival of Bicknell's thrush. One of the most common results of habitat fragmentation, such as that created by ski trails, is increased predation created by better access for predators along habitat edges. Rimmer *et al.* (2004) have not detected this pattern on Stratton and Mansfield mountains, however. Nest success and predation rates appear similar in ski trail areas and in controls (Rimmer *et al.* 2004). This may be due to the fact that the generalist predators such as raccoons or coyotes that are more common in fragmented habitats at low elevations are less prevalent at high elevations where Bicknell's thrush commonly nests. Red squirrels are the most significant nest predator for Bicknell's thrush, and squirrels appear to be more evenly disbursed throughout the landscape than are more generalist predators which concentrate along and use edges as travel corridors.

It is worth noting that we again detected no Bicknell's thrush in the existing glade area, and again detected highest abundance of Bicknell's thrush in the proposed Tree Island Pod area. Rimmer *et al.* (2004) stress that glade creation may effectively eliminate suitable Bicknell's thrush habitat by removing the dense subcanopy structure favored by this species. The Tree Island Pod area, in contrast, is in an area of the mountain that has a very dense subcanopy, a habitat characteristic favored by Bicknell's thrush. We are anxious to continue this work and to determine what the effects of the trail construction will be in this area.

Acknowledgements

The Wildlife Conservation Society acknowledges the generous financial support of the Olympic Regional Development Authority in allowing us to conduct this important work. We also acknowledge the in kind support provided by the Adirondack Park Agency, the New York State Department of Environmental Conservation, and the Vermont Institute of Natural Science.

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Use of Whiteface Mountain by Bicknell's Thrush and other Montane Forest Bird Species

2006 End-of-season report submitted to:
Olympic Regional Development Authority
218 Main Street
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September, 2005

Executive Summary: The Wildlife Conservation Society (WCS) was contracted by the Olympic Regional Development Authority (ORDA) to assess the use of Whiteface Mtn. by Bicknell's thrush (*Catharus bicknelli*), determining, at a minimum, the presence or absence of the species at a number of locations on the mountain. A species of special concern in New York State, Bicknell's thrush makes use of high elevation conifer forest such as that found on Whiteface and other Adirondack peaks for breeding and nesting habitat during the summer months. Proposed ski trail expansion on Whiteface has raised concerns about the potential for impacts of new trail development on Bicknell's thrush habitat. In the summer of 2004, we surveyed a total of 27 sample points on the mountain in 5 categories: (1) existing glade, (2) proposed glade, (3) existing trail, (4) proposed trail, and (5) control areas. During the summer of 2005, 2 additional survey locations were added to improve sample sizes within the proposed construction area for a total of 29 sample points. All points were resampled during summer 2006. Study points were sampled using standard point count methods to monitor the presence of Bicknell's thrush (BITH) and 4 other high elevation bird species: blackpoll warbler (BLPW), Swainson's thrush (SWTH), winter wren (WIWR), and white-throated sparrow (WTSP). Similar to 2004 and 2005, we found no significant differences in species richness, diversity, or evenness of Mt. Birdwatch species, or in the total number of Bicknell's thrush detected among existing ski trails, existing glades, proposed ski trails, proposed glades, and control areas. As stated previously, we believe that our power to detect statistical differences was good for richness, diversity, and evenness, but was not as good for individual species differences due to higher variability at the individual species level. Analysis of our third year of data shows that existing ski trails and glades do not differ statistically in terms of abundance or species richness for montane forest birds including Bicknell's thrush. For the third year in a row, we did not detect Bicknell's thrush in areas of existing glades on Whiteface Mt. Glading, in particular, may be detrimental to habitat quality for Bicknell's thrush.

Introduction

The Bicknell's thrush is a species of great interest in the northeastern United States, both for birders and scientists alike. The species breeds in high elevation conifer forests, primarily above 3000 ft., on mountaintops from the Catskills to northern Maine. It is among the most rare and probably most threatened species in North America, and is ranked as the nearctic Neotropical migrant of highest conservation priority in the Northeast (Rimmer *et al.* 2001).

Bicknell's thrush habitat in the U.S. consists of montane forests dominated by balsam fir (*Abies balsamea*), with lesser amounts of red (*Picea rubens*) and black spruce (*Picea mariana*), white birch (*Betula papyrifera*), mountain ash (*Sorbus americana*), and other hardwood species. It is adapted to naturally disturbed habitats and historically probably sought out patches of regenerating forest caused by fir waves, wind throw, ice and snow damage, fire, and insect outbreaks, as well as the chronically disturbed stunted conifer forests found at high elevations in the northeast (Rimmer *et al.* 2001). Highest densities of the species are often found in continually disturbed (high winds, heavy winter ice accumulation) stands of dense, stunted fir on exposed ridgelines or along edges of human-created openings, or in regenerating fir waves (Rimmer *et al.* 2001). More than 90% of birds are believed to breed in the U.S. (versus Canada), with the Adirondacks containing the largest area of its montane breeding habitat, followed by NH, ME, VT, and the Catskills.

Bicknell's thrush wintering habitat is even more restricted than its breeding habitat, with the species occurring regularly on only 5 islands in the Greater Antilles. It prefers mesic to wet broadleaf montane forests in the Dominican Republic, Haiti, Cuba, Jamaica, and Puerto Rico. Large-scale loss and degradation of wintering habitat pose the greatest threat to the long-term viability of this species (Rimmer *et al.* 2001).

Bicknell's thrush is not well-sampled by traditional bird monitoring methods due to its preference for high elevation habitat and its uncommon mating system. Both males and females mate with multiple partners, multiple paternity is common, and more than one male often feeds nestlings at a given nest. These characteristics make it poorly sampled by bird count methods that rely on more common territorial mating systems found in many bird species. Estimates of breeding densities for the species are unreliable at best (Rimmer *et al.* 2001). Though estimation of breeding densities are difficult to obtain, Bicknell's thrush is believed to be vulnerable to extinction and has been added to the Red List of Threatened Species by the World Conservation Union. As a habitat specialist of high elevation conifer forests, it is susceptible to a number of threats on the breeding grounds including pollution (acid rain, mercury), recreational development, cell tower construction, wind power development, and climate change.

