Fish and Wildlife Stewardship
#304, 4920 – 51 Street
Red Deer, Alberta T4N 6K8

August 30, 2021

Mark Gallagher, Development Manager
EDF Renewables Canada Inc.
416-216-5870
Mark.Gallagher@edf-re.com

Transmitted via email

Dear Mr. Gallagher,

RE: Renewable Energy Referral Report for the Bull Trail Wind Power Project by EDF Renewables Canada Inc.

This letter is to advise that Alberta Environment and Parks – Fish and Wildlife Stewardship (AEP-FWS) Staff have completed the review of the Project proposed by EDF Renewables Canada Inc., called Bull Trail Wind Power Project. Attached is a copy of the AEP-FWS Renewable Energy Referral Report, which reviews the potential impacts of the Project on wildlife and wildlife habitat for inclusion with your application to other regulatory agencies. This review is only for the Project as it has been presented by the Proponent and any changes to the Project (footprint, layout, mitigation measures, etc.), requires further review and written acknowledgement from AEP-FWS to ensure wildlife and habitat are protected.

Sincerely,

Jason Unruh, M.Sc.
Wildlife Biologist, Renewable Energy Projects
Alberta Environment and Parks – Fish and Wildlife Stewardship
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cc:
AEP.RenewableSSR@gov.ab.ca
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Stephen Glendinning, Solas Energy Consulting Inc., sglendinning@solasenergyconsulting.com

Alberta Environment and Parks – Fish and Wildlife Stewardship - Renewable Energy Referral Report

A. ALBERTA ENVIRONMENT AND PARKS – FISH AND WILDLIFE STEWARDSHIP (AEP-FWS) REVIEW

The Bull Trail Wind Power Project (the Project) proposed by EDF Renewables Canada Inc. (the Proponent) was reviewed by the Alberta Environment and Parks – Fish and Wildlife Stewardship (AEP-FWS) regional wildlife contact for renewable energy projects. AEP-FWS has reviewed the proposed location, mitigation strategies, including associated infrastructure and construction plans, and post-construction monitoring and mitigation program, as presented by the Proponent in a submission dated January 19, 2021 and accepted by AEP-FWS on January 22, 2021.

Documents reviewed by AEP-FWS and collectively referred to as the *Project Submission* throughout this referral report, include:

- *Renewable Energy Project Submission Bull Trail Wind Power Project;* 254 pages, dated January 19, 2021
- *2021-06-29 AEP Initial Review Questions_Bull Trail Wind Project V2.0;* Excel spreadsheet; dated June 29, 2021
- *Bull Trail Snake Protection Plan V2.0;* 6 pages; dated June 29, 2021

Note: various clarifications and edits of the original documents are discussed in the subsequent files and these changes are to supersede the original documents.

The AEP-FWS review of the Bull Trail Wind Power Project was guided by the AEP-FWS policy document, *Wildlife Directive for Alberta Wind Projects* (September 2018; hereafter called the *Directive*) and the *Post-Construction Survey Protocols for Wind and Solar Energy Projects (*January 2020; hereafter called the *PCMP Protocol*). The Proponent must follow the *Directive* and *PCMP Protocol* for requirements on siting, pre-construction surveys, construction, operation, and post-construction monitoring and mitigation plans.

This referral report summarizes the review undertaken by AEP-FWS that was restricted to reviewing information provided in the submitted documents, completed by Solas Energy Consulting Inc. on behalf of the Proponent, and applying the wildlife standards and best management practices for the siting, construction and operation of the wind facility. This office undertook no independent on-site assessment. This referral report is not intended to relieve any party from any liability if there are detrimental effects to wildlife or wildlife habitat during construction or operation that were not identified and mitigated for in the documents submitted. It is the responsibility of the Proponent to ensure compliance under all other policy and legislation, including but not limited to the *Alberta Wetland Policy*, *Water Act, Code of Practice for Watercourse Crossings, Environmental Protection and Enhancement Act, Alberta Wildlife Act, Migratory Bird Convention Act,* and *Species at Risk Act*. Federal requirements may differ from AEP-FWS policy, therefore additional consultation may be necessary. AEP-FWS review does not eliminate the need for review by other branches of the Environment and Parks

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Department, Government of Canada or other governing bodies. Due to proximity of this Project to Cypress Provincial Park, there may additional concerns from the Parks Operations Division and Land and Ecosystem Management. This referral report summarizes the potential risks to wildlife and wildlife habitat based on the information provided to AEP-FWS.

Summary: This summary is a condensed version of the entire referral report. For details on specific topics, please see the body of this report. The overall risk ranking of this Project is provided in the last paragraph of this summary.

AEP-FWS has determined that the risk to high quality native habitat and coulee breaks is moderate, based on the commitments by the Proponent to mitigate for disturbance during construction within these sensitive habitat areas. The proposed mitigations for working in areas of higher habitat quality (native grassland and coulee breaks) are aligned with the intent of the *Directive*. However, AEP-FWS has determined that the risk to wetlands and sensitive amphibian species is high due to a high number of construction impacts to wetland setbacks and the difficulty in avoiding potential disturbance and mortality of sensitive toad species.

AEP-FWS has determined the pre-assessment risk to bat mortality is high based on the bat survey results from the Bull Trail Wind Power Farm Project area. However, this risk can likely be mitigated for with the commitment by the Proponent for post-construction monitoring and implementation of appropriate post-construction mitigation based on the results, as required by AEP-FWS.

AEP-FWS has determined that the risk of mortality to birds is high, based a high diversity of species at risk and a high abundance of breeding raptors in the Project area. The risk of disturbance to breeding birds has been assessed as moderate based on the commitment made by the Proponent to construct outside of the breeding bird restricted activity period within native habitats.

