

WILDLIFE HABITAT EVALUATION REPORT SHUTESBURY, MA



Property:

Lake Wyola
Shutesbury, MA

Prepared for:

Lake Wyola Advisory
Committee
PO Box 276
1 Cooleyville Road
Shutesbury, MA 01072

Prepared by:



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Date:

June 2019



WILDLIFE HABITAT EVALUATION REPORT

Lake Wyola
Shutesbury, MA

Introduction

The proposed project involves the annual partial drawdown and subsequent refill of Lake Wyola in Shutesbury, MA. Based on the Order of Conditions issued by the Shutesbury Conservation Commission the drawdown impacts 12,000-LF of inland Bank and 688,000-SF of Land under Water Bodies (LUW). The OOC limits the drawdown to 2-FT with an expressed goal of reducing ice damage to the lake's Bank, resident's docks and the earthen dam and spillway. The drawdown has been reportedly occurring annually for 30-years.

Lake Wyola is located within the northwest corner of Shutesbury, a rural community within Franklin County, MA. The water level of the 128-acre lake is regulated by a constructed earthen dam and spillway located at the Sawmill River outflow. Rated by DCR has a High Hazard Dam, repair work for the dam was permitted in 2007 and was reportedly completed in May of 2009. Based on USGS mapping, the main inflow to Lake Wyola is Fiske Brook. Addition inflows include Skerry Brook, South Brook and smaller inlets presumably associated with culverted stormflow. The drainage area which contributes to the Sandmill River outflow is 6.84 square miles and is dominated by a forested landscape which includes the Lake Wyola State Park and the Ames Hill Lake Wyola Conservation Restriction lands. Based on USGS Stream Stats the watershed is comprised of approximately 6% developed lands.

Emily Stockman, P.W.S. and Ty Stockman inspected the site on March 20, 2019 and again on May 29, 2019 to collect data and perform a wildlife habitat evaluation as required under 310 CMR 10.00. Detailed Wildlife Habitat Evaluation (Appendix B) forms were completed to assess project impacts. The following detailed wildlife habitat evaluation has been performed following methodology presented in the March 2006 Massachusetts Wildlife Habitat Protection Guidance for Inland Wetlands.

The following materials were provided for review to assess project impacts to wildlife habitat:

Order of Conditions issued to Lake Wyola Advisory Committee dated 10/17/2018 (MA DEP File # 286-0272)

Partial WPA Form 3

Please note a full Notice of Intent submittal was not provided for review.



Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

Part 1. Summary Sheet

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



Lake Wyola Annual Drawdown/ Refill

Project Name

Lake Wyola Shutesbury, MA

Location

Approx. 12,000-LF of Inland Bank and 688,000-SF of LUW

3/20/2019; 5/29/2019

Size of Area Being Impacted

Date

Impact Areas (linear feet, square feet, or acres for each of the impact areas within the site)

Name	Waterbody/ Waterway	Wetland	Upland*	Total Area
1. Northern Portion	Lake Wyola	±6,000-LF; 344,000-SF		±6,000-LF; 344,000-SF
2. Central Portion	Lake Wyola	±4,000-LF; 229,000-SF		±4,000-LF; 229,000-SF
3. Southern Portion	Lake Wyola	±2,000-LF; 115,000-SF		±2,000-LF; 115,000-SF
4.				
5.				
6.				
7.				

*Riverfront Area/BLSF

Attach Sketch map and/or photos of the Impact Areas

Narrative Description of Site (attach separate page if necessary)

Lake Wyola is an approximately 128-ACRE freshwater lake located within the Town of Shutesbury, MA. The water level within the lake is controlled by an earthen dam and spillway located along the northwesterly lake shore. A Notice of Intent was filed by the Lake Wyola Advisory Committee in October 2018 for the annual 2-FT drawdown and refill of the lake. The subsequent approval Order of Conditions (DEP File #286-0272) required that a Wildlife Habitat Evaluation be performed in the spring of 2019.

Certification

I hereby certify that this project has been designed to avoid, minimize, and mitigate adverse effects on wildlife habitat, and that it will not, following two growing seasons of project completion and thereafter, substantially reduce its capacity to provide important wildlife habitat functions.

Signature of Wildlife Specialist (per 310 CMR 10.60 (1) (b))

SEE FULL WHE REPORT

Typed or Printed Name



Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

Part 2. Field Data Form (for each wetland or non-wetland resource area)

I. General Information

Lake Wyola

Project Location (from NOI page 1)

#1/ Northern Portion

Impact Area (number/name)

3/20/2019; 5/29/2019

Date(s) of Site Visit(s) and Data Collection

March-minimal snow, lake predominantly ice covered; May-sunny, cool

Weather Conditions During Site Visit (if snow cover, include depth)

Emily Stockman

5/29/2019

Person completing form per 310 CMR 10.60(1)(b)

Date this form was completed

The information on this data sheet is based on my observations unless otherwise indicated

Signature

II. Site Description (complete A or B under Classification - see instructions for full description)

A. Classification

1. For Wetland Resource Areas, complete the following:

System: Lacustrine

Subsystem: Littoral

Class: Aquatic Bed

Subclass: Rooted Vascular

Hydrology/Water Regime

Permanently flooded

Saturated

Intermittently exposed

Temporarily flooded

Semi-permanently flooded

Intermittently flooded

Seasonally flooded

Artificially flooded

2. For Riverfront or Bordering Land Subject to Flooding Resource Areas, complete the following.

Use a terrestrial classification system such as one of the two listed below:

a. "Classification of the Natural Communities of Massachusetts (Draft)" by Patricia C. Swain and Jennifer B. Kearsley, MA DFW NHESP, Westborough, MA. July 2000. ([Department of Fish & Game Website](#))

b. "New England Wildlife: Habitat, Natural History, and Distribution" by Richard M. DeGraaf and Deborah D. Rudis, USDA Forest Service, Northeastern Forest Experiment Station. General Technical Report NE-108. August 1992. 491 pages.

Community Name

Vegetation Description

Physical Description



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Appendix B: Detailed Wildlife Habitat Evaluation

Part 2. Field Data Form (continued)

B. Inventory (Plant community)

% Cover: 30 60 50
Trees (> 20') Shrubs (< 20') Woody vines Mosses Herbaceous

Plant Lists (species that comprise 10% or more of the vegetative cover in each strata; "*" designates a dominant plant species for the strata):

Strata	Plant Species	Strata	Plant Species
Tree	<i>Pinus strobus</i> *	Tree	<i>Acer rubrum</i>
Shrub	<i>Vaccinium corymbosum</i> *	Shrub	<i>Kalmia latifolia</i> *
Herb	<i>Isoetes ssp.</i>	Herb	<i>Urticularia spp.*</i>
Herb	<i>Proserpinaca palustris</i>	Herb	<i>Potamogeton spp.*</i>
Herb	<i>Nitella ssp.</i>	Herb	<i>Brasenia schreberi</i>
Herb	<i>Vallisnelia americana</i> *	Herb	<i>Pontederia cordata</i>

C. Inventory (Soils)

open water
Soil Survey Unit _____ Drainage Class _____

Texture (upper part) _____ Depth _____

Depth to Water Table _____

III. Important Habitat Features (complete for all resource areas)

If the following habitat characteristics are present, describe & quantify them on a separate sheet & attach.

Wildlife Food

Important Wetland/Aquatic Food Plants (smartweeds, pondweeds, wild rice, bulrush, wild celery)

Abundant Present Absent

Important Upland/Wetland Food Plants (hard mast and fruit/berry producers)

Abundant Present Absent

Shrub thickets or streambeds with abundant earthworms (American woodcock)

Present Absent

Shrub and/or herbaceous vegetation suitable for veery nesting

Present Absent



Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

Part 2. Field Data Form (continued)

Number of trees (live or dead) > 30" DBH: _____

Number (or density) of Standing Dead Trees (potential for cavities and perches):

Number of Tree Cavities in trunks or limbs of:

Small mammal burrows

Abundant Present Absent

Cover/Perches/Basking/Denning/Nesting Habitat

Dense herbaceous cover (voles, small mammals, amphibians & reptiles)

Large woody debris on the ground (small mammals, mink, amphibians & reptiles)

Rocks, crevices, logs, tree roots or hummocks under water's surface (turtles, snakes, frogs)

Rocks, crevices, fallen logs, overhanging branches or hummocks at, or within 1m above the water's surface (turtles, snakes, frogs, wading birds, wood duck, mink, raccoon)

Rock piles, crevices, or hollow logs suitable for:

otter

mink

porcupine

bear

bobcat

turkey vulture

Live or dead standing vegetation overhanging water or offering good visibility of open water (e.g., osprey, kingfisher, flycatchers, cedar waxwings)

Depressions that may serve as seasonal (vernal/autumnal) pools

Present

Absent

Standing water present at least part of the growing season, suitable for use by

Breeding amphibians

Non-breeding amphibians (foraging, re-hydration)

Turtles

Foraging waterfowl

Sphagnum hummocks or mats, moss-covered logs or saturated logs, overhanging or directly adjacent to pools of standing water in spring (four-toed salamander)

Present

Absent



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Appendix B: Detailed Wildlife Habitat Evaluation

Part 2. Field Data Form (continued)

Important habitat characteristics (if present, describe and quantify them on a separate sheet)

Medium to large (> 6"), flat rocks within a stream (cover for stream salamanders and nesting habitat for spring & two-lined salamanders)

Present Absent

Flat rocks and logs on banks or within exposed portions of streambeds (cover for stream salamanders and nesting habitat for dusky salamanders)

Present Absent

Underwater banks of fine silt and/or clay (beaver, muskrat, otter)

Present Absent

Undercut or overhanging banks (small mammals, mink, weasels)

Present Absent

Vertical sandy banks (bank swallow, kingfisher)

Present Absent

Areas of ice-free open water in winter

Present Absent

Mud flats

Present Absent

Exposed areas of well-drained, sandy soil suitable for turtle nesting

Present Absent

Wildlife dens/nests (if present, describe & quantify them on the back of this sheet)

Turtle nesting sites

Present Absent

Bank swallow colony

Present Absent

Nest(s) present of

Bald Eagle Osprey Great Blue Heron

Den(s) present of

Otter Mink Beaver



Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

Part 2. Field Data Form (continued)

Project area is within:

- 100' of beaver, mink or otter den, bank swallow colony or turtle nesting area
- 200' of Great Blue Heron or osprey nest(s)
- 1400' of a Bald Eagle nest¹

Emergent Wetlands (if present, describe & quantify them on a separate sheet)

Emergent wetland vegetation at least seasonally flooded during the growing season (wood duck, green heron, black-crowned night heron, king rail, Virginia rail, coot, etc.)