This report details the third season of field work conducted by the Wildlife Conservation Society to examine the potential impacts of ski area development on breeding habitat for Bicknell's thrush and other montane forest species on Whiteface Mtn. in the Adirondacks of New York State.

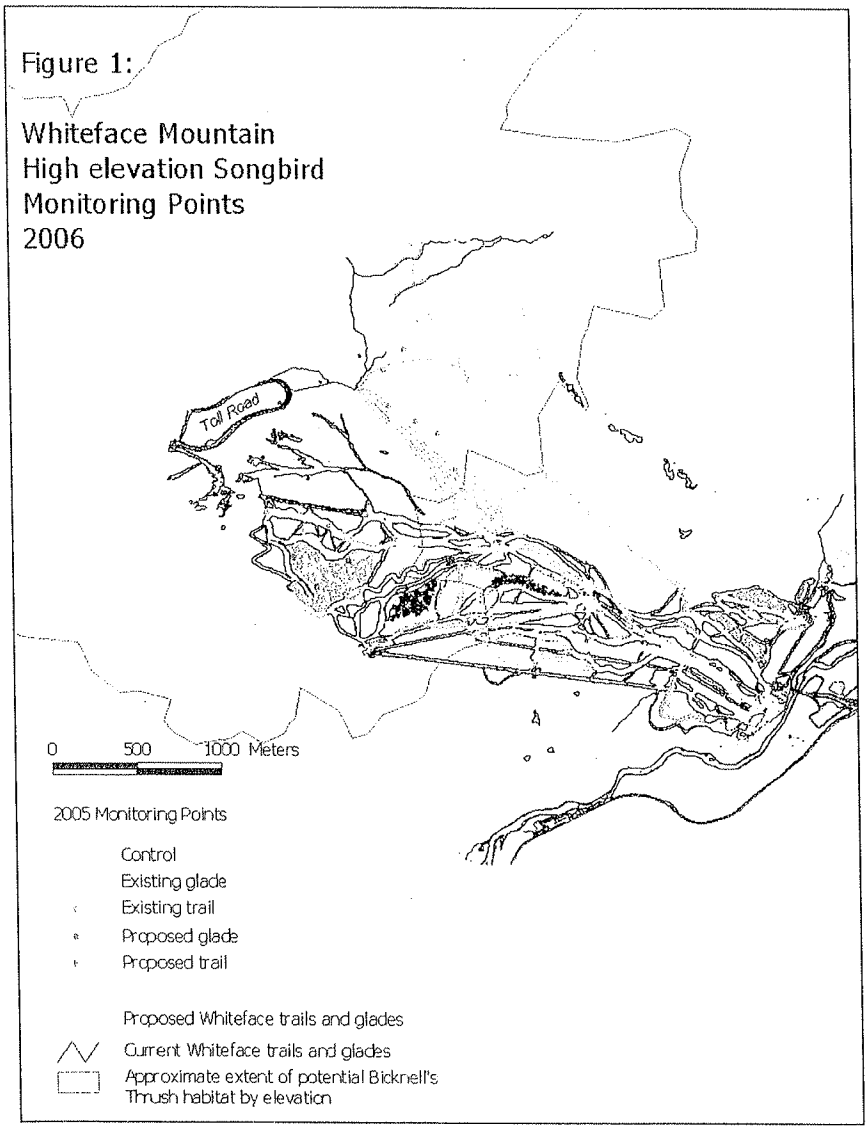
Study Area

Whiteface Mtn. is located in the high peaks region of the Adirondacks and contains approximately 1,020 acres of suitable Bicknell's thrush breeding habitat, with approximately 27 acres of potential habitat within the proposed Tree Island Pod expansion area. Elevations in the high peaks region range from 1,000 – 5,300 ft. The study site is characterized by spruce-fir forest at high elevations and transitions into a mix of softwood and hardwood species including paper birch and red maple (*Acer rubrum*) at low elevations. It is important to note that delineation of habitat for Bicknell's thrush is difficult, even when conducted by experts in the field. For that reason, any estimate of the area that may be used by Bicknell's thrush on Whiteface Mt. is by no means meant to be absolute and represents an estimate of potential habitat only.

Methods

We used standard point count methods to assess presence/absence and relative abundance of BITH and other high elevation bird species on Whiteface Mtn. (Ralph *et al.* 1995, Rosenstock *et al.* 2002, Thompson 2002). In a previous report to ORDA by the Vermont Institute of Natural Science, distance sampling methods were suggested as a means by which to obtain density estimates of BITH on Whiteface Mtn. However, authors of that report and several others discussed the limitations of the distance sampling approach in providing reliable density estimates, both because of the unique characteristics of the Bicknell's thrush mating system, and also due to the difficulty of meeting stringent assumptions of distance sampling methods (Farnsworth *et al.* 2002, Ralph *et al.* 1995, Rimmer *et al.* 2004, Rosenstock *et al.* 2002, Thompson 2002). Rimmer *et al.* (2004), in their report to ORDA, mention that these limitations, coupled with the single-site study design of the work on Whiteface, mean that distance sampling methods used in this study are unlikely to produce statistically defensible results. In an effort to make the best attempt possible, given these constraints, to obtain reliable information on BITH and other species, we adopted a point count method that allows for calculation of densities for individual species, if adequate detections are made. Standard distance sampling methods require that the distance to each bird detected be accurately estimated, a requirement that we felt was challenging given the conditions of the habitat we were working in and the known difficulties in meeting this and other assumptions of distance sampling. Farnsworth *et al.* (2002) describe a technique whereby densities of individual species may be calculated from standard point count data collected in a series of time intervals, given that researchers used a fixed radius for point counts (suggested radius = 50 m). We had more confidence in our ability to detect whether birds were within or outside of a 50 m radius, than in our ability to accurately estimate exact distances to all birds heard. Therefore, we used a standard 10 minute point count method that would allow for future calculations of density given adequate numbers, but required only that we determine whether birds were within or outside of 50 m. This point count method enables us to determine presence/absence, and relative abundance among different site on the mountain.

