

2007 NEW HAMPSHIRE ENVIROTHON: FISH AND WILDLIFE TEST

SECTION I - Wildlife Identification [1 pt each]

Team #: _____

Calls

- 1.
- 2.
- 3.
- 4.

Fish

- 5.
- 6.
- 7.
- 8.
- 9.
- 10.

Small Mammals

- 11.
- 12.
- 13.
- 14.
- 15.

Larger Mammals

- 16.
- 17.
- 18.
- 19.
- 20.

21.

Amphibians/Reptiles

- 22.
- 23.
- 24.

Birds

- 25.
- 26.
- 27.
- 28.
- 29.
- 30.

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SECTION I - Wildlife Identification [1 pt each]

Team #: _____

Calls

1. American Toad
2. Northern Flicker
3. Green Frog
4. Redwing Blackbird

Fish

5. Smallmouth Bass
6. Redbreast Sunfish
7. American Shad
8. Brook Trout
9. Walleye
10. Yellow Bullhead

Small Mammals

11. Little Brown Bat
12. Redbacked Vole
13. Woodland Jumping Mouse
14. Deer Mouse
15. House Mouse

Larger Mammals

16. Virginia Opossum
17. Grey Fox
18. White-tailed Deer
19. American Martin
20. Bobcat
21. Muskrat

Amphibians/Reptiles

22. red-spotted newt
23. Wood Turtle
24. Timber Rattlesnake

Birds

25. Black Duck
26. Bluebird
27. Peregrine Falcon
28. Wood Thrush
29. Bittern
30. Ruffed Grouse

Write the letter of the matching definition in the blank provided. There are more definitions than terms, so read them carefully! (2 points each)

Armoring	___	A. Fish that live most of their adult life in saltwater but spawn in freshwater.
Natural Selection	___	B. Vegetated areas adjacent to flowing waters that aid in sediment retention, flood abatement and bank stabilization.
Fecundity	___	C. Seasonal depressional wetlands – important for amphibian breeding
Photo Period	___	D. Referring to the movement of organisms out of an area.
Riparian Zone	___	E. The rate at which an individual produces offspring
Boreal	___	F. The process in which the sediment and biotic matter are scoured below dams leaving only cobble and boulders.
Sexual Dimorphism	___	G. A forest region in North America where the plants and animals are adapted to cold temperatures and the dominant tree species are conifers.
Nocturnal	___	H. A reversible change in the morphology or physiology of an organism in response to environmental change
Emigration	___	I. A condition present in an environment in such short supply that it restricts growth, reproduction, or other life processes
Acclimation	___	J. A region on mountaintops where extreme weather conditions make survival impossible for tall trees
Limiting factor	___	K. Animals that are most active during the night
Anadromous	___	L. Organisms whose diet is dominated by plant material
Detritavore	___	M. Organisms whose diet is dominated by animal material
Vernal Pool	___	N. The rate at which fetuses develop
Ecotone	___	O. Length of daylight
		P. An organism that feeds on decomposed or partly decomposed plant and animal matter.
		Q. The difference of physical form between males and females of the same species
		R. A transition zone between two distinct habitats that contains species from each area.
		S. The process that allows for individuals with inherited characteristics most suited to their environment to pass on those characteristics to their descendants
		T. Permanent wetlands found in forests – important areas for fish breeding

Write the letter of the matching definition in the blank provided. There are more definitions than terms, so read them carefully! (2 points each)