Flooded > 5 cm Present Absent

Flooded > 25 cm (pied-billed grebe) Present Absent

Persistent emergent wetland vegetation at least seasonally flooded during the growing season (mallard, American bittern, sora, common snipe, red-winged blackbird, swamp sparrow, marsh wren)

Flooded > 5 cm Present Absent

Flooded > 25 cm (least bittern, common moorhen) Present Absent

Cattail emergent wetland vegetation at least seasonally flooded during the growing season

Flooded > 5 cm (marsh wren) Present Absent

Flooded > 25 cm (least bittern, common moorhen) Present Absent

Fine-leaved emergent vegetation (grasses and sedges) at least seasonally flooded during the growing season (common snipe, spotted sandpiper, sedge wren)

Flooded > 5 cm Present Absent

Flooded > 25 cm (least bittern, common moorhen) Present Absent

IV. Landscape Context

A. **Habitat Continuity** (if present, describe the landscape context on a separate sheet and its importance for area-sensitive species)

- | | | | |
|---|---------------------|------------------------------|--|
| Is the impact area part of an emergent marsh at least | 1.0 acre in size? | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
| (marsh and waterbirds) | 2.0 acres in size? | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
| | 5.0 acres in size? | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
| | 10.0 acres in size? | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |

¹ 1400 feet is the distance used by NHESP for evaluating potential disturbance impacts on eagle nests under MESA. Keep in mind, however, that this doesn't give jurisdiction within 1400' of an eagle's nest; it only identifies it on the checklist so that adverse effects can be avoided if work in a resource area is within 1400 feet.



Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

Part 2. Field Data Form (continued)

- | | | | |
|---|---------------------|---|-----------------------------|
| Is the impact area part of a wetland complex at least | 2.5 acres in size? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| (turtles, frogs, waterfowl, mammals) | 5.0 acres in size? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| | 10.0 acres in size? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| | 25.0 acres in size? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| For upland resource areas is the impact area part of contiguous forested habitat at least | | | |
| (forest interior nesting birds) | 50 acres in size? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| | 100 acres in size? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| | 250 acres in size? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| | 500 acres in size? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| (grassland nesting birds) | > 1.0 acre in size? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| (special habitat such as gallery floodplain forest, alder thicket, etc.) | > 1.0 acre in size? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |

B. Connectivity with adjoining natural habitats

- No direct connections to adjacent areas of wildlife habitat (little connectivity function)
- Connectors numerous or impact area is embedded in a large area of natural habitat (limited connectivity function)
- Impact area contributes to a limited number of connectors to adjacent areas of habitat (somewhat important for connectivity function)
- Impact area serves as *part of* a sole connector to adjacent areas of habitat (important for connectivity function)
- Impact area serves as *only* connector to adjacent areas of habitat (very important for connectivity function)

V. Habitat Degradation (describe degradation and wildlife impacts on the back of the sheet)

- Evidence of significant chemical contamination
- Evidence of significant levels of dumping
- Evidence of significant erosion or sedimentation problems
- Significant invasion of exotic plants (e.g., purple loosestrife, *Phragmites*, glossy buckthorn)
- Disturbance from roads or highways
- Other human disturbance
- Is the site the only resource area in the vicinity of an otherwise developed area

Note: These are not the only important habitat features that may be observed on a site. If the wildlife specialist identifies other features they should be noted in the application.



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Appendix B: Detailed Wildlife Habitat Evaluation

Part 2. Field Data Form (continued)

VI. Quantification Table for Important Habitat Characteristics

Habitat Characteristic	Amount Impacted in Impact Area	Current (entire site)	Post-Construction (entire site)
Example: standing dead trees 6-12" dbh	4	12	8
Aquatic Food Source Various species	Predominantly within undeveloped areas	Predominantly within undeveloped areas; more abundant at greater water depth	Predominantly within undeveloped areas; more abundant at greater water depth
Berry-Producers Blueberry, Viburnum	Predominantly within undeveloped areas	Predominantly within undeveloped areas; more abundant along the northerly lake shore	Predominantly within undeveloped areas; more abundant along the northerly lake shore
Amphibian Breeding	Back Cove/ Inlet	Back Cove/ Inlet; Southerly outer littoral zone	Back Cove/ Inlet; Southerly outer littoral zone
Live Standing Trees with Good Visibility to Open Water	Predominantly within undeveloped areas	Predominantly within undeveloped areas	Predominantly within undeveloped areas
Rocks, Crevices, Logs Under/At the Water Surface	Back cove areas, Rocks and boulders common along developed areas	Back cove areas, Rocks and boulders common along developed areas	Back cove areas, Rocks and boulders common along developed areas
Standing Water During the Growing Season	Present during full pool; Absent outside of the growing season	Present during full pool; Absent outside of the growing season	Present during full pool; Absent outside of the growing season
Mudflats	Present during drawdown; Absent during full pool	Present during drawdown; Absent during full pool; Northerly sections and southerly outer littoral zone	Present during drawdown; Absent during full pool; Northerly sections and southerly outer littoral zone
Flooded Cattail and Fine-Leaf Emergents	Small sections scattered within less developed areas	Small sections scattered within less developed areas; larger cattail marsh within southerly outer littoral zone	Small sections scattered within less developed areas; larger cattail marsh within southerly outer littoral zone±
Overhanging Branches	Predominantly within undeveloped areas	Predominantly within undeveloped areas	Predominantly within undeveloped areas



Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

I. General Information

Lake Wyola

Project Location (from NOI page 1)

#2/ Central Portion

Impact Area (number/name)

3/20/2019; 5/29/2019

Date(s) of Site Visit(s) and Data Collection

March-minimal snow, lake predominantly ice covered; May-sunny, cool

Weather Conditions During Site Visit (if snow cover, include depth)

Emily Stockman

5/29/2019

Person completing form per 310 CMR 10.60(1)(b)

Date this form was completed

The information on this data sheet is based on my observations unless otherwise indicated

Signature

II. Site Description (complete A or B under Classification - see instructions for full description)

A. Classification

1. For Wetland Resource Areas, complete the following:

System: Lacustrine

Subsystem: Littoral

Class: Unconsolidated Bottom

Subclass: Sand

Hydrology/Water Regime

Permanently flooded

Saturated

Intermittently exposed

Temporarily flooded

Semi-permanently flooded

Intermittently flooded

Seasonally flooded

Artificially flooded

2. For Riverfront or Bordering Land Subject to Flooding Resource Areas, complete the following.

Use a terrestrial classification system such as one of the two listed below:

a. "Classification of the Natural Communities of Massachusetts (Draft)" by Patricia C. Swain and Jennifer B. Kearsley, MA DFW NHESP, Westborough, MA. July 2000. ([Department of Fish & Game Website](#))

b. "New England Wildlife: Habitat, Natural History, and Distribution" by Richard M. DeGraaf and Deborah D. Rudis, USDA Forest Service, Northeastern Forest Experiment Station. General Technical Report NE-108. August 1992. 491 pages.

Community Name

Vegetation Description

Physical Description

Part 2. Field Data Form (continued)



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Appendix B: Detailed Wildlife Habitat Evaluation

B. Inventory (Plant community)

% Cover: 25 25 25
 Trees (> 20') Shrubs (< 20') Woody vines Mosses Herbaceous

Plant Lists (species that comprise 10% or more of the vegetative cover in each strata; "*" designates a dominant plant species for the strata):

Strata	Plant Species	Strata	Plant Species
Tree	<i>Pinus strobus</i> *	Tree	<i>Acer rubrum</i>
Shrub	<i>Vaccinium corymbosum</i> *	Shrub	<i>Kalmia latifolia</i> *
Herb	<i>Isoetes ssp.*</i>	Herb	<i>Urticularia spp.</i>
Herb	<i>Potamogeton spp.</i>	Herb	<i>Vallisnelia americana</i>

C. Inventory (Soils)

open water
Soil Survey Unit Drainage Class

Texture (upper part) Depth

Depth to Water Table

III. Important Habitat Features (complete for all resource areas)

If the following habitat characteristics are present, describe & quantify them on a separate sheet & attach.

