

Rocky Forge Wind Project

USFWS Eagle Coordination Meeting

November 25, 2015

CONFIDENTIAL BUSINESS INFORMATION

Agenda and Goals

Agenda

- Eagle Survey Review
- Discuss Next Steps

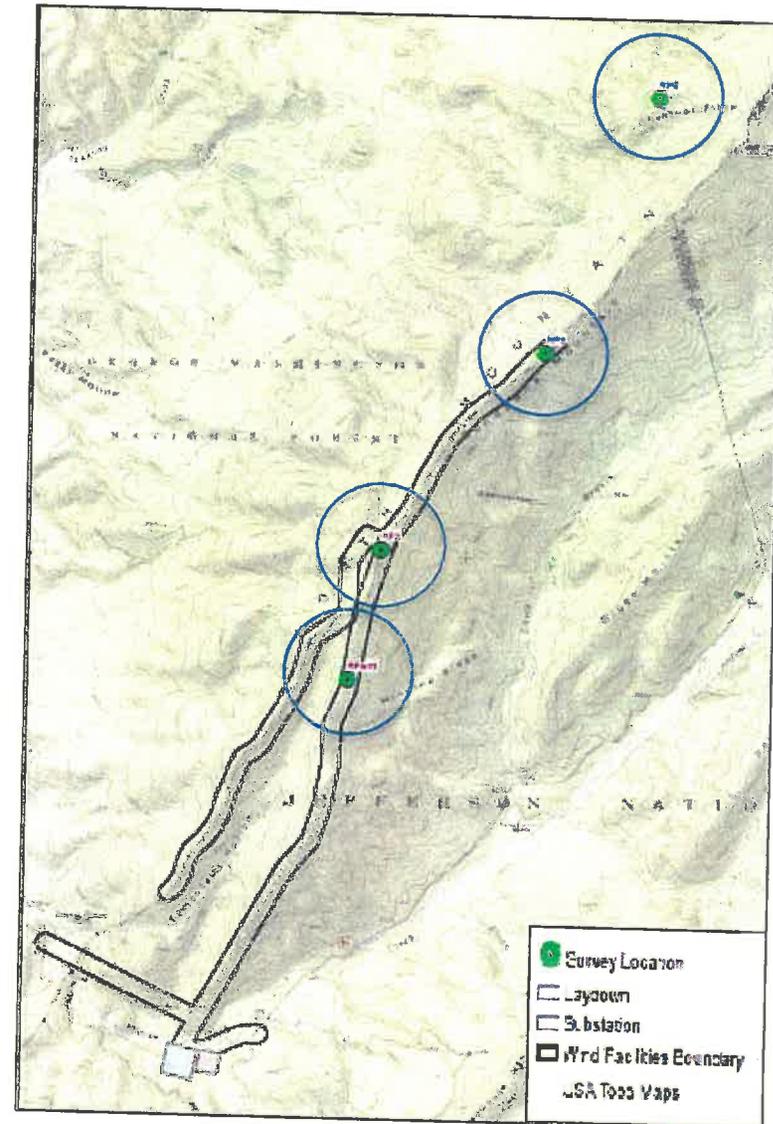
Goals

- USFWS/Apex Coordination
- Agency Input on Eagle Risk and Regulatory Compliance



Eagle Use Surveys – Methods

- Surveys completed using USFWS approved methods, consistent with ECPG methodology
- One year of surveys
 - Dec 15, 2014 to Dec 15, 2015
- 4 points, 2x/month
 - 5-min small bird counts
 - 20-min large birds
 - 2-hr eagles counts
 - Unlimited viewshed
- 16 hrs of eagle survey each month
- 176 hrs of eagle survey to date



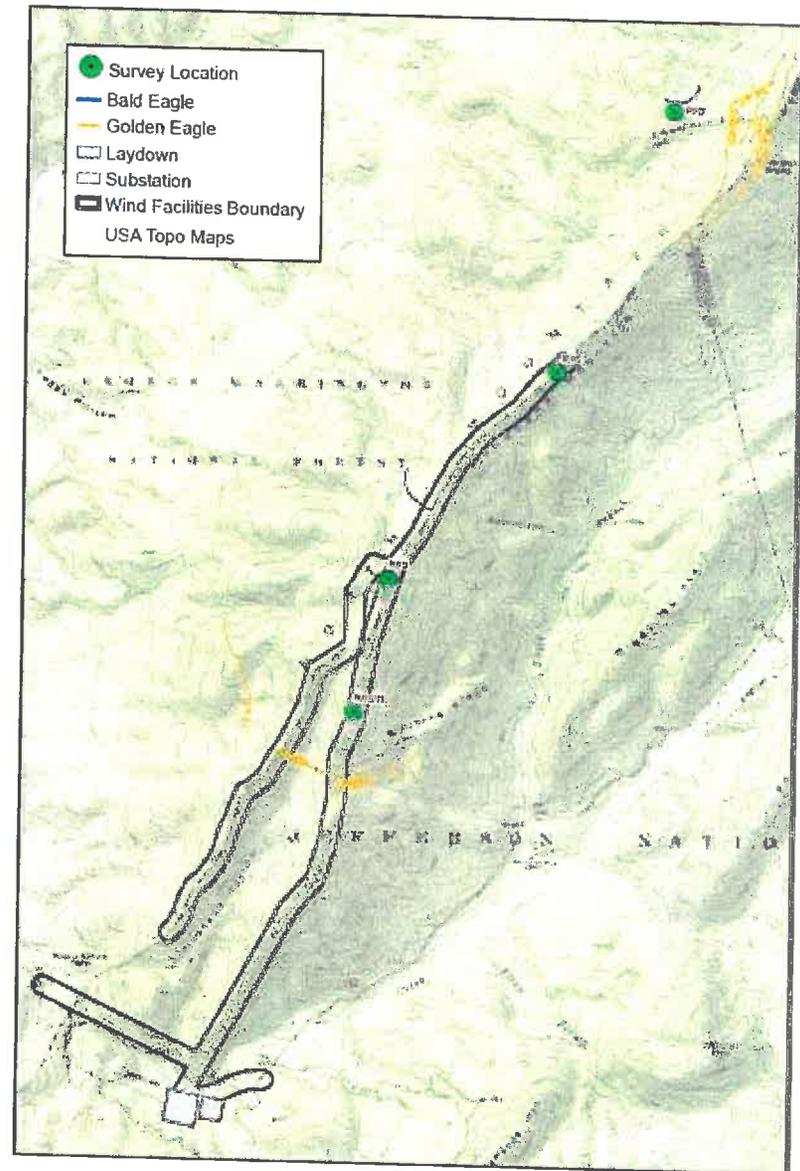
Eagle Use Surveys – Results

	No. Obs.	Obs/hr	Frequency
Bald Eagle	3	0.02	1 in 50 hrs
Golden Eagle	8	0.05	1 in 20 hrs

- All observed from Jan 5 - Feb 7, 2015
- No obvious flightpaths or concentration areas
- Avg distance from ridge 575 ft
- Avg height 14ft (low) – 111ft (high)

Conclusions

- Very low use compared to other Appalachian ridgelines
- Eagles generally observed outside RSA
- Low risk of impact to eagles
- No permit warranted



Next Steps

- No further eagle studies planned
- BBCS in prep to address overall bird and bat impact reduction/avoidance measures
- Initiate Virginia Permit by Rule process with FWS concurrence on eagle risk
- Begin construction early 2017

From: Jennie Geiger
To: "[Harding, Sergio \(DGIF\)](#)"; [Dave Phillips](#); [Tyson Utt](#); [Fernald, Ray \(DGIF\)](#); [Aschenbach, Ernie \(DGIF\)](#)
Subject: RE: Apex-Rocky Forge Wind Project meeting summary- Business Confidential
Date: Thursday, July 2, 2015 1:25:20 PM
Attachments: [image001.png](#)

Thank you Sergio – I will update the documents appropriately. We appreciate your helpful input and technical guidance.

Have a great holiday weekend!

JENNIE GEIGER
Environmental Permitting Manager

Apex Clean Energy, Inc.
310 4th St. NE, Suite 200, Charlottesville, VA 22902
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From: Harding, Sergio (DGIF) [<mailto:Sergio.Harding@dgif.virginia.gov>]
Sent: Monday, June 29, 2015 10:41 AM
To: Jennie Geiger; Dave Phillips; Tyson Utt; Fernald, Ray (DGIF); Aschenbach, Ernie (DGIF)
Subject: RE: Apex-Rocky Forge Wind Project meeting summary- Business Confidential

Hi Jennie,

Sorry for not getting back to you sooner. The attachments look fine, the only change that I would suggest, in both the pdf and the ppt, is that golden-winged warbler survey dates be changed from May 21 – June 15 to May 6 – June 15 – this species is an early breeder among neotropical migrants. Thanks.

Sergio

Sergio Harding | Nongame Bird Conservation Biologist | Virginia Department of Game and Inland Fisheries | 7870 Villa Park Dr, Suite 400, Henrico, VA 23228 | 804-367-0143 | www.dgif.virginia.gov | www.vabci.org

From: Jennie Geiger [<mailto:jennie.geiger@apexcleanenergy.com>]
Sent: Monday, June 22, 2015 3:09 PM
To: Harding, Sergio (DGIF); Dave Phillips; Tyson Utt; Fernald, Ray (DGIF); Aschenbach, Ernie (DGIF)
Subject: RE: Apex-Rocky Forge Wind Project meeting summary- Business Confidential

Hi Sergio/Ray –

I wanted to circle back with you on the attached notes to make sure that they accurately reflect our discussion and your recommendations. Could you confirm when you have a moment?

Thanks,
Jennie

JENNIE GEIGER
Environmental Permitting Manager

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From: Jennie Geiger
Sent: Friday, June 5, 2015 10:02 AM
To: 'Harding, Sergio (DGIF)'; Dave Phillips; Tyson Utt; Karen Tyrell (ktyrell@west-inc.com); Fernald, Ray (DGIF); Aschenbach, Ernie (DGIF)
Subject: RE: Apex-Rocky Forge Wind Project meeting summary- Business Confidential

Hello Sergio/Ray –

Attached are the revised notes (with pdf of slide) and ppt slide based on feedback received. Please let me know if they accurately reflect our discussion and your recommendations.

Thanks,
Jennie

JENNIE GEIGER
Environmental Permitting Manager

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From: Harding, Sergio (DGIF) [<mailto:Sergio.Harding@dgif.virginia.gov>]

Sent: Monday, June 1, 2015 5:45 PM

To: Jennie Geiger; Dave Phillips; Tyson Utt; Karen Tyrell (kyrell@west-inc.com); Fernald, Ray (DGIF); Aschenbach, Ernie (DGIF)

Subject: RE: Apex-Rocky Forge Wind Project meeting summary- Business Confidential

Hi Jennie,

Thank you for the summary. I have attached some edits/comments. I will send playback files and protocols for shrike and golden-winged warbler in separate e-mails.

