4. WILDLIFE AND BOTANICAL RESOURCES

According to the National Ecological Classification Framework of Ecological Units, the Project is located in the following ecological unit:

Domain: Humid Temperate
Division: Warm Continental
Province: Laurentian Mixed Forest Province #212
Section: Northern Lacustrine Influenced Lower Peninsula #VII
Subsection: Leelanau and Grand Traverse Peninsula #VII.5
Sub-Subsection: Traverse City # VII.5.2

The Michigan Natural Features Inventory (MNFI) classifies land within the state using a four digit land type association code by major landform, landform modifier, soil drainage class and soil textural class. The ERCOL is classified as #6121: a flat lake plain with well-drained sand, dominated by northern hardwoods in the uplands, conifer swamps in the lowlands and American beech/hemlock forests in between (MNFI 1999). The Northern Hardwood forest community is the northernmost deciduous forest community in eastern North America. In general, this community is dominated by three deciduous tree species: Yellow birch (*Betula alleghaniensis*), Suger maple (*Acer saccharum*) and American beech (*Fagus grandifolia*). Two coniferous species, Eastern hemlock (*Tsuga Canadensis*) and White pine (*Pinus strobus*), are also typically found in abundance in this forest community.

4.1. Upland Habitats

The plant communities within the Project Vicinity are the same as those found within the larger ERCOL. The Project Vicinity contains three of Michgan's 43 terrestrial plant communities and seven of Michigan's 31 palustrine plant communities. Of the 1,815 plant species present in the state, more than 400 are found within the Project Vicinity (MNFI 2009d).

While residential, urban and agricultural activities have removed a considerable amount of the predevelopment vegetation, the Project Vicinity's predominant watershed land cover remains upland forest (34%) (See Table E.1.3 and Figure E.1.4). Of this forest cover, 67% is Mesic Northern Forest, 26% is Dry Northern Forest and 7% is Dry Mesic Northern Forest (Figure E.4.1). Consequently many native plants, trees and shrubs are still found in the area.

MNFI has developed Community Abstracts for the plant communities found in Michigan. Each of the communities has been given a Global Rank and a State Rank related to the extent the community is imperiled and its occurrence. The most imperiled rank is 1 and the least imperiled rank is 5. The three forest types within the Project Vicinity have all been ranked as S3 – moderately imperiled and rare or uncommon in the state (on the order of 21-100 occurrences) (MNFI 2009c).

Mike Meriwether, Antrim County Forester, recently evaluated the ecological quality of the forest communities within the Project Vicinity as poor due to over-harvesting, fragmentation, and generally poor forest management practices. There are no stands of old growth forest. Antrim County, in which much of the Project Vicinity and most of the ERCOL lies, does not have an