We conducted all sampling on Whiteface Mtn. between June 5th and June 14th of this year. We returned to established sampling points in 5 different treatment types: (1) existing glades (n=1), (2) proposed glades[1] (n=3), (3) existing trails (n=4), (4) proposed Tree Island Pod trail area (n=9), and (5) control areas (n=14; Figure 1). Configuration of habitat on the mountain limited us to small sample sizes within several of the treatment types (i.e., existing glades, proposed glades, existing trails). To ensure that individual birds are counted only once at each sample point, standard methods require that sample points be approximately 200-250 m apart. This distance precluded us from having more than a few points within some of our treatment types. Battles *et al.* (1992, 2003) have conducted prior work on Whiteface Mtn. to examine trends in red spruce decline and tree community dynamics. In anticipation that habitat data collected at these points may one day be useful to this study, we conducted point counts at two locations also used by Battles *et al.* (1992, 2003) in one of our control areas that overlapped with their study sites.



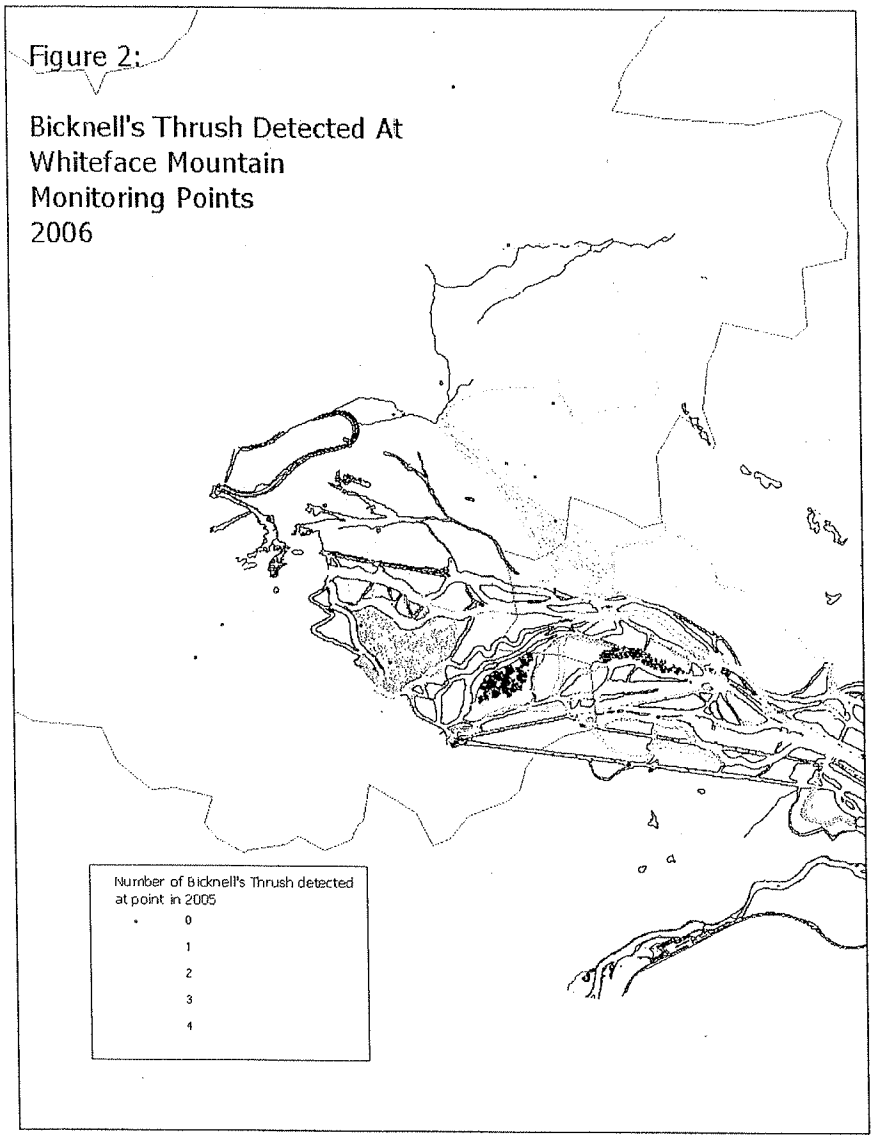
We sampled all points between the hours of 4:30 and 6:30 am, during the time in which Bicknell's thrush is believed to be most vocal. At each sample point, birds were recorded by species, time period of detection (i.e., 0-3 minutes, 3-5 minutes, 5-10 minutes), activity (i.e., singing, calling, individual seen), and whether or not they were within 50 m of the observer. In the interest of safety, two observers

[1] In order to maintain consistency with the 2004 and 2005 methods, we have kept the proposed glade area as part of the analysis. However, during the course of the past year the area proposed for new glades was moved from our sampling location to another location on the mountain. Therefore, our proposed glade area will not actually be gladed. We do not have any sample points in the newly proposed glade area.

were present on each sampling route, but only one observer was responsible for data collection.