Sergio

Sergio Harding | Nongame Bird Conservation Biologist | Virginia Department of Game and Inland Fisheries | 7870 Villa Park Dr, Suite 400, Henrico, VA 23228 | 804-367-0143 | www.dgif.virginia.gov | www.vabci.org

From: Jennie Geiger [<mailto:jennie.geiger@apexcleanenergy.com>]

Sent: Monday, June 01, 2015 1:40 PM

To: Dave Phillips; Tyson Utt; Harding, Sergio (DGIF); Karen Tyrell (kyrell@west-inc.com); Fernald, Ray (DGIF); Aschenbach, Ernie (DGIF)

Subject: Apex-Rocky Forge Wind Project meeting summary- Business Confidential

Hi Sergio/Ray --

Thank you for your input on the Rocky Forge project. Attached is a summary of our discussion, as well as a slide outlining our breeding bird survey protocol.

If you have comments on the meeting summary, or find that edits are needed, please let me know and I will revise accordingly; otherwise, if you could confirm that they accurately reflect our discussion and your recommendations at this time, that would be much appreciated.

Thanks,

Jennie

JENNIE GEIGER
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-----Original Appointment-----

From: Jennie Geiger

Sent: Thursday, May 14, 2015 3:54 PM

To: Jennie Geiger; Dave Phillips; Tyson Utt; Harding, Sergio (DGIF; Karen Tyrell (ktyrell@west-inc.com)); Fernald, Ray (DGIF; Aschenbach, Ernie (DGIF)

Subject: Rocky Forge Wind Follow Up Meeting

When: Wednesday, May 27, 2015 9:00 AM-11:00 AM (UTC-05:00) Eastern Time (US & Canada).

Where: Call In Info Below

Ernie – I know you are not available for this meeting but wanted to keep you in the loop.

Call in number: 877-621-7926

Conference Code: 3036459577

Host: 76094

ROCKY FORGE WIND PROJECT – CALL SUMMARY

Meeting Attendees: Sergio Harding, VDGIF
Ray Fernald, VDGIF
Dave Phillips, Apex
Jennie Geiger, Apex
Tyson Utt, Apex
Karen Tyrell, WEST

Notes Prepared by: Apex

Date: May 27, 2015

On May 27, 2015, Apex Clean Energy (Apex) met with Sergio Harding and Ray Fernald of Virginia Department of Game and Inland Fisheries (VDGIF) via conference call, to discuss compliance with Virginia's Permit by Rule (PBR) requirements pertaining to avian studies and risk assessment of the proposed Rocky Forge Wind Project (Project) in Botetourt County, Virginia. The call was completed as follow up to the meeting held on April 28, 2015, in which VDGIF avian experts could not attend. The Power Point (PPT) presentation provided at the April 28, 2015 meeting was reviewed during the call and the parties agreed on next steps for assessing avian risk.

Avian Surveys: Apex presented results from avian studies conducted to date, reviewed protocols for the ongoing avian surveys (i.e., year round avian point counts), and explained the proposed breeding bird surveys currently being implemented, which were not presented in the April 28 PPT.

VDGIF agreed that the avian studies were compliant with PBR requirements for raptor migration surveys and with the overall breeding bird survey approach, but requested additional playback surveys be conducted for northern saw-whet owl and golden-winged warbler, and that habitat assessments be completed to assess potential for Swainson's warbler habitat (i.e., rhododendron-mountain laurel, eastern hemlock, American holly community type), loggerhead shrike habitat (i.e., open country with fences and/or thorny trees/shrubs), and peregrine falcon nesting habitat (i.e., suitable rock outcrops). Apex agreed to incorporate these elements into the existing breeding bird survey protocol. Per VDGIF's request, an additional PPT slide is attached that summarizes the breeding bird survey approach.

VDGIF indicated that the list of Species of Greatest Conservation Need is being revised and that several species have been removed (e.g., winter wren, upland sandpiper, yellow-bellied sapsucker, and red crossbill) as Tier ½ species, and that black-billed cuckoo and wintering golden eagle have been added. No additional survey expectations were requested as a result of this change and it was agreed that the species on the revised list are addressed with the survey plan.

Eagles: Eagle data collected/raptor surveys conducted to date were discussed and it was agreed that the approach is consistent with PBR requirements. VDGIF indicated that they would reach out to Jeff Cooper for additional eagle telemetry data.

Non-Avian Wildlife: In the April 28 meeting, VDGIF deferred to other technical experts in the agency for input on Best Management Practices to avoid and minimize impacts to non-avian Tier 1/2 species (e.g., fish, herps). In this meeting, VDGIF indicated that they would work with JD Kleopfer and Mike Pinder (VDGIF Regional Biologists) and provide recommendations on fish and herps within approximately two weeks.

II. Action Items:

During the discussions, several action items surfaced:

- Apex will complete playback surveys and habitat assessments during the last 2 breeding bird surveys as described in Attachment 1.
- VDGIF will reach out to JD Kleopfer and Mike Pinder for input on fish and herp issues and get back to Apex in a week.
- VDGIF will reach out to Jeff Cooper (VDGIF) for eagle telemetry data.

Breeding Bird Survey Protocol

BBS surveys follow PBR Guidance:

- 3 surveys conducted at least 21 days apart between May 1, 2015 and June 30, 2015 as follows: approximately May 15, June 5, and June 26.
- Survey 30 points along the length of the facilities boundary, located approximately 270-280m apart.
- Each point is surveyed visually and auditorily for 5 mins.
- Biologists conduct surveys on foot, and record incidental observations between points.

Additional surveys per VDGIF Guidance:

- Habitat evaluation for loggerhead shrike, golden-winged warbler, peregrine falcon, and Swainson's warbler.
- Playback surveys conducted as follows:
 - Northern saw-whet owl: One survey conducted in suitable habitat between dusk and midnight between June 1 and June 30, using techniques consistent with the protocol described in the *VA Society of Ornithology 2006 Foray: a focus on the Northern Saw-whet owl* provided by Sergio Harding on May 27, 2015.
 - Golden-winged warbler: Two surveys conducted in suitable habitat from sunrise to 11am between May 6 and June 15, using techniques consistent with the protocol provided by Sergio Harding via email on June 1, 2015.
 - Loggerhead shrike: Two surveys conducted in suitable habitat at least 4 days apart between April 1 and July 31, using techniques consistent with the protocol provided by Sergio Harding via email on June 1, 2015.
 - Swainson's warbler: One survey conducted in suitable habitat between May 15 and June 30, using techniques consistent with the protocol provided by Sergio Harding via email on June 4, 2015.

From: [Jennie Geiger](#)
To: Rick.Reynolds@dgif.virginia.gov; trov_andersen@fws.gov; sumalee_hoskin@fws.gov;
Ernie.Aschenbach@dgif.virginia.gov; Ray.Fernald@dgif.virginia.gov; kimberly_smith@fws.gov
Cc: [Dave Phillips](#); [Tyson Utt](#); [John Arehart III](#)
Subject: Apex-Rocky Forge Meeting Summary
Date: Wednesday, June 10, 2015 9:29:56 AM
Attachments: [image001.png](#)
[ROC Meeting Summary_VDGIF_USFWS-2015-06-10.pdf](#)

Hello all,

Attached is a summary of our June 8 bat discussion , as well as a copy of the memo presented. If you have additional comments on the meeting summary, or find that edits are needed, please let me know and I will revise accordingly; otherwise, if you could confirm that they accurately reflect our discussion and your recommendations at this time, that would be much appreciated.

Thanks,

Jennie

JENNIE GEIGER
Environmental Permitting Manager

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ROCKY FORGE WIND PROJECT – CALL SUMMARY

Meeting Attendees: Sumalee Hoskin, USFWS
Rick Reynolds, VDGIF
Ray Fernald, VDGIF
Ernie Aschenbach, VDGIF
Dave Phillips, Apex
Jennie Geiger, Apex
Tyson Utt, Apex
Karen Tyrell, WEST

Notes Prepared by: Apex

Date: June 8, 2015

On June 8, 2015, Apex Clean Energy (Apex) spoke via conference call with Virginia Department of Game and Inland Fisheries (VDGIF; Rick Reynolds, Ernie Aschenbach, and Ray Fernald) and U.S. Fish and Wildlife Service (USFWS; Sumalee Hoskin) to discuss next steps for assessing bat risk at the proposed Rocky Forge Wind Project (Project) in Botetourt County, Virginia.

Bat Risk: WEST presented the attached memo summarizing fatalities of federally protected bats at operational wind projects in the Appalachia region. USFWS indicated that there was no additional data points that they were aware of that could be added to the dataset. Both USFWS and VDGIF agreed that risk for both northern long-eared bat (NLEB) and Indiana bat (IBAT) is higher during fall migration, and that risk during spring and summer could not be discounted based on the information available for known fatalities at ridgeline projects.

Bat Surveys: USFWS requested that presence/probable absence acoustic surveys be conducted according to 2015 USFWS protocol, followed by mist-netting in locations where presence is confirmed and telemetry of up to 10 individuals of federally listed species to assess presence of roost trees, exit counts if present, home range size, and bat use of the area. VDGIF requested that acoustic monitors and mist-nets be placed in optimal habitat to increase probability of detection.

Action Items: Apex will send bat study plan to VDGIF and USFWS for review/approval as soon as possible.

Attachment 1: *Indiana Bat and Northern Long-eared Bat Mortality Data at Appalachian Wind Projects* memo.



MEMORANDUM

Date: May 29, 2015
To: Dave Phillips, Apex Clean Energy, Inc. (Apex), 310 4th Street NE, Suite 200
Charlottesville, VA 22901
From: Karen Tyrell, PhD, Western EcoSystems Technology, Inc. (WEST)
Subject: Indiana Bat and Northern Long-Eared Bat Mortality Data at Appalachian Wind
Projects

This memo provides table and a map summarizing the publicly-available information documenting fatalities of federally endangered Indiana bats (*Myotis sodalis*; INBA) and federally threatened northern long-eared bats (*M. septentrionalis*, NLEB) at operational utility-scale wind energy generation projects, and identifies projects in the Appalachian region.

Summary Tables and Figure

Table 1 documents collision-related mortality of these species at wind energy facilities in the U.S. and Canada. Fatalities recorded within the Indiana bat Appalachian Mountain Recovery Unit are also identified in Table 1.

Table 2 summarizes results of studies of the reduction in bat fatalities observed under turbine blade feathering and curtailment at wind energy facilities in the U.S. and Canada. Studies completed within the Indiana bat Appalachian Mountain Recovery Unit are also identified in Table 2.

Figure 1 shows the distribution of INBA and NLEB mortalities within Appalachian Mountain region.

Overview of Turbine Blade Curtailment / Operations and *Myotis* Fatalities

As indicated in Table 1, one Indiana bat was found at the Fowler Ridge Wind Farm in Indiana at a turbine with a raised cut-in speed of 5.0 m/s (Good et al. 2011). However, the turbine operational protocol for the 2010 curtailment study at Fowler did not include feathering below cut-in speed. No northern long-eared bat fatalities have been found at turbines feathered below normal cut-in speed or operating under a raised cut-in speed protocol. The highest cut-in speed protocol for a turbine at which a *Myotis* (little brown bat [*Myotis lucifugus*]) fatality has been found is 6.5 m/s; this fatality occurred at the Casselman wind facility in Pennsylvania and turbines were feathered under cut-in speeds during this study (Arnett et al. 2010).

