

**Review of the
Kibby Expansion Wind Project
Aesthetic Impact Assessment**

James F. Palmer

Scenic Quality Consultants
Burlington, Vermont

April 16, 2010

Table of Contents

- 1. Introduction..... 1**
 - 1.1 Legislative Background..... 1**
- 2. Adequacy of the Report 4**
 - 2.1 Project Description..... 4**
 - 2.2 Landscape Character 4**
 - 2.3 Visibility Analysis..... 5**
 - 2.4 Significant Scenic Resources 6**
 - 2.5 Public Use and Expectations..... 7**
 - 2.6 Evaluation of Potential Scenic Impacts 7**
 - 2.7 Mitigation 10**
- 3. Field Review and Additional Analysis..... 10**
 - 3.1 Significant Scenic Resources 10**
 - 3.2 Visibility Analysis..... 11**
 - 3.3 Visual Simulations..... 16**
 - 3.4 Fieldwork..... 18**
- 4. Discussion of Additional Issues..... 19**
 - 4.1 Selection of Simulation Viewpoints..... 19**
 - 4.2 Standardization of Analysis 20**
 - 4.3 Cumulative Scenic Impacts..... 20**
 - 4.4 Designated Resources Need Not Be Scenic 21**
 - 4.5 Neighboring Jurisdictions 21**
 - 4.6 Mitigation 21**
- 5. Summary Conclusions..... 22**
- 6. References..... 23**
- Appendix 1. Viewshed Maps..... 26**
- Appendix 2. ArcScene Visualizations 37**

1. Introduction

On December 22, 2009, TransCanada Maine Wind Development, Inc. submitted a permit application to expand its existing Kibby Wind Power Project in Kibby Twp. and Skinner Twp. in Franklin County. The project expansion would be located in Kibby Twp. and Chain of Ponds Twp., and would consist of 15 Vestas V90 turbines, access roads, a 34.5 kV collector line, and a substation. The report entitled *Kibby Expansion Wind Project Aesthetic Impact Assessment* by Jean Vissering with simulations and mapping by Judy Bartos was submitted as part of this application. This review concerns the adequacy of the *Aesthetic Impact Assessment* (otherwise known as a Visual Impact Assessment, or VIA).¹

The remainder of the Introduction summarizes the important changes the *An Act to Implement Recommendations of the Governor's Task Force on Wind Power Development* (hereafter referred to as the Act) made in evaluating scenic impacts from expedited grid-scale wind energy development and how this fits into a standard process of visual impact assessment. The second section evaluates the Adequacy of the Report by focusing on the completeness with which each of the steps in the VIA process are addressed in the *Kibby Expansion Wind Power Aesthetic Impact Assessment*. The third section reports on the fieldwork and additional studies conducted for this review. The fourth section selectively expands on this through a Discussion of Additional Issues. The final section presents the Summary Conclusions.

1.1 Legislative Background

On April 18, 2008, Governor John Baldacci signed *An Act to Implement Recommendations of the Governor's Task Force on Wind Power Development* (the Act). It establishes a favorable State policy encouraging grid-scale wind energy development in appropriate locations. In particular, it designates a large portion of the state for expedited grid-scale wind energy development. While most environmental impacts are evaluated in the same manner as previously, special provisions are made for scenic impacts. As directed by the Act, the Land Use Regulation Commission has adopted these new scenic impact provisions by reference.²

While the provisions of this Act can be viewed as an effort to simplify and clarify scenic impact assessments, questions of interpretation still remain. There are several major determinations that effect how a scenic impact assessment is to be conducted.

What is the standard of scenic impact evaluation? The standard is “Unreasonably Adverse,” and it only applies to views from significant scenic areas. “The primary siting authority shall determine...whether the development significantly compromises views from a scenic resource of state or national significance such that the development has an unreasonable adverse effect on the scenic character or existing uses related to scenic character of the scenic resource of state or national significance.”³ “Harmonious fit” into the natural environment is explicitly not required.⁴

What evaluation criteria are to be used? The Act lists six evaluation criteria:

¹ For the purposes of this review, aesthetic, scenic and visual impacts will be considered synonymous.

² Title 12, Section 685-B, subsection 4(C)

³ 35-A MRSA, § 3452, sub-§1

⁴ 35-A MRSA, § 3452, sub-§1

- A. “Significance of...affected scenic resource;”
- B. “Existing character of surrounding area;”
- C. “Expectations of the typical viewer;”
- D. “Expedited wind energy development’s purpose and...context;”
- E. “Extent, nature and duration of the...public use of the scenic resource...and the...effect...on the public’s continued use and enjoyment of the scenic resource;”
- F. “Scope and scale of the...effect of views of the generating facilities...including...number and extent of [visible] turbines, ...distance [to visible facilities] ...and effect of prominent features of the development on the landscape”⁵

What constitutes a significant scenic resource? The Act only requires that designated state or nationally significant scenic resources be evaluated and provides a list of qualifying designations. In this review further reference to scenic resources will assume that they are state or nationally significant. While a major step toward specificity, it is anticipated that interpretation of this list will be contested. For instance this list includes resources typically designated for non-scenic reasons (e.g., national landmark or registered historic place), and only minor portions of resources designated for scenic reasons (e.g., turnouts on a scenic byway)

What is the area of potential effects (APE)? The Act states that scenic impacts from generating facilities located 8 or more miles from a scenic resource are “insignificant.”⁶ The regulations presume that potential scenic impacts to scenic resources must be evaluated within 3 miles of generating facilities. The primary siting authority may also require the evaluation of potential scenic impacts to state and nationally significant scenic resources located between 3 and 8 miles from generating facilities.⁷ As a result, it is anticipated that normally the scenic impact assessment will study the area within 8 miles of the proposed generating facilities.

Process of Conducting a Visual Impact Assessment

While the Act has focused which views are to be considered and established criteria and a standard for their evaluation, there is no apparent reason that the process by which a visual impact assessment (VIA) is conducted would be changed. While there are slight variations, a professionally conducted VIA includes the following:

1. **Project Description.** The purpose and context of the project must be described, as it is one of the evaluation criteria.⁸ In addition it is necessary to describe the visible attributes of the generating and associated facilities.
2. **Landscape Character.** The description of the landscape character establishes the context for evaluating any visible change from introducing the proposed development.⁹ The US Forest Service describes landscape character this way:

⁵ 35-A MRSA, § 3452, sub-§3

⁶ 35-A MRSA, § 3452, sub-§3

⁷ 35-A MRSA, § 3452, sub-§4

⁸ 35-A MRSA, § 3452, sub-§3, criterion D

⁹ 35-A MRSA, § 3452, sub-§3, criterion B

Landscape Character descriptions are a combination of the objective information contained within ecological unit descriptions and the cultural values that people assign to landscape. Together they help define the meaning of “place”, and its scenic expression (USDA FS 1995, page 1-1).

The regional landscape character is described first. Often there are several distinct landscape units to describe. The character (e.g., ecological zone) and visible quality (e.g., vividness, intactness, unity) of each landscape unity is summarized. A somewhat more detailed description is given for the project site and its APE.

3. **Visibility Analysis.** A visibility or viewshed analysis identifies those areas with potential views of the proposed development. The minimum professional standard is to calculate the maximum potential extent of visibility based only on topography; additional analyses may consider the effects of screening. Normally only views from scenic resources within the topographic viewshed are evaluated in detail (though the accuracy of the analysis must field checked). A visibility analysis may also be helpful in describing the potential number, extent, and distance of visible turbines.¹⁰
4. **Significant Scenic Resources.** Identify the state or nationally significant scenic resources within the study area, based on the list in the statute.¹¹ A description of each identified scenic resource needs to be presented in sufficient detail that the criteria for evaluating scenic impacts can be applied.¹² Each scenic resource will be documented as part of the fieldwork, include the general scenic character of the resource, the “worst case” potential views of the development, and perhaps other views.
5. **Public Use and Expectations.** The extent, number and duration of public uses of the identified scenic resources, and the expectations of the “typical viewer” must be described.¹³
6. **Evaluation of Potential Impacts.** The findings from applying each of the criteria for evaluating scenic impacts should be reported.¹⁴

Accurate visual simulations are particularly useful when conducting this evaluation. The selection of viewpoints for the visual simulations is frequently a source of controversy. Opponents are likely to want simulations that represent “worst case” views, while the developer and other proponents will argue that “typical views” provide a fairer representation. Worst case views are closer, show larger portions of the project, represent situations where the project appears less compatible with its surroundings. Typical views normally do not show the project at its worst, but are at viewpoints that might have many viewers, or that are selected to represent a diversity of viewing conditions (e.g., distances from the project, types of screening, and levels of incompatibility). It is very unusual for a scientific method (i.e., random sampling) to be used to select the typical viewpoints—normally they are simply declared “typical.” Both types of simulations are useful to decision makers. However, it is difficult to imagine why they would not want to be aware of the very worst case situations.

¹⁰ 35-A MRSA, § 3452, sub-§3, criterion F

¹¹ 35-A MRSA, § 3451, sub-§9

¹² 35-A MRSA, § 3452, sub-§3, criterion A

¹³ 35-A MRSA, § 3452, sub-§3, criteria E and C

¹⁴ 35-A MRSA, § 3452, sub-§3

7. **Mitigation.** It is normal in a professional VIA that the approaches taken to mitigate adverse effects are described. Typically, if Unreasonably Adverse scenic impacts were found, approaches to further mitigation would be discussed. This might include revisions to project siting or design, or screening at impacted viewpoints. No explicit mention of scenic mitigation is found in the Act.

2. Adequacy of the Report

This section reviews what the *Kibby Expansion Wind Power Aesthetic Impact Assessment* (Vissering 2009) reported for each portion of a standard VIA process. It is supported by a day of fieldwork on March 25, 2010 visiting the identified scenic resources within 8 miles of the proposed project. In addition, the geographic information system (GIS) data used for the VIA were reviewed and additional analysis conducted. In particular, standard a visibility analysis was performed in ArcMap, and the visual simulations were compared to a three-dimensional ArcScene model to determine representational accuracy.

2.1 Project Description

The project's "Generating Facilities" are described in the most cursory fashion (Vissering 2009, page 4-5). The height to the wind turbine hub and tip of an upright blade is provided, but no other dimensions. The visual characteristics of the turbines are not described—their form, color, texture, reflectance, night lighting, etc. A map shows the location of each turbine, but there are no scaled drawings of the turbines themselves. The existence of the collector (transmission) line is mentioned, but none of its visual characteristics are described. "Associated facilities" include the access buildings, roads, substations, etc. are to be evaluated. No description of visual characteristics of the associated facilities is provided.

The visible characteristics of major project elements must be described in order to be considered. It is worth noting that the Project Description section of the *Kibby Wind Power Aesthetic Impact Assessment* (Vissering 2007) provided a much fuller description of the major project elements.

2.2 Landscape Character

The description of the project's context is limited to listing landscape elements within or nearby the APE (Vissering 2009, page 5). The Project Site Characteristics and Character of the Region sections of the *Kibby Wind Power Aesthetic Impact Assessment* (Vissering 2007) provided a much fuller description. What would be helpful is a description of the visual characteristics of the APE and surrounding area. What is the visual character of the landform and land cover? What is the visual character of the settlement pattern and road network? How does the project site relate to the larger context—is it unusual or mundane?

The Bureau of Parks and Lands' *Flagstaff Region Management Plan* also includes a good example of a regional character description, though its purpose is not primarily the visual landscape (MDOC BPL 2007, page 6-9).

2.3 Visibility Analysis

The normal minimum visibility analysis is a map of the topographic viewshed of the highest points for each major project element. This shows those areas that have a potential view of the tip of an upright turbine blade if all land cover were removed. Since it is possible that views to a project could be opened by the removal of land cover, a topographic viewshed is considered a useful conservative assessment of potential project visibility. It is common that the area of existing forest cover is also indicated on a topographic viewshed map. This aids the evaluator distinguish between viewpoints within the forest, where viewing distance is limited, from those that are not under the forest canopy.

Typically, a second visibility analysis includes the screening effect of forest cover. The three forest classes (deciduous, evergreen and mixed) of the National Land Cover Database are most commonly used. Forest height is typically set to a regionally appropriate 40 feet for the analysis, though the minimum tree height for the three forest classes is 16 feet.

Addition visibility analyses might show how many turbines are visible, or the viewshed for larger portions of each project element (i.e., the nacelle rather than the upright blade tip).

A peculiar approach was taken to the visibility analysis. Appendix 1: Viewshed Analysis Map 8-Mile Radius mixes two different visibility analyses on the same map. A topographic viewshed is represented, but only that portion under forest cover—the open areas with topographic visibility are not shown. Also shown is a vegetated viewshed. However, harvested forest areas are included as part of the 40-foot high forest (Bartos 2010). These areas included clear-cuts with greater than 90 percent of the canopy cover removed, partial cuts where a substantial portion of the canopy has been removed, and regeneration areas where trees are seedlings or saplings. Harvested areas will have substantially less screening effect than the standard three forest classes.

I find this presentation of two separate analyses on the same map confusing and misleading. A straight forward topographic viewshed map is not presented, so it is not possible to see the “worst case” condition. The inclusion of harvested areas in the vegetated visibility map might be justified because these areas may develop the full screening effect of mature forest in the future, though it may be after the project’s designed life-cycle. An artifact of how these two analyses are presented is that there are areas that literally fall through the crack—open space slivers that are “blank” because they have potential visibility in the topographic viewshed, but are screened by forest cover in the vegetated viewshed.

Appendix 2: Viewshed Analysis Map Detail: Chain of Ponds shows the number of turbines that are potentially visible from open areas over the assumed 40-foot forest (and harvested) canopy. This is helpful in identifying the area of Long Pond that has potential views of many turbines. However, no attempt is made to use visibility analysis as a tool to evaluate how much of individual turbines will be visible or how much visible turbines will potentially dominate a view.

However, in this particular instance these criticisms may not be particularly important. The viewshed maps clearly show which areas of Chain of Ponds, Arnold’s Trail, and the Route 27

Scenic Byway have the greatest potential for views of the wind turbines. Other project elements (which have less potential for dramatic visual dominance) are not evaluated.

2.4 Significant Scenic Resources

The *Kibby Wind Power Aesthetic Impact Assessment* (Vissering 2007) identifies state or nationally significant scenic resources within 8 miles of the proposed wind turbines. Though this is done systematically, covering each category of resource, it inexplicably occurs in the Methodology of Review section of the report. A description of each scenic resource includes its general location and the source of its designation. Each resource is identified on the maps, except the scenic turnouts. There is also a comment about whether turbines will be visible, which seems out of place in this section. There is little to no description of what makes the resource scenic; no information that would help evaluate its sensitivity to visual impacts from a wind energy development.

