STATE OF NEW YORK
SUPREME COURT : ALBANY COUNTY

In the Matter of the Application of PROTECT THE ADIRONDACKS! INC., Plaintiff-Petitioner, For a Judgment Pursuant to Section 5 of Article 14 of the New York State Constitution and CPLR Article 78 -against- NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION and ADIRONDACK PARK AGENCY, Defendants-Respondents.	AFFIDAVIT OF TIMOTHY G. HOWARD, Ph.D. Index No. 2137-13 RJI No. 01-13-ST-4541 Hon. Gerald W. Connolly

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State of New York :
:ss.:
County of Albany :

Timothy G. Howard, being duly sworn, deposes and says:

1. I am Director of Science with the New York Natural Heritage Program located at 625 Broadway, Albany, New York. I received a BA in Biology from Middlebury College (1987), an MS in Biology from the University of Michigan (1994), and a PhD Degree in Biology (Plant Ecology) from The University of Michigan in 1998. I have worked for the New York Natural Heritage Program since November, 2000.

2. The Natural Heritage Program (NYNHP) is a program of the Research Foundation for the State University of New York College of Environmental Science and Forestry (SUNY-ESF). NYNHP provides information and scientific expertise on rare species, natural ecosystems, and landscape assessment. NYNHP works in partnership with the New York State Department of

Environmental Conservation (DEC) and other state, federal, and private organizations involved in natural resource management, land protection and stewardship, and biodiversity conservation. I am responsible for helping with oversight of our science staff and science program, helping to obtain funding for the program, managing projects, and leading most of the landscape analysis and modeling portions of our projects. I have extensive experience in ecological field surveys and condition assessment, landscape assessment and species distribution modeling, mapping and aerial photo interpretation using Geographic Information Systems (GIS), and statistical analysis and modeling. A copy of my resume is attached as Exhibit A.

3. I have read the allegation in the complaint/petition (complaint) in this proceeding that construction of Class II trails violates the State Constitution, Article XIV, § 1, that a substantial amount of timber will be cut, that the trails are not consistent with the wild forest nature of the preserve, and that the trails create a man-made setting (Complaint, ¶ 82). I submit this affidavit in support of the State's motion for summary judgment.

4. My goals with this document are to address two issues. The first is to discuss DEC's goal to minimize the overall effects of snowmobile trails as described in the Snowmobile Plan For the Adirondack Park/Final Generic Impact Statement (Record Exhibit 3; 2006 Snowmobile Plan) [Complaint, ¶ 67]) and in the 2009 Management Guidance (Record Exhibit 8; 2009 Guidance). These efforts are related to the goal of maintaining the wild forest character of the preserve. The second addresses the plaintiff's use of the term 'clearcut' (Complaint, ¶ 71). This is also related to the goal of maintaining the wild forest character of the preserve.

Snowmobile Trail Reconfiguration to Minimize Harm from Forest Fragmentation

5. In the Management Guidance of 2009 (Snowmobile Trail Siting, Construction and Maintenance on Forest Preserve Lands in the Adirondack Park) (Record Exhibit 8; 2009 Guidance) a clear goal is to close snowmobile trails that penetrate to the more interior portions of the Wild Forest (2009 Guidance p. 6) and strive to locate new trails along existing roadways (2009 Guidance p. 3).

6. A primary reason for this trail reconfiguration goal resides in the concept of forest fragmentation. In broad terms, roads and other features that divide a forest have detrimental impacts on the plants and animals making up the forest ecosystem. Impacts of these fragmenting features extend into the adjacent forest at varying distances, which in turn lessens the areal extent of 'interior' forest remaining for species that require this type of habitat. Many studies have documented the negative effects of fragmentation and, as a result, large roadless areas of forest (roadless blocks) are often desirable conservation targets for conservation organizations. Indeed, the Adirondacks contain the largest remaining roadless blocks (or "Matrix Forest Blocks" per The Nature Conservancy) in New York State and other adjacent states (e.g., PA, NJ, CT, MA, VT, and NH).

7. Minimizing forest fragmentation increases the ability of forest ecosystems (and other natural systems within the roadless block such as streams and wetlands) to withstand natural weather and climate perturbations such as high winds, heavy rainfall, and drought. High winds, for example, cause tree blowdowns in patches of tens to hundreds of acres. In larger, unfragmented forests, a blowdown helps maintain a diverse mosaic of forest ages, stand densities, and forest types, promoting species diversity and ecosystem stability. In a fragmented forest, roadless blocks are much smaller and the blowdown might take out an entire block,

effectively removing the variation in forest ages, densities, and types, which in turn lowers the number and types of species and the stability of the forest ecosystem within that block. The roads causing the fragmentation then limit the ability for species to disperse back into this disturbed area.

8. A small sampling of specific studies suggests the breadth of the effects of fragmentation: The edges of larger forest blocks have less of an effect on nesting birds than the edges of fragmented forest blocks (Driscoll and Donovan. 2004. Landscape context moderates edge effects: nesting success of wood thrushes in central New York. Conservation Biology 18:1330–1338.); forest fragmentation is associated with a reduced number of forest bird species (Boulinier et al. 1998. Higher temporal variability of forest breeding bird communities in fragmented landscapes. Proceedings of the National Academy of Sciences 95:7497–7501.); higher road densities (e.g., increased fragmentation) have negative effects on amphibians (Cosentino et al. 2014. Citizen science reveals widespread negative effects of roads on amphibian distributions. Biological Conservation 180:31–38.); and fragmented forests are impacted more by deer and deer browse (Alverson et al. 1988. Forests too deer: edge effects in northern Wisconsin. Conservation Biology 2:348–358.).

9. Designing a snowmobile trail system that minimizes forest fragmentation also lessens the potential threat of transporting invasive species into the interior forest. Roads and trails are important pathways for many invasive species, with seeds carried along these corridors unintentionally by people (for an example, see Mortensen et al. 2009. Forest Roads Facilitate the Spread of Invasive Plants. Invasive Plant Science and Management 2:191–199).