Wildlife Food

Important Wetland/Aquatic Food Plants (smartweeds, pondweeds, wild rice, bulrush, wild celery)

Abundant Present Absent

Important Upland/Wetland Food Plants (hard mast and fruit/berry producers)

Abundant Present Absent

Shrub thickets or streambeds with abundant earthworms (American woodcock)

Present Absent

Shrub and/or herbaceous vegetation suitable for veery nesting

Present Absent

Part 2. Field Data Form (continued)

Number of trees (live or dead) > 30" DBH:



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Number (or density) of Standing Dead Trees (potential for cavities and perches):

_____	<u>1 (<i>Acer rubrum</i>)</u>	<u>1 (<i>Pinus strobus</i>)</u>	_____
6-12" dbh	12-18" dbh	18-24" dbh	> 24" dbh

Number of Tree Cavities in trunks or limbs of:

6-12" diameter (e.g., tree swallow, saw whet owl, screech owl, bluebird, other songbirds)

12-18" diameter (e.g., hooded merganser, wood duck, common goldeneye, mink)

>18" diameter (e.g., hooded merganser, wood duck, common goldeneye, common merganser, barred owl, mink, raccoon, fisher)

Small mammal burrows

Abundant Present Absent

Cover/Perches/Basking/Denning/Nesting Habitat

Dense herbaceous cover (voles, small mammals, amphibians & reptiles)

Large woody debris on the ground (small mammals, mink, amphibians & reptiles)

Rocks, crevices, logs, tree roots or hummocks under water's surface (turtles, snakes, frogs)

Rocks, crevices, fallen logs, overhanging branches or hummocks at, or within 1m above the water's surface (turtles, snakes, frogs, wading birds, wood duck, mink, raccoon)

Rock piles, crevices, or hollow logs suitable for:

otter mink porcupine bear bobcat turkey vulture

Live or dead standing vegetation overhanging water or offering good visibility of open water (e.g., osprey, kingfisher, flycatchers, cedar waxwings)

Depressions that may serve as seasonal (vernal/autumnal) pools

Present Absent

Standing water present at least part of the growing season, suitable for use by

Breeding amphibians Non-breeding amphibians (foraging, re-hydration)

Turtles Foraging waterfowl

Sphagnum hummocks or mats, moss-covered logs or saturated logs, overhanging or directly adjacent to pools of standing water in spring (four-toed salamander)

Present Absent

Part 2. Field Data Form (continued)

Important habitat characteristics (if present, describe and quantify them on a separate sheet)

Medium to large (> 6"), flat rocks within a stream (cover for stream salamanders and nesting habitat for spring & two-lined salamanders)



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Present Absent

Flat rocks and logs on banks or within exposed portions of streambeds (cover for stream salamanders and nesting habitat for dusky salamanders)

Present Absent

Underwater banks of fine silt and/or clay (beaver, muskrat, otter)

Present Absent

Undercut or overhanging banks (small mammals, mink, weasels)

Present Absent

Vertical sandy banks (bank swallow, kingfisher)

Present Absent

Areas of ice-free open water in winter

Present Absent

Mud flats

Present Absent

Exposed areas of well-drained, sandy soil suitable for turtle nesting

Present Absent

Wildlife dens/nests (if present, describe & quantify them on the back of this sheet)

Turtle nesting sites

Present Absent

Bank swallow colony

Present Absent

Nest(s) present of

Bald Eagle

Osprey

Great Blue Heron

Den(s) present of

Otter

Mink

Beaver

Part 2. Field Data Form (continued)

Project area is within:

100' of beaver, mink or otter den, bank swallow colony or turtle nesting area

200' of Great Blue Heron or osprey nest(s)



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1400' of a Bald Eagle nest¹

Emergent Wetlands (if present, describe & quantify them on a separate sheet)

Emergent wetland vegetation at least seasonally flooded during the growing season (wood duck, green heron, black-crowned night heron, king rail, Virginia rail, coot, etc.)

Flooded > 5 cm Present Absent

Flooded > 25 cm (pied-billed grebe) Present Absent

Persistent emergent wetland vegetation at least seasonally flooded during the growing season (mallard, American bittern, sora, common snipe, red-winged blackbird, swamp sparrow, marsh wren)

Flooded > 5 cm Present Absent

Flooded > 25 cm (least bittern, common moorhen) Present Absent

Cattail emergent wetland vegetation at least seasonally flooded during the growing season

Flooded > 5 cm (marsh wren) Present Absent

Flooded > 25 cm (least bittern, common moorhen) Present Absent

Fine-leaved emergent vegetation (grasses and sedges) at least seasonally flooded during the growing season (common snipe, spotted sandpiper, sedge wren)

Flooded > 5 cm Present Absent

Flooded > 25 cm (least bittern, common moorhen) Present Absent

IV. Landscape Context

A. **Habitat Continuity** (if present, describe the landscape context on a separate sheet and its importance for area-sensitive species)

Is the impact area part of an emergent marsh at least 1.0 acre in size? Yes No

(marsh and waterbirds) 2.0 acres in size? Yes No

5.0 acres in size? Yes No

10.0 acres in size? Yes No

Part 2. Field Data Form (continued)

Is the impact area part of a wetland complex at least 2.5 acres in size? Yes No

(turtles, frogs, waterfowl, mammals) 5.0 acres in size? Yes No

10.0 acres in size? Yes No

25.0 acres in size? Yes No

¹ 1400 feet is the distance used by NHESP for evaluating potential disturbance impacts on eagle nests under MESA. Keep in mind, however, that this doesn't give jurisdiction within 1400' of an eagle's nest; it only identifies it on the checklist so that adverse effects can be avoided if work in a resource area is within 1400 feet.



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Appendix B: Detailed Wildlife Habitat Evaluation

For upland resource areas is the impact area part of contiguous forested habitat at least

- | | | | |
|--|---------------------|------------------------------|-----------------------------|
| (forest interior nesting birds) | 50 acres in size? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| | 100 acres in size? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| | 250 acres in size? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| | 500 acres in size? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| (grassland nesting birds) | > 1.0 acre in size? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| (special habitat such as gallery floodplain forest, alder thicket, etc.) | > 1.0 acre in size? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |

B. Connectivity with adjoining natural habitats

- No direct connections to adjacent areas of wildlife habitat (little connectivity function)
- Connectors numerous or impact area is embedded in a large area of natural habitat (limited connectivity function)
- Impact area contributes to a limited number of connectors to adjacent areas of habitat (somewhat important for connectivity function)
- Impact area serves as *part of* a sole connector to adjacent areas of habitat (important for connectivity function)
- Impact area serves as *only* connector to adjacent areas of habitat (very important for connectivity function)

V. Habitat Degradation (describe degradation and wildlife impacts on the back of the sheet)

- Evidence of significant chemical contamination
- Evidence of significant levels of dumping
- Evidence of significant erosion or sedimentation problems
- Significant invasion of exotic plants (e.g., purple loosestrife, *Phragmites*, glossy buckthorn)
- Disturbance from roads or highways Other human disturbance
- Is the site the only resource area in the vicinity of an otherwise developed area

Note: These are not the only important habitat features that may be observed on a site. If the wildlife specialist identifies other features they should be noted in the application.

Part 2. Field Data Form (continued)

VI. Quantification Table for Important Habitat Characteristics

Habitat Characteristic	Amount Impacted in Impact Area	Current (entire site)	Post-Construction (entire site)
Example: standing dead trees 6-12" dbh	4	12	8



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Aquatic Food Source	Present, but very limited	Aquatic plants more abundant to the north, within less developed areas and at greater water depth	Aquatic plants more abundant to the north, within less developed areas and at greater water depth
Berry-Producers	Present, but very limited	Predominantly within undeveloped areas; more abundant to the north	Predominantly within undeveloped areas; more abundant to the north
Rocks, Crevices, Logs, Branches Under/At the Water Surface	Rocks and crevices common within developed areas; woody materials within undeveloped areas	Rocks and crevices common within developed areas; woody materials more abundant to north and south	Rocks and crevices common within developed areas; woody materials more abundant to north and south
Live Standing Trees with Good Visibility to Open Water	Predominantly within undeveloped areas	Predominantly within undeveloped areas	Predominantly within undeveloped areas
Standing Water During the Growing Season	Present during full pool; Absent outside of the growin season	Present during full pool; Absent outside of the growin season	Present during full pool; Absent outside of the growin season
Standing Dead Trees	Western Bank (2)	Western Bank (2); Southerly outer littoral zone (1)	Western Bank (2); Southerly outer littoral zone (1)
Overhanging Branches	Predominantly within undeveloped areas	Predominantly within undeveloped areas	Predominantly within undeveloped areas



Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

Part 2. Field Data Form (for each wetland or non-wetland resource area)

I. General Information

Lake Wyola

Project Location (from NOI page 1)

#3/ Southern Portion

Impact Area (number/name)

3/20/2019; 5/29/2019

Date(s) of Site Visit(s) and Data Collection

March-minimal snow, lake predominantly ice covered; May-sunny, cool

Weather Conditions During Site Visit (if snow cover, include depth)

Emily Stockman

5/29/2019

Person completing form per 310 CMR 10.60(1)(b)

Date this form was completed

The information on this data sheet is based on my observations unless otherwise indicated

Signature

II. Site Description (complete A or B under Classification - see instructions for full description)

A. Classification

1. For Wetland Resource Areas, complete the following:

System: Lacustrine

Subsystem: Littoral

Class: Unconsolidated Bottom

Subclass: Sand

Hydrology/Water Regime

Permanently flooded

Saturated

Intermittently exposed

Temporarily flooded

Semi-permanently flooded

Intermittently flooded

Seasonally flooded

Artificially flooded

2. For Riverfront or Bordering Land Subject to Flooding Resource Areas, complete the following.

Use a terrestrial classification system such as one of the two listed below:

a. "Classification of the Natural Communities of Massachusetts (Draft)" by Patricia C. Swain and Jennifer B. Kearsley, MA DFW NHESP, Westborough, MA. July 2000. ([Department of Fish & Game Website](#))

b. "New England Wildlife: Habitat, Natural History, and Distribution" by Richard M. DeGraaf and Deborah D. Rudis, USDA Forest Service, Northeastern Forest Experiment Station. General Technical Report NE-108. August 1992. 491 pages.

Community Name

Vegetation Description

Physical Description



Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

Part 2. Field Data Form (continued)

B. Inventory (Plant community)

% Cover: 15 60 30 25
Trees (> 20') Shrubs (< 20') Woody vines Mosses Herbaceous

Plant Lists (species that comprise 10% or more of the vegetative cover in each strata; "*" designates a dominant plant species for the strata):

Strata	Plant Species	Strata	Plant Species
Tree	<i>Pinus strobus</i> *	Tree	<i>Acer rubrum</i> *
Shrub	<i>Vaccinium corymbosum</i>	Shrub	<i>Chamaedaphne calyculata</i> *
Herb	<i>Isoetes ssp.</i>	Herb	<i>Urticularia spp.</i>
Herb	<i>Potamogeton spp.</i>	Herb	<i>Nuphar spp.</i>
Herb	<i>Typha latifolia</i> *	Herb	<i>Vallisnelia americana</i>
Moss	<i>Sphagnum spp</i> *		

C. Inventory (Soils)

open water
Soil Survey Unit _____
Texture (upper part) _____
Depth to Water Table _____

_____ Drainage Class
_____ Depth

III. Important Habitat Features (complete for all resource areas)

If the following habitat characteristics are present, describe & quantify them on a separate sheet & attach.