Table 1 is a useful summary from the VIA listing the inventoried scenic resources, their level of significance and whether they have project visibility. The VIA’s list includes all of the scenic resources as specified by the Act of which I am aware. However, there is one possible error in the VIA—the visibility analysis the North Branch of the Dead River suggests the potential for a view of the Development from a very short stretch. It is also probable that shore vegetation would block this view. While technically an error, this is not considered significant and would not affect the findings or conclusions.

Table 1. Summary of Scenic Resources of State and National Significance in the Surrounding Area

Scenic Resources of State or National Significance in the Surrounding Area	Significance State: (S) National: (N)	Visibility Yes (Y) No (N)
<u>Within 3 miles of the project</u>		
▪ National Register of Historic Places: The Arnold Trail	N	Y
▪ Great Ponds: Chain of Ponds	S	Y
▪ Scenic River: Kibby Stream	S	Y
▪ Scenic Road Turnouts		
▪ Natanis Pond Overlook	S	N
<u>Within 8 miles of the Project</u>		
▪ National Register of Historic Places: The Arnold Trail	N	Y
▪ Great Ponds		
▪ Chain of Ponds	S	Y
▪ Arnold Pond	S	Y
▪ Crosby Pond	S	Y
▪ Scenic River		
▪ North Branch of the Dead River	S	N Y
▪ Spencer Stream	S	N
▪ Scenic Road Turnouts		
▪ Sarampus Falls Rest Area	S	N

(Source: Vissering 2009, page 3. Corrected)

The section on Project Visibility and Scenic Character of Affected Areas for Chain of Ponds does give more detailed information about the landscape character of this particular scenic resource (Vissering 2009, page 7). The visual character of Mount Pisgah and the Bigelow Mountains are mentioned as distinctive and prominent, while Sisk Mountain is a secondary feature. The Route 27 Scenic Byway's negative effect on the aesthetic experience from Chain of Ponds is noted here. The fieldwork for this review verifies that the sound of trucks is clearly audible on the lakes during winter.

2.5 Public Use and Expectations

There is no description for most of the identified scenic resources of the extent, nature, and duration of public use, nor of the typical viewer's expectations. The section on Project Visibility and Scenic Character of Affected Areas for Chain of Ponds identifies the following recreation activities: "camping, motorboating, paddling, fishing, swimming, and wildlife viewing;" an ATV trail and the Route 27 Scenic Byway are also mentioned. A brief description of the available public and private campground facilities is also provided (Vissering 2009, pages 6-7). No source is provided for how it is known that these are the normal recreation activities on Chain of Ponds. The Route 27 Scenic Byway's negative effect on the aesthetic experience from Chain of Ponds is asserted here (Vissering 2009, pages 7). However, there is no description or authoritative reference about how this might affect user experience. The fieldwork for this review verified that the sound of trucks is easily heard on the lakes during winter. The State website for Chain of Ponds (Maine DOC BPL 2009) does not reference the extent, nature, and duration of public use, nor of the typical viewer's expectations for this area. The *Flagstaff Region Management Plan* provides a good description of recreation areas in the region, but not of the nature, duration, or viewers' experience (MDOC BPL 2007, page 10-13, 30-32).

The State website for the Route 27 Scenic Byway does not reference the extent, nature, and duration of public use, nor of the typical viewer's expectations for the scenic turnouts (USDOT FHA National Scenic Byways Program 2009). However, the 2006 annual average daily traffic (AADT) for Maine Route 27 at the boarder between Chain of Ponds Township and Alder Stream Township was 710; at bridge number 3270 in Chain of Ponds Township it was 490 (Maine DOT 2008). These are the only potential visitor counts relating to scenic resources in the APE that could be found.

This lack of information is not surprising. It is unusual to find a park or other scenic resource with accurate visitation numbers, let alone length of stay, types of activities, the nature of visitor expectations, or the quality of their experience. The Maine State Comprehensive Outdoor Recreation Plan (SCORP) primarily reports statewide statistics rather than statistics for specific parks (Maine DOC BPL 2009).

2.6 Evaluation of Potential Scenic Impacts

Logically, the information about the project, surrounding area, and scenic resources' character and use should be presented first in a VIA. Then the scenic impact and whether it is Not Adverse, Adverse, or Unreasonably Adverse can be systematically evaluated by applying the criteria to what is presented about each scenic area and their views of the proposed development. The *Kibby Wind Power Aesthetic Impact Assessment* mixes together supporting information and

evaluation over several sections of the report, so it is not easy to obtain a systematic, complete understanding of the potential scenic impact.

The treatment of each Evaluation Criterion is described below. This is somewhat repetitive, since application of the Evaluation Criteria must be grounded in the finding presented in the previous sections of the VIA.

- A. **“Significance of...affected scenic resource;”** The appropriate scenic resources are identified in the text. The Route 27 Scenic Byway turnouts are not indicated on the maps, though the other scenic resources are. The significance of scenic resources is either state or national, as shown in the summary table above (Vissering 2009, pages 3). This seems to be a reasonable interpretation of this criterion, since the Act does not recognize other degrees of significance.
- B. **“Existing character of surrounding area;”** The major surrounding landscape features are listed in the various places throughout the report. However the visual “character of the surrounding area” is not described.
- C. **“Expectations of the typical viewer;”** There is a section entitled Viewer Expectation and Experience (Vissering 2009, page 10). There is no reference to studies of viewer expectations at the potentially affected scenic resources or elsewhere. Nor is there reference to approaches to planning for recreation experience (USDA Forest Service 1987; More 2002), or discussion of how different uses might include different scenic expectation. For instance, what is the expected experience of someone following the Arnold Trail by driving along the Route 27 Scenic Byway and occasionally stopping to go down to the route itself? What role does landscape scenic quality play in this experience? How is this experience different from someone ice fishing on Long Pond in the winter or flat water paddling in the summer?

“Chain of Ponds is recommended as a pleasing paddling opportunity. Historical associations add to the experience. Fishermen and local camp owners also enjoy the Ponds.” It is asserted that sound from Route 27 and camping vehicles means that “the experience is not presently one that feels remote in character.” This may be true, though it is simply asserted without supporting evidence, but one assumes that since anyone using Chain of Ponds arrived there from Route 27, it is unlikely they expected it to be far from a major road. In any case, a feeling of remoteness is not a prerequisite for outstanding scenic quality. Finally, it is asserted that for Chain of Ponds, “the turbines would not be prominent features since they would be set behind dominant foreground landforms.” The veracity of this assertion is undermined by the simulation at Viewpoint 5 on Long Pond, where the turbines are most certainly “prominent” by any definition, and may be considered collectively dominant. It seems reasonable to assert that the turbines in the simulations from Viewpoints 4 and 6 are also “prominent;” Some would also consider the turbines in the simulations from Viewpoints 1 and 3 as “prominent.”

Typical viewer expectations at the Arnold Trail, Kibby Stream, Arnold Pond, Crosby Pond are not discussed.

- D. **“Expedited wind energy development’s purpose and...context;”** The “purpose” and “context” of the project is not described—Why is it necessary to put a wind project here instead of somewhere else? Why is it needed here instead of somewhere else? It may be that this criterion is not really intended to be about scenic attributes, but is about the Legislature’s perceived need for a great amount of wind energy development “as immediately necessary for the preservation of the public peace, health, and safety.”¹⁵

There is a section entitled Project Description and Context, which is very limited (Vissering 2009, pages 4-5). It describes some of the project’s elements, but not all of them, and it lists the major surrounding landscape.

- E. **“Extent, nature and duration of the...public use of the scenic resource...and the...effect...on the public’s continued use and enjoyment of the scenic resource;”** There is no indication of systematic fieldwork or reference to an authoritative source to provide the necessary information to address this criterion. How many people are using potentially affected scenic resources? In what activities do they engage? For how long do they use these scenic resources? What is the effect on the continued use and enjoyment? What is the basis of these findings? None of this is addressed.

- F. **“Scope and scale of the...effect of views of the generating facilities...including...number and extent of [visible] turbines, ...distance [to visible facilities] ...and effect of prominent features of the development on the landscape”** “Scope” refers to extent or the geographic area effected. “Scale” refers to the number of turbines and the amount of each turbine that is visible (i.e., just the blade tip, the nacelle and above, or the whole turbine above the tree canopy). Scale also refers to the relative area the turbines occupy in the field of view, which may be described as “Prominence” or dominance. This is related in part to distance.

Scope and Scale are to be considered for the “Generating Facilities,” which includes the turbines individually, but also collectively as a whole electric power generation plant, and the transmission lines. The report only seems to consider individual turbines, not the impact of seeing a power plant (i.e., many turbines together) or the transmission line.

Scope is addressed--the geographic extent of where the project may be seen from each scenic resource is shown on two viewshed maps and discussed in the report.

Scale is marginally considered. A vegetated visibility map shows how many turbines may be visible from Chain of Ponds and other scenic resources. “Worst case” examples of the scale of the scenic impact is shown in the visual simulations, however, they are not systematically evaluated. For instance, there is no discussion of what visual “prominence” means and how the visual prominence of the turbines would be evaluated.

¹⁵ PL 2008, chapter 661

Other than the above criteria, the Act does not provide guidance for making the distinction between Adverse and Unreasonably Adverse impacts to scenic resources. There is no discussion of how this distinction is made in the VIA.

Nonetheless, the VIA concludes that “the proposed Kibby Expansion Project would not significantly compromise views from scenic resources of state or national significance, or have an unreasonable adverse effect on the scenic character of the area or uses related to this scenic character” (Vissering 2009, page 11).

2.7 Mitigation

Mitigation related to scenic impacts is not explicitly addressed, and it is unclear whether it is required. However, some apparent instances of mitigation are mentioned in passing.

- “Dark-colored mulch matting will be installed to reduce color contrast” (Vissering 2009, page 7).
- “Information about the Arnold Trail is planned for the Natanis overlook on Route 27” (Vissering 2009, page 6).

3. Field Review and Additional Analysis

The first section of this review describes how the standards and criteria established by the Act fit with a normal approach to visual impact assessment process. The second section of this review considers the adequacy with which the Kibby Expansion Wind Project Aesthetic Impact Assessment follows this process. This, the third section, reports the findings of the fieldwork and additional analyses conducted as part of this review.

3.1 Significant Scenic Resources

The state and nationally significant scenic resources have been identified according to the definitions provided in the Act.¹⁶ However, two of these resources seem to be designated primarily for non-scenic reasons.

Arnold Trail to Quebec. The National Register of Historic Places online database includes an entry for the Arnold Trail to Quebec, but the nomination documents have not been digitized (National Register of Historic Places 1969). A PDF of the nomination forms was obtained from TRC. It is clear that the Arnold Trail to Quebec was nominated for its historical military significance—no mention is made of aesthetic or scenic qualities. However, there are landscape descriptions: “Virtually no virgin timber remains along the trail from Bingham to the Canadian border, but the entire region does give the appearance of a vast, hostile wilderness, as it did in 1775.” To say that this area can still be experienced as a “vast, hostile wilderness” seems to be a bit of hyperbole. The area is still largely forested, but is under intensive forest management with logging trucks being a common sight. State Route 27 is in close proximity to the Arnold Trail in the APE, and provides continuous auditory and visual reminders that the year is 2010 and not 1775. The Maine Department of Conservation Bureau of Parks and Lands (BPL) *Flagstaff*

¹⁶ 35-A MRSA, § 3451, sub-§9

Region Management Plan recognizes the importance of the Arnold Trail Historic District, but does not indicate that it has significant scenic value (MDOC BPL 2007, page 33)

State Route 27 Scenic Byway and Turnouts. While the Act limits scenic viewpoints to official turnouts, it is the whole highway that receives the Scenic Byway designation. Of the two turnouts in the APE, the Natanis Pond Overlook has a wonderful elevated panoramic view to the west, but no visibility of the proposed development to the northeast. However, the Sarampus Falls Rest Area is designed primarily to provide rest facilities and access to the North Branch of the Dead River. Its scenic quality is very ordinary for the area.

There is a third state “scenic” resource that appears to be missing, perhaps because of an idiosyncrasy in how the Act is being implemented. In response to the Act, the Department of Conservation must identify “scenic viewpoint[s] located on state public reserve land” that are significant scenic resources.¹⁷ The approach taken in the draft rule is to identify lands “located on rivers or streams or great ponds, ...[or]... state park lands, as such viewpoints are governed by” other portions of the Act. The proposed rule determined that all possible viewpoints in the eleven identified areas and four trails are significant scenic resources (DOC 2009). Chain of Ponds is identified as a significant scenic resource in *Maine Wildland Lakes Assessment*, therefore the Chain of Ponds Public Reserve Land was not included in the rule.

Chain of Ponds Public Reserved Land. Chain of Ponds is a scenic resource because of its status as a scenic great pond. However, the BPL manages 1,041 acres of Maine Public Reserve Land around Natanis and Round Ponds, and along the eastern side of Bag and Long Ponds and the northern end of Lower Pond (MDOC BPL 2007, page 91). Recreation activities include camping, canoeing/kayaking, shore and boat fishing, ice fishing, ATV and snowmobiling. There is good vehicle access for all activities. The description of recreation and visual resources does not highlight any special scenic resources (Maine DOC BPL 2007, page 94-96).

3.2 Visibility Analysis

Visibility analysis determines whether a line of sight exists between two specified points. Typically a geographic information system (GIS) is used to map the viewshed from which specified targets are visible. In principle this is an objective exercise in geometry highly suited to a computer application. In practice however, since the data are only approximations of the actual condition and may include errors, the resulting viewshed maps are best considered a preliminary analysis of potential visibility under simplified conditions. The maps are useful for providing a preliminary investigation of the overall potential visual impact, and particularly for comparing alternatives. If potential visual impacts appear to exist for significant scenic resources, they need to be confirmed through field investigation and other visualization techniques.

For this review, visibility analyses were performed using ArcInfo 9.2 software (ESRI 2006). The digital data were provided by TRC and appear to be the same as those available from the Maine Office of GIS. The analysis procedure is relatively standardized, though analysts can reasonably make different assumptions about the analysis variables, and the results can be presented in a variety of ways. As discussed in the Section 2: Adequacy of the Report, the VIA presented two analyses on one map, creating the potential for confusion. Therefore the viewshed maps presented

¹⁷ 35-A MRSA, § 3451, sub-§9

here show a single analysis with the minimum of additional relevant data. The visibility analysis in the VIA also assumed harvested areas and forested wetlands provide a solid 40-foot high visual screen. Forty feet is typically used by professionals in the northeast as a conservative, but reasonable forest canopy height in a visibility analysis. However, it is unusual to include forested wetlands and harvested areas without a full forested canopy as part of this area.