Little brown bats have also been found as fatalities at turbines feathered under cut-in speeds of 5.5 m/s (n=4, Summerview, Alberta, Baerwald et al. 2009); 4.0 m/s (n=8, Summerview, Alberta, Baerwald et al. 2009) (n=7, Mount Storm, West Virginia, Young et al. 2011); and 3.5 m/s (n=1, Fowler Ridge, Indiana, Good et al. 2012). One long-legged myotis (*Myotis volans*) was also found at a turbine feathered under 5.5 m/s at the Summerview wind facility in Alberta (Baerwald et al. 2009). Sample size is too limited to establish mean percent reductions in *Myotis* fatality across varying cut-in speeds.

Table 1. Publicly-available records of Indiana bat and northern long-eared bat fatalities to date at wind energy facilities in the U.S. and Canada; fatalities recorded within the Indiana bat Appalachian Mountain Recovery Unit are in bold font.

Project Name	State/ Province	County	Date	WNS Status ¹	Reference	Survey Dates
Indiana bat fatalities (one per row) N = 7						
Fowler Ridge	IN	Benton	9/11/2009	Pre	Good et al. 2011	4/6-10/30/2009
Fowler Ridge*	IN	Benton	9/18/2010	Pre	Good et al. 2011	4/13-5/15/2010, 8/1-10/15/2010
Blue Creek	OH	Van Wert	10/3/2012	Post	USFWS 2012a, Pruitt and Okajima 2013	Not public
North Allegheny	PA	Blair, Cambria	9/26/2011	Transition	USFWS 2011	4/1-11/15/2011***
Laurel Mountain	WV	Barbour, Randolph	7/8/2012	Post	USFWS 2012b	Not public
Anonymous	OH	Unknown	Spring 2014	Post	M. Reed, USFWS, pers. comm.	Not public
Anonymous	OH	Unknown	Fall 2013	Post	M. Reed, USFWS, pers. comm.	Not public
Northern long-eared bat fatalities (one per row), N = 41						
Anonymous	IA	Anonymous	8/10/2013	Transition	M. Turner, pers. comm.	Not public
Anonymous	IA	Anonymous	8/22/2013	Transition	M. Turner, pers. comm.	Not public
Anonymous	IL	Anonymous	9/25/2013	Transition	M. Turner, pers. comm.	Not public
Fowler Ridge	IN	Benton	8/25/2009	Pre	Good et al. 2011	4/6-10/30/2009
Criterion	MD	Garrett	7/22/2011	Pre	Young et al. 2013	4/5-11/15/2011
Anonymous	MI	Anonymous	7/10/2014	Transition	M. Turner, pers. comm.	Not public
Anonymous	MO	Anonymous	2009 ⁵	Pre	M. Turner, pers. comm.	Not public
Cohocton/Dutch Hills	NY	Stueben	6/22/2010	Post	Stantec 2011a	4/26-10/22/2010
Noble Ellenburg	NY	Clinton	8/2008	Pre	Jain et al. 2009	4/28-10/13/2008
Noble Wethersfield	NY	Wyoming	6/11/2010	Post	Jain et al. 2011	4/26-10/15/2010
Noble Wethersfield	NY	Wyoming	7/17/2011**	Post	Kerlinger et al. 2011	8/1-9/30/2011
Noble Wethersfield	NY	Wyoming	8/6/2011	Post	Kerlinger et al. 2011	8/1-9/30/2011
Noble Wethersfield	NY	Wyoming	8/18/2011	Post	Kerlinger et al. 2011	8/1-9/30/2011
Noble Wethersfield	NY	Wyoming	9/2/2011	Post	Kerlinger et al. 2011	8/1-9/30/2011
Noble Wethersfield	NY	Wyoming	9/3/2011	Post	Kerlinger et al. 2011	8/1-9/30/2011

Rocky Forge

Project Name	State/ Province	County	Date	WNS Status¹	Reference	Survey Dates
Steel Winds	NY	Erie	2007 ²	Pre	Grehan 2008	4/3-10/16/2007
Steel Winds	NY	Erie	2007 ²	Pre	Grehan 2008	4/3-10/16/2007
Steel Winds	NY	Erie	2007 ²	Pre	Grehan 2008	4/3-10/16/2007
Steel Winds	NY	Erie	2007 ²	Pre	Grehan 2008	4/3-10/16/2007
Steel Winds	NY	Erie	2007 ²	Pre	Grehan 2008	4/3-10/16/2007
Steel Winds	NY	Erie	2007 ²	Pre	Grehan 2008	4/3-10/16/2007
Erie Shores	Ontario	Norfolk	8/30/2007	Pre	James 2008	March, May to mid-June, mid-August to early November 2006 & 2007
Erie Shores	Ontario	Norfolk	5/25/2007	Pre	James 2008	March, May to mid-June, mid-August to early November 2006 & 2007
Erie Shores	Ontario	Norfolk	6/11/2007	Pre	James 2008	March, May to mid-June, mid-August to early November 2006 & 2007
Erie Shores	Ontario	Norfolk	6/12/2007	Pre	James 2008	March, May to mid-June, mid-August to early November 2006 & 2007
Erie Shores	Ontario	Norfolk	8/28/2007	Pre	James 2008	March, May to mid-June, mid-August to early November 2006 & 2007
Erie Shores	Ontario	Norfolk	8/28/2007	Pre	James 2008	March, May to mid-June, mid-August to early November 2006 & 2007
Kingsbridge I	Ontario	Huron	10/5/2006	Pre	Stantec 2007	5/2-5/23, 9/6-10/26/2006
Ripley	Ontario	Bruce	9/5/2008	Pre	Jacques Whitford 2009	4/14-5/30, 7/2- 10/17/2008
Ripley	Ontario	Bruce	8/4/2008	Pre	Jacques Whitford 2009	4/14-5/30, 7/2- 10/17/2008
Meyersdale	PA	Somerset	9/13/2004	Pre	Arnett et al. 2005	7/31-9/13/2004
Meyersdale	PA	Somerset	9/11/2004	Pre	Arnett et al. 2005	7/31-9/13/2004
PGC site 2-14³	PA	n/a	9/2009	Pre	J. Taucher, PGC, pers. comm.	4/1-11/15/2011***
PGC unknown site³	PA	n/a	7/2012	Post	J. Taucher, PGC, pers. comm.	4/1-11/15/2011***

Rocky Forge

Project Name	State/ Province	County	Date	WNS Status ¹	Reference	Survey Dates
Mount Storm	WV	Grant	8/26/2008	Pre	Young et al. 2009	7/18-10/17/2008
Mountaineer	WV	Tucker	8/18/2003	Pre	Kerns and Kerlinger 2004	4/4-11/11/2003
Mountaineer	WV	Tucker	2003 ⁴	Pre	Kerns and Kerlinger 2004	4/4-11/11/2003
Mountaineer	WV	Tucker	2003 ⁴	Pre	Kerns and Kerlinger 2004	4/4-11/11/2003
Mountaineer	WV	Tucker	2003 ⁴	Pre	Kerns and Kerlinger 2004	4/4-11/11/2003
Mountaineer	WV	Tucker	2003 ⁴	Pre	Kerns and Kerlinger 2004	4/4-11/11/2003
Mountaineer	WV	Tucker	9/8/2003	Pre	Kerns and Kerlinger 2004	4/4-11/11/2003

- ¹ WNS status provided by R. Niver, USFWS, pers. comm. for northeast projects and by WNS map (<http://www.whitenosesyndrome.org/resources/map>)
- ² NYSDEC identified the bat species for this survey and provided the information via pers. comm. with WEST; species were not included in the original report.
- ³ Sites participating in the PGC WEVCA are not identified by name.
- ⁴ Study reported that northern long-eared bat fatalities were first recorded on 8/18/2003 and last recorded on 9/8/2003 but did not provide dates for each fatality.
- ⁵ Northern long-eared bat fatality occurred between 5/16/2009 and 11/15/2009.
- * Indiana bat fatality occurred at a turbine with cut-in speed raised to 5.0 m/s, but turbine operational protocol did not include feathering below the cut-in speed.
- ** Incidental find during carcass clearing sweeps prior to start of standardized survey effort.
- *** Standardized post-construction monitoring period in the PGC WEVCA (Taucher et al. 2012).

Table 2. Results from publicly-available studies of the reduction in bat fatalities observed under turbine blade feathering and curtailment (Treatment); studies within the Indiana bat Appalachian Mountain Recovery Unit are in bold font.

Study Name	Manufacturer's Rated Cut-in Speed (m/s)	Treatment Cut-in Speed (m/s)	Mean Percent Reduction in Fatalities	Mean Percent Reduction in Fatalities Per Cut-in Speed	Source
Fowler Ridge, IN 2011	3.5	3.5	36	36	Good et al. 2012
Mount Storm, WV 2010^a	4.0	4.0	35		Young et al. 2011
Summerview, Alberta	4.0	4.0	57	46	Baerwald et al. 2009
Fowler Ridge, IN 2011	3.5	4.5	57		Good et al. 2012
Anonymous Project (AN01), USFWS Region 3	3.5	4.5	47		Arnett et al. 2013
Wolfe Island, Lake Ontario	4.0	4.5	48	51	Stantec 2011b
Casselman, PA 2008	3.5	5.0	82		Arnett et al. 2010
Casselman, PA 2009	3.5	5.0	72		Arnett et al. 2010
Fowler Ridge, IN 2010 ^b	3.5	5.0	50		Good et al. 2011
Criterion, MD 2012^c	4.0	5.0	62	61	Young et al. 2013
Pinnacle, WV 2012	3.0	5.0	47		Hein et al. 2013
Pinnacle, WV 2013	3.0	5.0	54		Hein et al. 2014
Summerview, Alberta	3.5	5.5	60		Baerwald et al. 2009
Fowler Ridge, IN 2011	4.0	5.5	73		Good et al. 2012
Anonymous Project (AN01), USFWS Region 3	3.5	5.5	72	66	Arnett et al. 2013
Wolfe Island, Lake Ontario	4.0	5.5	60		Stantec 2011b
Sheffield, VT ^d	4.0	6.0	60	60	Arnett et al. 2013
Casselman, PA 2008	3.5	6.5	82		Arnett et al. 2010
Casselman, PA 2009	3.5	6.5	72		Arnett et al. 2010
Fowler Ridge, IN 2010 ^b	3.5	6.5	78	77	Good et al. 2011
Pinnacle, WV 2013	3.0	6.5	76		Hein et al. 2014
Beech Ridge, WV	3.5	6.9	89^e		Tidhar et al. 2013
Beech Ridge, WV	3.5	6.9	97^e	93	Young et al. 2014

Table 2. Results from publicly-available studies of the reduction in bat fatalities observed under turbine blade feathering and curtailment (Treatment); studies within the Indiana bat Appalachian Mountain Recovery Unit are in bold font.