The Project has been sited to avoid all active raptor nests, and so the risk to these wildlife features is low. One active sharp-tailed grouse lek will be impacted by a collector line, but with the mitigation commitments made by the Proponent the risk has been reduced to low. One active burrowing owl den will also be impacted by an access road, and AEP-FWS has determined that risk to this sensitive wildlife feature is high. Finally, there is a risk of increased road mortality to snakes, and the risk to snakes has been assessed as moderate.

AEP-FWS has determined the Bull Trail Wind Power Project proposed by EDF Renewables Canada Inc., poses a moderate risk to wildlife and wildlife habitat, based on Project siting and commitments to mitigate disturbance in higher quality native habitats, high wetland impacts, high mortality risk to bats and birds including some species at risk, avoidance of most sensitive wildlife features, and commitments made by the Proponent to mitigate and monitor wildlife impacts. This AEP-FWS Renewable Referral Report expires on August 30, 2026.

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AEP-FWS Renewable Referral Report Prepared by:

Signature:_____ Date:____August 30, 2021_____
Printed Name, Position, and Office: Jason Unruh, Wildlife Biologist, South Region, Red Deer, Alberta

AEP-FWS Renewable Referral Report Reviewed by:

Signature:_____ Date:____August 30, 2021_____
Printed Name and Position: Kristin Cline, Wildlife Biologist, South Region, Lethbridge, Alberta

B. PROJECT DETAILS

Project Name: Bull Trail Wind Power Project (also referred to as the Project)

Proponent Name: EDF Renewables Canada Inc. (also referred to as the Proponent)

Project Location: Refer to Table 1

Table 1. Proposed legal land locations of the Bull Trail Wind Power Project

Section	Township	Range	Meridian
28-33	9	2	W4
3-6, 9-11, 14-16, 20-23, 25-36	10	2	W4
7, 18	11	1	W4
1-13, 16-19	11	2	W4
12	11	3	W4

Project Area (hectares):

Disturbance footprint for construction phase (temporary): 292.5ha
Disturbance footprint for operation phase (permanent): 36.9 ha

Nameplate Capacity (total megawatts): 300 MW

Turbine Details:

Number: 43 (43 preferred turbine locations, plus 28 alternates)
Hub height: 103 m
Rotor diameter: 160 m
Blade length (rotor radius): 80 m
Rotor-swept area: 23-183 m above ground level (total RSA = 864,128 m^2)

Turbine Locations: Refer to Table 2

Table 2. Proposed UTM and legal land locations of Bull Trail Wind Power Project turbines, in UTM Zone 12U

Turbine ID	Easting	Northing	Quarter	Section	Township	Range	Meridian	Land Cover Type	Preferred or Alternative
1	555750	5522823	NW	28	10	2	W4	Cultivation	Preferred

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Turbine ID	Easting	Northing	Quarter	Section	Township	Range	Meridian	Land Cover Type	Preferred or Alternative
2	559820	5526043	NE	2	11	2	W4	Cultivation	Preferred
4	555548	5521102	NW	21	10	2	W4	Cultivation	Preferred
5	556562	5525097	SE	4	11	2	W4	Cultivation	Preferred
6	554121	5512321	SW	29	9	2	W4	Cultivation	Preferred
7	555169	5513310	NE	29	9	2	W4	Cultivation	Preferred
8	559239	5517700	NW	11	10	2	W4	Tame Grassland	Preferred
9	557334	5523683	SW	34	10	2	W4	Cultivation	Preferred
10	557382	5519846	NW	15	10	2	W4	Cultivation	Preferred
11	555137	5516511	NE	5	10	2	W4	Tame Grassland	Preferred
12	559504	5525171	SE	2	11	2	W4	Cultivation	Preferred
13	555150	5514819	NE	32	9	2	W4	Cultivation	Preferred
14	556319	5526873	SE	9	11	2	W4	Tame Grassland	Alternative
15	557187	5520393	SW	22	10	2	W4	Cultivation	Preferred
16	557329	5518633	SW	15	10	2	W4	Cultivation	Preferred
17	557259	5521143	NW	22	10	2	W4	Cultivation	Preferred
18	554360	5523775	SW	32	10	2	W4	Cultivation	Alternative
19	559071	5522677	NW	26	10	2	W4	Cultivation	Alternative
20	555143	5515419	SE	5	10	2	W4	Cultivation	Preferred
21	552455	5528370	SW	18	11	2	W4	Cultivation	Alternative
22	560763	5526780	SW	12	11	2	W4	Cultivation	Preferred
23	552480	5513141	NW	30	9	2	W4	Cultivation	Preferred
24	553936	5523097	NW	29	10	2	W4	Cultivation	Alternative
25	555586	5523538	SW	33	10	2	W4	Cultivation	Preferred
26	558032	5519921	NE	15	10	2	W4	Cultivation	Alternative
27	554673	5513736	SE	32	9	2	W4	Cultivation	Alternative
28	557317	5517171	SW	10	10	2	W4	Cultivation	Preferred
29	554815	5528498	SE	17	11	2	W4	Tame Grassland	Preferred
30	552284	5527624	NW	7	11	2	W4	Cultivation	Alternative
32	554803	5529113	NE	17	11	2	W4	Cultivation	Alternative
34	562231	5527752	NW	7	11	1	W4	Cultivation	Preferred
35	553993	5514181	SW	32	9	2	W4	Cultivation	Preferred
37	552541	5526495	SW	7	11	2	W4	Cultivation	Alternative
38	561307	5527758	NE	12	11	2	W4	Cultivation	Alternative
39	555640	5514183	SW	33	9	2	W4	Cultivation	Preferred
40	552391	5529900	SW	19	11	2	W4	Cultivation	Alternative
41	558786	5522017	SW	26	10	2	W4	Cultivation	Preferred
42	553243	5529244	NE	18	11	2	W4	Cultivation	Alternative