Visibility of the Kibby Expansion Development. The ten viewshed maps prepared to investigate several issues associated with the Kibby Expansion Development are included in Appendix 1. The first three maps investigate the greatest possible area from which a part of any turbine could possibly be visible. In this case it is an upraised blade tip 410 feet (125 meters) above the ground. Three different constraints on visibility are considered: (1) just bare topography, (2) topography with forest cover, and (3) topography with forest cover, harvested areas that will regrow to full forest cover, and forested wetlands. The resulting viewshed maps are:

Map 1: Kibby Expansion Topographic Viewshed for Blade Tip

Map 2: Kibby Expansion Forested Viewshed for Blade Tip

Map 3: Kibby Expansion Forested and Harvested Viewshed for Blade Tip

While there may be a line of sight to just an upraised blade tip, it may not be noticeable and would certainly not be visually dominant. Therefore the second three maps investigate the area from which a significant portion of a turbine could possibly be visible. In this case it is visibility of the turbine hub, located 295 feet (90 meters) above the ground. The same three constraints on visibility resulted in the following viewshed maps:

Map 4: Kibby Expansion Topographic Viewshed for Turbine Hub

Map 5: Kibby Expansion Forested Viewshed for Turbine Hub

Map 6: Kibby Expansion Forested and Harvested Viewshed for Turbine Hub

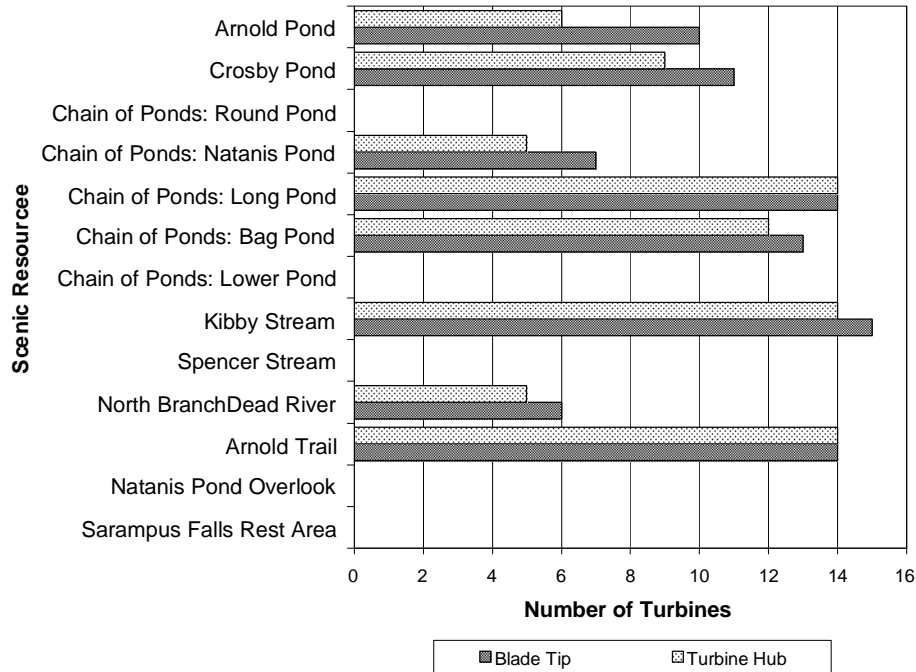
Table 2 summarizes the maximum number of Kibby Expansion blade tips and turbine hubs that may possibly be visible within 8 miles of the significant scenic resources under the three different visibility constraints. Figure 1 charts the maximum potential number of blade tips and turbine hubs potentially visible over forested cover for each of the significant scenic resources.

The most important finding revealed by these viewshed maps is that several significant scenic resources will not have visibility of the Kibby Expansion turbines: Round Pond, Lower Pond, Spenser Stream, Natanis Pond Overlook, and Sarampus Falls Rest Area. An inspection of the viewshed maps 1 and 2 shows that the overall area with potential views of the turbines is greatly decreased with the consideration of forest screening—from over 40 percent to about 8 percent. Similarly, a comparison of maps 2 and 3 shows that assuming harvested areas have the same screening affect as a full forested canopy greatly decreases the potential visibility once again—from about 8 percent to about two percent. Unfortunately different ways of considering visual screening have only modest affect on turbine visibility from Arnold Pond, Chain of Ponds, and Crosby Pond. However, they make a big difference in evaluating the potential impact to the Arnold Trail, Kibby Stream, and North Branch Dead River. Fieldwork is particularly necessary to establish the affect on visibility from these three significant scenic resources.

Table 2: Maximum Number of Kibby Expansion Turbines Visible

Significant Scenic Resource	Blade Tip Visible			Turbine Hub Visible		
	Topography	Forested	Forested & Harvested	Topography	Forested	Forested & Harvested
Arnold Pond	10	10	10	7	6	6
Crosby Pond	11	11	11	10	9	9
Chain of Ponds: Round Pond	0	0	0	0	0	0
Chain of Ponds: Natanis Pond	7	7	7	7	5	5
Chain of Ponds: Long Pond	14	14	14	14	14	14
Chain of Ponds: Bag Pond	14	13	12	12	12	11
Chain of Ponds: Lower Pond	0	0	0	0	0	0
Kibby Stream	15	15	15	15	14	14
Spencer Stream	0	0	0	0	0	0
North Branch Dead River	7	6	3	6	5	3
Arnold Trail	14	14	14	14	14	14
Natanis Pond Overlook	0	0	0	0	0	0
Sarampus Falls Rest Area	0	0	0	0	0	0
Percent of APE with Potential Visibility	44.5	8.5	2.4	42.0	7.9	2.2

Figure 1. Kibby Expansion Visibility over Forested Cover



In this analysis there is relatively little difference between whether the viewed target is the tip of an upright blade, or the center of the turbine hub. In most areas with potential visibility a substantial portion of some turbines will be visible.

Cumulative Visibility of the Kibby A, B and Expansion Developments. An important consideration that does not seem to be receiving any attention is that this area is receiving cumulative visual impact from the Kibby Expansion development. The Kibby A and B Wind Energy Developments have been approved and are built or being built, but their visual presence is not described as an important part of the existing landscape character. There are many areas from within the Kibby Expansion APE that will have views of these turbines in addition to the proposed Kibby Expansion turbines. This cumulative visibility was investigated within the APE for views of the blade tip and turbine hub under the constraints of just topography and topography with forest cover.

Map 7: Kibby A, B & Expansion Topographic Viewshed for Blade Tip

Map 8: Kibby A, B & Expansion Forested Viewshed for Turbine Hub

Map 9: Kibby A, B & Expansion Topographic Viewshed for Blade Tip

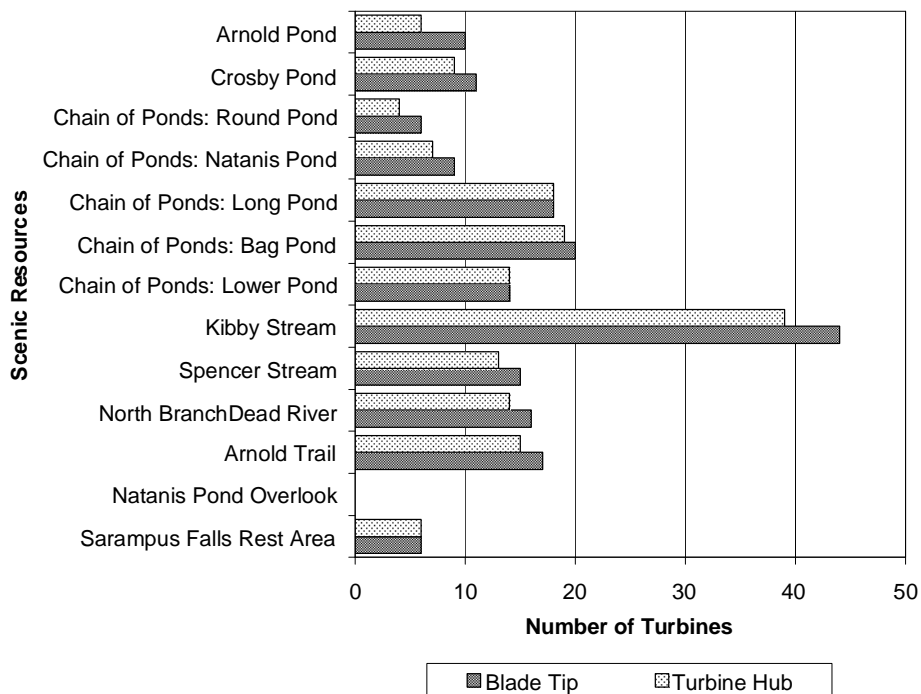
Map 10: Kibby A, B & Expansion Forested Viewshed for Turbine Hub

Table 3 summarizes the maximum number of Kibby A, B and Expansion blade tips and turbine hubs that may possibly be visible within 8 miles of the significant scenic resources under the three different visibility constraints. Figure 2 charts the maximum potential number of blade tips and turbine hubs potentially visible over forested cover for each of the significant scenic resources.

Table 3: Maximum Number of Kibby A, B and Expansion Turbines Visible

Significant Scenic Resource	Blade Tip Visible		Turbine Hub Visible	
	Topography	Forested	Topography	Forested
Arnold Pond	10	10	7	6
Crosby Pond	11	11	10	9
Chain of Ponds: Round Pond	6	6	5	4
Chain of Ponds: Natanis Pond	10	9	9	7
Chain of Ponds: Long Pond	18	18	18	18
Chain of Ponds: Bag Pond	20	20	19	19
Chain of Ponds: Lower Pond	14	14	14	14
Kibby Stream	47	44	41	39
Spencer Stream	15	15	15	13
North BranchDead River	22	16	21	14
Arnold Trail	22	17	21	15
Nantis Pond Overlook	0	0	0	0
Sarampus Falls Rest Area	6	6	6	6
Percent of APE with Potential Visibility	79.7	22.7	78.8	22.4

Figure 2. Kibby A, B & Expansion Visibility over Forested Cover



This analysis indicates that some areas in the APE that will not have views of the Kibby Expansion may have views of the Kibby A or B turbines: Round Pond, Lower Pond, Spencer Stream, and the Sarampus Falls Rest Area. However, Kibby Stream is the significant scenic resource that will potentially be seriously impacted by both the Kibby A and B Developments and the Kibby Expansion. Again, this result suggests that there is a need for fieldwork, and possibly visual simulations, to verify the extent and magnitude of these potential scenic impacts. For instance, it may be that shoreline vegetation may screen all or most views from Kibby Stream. It is unfortunate that there is no information about “the expectations of the typical viewer” and “extent, nature and duration of potentially affected public uses” of Kibby Stream.¹⁸

3.3 Visual Simulations

Visual simulations are the next step to investigate the impact to significant scenic resources. Flying balloons to calibrate the size of project elements in a visual simulation is very much a thing of the past (though it still may be a useful public participation tool). The current best professional practice in static simulation builds a three-dimensional model of the proposed project using computer-aided design (CAD) or similar software and matches it to a photograph taken in the field. For this to work properly, it is necessary to know the location of the viewpoint photography with a high degree of precision, which is provided by global positioning system (GPS) device. To match the CAD model to the photograph, it is also necessary to know the elevation of the viewpoint and project elements, the focal length of the camera lens, and the location and height of some elements in the photograph. This is the procedure that TRC used to create their simulations (Bartos 2010). TRC employees were observed properly collecting and documenting field data for new photographic simulations. Adequate documentation was provided to evaluate the general accuracy of the VIA simulations.

The only major piece of information not provided in the VIA is how to view the simulations so that they appear in proper perspective. Viewing a simulation from too far away diminishes the apparent impact of the project, while viewing it too close will increase the apparent visual magnitude of the impact. Table 3 presents the necessary information for calculating the proper viewing distance for each of the simulations in the printed copy of the VIA submitted with the application. In general, these simulations are in proper perspective when viewed from a distance of approximately 1.5 times their width.

Table 3. Establishing Viewing Distance for the Visual Simulations

View point	Location	Camera	Focal Length	Equivalent Focal Len.†	Horizontal Angle	Simulation Width	Viewing Distance
1	Natanis Pond, SE	D200	35mm	53.4mm	37.3°	12.5"	18.5"
2	Narrows, Natanis P. to Long P.	D200	35mm	53.4mm	37.3°	12.5"	18.5"
3	Long Pond, NW 1	D200	36mm	54.9mm	36.3°	12.5"	19.1"
4	Long Pond, NW 2	D200	35mm	53.4mm	37.3°	12.5"	18.5"
5	Long Pond, SE	D70	34mm	51.9mm	38.3°	12.5"	18.0"
6	Bag Pond	D70	31mm	47.3mm	41.7°	12.5"	16.4"

† Using Nikon’s DX format (23.6mm-by-15.7mm). <http://www.isotton.com/misc/lens-angle-calculator/>

¹⁸ 35-A MRSA, § 3452, sub-§3, criteria C and E.

No photographic simulations were prepared for this review. Instead the VIA's simulations were checked by comparing them to geometrically accurate three-dimensional perspectives created using ArcScene (ESRI 2006). These visualizations are created using camera information imbedded in the simulation photographs' metadata and location information from the GIS database that was used to prepare the VIA. Forest cover is set to between 40 and 72 feet, and immediate vegetation not visible in the photograph is removed. The visualizations included in Appendix 2 are in proper perspective when viewed from a distance of approximately 1.5 times their width.

Overall the ArcScene visualizations are similar to the VIA simulations. The scale and contrast match is very good for Viewpoint 1 in the southeastern portion of Natanis Pond. No turbines are visible from Viewpoint 2 at the Narrows between Natanis and Long Ponds. Walking on the frozen lake approximately 480 feet to the south to Viewpoint 3, two turbines become visible around the shoulder of the hill. Again the scale and contrast appear to be reasonable. Continuing south another 315 feet, four turbines are clearly visible at Viewpoint 4. The simulation and visualization show a similar scale for the turbines. However, the turbines in the simulation have unacceptably low contrast, making it difficult to distinguish them. Viewpoint 5 is on Long Pond looking up the Clearwater Brook valley. The same turbines are shown in both the simulation and visualization. However, the turbines in the simulation appear a bit shorter, though this may be due to the visualization turbines being darker, or the slight deviations in registering the turbines to the terrain. More important is that the turbine's contrast seems low. Viewpoint 6 on Bag Pond looks up the Gold Brook valley. Again, the turbines in the simulation appear a bit smaller. In addition, turbines T-4 through T-7 are more exposed in the simulation than in the visualization, while turbine T-10 is more exposed in the visualization, and the blade tips of turbines T-12 and T-13 are not visible in the simulation at all. Among other reasons, this might happen because the photograph and 3D CAD model are not completely registered in the simulation. Perhaps T-12 and T-13 are behind the pine tree that breaks the ridgeline. The turbines in this simulation also suffer from unacceptably low contrast.

There are several possible reasons that the turbines may have lower contrast than is. It is possible that the contrast is correct, but that the lighting and clouds in the photograph do not represent a "worst case" viewing condition. On the other hand, it may be that the turbine lighting and color are not appropriate. For instance the turbines in the Viewpoint 1 simulation have more acceptable contrast. Another common difficulty is that the resolution of the simulation (or the printer) may not be adequate to fully represent the turbines. Another possibility is that the turbines were purposely blurred. For instance this was done in the Kibby A and B simulations, though no validation of the appropriateness of this blurring was given (Vissering 2007, Appendix D, page 11).