Wildlife Food

Important Wetland/Aquatic Food Plants (smartweeds, pondweeds, wild rice, bulrush, wild celery)

Abundant Present Absent

Important Upland/Wetland Food Plants (hard mast and fruit/berry producers)

Abundant Present Absent

Shrub thickets or streambeds with abundant earthworms (American woodcock)

Present Absent

Shrub and/or herbaceous vegetation suitable for veery nesting

Present Absent



Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

Part 2. Field Data Form (continued)

Number of trees (live or dead) > 30" DBH: _____

Number (or density) of Standing Dead Trees (potential for cavities and perches):

_____ ¹ _____ _____ _____
6-12" dbh 12-18" dbh 18-24" dbh > 24" dbh

Number of Tree Cavities in trunks or limbs of:

_____ 6-12" diameter (e.g., tree swallow, saw whet owl, screech owl, bluebird, other songbirds)

_____ 12-18" diameter (e.g., hooded merganser, wood duck, common goldeneye, mink)

_____ >18" diameter (e.g., hooded merganser, wood duck, common goldeneye, common merganser, barred owl, mink, raccoon, fisher)

Small mammal burrows

Abundant Present Absent

Cover/Perches/Basking/Denning/Nesting Habitat

Dense herbaceous cover (voles, small mammals, amphibians & reptiles)

Large woody debris on the ground (small mammals, mink, amphibians & reptiles)

Rocks, crevices, logs, tree roots or hummocks under water's surface (turtles, snakes, frogs)

Rocks, crevices, fallen logs, overhanging branches or hummocks at, or within 1m above the water's surface (turtles, snakes, frogs, wading birds, wood duck, mink, raccoon)

Rock piles, crevices, or hollow logs suitable for:

otter mink porcupine bear bobcat turkey vulture

Live or dead standing vegetation overhanging water or offering good visibility of open water (e.g., osprey, kingfisher, flycatchers, cedar waxwings)

Depressions that may serve as seasonal (vernal/autumnal) pools

Present Absent

Standing water present at least part of the growing season, suitable for use by

Breeding amphibians Non-breeding amphibians (foraging, re-hydration)

Turtles Foraging waterfowl

Sphagnum hummocks or mats, moss-covered logs or saturated logs, overhanging or directly adjacent to pools of standing water in spring (four-toed salamander)

Present Absent



Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

Part 2. Field Data Form (continued)

Important habitat characteristics (if present, describe and quantify them on a separate sheet)

Medium to large (> 6"), flat rocks within a stream (cover for stream salamanders and nesting habitat for spring & two-lined salamanders)

Present Absent

Flat rocks and logs on banks or within exposed portions of streambeds (cover for stream salamanders and nesting habitat for dusky salamanders)

Present Absent

Underwater banks of fine silt and/or clay (beaver, muskrat, otter)

Present Absent

Undercut or overhanging banks (small mammals, mink, weasels)

Present Absent

Vertical sandy banks (bank swallow, kingfisher)

Present Absent

Areas of ice-free open water in winter

Present Absent

Mud flats

Present Absent

Exposed areas of well-drained, sandy soil suitable for turtle nesting

Present Absent

Wildlife dens/nests (if present, describe & quantify them on the back of this sheet)

Turtle nesting sites

Present Absent

Bank swallow colony

Present Absent

Nest(s) present of

Bald Eagle Osprey Great Blue Heron

Den(s) present of

Otter Mink Beaver



Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

Part 2. Field Data Form (continued)

Project area is within:

- 100' of beaver, mink or otter den, bank swallow colony or turtle nesting area
- 200' of Great Blue Heron or osprey nest(s)
- 1400' of a Bald Eagle nest¹

Emergent Wetlands (if present, describe & quantify them on a separate sheet)

Emergent wetland vegetation at least seasonally flooded during the growing season (wood duck, green heron, black-crowned night heron, king rail, Virginia rail, coot, etc.)

Flooded > 5 cm Present Absent

Flooded > 25 cm (pied-billed grebe) Present Absent

Persistent emergent wetland vegetation at least seasonally flooded during the growing season (mallard, American bittern, sora, common snipe, red-winged blackbird, swamp sparrow, marsh wren)

Flooded > 5 cm Present Absent

Flooded > 25 cm (least bittern, common moorhen) Present Absent

Cattail emergent wetland vegetation at least seasonally flooded during the growing season

Flooded > 5 cm (marsh wren) Present Absent

Flooded > 25 cm (least bittern, common moorhen) Present Absent

Fine-leaved emergent vegetation (grasses and sedges) at least seasonally flooded during the growing season (common snipe, spotted sandpiper, sedge wren)

Flooded > 5 cm Present Absent

Flooded > 25 cm (least bittern, common moorhen) Present Absent

IV. Landscape Context

A. **Habitat Continuity** (if present, describe the landscape context on a separate sheet and its importance for area-sensitive species)

- | | | | |
|---|---------------------|------------------------------|--|
| Is the impact area part of an emergent marsh at least | 1.0 acre in size? | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
| (marsh and waterbirds) | 2.0 acres in size? | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
| | 5.0 acres in size? | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
| | 10.0 acres in size? | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |

¹ 1400 feet is the distance used by NHESP for evaluating potential disturbance impacts on eagle nests under MESA. Keep in mind, however, that this doesn't give jurisdiction within 1400' of an eagle's nest; it only identifies it on the checklist so that adverse effects can be avoided if work in a resource area is within 1400 feet.



Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

Part 2. Field Data Form (continued)

- | | | | |
|---|---------------------|---|-----------------------------|
| Is the impact area part of a wetland complex at least | 2.5 acres in size? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| (turtles, frogs, waterfowl, mammals) | 5.0 acres in size? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| | 10.0 acres in size? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| | 25.0 acres in size? | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| For upland resource areas is the impact area part of contiguous forested habitat at least | | | |
| (forest interior nesting birds) | 50 acres in size? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| | 100 acres in size? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| | 250 acres in size? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| | 500 acres in size? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| (grassland nesting birds) | > 1.0 acre in size? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| (special habitat such as gallery floodplain forest, alder thicket, etc.) | > 1.0 acre in size? | <input type="checkbox"/> Yes | <input type="checkbox"/> No |

B. Connectivity with adjoining natural habitats

- No direct connections to adjacent areas of wildlife habitat (little connectivity function)
- Connectors numerous or impact area is embedded in a large area of natural habitat (limited connectivity function)
- Impact area contributes to a limited number of connectors to adjacent areas of habitat (somewhat important for connectivity function)
- Impact area serves as *part of* a sole connector to adjacent areas of habitat (important for connectivity function)
- Impact area serves as *only* connector to adjacent areas of habitat (very important for connectivity function)

V. Habitat Degradation (describe degradation and wildlife impacts on the back of the sheet)

- Evidence of significant chemical contamination
- Evidence of significant levels of dumping
- Evidence of significant erosion or sedimentation problems
- Significant invasion of exotic plants (e.g., purple loosestrife, *Phragmites*, glossy buckthorn)
- Disturbance from roads or highways
- Other human disturbance
- Is the site the only resource area in the vicinity of an otherwise developed area

Note: These are not the only important habitat features that may be observed on a site. If the wildlife specialist identifies other features they should be noted in the application.



Wildlife Habitat Protection Guidance

Appendix B: Detailed Wildlife Habitat Evaluation

Part 2. Field Data Form (continued)

VI. Quantification Table for Important Habitat Characteristics

Habitat Characteristic	Amount Impacted in Impact Area	Current (entire site)	Post-Construction (entire site)
Example: standing dead trees 6-12" dbh	4	12	8
Aquatic/Wetland Food Source; Various aquatics, Cattails, sedges	Present in less developed areas	Aquatic plants more abundant to the north, within less developed areas and at greater water depth	Aquatic plants more abundant to the north, within less developed areas and at greater water depth
Berry-Producers Leatherleaf, highbush Blueberry	Predominantly within undeveloped areas	Predominantly within undeveloped areas; more abundant to the north and south	Predominantly within undeveloped areas; more abundant to the north and south
Sphagnum Hummocks	Abundant within the southerly drawdown area	Abundant within the southerly drawdown area	Abundant within the southerly drawdown area
Live Standing Trees with Good Visibility to Open Water	Predominantly within undeveloped areas Standing dead tree within southerly wetland	Predominantly within undeveloped areas Standing dead tree within southerly wetland and 2 on West Bank	Predominantly within undeveloped areas Standing dead tree within southerly wetland and 2 on West Bank
Rocks, Crevices Under the Water	Common along developed areas	Common along developed areas	Common along developed areas
Standing Water During the Growing Season	Present during full pool; Absent outside of the growin season	Present during full pool; Absent outside of the growin season	Present during full pool; Absent outside of the growin season
Beaver Lodge	Located within southerly littoral zone	Located within southerly littoral zone	Located within southerly littoral zone
Flooded Cattail and Fine-Leaf Marsh	Located within southerly littoral zone	Located within southerly littoral zone and less developed areas to the north	Located within southerly littoral zone and less developed areas to the north
Numerous Stumps, Trunks, Branches Under/At the Water Surface	Abundant within southerly littoral zone	Abundant within southerly littoral zone; branches and logs to the north in less developed areas	Abundant within southerly littoral zone; branches and logs to the north in less developed areas
Mud Flats	Southerly littoral zone. Exposed during drawdown	Present during drawdown; Absent during full pool; Northerly sections and southerly outer littoral zone	Present during drawdown; Absent during full pool; Northerly sections and southerly outer littoral zone

Part 2. Important Habitat Features Narrative to Accompany Field Data Forms

IMPACT AREA #1 –Lake Wyola Northern Portion

Impact Area #1 consists of the northerly portion of Bank and LUW along Lake Wyola. Cumulative impacts within the subject property exceed 100-LF of Bank and 5,000-SF of LUW; therefore, a detailed wildlife habitat evaluation was performed for this area. Proposed impacts (both temporary and permanent) include the following:

- 1) Annual 2-FT drawdown and refill

Total Proposed Impacts to Bank $\pm 6,000$ -LF
Total Proposed Impacts to LUW $\pm 344,000$ -SF

Stockman Associates LLC visited the site on March 20, 2019 to observed drawdown conditions. The full profile of the Bank was exposed and assessed. Stockman Associates LLC returned to the site to observed spring full basin conditions (May 29, 2019).