10. These (¶ 6, 7, 8, 9) are some of the reasons that shifting trails from the forest interior to forest edge has a potential to increase the wild forest character of forest blocks.

11. I have reviewed historical and current information about the network of snowmobile trails in the Adirondacks to evaluate whether the actions planned or taken would actually lessen forest fragmentation with respect to roads and snowmobile trails.

12. As test cases, I evaluated whether trail system restructuring that has already been undertaken has changed the level of forest fragmentation at three sites or "focus areas": Gilmantown, Seventh Lake Mountain, and Wilmington. I focused on the primary forest block through which each of these Class II trails pass.

13. In 2009 the New York Natural Heritage Program obtained a complete GIS data set ("Shared Adirondack Park Geographic Information CD-ROM ver.1.0") from the Adirondack Park Agency (APA). This data set cataloged all snowmobile trails as the APA knew them to be in 2001. I used information from both this data set and information from DEC (August 19, 2016 Affidavit of Joshua Clague) to determine the trail network before the construction of the Class II trails. This trail network is treated as the baseline or "Before" state of snowmobile trails in the focus areas. The recently constructed trail systems in the focus areas are considered the "After" state of snowmobile trails – these data were also obtained in GIS format from DEC.

14. There are several methods available to evaluate changes in forest fragmentation between the Before and After snowmobile trail systems. A simple but effective metric is change to the size of the roadless blocks. Consider a study area divided into two forest blocks. Given the option of two moderately-sized blocks (trail divides the study area roughly in two) or one large and one small block (trail divides the study area unequally), the latter option of having one large roadless block would be preferable in terms of fragmentation.

15. Other measures of fragmentation consider the extent of trails that penetrate but do not cross the block and the overall shape of the block by comparing the length of the perimeter to the size. Thus, a long, narrow block would score more poorly than a perfectly round block and a block with a trail penetrating into it would score more poorly than an equivalently shaped block with no penetrating trail. Here, I focus on methods summarized by Schumaker in the scientific journal Ecology (Schumaker, N. H. 1996. Using landscape indices to predict habitat connectivity. Ecology 77:1210–1225). These include the shape index and the area-weighted mean of the shape index. The shape index equals one (1) with a perfect circle (with no penetrations) and increases with more uneven edges and added trails that penetrate into the interior. Thus, forest blocks with the least fragmentation by this measure would be closest to one.

16. The first Focus Area is the roadless block containing the Gilmantown trails. The total size of this block is 11,305 acres in size. Before approximately 2010 it was divided east-west by the Dunning Pond Trail (Exhibit B, Figure 1, left). The Gilmantown trail was subsequently added along the western side of the Focus Area (Exhibit B, Figure 1, right).

17. With the change in Gilmantown snowmobile trails (closing the Dunning Pond Trail and opening the Gilmantown Trail), the largest snowmobile-free roadless area in the Focus Area 1 changes from 7,957 acres to 9,714 acres. The shape indices also improve with the new trail layout: the Shape Index of the largest block improved from 1.44 to 1.32 and the area weighted mean of both blocks improved from 1.43 to 1.38 (Exhibit B, Table 1). Thus, overall for this Focus Area all three fragmentation measures improved with the trail changes.

18. The second Focus Area is the roadless block containing the Seventh Lake Mountain Trail. The total size of this Focus Area is 91,434 acres in size. Before approximately 2011 it had a small loop trail (Seventh-Eighth Lake Loop Trail) and several other trails that penetrated into

the forest. The Seventh Lake Mountain Trail was subsequently added along the northwestern side, incorporating some of the Seventh-Eighth Lake Loop Trail, while the aforementioned trails were closed (Exhibit B, Figure 2).

19. The change in snowmobile trails for the roadless area holding the Seventh Lake Mountain Trail decreased the snowmobile-free roadless area from 89,270 acres to 85,611 acres. The removal of the other trails that penetrated into the forest, however, greatly improved the fragmentation metrics for this site (Exhibit B, Table 2). For example the shape index changed from 2.11 to 1.6, a large improvement. Thus, overall for this Focus Area, one measure (size of largest block) went down slightly while two measures improved greatly with the snowmobile trail changes.

20. The third Focus Area is the roadless block containing the northern section of the Wilmington Snowmobile Trail. The total size of this Focus Area is about 14,986 acres. Before around 2012, the trail from Bonnie View Road (east side of block) was open to snowmobiles. Afterwards it was closed from the east side but it remains open to the pond from the west. The new addition (Wilmington Snowmobile Trail) extends from this trail to the north (Exhibit B, Figure 3).

21. The change in snowmobile trails for the third Focus Area increased the largest block from 34,267 acres to 38,312 acres (Exhibit B, Table 3). The other fragmentation indices increased slightly under the "After" scenario (Exhibit B, Table 3). This is primarily because of the continued use of the spur trail to Cooper Kill Pond.

22. In summary of the fragmentation assessments (above), I looked at the changes in snowmobile trails within three different Focus Areas. Each Focus Area is a location where a

Community Connector Trail (Class II Trail) has been installed. At each Focus Area, I assessed the snowmobile trail condition – as it relates to forest fragmentation – before the Class II trails were installed ("Before") and after the trails were installed ("After"). In all cases, trails that penetrated the forest interior have been closed to snowmobiles, changing the fragmentation status of the Focus Areas. In all cases there were fragmentation measures that improved with the new trail system. At Focus Area 1 (Gilmantown), all fragmentation metrics were positive; at Focus Area 2 (Seventh Lake Mountain), the shape indices improved greatly while ultimate size of the largest block decreased a small amount. At Focus Area 3 (Wilmington) the ultimate size of the largest block increased a large amount but fragmentation as measured by the shape increased a small amount (e.g., was negative, because of the continued existence of the snowmobile trail penetrating to Cooper Kill Pond). For details see the tables in Exhibit B.