Results

Numbers of detections of all species were far below minimal standards required for calculating densities by distance sampling. In lieu of densities, we calculated relative abundances for Bicknell's thrush and the 4 other montane bird species. We used analysis of variance (ANOVA; Zar 1999) to test whether there were differences in the number, diversity, and evenness of Mtn. Birdwatch species, and the abundance of individual species (BITH, BLPW, SWTH, WIWR, and WTSP) among the treatment types. One type, existing glades, could not be included in the analysis because we had only one sample point within an existing glade, and variance cannot be calculated from a single sample. We tested normality of variables and homogeneity of variances to ensure that we had not violated the assumptions of ANOVA. An analysis of variance allows for the test of whether there are differences in the means observed for more than 2 different treatment types. We used a commonly accepted *P* value of 0.05 to denote statistical significance; values ≤ 0.05 are considered statistically different. We tested for differences among years because this was the third year of the survey. Finding no significant differences between 2004, 2005, and 2006, we averaged the data from the three years to conduct ANOVAs; results and figures are based on these average values. We found no statistical differences in the abundance,



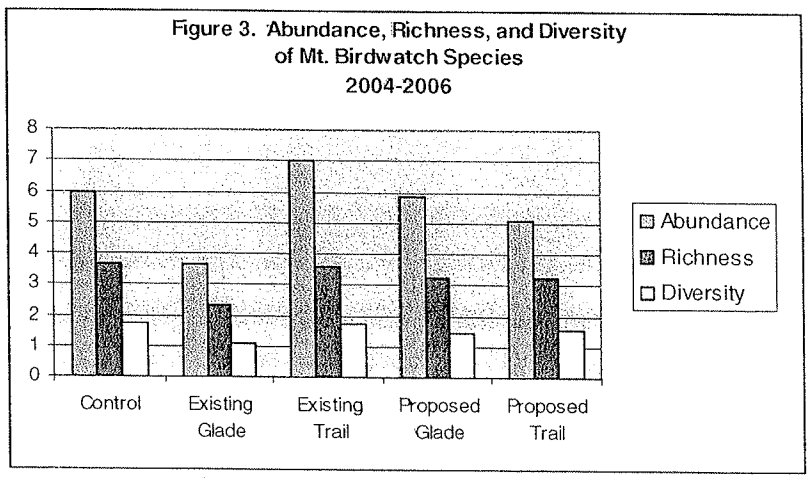
richness, diversity, or evenness of Mtn. Birdwatch species observed (Table 1). Figure 2 depicts the locations on Whiteface Mt. at which Bicknell's thrush was detected.

In the interest of knowing whether there were differences in bird communities found in any kind of ski trail versus the undisturbed forested areas on the mountain, we again conducted an analysis in which we lumped the existing trail data into one category (ski trails) and compared it against a second category comprising all of the areas which at this time are undeveloped including the proposed Tree Island Pod points, the proposed glade points, and the control points (no trails). When comparing existing trails to currently uncut forest areas, we again found no statistical differences in total abundance, richness, diversity, or evenness of Mtn. Birdwatch species, or individual abundance of BITH, BLPW, SWTH, WIWR, and WTSP.

Table 1. Means and *P* values observed for 9 response variables among areas of proposed glade, existing trail, proposed trail, and control areas on Whiteface Mtn, 2004-2006. There were no significant differences among types.

Response variable	Proposed glade	Existing trail	Proposed trail	Control	*P* value
Abundance of Mtn. Birdwatch species	5.444	6.083	4.929	5.292	0.755
Richness of Mtn. Birdwatch species	3.222	3.583	3.333	3.625	0.839
Diversity of Mtn. Birdwatch species	1.478	1.716	1.571	1.740	0.679
Evenness of Mtn. Birdwatch species	63.656	73.481	67.183	74.989	0.667
Bicknell's thrush (BITH)	0.444	0.750	0.810	0.821	0.861
Blackpoll warbler (BLPW)	0.778	0.917	0.905	1.107	0.797
Swainson's thrush (SWTH)	1.000	1.333	1.071	0.911	0.399
Winter wren (WIWR)	1.444	1.500	1.381	1.244	0.817
White-throated sparrow (WTSP)	1.778	1.583	0.762	1.208	0.207

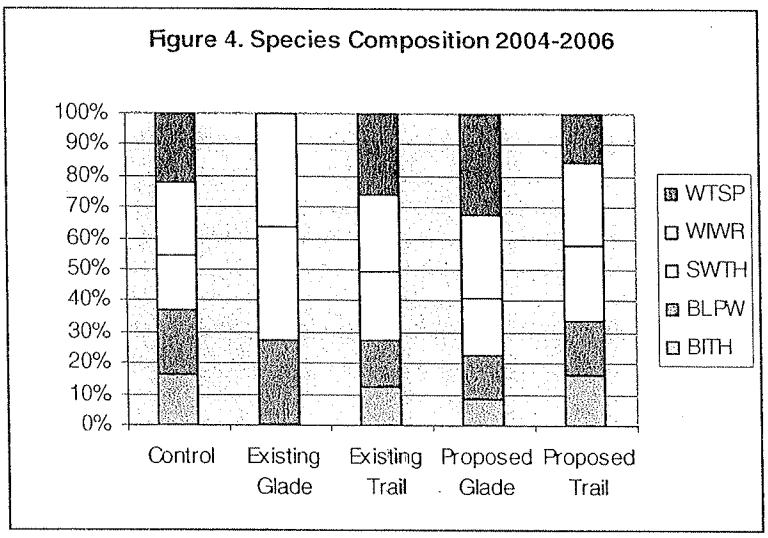
Though no statistical differences were detected among treatment types, control areas, as-yet-uncut trail areas, and existing trails demonstrated a trend of higher abundance, richness, and diversity than existing glades (Figure 3). Examining species representation among types showed, similar to 2004 and 2005, that existing glades appear to be somewhat lower in species richness than the other types (Figure 4).



Control areas, along with proposed and existing trails and proposed glades appear to have a more even distribution of birds among species than do existing glades. An even distribution of species representation implies a more diverse community of birds in these areas.