IMPORTANT WILDLIFE HABITAT FEATURES

Wetland/Aquatic Food Plants

Some pondweeds (*Potamogeton spp.*) and other aquatic and wetland food sources (*Typha latifolia*, *Vallisneria americana*) were observed within the full pool open water portion of the outer littoral zone. These food sources were present primary within back cove areas and were absent in more developed portions of the lake and portions of the lake with steeper shores.

While the majority of the aquatic plant populations were limited in size, this may be partially attributed to time of year. It should be noted that dock and beach areas within the drawdown areas were predominately void of submerged aquatic vegetation. A full aquatic plant survey was not performed; however, based on observed populations, aquatic plants appeared more abundant at deeper water depths (outside of the drawdown area).

A large population of bladderwort (*Utricularia spp.*) was observed along the northwesterly portion of the lake.

Perch (*Perca sp.*), Pumpkinseed (*Lepomis gibbosus*) and Striped Bass (*Morone saxatilis*) were observed. Bass were observed creating test nests in sandy lake bottom sections. Numerous Pumpkinseed nests were observed in sandy areas and near existing docks.

Upland/Wetland Food Plants (hard mast and fruit/berry producers)

Berry-producing Highbush Blueberry (*Vaccinium corymbosum*) and Viburnums were observed along undeveloped portions of the Bank.

Rocks, crevices and overhanging branches under, at, and above 1m of the water's surface

Numerous crevices are located under the water surface during full pool conditions. The rock crevices are associated with native stones in back cove areas and riprap and other armament is developed areas.

During drawdown conditions the crevices are above the water surface.

Exposed tree roots and undercuts along the Bank (particularly in undeveloped areas) also provide cover habitat. Woody plant root systems aid in bank stabilization.

Numerous shrubs and trees species along undeveloped portions of the Bank were providing overhanging branches for nesting and perching habitat. Branches also provide cover for aquatic species and help to regulate the water temperature of the lake.

Cattail emergent wetland vegetation and fine leaf emergent vegetation

Small scattered patches of cattail marsh were observed within the northerly back cove areas. Similarly, patches of fine-leaf emergent marsh were observed within less developed areas. However, none of these observed flooded communities were substantial in size.

Live or dead standing vegetation overhanging water or offering good visibility of open water

Numerous live standing trees, predominately White Pine (*Pinus strobus*), are growing along the Bank and provide perching habitat with good visibility to the open water of Lake Wyola.

Connectivity with adjoining natural habitats

The impact area is located along the northerly Bank of Lake Wyola and is part of the larger Lake Wyola ecosystem. Therefore, there is limited connectivity function.

Mud Flats

During drawdown mud flats are intermittently exposed within the back water areas. No evidence of freshwater snails or mussels was observed during the site visits.

Standing Water

Lake Wyola provides standing water during the growing season for use by breeding amphibians, turtles, non-breeding amphibians and foraging waterfowl.

Spotted Salamander (*Ambystoma maculatum*) egg masses were observed within the inlet cove north of the beach.

An early season open section of water was being utilized by Canada Geese during the March 20, 2019 site visit.

Habitat Degradation

Anthropogenic impacts include the previous placement of riprap, lumber, beams and concrete to armor the Bank against erosion. The earthen dam and spillway are located within the westerly portion of Impact Area #1. Numerous docks are located along the developed shoreline.

Several culverts discharge into the lake resulting in sedimentation presumably associated with turbid stormwater. In the case of the Fiske Brook culvert, a large plunge pool was observed at the outlet area.

A few small erosion rills were observed along the beach and other sections of exposed bank. This was attributed to the unvegetated, more erodible, coarser substrate.

IMPACT AREA #2 –Lake Wyola Central Portion

Impact Area #2 consists of the central portion of Bank and LUW along Lake Wyola. Cumulative impacts within the subject property exceed 100-LF of Bank and 5,000-SF of LUW; therefore, a detailed wildlife habitat evaluation was performed for this area. Proposed impacts (both temporary and permanent) include the following:

- 1) Annual 2-FT drawdown and refill

Total Proposed Impacts to Bank $\pm 4,000$ -LF
Total Proposed Impacts to LUW $\pm 229,000$ -SF

Stockman Associates LLC visited the site on March 20, 2019 to observed drawdown conditions. The full profile of the Bank was exposed and assessed. Stockman Associates LLC returned to the site to observed spring full basin conditions (May 29, 2019).

IMPORTANT WILDLIFE HABITAT FEATURES

Wetland/Aquatic Food Plants

Some pondweeds (*Potamogeton spp.*) and other aquatic food sources (*Urticularia spp.*, *Vallisneria americana*) were observed within the full pool open water portion of the outer littoral zone. These food sources were present primary within back cove areas and along undeveloped portions of the lake shore. Aquatic and wetland food sources were sparse or absent along more developed portions of the lake and portions of the lake with steeper shores.

While the majority of the aquatic plant populations were limited in size, this may be partially attributed to time of year. It should be noted that dock and beach areas within the drawdown areas were predominately void of submerged aquatic vegetation. A full aquatic plant survey was not performed; however, based on observed populations, aquatic plants appeared more abundant at deeper water depths (outside of the drawdown area).

Perch (*Perca sp.*), Pumpkinseed (*Lepomis gibbosus*) and Striped Bass (*Morone saxatilis*) were observed. Numerous Pumpkin seed nests were observed in sandy areas and near existing docks along the easterly lake shore.

Upland/Wetland Food Plants (hard mast and fruit/berry producers)

Berry-producing Highbush Blueberry (*Vaccinium corymbosum*) and Viburnums were observed along undeveloped portions of the Bank. These shrub species were present, but not abundant.

Rocks, crevices and overhanging branches under, at, and above 1m of the water's surface

Numerous crevices are located under the water surface during full pool conditions. The rock crevices are associated with native stones in back cove areas and riprap and other armament is developed areas.

During drawdown conditions the crevices are above the water surface.

Exposed tree roots and undercuts along the Bank (particularly in undeveloped areas) also provide cover habitat. Woody plant root systems aid in bank stabilization.

Numerous shrubs and trees species along undeveloped portions of the Bank were providing overhanging branches for nesting and perching habitat. Branches also provide cover for aquatic species and help to regulate the water temperature of the lake.

Live or dead standing vegetation overhanging water or offering good visibility of open water

Numerous live standing trees, predominately White Pine (*Pinus strobus*), are growing along the Bank and provide perching habitat with good visibility to the open water of Lake Wyola.

A Red Maple (*Acer rubrum*) snag and standing dead White Pine (*Pinus strobus*) are located along the westerly lake shore, proving existing and potential wildlife cavities. The tall standing dead White Pine (*Pinus strobus*) also provides good perching habitat.

Connectivity with adjoining natural habitats

The impact area is located along the central Bank of Lake Wyola and is part of the larger Lake Wyola ecosystem. Therefore, there is limited connectivity function.

Standing Water

Lake Wyola provides standing water during the growing season for use by breeding amphibians, turtles, non-breeding amphibians and foraging waterfowl.

There were several seeps observed along both the westerly and easterly Bank. Seeps can improve the level of dissolved oxygen within the lake, which is already typically low during the winter month and can decrease further under drawdown conditions.

Habitat Degradation

Anthropogenic impacts include the previous placement of riprap, lumber, beams and concrete to armor the Bank against erosion. Numerous docks are located along the developed shoreline.

Several culverts discharge into the lake resulting in sedimentation presumable associated with turbos stormwater. A sedimentation delta was observed along the westerly Bank where a culvert from Lake Drive discharges stormwater. Additional culverts were observed along the easterly Bank, presumable discharging stormwater associated with North Laurel Drive.

IMPACT AREA #3 –Lake Wyola Southern Portion

Impact Area #3 consists of the southerly portion of Bank and LUW along Lake Wyola. Cumulative impacts within the subject property exceed 100-LF of Bank and 5,000-SF of LUW; therefore, a detailed wildlife habitat evaluation was performed for this area. Proposed impacts (both temporary and permanent) include the following:

- 1) Annual 2-FT drawdown and refill

Total Proposed Impacts to Bank \pm 2,000-LF
Total Proposed Impacts to LUW \pm 115,000-SF

Stockman Associates LLC visited the site on March 20, 2019 to observed drawdown conditions. The full profile of the Bank was exposed and assessed. Stockman Associates LLC returned to the site to observed spring full basin conditions (May 29, 2019).

IMPORTANT WILDLIFE HABITAT FEATURES

Wetland/Aquatic Food Plants

Some pondweeds (*Potamogeton spp.*) and other aquatic food sources (*Typha latifolia*, *Vallisneria americana*, *Nuphar spp.*, *Isoetes spp.*) were observed within the full pool open water portion of the outer littoral zone. These food sources were present primarily within the southerly outer littoral zone.

While the majority of the aquatic plant populations were limited in size, this may be partially attributed to time of year. It should be noted that dock and beach areas within the drawdown areas were predominately void of submerged aquatic vegetation. A full aquatic plant survey was not performed; however, based on observed populations, aquatic plants appeared more abundant at deeper water depths (outside of the drawdown area).

Upland/Wetland Food Plants (hard mast and fruit/berry producers)

Berry-producing Highbush Blueberry (*Vaccinium corymbosum*) and Leatherleaf (*Chamaedaphne calyculata*) were observed within and along the southerly littoral zone.

Rocks, crevices and overhanging branches under, at, and above 1m of the water's surface

Rocks and crevices were more common among developed areas.

In the undeveloped area to the south, numerous stumps, trunks and braches under the water surface during full pool conditions.

During drawdown conditions theses woody features are above the water surface.

Numerous shrubs and trees species along undeveloped portions of the Bank were providing overhanging branches for nesting and perching habitat. Branches also provide cover for aquatic species and help to regulate the water temperature of the lake.

Numerous song birds were observed during the May site visit perching, feeding and nesting. A Red-tailed Hawk (*Buteo jamaicensis*) was utilizing the exposed tree stumps for perching during the March (drawdown) site visit.