All things considered, the conclusion of this review analysis is that the shortcomings of these six simulations are relatively minor and well within the current standards of professional practice. The number and relative size of the represented turbines are portrayed within the limits of the simulation technology used. The six simulations represent a selection of the more impacted views from Chain of Ponds and the Arnold Trail. It is unfortunate that a simulated view of the turbines from the vicinity of Kibby Stream is not included, since that is the other significant scenic resource that has the potential to be seriously impacted. Finally, it is important to

remember that all simulations need to be viewed from the proper distance to produce the appropriate perspective effect. Simulations should include a statement describing this distance—in the case of the printed VIA this is about 18.5 inches or 1.5 times the simulation’s width.

3.4 Fieldwork

Fieldwork for this review was conducted on March 25, 2010. Its purpose was to investigate the landscape character of the APE, and especially to verify the veracity of the visual condition as represented in the VIA. Each of the significant scenic resources was observed, except for Spencer Stream, which should not have views of the Development. This activity was accomplished with the cooperation of Dana Valleau, the Environmental Scientist with TRC assigned to this project.

Since the ponds were still frozen hard, it was relatively easy to visit the simulations viewpoints. The conditions were as represented in the report. However, the drawback of winter fieldwork is that it is more difficult to understand how the scenic resources may be used and appreciated by warm weather visitors. Two couples were observed ice fishing on Lower Pond, though they were not in the project’s viewshed. No snowmobilers were observed all day. Another obvious difference in winter fieldwork is that deciduous trees have dropped their leaves. However, this does not appear to be particularly important for these scenic resources with the exception of Kibby Stream where it may make the difference between seeing and not seeing turbines.

The VIA describes the landscape character of the Chain of Ponds area this way”

“A number of features contribute to the scenic quality of Chain of Ponds. Mount Pisgah is a distinctly shaped peak that forms a focal point in views from many vantage points. ... The southern peak of Sisk Mountain is a secondary feature which is also relatively prominent in views (note that there would be no turbines on or near this southern peak of Sisk). Views toward the Bigelow Mountains from the northern end of Chain of Ponds create a notable focal point looking down the pond. Along Bag and Lower Ponds there are impressive cliffs visible on both sides. Most camps tend to be of modest size and relatively unobtrusive due to the tree cover along the shoreline. Where terrain is steep, there is no development at all.

“Detracting from the aesthetic quality is the presence of Route 27 visible from Natanis and Lower Ponds, and the sound of traffic, particularly truck traffic which is audible everywhere” (Vissering 2009, page 7).

The fieldwork confirms that most distinctive visual features in the APE are Chain of Ponds and the Sisk Mountain and Mount Pisgah. The Kibby Expansion turbines are located on a ridge well separated from the distinctive Sisk Mountain peak. The Route 27 Scenic Byway probably provides the best views to the most people of these scenic resources. The turbines do not obscure views of Chain of Ponds, Sisk Mountain or Mount Pisgah from significant scenic resources.

The fieldwork also confirms that the regular sound of large trucks is easily heard throughout the Chain of Ponds, at least during the winter. While this sound may or may not be aesthetically

disrupting to people seeking to enjoy the significant scenic resources, it certainly establishes that the area is neither remote nor primitive.

It is clear from the fieldwork that the greatest scenic impacts will be to the area along Kibby Stream, which is already heavily impacted by the Kibby A and B turbines. This is the significant scenic resource that is closest to the Kibby Expansion, and it has the greatest potential exposure. It is unfortunate that the VIA did not include field documentation of the extent to which vegetation would screen views throughout the length of Kibby Stream. In addition, little is known about the number and types of users on Kibby Stream, or how the visible presence of turbines may affect their experience.

The viewpoints selected for the simulations were found to be appropriate for understanding the worst scenic impacts to Chain of Ponds—understanding that there will be no visibility from most of Chain of Ponds, and it will be most severe on Long Pond, which is approximately 3 miles distant. While major portions of turbines are likely to be visible from Arnold and Crosby Ponds, these views will be moderated by being approximately 6.5 to over 8 miles away.

As a final note, mature canopy trees were measured to be between 40 and 65 feet tall in the vicinity of Natanis Point.

4. Discussion of Additional Issues

The *Kibby Expansion Wind Project Aesthetic Impact Assessment* raises a number of issues that are worth considering. They are presented below in no particular order.

4.1 Selection of Simulation Viewpoints

One of the major decisions in any VIA is selecting viewpoints to use for visual simulations. The Act has established that only views from significant scenic resources need be considered. In addition, there is little need to consider areas without any reasonable probability to see project elements. The exception might be to demonstrate that a particularly important resource does not have a view of the project. Typically preference is given to viewpoints normally visited by people, and not simply places where it may be possible for them to go. Preference should also be given to viewpoints frequented by people more sensitive to visual.

The final criterion for selecting simulation viewpoints is to represent the “worst case” situation at each significant scenic resource. The logic of selecting “worst case” viewpoints is that those responsible for making decisions need to know how bad the impacts can get. What decision maker wants to face a constituent and tell them, “I’m sorry I didn’t know it was going to be that bad!”? Sometimes VIA analysts disagree with this criterion, saying that it is too negative and not representative. The “worst case” does show the most negative impacts; there is no denying that. There is nothing preventing the VIA analysis from also simulating views with lesser impacts, or even photos of views without impacts. What is important is that the worst impacts to each of the significant scenic resources is shown and understood. As for representativeness, it is difficult to be sure what a VIA analyst means. The only scientific way to identify a representative sample is through random selection. Random selection of views is rarely used in landscape perception

research, and is unlikely to have ever been used in a VIA. It is simply too inefficient since most randomly selected views are not of interest. Typically what a VIA analysis means by “representative” is a selection of viewpoints that they make to avoid investigating the worst cases. There may be a reasonably sounding process for selecting the representative views, but in the end the VIA analyst selects those viewpoints she wants and this redirects her attention from scenic resources that may be more severely impacted.

4.2 Standardization of Analysis

LURC has not established a formal set of guidelines for conducting and presenting a VIA. The Act settles some of the important variables in conducting a VIA, a turbine’s visual impact is insignificant beyond 8 miles, and only impacts to state and nationally significant scenic resources need to be considered. However, it also requires explicit consideration of viewers’ expectations, and the extent, nature and duration of potentially effected public uses. Further, the two primary siting authorities, DEP and LURC, have somewhat different approaches to considering the scenic impacts. In particular, DEP has established a standard operating procedure for assessing scenic impacts which does not include all of the evaluation criteria required by the Act (Maine DEP 2003). It may be appropriate for LURC and DEP to determine a uniform procedure for considering scenic impacts associated with grid-scale wind energy projects.

4.3 Cumulative Scenic Impacts

There are 44 wind turbines approved for construction as part of the Kibby Wind Project. Approximately half are producing electricity and the other half are under construction. The proposed Kibby Expansion is to add an addition 15 wind turbines to this project. There is little to no mention of the visibility and visual character of the approved Kibby Wind Project, yet it already has a prominent visual presence in this area, including from some of the scenic resources being evaluated. What is the scenic impact of adding more wind turbines to a view in which wind turbines are already visible, or where they are visible from other nearby viewpoints? This is the issue of cumulative impacts.

Within the area of environmental impact assessment, cumulative impacts are an understudied topic. In the area of visual impacts, research generally indicates that smaller changes have a smaller impact. What is not well studied is if 100 wind turbines were going to be built, would the total scenic impact be different if the turbines were built in one single area, or in three separate areas? The closest investigation of this type of problem of which I am aware involved the intensity, size and distribution of clearcuts in the White Mountains (Palmer 2008). The result indicated that the first visible clearcut had a large adverse scenic impact. Each additional clearcut contributed incrementally to the overall scenic impact, but never as much as the preceding clearcuts. The evaluation was limited to scenarios that provided a sustainable yield of timber, and they stopped before the point where additional clearcuts no longer had a significant incrementally adverse scenic impact. The implication for wind energy development seems to be that concentrating wind energy development may have a lower overall impact on the state than distributing it throughout the state. This does not mean that we should not be concerned about scenic impacts. On the contrary, we should do planning studies that identify those areas that are optimally suited for wind energy development and have the lowest potential for significant scenic impacts. Once an area is deemed appropriate for wind development, then it makes the most sense to fully develop its potential rather than move on to another area.

4.4 Designated Resources Need Not Be Scenic

For a state of nationally significant resource to be “scenically” significant, it should have been recognized for its outstanding scenic quality when it was designated. In the Act this is made explicit for Great Ponds, rivers and streams. All Great Ponds are significant public resources, which is why the public is guaranteed access to them. However, only those identified in the inventories as having outstanding or significant scenic quality are determined to be significant scenic resources. The same standard should be applied to national landmarks, national parks, property listed on the National Register of Historic Places, scenic roads or turnouts, and public reserve lands. All of these resources could be designated as significant for reasons other than their outstanding scenic quality. In addition, documentation of the process to inventory and evaluate scenic quality must be included. It seems inappropriate to simply accept an assertion of scenic significance, just as it would be inappropriate to accept an undocumented assertion of historical significance or ecological significance.

It needs to be noted that visible landscape qualities other than scenic quality are protected through separate assessments. For instance, if the visual dominance of a wind turbine erodes the non-scenic historic integrity of a National Historic Site, then that is appropriately considered as part of the Archaeological and Historic Resources Assessments.

In contrast to many of the resources listed in the Act, Scenic Byways are designated because of the scenic value throughout their length, in addition to other possible values. However, the Act limits consideration of scenic impacts to turnouts designated “pursuant to Title 23, section 954.”¹⁹

The department is authorized to construct along state and state aid highways roadside picnic areas, roadside springs, scenic turnouts or other landscaping where in the opinion of the department it may seem advisable.²⁰

The remainder of the text focuses on signing and toilet facilities. It seems inappropriate to restrict assessment of a scenic resource to viewpoints that are created for other reasons.

4.5 Neighboring Jurisdictions

There is a big notch cut out of the APE for the Kibby Expansion. Scenic resources in Canada are not inventoried or otherwise considered. The topographic viewshed indicates that most of Canada within 8 miles of the Kibby Expansion may have view of some turbines. While Canada may be a different country, it does not seem to be in keeping with a good neighbor policy to ignore the visual impacts of our development on their lands. On the other hand, it was outside the scope of this review to determine whether there even were significant scenic resources within the Canadian portion of the APE.

4.6 Mitigation

The consideration of mitigation is normally part of a VIA. The Act seems to accept the inevitability of Adverse scenic impacts from grid-scale wind development in most cases.

¹⁹ 35-A MRSA, § 3451, § 9(G)

²⁰ 23 MRSA, § 954

However it does not mention mitigation. In other contexts it is expected that all reasonable means to reduce adverse scenic impacts to publicly used viewpoints from scenic resources be made. The preferred methods of mitigation involve modifying the site design to reduce visibility or improve the project's design quality so that it is no longer scenically adverse. If this is not possible, then it may be appropriate to treat the viewpoint to screen scenic impacts. The least preferred approach, which may not be allowed in all jurisdictions, is to provide equivalent offsets that compensate the public for resultant scenic impacts. Preference would be given to scenic offsets (e.g., the removal of an eyesore) over non-scenic offsets (e.g., protection of rare habitat). It would be unusual to find a systematic evaluation justifying that the offset had equivalent value.

5. Summary Conclusions

This review considers how the criteria and standards in Maine's Wind Power Development Act can be integrated into a standard visual impact assessment (VIA) process. The Act establishes some useful limits: (1) facilities seen from 8 miles away or further are insignificant, and (2) only impacts to eight types of state or nationally significant scenic resources need be considered. However, the Act also requires consideration of the extent, nature and duration of affected public uses of the scenic resources and viewer expectations—information that is not readily available. The old standard of harmonious fit with nature is explicitly abandoned and a new undefined standard of “unreasonably adverse” is introduced. While the Act simplifies and clarifies some aspects of the VIA process; in other ways it raises questions about how to fulfill both the letter and the spirit of the Act. However, there is nothing in the Act that challenges the appropriateness of using a standard VIA organization that involves describing: (1) Project Description, (2) Landscape Character, (3) Visibility Analysis, (4) Significant Scenic Resources, (5) Public Use and Expectations, (6) Evaluation of Potential Impacts, and (7) Mitigation.

The adequacy of the *Kibby Expansion Wind Project Aesthetic Impact Assessment* is reviewed. Many visual aspects of the project are not fully described, and the landscape character description is more like a list of landscape elements than a description of visual character. The visibility analysis assumes that harvested areas will have the same screening effect as an undisturbed forest canopy. The viewshed map attempts to combine the results of two separate analyses, and it does not investigate whether more than a turbine's blade tip is visible. This VIA does identify all significant scenic resources within 8 miles of the wind turbines, as specified by the Act, but it does not always identify the basis of their scenic value. The public use of the scenic resources and how viewer expectations may be impacted are not documented. No substantiated systematic approach to evaluating potential scenic impacts is presented, though the conclusion reached is that “the proposed Kibby Expansion Project would not significantly compromise views from scenic resources of state or national significance, or have an unreasonable adverse effect on the scenic character of the area or uses related to this scenic character.”

Fieldwork and additional analyses were conducted as part of the review. Additional visibility analyses determine that the primary potential visual impacts will be to Chain of Ponds and Kibby Stream. It is also determined that Kibby Stream has the potential for very large cumulative scenic impacts. The simulations were compared to perspective visualizations and generally found to be

accurate. However, the turbines in several of the simulations appeared to have lower contrast that would be indicated under the principle of representing the “worst case” view. In addition, it is necessary to indicate the proper viewing distance on all simulations. The fieldwork verified that the simulation viewpoints on Chain of Ponds provided a good representation of the “worst case” conditions. However, it is clear that there may be significant visual impacts to Kibby Stream that were not fully investigated.

While critical of the VIA, this review did not find any examples of serious errors or misrepresentations. It is important that the public use of the scenic resources and how viewer expectations may be impacted are not documented, but this information is not readily available for scenic resources in this area. It is expected that the visual simulations from Chain of Ponds will be particularly helpful in evaluating the seriousness of the scenic impacts. It is unfortunate that simulations for Kibby Stream were not similarly prepared.

This review raises several issues that might be beneficially considered at this early stage of implementing the Act.