Discussion

We have completed a third year of field work as part of a multiple-year study to determine the potential impacts of ski area development on habitat for Bicknell's thrush and other montane forest birds. This year, we again sampled a total of 29 points on Whiteface Mtn., though the configuration of Bicknell's thrush habitat on the study site, combined with the requirements of point count sampling, constrained us to small sample sizes for some treatment types. In particular, the amount of existing gladed area on the mountain at elevations high enough to provide potential Bicknell's thrush habitat was small and allowed for only one point within this type. Similarly, we were able to sample only 3 points in the proposed glade and 4 points in the existing trail due to constraints of the habitat, geographical constraints related to our need to space the points more than 200 meters apart from one another, and the time required to reach these points, even when camping overnight on the mountain. Our primary concern, however, was to address the potential impacts of ski development within the proposed expansion area, or Tree Island Pod, and to establish a series of sample points within this area that can be compared to control areas on the mountain not open to development.



One of the potential results of low sample sizes in any statistical analysis and an issue we raised subsequent to our first two field seasons is a low power to detect differences. Statistical power is defined as the ability to detect a statistical difference, if one is present. Our power was generally good for detecting differences in the total number, diversity, and evenness of Mtn. Birdwatch species observed. Our power was lower, however, for detecting individual species differences because the variability at the individual species level is much higher. Therefore, the conclusions drawn from these data must again be taken with some caution. Because we have sampled for 3 years, however, and because our primary interest is in the differences among the different types of trail and non-trail areas on the mountain, we were able to average data from 2004, 2005, and 2006 and therefore likely yield more reliable estimates of abundance for each species.

Given the caveats mentioned, there are interesting patterns in the data obtained from years 1-3 of this study. We found no statistical differences in the total number, diversity, and evenness of Mtn. Birdwatch species among existing glades, proposed glades, existing trails, proposed trails, and control areas. Likewise, we found few differences in the

abundances of Bicknell's thrush, blackpoll warbler, Swainson's thrush, winter wren, and white-throated sparrow among these treatment types. As we discussed previously, the Vermont Institute of Natural Science has been studying the impacts of ski area development on Bicknell's thrush on Stratton and Mansfield mountains for a number of years (Rimmer *et al.* 2004). Results from their analyses indicate that there are few differences in population and reproductive parameters for Bicknell's thrush between existing ski areas and control areas on those 2 mountains. This study, much more extensive than our own, has examined differences in reproductive success, survivorship, and nest predation for Bicknell's nesting near or along existing ski trails versus those nesting in uncut controls and found very few differences among observed parameters between ski areas and controls. It appears that ski areas are not negatively impacting Bicknell's thrush survival or nest success on these 2 mountains. Whether these same results would be obtained for other montane forest species is unknown. Our preliminary data, however, appear to show that relative abundances of the montane species we studied are similar in existing trail and control areas on Whiteface Mtn.

It is important to note that most of the human-related activity occurring on Whiteface and other ski areas occurs during the winter months when most bird species are absent. It may be that direct effects of humans are minimal during the summer months when breeding activity is occurring, and that loss of habitat and other human impacts on the wintering grounds may be much more critical to the long-term survival of Bicknell's thrush. One of the most common results of habitat fragmentation, such as that created by ski trails, is increased predation created by better access for predators along habitat edges. Rimmer *et al.* (2004) have not detected this pattern on Stratton and Mansfield mountains, however. Nest success and predation rates appear similar in ski trail areas and in controls (Rimmer *et al.* 2004). This may be due to the fact that the generalist predators such as raccoons or coyotes that are more common in fragmented habitats at low elevations are less prevalent at high elevations where Bicknell's thrush commonly nests. Red squirrels are the most significant nest predator for Bicknell's thrush, and squirrels appear to be more evenly disbursed throughout the landscape than are more generalist predators which concentrate along and use edges as travel corridors.

It is worth noting that we again detected no Bicknell's thrush in the existing glade area. Rimmer *et al.* (2004) stress that glade creation may effectively eliminate suitable Bicknell's thrush habitat by removing the dense subcanopy structure favored by this species. The Tree Island Pod area, in contrast, is in an area of the mountain that has a very dense subcanopy, a habitat characteristic favored by Bicknell's thrush. We are anxious to continue this work and to determine what the effects of the trail construction will be in this area.

Acknowledgements

The Wildlife Conservation Society acknowledges the generous financial support of the Olympic Regional Development Authority in allowing us to conduct this important work. We also acknowledge the in kind support provided by the Adirondack Park Agency, the

New York State Department of Environmental Conservation, and the Vermont Institute of Natural Science.

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2008 End-of-season report submitted to:
Olympic Regional Development Authority
218 Main Street
Lake Placid, NY 12946

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May 18, 2009

Executive Summary: The Wildlife Conservation Society (WCS) was contracted by the Olympic Regional Development Authority (ORDA) to assess the use of Whiteface Mtn. by Bicknell's thrush (*Catharus bicknelli*), determining, at a minimum, the presence or absence of the species at a number of locations on the mountain. A species of special concern in New York State, Bicknell's thrush makes use of high elevation conifer forest such as that found on Whiteface and other Adirondack peaks for breeding and nesting habitat during the summer months. A proposed and now executed ski trail expansion on Whiteface raised concerns about the potential for impacts of new trail development on Bicknell's thrush habitat. In the summer of 2004, we surveyed a total of 27 sample points on the mountain in 5 categories: (1) existing glade, (2) proposed glade, (3) existing trail, (4) proposed trail, and (5) control areas. During the summer of 2005, 2 additional survey locations were added to improve sample sizes within the proposed construction area for a total of 29 sample points. All points were resampled during summer 2006, 2007, and 2008, the first year of post-construction sampling. Study points were sampled using standard point count methods to monitor the presence of Bicknell's thrush (BITH) and 4 other high elevation bird species: blackpoll warbler (BLPW), Swainson's thrush (SWTH), winter wren (WIWR), and white-throated sparrow (WTSP). Throughout the study period, we found no significant differences in species richness, diversity, or evenness of Mt. Birdwatch species, or in the total number of Bicknell's thrush detected among existing ski trails, existing glades, proposed ski trails, proposed glades, and control areas. As stated previously, we believe that our power to detect statistical differences was good for richness, diversity, and evenness, but was not as good for individual species differences due to higher variability at the individual species level. Analysis of our fifth year of data shows that existing ski trails and control areas do not differ statistically in terms of abundance or species richness for montane forest birds including Bicknell's thrush. Across all years, we did not detect Bicknell's thrush in areas of existing glades on Whiteface Mt. Glading, in particular, may be detrimental to habitat quality for Bicknell's thrush. In the first year of post-construction sampling, we detected