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Turbine ID	Easting	Northing	Quarter	Section	Township	Range	Meridian	Land Cover Type	Preferred or Alternative
43	557425	5517830	NW	10	10	2	W4	Cultivation	Preferred
44	556658	5524390	NE	33	10	2	W4	Cultivation	Preferred
45	559915	5524250	NE	35	10	2	W4	Cultivation	Preferred
46	554335	5521968	SW	29	10	2	W4	Tame Grassland	Preferred
47	553241	5526269	NE	6	11	2	W4	Cultivation	Alternative
48	553258	5528356	SE	18	11	2	W4	Cultivation	Alternative
49	555560	5520503	SW	21	10	2	W4	Cultivation	Preferred
50	555843	5516514	NW	4	10	2	W4	Cultivation	Alternative
51	557005	5527008	SW	10	11	2	W4	Tame Grassland	Preferred
53	554134	5516511	NW	5	10	2	W4	Tame Grassland	Preferred
56	554285	5513138	NW	29	9	2	W4	Cultivation	Preferred
57	562296	5528785	SW	18	11	1	W4	Cultivation	Alternative
59	552302	5527021	SW	7	11	2	W4	Cultivation	Alternative
60	554780	5527697	NE	8	11	2	W4	Cultivation	Preferred
61	554328	5515572	SW	5	10	2	W4	Cultivation	Preferred
62	559400	5526622	SE	11	11	2	W4	Cultivation	Alternative
63	552429	5529136	NW	18	11	2	W4	Cultivation	Alternative
64	554635	5523002	NE	29	10	2	W4	Cultivation	Alternative
65	553235	5513105	NE	30	9	2	W4	Cultivation	Preferred
66	561285	5528417	SE	13	11	2	W4	Cultivation	Alternative
67	556299	5517397	SE	9	10	2	W4	Cultivation	Preferred
68	556268	5518002	NE	9	10	2	W4	Tame Grassland	Alternative
69	558810	5517880	NW	11	10	2	W4	Tame Grassland	Alternative
70	557590	5523052	NW	27	10	2	W4	Cultivation	Alternative
71	554061	5527567	NW	8	11	2	W4	Cultivation	Alternative
73	559236	`5524498	NW	35	10	2	W4	Cultivation	Alternative
75	556148	5525929	NE	4	11	2	W4	Cultivation	Preferred
76	557586	5521888	SW	27	10	2	W4	Cultivation	Preferred
77	556252	5520213	SE	21	10	2	W4	Cultivation	Preferred
81	556468	5521106	NE	21	10	2	W4	Cultivation	Alternative
82	555763	5522205	SW	28	10	2	W4	Cultivation	Preferred
83	554696	5523803	SE	32	10	2	W4	Cultivation	Alternative
84	554241	5522988	NW	29	10	2	W4	Tame Grassland	Preferred

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C. WILDLIFE CONCERNS RELATED TO WIND ENERGY

Impacts to wildlife identified for all wind energy projects in Alberta, which forms the basis for project-specific review.

HABITAT LOSS, DEGRADATION AND FRAGMENTATION

Wind energy facilities may result in the direct loss of habitat for wildlife. Negative effects may include, but are not limited to, interruption of movement corridors, isolation of species and populations, shifts in composition and degradation of foraging/breeding/brood rearing habitat. There are particularly negative effects to wildlife, especially species at risk, by siting wind energy facilities in areas of native grasslands. AEP-FWS requires siting the wind facility and associated infrastructure (access roads, substation, etc.) on cultivated or other previously disturbed lands that do not contain sensitive features such as wetlands, to significantly reduce potential negative effects on wildlife habitat.

WILDLIFE DISTURBANCE AND MORTALITY

AEP-FWS has identified concerns over the potential negative effects on wildlife caused by wind facilities and related infrastructure, including access roads, collection lines, and increased human activity. For example, wind projects may result in site avoidance and abandonment, decreased productivity and collision mortality.

Direct Mortality: Bat and bird mortalities have been documented at a number of wind energy facilities in North America. There is an increased risk of mortality for bats and birds during migration. Wind energy projects built within migration routes or in close proximity to a roost/nest present a significant hazard and an increased mortality risk.

While a bat or bird of any species may collide with a wind turbine, the following species/species groups are of primary concern in Alberta:

- Migrating and resident bats
- Raptors
- Breeding grassland birds (including species at risk, sensitive species and species with aerial flight displays, such as long-billed curlew, Sprague's pipit, lark bunting, and chestnut-collared longspur)
- Greater sage grouse and sharp-tailed grouse
- Migrating songbirds
- Shorebirds
- Species of management concern listed under the Alberta *Wildlife Act* or the Federal *Species at Risk Act*

AEP-FWS recommends siting wind energy facilities away from migration routes for bats and birds and away from the nest, house, or den of wildlife species. AEP-FWS requires that three years of post-construction monitoring be completed at all wind energy facilities to assess the risk of the facility for wildlife, as per AEP-FWS policy at the time of the project commissioning. If mortality rates are revealed to be high, then post-construction mitigation measures must be implemented in consultation with AEP-FWS. Additional years of post-construction monitoring may be required if mitigation is needed, as determined by AEP-FWS. Post-construction

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monitoring will include carcass searches, searcher efficiency trials, and scavenger removal rate trials, and must meet the requirements outlined in the *Directive* and *PCMP Protocol*.