23. In this abbreviated assessment of the influence of trail reconfiguration on forest fragmentation, it appears that trail reconfiguration is mostly improving the fragmentation state of these forests, suggesting that the wild forest state is improving with respect to snowmobile trails.

Characteristics of a Clearcut

24. The Complaint stated that "The construction of said trails will result in the clearcutting of a minimum of 47.7 acres of the Forest Preserve," (Complaint, ¶ 71), and "Each such Class II Community Connector Trail would result in the additional destruction of a substantial number of trees and more clearcutting in the Forest Preserve" (Complaint, ¶ 96). The following section addresses use of the term "clearcut" in this language.

25. The ecological effects of clearcuts have been studied for many years, with topics varying from the effects of clearcuts on soil runoff, nutrient cycling and retention (e.g. Hornbeck

et al., 1986. Clearcutting Northern Hardwoods: Effects on Hydrologic and Nutrient Ion Budgets. Forest Science 32:667–686), the effects of clearcuts and clearcut edges on bird nesting and survival (e.g. Manolis et al., 2002. Edge effect on nesting success of ground nesting birds near regenerating clearcuts in a forest-dominated landscape. The Auk 119:955–970), and the effects of clearcut edges on Amphibians (e.g. Demaynadier et al., 1998. Effects of Silvicultural Edges on the Distribution and Abundance of Amphibians in Maine. Conservation Biology 12:340–352).

26. An important characteristic of these studies is that clearcuts contain: 1. wide open spaces with no tree canopy overhead, and 2. forest edges with an abrupt change in vegetation from clearcut to forest. Using these characters to define a clearcut broadens the scope of a clearcut and allows the actual size to vary with the type of forest such that shorter-statured forests might have smaller clearings that fit into this definition of clearcut.

27. The Class II Community Connector Trails as constructed do not have these characteristics. Colleagues and I have visited some of these trails and canopy closure is relatively high. As a result there are no wide open spaces along these trails. Also, trees along the border of these trails continue to grow and close up the gap with time, so that in just a few years after trail construction the canopy is even more closed. Because of this, we are finding mostly forest herbs (not plants found in an opening) throughout these trails, emphasizing the shaded (and understory) nature of these trails.

28. Because there is no large gap in the canopy, there is also no "Forest Edge." The forest herbs growing on the trails are clear indicators of the low sunlight regime and the lack of abrupt differences in vegetation along the trail edges indicate that the forest edge characterizing a clearcut does not exist.

29. One interesting way to see this is to look at aerial imagery and see if the Class II Community Connector Trails are visible on the imagery. Aerial imagery is of high enough resolution to see individual treetops and roads clearly. Exhibit C shows a short section of the Wilmington Trail. In the imagery, a snowmobile bridge is clearly visible but it is very difficult to discern the actual trail connecting the bridges even during the spring under leaf-off conditions, the time when the imagery was collected. This simply emphasizes the difference between the activities (tree clearing) conducted for trail construction and those conducted as part of a clearcut – a clearcut would be exceptionally visible from imagery such as this. This imagery is available at the NYS GIS clearinghouse, here: http://www.orthos.dhses.ny.gov/.

30. In conclusion, I support the notion that trail re-arrangement has the potential to improve the wild nature of the Wild Forest and, indeed, three areas score better in many fragmentation metrics after trail restructuring. I also note that the construction of Class II snowmobile trails does not create clearcuts, as the term is used in the ecological literature.

Timothy G. Howard

Sworn to before me this 24th day
of August , 2016

Notary Public

Fiona M. McKinney
Notary Public, State of New York
01MC6122742
Qualified in Albany County
My Commission Expires February 22, 2017

M Kinney
ate of New York
122742
Albany County
res February 22, 20___

EXHIBIT A

Exhibit A

Timothy Gramlich Howard

ADDRESS	New York Natural Heritage Program 625 Broadway, 5th floor Albany, NY 12233-4757	phone: (518) 402-8945 Email: tghoward@esf.edu

EDUCATION

1998	**Ph.D. Biology.** University of Michigan, Ann Arbor, MI. *The relationship of competitive hierarchies for germination, growth, and survivorship to relative abundance in an old field community.* Dr. Deborah Goldberg, chair.
1994	**M.S. Biology.** University of Michigan, Ann Arbor, MI.
1987	**B.A. Biology.** Cum laude. Middlebury College, Middlebury, VT. Concentrations: Geology, Public Policy in Northern Environments.
1985-1986	The Center for Northern Studies, Wolcott, VT.

RESEARCH AND WORK EXPERIENCE

2007-present	**Director of Science**, New York Natural Heritage Program.
2012-present	**Adjunct Assistant Professor**, SUNY College of Environmental Science and Forestry
2004-2007	**Program Scientist,** New York Natural Heritage Program. Provide cross-program support and ideas for collaboration and funding. Continue with Ecologist roles, as below.
2002-2004	**Ecologist,** New York Natural Heritage Program. Conducted inventories of natural communities in New York State. Participated in community classification efforts. Pursued funding, managed projects.
2000-2002	**Associate Ecologist**, New York Natural Heritage Program. Conducted inventories of natural communities in New York State. Participated in state-wide community classification efforts. Managed projects, including budget and contractor oversight.
1998-2000	**Post-doctoral Research Associate** for Drs. J. Gurevitch and M. Lerdau at the State University of New York (SUNY), Stony Brook. Designed and conducted field experiments to determine why some plant communities are more susceptible to invasive plant species than others.
1993-1998	**Ph.D. thesis research**. Completed pilot and multi-year experiments at the E.S. George Reserve in Pinckney, MI to investigate how much of a role plant competition plays in determining the species abundance. Supervised undergraduate and graduate student assistants.
1996-1997	**Geographic Information Systems (GIS) Map Developer** for the E.S. George Reserve, University of Michigan Museum of Natural History.
1994-1996	**Naturalist and GIS Developer** for the City of Ann Arbor Parks and Recreation Department, Natural Areas Preservation Division. Led plant identification walks and inventoried plants in local natural areas; mapped natural communities using GIS.