Study Name	Manufacturer's Rated Cut-in Speed (m/s)	Treatment Cut-in Speed (m/s)	Mean Percent Reduction in Fatalities	Mean Percent Reduction in Fatalities Per Cut-in Speed	Source
^a Based on the average reduction of 47% and 22% from first and second halves of the night; an average reduction of 61% (72% and 50% from first and second halves of the night) was realized when comparing only nights when treatments were in place (32% and 40% of the time for the first and second halves of the night) to nights when treatments were not in place ^b Study did not include feathering below cut-in speed ^c Percent reduction is based upon comparison to the previous year's results from mortality monitoring because there were no control turbines during the year the study was implemented ^d Raised cut-in speeds were applied only when temperatures were above 9.5 °C ^e Percent reduction based on comparison to average bat mortality at two other West Virginia projects, likely indicative of what impacts would have been at the site in the absence of feathering					

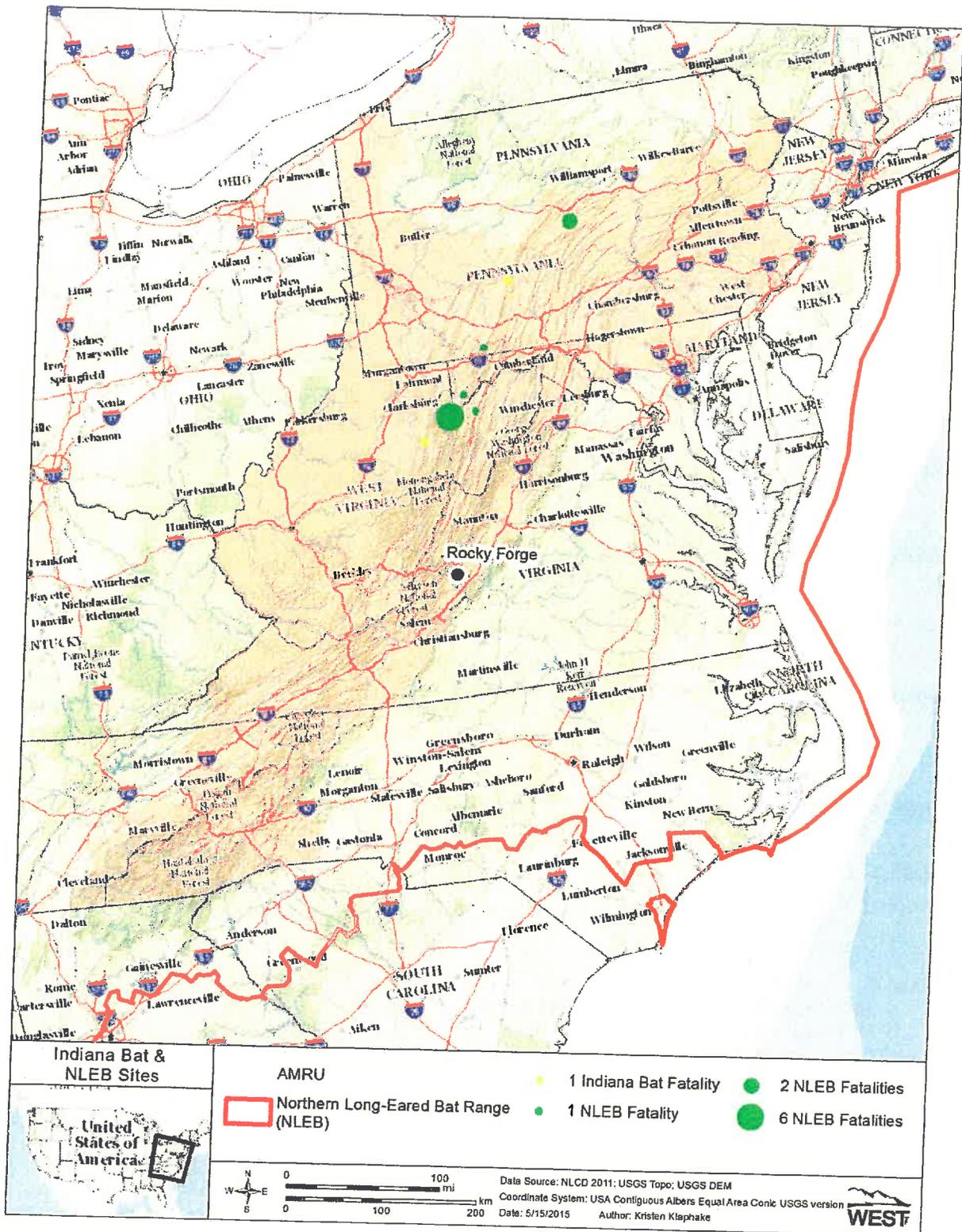


Figure 1. Publicly reported Indiana bat fatalities at wind energy generation projects in the Appalachian Mountain region.

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From: [Sumalee Hoskin](#)
To: [Chris Leftwich](#)
Cc: [Dave Phillips](#); [Jennie Geiger](#); [Tyson Utt](#); [Sarah Nystrom](#); [Troy Andersen](#)
Subject: RE: Rocky Forge - Additional Survey Effort
Date: Thursday, August 6, 2015 3:44:18 PM

Dear Chris,

This message responds to the study plan received August 6, 2015 for the federally listed threatened Northern long-eared bat (*Myotis septentrionalis*) associated with the Southwest ridge addition of the Rocky Forge Wind Facility in Botetourt County. The following comments are provided under provisions of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended.

Your proposed bat survey plan follows the U.S. Fish and Wildlife Service's April 2015 Range-wide Indiana Bat Summer Survey Guidance. We concur with your proposed bat survey plan. Your plan did not specify you will follow the most recent White Nose Syndrome Decontamination Protocol. As a reminder, please follow the protocol.

Upon completion of the bat survey, submit the results to this office for review.

Please let me know if you have any questions.

Sumalee

Sumalee Hoskin

US Fish & Wildlife Service

6669 Short Lane

Gloucester, VA 23061

Tel: 804-693-6694 ex. 2414

Fax: 804-693-9032

Cell: 804-654-1824

Visit us at <http://www.fws.gov/northeast/virginiafield/>

-----Original Message-----

From: Chris Leftwich [<mailto:cleftwich@copperheadconsulting.com>]
Sent: Thursday, August 06, 2015 2:17 PM
To: 'Sumalee Hoskin'
Cc: Dave Phillips (dave.phillips@apexcleanenergy.com);
'jennie.geiger@apexcleanenergy.com'; Tyson Utt (tyson.utt@apexcleanenergy.com)
Subject: Rocky Forge - Additional Survey Effort

Sumalee, please see attached Study Plan to conduct a presence/absence mist-net survey per your recommendations for the additional ridge near Rocky Forge. If you have any questions or would like to discuss over the phone, I'm available today and tomorrow.

Thanks again for your time,

Chris Leftwich

Biologist/Project Manager

Copperhead Environmental Consulting, Inc.

11641 Richmond Rd.

P.O. Box 73

Paint Lick, KY 40461

859-339-9410 - Mobile

859.925.9012 - Office

859.925.9816 - Fax

www.copperheadconsulting.com<<http://www.copperheadconsulting.com/>>

[Copperhead logo round]

From: [Reynolds, Rick \(DGIF\)](#)
To: [Dave Phillips](#)
Cc: [Tyson Utt](#); [Jennie Geiger](#)
Subject: RE: Follow Up To Our Conversation
Date: Wednesday, August 5, 2015 2:27:58 PM
Attachments: [image001.png](#)

Dave,

VDGIF is in concurrence that the work conducted by Copperhead to assess presence/absence of listed species is sufficient to meet the PBR requirements and/or guidance. Please let me know if you need anything else.

Rick Reynolds
Wildlife Biologist
Virginia Department of Game and Inland Fisheries
P.O. Box 996
Verona, VA 24482
540-248-9360

From: Dave Phillips [<mailto:dave.phillips@apexcleanenergy.com>]
Sent: Wednesday, August 05, 2015 1:28 PM
To: Reynolds, Rick (DGIF)
Cc: Tyson Utt; Jennie Geiger
Subject: RE: Follow Up To Our Conversation

Rick, the question is more related to the survey requirements for acoustic monitoring on the met towers. I think Jennie sort of took us off track with the comment about modification of operations. Modifications during migration is logical to expect at this site, but I'm not sure we are vetting that issue at this stage with you. That seems to be something we will need to dive into carefully once all the data is on the table. We have confirmed N. long-eared presence during summer on the north end of the project, so there is plenty to discuss with both you and FWS on that topic going fwd.

The confirmation we were seeking is more related to the presence/absence work being sufficient. Since we have agreed verbally that acoustic met tower work isn't being conducted, and that the presence/absence work being done by Copperhead to assess listed bats is sufficient to meet PBR requirements. So, we want to make sure VDGIF is "on record" in writing as agreeing that meets the requirements to avoid any late stage surprises. Does that make sense?

Thanks, Dave

DAVE PHILLIPS
office: [434-282-2104](tel:434-282-2104) (x3051) | cell: [434-906-9127](tel:434-906-9127)
dave.phillips@apexcleanenergy.com



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From: [Nystrom, Sarah](#)
To: [Dave Phillips](#); [Jennie Geiger](#)
Subject: Rocky Forge Term Sheet
Date: Tuesday, August 9, 2016 1:37:27 PM

We have reviewed the term sheet received on July 8, 2016 for the Rocky Forge Wind Project. The following comments are provided under provisions of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884)(ESA), as amended, and Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d, 54 Stat. 250), as amended.

The proposed design, construction, and operational conservation plan terms are consistent with our recommendations. The federally listed endangered Indiana bat (*Myotis sodalis*) and federally listed threatened Northern long-eared bat (*Myotis septentrionalis*) are not likely to be adversely affected by the proposed and ongoing actions if the established avoidance and minimization measures are followed, and an incidental take permit under Section 10 of the ESA would not be suggested. Design and construction activities proposed to be conducted by Rocky Forge Wind, LLC are consistent with the conservation measures outlined in the ESA 4(d) rule for the Northern long-eared bat (81 Federal Register 1900-1922). Proposed level of effort for post-construction bat fatality monitoring is consistent with our recommendations, details of the monitoring protocols will be developed and finalized through future coordination.

Please feel free to let me know if you have any questions.

Sarah

--

Sarah Nystrom
Fish and Wildlife Biologist
Virginia Field Office - Ecological Services
6669 Short Lane
Gloucester, Virginia 23061
(804) 824-2413

Federally Listed Bat Term Sheet

Rocky Forge Wind Project

The following document addresses the key components of a conservation plan that Rocky Forge Wind, LLC proposes for federally listed bat species to support issuance of a Technical Assistance Letter (TAL) from the U.S. Fish and Wildlife Service (USFWS). The terms outlined below will be incorporated into a Bird and Bat Conservation Strategy (BBCS) intended to reduce risk of effects for listed bat species to insignificant and discountable levels so the project can be constructed and operated without need for incidental take authorization from USFWS. Terms presented result from coordination with USFWS during development of the project.

Proposed Conservation Plan Terms:

Design and Construction:

- (1) Minimize impacts to forested areas to the extent practicable.
- (2) Unless otherwise approved by USFWS, avoid tree clearing as follows:
 - Within 5 miles of Perry's Saltpetre cave – Apr 1 – Nov 15
 - Within 150 feet of identified northern long-eared bat roost trees – Apr 1 – Sep 15
- (3) Avoid removal of identified roost trees to the extent practicable.
- (4) Begin blasting by May 1 so that roosting bats have time to habituate and/or select maternal roost sites away from project activity.