PROJECT-SPECIFIC CONCERNS

Desktop and field investigations are required to determine the potential of the Bull Trail Wind Power Project to affect wildlife and wildlife habit. Per Standard 100.2.2 of the *Directive*, the Proponent must complete the following pre-assessment wildlife surveys:

- Acoustic bat surveys
- Spring and fall bird migration surveys
- Breeding bird surveys
- Raptor nest searches
- Determination of habitat types

In addition, surveys must be conducted for species of management concern that may occur in and around the Project area. The proposed Project is sited within the following Key Range or Wildlife layers, as described within the provincial Wildlife Sensitivity Data Sets:

- Sensitive amphibians
- Sensitive raptors (including ferruginous hawk, golden eagle, and prairie falcon)
- Sharp-tailed grouse
- Burrowing owl
- Sensitive snakes

Surveys for all of the above must be conducted following protocols outlined in the *Sensitive Species Inventory Guidelines,* as applicable. If a species of management concern is identified, AEP-FWS requires that areas immediately adjacent to key wildlife habitats be avoided by appropriate setbacks as outlined in the *Directive*.

D. WILDLIFE MONITORING PROGRAM

Completion of pre-development surveys and submission of information to the Fisheries and Wildlife Management Information System (FWMIS).

Research Permit and Collection Licence Number(s): 18-333, 18-411, 19-201, and 20-176

Pre-assessment survey data completed within two years of submission to AEP-FWS:
Pre-assessment survey methods and results were provided in the *Project Submission*.

Wildlife surveys conducted include:

- Spring bat migration surveys: May 1 -31, 2018;
- Fall bat migration surveys: July 15 –October 15, 2018;
- Spring bird migration surveys: April 4, April 26, and May 15, 2018;
- Fall bird migration surveys: August 22, September 19, and October 17, 2018;
- Breeding bird point count surveys: June 2-5 and June 15-18, 2019, and June 2 and June 24, 2019;
- Raptor nest searches: April 7-9 and April 22-24, 2020;
- Sharp-tailed grouse lek surveys: April 7-9 and April 22-24, 2020;

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- Burrowing owl surveys: call playback June 2-5 and June 21-23, 2020;

The Proponent has committed to keeping wildlife surveys current by completing additional site-specific wildlife surveys (i.e., raptor nest searches, sharp-tailed grouse lek surveys, and burrowing owl surveys) every two years until the Project is commissioned, as per Standard 100.2.3 of the *Directive*. All wildlife related surveys (pre- and post-construction) and analysis of data are required to be conducted by experienced wildlife biologists as defined by the *Directive*. Survey results are to be submitted to the AEP-FWS Fish and Wildlife Management Information System (FWMIS). The Proponent has committed to implementing additional mitigation measures if any new sensitivities or features are detected, as determined by AEP-FWS.

If the Project has not been constructed within five years of this AEP-FWS Renewable Energy Referral Report being issued (expiry date: August 30, 2026), wildlife surveys will need to be updated and a new Renewable Energy Referral Report will be required, as per Standard 100.2.10 of the *Directive*. Wildlife surveys that would be required may include, but may not be limited to, all those listed above.

E. WIND ENERGY FACILITY - AVOIDANCE AND MITIGATION OF WILDLIFE RISKS

Review of the proposed wildlife avoidance and mitigation strategies identified in the submission, in comparison with the Directive.

HABITAT LOSS, DEGRADATION AND FRAGMENTATION

Native Habitat

Project infrastructure has been primarily sited to avoid native habitats. Infrastructure includes but is not limited to turbines, collector lines, crane paths, substation, operation and maintenance building, meteorological towers, access roads, laydown yards, and temporary work space. The Proponent has identified a total of 27 exceptions where Project related disturbance will be sited on native habitat, amounting to 3.0 ha of disturbance (Table 3). This does not align with the *Directive*.

Table 3. Bull Trail Wind Power Project infrastructure proposed to be sited within native grassland

Exception #	Land Cover	Disturbance Type	Location(s)	Length of Disturbance	Area of Disturbance
1	Native grassland	Collection Line	NE-10-10-2-W4	137 m	0.14 ha
2	Native grassland-riparian	Access Road	NW-5-10-2-W4	13 m	0.03 ha
3	Native grassland-riparian	Collection Line	SE-27-10-2-W4	233 m	0.24 ha
4	Riparian	Access Road	NW-18-11-2-W4	30 m	0.06 ha
5	Riparian	Access Road	NW-5-10-2-W4	51 m	0.11
6	Riparian	Access Road	SE-32-10-2-W4 NE-29-10-2-W4	106 m	0.19 ha
7	Riparian	Access Road	SW-15-10-2-W4	18 m	0.07 ha
8	Riparian	Access Road	SW-15-10-2-W4	57 m	0.13 ha