TEACHING EXPERIENCE

Fall 1999	Visiting Assistant Professor, Plant Ecology, SUNY, Stony Brook.
October 1998	Guest Faculty, Glacial Geology, University of Michigan, Ann Arbor MI.
January 1998	Visiting Professor, Woody Plants in the Winter: Identification and Ecology, Middlebury College, VT.
1991-1997	Graduate Student Instructor, University of Michigan Department of Biology: Community Ecology, Systematic Botany Plant Population and Community Ecology, Introduction to Biology, Biology and Human Affairs, Practical Botany, Spring Flora.
1992, 1993	Teaching Assistant, General Ecology, University of Michigan Biological Station, Pellston MI.
1987-1989	High School Teacher, Biology, Earth Science, and Geometry, Killington Mountain School, VT.

Selected Publications

Howard, T. G., M. D. Schlesinger, C. Lee, G. Lampman, and T. H. Tear. 2016. Guiding Conservation and renewable energy development using a paired return-on-investment approach. Biological Conservation. 201:69-77

Howard, T. G., and M. D. Schlesinger. 2013. Wildlife habitat connectivity in the changing climate of New York's Hudson Valley. Annals of the New York Academy of Sciences 1298:103–109.

Howard, T. G., J. Saarela, B. Paszko, P. Peterson, and D. Werier. 2009. New records and a taxonomic review of Calamagrostis perplexa (Poaceae: Poeae: Agrostidinae), a New York state endemic. Rhodora. 111:155-170

Gurevitch, J., T. Howard, I. Ashton, E. Leger, K. Howe, E. Woo, and M. Lerdau. 2008. Effects of experimental manipulation of light and nutrients on establishment of seedlings of native and invasive woody species in Long Island, NY forests. Biological Invasions 10: 821-831.

Edinger, G.J. and Howard, T.G. 2008. Habitats of New York State. The second atlas of breeding birds in New York State. (eds K.J. McGowan & K. Corwin), pp. 43-57. Cornell University Press, Cornell, NY.

Callaway, R. and T. G. Howard. 2007. Competitive networks, indirect interactions, and allelopathy: a microbial viewpoint on plant communities. Progress in Botany. Esser, K., Luttge, U.E. Beyschlag, W., Murata, J. (Eds.). Springer. Vol. 68:317-331

Howard, T.G., J. Gurevitch, L. Hyatt, M. Carreiro, M.L. Lerdau. 2004. Forest Invasibility in Communities in Southeastern New York. Biological Invasions 6: 393–410.

Hyatt, L.A., M. S. Rosenberg, T. G. Howard, G. Bole, W. Fang, J. Anastasia, K. Brown, R. Grella, K. Hinman, J. P. Kurdziel, J. Gurevitch. 2003. The Distance Dependence Prediction of the Janzen-Connell Hypothesis: a Meta-analysis. Oikos 103: 590–602.

Howard, T.G. and Goldberg, D.E. 2001. Competitive Response Hierarchies for Germination, Growth and Survival and Their Influence on Abundance. Ecology 82(4). 979-990.

Howard, T.G. 2001. The Relationship of Total and Per-gram Rankings in Competitive Effect to the Natural Abundance of Herbaceous Perennials. Journal of Ecology 89(1): 110-117.

City of Ann Arbor Natural Area Preservation Staff. 1999. Along the Huron: the Natural Communities of the Huron River Corridor in Ann Arbor, Michigan. The University of Michigan Press. (co-author)

Selected Recent Reports *(not peer-reviewed)*

Howard, T., and M. Schlesinger. 2012. PATHWAYS: Wildlife Habitat Connectivity in the Changing Climate of the Hudson Valley. 143 pages.

Lyons-Swift, L., Howard, T. 2010. Distribution Maps for Amphibians and Reptiles at the edge of their range in New York State. 47 pages.

Howard, T., M. Schlesinger, J. Corser, G. Edinger, L. Lyons-Swift, K. Perkins, R. Ring, F. Sechler, E. White, S. Young. 2008. 2008 Field Surveys of Adirondack Woodlands (Finch Pruyn) Easement Properties.

Howard, T., A. Chaloux, J. Corser, A. Feldmann, J. Jaycox, A. Leder, K. Perkins, R. Ring, M. Schlesinger, F. Sechler, E. Spencer, E. White, S. Young. 2007. Adirondack Woodlands Fall 2007 Rapid Assessment.

Howard, T.G. 2006. Salmon River Watershed Inventory and Landscape Analysis. Prepared for the NYS Tug Hill Commission. 146 pages.

Selected Presentations

"Linking Open-Source Mapping to Relational Data Collection in the Android Environment" Presentation at the NatureServe Biodiversity without Boundaries conference, 28 April 2016. (T.G. Howard, S. Cooke).

"Providing Biodiversity Information for Habitat Protection and Rare Species Conservation" Presentation to Conservation Biology class at Siena College, Albany NY. 15 April 2015 (T.G. Howard).

"Mapping the Ridgeline: Maps as tools for Management" Collaborative presentation to the Shawangunk Ridge Biodiversity Partnership Winter Lecture Series, 19 February 2015. (C. Lee, J. Thompson, T. Howard).