1. It might be helpful to consider standards for selecting simulation viewpoints, and it is recommended that a “worst case” viewpoint be simulated for each significant scenic resource.
2. At this time there is no standardized way to conduct a VIA. It may be appropriate for LURC and DEP to determine a uniform procedure for considering scenic impacts associated with grid-scale wind energy projects.
3. Maine has established ambitious wind energy goals. It may be useful to consider how to manage the cumulative scenic impacts of this development. In particular, the expedited wind energy development area is very extensive. Is it better to distribute development evenly throughout this area, or concentrate it in a smaller identified area?
4. The Act has identified 8 types of designation to determine significant scenic resources. However, several of these designations can be for reasons other than scenic value. Perhaps this should be clarified.
5. The practice of not considering visual impacts to neighbors concentrates undesirable impacts near the borders of jurisdictions. Perhaps the scenic resources of our neighbors should also be respected.
6. The Act does not mention mitigation, and it might be appropriate to clarify standards for mitigation.

6. References

Bartos, Judy. 2010. Personal written communication dated March 10, 2010.

ESRI. 2006. *ArcGIS Desktop*. Redlands, CA: ESRI.

Expedited Permitting of Grid-Scale Wind Energy Development. MRSA Title 35-A, Chapter 34-A. <http://www.mainelegislature.org/legis/statutes/35-A/title35-Ach34-A.pdf> (accessed February 23, 2010).

Maine, Department of Conservation. 2009a. Chain of Ponds. http://www.maine.gov/cgi-bin/online/doc/parksearch/search_name.pl?state_park=&historic_site=&public_reserved_land=82&shared_use_trails=&option=search (accessed March 29, 2010).

Maine, Department of Conservation. 2009b. Designated Scenic Viewpoints of State or National Significance, Located on Public Reserved Land or on a Publicly Accessible Trail Used Exclusively for Pedestrian Use, for Consideration in the Permitting of Expedited Wind Energy Development. <http://www.maine.gov/doc/DraftRule/DraftScenicRule.pdf> (accessed March 11, 2010).

Maine, Department of Conservation, Bureau of Parks and Lands. 2007. *Flagstaff Region Management Plan*. <http://www.maine.gov/doc/parks/programs/planning/flagstaff/Flagstaff%20Plan.pdf> (accessed April 10, 2010).

Maine, Department of Conservation, Bureau of Parks and Lands. 2009. *Maine State Comprehensive Outdoor Recreation Plan 2009-2014*. <http://www.maine.gov/doc/parks/programs/SCORP/contents.html> (accessed March 3, 2010).

Maine, Department of Environmental Protection, Bureau of Land and Water Quality. 2003. *Guidance for Assessing Impacts to Existing Scenic and Aesthetic Uses under the Natural Resources Protection Act*. (DEPLW0541-A2003) <http://www.maine.gov/dep/blwq/docstand/nrpa/sopscenic.pdf> (accessed March 3, 2010).

Maine, Department of Transportation. 2008. *Traffic Volume Counts 2008 Annual Report*. <http://www.state.me.us/mdot/traffic-counts/2008tc/completereport.pdf> (accessed March 29, 2010).

More, Thomas A.; Bulmer, Susan; Henzel, Linda; Mates, Ann E. 2003. Extending the Recreation Opportunity Spectrum to nonfederal lands in the Northeast: an implementation guide. Gen. Tech. Rep. NE-309. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northeastern Research Station.

National Register of Historic Places. 1969. Arnold Trail to Quebec. (69000018 NRIS). <http://nrhp.focus.nps.gov/natregsearchresult.do?fullresult=true&recordid=0> (accessed April 2, 2010).

- Nikon. 2004. *The Nikon Guide to Digital Photography with the D70 Digital Camera*.
http://www.nikonusa.com/pdf/manuals/dslr/D70_en.pdf (accessed April 11, 2010).
- Nikon. 2005. *The Nikon Guide to Digital Photography with the D200 Digital Camera*.
http://www.nikonusa.com/pdf/manuals/dslr/D200_en.pdf (accessed April 11, 2010).
- Palmer, J.F. 2008. The perceived scenic effects of clearcutting in the White Mountains of New Hampshire, USA. *Journal of Environmental Management* 89(3):167-183.
- Sheppard, Stephen R.J. 1989. *Visual Simulation: A User's Guide for Architects, Engineers, and Planners*. New York: Van Nostrand Reinhold.
- USDOT, Federal Highway Administration, National Scenic Byways Program. 2009. State Route 27. <http://www.byways.org/explore/byways/11514/> (accessed March 29, 2010).
- USDA, Forest Service. 1987. Project Planning ROS User's Guide Chapter 60. USDA, Forest Service.
- USDA, Forest Service. 1995. *Landscape Aesthetics: A Handbook for Scenery Management*. Agricultural Handbook Number 701. <http://www.esf.edu/es/via/> (accessed March 11, 2010).
- Vissering, Jean, and Judy Bartos. 2009. *Kibby Expansion Wind Project Aesthetic Impact Assessment*. TransCanada.
- Vissering, Jean. 2007. *Kibby Wind Project Aesthetic Impact Assessment*. TransCanada.

Appendix 1

Viewshed Maps

Map 1: Kibby Expansion Topographic Viewshed for Blade Tip

Map 2: Kibby Expansion Forested Viewshed for Blade Tip

Map 3: Kibby Expansion Forested and Harvested Viewshed for Blade Tip

Map 4: Kibby Expansion Topographic Viewshed for Turbine Hub

Map 5: Kibby Expansion Forested Viewshed for Turbine Hub

Map 6: Kibby Expansion Forested and Harvested Viewshed for Turbine Hub

Map 7: Kibby A, B & Expansion Topographic Viewshed for Blade Tip

Map 8: Kibby A, B & Expansion Forested Viewshed for Turbine Hub

Map 9: Kibby A, B & Expansion Topographic Viewshed for Blade Tip

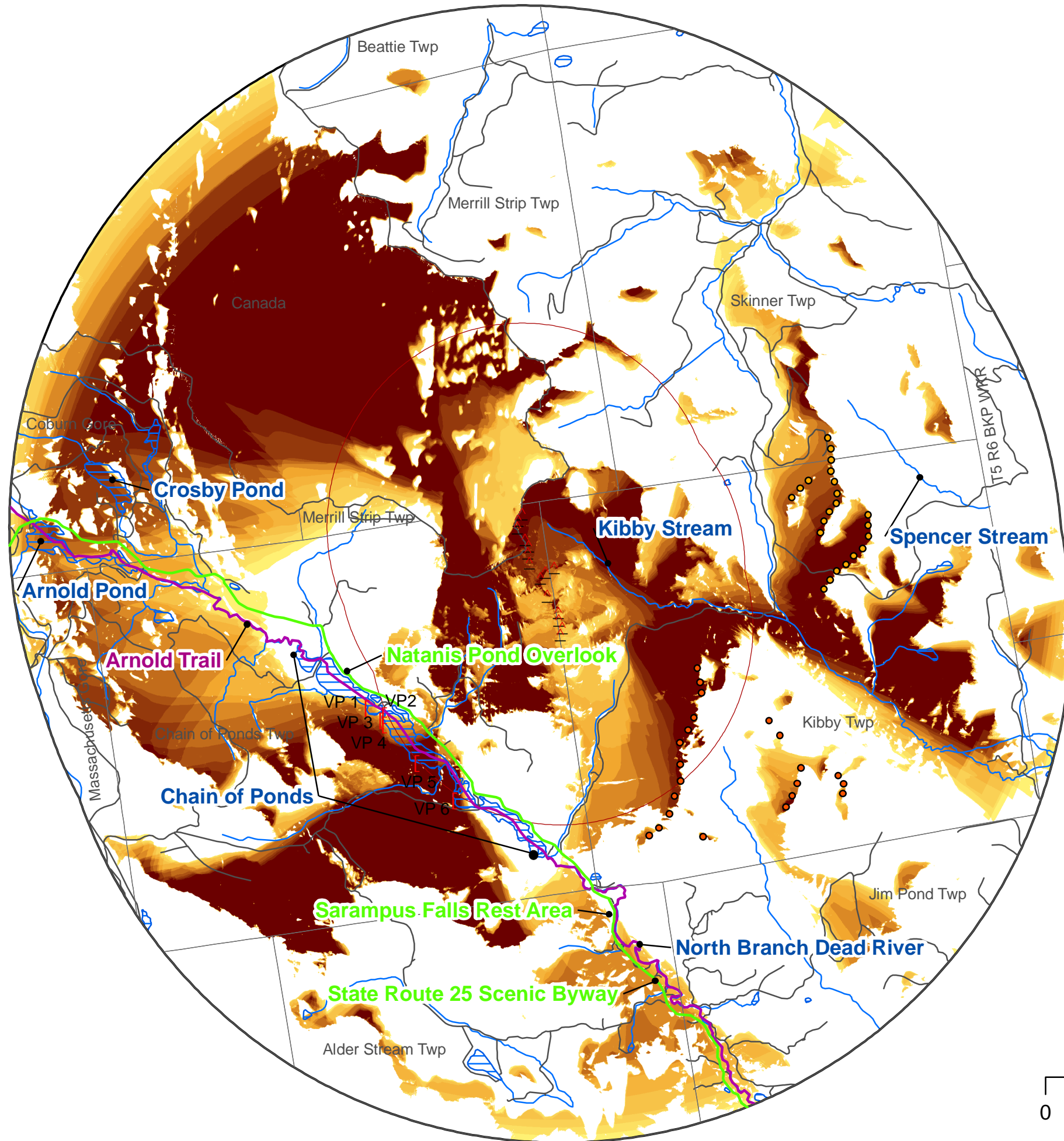
Map 10: Kibby A, B & Expansion Forested Viewshed for Turbine Hub

Visibility analysis determines whether a line of sight exists between two specified points. A geographic information system (GIS) is used to map the viewsheds from which the Kibby turbines are potentially visible. In principle this is an objective exercise in geometry highly suited to a computer application. In practice however, since the data are only approximations of the actual condition and may include errors, the resulting viewshed maps are best considered a preliminary analysis of potential visibility under specified conditions. The maps are useful for providing a preliminary investigation of the overall potential visual impact. If potential visual impacts appear to exist for significant scenic resources, they need to be confirmed through field investigation and other visualization techniques.

Map 1

Kibby Expansion Wind Power Project

Topographic Viewshed for Blade Tip

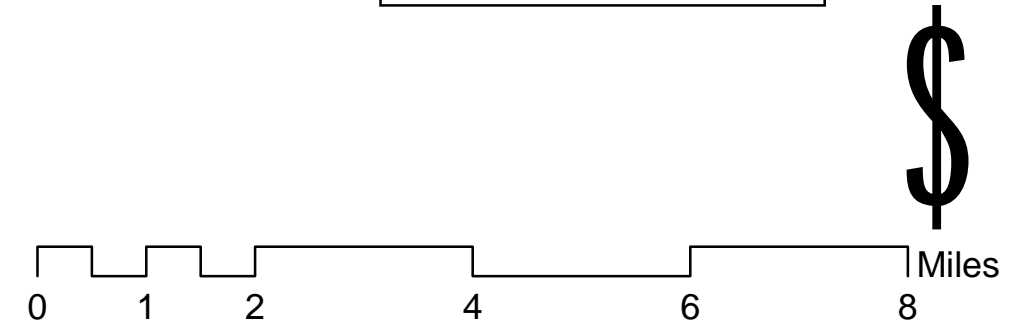


Legend

- Simulation Viewpoints
- Kibby Expansion
- Kibby A
- Kibby B
- Rt. 27 Scenic Byway
- Arnold Trail

Visible Turbines

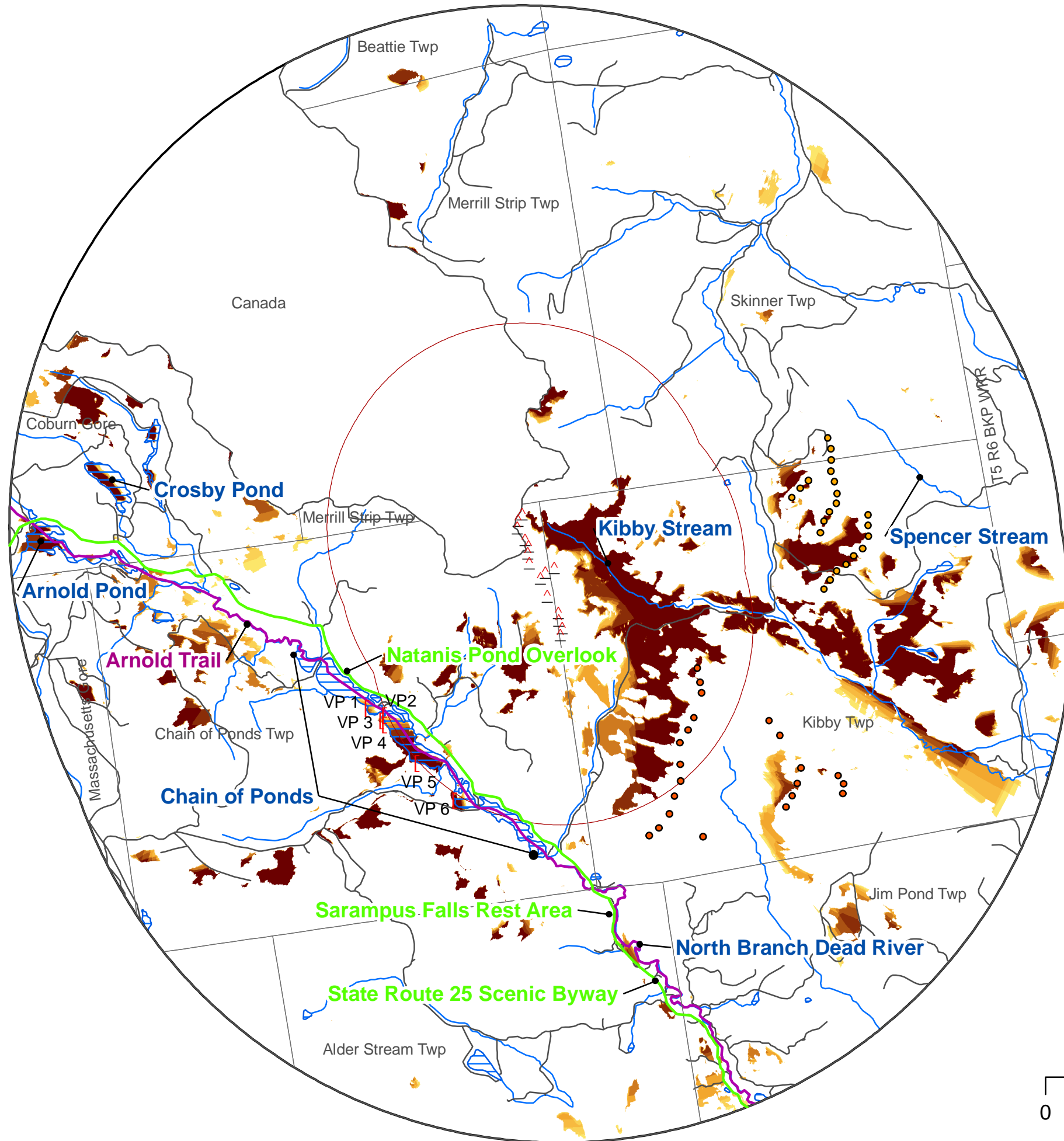
15
1



Map 2

Kibby Expansion Wind Power Project

Forested Viewshed for Blade Tip

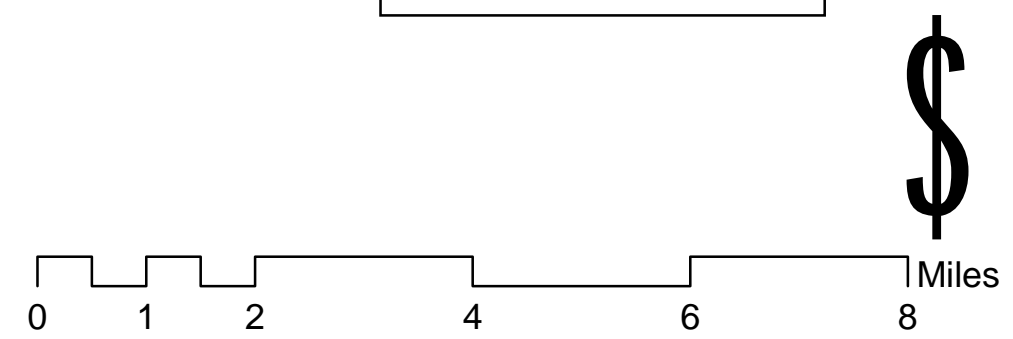


Legend

- [] Simulation Viewpoints
- △ Kibby Expansion
- Kibby A
- Kibby B
- Rt. 27 Scenic Byway
- Arnold Trail