Operations:

- (1) Curtail all turbines (i.e., feather blades) from sunset to sunrise to minimize collision risk while listed bats may be active onsite (May 15 to Nov 15) at winds below 6.9 m/s when temperatures are >38°F.
- (2) Conduct post-construction bat fatality monitoring from Apr 1 – Nov 15, for 1 or 2 years based on methods to be approved by USFWS, currently proposed as:
 - a. 20% turbines will be searched with cleared-plot surveys (up to 50-m radius depending on terrain), 80% turbines road and pad surveys, with roads evaluated out to 90 meters.
 - b. During the fall bat migration period (Aug 1-Nov 15), surveys will be conducted twice per week from Aug 1-Aug 31, and weekly from Sep 1-Nov 15.
 - c. During spring and summer (Apr 1-Jul 31), surveys will be conducted weekly.

Reporting and Adaptive Management:

- (1) Results of operational monitoring studies will be discussed annually with USFWS.
- (2) Cut in speeds may be reduced if no listed bats are detected during monitoring and data indicates reductions are appropriate.
- (3) If listed bats are detected, Rocky Forge will notify USFWS within 48 hrs and meet and confer with USFWS to address identified issues.

From: [Nystrom, Sarah](#)
To: [Dave Phillips](#); [Jennie Geiger](#); [Charlie Johnson](#)
Subject: Rocky Forge Wind Project – Stream Impacts
Date: Thursday, January 28, 2016 10:45:55 AM

We have reviewed the project package received on December 29, 2015 for the referenced project. The following comments are provided under provisions of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended, and Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c, 54 Stat. 250), as amended.

We concur with the determinations provided in the Species Conclusion Table dated December 18, 2015 and have no further comments. Should project plans change or if additional information on the distribution of listed species or critical habitat becomes available, this determination may be reconsidered. If you have any questions, please contact me at (804) 824-2413, or via email at Sarah_Nystrom@fws.gov.

Thanks!

Sarah

--

Sarah Nystrom
Fish and Wildlife Biologist
Virginia Field Office - Ecological Services
6669 Short Lane
Gloucester, Virginia 23061
(804) 824-2413

From: [Nystrom, Sarah](#)
To: [Dave Phillips](#); [Jennie Geiger](#)
Subject: Rocky Forge Wind Project- Stream Impacts
Date: Monday, May 23, 2016 10:32:21 AM

We have reviewed the updated project package received on April 19, 2016 for the referenced project. The following comments are provided under provisions of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended, and Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c, 54 Stat. 250), as amended.

We concur with the determinations provided in the Species Conclusion Table dated December 18, 2015, which did not change with the new project description and have no further comments. Should project plans change or if additional information on the distribution of listed species or critical habitat becomes available, this determination may be reconsidered. If you have any questions, please contact me at (804) 824-2413, or via email at Sarah_Nystrom@fws.gov.

Thanks!

Sarah

--
Sarah Nystrom
Fish and Wildlife Biologist
Virginia Field Office - Ecological Services
6669 Short Lane
Gloucester, Virginia 23061
(804) 824-2413

From: [Nystrom, Sarah](#)
To: [Dave Phillips](#)
Cc: [Jennie Geiger](#); [Charlie Johnson](#)
Subject: Re: Rocky Forge Wind Project – Stream Impacts
Date: Tuesday, April 19, 2016 3:41:50 PM
Attachments: [image001.png](#)

Hi Dave,

Thanks for your email. You don't need to go through the project review process again, as long as there haven't been any changes to the official species list or to the species conclusion table. We'd still be reviewing for northeastern bulrush, Indiana bat and northern long-eared bat, correct? If that's the case it should be pretty straightforward.

Thanks!

Sarah

On Tue, Apr 19, 2016 at 2:10 PM, Dave Phillips <dave.phillips@apexcleanenergy.com> wrote:

Hello Sarah,

In the email below you provide USFWS concurrence with the no effect determination for T&E species impacts associated with stream and wetland crossings at the Rocky Forge Wind Project. Since then, we have made some modifications to the facilities locations in and near the streams/wetlands at the south end of the project. Impacts to the streams and wetlands have been minimized in number and extent by design; however, the modifications have been made, which differ from your initial review area:

- 1) A construction laydown area is added on the southwest side of the project
- 2) A road to access the substation has been added that will facilitate delivery of the main power transformer (very heavy piece of equipment that wouldn't fit on the Dagger Springs Road)
- 3) A slight move of the collector substation and switching station and the point of interconnection
- 4) A slight modification to the collection line home runs to the substation have been made to reduce overall environmental impacts and align with the new substation location.

Attached is a PDF showing a revised area of impact. Also attached is a .shp of the new areas (illustrated in the snip below).



Is this email acceptable for you to initiate USFWS review of the changed layout, or would you like me to submit this via the FWS project review website that I used for the initial submittal?

Thanks, Dave

DAVE PHILLIPS

office: [434-282-2104](tel:434-282-2104) | cell: [434-906-9127](tel:434-906-9127)

dave.phillips@apexcleanenergy.com



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From: Nystrom, Sarah [mailto:sarah_nystrom@fws.gov]
Sent: Thursday, January 28, 2016 10:45 AM
To: Dave Phillips <dave.phillips@apexcleanenergy.com>; Jennie Geiger <jennie.geiger@apexcleanenergy.com>; Charlie Johnson <charlie.johnson@apexcleanenergy.com>
Subject: Rocky Forge Wind Project – Stream Impacts

We have reviewed the project package received on December 29, 2015 for the referenced project. The following comments are provided under provisions of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended, and Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c, 54 Stat. 250), as amended.

We concur with the determinations provided in the Species Conclusion Table dated December 18, 2015 and have no further comments. Should project plans change or if additional information on the distribution of listed species or critical habitat becomes available, this determination may be reconsidered. If you have any questions, please contact me at (804) 824-2413, or via email at Sarah_Nystrom@fws.gov.

Thanks!

Sarah

--

Sarah Nystrom

Fish and Wildlife Biologist

Virginia Field Office - Ecological Services

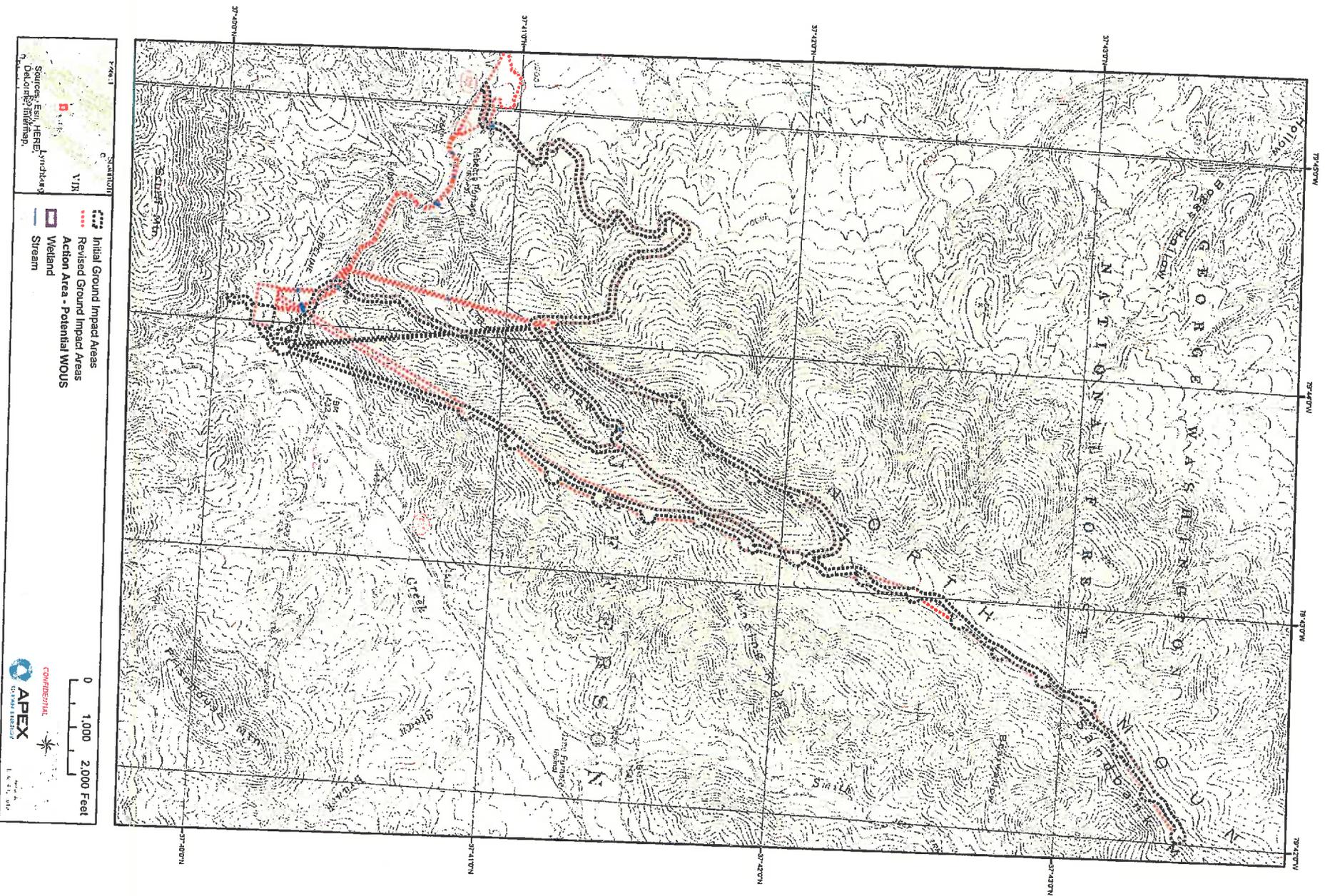
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Figure 1. Potential Waters of the U.S. Crossings (Action Area) for the utility lines and associated access roads planned for the Rocky Forge Project.



Species Conclusions Table

Project Name:

Date:

Species / Resource Name	Conclusion	ESA Section 7 / Eagle Act Determination	Notes / Documentation
Northeastern bulrush	No suitable habitat present (i.e., wetlands, sinkhole ponds or wet depressions) at stream impact areas (i.e., USACE jurisdictional area) per USFWS habitat description (https://www.fws.gov/northeast/pdf/bulrush.pdf).	No effect	USFWS species profile shows range outside Action Area (not known to occur in Botetourt County (http://ecos.fws.gov/tess_public/profile/speciesProfile?spcode=Q21H)). Although not expected on the project site, potentially suitable habitat will be avoided by project design.
Indiana bat	Species present. Tree removal at USACE crossings conducted in accordance with USFWS technical assistance.	Not likely to adversely affect	Species noted in IPaC review and VAFWIS Search Report as potentially occurring, and acoustic calls documented during summer during site-specific studies completed in 2015 (report provided to USFWS under separate cover). Tree removal in entire project area (i.e., potentially suitable habitat) conducted in accordance with USFWS technical assistance input (i.e., timing restrictions from Nov 15-Apr 1) to avoid impact. No operational measures required at USACE crossings to avoid impacts; however, turbines will be operated to avoid impacts during operations.
Northern long-eared bat	Species present. Tree removal at USACE crossings conducted in accordance with USFWS technical assistance.	Not likely to adversely affect	Species documented in IPaC review and VAFWIS Search Report as potentially occurring, and captured onsite during summer mist netting studies completed in 2015 (report provided to USFWS under separate cover). Measures required for Indiana bat avoid impacts to northern long-eared bat.
Gray bat		No effect	Species documented as potentially occurring in VAFWIS Search Report within 3 mi radius. Confirmed absent via surveys completed onsite in 2015.