"Developing a Stressor-based Landscape Condition Assessment Metric with Validation in New York Wetlands." Presentation at the Northeast Natural History Conference, 20 April 2015. (T.G. Howard, A. Feldmann)

"Tracking wetland change in response to Lake Ontario water level management" Presentation at the NatureServe Biodiversity without Boundaries conference, 28 April 2015. (T.G. Howard, A. Feldmann)

"Monitoring Plant Populations in the Adirondack Alpine." Presentation at the NatureServe Biodiversity without Boundaries conference, 8 April 2014. (T.G. Howard, J. Goren).

"Wetland Monitoring for Lake Ontario Adaptive Management" Presentation at the NYSDEC Lake Ontario Ecosystem Forum, 15 August 2013. (T.G. Howard, A. Feldmann).

"Distribution Modeling and Connectivity Modeling at Fine Scales in the Hudson Valley with Applications to a Spatial Vulnerability Assessment." Presentation at the 69th Annual Northeast Fish & Wildlife Conference, 2013. (T.G. Howard, M. Schlesinger).

"Species Distribution Modeling for Rare Species: approaches in NY, VA, and OR." Webinar presentation to United State Fish and Wildlife Service, 2012. (T.G.Howard)

"Wind, Willows, and Wings: New Data and Tools to Improve Energy Siting for Biodiversity in New York." Poster presentation at the State of the Science workshop on the Ecological Effects of Wind, hosted by the Great lakes Wind Collaborative and the Lugar Center for Renewable Energy. Indianapolis, IN 2011 (T.G. Howard, M. Schlesinger, T. Tear, C. Lee, B. Stratton, R. Rohrbaugh, A. Farnsworth, G. Lampman).

"Planning for Wildlife Habitat Connectivity in the Hudson River Valley with Changing Climate." Shawangunk Ridge Partnership Connectivity Meeting Series, New Paltz, NY 2010 (T.G. Howard, M. Schlesinger).

"Species Distribution Modeling for Rare Species. NatureServe's approach to Improve Planning, Recovery, and Consultation." Webinar presented nationally to U.S. Fish and Wildlife Staff. 2010 (T.G. Howard).

"Biodiversity and Conservation in New York: Paradigms, Progress, and Prospects." The Nature Conservancy in New York Statewide Retreat, Ellenville, NY 2010 (T.G. Howard).

"Rare plant densities in the Adirondack Alpine: setting baselines in the context of climate change." Biodiversity Research Institute Biology and Conservation Lecture Series, Albany, NY 2008 (T.G. Howard)

"The Adirondack Alpine Zone in the face of Climate Change." Linnean Society of New York lecture series, New York, NY 2007 (T.G. Howard).

"Element distribution modeling in NY: Why, How, and Hotspot Rollups. NatureServe Conservation Conference, Boulder, CO 2007 (T.G. Howard, H.J. Krahling, E. Spencer).

"Using Species and Natural Community Distribution Models to Predict Biodiversity Hotspots." The Nature Conservancy Science in Practice meeting, Tucson, AZ 2006. (T.G. Howard, T.W. Weldy, H.J. Krahling, J.W. Jaycox).

"Buffering natural communities for community persistence." The Nature Conservancy All-Science Meeting contributed paper, Duluth, MN 2003 (T.G. Howard and J. Schmid).

"Experimental tests of factors promoting forest invasibility." Ecological Society of America (ESA) contributed paper, Savannah, GA 2003 (J. Gurevitch, T.G. Howard, L.A. Hyatt).

"Linking traits to competitive success and the structure of plant communities" ESA contributed paper, Savannah, GA 2003 (K.N. Suding, D.E. Goldberg, and T.G. Howard).

"Prioritizing natural community and rare species inventories: lessons learned." The Nature Conservancy All-Science Meeting contributed paper, Albuquerque, NM 2002 (T. Howard).

"The differential influence of site and soil characteristics on invasibility of forest communities." ESA contributed paper, Snowbird, UT 2000 (T. Howard, J. Gurevitch, R. Misra, W. Fang, K. Brown).

"The relationship between competitive ability and abundance: experimental evidence and a literature review." ESA contributed paper, Spokane, WA 1999 (T. Howard).

"Patterns of plant invasion in multiple environments." ESA contributed paper, Spokane WA 1999 (Gurevitch, J.K., L Hyatt, T. Howard, W. Fang, K. Brown, J. Kaplan).

"Community changes in response to single species perturbations." ESA contributed paper, Albuquerque, NM 1997 (T. Howard and D.E. Goldberg).

"Potential determinants of plant community structure: competitive ability and natural germination rate." ESA contributed paper, Providence, RI 1996 (T. Howard).

"Competitive effect and response hierarchies in Michigan old fields." ESA contributed paper, Snowbird, UT 1995 (T. Howard).

EXHIBIT B

Exhibit B.

Figures and Tables for fragmentation assessments (¶14, ¶15, ¶16, ¶17, ¶18, ¶19)