Visible Turbines

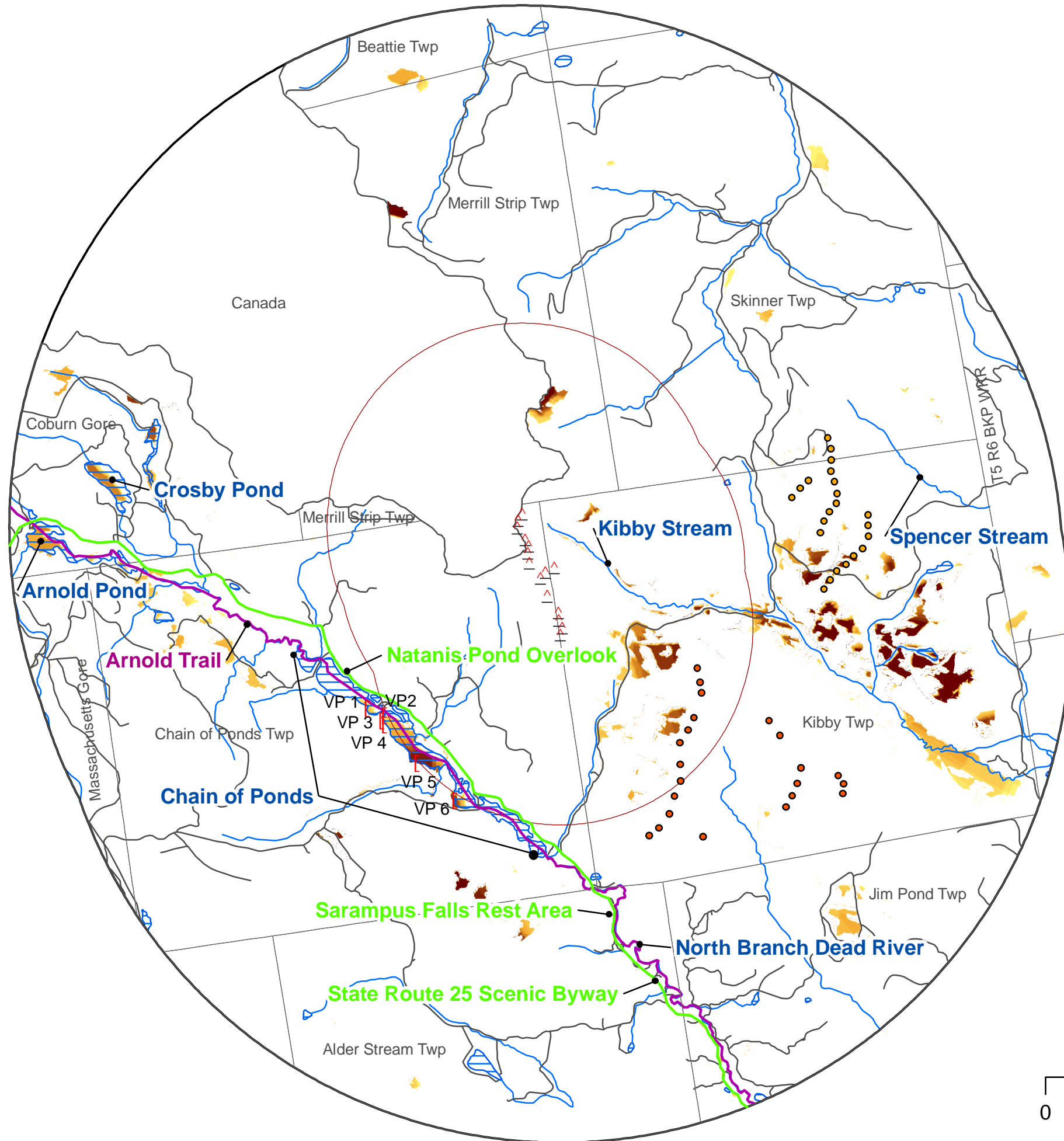
15
1



Map 3

Kibby Expansion Wind Power Project

Forested and Harvested Viewshed for Blade Tip

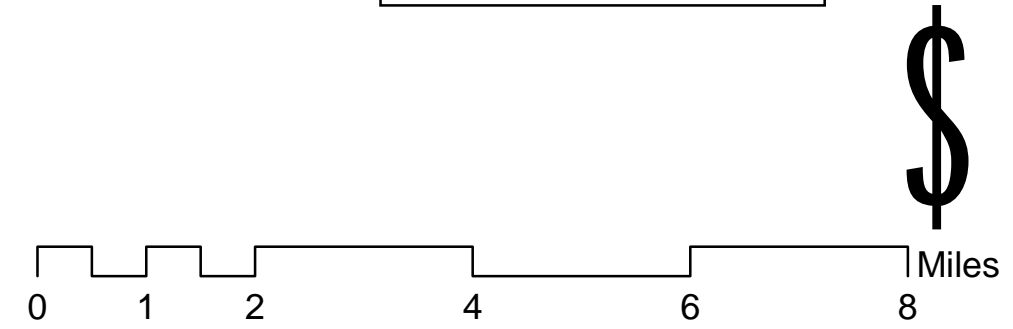


Legend

- Simulation Viewpoints
- Kibby Expansion
- Kibby A
- Kibby B
- Rt. 27 Scenic Byway
- Arnold Trail

Visible Turbines

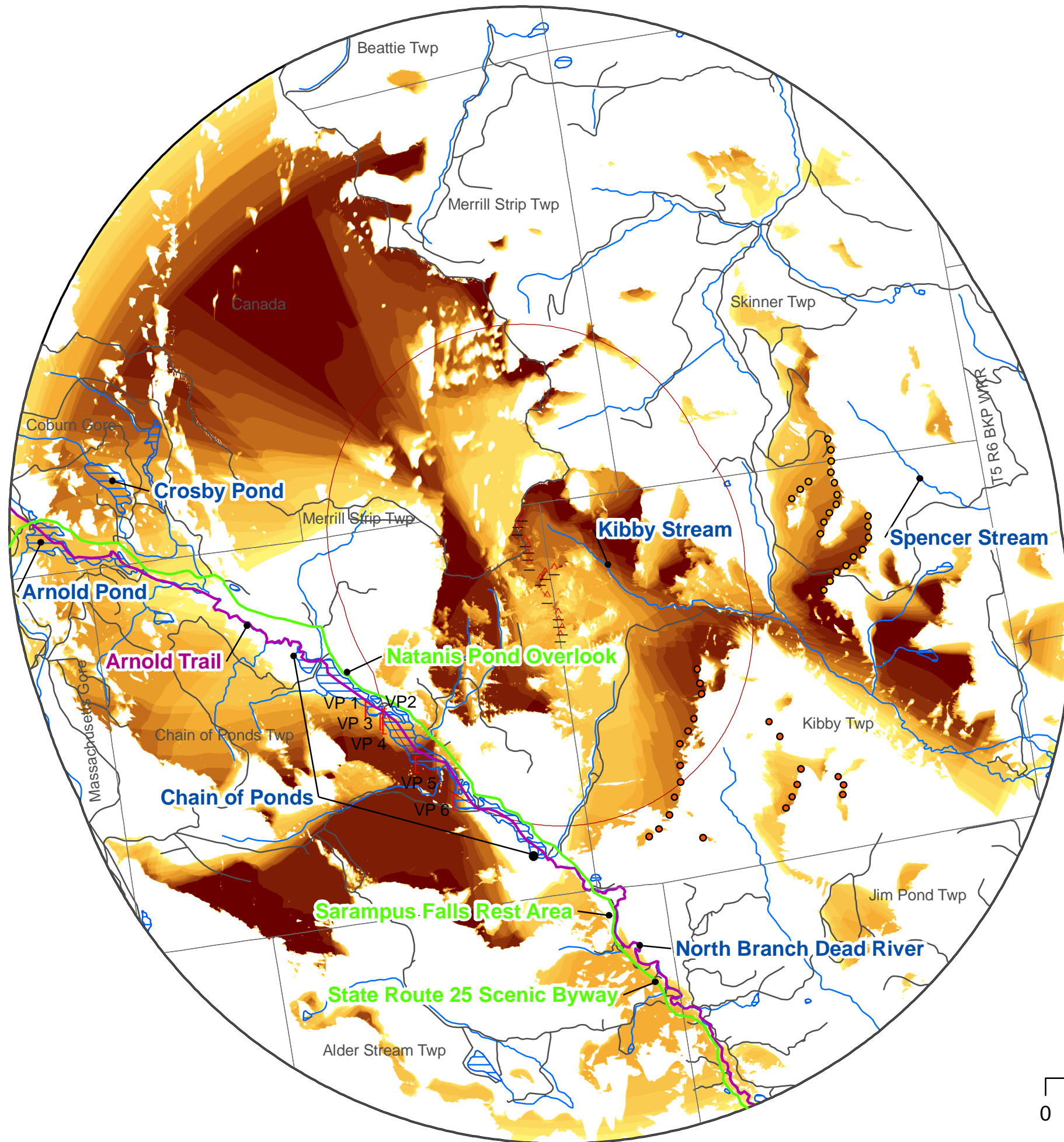
15
1



Map 4

Kibby Expansion Wind Power Project

Topographic Viewshed for Turbine Hub

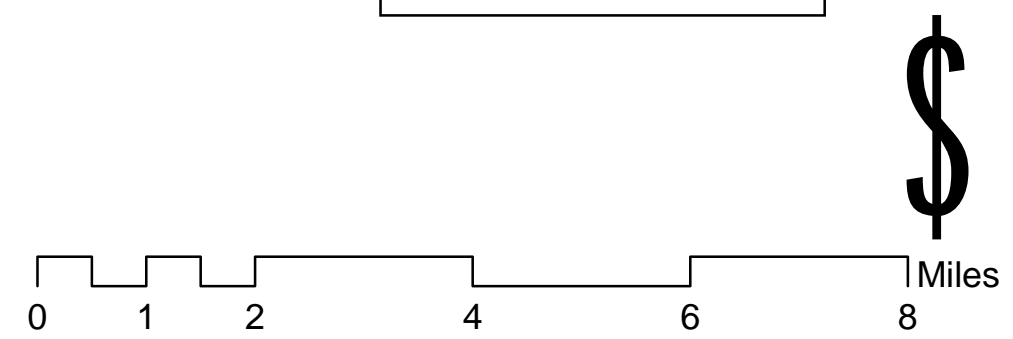


Legend

- Simulation Viewpoints
- Kibby Expansion
- Kibby A
- Kibby B
- Rt. 27 Scenic Byway
- Arnold Trail