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Exception #	Land Cover	Disturbance Type	Location(s)	Length of Disturbance	Area of Disturbance
9	Riparian	Access Road	SE-30-9-2-W4	68 m	0.13 ha
10	Riparian	Access Road	NW-18-11-2-W4	74 m	0.06 ha
11	Riparian	Collection Line	NW-30-9-5-W4	156 m	0.16 ha
12	Riparian	Collection Line	NE-10-10-2-W4	90 m	0.08 ha
13	Riparian	Collection Line	NE-29-10-2-W4	29 m	0.13 ha
14	Riparian	Collection Line	SE-16-10-2-W4	48 m	0.05 ha
15	Riparian	Collection Line	SE-16-10-2-W4	53 m	0.05 ha
16	Riparian	Collection Line	SE-16-10-2-W4	62 m	0.06 ha
17	Riparian	Collection Line	SE-16-10-2-W4	69 m	0.07 ha
18	Riparian	Collection Line	NW-27-10-2-W4	129 m	0.13 ha
19	Riparian	Collection Line	NW-27-10-2-W4	148 m	0.15 ha
20	Riparian	Collection Line	NW-27-10-2-W4	151 m	0.15 ha
21	Riparian	Collection Line	NW-35-10-2-W4	261 m	0.26 ha
22	Riparian	Collection Line	NW-35-10-2-W4	206 m	0.21 ha
23	Riparian	Collection Line	NW-35-10-2-W4	228 m	0.23 ha
24	Riparian	Collection Line	SE-7-11-2-W4	122 m	0.12 ha
25	Riparian	Collection Line	SE-7-11-2-W4	89 m	0.09 ha
26	Riparian	Collection Line	NW-18-11-2-W4	36 m	0.06 ha
27	Riparian	Crane Path	NW-18-11-2-W4	44 m	0.13 ha

The Proponent has identified alternative mitigations for this disturbance of native grassland and other native habitat types to reduce the risk of disturbance to breeding birds and other wildlife (for details see the *Breeding Bird* and *Wetland* sections of this referral report).

To minimize the disturbance to native habitats the Proponent has committed to using minimal disturbance techniques. Collection lines in native habitat will be installed using plough-in methods or directional drilling. The amount of topsoil stripping and grading will be limited through matting, geotextiles, and by working during frozen or dry ground conditions. The Proponent has also committed to replanting native land cover types with native grasses and appropriate seed mixes.

The mitigation commitments, identified by the Proponent, for infrastructure that disturbs native grassland and other native habitat types, meets the intent of the *Directive*. The risk to native wildlife habitat has been assessed as moderate due to the large number of planned disturbances.

Valley/Coulee Breaks

All turbines are sited a minimum of 100 m from mapped valley/coulee breaks. This is consistent with the *Directive*. However, the Proponent has identified 10.6 ha of disturbance (secondary infrastructure) sited within coulee breaks (Table 4). A total of 1.38 ha of this disturbance in riparian areas will be permanent.

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Table 4. Bull Trail Wind Power Project infrastructure proposed to be sited within riparian/coulee breaks.

Exception #	Disturbance Type	Location(s)	Area of Disturbance
1	Access Road	NW-11-10-1-W4	0.12 ha
2	Access Road	NW-5-10-2-W4	0.58 ha
3	Access Road	NE-18-11-2-W4	0.47 ha
4	Access Road	NW-30-9-2-W4	0.37 ha
5	Access Road	SE-30-9-2-W4	0.58 ha
6	Access Road	NE-18-11-2-W4	0.52 ha
7	Access Road	NW-18-11-2-W4 SW-18-11-2-W4	0.73 ha
8	Access Road	SW-5-11-2-W4	0.81 ha
9	Access Road	NE-4-11-2-W4	0.08 ha
10	Access Road	SW-27-10-2-W4	0.05 ha
11	Laydown Yard	NW-34-10-2-W4	1.47 ha
12	Collection Line	NE-30-9-2-W4 NW-30-9-2-W4	0.52 ha
13	Collection Line	NE-10-10-2-W4	0.41 ha
14	Collection Line	SE-7-11-2-W4	0.35 ha
15	Collection Line	SE-7-11-2-W4	0.44 ha
16	Collection Line	NW-35-10-2-W4	0.48 ha
17	Collection Line	NW-35-10-2-W4	0.45 ha
18	Collection Line	NW-35-10-2-W4	0.40 ha
19	Collection Line	NW-27-10-2-W4	0.42 ha
20	Collection Line	NW-27-10-2-W4	0.44 ha
21	Collection Line	NW-27-10-2-W4	0.45 ha
22	Collection Line	SE-27-10-2-W4	0.46 ha

To minimize the disturbance to habitat within coulee breaks, the Proponent has committed to reducing road widths from 20 m to 6 m within coulee break setbacks. Collection lines within coulee break setbacks will be installed using plough-in methods. The Proponent has also committed to progressively reclaiming the disturbances within coulee setbacks to an equivalent land capability as per the *Conservation and Reclamation Directive for Renewable Energy Operations*. Much of the disturbance within coulee setbacks will take place on cultivated land. Due to the Project location, the mortality and disturbance impacts to wildlife using coulee habitat (i.e. ungulates, birds, bats, etc.) are reasonably mitigated – though the presence of bull snakes and garter snakes will cause some mortality risk (further addressed in the Snake Hibernacula and Mortality section below).

The mitigation commitments, identified by the Proponent, for infrastructure that disturbs coulee setbacks, meets the intent of the *Directive*. The wildlife risk in coulee habitat has been assessed as moderate due to the large number of planned disturbances.

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Lakes and Large Waterbodies

The Proponent has sited all infrastructure, including turbines, at least 1000 m from all large water bodies. This aligns with the *Directive*.

Wetlands

The Proponent has identified 13 wetland setbacks that will be infringed by Project infrastructure (Table 5). In all cases, wetland setback disturbance will be caused by access roads or collection lines. The total disturbance footprint within wetland setbacks will be 3.22 ha and 0.62 ha of this will be permanent disturbance. An additional 11 ephemeral and temporary (Class I and II) wetlands will be directly impacted by Project infrastructure; the *Directive* recommends avoidance of these wetlands as a best management practice.