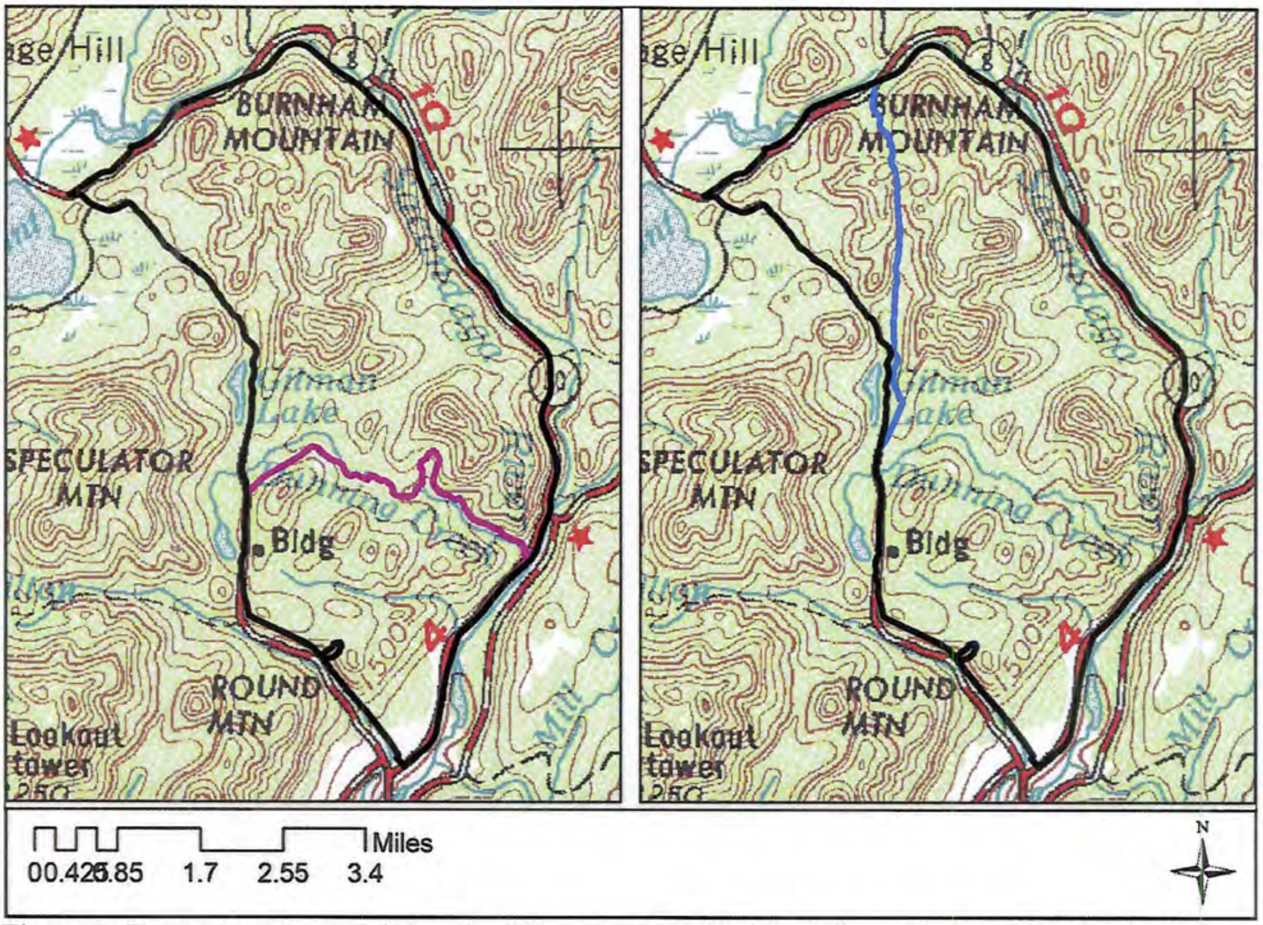

Figure 1. Focus Area 1, containing the Gilmantown trails. The left panel shows "Before" with the black line circumscribing the outer limits of the Study Area and the Dunning Pond Trail consisting of the purple line traveling east-west through the middle of the Study Area. The right panel shows "After" with the outer black line circumscribing the same limits of the Study Area and the new Class II Gilmantown Trail running north-south and dividing the block in a new location. The Dunning Pond Trail is now closed and thus removed from this map and the calculations.

Table 1. Fragmentation metrics for Focus Area 1. Lower values for shape index represent lower levels of fragmentation. Positive (blue) numbers in the % change column indicate improvements in the fragmentation metric; negative (red) numbers indicate a decline in the fragmentation metric.

Metric	Before	After	% change
Largest Block (acres)	7,957	9,714	22.1%
Shape Index (largest block)	1.44	1.32	9.1%
Shape Index (all blocks, area weighted mean)	1.43	1.38	3.6%