Visible Turbines

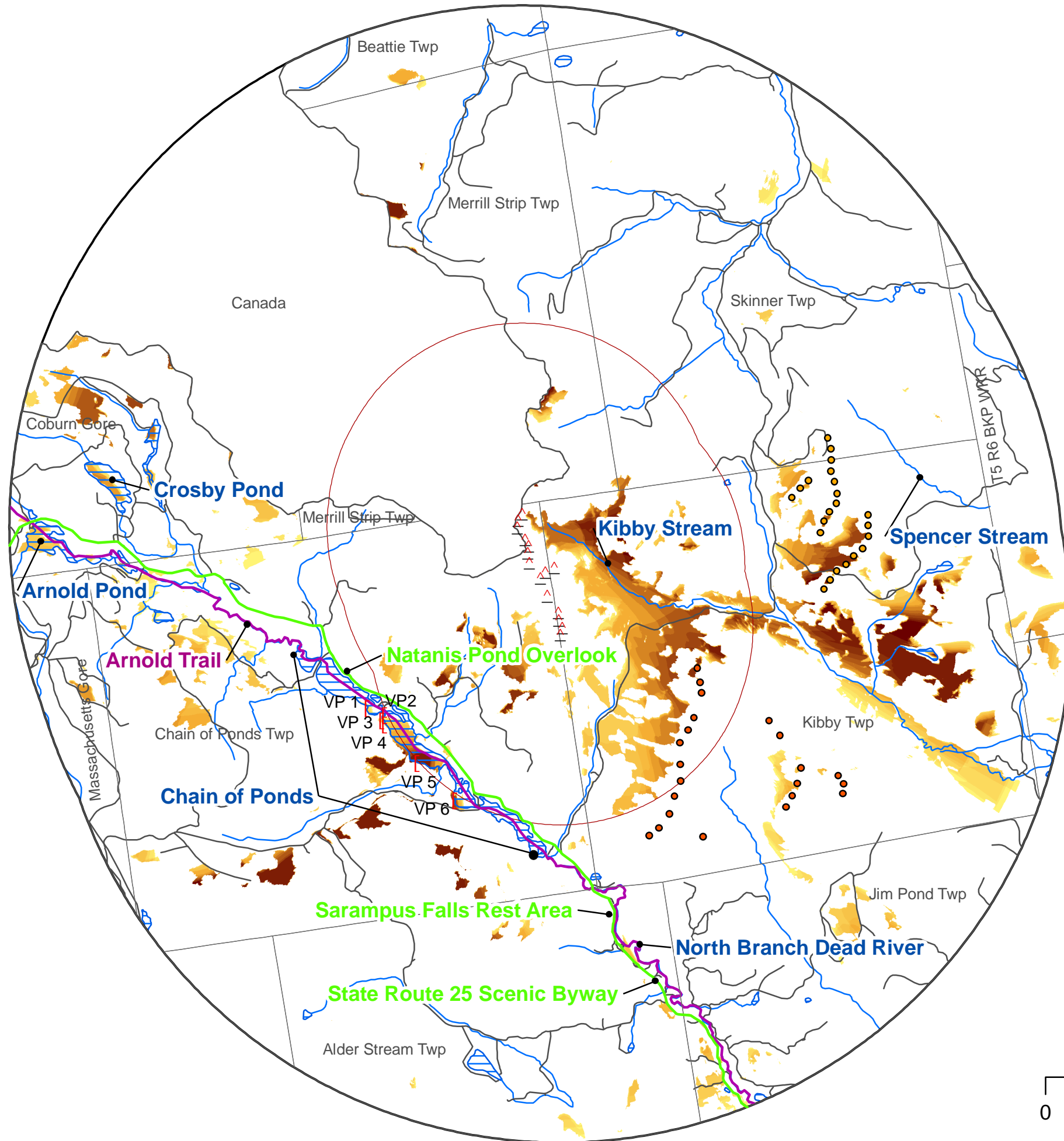
15
1



Map 5

Kibby Expansion Wind Power Project

Forested Viewshed for Turbine Hub

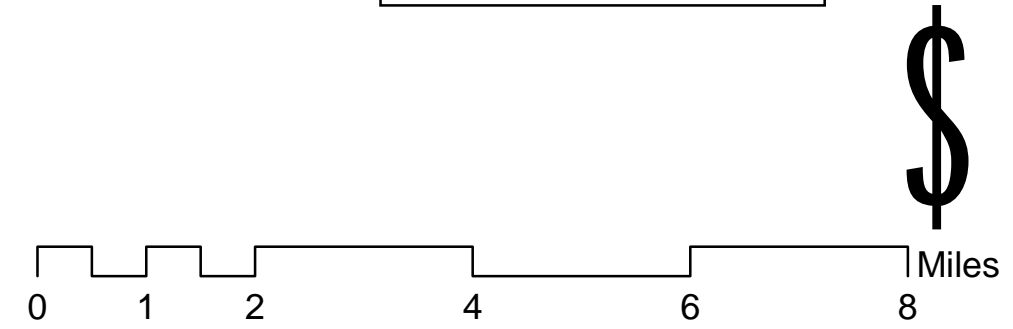


Legend

- [] Simulation Viewpoints
- △ Kibby Expansion
- Kibby A
- Kibby B
- Rt. 27 Scenic Byway
- Arnold Trail

Visible Turbines

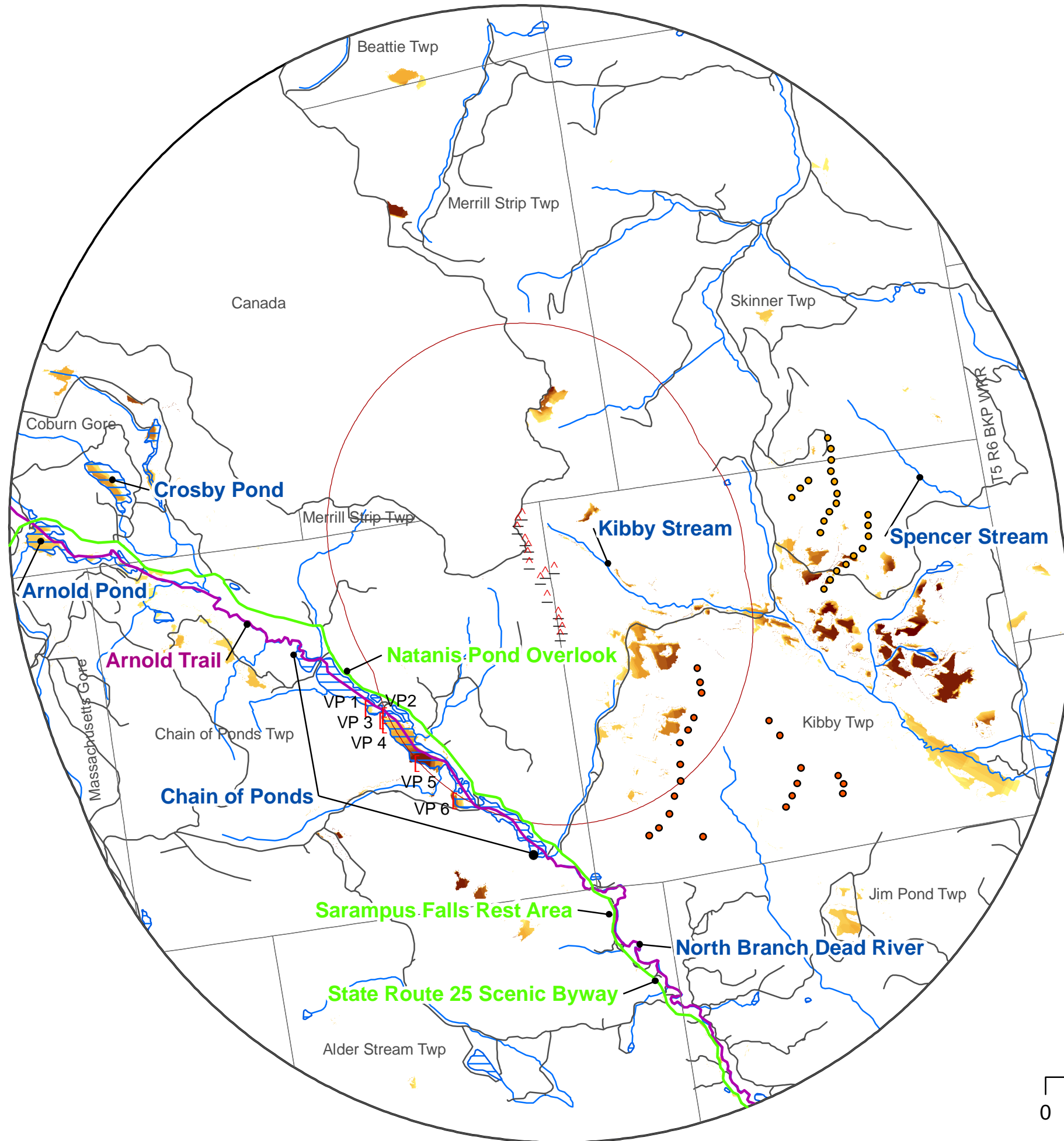
15
1



Map 6

Kibby Expansion Wind Power Project

Forested and Harvested Viewshed for Turbine Hub



Legend

- [] Simulation Viewpoints
- △ Kibby Expansion
- Kibby A
- Kibby B
- Rt. 27 Scenic Byway
- Arnold Trail

Visible Turbines

15
1



Map 7

Kibby A, B & Expansion Wind Power Projects

Topographic Viewshed for Blade Tip

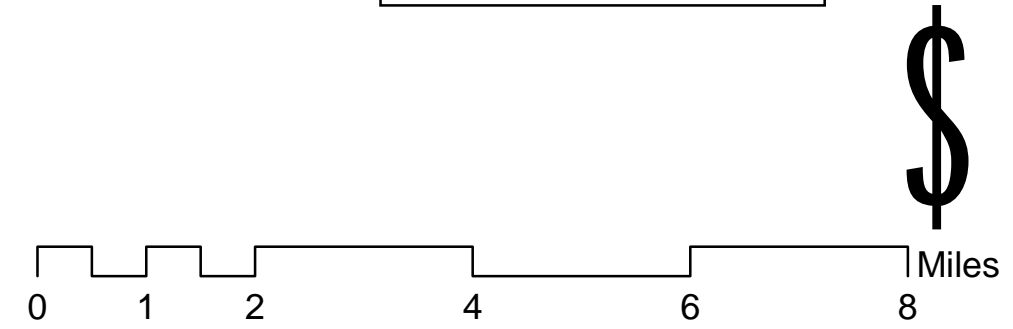


Legend

- Simulation Viewpoints
- Kibby Expansion
- Kibby A
- Kibby B
- Rt. 27 Scenic Byway
- Arnold Trail

Visible Turbines

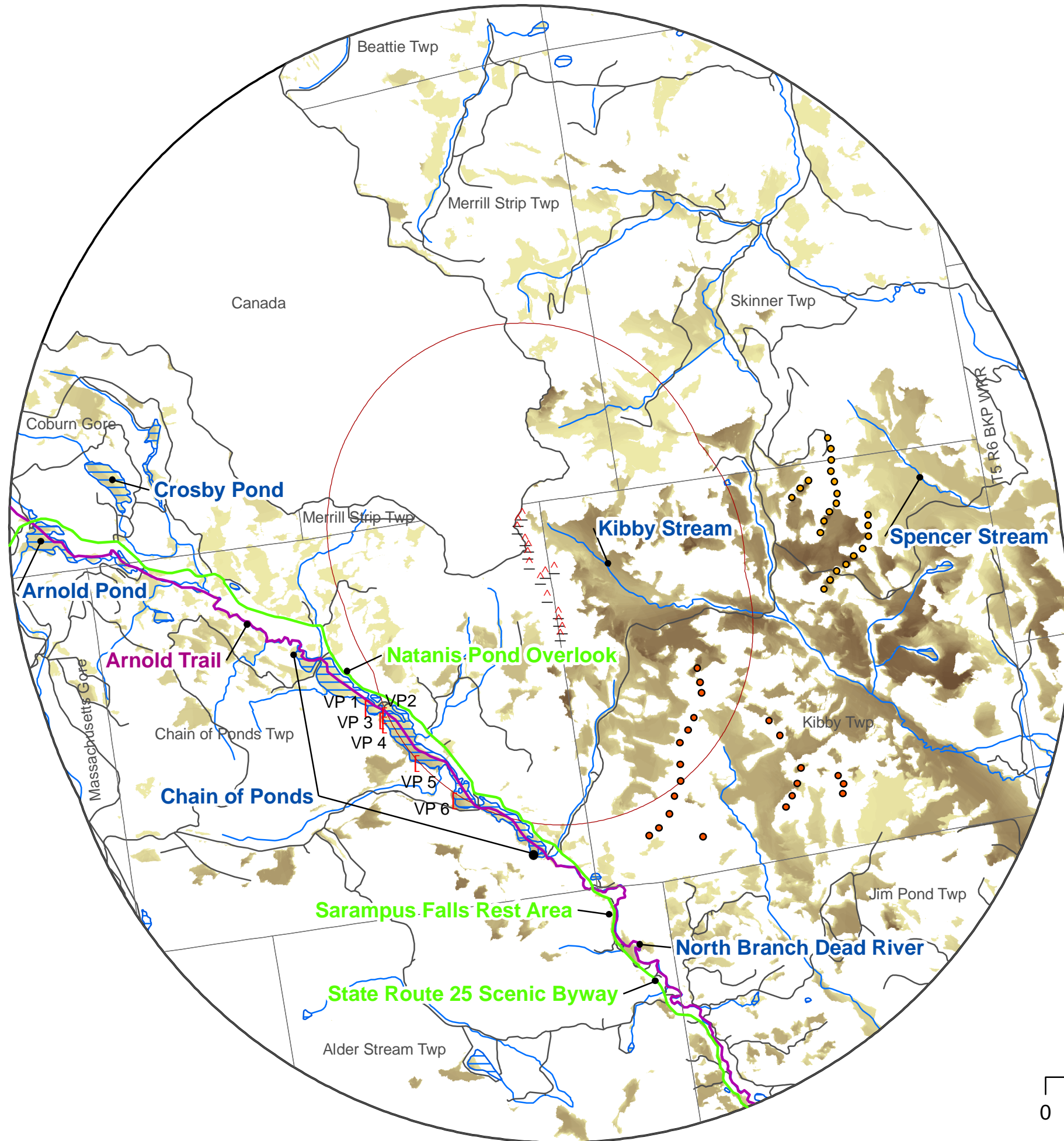
59
1



Map 8

Kibby A, B & Expansion Wind Power Projects

Forested Viewshed for Blade Tip

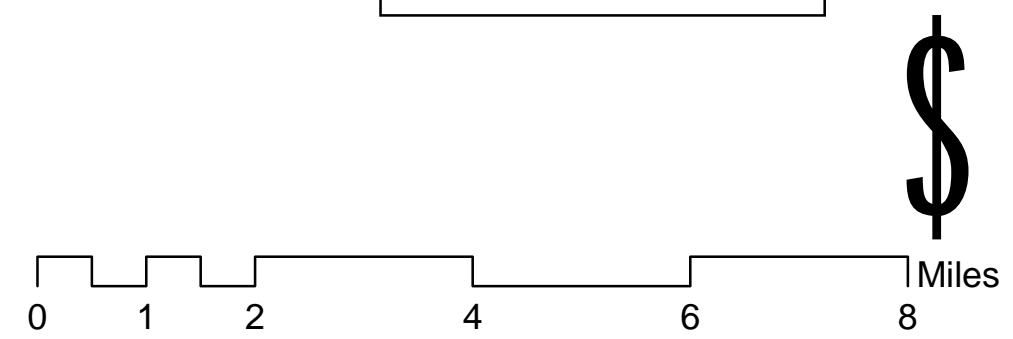


Legend

- Simulation Viewpoints
- Kibby Expansion
- Kibby A
- Kibby B
- Rt. 27 Scenic Byway
- Arnold Trail

Visible Turbines

56
1



Map 9

Kibby A, B & Expansion Wind Power Projects

Topographic Viewshed for Turbine Hub



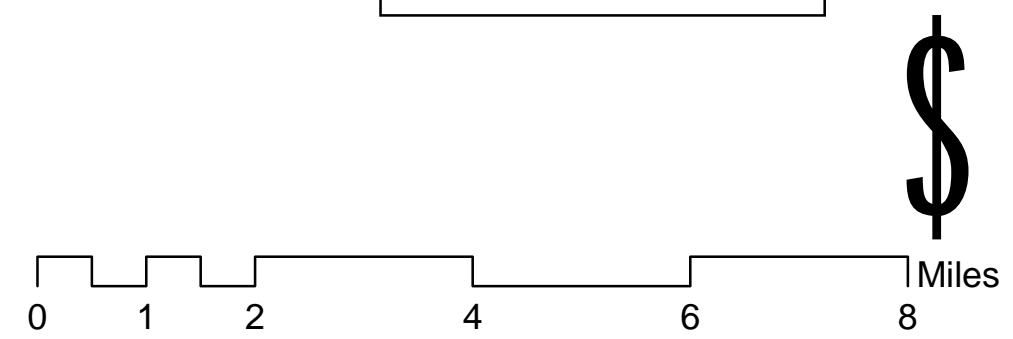
Legend

- Simulation Viewpoints
- Kibby Expansion
- Kibby A
- Kibby B
- Rt. 27 Scenic Byway
- Arnold Trail