Numerous logs are located above the water surface during full pool, proving excellent basking habitat for turtles. A dozen Painted Turtles (*Chrysemys picta*) were observed basking during the May site visit.

Cattail emergent wetland vegetation and fine leaf emergent vegetation

Substantial sections of cattail marsh are dispersed among the Sphagnum hummocks and Leatherleaf within the outer littoral zone. A bounteous red-wing blackbird population was observed.

Live or dead standing vegetation overhanging water or offering good visibility of open water

Numerous live standing trees predominately White Pine, (*Pinus strobus*) are growing along the Bank of undeveloped areas and provide perching habitat with good visibility to the open water of Lake Wyola.

A large standing dead tree is located within the southerly wetland.

Connectivity with adjoining natural habitats

The impact area is located along the northerly Bank of Lake Wyola and is part of the larger Lake Wyola ecosystem. Therefore, there is limited connectivity function.

Sphagnum Hummocks

Numerous hummocks were observed throughout the southerly littoral zone and provide potential breeding sites for four-toed salamanders, particularly those closer to the Bank.

Beaver Lodge

A beaver lodge was observed within the impact area as well as several recent beaver cuts within shrub lands. A second beaver lodge was observed further to the south (within the large wetland complex).

Mud Flats

During drawdown mud flats are intermittently exposed within the back water areas. No evidence of freshwater snails or mussels was observed during the site visits.

Standing Water

Lake Wyola provides standing water during the growing season for use by breeding amphibians, turtles, non-breeding amphibians and foraging waterfowl.

Habitat Degradation

Anthropogenic impacts include the previous placement of riprap, lumber, beams and concrete to armor the Bank against erosion. This was significantly less within the southern impact area, which is substantially less developed due to the adjacent wetland.

A significant depression was observed at the terminus of the boat ramp, presumably associated with sediment disturbance from boat motors.

**Part 3. Conceptual Wildlife Habitat Assessment Plan
(Depicting Impact Areas and Habitat Features)
&
Photo Documentation**

Lake Wyola

WHE Northern Portion

BACKWATER AREAS WITH FINER SUBSTRATE, GREATER ORGANIC MATTER AND AQUATIC MACROPHYTES. EXPOSED MUDFLATS DURING DRAWDOWN

PLUNGE POOL AT FISKE BROOK BOX CULVERT OUTLET

SMALL SECTION OF EMERGENT CATTAIL MARSH

EXPOSED SANDBAR DURING DRAWDOWN

FORAGING FAMILY OF MALLARD DUCKS

EARLY SEASON OPEN WATER. CANADA GEESE

SPOTTED SALAMANDER EGG MASSES WITHIN SKERRY BROOK INLET AREA

DENSE POPULATION OF BLADDERWORT

ELEVATED CULVERT OUTLET DURING DRAWDOWN

FISH NESTS

FISH NESTS

NUMEROUS OVERHANGING BRANCHES, SMALL BANK UNDERCUTS, BERRY-PRODUCING SHRUBS WITHIN UNDEVELOPED AREAS ALONG THE LAKE SHORE

SAND AND COARSER SUBSTRATE, STONES AND CREVICES AT BEACH, DAM AND DEVELOPED SECTIONS ALONG THE LAKE SHORE.

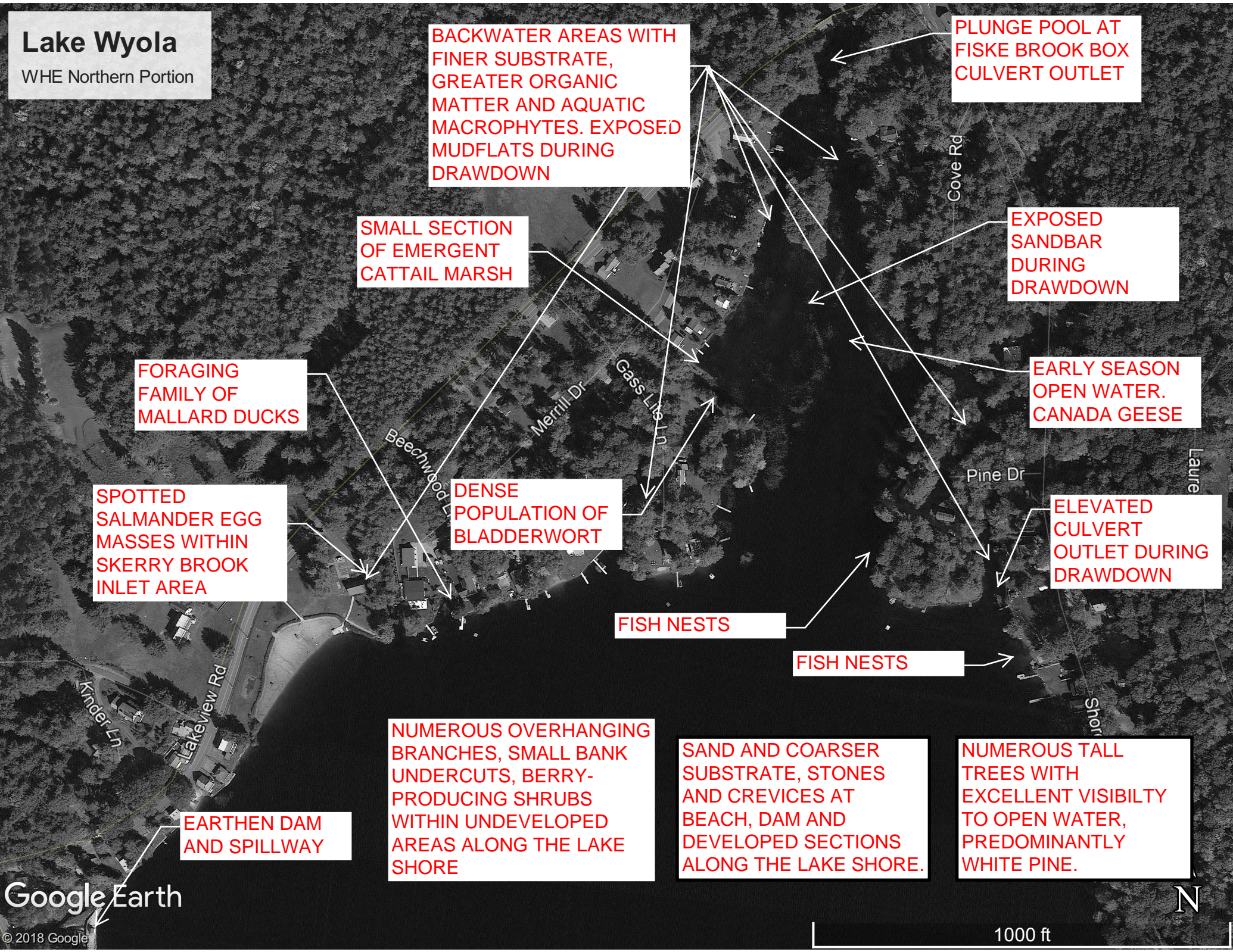
NUMEROUS TALL TREES WITH EXCELLENT VISIBILITY TO OPEN WATER, PREDOMINANTLY WHITE PINE.

EARTHEN DAM AND SPILLWAY

Google Earth

© 2018 Google

1000 ft



Lake Wyola

WHE Central Portion

PREDOMINATELY SAND AND COARSER SUBSTRATE, SPARSE TO NO AQUATIC MACROPHYTE POPULATION. ROCKS AND CREVICES AT AND BELOW THE WATER SURFACE WITHIN MORE DEVELOPED PORTIONS.

COMPARATIVELY FEWER OVERHANGING BRANCHES, BERRY PRODUCING SHRUBS AND SMALL BANK UNDERCUTS.