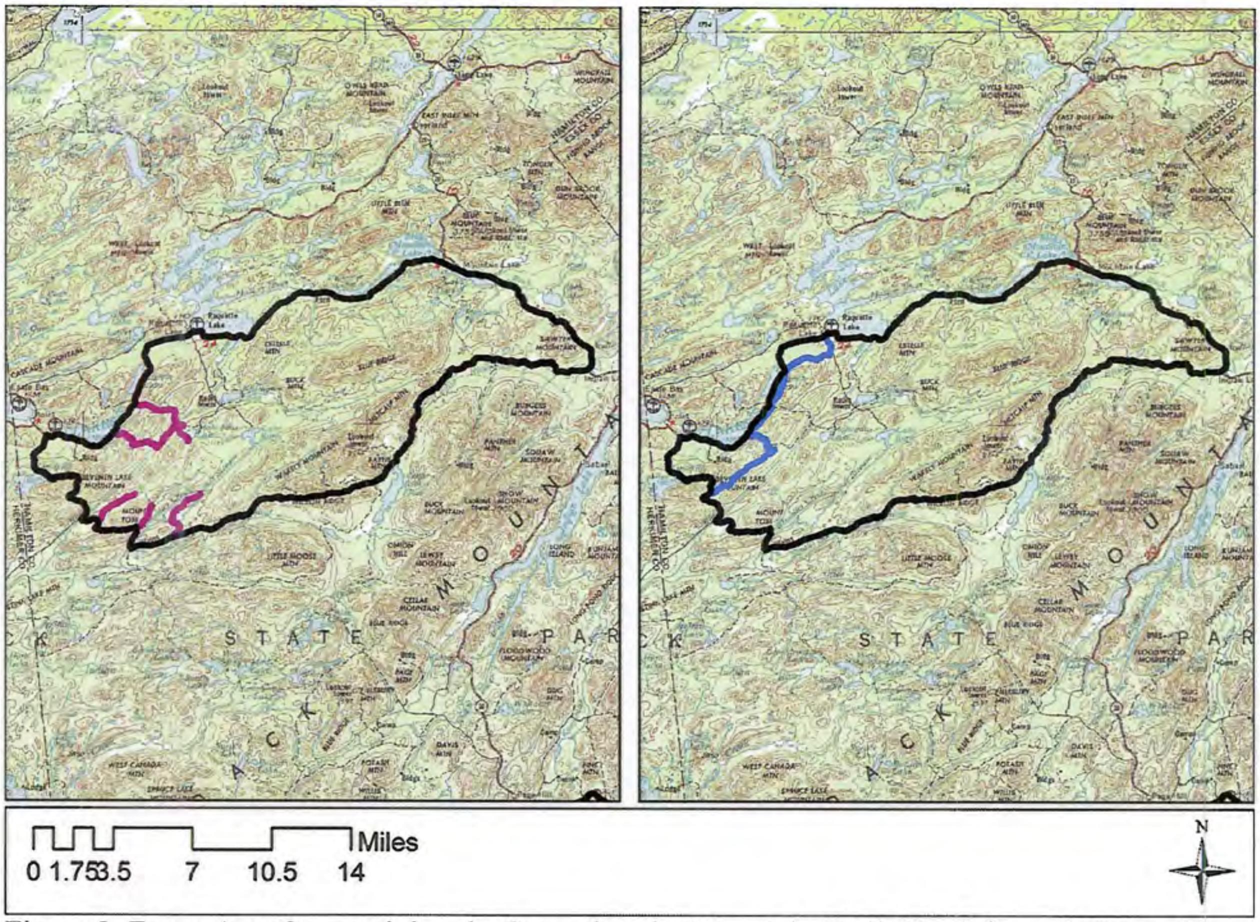

Figure 2. Focus Area 2, containing the Seventh Lake Mountain Trail. The left panel shows the snowmobile trails present beforehand, including the Seventh-Eighth Lake Loop Trail, Mohegan Lake Trail, Bear Pond Tail, Benedict Creek Trail, and Lost Ponds Trail. All of these trails have been subsequently closed to snowmobile traffic, with the exception of the shared portion of the Loop Trail with the Seventh Mountain Trail. The right panel shows the current snowmobile trail system within this roadless block. In both cases, the outer ring of the study area (thick black line) consists of roads and snowmobile trails (whichever is inner-most) circumscribing the Focus Area.

Table 2. Fragmentation metrics for Focus Area 2. Lower values for shape index represent lower levels of fragmentation. Positive (blue) numbers in the % change column indicate improvements in the fragmentation metric; negative (red) numbers indicate a decline in the fragmentation metric.

Metric	Before	After	% change
Largest Block (acres)	89,270	85,611	-4.3%
Shape Index (largest block)	2.11	1.60	31.9%
Shape Index (all blocks, area weighted mean)	2.09	1.60	30.6%