Visible Turbines

59

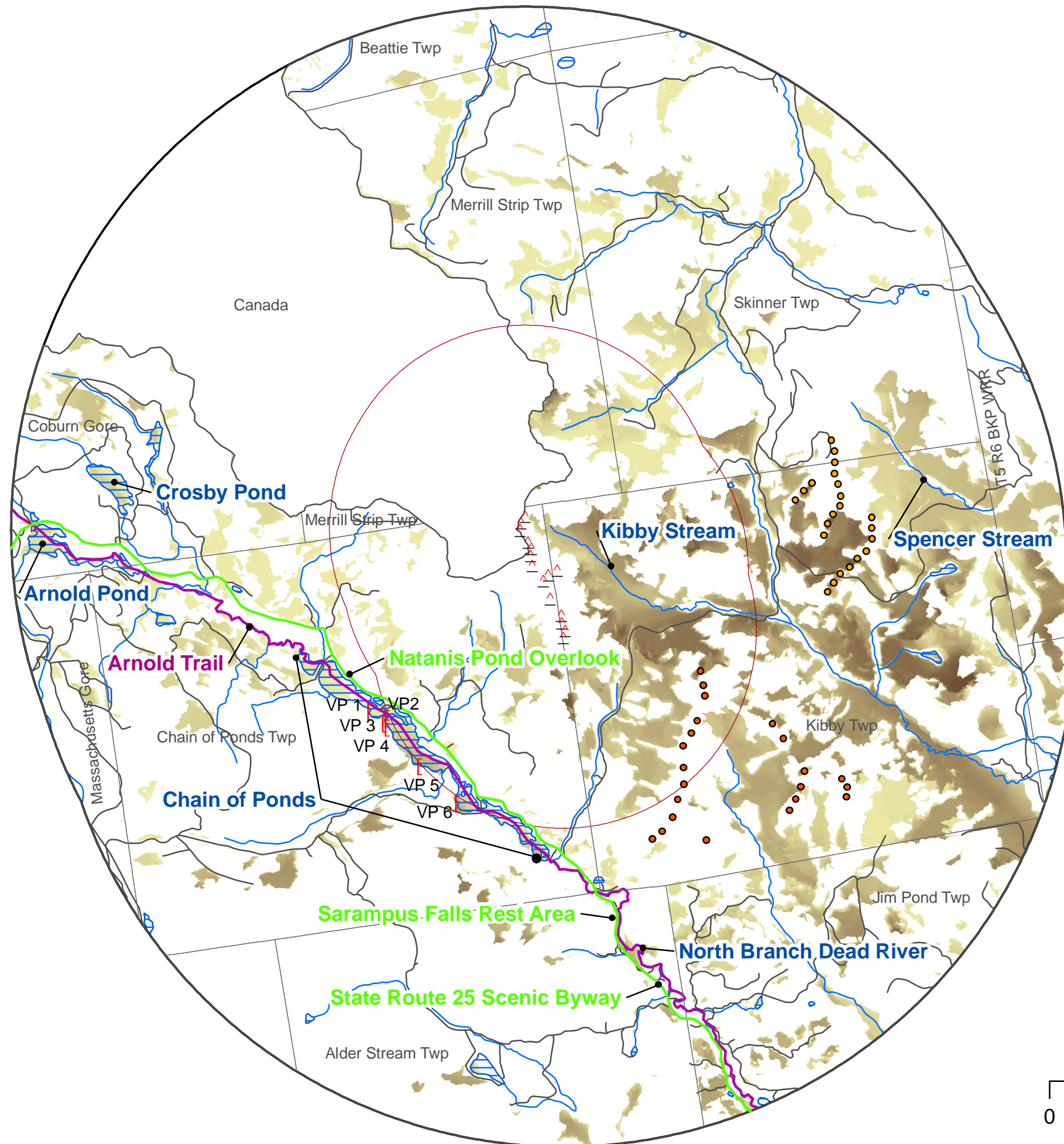
1



Map 10

Kibby A, B & Expansion Wind Power Projects

Forested Viewshed for Turbine Hub

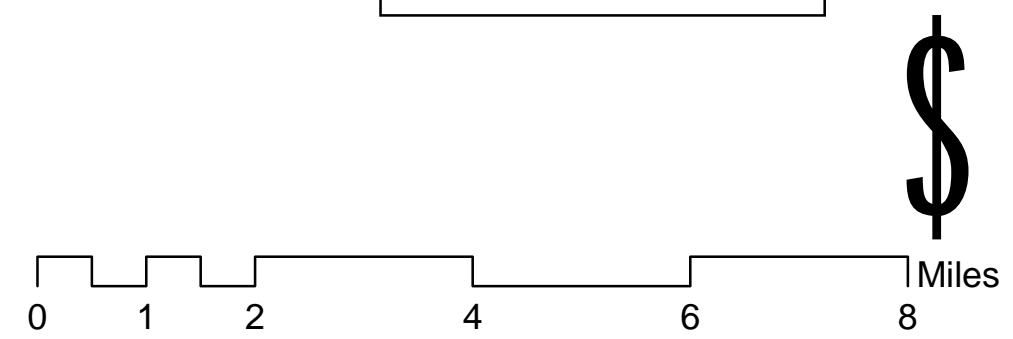


Legend

- Simulation Viewpoints
- Kibby Expansion
- Kibby A
- Kibby B
- Rt. 27 Scenic Byway
- Arnold Trail

Visible Turbines

52
1



Appendix 2

ArcScene Visualizations

ArcScene Visualization from Viewpoint 1

ArcScene Visualization from Viewpoint 2

ArcScene Visualization from Viewpoint 3

ArcScene Visualization from Viewpoint 4

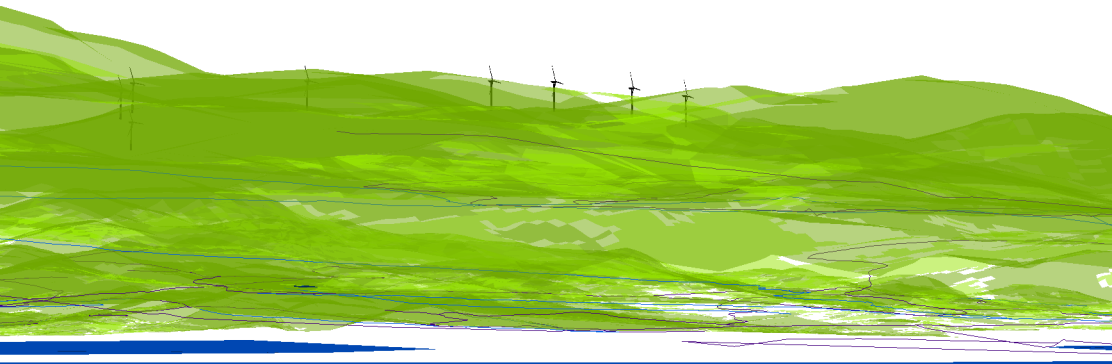
ArcScene Visualization from Viewpoint 5

ArcScene Visualization from Viewpoint 6

The purpose of these visualizations is to validate the relative accuracy of the *Kibby Expansion Wind Project Aesthetic Impact Assessment* photographic simulations. They are created using the location and camera information from the photograph metadata and GIS database that were used to prepare the *Kibby Expansion Wind Project Aesthetic Impact Assessment*. Forest cover is set to between 40 and 66 feet and immediate vegetation not visible in the photograph is removed. The visualizations are in proper perspective when viewed from a distance of approximately 1.5 times its width.

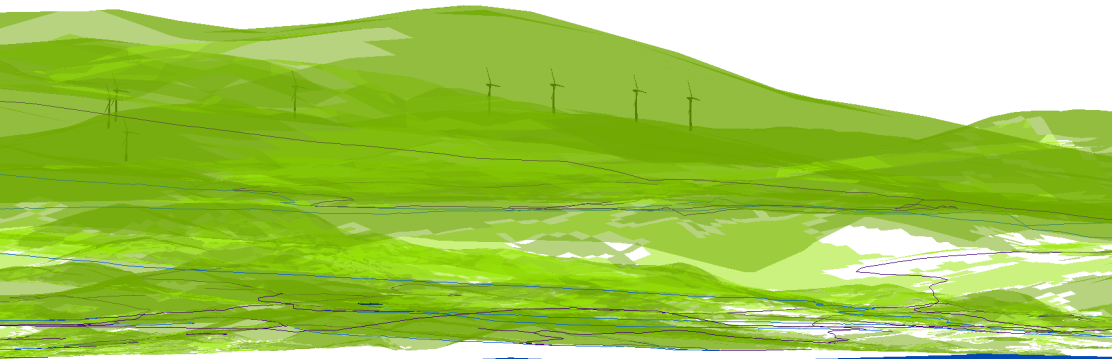
ArcScene Visualization from Viewpoint 1

The purpose of this visualization is to validate the relative accuracy of a photographic simulation. It is created using the location and camera information from the photograph metadata and GIS database that were used to prepare the *Kibby Expansion Wind Project Aesthetic Impact Assessment*. Forest cover is set to 40 feet and immediate vegetation not visible in the photograph has been removed. It will be in proper perspective when viewed from a distance of approximately 1.5 times its width.



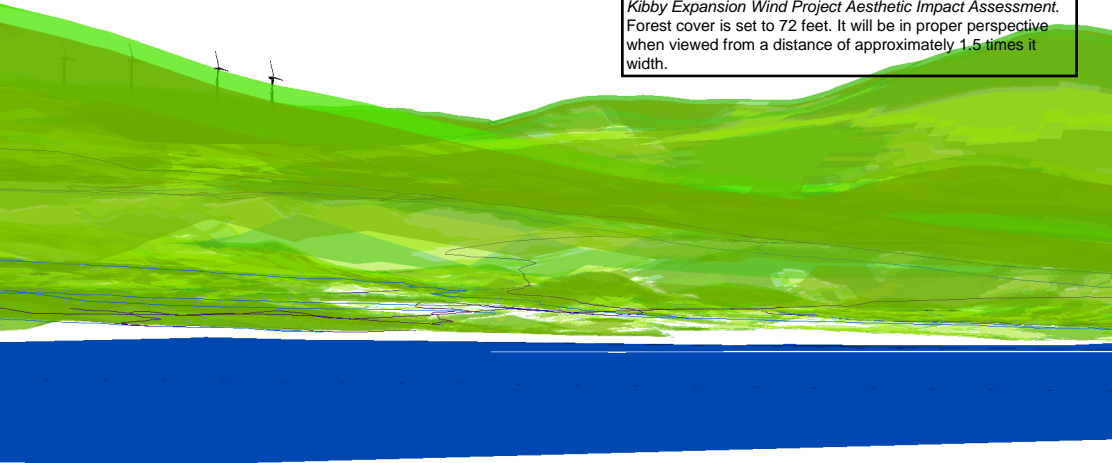
ArcScene Visualization from Viewpoint 2

The purpose of this visualization is to validate the relative accuracy of a photographic simulation. It is created using the location and camera information from the photograph metadata and GIS database that were used to prepare the *Kibby Expansion Wind Project Aesthetic Impact Assessment*. Forest cover is set to 40 feet. It will be in proper perspective when viewed from a distance of approximately 1.5 times its width.



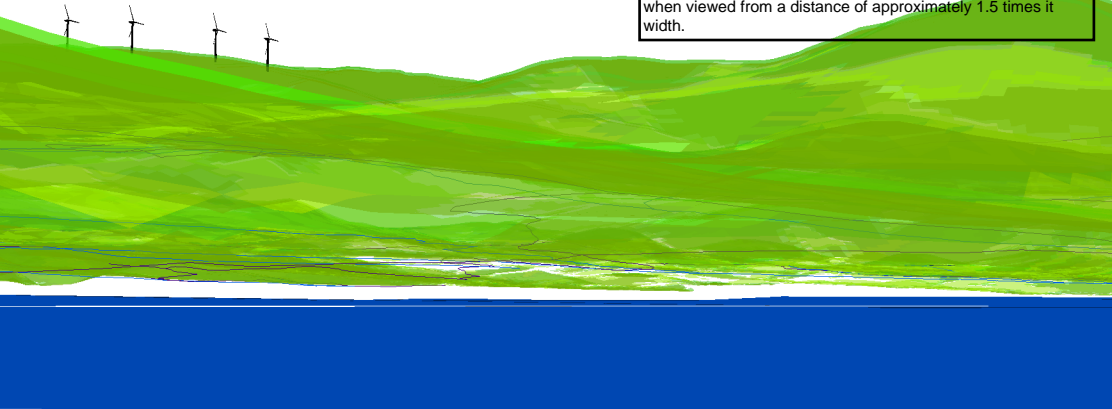
ArcScene Visualization from Viewpoint 3

The purpose of this visualization is to validate the relative accuracy of a photographic simulation. It is created using the location and camera information from the photograph metadata and GIS database that were used to prepare the *Kibby Expansion Wind Project Aesthetic Impact Assessment*. Forest cover is set to 72 feet. It will be in proper perspective when viewed from a distance of approximately 1.5 times its width.



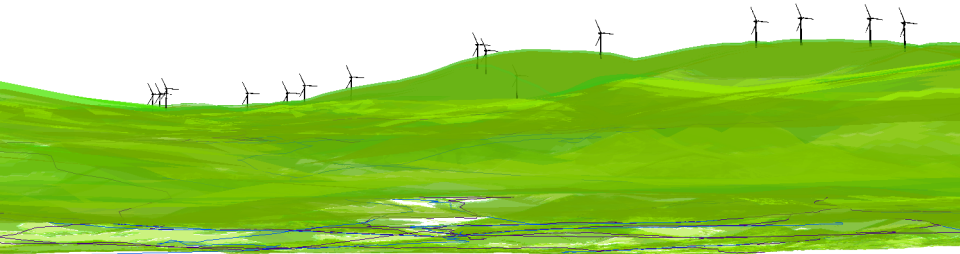
ArcScene Visualization from Viewpoint 4

The purpose of this visualization is to validate the relative accuracy of a photographic simulation. It is created using the location and camera information from the photograph metadata and GIS database that were used to prepare the *Kibby Expansion Wind Project Aesthetic Impact Assessment*. Forest cover is set to 62 feet. It will be in proper perspective when viewed from a distance of approximately 1.5 times its width.



ArcScene Visualization from Viewpoint 5

The purpose of this visualization is to validate the relative accuracy of a photographic simulation. It is created using the location and camera information from the photograph metadata and GIS database that were used to prepare the *Kibby Expansion Wind Project Aesthetic Impact Assessment*. Forest cover is set to 66 feet and immediate vegetation not visible in the photograph has been removed. It will be in proper perspective when viewed from a distance of approximately 1.5 times its width.



ArcScene Visualization from Viewpoint 6

The purpose of this visualization is to validate the relative accuracy of a photographic simulation. It is created using the location and camera information from the photograph metadata and GIS database that were used to prepare the *Kibby Expansion Wind Project Aesthetic Impact Assessment*. Forest cover is set to 66 feet. It will be in proper perspective when viewed from a distance of approximately 1.5 times its width.