Viginia big-eared bat		No effect	Species documented as potentially occurring in VAFWIS Search Report within 3 mi radius. Confirmed absent via surveys completed onsite in 2015.
James Spiny mussel		No effect	VAFWIS indicates potential to occur within 3 miles of Action Area; however, Habitat Assessment memo (Timmons Group, Dec 15, 2015; attached), concludes no effect to the species from the road or collection crossings.
Smooth Purple Coneflower		No effect	Species listed as potentially occurring in VNHD-DCR report, but habitat at USACE crossings is unsuitable (http://www.fws.gov/raleigh/species/es_smooth_coneflower.html and http://explorer.natureserve.org/servlet/NatureServe?searchName=ECHINA+CEA+LAEVIGATA ; http://explorer.natureserve.org/servlet/NatureServe?searchName=ECHINA+CEA+LAEVIGATA). Per USFWS reference (http://www.fws.gov/raleigh/species/es_smooth_coneflower.html) smooth coneflower is typically found in open woods, glades, cedar barrens, roadsides, clearcuts, dry limestone bluffs, and power line rights-of-way, usually on magnesium and calcium rich soils associated with amphibolite, dolomite or limestone (in Virginia), gabbro (in North Carolina and Virginia), diabase (in North Carolina and South Carolina), and marble (in South Carolina and Georgia). Smooth coneflower occurs in plant communities that have been described as xeric hardpan forests, diabase glades or dolomite woodlands. Optimal sites are characterized by abundant sunlight and little competition in the herbaceous layer. Natural fires, as well as large herbivores, historically influenced the vegetation in this species' range.
Critical Habitat	No critical habitat present	No effect	
Bald Eagle	Unlikely to disturb nesting bald eagles	No Eagle Act permit required	
Bald Eagle	Does not intersect with an eagle concentration area	No Eagle Act Permit required	

From: [Jennie Geiger](#)
To: [Sumalee Hoskin \(sumalee_hoskin@fws.gov\)](#); [Sarah Nystrom \(sarah_nystrom@fws.gov\)](#); [Reynolds, Rick \(DGIF.Rick.Reynolds@doif.virginia.gov\)](#)
Cc: [Dave Phillips](#); [Tyson Utt](#); [Charlie Johnson](#)
Subject: Rocky Forge Meeting Summary For Review
Date: Wednesday, September 2, 2015 9:39:56 PM
Attachments: [image001.png](#)
[ROC Meeting Summary_VDGIF USFWS 2015-09-02.pdf](#)

Hi Sumalee/Sarah/Rick –

Attached is a summary of our August 27, 2015 meeting, including the presentation. If you have comments on the meeting summary, or find that edits are needed, please let me know and I will revise accordingly before finalizing. Otherwise, if you could confirm that they accurately reflect our discussion and your recommendations at this time, that would be much appreciated. We will send the Term Sheet for review as soon as possible.

Thanks,

Jennie

JENNIE GEIGER

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ROCKY FORGE WIND PROJECT – BAT DISCUSSION

Meeting Attendees: Sumalee Hoskin, USFWS
Sarah Nystrom, USFWS
Rick Reynolds, VDGIF
Dave Phillips, Apex
Jennie Geiger, Apex
Tyson Utt, Apex
Charlie Johnson, Apex
Chris Leftwich, Copperhead Consulting
Jim Lynch, K&L Gates (by phone)

Notes Prepared by: Apex

Date: September 2, 2015

On August 27, 2015, Apex Clean Energy (Apex) met with the U.S. Fish and Wildlife Service (USFWS) and Virginia Department of Game and Inland Fisheries (VDGIF) in Charlottesville, Virginia to discuss the bat surveys completed for the Rocky Forge Wind Project and next steps to ensure regulatory compliance. It was agreed that no further data collection is warranted to address requirements under Virginia's Permit By Rule process or to enable informed decision making for Endangered Species Act compliance.

In response to the bat survey results, Apex proposed a number of avoidance measures to reduce the potential of incidental take of listed species or their habitat to insignificant and discountable levels in order to receive a Technical Assistance Letter (TAL) from USFWS for the project. USFWS noted that the timing of tree clearing and rock blasting were the primary construction issues to address. Discussion regarding potential avoidance measures led the group to decide that a term sheet, outlining the details of the construction process and proposed risk reduction/impact avoidance measures, should be provided for USFWS review and consideration, and that a TAL was an option if appropriate measures are implemented to ensure impact avoidance.

Given the project schedule, which includes a commercial operations date of 2017 and the potential need for tree clearing/blasting during the winter of 2016-17, the group agreed that decisions regarding appropriate impact avoidance measures for issuance of a TAL should be completed within approximately 2 months.

Action Items:

- Apex will send a term sheet to USFWS for review as soon as possible.
- USFWS will review existing ridgeline projects and assess impact avoidance measures for inclusion in a TAL.
- Apex will prepare a Bird and Bat Conservation Strategy that incorporates TAL considerations.



Rocky Forge Wind Project

USFWS-VADGIF Meeting

August 27, 2015

CONFIDENTIAL BUSINESS INFORMATION

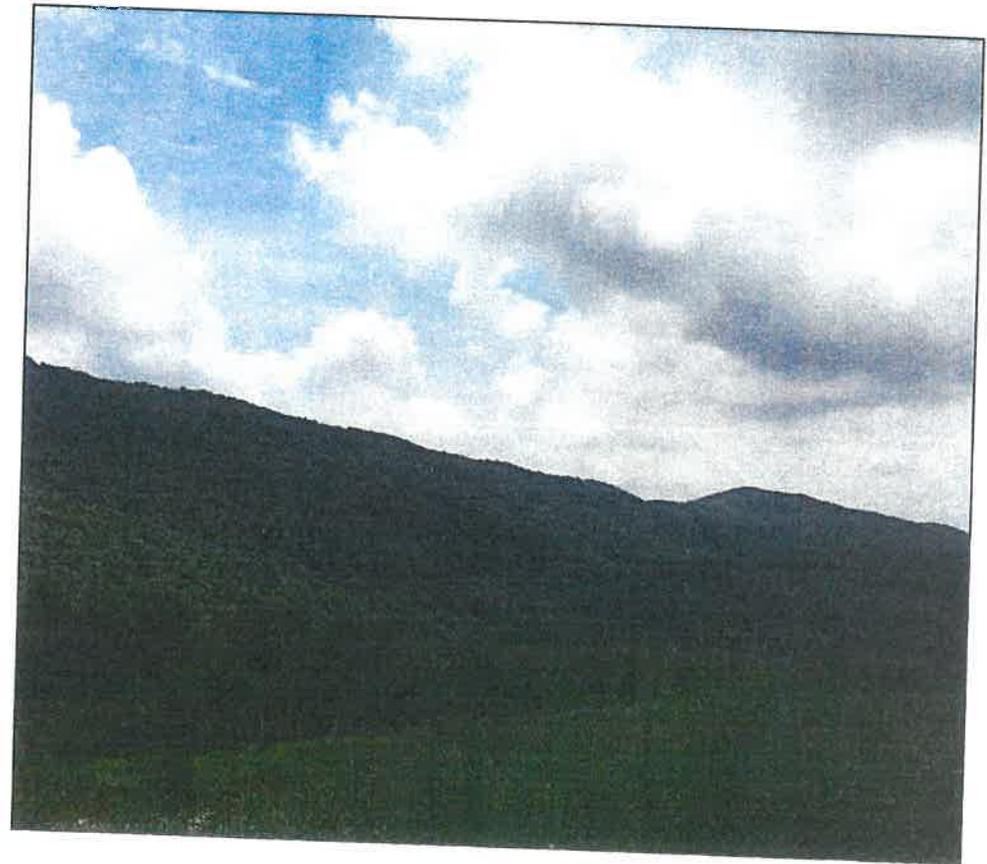
Agenda and Goals

Agenda

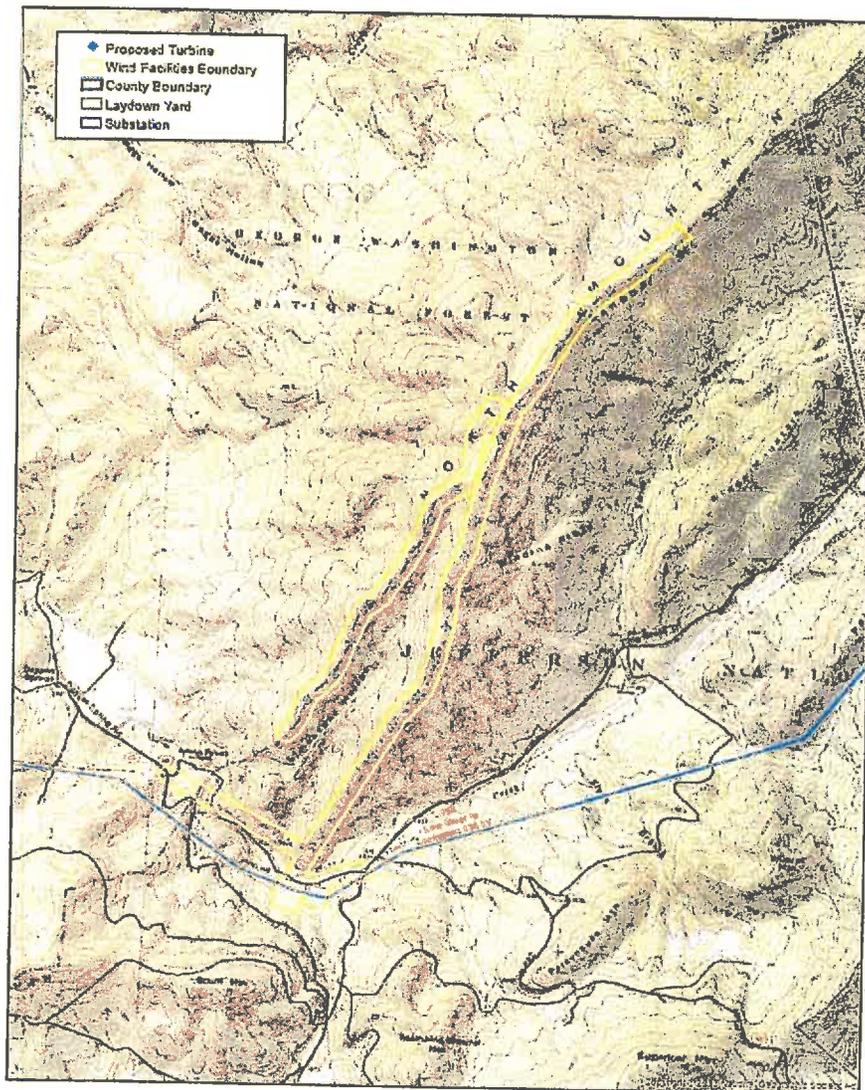
- Project Status Update
- Bat Survey Review
- Discuss Next Steps
 - Impact avoidance
 - Permitting options if needed

Goals

- USFWS/VDGIF/Apex Coordination
- Agency Concurrence on Next Steps to ensure ESA compliance