NUMEROUS SPRINGS AND SEEPS ALONG THE EXPOSED BANK/LUW

CULVERT DISCHARGE-SEDIMENTATION

STONE JETTIES ALONG EASTERLY SHORE

TALL STANDING DEAD WHITE PINE

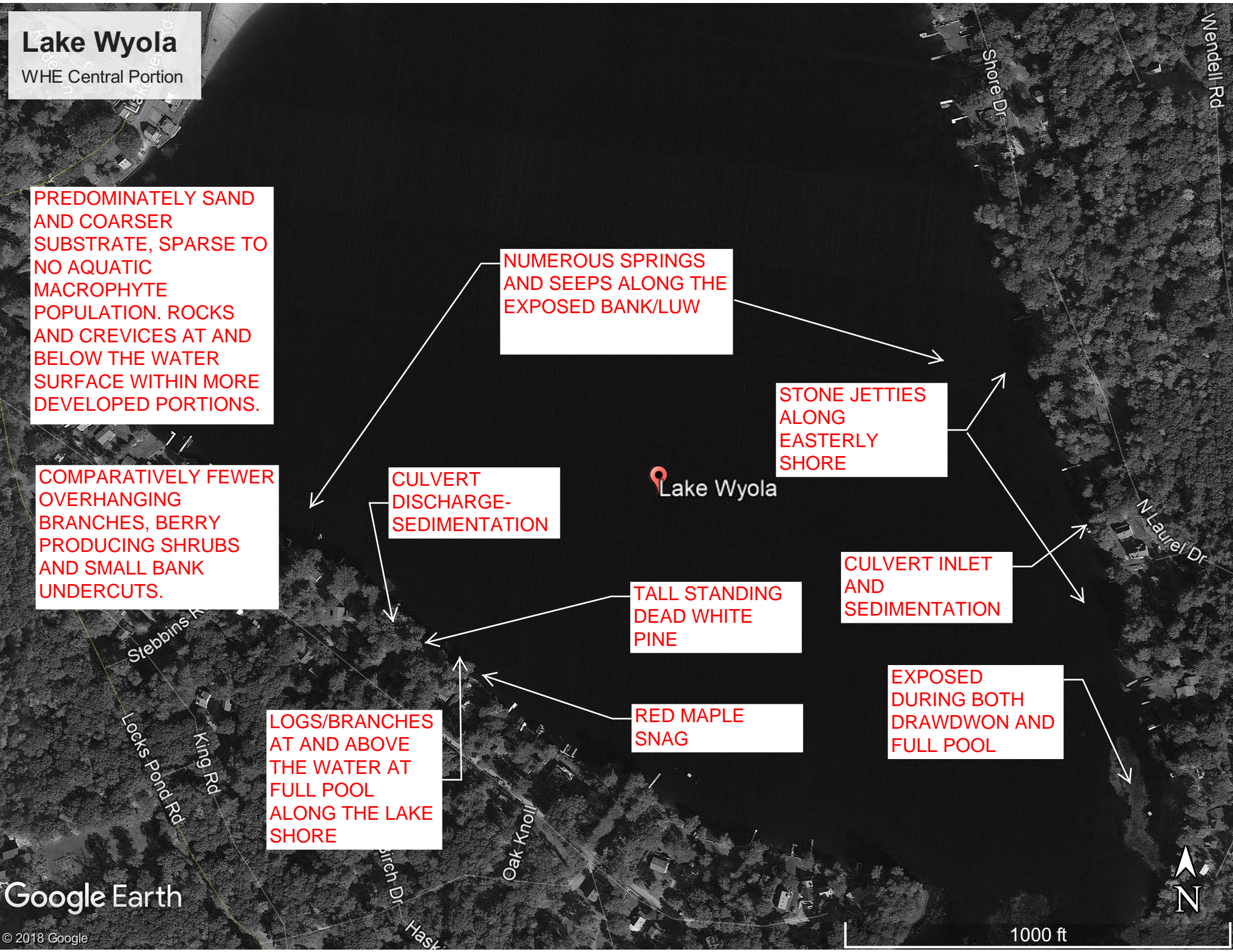
CULVERT INLET AND SEDIMENTATION

LOGS/BRANCHES AT AND ABOVE THE WATER AT FULL POOL ALONG THE LAKE SHORE

RED MAPLE SNAG

EXPOSED DURING BOTH DRAWDOWN AND FULL POOL

Lake Wyola



Lake Wyola

WHE Southern Portion

SANDBAR FORMING

SECTIONS OF OLD FABRIC/
BARRIER OVER LUW

FINES, ORGANIC MATTER AND
AQUATIC MACROPHYTES

SHRUBS AND TREES
THROUGHOUT PROVIDING
NESTING, PERCHING AND
FOOD

POOL ASSOCIATED WITH BOAT MOTOR
ACTIVITY AT TERMINUS OF BOAT
RAMP

EARLY SEASON OPEN WATER

EXPOSED MUDFLATS AND
WOODY DEBRIS DURING
DRAWDOWN

BEAVER LODGES

NUMEROUS EXPOSED
STUMPS AND LOGS
DURING FULL POOL FOR
PERCHING AND BASKING

COARSER SUBSTRATE ALONG
EASTERLY SHORE

STANDING DEAD TREE WITH
GOOD VISIBILITY
TO OPEN WATER

SPARSE
AQUATIC
MACROPHYTES

SECTIONS OF
EMERGENT CATTAIL
MARSH
THROUGHOUT

SPHAGNUM
HUMMOCKS
THROUGHOUT

SLAURE



600 ft

Photo #.1

Northern Portion. The beach and sediment disturbance attributed to water level fluctuation and ice movement.



Photo #2.

Northern Portion. Exposed bank. Example of rocks above and below the water surface (note stain lines) and crevices. Example of sand and coarse substrate common throughout the outer littoral zone.



Photo #3.

Northern Portion. Earthen dam and spillway. Another example of rocks above and below the water surface (note stain lines) and crevices.



Photo #4.

Northern Portion. Exposed Bank during drawdown. Example of overhanging banks at and below the water surface during full pool.



Photo #5.

Northern Portion. Exposed Bank and LUW. Another example of sand and coarse substrate common throughout the outer littoral zone.



Photo #6.

Northern Portion Exposed Bank and LUW. Contrasting substrate. Increased fines, and organics within backwater coves and inlets. Mudflats are exposed during drawdown conditions.



Photo #7.

Northern Portion. Exposed sand bar during drawdown conditions. Several Canada Geese were observed within this area during the site assessment.



Photo #8.

Northern Portion. Canada Geese utilizing the early spring open water. Note tall White Pine (*Pinus strobus*), which provide perching habitat.



Photo #9.

Northern Portion. Another example of fine sediment, organics and aquatic plants, which are more prominent in back coves and small inlet areas.



Photo #10.

Northern Portion. Exposed Bank and LUW. Another example of sand and coarse substrate common throughout the outer littoral zone.



Photo #11.

Northern Portion. Fiske Brook discharging to Lake Wyola at the Lakeview Road box culvert.



Photo #12.

Northern Portion. Plunge pool associated within Lakeview Road box culvert outlet (Fiske Brook).



Photo #13.

Northern Portion. Elevated culvert outlet during drawdown. Sedimentation.



Photo #14.

Northern Portion. Skerry Brook entering Lake Wyola at the Lakeview Road culvert.



Photo #15.

Central Portion. Exposed Bank and LUW. Several seeps were observed along both the west and east central lake shore.



Photo #16.

Central Portion. Exposed Bank and LUW. Example of undercuts and rocks at and below the water surface during full pool.



Photo #17.

Central Portion. Exposed Bank and LUW. Example of sands and coarser substrate along the outer littoral zone. Also depicted are downed branches that are at or below the water surface during full pool.



Photo #18.

Central Portion. Small cove area with inflow from culvert at Lake Drive. Note sedimentation attributed to turbid stormwater from nearby Lake Drive, which is a gravel/dirt road. Also note the fine sediments and organics which were typically observed within the coves and small inlet areas around the lake.



Photo #19.

Central Portion. Exposed Bank and LUW. Overall, the westerly shore was the most snow-covered. Another example of downed branches that are at or below the water surface during full pool.



Photo #20.

Central Portion. Grey Birch trees with overhanging branches.



Photo #21.

Central Portion. Example of tall White Pines (*Pinus strobus*), which provide perching habitat and excellent visibility over the open water.



Photo #22.

Central Portion. Westerly shore dead White Pine (*Pinus strobus*), providing perching habitat as well as cavities.



Photo #23.

Central Portion. Easterly shore. Example of sands and coarser substrate along the outer littoral zone. Also note discharge presumable associated with a culvert at North Laurel Drive.



Photo #24.

Central Portion. Easterly shore.
Example of sands and coarser
substrate along the outer littoral
zone.



Photo #25.

Central Portion. Easterly shore.
Example of sands and coarser
substrate along the outer littoral
zone. Several stone jetties and
seeps are also located along this
section of shoreline.



Photo #26.

Central Portion. Example of
underwater cover habitat during
full pool conditions.



Photo #27.

Southern Portion. Section of open water during the early spring prior to refill.



Photo #28.

Southern Portion. Exposed stumps, braches and logs which are under or at the water surface during fool pool condition. A Red-tailed Hawk was observed perched on a stump, resting from its hunt.



Photo #29.

Southern Portion. Recent beaver cuts.



Photo #30.

Southern Portion. Beaver lodge.



Photo #31.

Southern Portion. Pool at the terminus of the boat ramp attributed to sediment disturbance from boat motors.



Photo #32.

Southern Portion. Standing dead tree with good visibility to open water.



Photo #33.

Southern Portion. Exposed Bank and LUW along westerly shore. Note fines, organics and vegetation.



Photo #34.

Southern Portion. Exposed Bank and LUW along easterly shore. Note sands and coarser substrate.



Photo #35.

Southern Portion. Island. Exposed during drawdown and full pool.



Photo #36.

Northern Portion. Skerry Brook inlet area



Photo #37.

Northern Portion. Pondweeds (*Potamogeton* spp.)



Photo #38.

Northern Portion. Mallard duck (*Anas platyrhynchos*).



Photo #39.

Northern Portion. Watershield
(*Brasenia schreberi*).



Photo #40.

Northern Portion. Ducklings.



Photo #41.

Northern Portion. Water celery
(*Vallisneria americana*).



Photo #42.

Northern Portion. Undercut bank. Overhanging branches including Highbush Blueberry (*Vaccinium corymbosum*).



Photo #43.

Northern Portion. Tall White Pine (*Pinus strobus*) with good visibility of open water.



Photo #44.

Northern Portion. Example of areas with coarse substrate and sparse aquatic macrophytes.



Photo #45.

Northern Portion. Example of areas with coarse substrate and sparse aquatic macrophytes.



Photo #46.

Northern Portion. Example of areas with coarse substrate and sparse aquatic macrophytes.



Photo #47.

Northern Portion. Large bladderwort (*Urticularia* spp.) population.



Photo #48.

Northern Portion. Pondweed
(*Potamogeton amplifolius*).



Photo #49.

Northern Portion. Pos. newly
emerging waterweed (*Elodea
canadensis*).



Photo #50.

Northern Portion. Small section of
cattail marsh.



Photo #51.

Northern Portion. Small section of fine-leaf emergent marsh.



Photo #52.

Northern Portion. Fiske Brook outlet to lake.



Photo #53.

Northern Portion. Example of observed cut overhanging bank.



Photo #54.

Northern Portion. Example of overhanging branches.



Photo #55.

Northern Portion. Artificial bank



Photo #56.

Northern Portion. Example of coarser substrate with sparse to no aquatic macrophytes.



Photo #57.

Northern Portion. Fish nests.



Photo #58.

Northern Portion. Bullfrog (*Rana catesbeiana*).



Photo #59.

Northern Portion. Canada Geese (*Branta canadensis*).



Photo #60.

Northern Portion. Earthen dam and spillway.



Photo #61.

Central Portion. View of easterly lake shore. Mix of development and wooded areas.



Photo #62.

Central Portion. Sand and coarse substrate predominant along easterly lake shore.



Photo #63.

Central Portion. Sand and coarse substrate predominant along westerly lake shore.



Photo #64.

Central Portion. A developed portion of westerly lake shore.



Photo #65.

Central Portion. Less developed portion of westerly lake shore.



Photo #66.

Central Portion. Sand and coarse substrate predominant along westerly lake shore. Log at the water's surface and overhanging branches.



Photo #67.