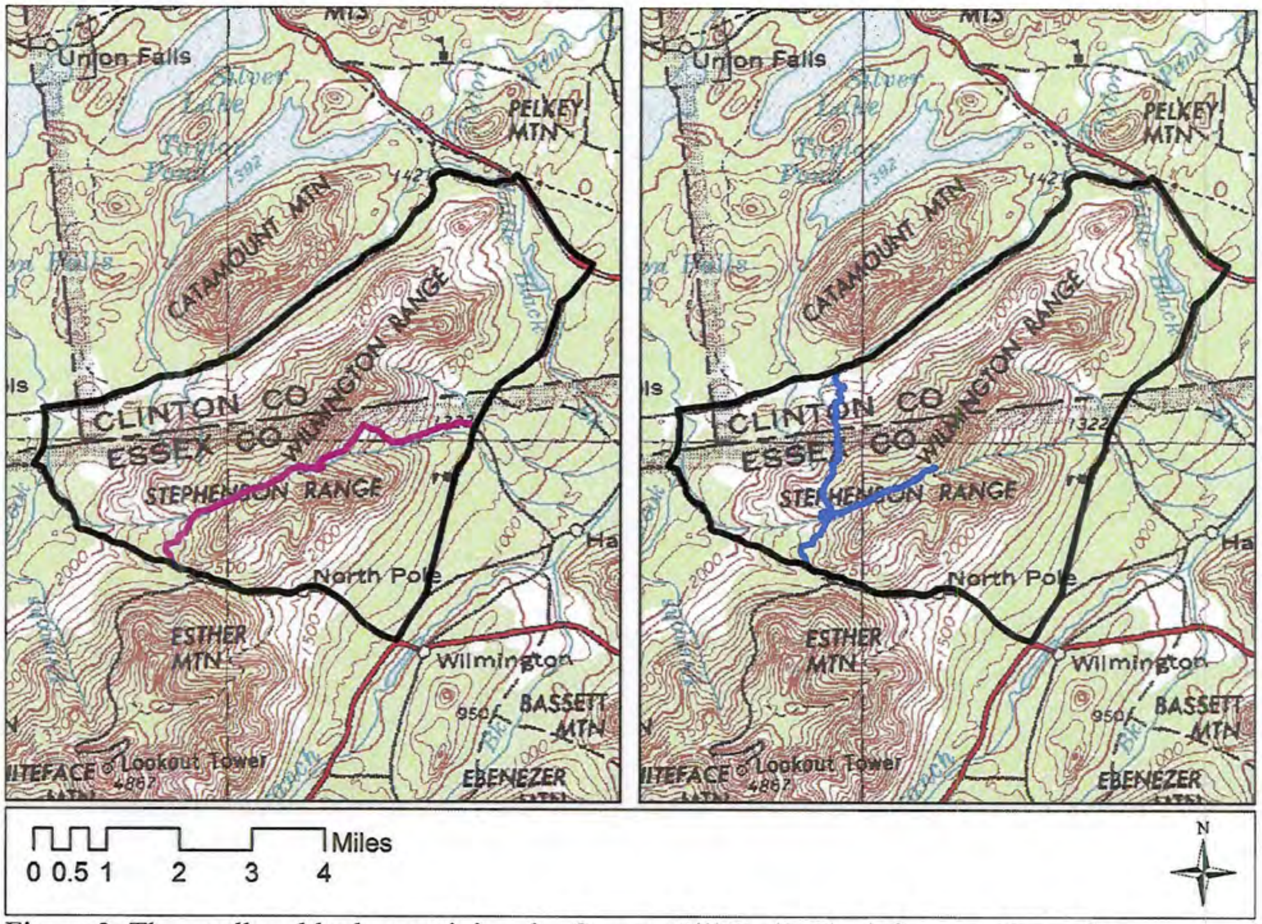

Figure 3. The roadless block containing the Cooper Kill Trail. The left panel shows the snowmobile trail present beforehand (the Cooper Kill Pond Trail from Bonnie View Road through to Gillespie Drive). The right panel shows the snowmobile trail system with the Wilmington Snowmobile Trail and the spur to Cooper Kill Pond.

Table 3. Fragmentation metrics for the roadless area holding the Seventh Lake Mountain Trail. Lower values for shape index represent lower levels of fragmentation. Positive (blue) numbers in the % change column indicate improvements in the fragmentation metric; negative (red) numbers indicate a decline in the fragmentation metric.

Metric	Before	After	% change
Largest Block (acres)	10,734	12,333	14.9%
Shape Index (largest block)	1.47	1.53	-4.1%
Shape Index (all blocks, area weighted mean)	1.43	1.49	-4.2%

EXHIBIT C

Exhibit C. View of trail with high-resolution aerial imagery.

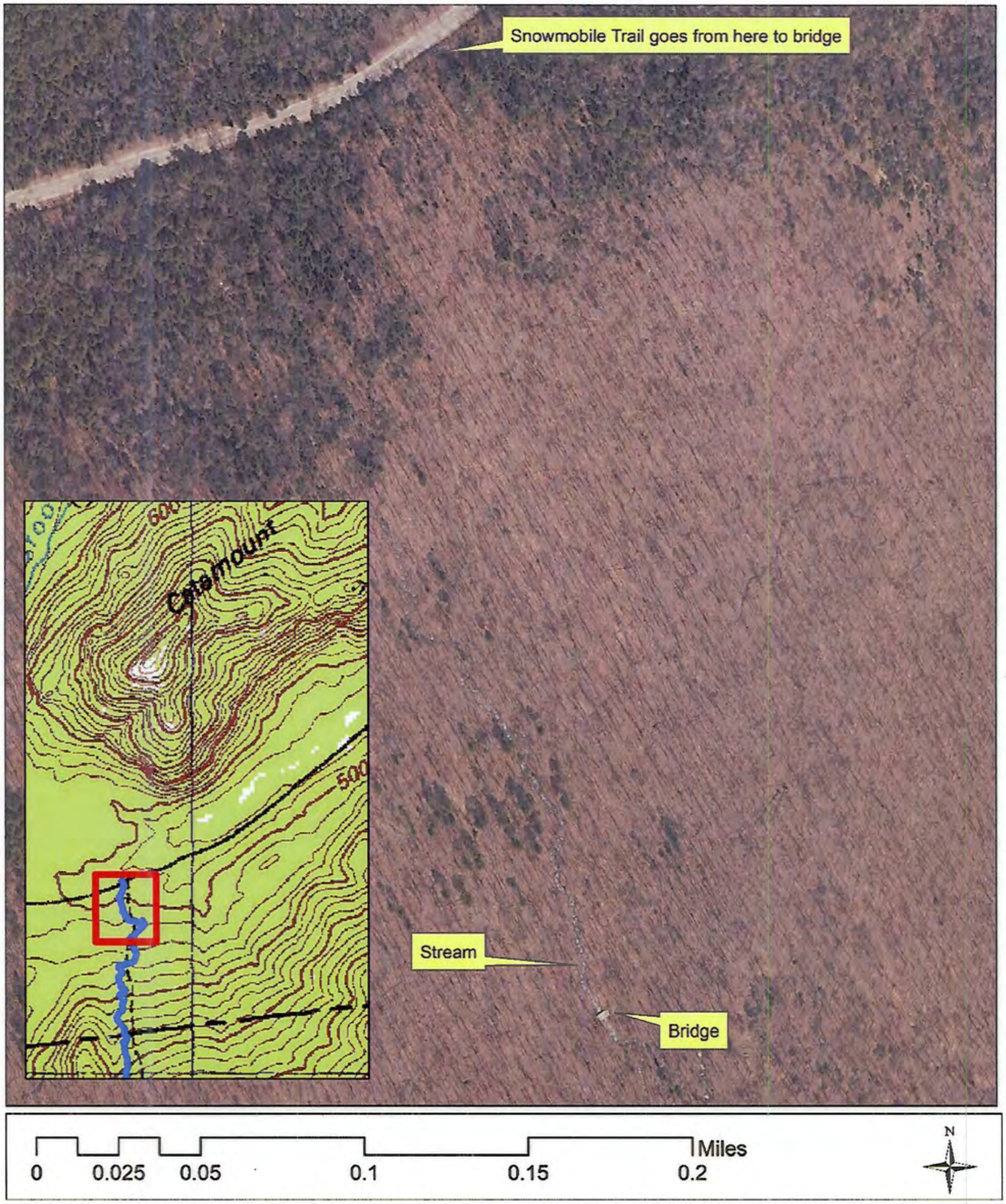

Figure 4. Example of a section of the Wilmington Snowmobile Trail using aerial imagery. This imagery was acquired in April of 2014 in leaf-off condition and is rated at 1 foot resolution. The road is Forestdale Road and the snowmobile trail runs between the road and the bridge indicated. The inset map shows the trail in blue and the area zoomed in on with the red rectangle.