Rocky Forge – Botetourt County, Virginia



Project Capacity

Up to 80 MW

Up to 25 turbines

Commercial Operations

December 2017

Project Drivers

Demand for New Clean & Renewable Energy

Verified Wind Resource

Strategic Location to Utilize Existing Power Grid

Accessible from Existing Highways

Minimizes Impact to Sensitive Habitat

Project Status

Historic Met Tower and SoDAR Data

Two MET Towers installed, one more planned

PJM Feasibility Study of Existing Onsite Transmission Line Complete

Agency, County, Stakeholder Consultation Ongoing

Onsite Wildlife Studies Complete

Meeting Objectives

Agency Input on Listed Bat Study Results

Coordination to ensure Regulatory Compliance

Bat Activity Summary (Apr 27 – Nov 11, 2010 Acoustic Study)

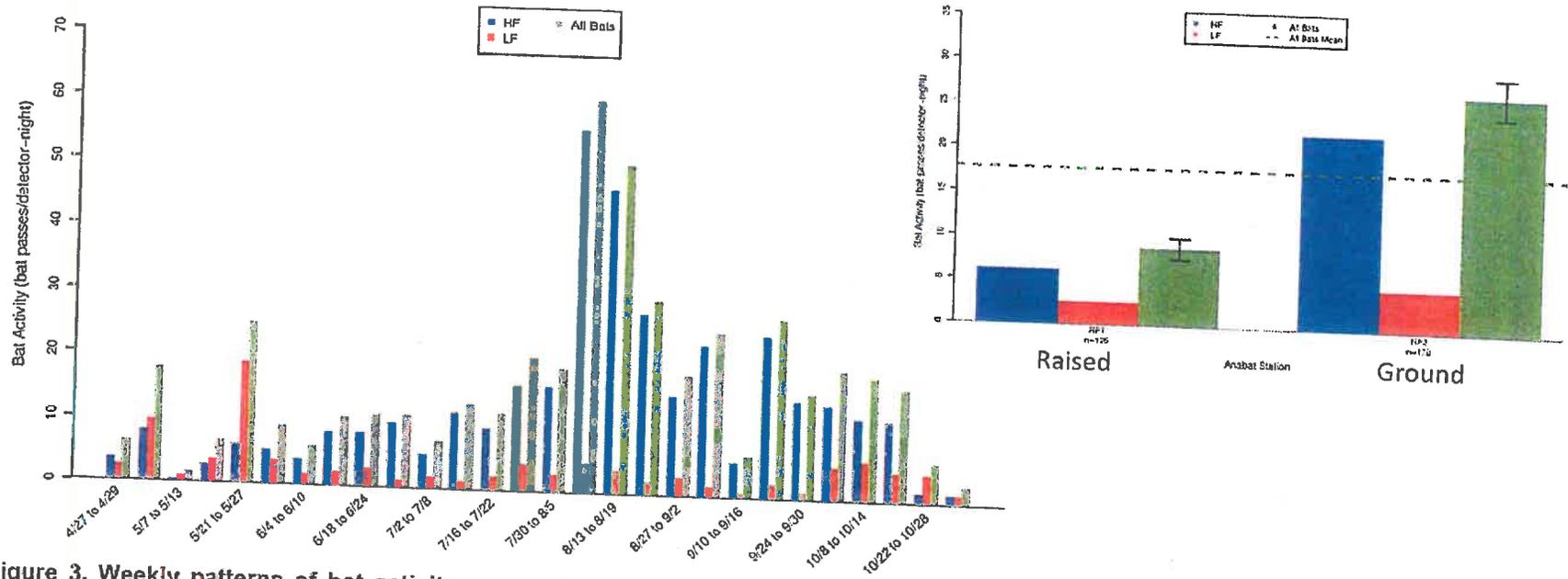


Figure 3. Weekly patterns of bat activity among fixed stations within the Rocky Ford Wind Resource Area for the study period April 27 to November 1, 2010.

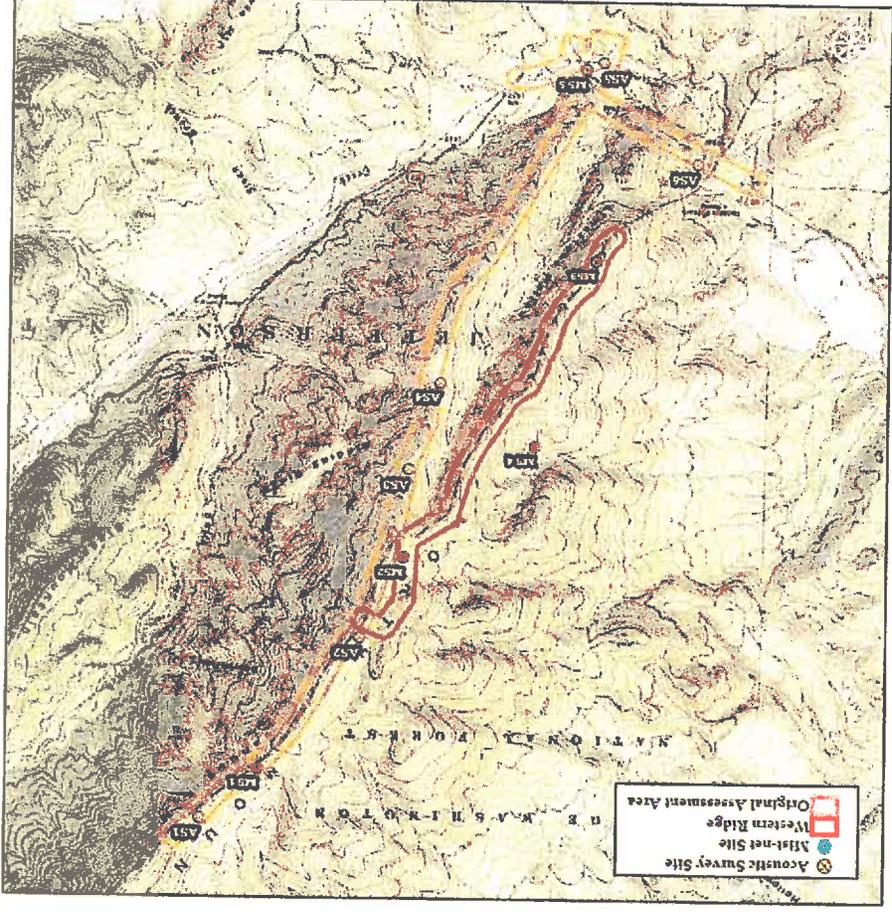
- 1 ground / 1 raised units, 303 detector nights, 5,849 bat passes
- Very low use at raised unit
- HF = 80% of calls (Eastern Red, Hoary), LF = 20% of calls
- HF peak in early August
- Conclusion: low risk site, fall migration warrants consideration
- Expected impacts comparable to other NE US wind projects

Listed Bat Surveys – Methods (Summer 2015)

Surveys followed USFWS approved study plans and protocols

- Acoustic Surveys
 - Conducted within original assessment area (eastern ridge/access road/POI area)
 - July 6 – 7, 2015
 - 6 acoustic sites, 12 detector nights
 - Acoustic data analyzed using BCID, Kaleidoscope Pro, and manually

- Mist-net Surveys
 - Jul 13-16 (original assessment area)
 - 3 net sites based on acoustic surveys; 26 net nights
 - Aug 11-14 (western ridge)
 - 2 net sites; 16 net nights

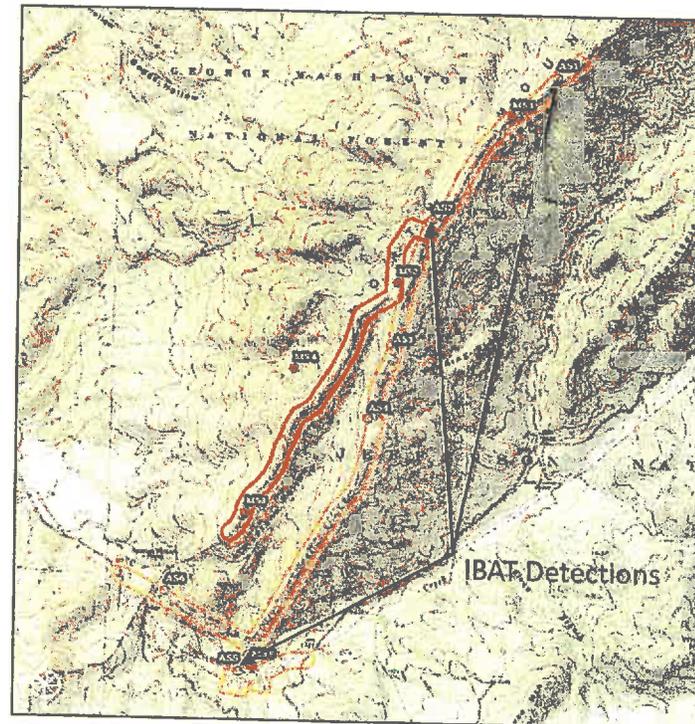


Listed Bat Surveys – Acoustic Results

Results

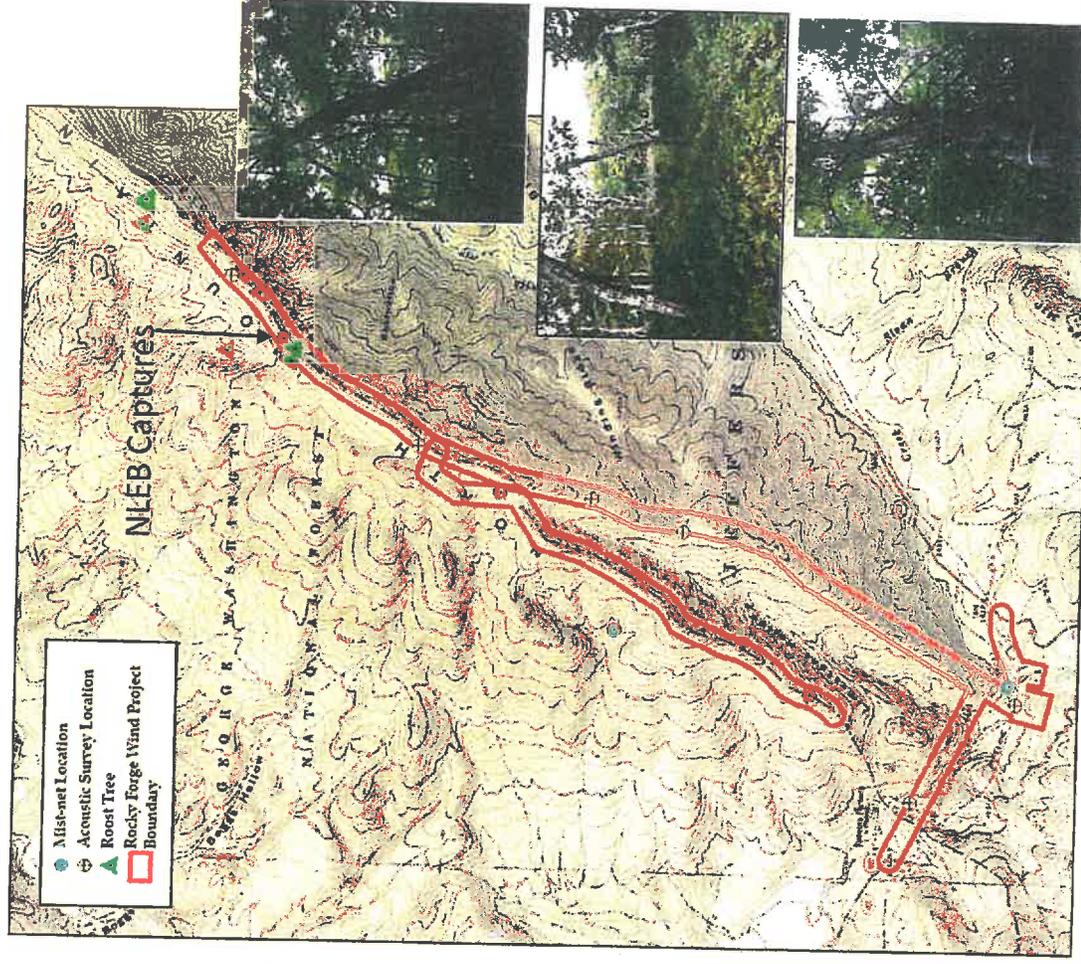
- 1,498 call files recorded
- BCID indicated potential call files of gray bat (79), Indiana bat (13) and northern long-eared bat (1)
 - Of these Kaleidoscope indicated 19 were potential gray bat and 4 were potential Indiana bat calls
- Manual interpretation indicated 5 potential Indiana bat calls (under evaluation)