a significant decline in the number of birds post-construction for Bicknell's thrush only among the target species.

Introduction

The Bicknell's thrush is a species of great interest in the northeastern United States, both for birders and scientists alike. The species breeds in high elevation conifer forests, primarily above 3000 ft., on mountaintops from the Catskills to northern Maine. It is among the most rare and probably most threatened species in North America, and is ranked as the nearctic Neotropical migrant of highest conservation priority in the Northeast (Rimmer *et al.* 2001).

Bicknell's thrush habitat in the U.S. consists of montane forests dominated by balsam fir (*Abies balsamea*), with lesser amounts of red (*Picea rubens*) and black spruce (*Picea mariana*), white birch (*Betula papyrifera*), mountain ash (*Sorbus americana*), and other hardwood species. It is adapted to naturally disturbed habitats and historically probably sought out patches of regenerating forest caused by fir waves, wind throw, ice and snow damage, fire, and insect outbreaks, as well as the chronically disturbed stunted conifer forests found at high elevations in the northeast (Rimmer *et al.* 2001). Highest densities of the species are often found in continually disturbed (high winds, heavy winter ice accumulation) stands of dense, stunted fir on exposed ridgelines or along edges of human-created openings, or in regenerating fir waves (Rimmer *et al.* 2001). More than 90% of birds are believed to breed in the U.S. (versus Canada), with the Adirondacks containing the largest area of its montane breeding habitat, followed by NH, ME, VT, and the Catskills.

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Bicknell's thrush is not well-sampled by traditional bird monitoring methods due to its preference for high elevation habitat and its uncommon mating system. Both males and females mate with multiple partners, multiple paternity is common, and more than one male often feeds nestlings at a given nest. These characteristics make it poorly sampled by bird count methods that rely on more common territorial mating systems found in many bird species. Estimates of breeding densities for the species are unreliable at best (Rimmer *et al.* 2001). Though estimation of breeding densities are difficult to obtain, Bicknell's thrush is believed to be vulnerable to extinction and has been added to the Red List of Threatened Species by the World Conservation Union. As a habitat specialist of high elevation conifer forests, it is susceptible to a number of threats on the breeding grounds including pollution (acid rain, mercury), recreational development, cell tower construction, wind power development, and climate change.

This report details the fifth season of field work conducted by the Wildlife Conservation Society to examine the potential impacts of ski area development on breeding habitat for Bicknell's thrush and other montane forest species on Whiteface Mtn. and the first year of post ski trail expansion sampling.

Study Area

Whiteface Mtn. is located in the high peaks region of the Adirondacks and contains approximately 1,020 acres of suitable Bicknell's thrush breeding habitat, with approximately 27 acres of potential habitat within the proposed Tree Island Pod expansion area. Elevations in the high peaks region range from 1,000 – 5,300 ft. The study site is characterized by spruce-fir forest at high elevations and transitions into a mix of softwood and hardwood species including paper birch and red maple (*Acer rubrum*) at low elevations. It is important to note that delineation of habitat for Bicknell's thrush is difficult, even when conducted by experts in the field. For that reason, any estimate of the area that may be used by Bicknell's thrush on Whiteface Mt. is by no means meant to be absolute and represents an estimate of potential habitat only.

Methods

We used standard point count methods to assess presence/absence and relative abundance of BITH and other high elevation bird species on Whiteface Mtn. (Ralph *et al.* 1995, Rosenstock *et al.* 2002, Thompson 2002). In a previous report to ORDA by the Vermont Institute of Natural Science, distance sampling methods were suggested as a means by which to obtain density estimates of BITH on Whiteface Mtn. However, authors of that report and several others discussed the limitations of the distance sampling approach in providing reliable density estimates, both because of the unique characteristics of the Bicknell's thrush mating system, and also due to the difficulty of meeting stringent assumptions of distance sampling methods (Farnsworth *et al.* 2002, Ralph *et al.* 1995, Rimmer *et al.* 2004, Rosenstock *et al.* 2002, Thompson 2002). Rimmer *et al.* (2004), in their report to ORDA, mention that these limitations, coupled with the single-site study design of the work on Whiteface, mean that distance sampling methods used in this study are unlikely to produce statistically defensible results. In an effort to make the best attempt possible, given these constraints, to obtain reliable information on BITH and other species, we adopted a point count method that allows for calculation of densities for individual species, if adequate detections are made. Standard distance sampling methods require that the distance to each bird detected be accurately estimated, a requirement that we felt was challenging given the conditions of the habitat we were working in and the known difficulties in meeting this and other assumptions of distance sampling. Farnsworth *et al.* (2002) describe a technique whereby densities of individual species may be calculated from standard point count data collected in a series of time intervals, given that researchers used a fixed radius for point counts (suggested radius = 50 m). We had more confidence in our ability to detect whether birds were within or outside of a 50 m radius, than in our ability to accurately estimate exact distances to all birds heard. Therefore, we used a standard 10 minute point count method that would allow for future calculations of density given adequate numbers, but required only that we determine

whether birds were within or outside of 50 m. This point count method enables us to determine presence/absence, and relative abundance among different site on the mountain.