Table 5. Wetland setbacks that will be infringed by infrastructure for the Bull Trail Wind Power Project

Wetland ID	Wetland Classification	Infrastructure Type	Legal Land Location	Proximity of Infrastructure to Nearest Edge of Wetland (m)	Impacted Area (ha)
BT-18-11-2-1	Class V	Access Road	NW-18-11-2-W4	1	0.49
BT-1-11-2-2	Class VI	Access Road	NE-2-11-2-W4	69	0.07
BT-16-10-2-9	Class V	Access Road	SW-15-10-2-W4	69	0.09
BT-18-11-2-1	Class V	Access Road	NE-18-11-2-W4	59	0.22
BT-29-10-2-1	Class V	Access Road	NE-29-10-2-W4	28	0.46
BT-32-10-2-20	Dugout	Access Road	SE-32-10-2-W4	0	0.45
BT-7-11-2-2	Dugout	Access Road	SW-7-11-2-W4	23	0.45
BT-36-10-2-6	Class III	Access Road	SE-36-10-2-W4	81	0.004
BT-15-10-2-10	Class VI	Collection Line	SW-15-10-2-W4	48	0.21
BT-21-10-2-2	Class VI	Collection Line	SE-21-10-2-W4	17	0.26
BT-21-10-2-3	Class VI	Collection Line	SE-21-10-2-W4	30	0.21
BT-21-10-2-3	Class VI	Collection Line	SE-21-10-2-W4	47	0.16
BT-21-10-2-3	Class VI	Collection Line	SE-21-10-2-W4	58	0.15

The Proponent has committed to conducting amphibian surveys where wetland setbacks are not being avoided; this includes conducting surveys for toads if conditions are appropriate for toad emergence. Should conditions not be suitable for toad emergence, AEP-FWS will assume that all seasonal and higher class (Class 3+) wetlands (including dugouts) have the potential to support sensitive breeding amphibians, including Great Plains toad, plains spadefoot, and northern leopard frog. Sensitive toad species (i.e., Great Plains toad and plains spadefoot) may remain underground for several years and are known to disperse and hibernate within 100 m from their breeding ponds. Due to the proposed construction activities, there are limited mitigation options to address the risk to hibernating toad species outside of the proposed construction setback and within 100 m of the wetland.

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To reduce the disturbance and mortality risk to sensitive amphibians, the Proponent has committed to implementing the following mitigations when infringing on the required 100 m wetland setbacks:

- Construction will be scheduled to take place outside of the amphibian breeding and dispersal period (May 1 to June 30).
- Construction will take place during frozen or dry ground conditions.
- Silt fencing will be installed to prevent vehicle traffic from entering wetlands and watercourses. Fences will be installed between wetlands and areas of traffic to limit wildlife movement into high-risk areas, while not restricting wildlife movement in other directions, and to reduce the chance of entrapment. A wildlife monitor will inspect silt fencing and relocate trapped animals if required.
- Direct plough-in and trenching methods will be used to install underground collection lines. The Proponent will consider directional boring as an alternative installation method for underground collection lines in wetlands where mitigation measures are deemed insufficient.
- Equipment with low ground pressure tires or wide-pad tracks will be used during construction.
- Rig matting, geotextiles, and vegetated buffer zones will be used, and temporary or permanent earthen berms or silt fencing will be installed to limit potential sedimentation into wetlands.

While the above mitigations reduce the risk to northern leopard frogs, the species' activity period starts earlier and ends later than the proposed restricted activity period. Due to the proposed construction activities (i.e., ground stripping, grading and trenching), there are limited possible mitigation options to address the risk to hibernating toad species that occur outside of the proposed setback and within 100 m of the wetland. Development within wetland setbacks of seasonal, semi-permanent and permanent wetlands (Class III-V) does not align with the *Directive*. While the Proponent has committed to mitigation measures to reduce impacts to wildlife, the amount of disturbance planned within wetland habitat remains a concern. Therefore, the risk to wetland habitat and associated wildlife is assessed as high.

WILDLIFE DISTURBANCE AND MORTALITY

Bats

Spring and fall acoustic bat migration surveys were conducted in 2018 following AEP-WM survey protocols and requirements within current AEP-WM policy. An average of 1.01 bat passes per detector night and 0.65 migratory bat passes per detector night were identified during the spring monitoring period (May 1-31). An average of 8.37 bat passes per detector night and 7.49 migratory bat passes per detector night were identified during the fall migration period (August 1 to September 10). As per the *Bat Mitigation Framework for Wind Power Development*, bat mortality risk is assessed as high, based on an average activity level of >2 migratory bat passes/detector night during the fall migratory period.

The Proponent has committed to three years of post-construction monitoring, as detailed in a below section of this report and the *Bull Trail Wind Power Farm Post-Construction Wildlife*

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Monitoring. If mortality is found to be high, as determined by AEP-FWS, the Proponent has committed to implementing mitigation to reduce mortality. Proposed mitigation to reduce mortality risk is detailed in the below *Post-Construction Monitoring and Mitigation* section of this AEP-FWS Renewable Energy Referral Report. The proposed mitigation is expected to reduce mortality to acceptable levels. This plan is consistent with the *Directive*.

Migrating Birds

Spring and fall bird migration surveys were conducted following standard protocols as per the *Directive* and *Sensitive Species Inventory Guidelines* (2013). Spring migration surveys, conducted in 2018, detected a total of 1,372 individuals and 42 different species within the Project area. This equates to an average of 1.04 bird observations per minute of survey time. The two most common bird guilds detected were passerines (58% of observations) and waterfowl (30% of observations). Five species of management concern were detected during spring migration surveys: American white pelican (3), ferruginous hawk (6), golden eagle (1), long-billed curlew (17), and sharp-tailed grouse (8). The ferruginous hawk is listed as 'At Risk' and the other four species are listed as 'Sensitive' in Alberta.