	BCID	Manual
Indiana bat	13	5
N. long-eared bat	1	0
Gray bat	79	0
VA big-eared bat	0	0



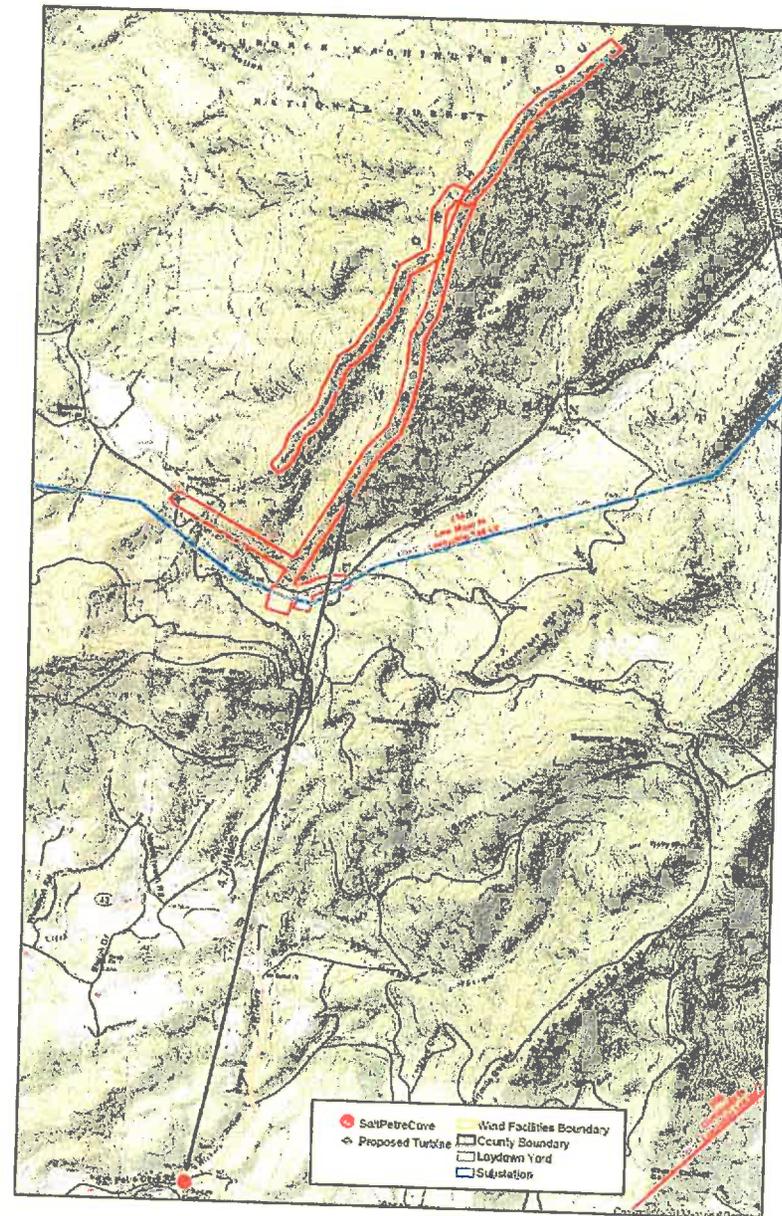
Listed Bat Surveys – Mist Nest Results

- 4 species captured
 - Northern long-eared (3)
 - Big brown bat (16)
 - Eastern red bat (9)
 - Eastern small-footed (3)
 - 31 total bats, no Indiana bat
- Northern Long-eared Bat
 - Captures limited to northernmost site
 - 2F, 1M captured
 - All 3 tracked for 7 days
 - 12 roost trees located
 - 24 emergence counts
 - Median count = 1
 - Max count = 10
- Indiana Bat
 - None captured
 - Possible misidentification from acoustics
 - Low density use possible



Hibernacula Data

- Perry Saltpeter
 - Approximately 4.7 miles south of nearest proposed turbine
 - 4 Indiana bat, 37 tri-colored, 227 little brown bats in winter 2014/15 (VDGIF)
- Distance to hibernacula suggests:
 - No risk to hibernacula
 - Low risk to fall swarming bats



Risk Assessment

- Spring Migration
 - Collision risk unlikely
- Summer
 - NLEB present on north end
 - IBAT possible
 - Low risk of impact
 - Avoidance measures warranted
- Fall Migration:
 - Collision risk probable
 - Avoidance measures warranted (also benefits non-listed bats)
- Habitat
 - Winter tree removal eliminates take risk

Publicly available Indiana bat and northern long-eared bat fatalities recorded to date at wind energy generation facilities in the Indiana bat Appalachian Mountain Recovery Unit.

Project Name	State/Province	County	Date	WNS Status ¹	Reference
Indiana bat fatalities (one per row)					
North Allegheny	PA	Blair, Cambria	9/26/2011	Transition	USFWS 2011
Laurel Mountain	WV	Barbour, Randolph	7/8/2012	Post	USFWS 2012
Northern long-eared bat fatalities (one per row)					
Criterion	MD	Garrett	7/22/2011	Pre	Young et al. 2013
Meyersdale	PA	Somerset	9/13/2004	Pre	Arnett et al. 2005
Meyersdale	PA	Somerset	9/11/2004	Pre	Arnett et al. 2005
PGC site 2-14 ²	PA	n/a	9/2009	Pre	J. Taucher pers. comm.
PGC unknown site ²	PA	n/a	7/2012	Post	J. Taucher pers. comm.
Mount Storm	WV	Grant	8/26/2008	Pre	Young et al. 2009
Mountaineer	WV	Tucker	8/18/2003	Pre	Kerns and Kerlinger 2004
Mountaineer	WV	Tucker	2003 ³	Pre	Kerns and Kerlinger 2004
Mountaineer	WV	Tucker	2003 ³	Pre	Kerns and Kerlinger 2004
Mountaineer	WV	Tucker	2003 ³	Pre	Kerns and Kerlinger 2004
Mountaineer	WV	Tucker	2003 ³	Pre	Kerns and Kerlinger 2004
Mountaineer	WV	Tucker	9/8/2003	Pre	Kerns and Kerlinger 2004

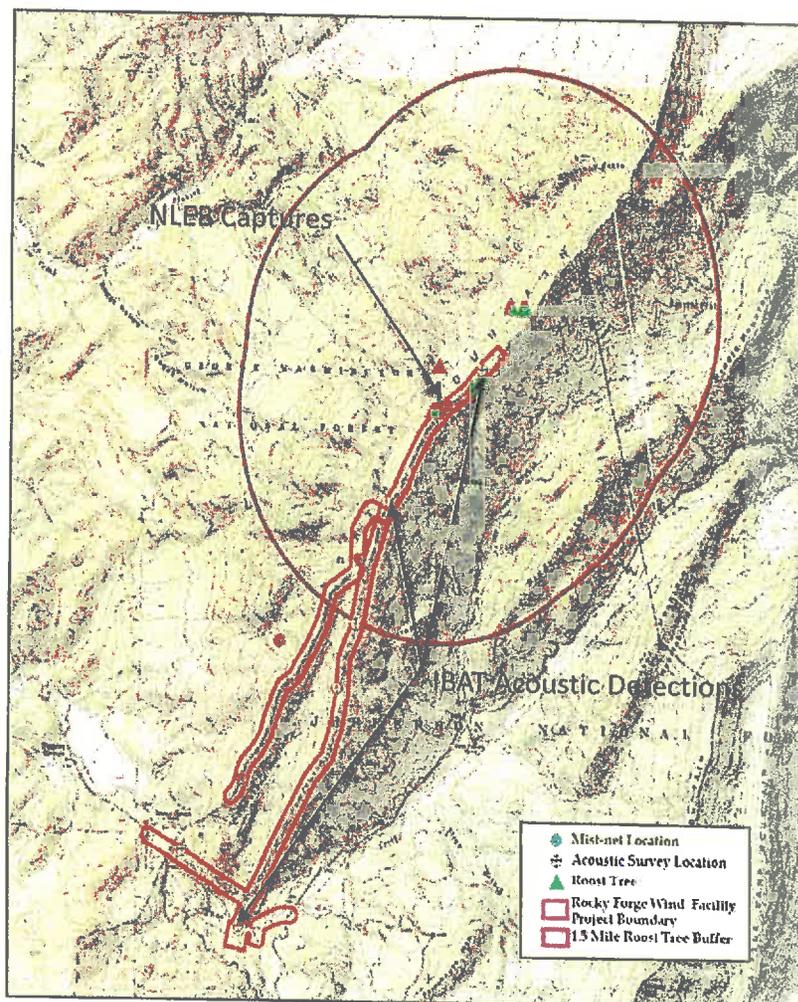
¹ WNS status source: WNS map (<http://www.white-nose-syndrome.org/resources/map>)

² Sites participating in the PGC WEVCA are not identified by name.

³ Study reported that northern long-eared bat fatalities were first recorded on 8/18/2003 and last recorded on 9/8/2003 but did not provide dates for every fatality of the species.

Proposed Avoidance Measures

- Habitat/Roost Impact Avoidance
 - Tree clearing during winter (Sep 15 – Mar 15)
- Collision Risk Avoidance
 - Spring (Apr 1 – May 15)
 - Feather to manufacturer cut in speed (all turbines)
 - Summer (May 16 – July 31):
 - 5 m/s cut-in speed curtailment within 1.5 mi of roosts
 - Manufacturer cut in speed elsewhere
 - Fall (Aug 1 - Oct 9)
 - 6.9 m/s cut-in speed curtailment (all turbines)
- Operational Monitoring
 - 2 years, 3 seasons/year
 - Roads and pads (100%)
 - Possible reduction in cut-in speed in response to findings



Next Steps

- Agency concurrence on next steps for listed bats
- Develop Bird and Bat Conservation Strategy
 - Specify details for listed bat impact avoidance measures
 - Provide to agencies for review and input
- Technical Assistance Letter
 - USFWS confirmation that take is unlikely with avoidance measures implemented
- Construction and Operations
 - Proceed to construction and operations without ESA permit recommended