We conducted all sampling on Whiteface Mtn. between June 5th and June 15th of each year. We returned to established sampling points in 5 different treatment types: (1) existing glades (*n*=1), (2) proposed glades[1] (*n*=3), (3) existing trails (*n*=4), (4) proposed Tree Island Pod trail area (*n*=9), and (5) control areas (*n*=14; Figure 1). Configuration of habitat on the mountain limited us to small sample sizes within several of the treatment types (i.e., existing glades, proposed glades, existing trails). To ensure that individual birds are counted only once at each sample point, standard methods require that sample points be approximately 200-250 m apart. This distance precluded us from having more than a few points within some of our treatment types. Battles *et al*. (1992, 2003) have conducted prior work on Whiteface Mtn. to examine trends in red spruce decline and tree community dynamics. In anticipation that habitat data collected at these points may one day be useful to this study, we conducted point counts at two locations also used by Battles *et al*. (1992, 2003) in one of our control areas that overlapped with their study sites.

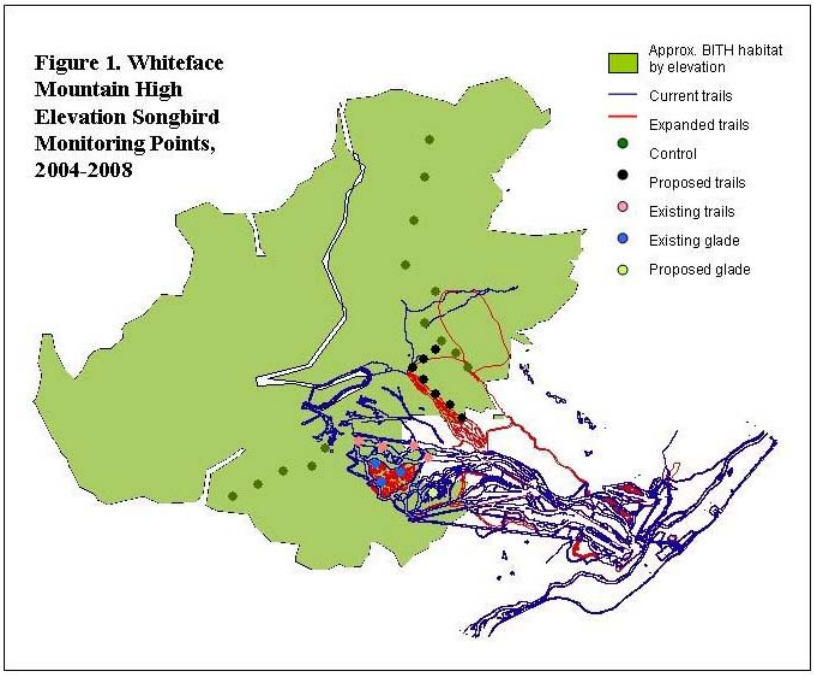

Figure 1. Whiteface Mountain High Elevation Songbird Monitoring Points, 2004-2008

We sampled all points between the hours of 4:30 and 6:30 am, during the time in which Bicknell's thrush is believed to be most vocal. At each sample point, birds were recorded by species, time period of detection (i.e., 0-3 minutes, 3-5 minutes, 5-10 minutes), activity (i.e., singing, calling, individual seen), and whether or not they were within 50 m of the observer. In the interest of safety, two observers were present on each sampling route, but only one observer was responsible for data collection. Trails were constructed during the winter months of 2007-2008 and therefore, 2008 represented the first year of post-construction sampling.

[1] In order to maintain consistency with the 2004 - 2007 methods, we have kept the proposed glade area as part of the analysis. However, during the course of the study the area proposed for new glades was moved from our sampling location to another location on the mountain. Therefore, our proposed glade area will not actually be gladed. We do not have any sample points in the newly proposed glade area.

Results

Numbers of detections of all species were far below minimal standards required for calculating densities by distance sampling. In lieu of densities, we calculated relative abundances for Bicknell's thrush and the 4 other montane bird species. We used analysis of variance (ANOVA; Zar 1999) to test whether there were differences in the number, diversity, and evenness of Mtn. Birdwatch species, and the abundance of individual species (BITH, BLPW, SWTH, WIWR, and WTSP) among the treatment types. Because this was the first year of post-construction data, our past treatment type of proposed trail has now become existing trail. Therefore, our anovas were run on only two treatment types: controls and existing trails. We found no statistical differences in the abundance, richness, diversity, or evenness of Mtn. Birdwatch species observed between control sites and existing trails, both old and newly constructed.

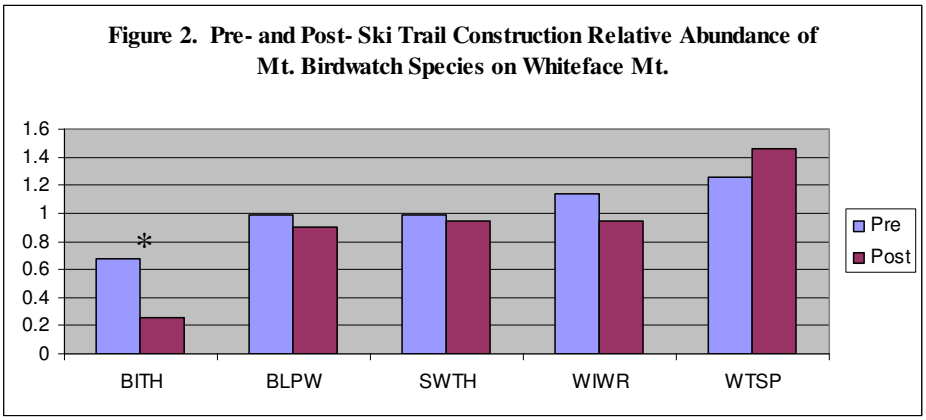

Figure 2. Pre- and Post- Ski Trail Construction Relative Abundance of Mt. Birdwatch Species on Whiteface Mt.