Fall migration surveys, conducted in 2018, detected a total of 1,402 birds and 35 different species. This equates to an average of 1.06 bird observations per minute of survey time. The most common bird guilds detected were passerines (51% of observations) and waterfowl (40%) of observations. Six species of management concern were detected during fall migration surveys: American kestrel (2), barn swallow (2), ferruginous hawk (3), great-blue heron (1), sandhill crane (80), and sharp-tailed grouse (3). The ferruginous hawk is listed as 'At Risk' and the other five species are listed as 'Sensitive' in Alberta.

As Project turbines are sited away from landscape features associated with increased bird activity during migration (e.g., valley/coulee breaks, large waterbodies), it is not expected to pose an elevated risk to migrating birds. Based on the survey data (migratory activity rates and abundance of sensitive species), the risk to migrating birds is assessed as moderate.

Breeding Birds

Songbirds and waterbirds: Results from the 2018/2019 breeding bird surveys for song birds and waterbirds (including waterfowl, shorebirds, grebes, loons and pelicans) show 805 individual birds from 68 species were observed, with an additional 207 birds observed incidentally. This equates to an average of 1.64 individual birds per minute (not including incidentals). The most abundant species observed were horned lark, savannah sparrow, and red-winged blackbird, all listed as 'Secure'. Thirteen species of management concern were observed during breeding bird surveys: Baird's sparrow (8), bank swallow (10), barn swallow (6), bobolink (2), common yellowthroat (5), eastern kingbird (26), ferruginous hawk (1), great-blue heron (1), lark bunting (3), least flycatcher (1), long-billed curlew (4), Sprague's pipit (7), and upland sandpiper (3). The ferruginous hawk is listed as 'At Risk' and the other 12 species are listed as 'Sensitive' in Alberta.

To limit disturbance to breeding birds, the Proponent has committed to scheduling all construction activities located in high value habitat (e.g. native grassland, wetland and coulee

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habitat) outside of the breeding bird restricted activity period (April 1 to July 15). This mitigation aligns with the *Directive*.

As described above, results of the breeding bird survey indicates that a diversity of birds, including species at risk, use the Project area for breeding and foraging. However, the mitigation commitments should reduce the risk to breeding birds, particularly to sensitive species using native habitats. The risk to breeding birds is assessed as moderate.

Raptors: During raptor nest surveys in 2020, 13 active nests were identified: seven ferruginous hawk nests, three great-horned owl nests, two red-tailed hawk nests, and one Swainson's hawk nest. All nest setbacks are being met, which aligns with the *Directive*, and the risk to breeding raptors is assessed as low.

The Proponent has committed to repeating raptor nest surveys every two years until the Project is commissioned. If raptor nests are identified during these surveys a mitigation plan will be developed in consultation with AEP-FWS to meet the intent of the *Directive*. These commitments are consistent with the *Directive*.

Sharp-tailed Grouse: During sharp-tailed grouse lek surveys in 2020, five active leks were identified. One lek will have its 500 m buffer infringed upon by Project infrastructure (Table 6).

Table 6. Active sharp-tailed grouse leks with Project infrastructure located inside the 500 m setback at the Bull Trail Wind Power Project.

Lek ID	Location (12U)	Setback Requirement	Distance to Nearest Project Infrastructure	Type of Infrastructure within setback
EBTlek2	558051 E, 5517535 N	500 m	360 m	collection line

To reduce the disturbance to sharp-tailed grouse, the Proponent has committed to constructing the section of underground collector line located within the 500 m lek setback outside of the restricted activity period for breeding sharp-tailed grouse (March 15 to June 15). The setback infringement does not align with the *Directive*, however the mitigation reduces this risk to low.

The Proponent has committed to repeating sharp-tailed grouse surveys every two years until the Project is commissioned. AEP-WM requires sharp-tailed grouse lek surveys be done with adequate coverage (i.e. in all areas of native grassland within 500m of project infrastructure) before construction begins. If sharp-tailed grouse leks are identified during these surveys a mitigation plan will be developed in consultation with AEP-FWS to meet the intent of the *Directive*. These commitments are consistent with the *Directive*.

Burrowing Owls*:* A pair of burrowing owls were detected during the burrowing owl call playback surveys in 2020. No young were detected, but two potential dens were identified, and the 500 m setback for both locations will be infringed upon by Project infrastructure (Table 7).

Table 7. Active burrowing owl dens with Project infrastructure located inside the 500 m setback at the Bull Trail Wind Power Project.

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Den ID	Location (12U)	Setback Requirement	Distance to Nearest Project Infrastructure	Type of Infrastructure within setback
EBTbuowDen1a	555010 E, 5524960 N	500 m	270 m	access road
EBTbuowDen2a	554955 E, 5525097 N	500 m	395 m	access road

To reduce disturbance to breeding burrowing owls, the Proponent has committed to scheduling both construction and operation activities within the 500 m setback outside of the restricted activity period (April 1 to July 15). While the proposed restricted activity period reduces the risk to burrowing owls, young may rely on the burrow until August 15th so disturbance of an active nest is still possible. The setback infringement does not align with the *Directive*; though the mitigation reduces some of the risk, the risk to breeding burrowing owls remains high.

The Proponent has committed to repeating burrowing owl surveys every two years until the Project is commissioned. AEP-WM requires burrowing owl call playback surveys be done with adequate coverage as per *Sensitive Species Inventory Guidelines*. If burrowing owl dens are identified during these surveys a mitigation plan will be developed in consultation with AEP-FWS to meet the intent of the *Directive*. These commitments are consistent with the *Directive*.