Armoring	<u>F</u>	A. Fish that live most of their adult life in saltwater but spawn in freshwater.
Natural Selection	<u>S</u>	B. Vegetated areas adjacent to flowing waters that aid in sediment retention, flood abatement and bank stabilization.
Fecundity	<u>E</u>	C. Seasonal depressional wetlands – important for amphibian breeding
Photo Period	<u>O</u>	D. Referring to the movement of organisms out of an area.
Riparian Zone	<u>B</u>	E. The rate at which an individual produces offspring
Boreal	<u>G</u>	F. The process in which the sediment and biotic matter are scoured below dams leaving only cobble and boulders.
Sexual Dimorphism	<u>Q</u>	G. A forest region in North America where the plants and animals are adapted to cold temperatures and the dominant tree species are conifers.
Nocturnal	<u>K</u>	H. A reversible change in the morphology or physiology of an organism in response to environmental change
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Limiting factor	<u>I</u>	K. Animals that are most active during the night
Anadromous	<u>A</u>	L. Organisms whose diet is dominated by plant material
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Vernal Pool	<u>C</u>	N. The rate at which fetuses develop
Ecotone	<u>R</u>	O. Length of daylight
		P. An organism that feeds on decomposed or partly decomposed plant and animal matter.
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		S. The process that allows for individuals with inherited characteristics most suited to their environment to pass on those characteristics to their descendants
		T. Permanent wetlands found in forests – important areas for fish breeding

Question 1, Part A. (10 points) You are a wildlife biologist with Walk-In-Woods Consultants, Inc. You have been awarded a contract with the US Forest Service, White Mountain National Forest (WMNF) to determine the potential immediate and long term benefits and impacts from a proposed wind power project. The site for the proposed wind farm is located in the WMNF. Wind turbines will be mounted on 20 250' tall towers, with rotors that measure 200' in diameter. The speed of the rotors will turn at the rate of approximately 20 rpm, which translate to a rough tip speed of about 140 mph. Also consider the effects, good or bad, to the species habitats that might be expected due to the construction of this wind farm project in this rural area. Note: please indicate a different impact (either positive or negative) for each of the species listed. So, given the species of concern listed below, choose an impact (either POS or NEG) and place in the box titled Impact. In the Explanation box, describe the impact. Note: the first box, which is shaded, is an example to assist you.

Species	Impact (POS or NEG)	Explanation
Great Horned Owl	NEG	When in flight, the owls could be struck by the rotors
Fisher		
Black Bear		
Red Bat		
Peregrine Falcon		
Barred Owl		

Question 1, Part B.

Part B. (10 points) With regards to this wind turbine project, list 5 potential issues that could arise as a result of the project on avian wildlife and explain how you, as a wildlife biologist with Walk-In-Woods Consulting, would make changes to abate, reduce or eliminate the negative effect.

1) Problem: Solution:
2) Problem: Solution:
3) Problem: Solution:
4) Problem: Solution:
5) Problem: Solution:

Question 3. Fill in the blanks (2 pts each)

1. Mercury released into the atmosphere can travel long distances on global air currents and be deposited in areas far from its original source. The largest human-generated source of mercury emissions in the United States is the burning of _____, which is roughly one percent of mercury in the global pool.
2. _____ passing through or around a dam can become stressed, injured, disoriented, or die because of contact with turbines, the walls of the dam, or deflection screens.
3. _____ have a complex life cycle, and can be harmed by over harvest, predation, pollution, and impoundments. They were abundant in pre-colonial times and were declared extirpated from both the Connecticut and Merrimack rivers in the early nineteenth century. The loss was attributed to the construction of impassable dams.
4. Slimy sculpin is one of 3 New Hampshire fish species that serve as hosts to the federally and state endangered dwarf wedge mussel. Healthy populations of slimy sculpin in the Connecticut and Ashuelot Rivers likely contribute to the persistence of dwarf wedge mussel populations in New Hampshire. The Atlantic Salmon and the _____ are the only other New Hampshire fish species that are hosts for the dwarf wedge mussel.

Question 1, Part A. (10 points) You are a wildlife biologist with Walk-In-Woods Consultants, Inc. You have been awarded a contract with the US Forest Service, White Mountain National Forest (WMNF) to determine the potential immediate and long term benefits and impacts from a proposed wind power project. The site for the proposed wind farm is located in the WMNF. Wind turbines will be mounted on 20 250' tall towers, with rotors that measure 200' in diameter. The speed of the rotors will turn at the rate of approximately 20 rpm, which translate to a rough tip speed of about 140 mph. Also consider the effects, good or bad, to the species habitats that might be expected due to the construction of this wind farm project in this rural area. Note: please indicate a different impact (either positive or negative) for each of the species listed. So, given the species of concern listed below, choose an impact (either POS or NEG) and place in the box titled Impact. In the Explanation box, describe the impact. Note: the first box, which is shaded, is an example to assist you.