This was the first year in which we were able to test the differences in pre- and post-construction relative abundance of BITH and other species. To do so, we averaged the data from 2004-2007 because no significant year-to-year differences had been detected in any target species previously. We compared the averaged data from 2004-2007 (pre-construction) to the single year of post-construction data from 2008. We found a significant decline in the number of BITH ($F = 6.140$, $P < 0.029$), but no differences for any other species or community level metric (Figure 2).

Discussion

We have completed a fifth year of field work as part of a multiple-year study to determine the potential impacts of ski area development on habitat for Bicknell's thrush and other montane forest birds. This year, we again sampled a total of 29 points on Whiteface Mtn., though the configuration of Bicknell's thrush habitat on the study site, combined with the requirements of point count sampling, constrained us to small sample sizes for some treatment types. In particular, the amount of existing gladed area on the mountain at elevations high enough to provide potential Bicknell's thrush habitat was small and allowed for only one point within this type. Similarly, we were able to sample only 3 points in the proposed glade and 4 points in the existing trail due to constraints of the habitat, geographical constraints related to our need to space the points more than 200 meters apart from one another, and the time required to reach these points, even when camping overnight on the mountain. Our primary concern, however, was to address the

potential impacts of ski development within the proposed expansion area, or Tree Island Pod, and to establish a series of sample points within this area that can be compared to control areas on the mountain not open to development.

One of the potential results of low sample sizes in any statistical analysis and an issue we raised subsequent to our first two field seasons is a low power to detect differences. Statistical power is defined as the ability to detect a statistical difference, if one is present. Our power was generally good for detecting differences in the total number, diversity, and evenness of Mtn. Birdwatch species observed. Our power was lower, however, for detecting individual species differences because the variability at the individual species level is much higher. Therefore, the conclusions drawn from these data must again be taken with some caution. Because we have sampled for 5 years, however, and because our primary interest is in the differences among the different types of trail and non-trail areas on the mountain, we were able to average data across the study period and therefore likely yield more reliable estimates of abundance for each species.

Given the caveats mentioned, there are interesting patterns in the data obtained from this study. We found no statistical differences in the total number, diversity, and evenness of Mtn. Birdwatch species among existing glades, proposed glades, existing trails, proposed trails, and control areas between 2004 and 2007. In 2008, post-construction, we similarly found no differences in community characterisitcs of birds between control areas and existing trails. Likewise, we found few differences in the abundances of Bicknell's thrush, blackpoll warbler, Swainson's thrush, winter wren, and white-throated sparrow among these treatment types. As we have discussed previously, the Vermont Center for Ecostudies (VCE; formerly the Vermont Institute of Natural Science) has been studying the impacts of ski area development on Bicknell's thrush on Stratton and Mansfield mountains for a number of years (Rimmer *et al.* 2004). Results from their analyses indicate that there are few differences in population and reproductive parameters for Bicknell's thrush between existing ski areas and control areas on those 2 mountains. This study, much more extensive than our own, has examined differences in reproductive success, survivorship, and nest predation for Bicknell's nesting near or along existing ski trails versus those nesting in uncut controls and found very few differences among observed parameters between ski areas and controls. It appears that ski areas are not negatively impacting Bicknell's thrush survival or nest success on these 2 mountains. Whether these same results would be obtained for other montane forest species is unknown. Our data, however, appear to show that relative abundances of the montane species we studied are similar in existing trail and control areas on Whiteface Mtn.

It is important to note that most of the human-related activity occurring on Whiteface and other ski areas occurs during the winter months when most bird species are absent. It may be that direct effects of humans are minimal during the summer months when breeding activity is occurring, and that loss of habitat and other human impacts on the wintering grounds may be much more critical to the long-term survival of Bicknell's thrush. One of the most common results of habitat fragmentation, such as that created by ski trails, is increased predation created by better access for predators along habitat edges. Rimmer *et al.* (2004) have not detected this pattern on Stratton and Mansfield mountains,

however. Nest success and predation rates appear similar in ski trail areas and in controls (Rimmer *et al.* 2004). This may be due to the fact that the generalist predators such as raccoons or coyotes that are more common in fragmented habitats at low elevations are less prevalent at high elevations where Bicknell's thrush commonly nests. Red squirrels are the most significant nest predator for Bicknell's thrush, and squirrels appear to be more evenly disbursed throughout the landscape than are more generalist predators which concentrate along and use edges as travel corridors.

Though extensive work has been conducted by VCE and others on Bicknell's thrush on areas with existing ski trails, our study represented the first opportunity to examine changes in abundance of Bicknell's thrush and other species before and after ski trail construction occurred. We found significantly fewer BITH in those areas that were cut as new trails in 2008, though no other species demonstrated a difference between pre- and post-construction relative abundance. It is difficult to assess the significance of these findings because we have only one year of post-construction data to date. While Bicknell's thrush is a species of concern and any impacts resulting in a decline in abundance of the species should be monitored, it is impossible to know at this point whether this pattern of decreased abundance in the new trails will continue. Much of our other data from this study suggest that BITH and the other montane forest species are not negatively impacted by existing trails, and so it is possible that abundances will return to pre-construction levels after a couple of years. Additional sampling will be needed to determine what the long-term impacts of the new trails may be on this population. In the meantime, it will be important to manage trail cutting and maintenance activities so that they occur outside of the breeding season when impacts to BITH would be minimized.

Acknowledgements

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