Bird Mortality

Aboveground collector lines are a risk of avian mortality due to collision or electrocution. Additionally, the presence of above ground structures could increase perching opportunities for avian predators, which could increase mortality. The Proponent has committed to installing all collector lines underground, which aligns with the *Directive*. If permanent met towers require guy wires, the Proponent will install markers to reduce the potential for bird collisions.

Project infrastructure has been sited to mostly avoid high quality native habitat; however, the Project is sited in an area with a high abundance of breeding raptors (13 active nests), and numerous other species at risk, including seven active ferruginous hawk nests and an active burrowing owl den. The potential for burrowing owl road mortality is not easily monitored or mitigated and may be a persistent risk for this *Endangered* species. The construction of project infrastructure and operation of turbines presents an increased risk to avian mortality in the Project area. Post-construction monitoring will be conducted and if high mortality occurs, mitigation will be implemented. Proposed mitigation to reduce mortality risk is detailed in the below *Post-Construction Monitoring and Mitigation* section of this AEP-WM Renewable Energy Referral Report. Given the abundance of breeding raptors and species at risk in the Project area, the risk to bird mortality is considered to be high.

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Snake Hibernacula and Mortality

The Project has been sited adjacent to the sensitive snake range and no Project-related disturbance will occur within 500 m of the sensitive snake range; however, bull snakes and garter snakes are known to occur in the area.

To reduce the risk of snake mortality during Project construction and operation the Proponent has developed a snake protection plan which includes:

- On site personnel will be given a review of snake species that could be found in the project area, including habitat, activity, characteristics.
- Prior to starting the job at hand, a walkthrough of the area will be completed to ensure snakes are not present in the work area
- If a snake is observed on-site, it will not be approached or handled. The designated snake monitor will be contacted.
    - The snake monitor will be equipped with the appropriate tools to handle and remove snakes.
    - The snake monitor will relocate snakes that are in harm's way or present a safety concern to construction personnel to a safe location 100 m to 200 m away. Coulee or wetland habitat is preferable for relocation, if it's within close proximity.
- On site personnel will stay in designated work areas, avoid rock piles, bushes, and long grass.
- On site personnel will not put hands and feet in cracks, holes and crevices, or in or under bushes, or will check for snakes first before placing hands where they can't be seen.
- Personnel will watch the road for snakes. The speed limit on turbine access roads will be 30 km/h.

Given the presence of several snake species, road mortality is an outstanding concern. The above mitigation commitments will reduce the risks to snakes, and the risk to snakes is assessed as moderate.

CONSTRUCTION AND OPERATION MITIGATION

AEP-FWS requires the construction and operation mitigation plan, which outlines construction techniques, mitigation and standard operating procedures, will meet the requirements outlined in Stage 3 of the *Directive.* The mitigations outlined in the *Project Submission* will be implemented with the intent to reduce disturbance to wildlife and wildlife features (house, nest, den, etc.). This does not preclude any liability under the *Wildlife Act*, the *Species at Risk Act*, or other legislation. AEP-FWS considers all injured or dead wildlife found in the Project area during construction and operation of the facility to be caused by the facility. In the event that injured wildlife is found, AEP-FWS will be notified and the Proponent will act in accordance with regulatory direction and requirements. All wildlife mortalities must be reported to AEP-FWS.

POST-CONSTRUCTION MONITORING AND MITIGATION

AEP-FWS requires the post-construction monitoring and mitigation plan to meet the requirements outlined in Stage 4 of the *Directive.* The Proponent has committed to post-

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construction monitoring for the proposed Project following minimum standards outlined in the *PCMP Protocol*. Details of the post-construction monitoring plan should be reviewed and finalized with AEP-FWS prior to implementation, to ensure the plan aligns with the requirements at the time. A Wildlife Research Permit and Collection Licence must be obtained from AEP-FWS prior to conducting the post-construction monitoring surveys and all surveys and analysis must be conducted by an experienced wildlife biologist as defined in the *Directive*.

Notable wildlife observations as well as observed changes in wildlife behavior, species composition, or potential threats to wildlife during the post-construction monitoring period will be documented and reported.

A detailed report of the post-construction monitoring will be provided to AEP-FWS and the Alberta Utilities Commission (AUC) annually by the end of January the year following the mortality monitoring period, as per Standard 100.4.7 of the *Directive*.

Should carcass surveys, at any time, result in unusually high fatality numbers or fatalities of species at risk (provincially and/or federally listed, including species provincially listed as 'sensitive') carcasses must be collected, frozen, and submitted to AEP-FWS. The Proponent must *immediately* notify AEP-FWS and the AUC of the mortality event and then discuss mitigation measures.

The Proponent has committed to notifying AEP-FWS within 24 hours of discovering high levels of mortality when the following occurs:

- ≥ 5 bats at a single turbine found in a single monitoring event;
- ≥ 10 bats at a single turbine found over the survey year;
- ≥ 7 birds at a single turbine found in a single monitoring event;
- ≥ 15 birds at a single turbine found over the survey year; or
- Fatality of a species at risk.

In the event of high mortality, as determined by AEP-FWS, post-construction mitigation will be required. The Proponent has identified the following post-construction operational mitigation that could be implemented:

- Altered cut-in speeds;
- Feathering of turbine blades;
- Use of deterrents; and
- Alternative acceptable mitigation that is deemed appropriate based upon the site specific circumstances or incidents following consultation with AEP-FWS.

Mitigation plans will be submitted for review and agreement by AEP-FWS. If post-construction mitigation is required, as determined by AEP-FWS, at least two additional years of monitoring will be required to determine if the mitigation is successful at reducing the fatalities to acceptable levels, as per the *Directive*.

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