Central Portion. Another example of sand and coarse substrate predominant along westerly lake shore. Fallen branch at the water's surface and overhanging branches.



Photo #68.

Central Portion. Less developed backwater area where the culvert from Lake Drive discharges.



Photo #69.

Central Portion. Westerly lake shore. Snag.



Photo #70.

Southern Portion. Cattail (*Typha latifolia*) marsh.



Photo #71.

Southern Portion. Sphagnum hummocks.



Photo #72.

Southern Portion. Closer view of a Sphagnum hummock.



Photo #73.

Southern Portion. Substrate within the outer littoral zone amongst the Sphagnum hummock. Note the sparse aquatic macrophyte population.



Photo #74.

Southern Portion. Beaver lodge.



Photo #75.

Southern Portion. Tufted Titmouse (*Baeolophus bicolor*) perched on White Pine.



Photo #76.

Southern Portion. Songbird perching on shrubs along southerly lake shore.

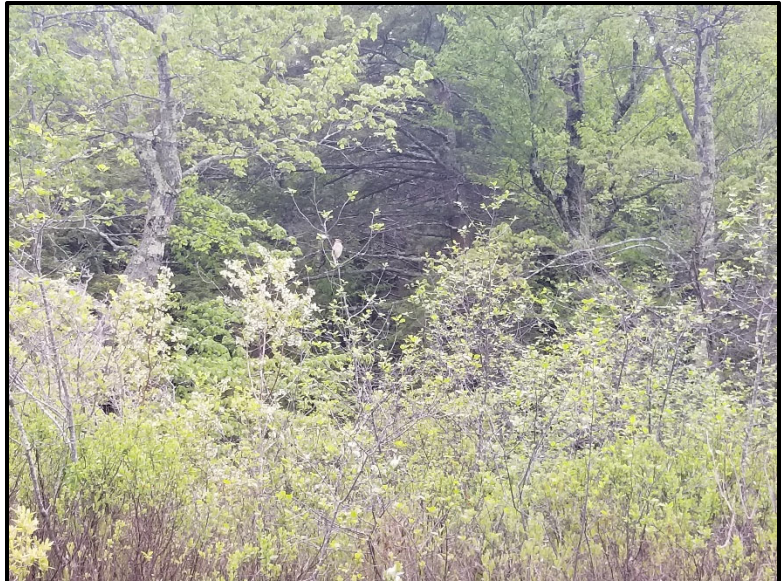


Photo #77.

Southern Portion. Nesting habitat. Dense shrubs along the southerly lake shore.



Photo #78.

Southern Portion. Basking habitat (logs above the water) are prevalent throughout the southerly outer littoral zone. Painted Turtles (*Chrysemys picta*).



Part 4. Reducing the Alteration

Bank & LUW

Based on information provided in the Order of Conditions, the drawdown has been historically and currently performed to reduce ice damage to the lake's bank, resident's docks and the earthen dam and its spillway during the winter. The drawdown is presented as a 2-FT lowering of the lake; however, details regarding the timing of the drawdown, rate of the drawdown and monitoring of the drawdown are limited within the provided documentation. These details must be vetted to ensure that impacts to wildlife are avoided and/or reduced. Specifically, the applicant and Commission should review the MA DFW drawdown performance standards.

The rate of both the drawdown and the refill processes is an important factor in the extent of erosion. For example, a rapid refill can result in erosion at deeper depths causing turbid water (suspended sediments) and a flush of nutrient release. Similarly, a rapid drawdown can have an adverse impact on aquatic species, particularly macroinvertebrates with low to moderate mobility (molluscs) which limits the ability to acclimate to a sudden change in water depth.

The timing of the drawdown is essential in minimizing potential adverse impacts. Fall drawdowns must be completed prior to hibernation periods to ensure that species have adequate time to adjust to changes in water depth and species (such as reptiles and amphibians) are not exposed to freezing temperatures resulting in fatalities. Spring refills must be timed appropriately to reduce potential impacts to spring spawning within littoral zones.

Research has shown that annual drawdowns can accelerate the loss of sediment fines, organic matter and nutrients from the outer littoral zone as these materials are transported to non-exposed areas. This phenomena was evidenced by the predominantly coarser substrate observed around the lake shore, particularly where the shoreline has a steeper slope. The resulting substrate change (lower water-holding capacity, low nutrient storage capacity, higher bulk density) has a subsequent impact on the population of macrophytes and invertebrates. Exposure to freezing and erosion also reduce abundance and diversity.

Finer substrate was dominant in back cover and inlet areas. Impacts from the drawdown may be lessened in these areas due to the extent of vegetated Bank, more gradual slopes and transportation of materials from inlet streams. It should also be noted that these areas were less accessible to motorboat traffic and appeared more sheltered from wave/wind action.

The depth of the drawdown relates to the extent (width) of exposed Bank and/or LUW. The extent of exposure is dependent on grade and can vary along the lake shore, as observed during the March 2019 site visit. For example, the observed 2-FT drawdown resulted in Bank/LUW exposure which varied from 10-FT to over 50-FT in the southern portion of the lake where the grades are nearly level. Exposure during drawdown aids in the killing of vegetation by both drying and freezing, typically having a greater impact of aquatic macrophytes which reproduce by rhizomes. This can shift population richness to species which reproduce by seed and other means.

Drawdowns may adversely affect aquatic species due to a reduction in dissolved oxygen, which is typically already low during the winter months. The reduction in the water column associated with the drawdown can further reduce DO concentrations. Winterkill (fishkill due to low dissolved oxygen) can be an adverse effect of winter drawdowns. This may be at least partially alleviated if the lake has continued ground water and surface water inputs. Three mapped perennial streams contribute to Lake Wyola (Skerry Brook, Fiske Brook and South Brook) as well as several smaller inlets presumable associated with stormwater. Numerous ground water seeps were also observed along and within the westerly and easterly exposed lakebed.

Part 5. Adverse Effect Analysis and Certification

Bank & LUW-Adverse Effect Analysis

The purpose of this report is to provide the Lake Wyola Advisory Committee with an initial wildlife habitat evaluation under 310 CMR 10.60 and recommend further steps in developing baseline data on the overall health of Lake Wyola.

One of the challenges associated with the current assessment is the historic practice of drawing down Lake Wyola, which commenced some 30 years ago. As such, a current day assessment of the lake does not provided a “pre-drawdown” baseline.

The following adverse effect analysis notes observed characterizes of the lake which may be attributed to repeated drawdown and provides guidance on how to improve drawdown procedure.

The repeated winter drawdown of Lake Wyola appears to have resulted in a substrate change within the outer littoral zone. This is a common phenomenon known as sediment coarsening. Where the slopes are greater the habitat is rock, sand and gravel with sparse macrophytes.

Of note, there was no observed evidence of freshwater mussels and clams during the 2019 site visits. It is hypothesized that historic drawdown practice may have failed to properly address timing, depth, and rate factors, thus having an adverse (fatal) impact on freshwater molluscs with low mobility.

The Order of Conditions (OOC) issued by the Shutesbury Conservation Commission clearly states that a one-time lowering of Lake Wyola is permitted starting November 1, 2018. It is recommended that the 5-year OOC be amended to require that the fall drawdown commence after the beginning of November AND be completed by the beginning of December. During this time period the target drawdown rate should not exceed 3-inches per day. Information regarding the drawdown mechanism and water level regulation must be provided to the Commission. This information should include methods applied to monitor changes water level (i.e. staff gauge) and the rate of drawdown and refill. Per the MA DFW standards the outflow during drawdown should be below 4 cfs per square mile of watershed and the discharge during refill should above 0.5 cfs per square mile of watershed. Based on a watershed analysis performed using the USGS Stream Stats program, the watershed of Lake Wyola is 6.84-square miles.

Correspondence with the Lake Wyola Advisory Committee and town officials, indicates that the level of the lake must be refilled by April 1st of each given year. However, this is not clearly stated in the OOC. To alleviate concerns regarding hydrological impacts on adjacent wetland habitat, dissolved oxygen levels and spring fish spawning within littoral zones, the OOC should be amended to clearly state that the lake be refilled by the beginning of April.

It is highly recommended that a monitoring program be instituted to gather additional baseline information on Lake Wyola and further assess impacts from the drawdown. The site visits performed in March and May of 2019 provide a snapshot of observed wildlife habitat features and anthropogenic impacts associated with Lake Wyola. Recommended abiotic and biotic monitoring parameters include:

- Water level
- Flow rate-discharge during drawdown and refill
- Turbidity/ water clarity
- Dissolved oxygen levels

- pH
- Water temperature
- Lakebed substrate- sediment composition change
- Aquatic plant survey-inclusive of the entire lake, not just the area of exposure associated with the drawdown.
- Invertebrates
- Fisheries spawning habitat

Priority Habitats for Rare Species & Estimated Habitat for Rare Wildlife- Adverse Effect Analysis

The project site is **not** located within Priority and Estimated Habitats as indicated in the 13th Edition of the MA Natural Heritage Atlas.

It should be noted that the small pond (impoundment of Skerry Brook) located north of Lakeview Road has been mapped by MA NHESP as a potential vernal pool. Spotted Salamander eggs were observed within the inlet cove just downstream of the pond, indicating that the breeding habitat extends further than the potential mapping. An early April refill of Lake Wyola results in full pool conditions during the vernal pool breeding period, thus reducing adverse impacts to breeding habitat.

Habitat of Potential Regional and Statewide Importance- Adverse Effect Analysis

The southern portion of Lake Wyola and the adjacent wetland complex are mapped as Habitat of Potential Regional and Statewide Importance.

Area of Critical Environmental Concern- Adverse Effect Analysis

The project area is **not** mapped as an Area of Critical Environmental Concern.

Certification

With the incorporation of the drawdown and refill recommendations provided in this report the proposed winter drawdown will not substantially reduce the capacity of the Bank/LUW to provide important wildlife habitat functions. Impacts have been minimized by limiting the depth, time of year and rate of the drawdown. The establishment of a monitoring program will ensure compliance with drawdown performance standards and allow for the compilation of baseline data to assist in the long-term assessment of the health of Lake Wyola.

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