Species	Impact (POS or NEG)	Explanation
Great Horned Owl	NEG	When in flight, the owls could be struck by the rotors
Fisher	POS	Rock piles developed as a result of the construction of the wind tower would inc. rodent populations
Black Bear	POS	Open fields created by the burial of the power lines or of the towers themselves would increase foraging opportunities
Red Bat	NEG	Flying into the wind tower rotors
Peregrine Falcon	NEG	Placement of wind towers near ridges/cliffs could affect these cliff dwelling species
Barred Owl	NEG	Possible electrocution due to high voltage power lines

Question 1, Part B.

Part B. (10 points) With regards to this wind turbine project, list 5 potential issues that could arise as a result of the project on avian wildlife and explain how you, as a wildlife biologist with Walk-In-Woods Consulting, would make changes to abate, reduce or eliminate the negative effect.

1) Problem: Red warning lights on top of wind tower Solution: Change red light to white. Birds are not bothered by the white light
2) Problem: Power lines Solution: Bury power lines
3) Problem: Placement of wind towers near or on cliffs might impact cliff dwelling species such as falcons Solution: Don't allow towers to be built by cliffs or ridges
4) Problem: Spinning rotors Solution: Shut off the rotors/turbines when mass migrations are occurring
5) Problem: Construction of tower might encourage birds to nest in proximity to the spinning rotors Solution: Build towers with tubular construction that does not encourage birds to build nests in the tower
6) Problem: Tower height Solution: Increase/decrease height based on radar studies
7) Problem: New construction roads create fragmentation of existing habitat Solution: Cluster towers to minimize new road construction
8) Problem: Rock piles generated as the result of the towers could attract an inc. in rodent populations that would attract raptors, therefore inc. the mortality of these birds Solution: Adjust height of rotor to avoid low flying bird species

Question 2. New England College has decided to go "green" and become environmentally self-sufficient. As part of that initiative, they are proposing to produce all their own energy through a hydropower dam on the Contoocook River and build a Bioenergy production facility on campus.

- 1) Name two species of fish (at least one of which is anadromous) that would/would not be impacted by the dam and why. (4 pts)**

Species: Anadromous (Atlantic salmon, shad, herring) Others (trout, sunfish, bass)

Impact, Salmon (-): NHF&G/FWS salmon stocking upstream would mean that fish have to pass the dam and would not be able to return upstream to breed.

Impact, other anadromous species (+/-): not present in river reach, downstream dams already bar them from making it that far up the Merrimack watershed.

Impact, trout (-): increased water temp and decreased DO in impoundment

Impact, sunfish, LMB (+): habitat preferences favor impounded conditions

Impact, SMB (+/-): adapted to a variety of conditions

- 2) Name two features of the river that would be impacted by the production of hydropower and how these would impact the local fishery. (4 pts)**

Stream flow, nutrient exchange, water temps, DO, river hydrogeomorphology, etc. – all the changes that result from turning a free flowing reach into an impoundment

Impact: Change in fishery assemblage, decreased biodiversity, change in prey base.

- 3) The Bioenergy production plant will require 10 tons of wood chips per day to produce enough energy to supply the remainder of the energy needs after hydropower and wind energy production. How will this potentially impact birds, mammals and fish at the wood chip source? (4 pts)**

Continual volume of pulp wood needed would require large-scale forest operation for consistent. Continual cutting of pulp wood would impact forest dwelling species habitat(cover, nesting, resting), logging operations could disrupt interior species or cause increased erosion and sedimentation in streams, impacting fish habitat. Removal of overstory would favor regeneration of shrubs, berries, saplings but might lead to inc. temps in surface waters and loss of near-term cover. Short cycle pulp wood generation would favor early successional species and not favor species needing uninterrupted large tracts of forest with large dbh trees, mast production, etc ... Timing of logging may impact bird nesting..... Pulpwood monoculture may also limit bird/mammal diversity.

Question 3. Fill in the blanks (2 pts each)

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