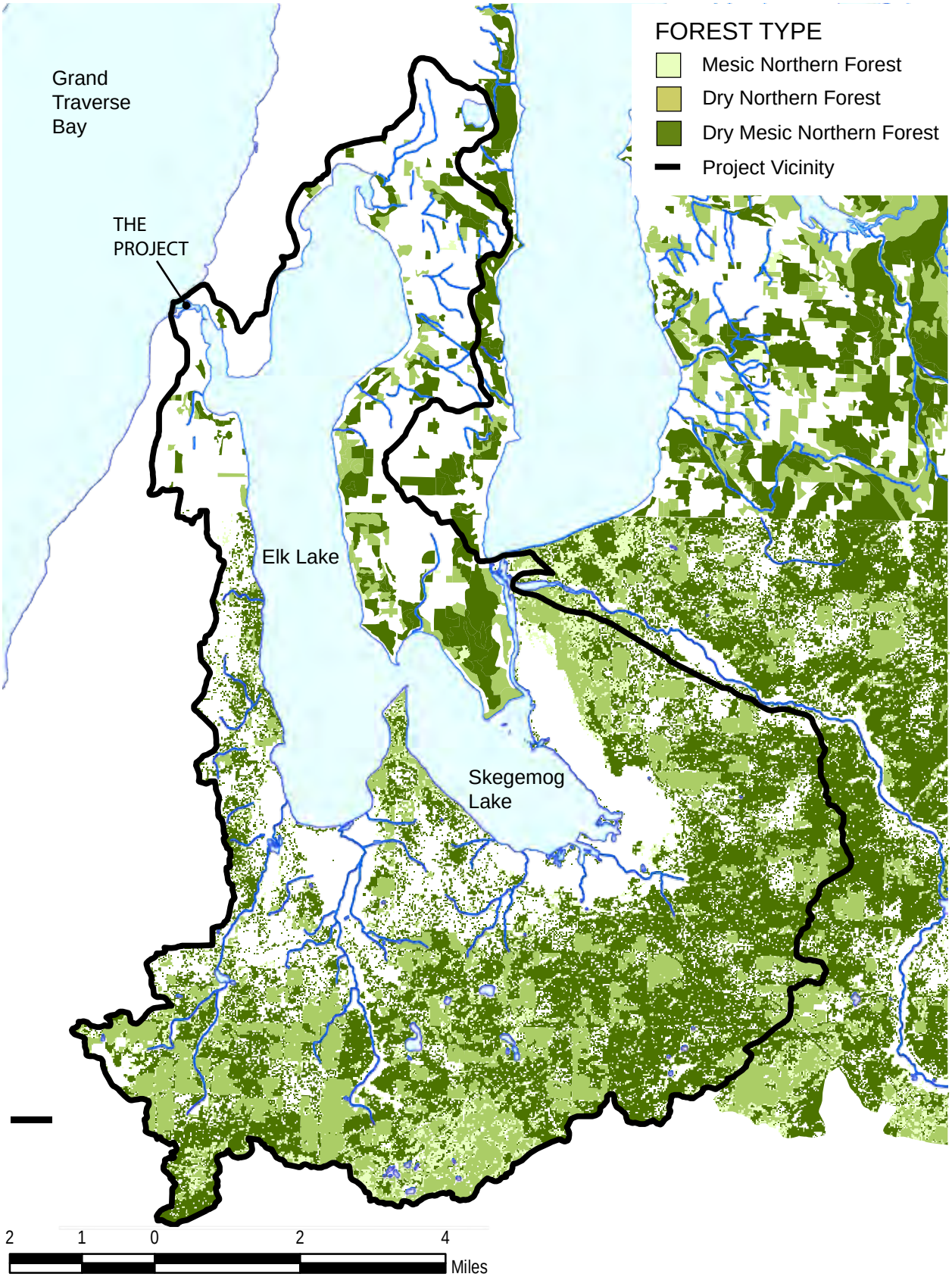

Figure E.4.1 Forest Cover within the Project Vicinity (Source: MGDL 2012)

overall forest management plan, however, the County does have plans for most of the individual parcels owned by the County. These plans are currently being updated and mapped. Many private landowners also have management plans for the forests on their properties (Meriwether 2009).

Descriptions of the typical composition of each of the forest communities found in the Project Vicinity are set forth below.

4.1.1 Mesic Northern Forest (67%)

These forests are found chiefly on coarse-textured ground and end moraines, but they also occur on silty/clayey lake plains, thin glacial till over bedrock, and medium-textured moraines. Locally, Mesic Northern Forests are found on kettle-kame topography, moderately well-drained to well-drained sandy lake plains and sand dunes. Presettlement forests dominated by Eastern hemlock and Yellow birch were frequent on moderate to poorly drained till plains and outwash plains. Mesic Northern Forests were predominantly found around lake and bog margins and in complex mosaics with Suger maple-Hemlock forests on the surrounding better-drained soils.

Like the canopy, the ground and shrub layer of Mesic Northern Forests is diverse (Table E.4.1). Communities of Beech and Suger maple have relatively few shrubs but support many spring ephemerals and perennial herbs. A unique feature of this forest type is the presence of chlorophyll-free, parasitic and saphrophytic seed plants such as Indian pipes (*Monotropa unifolia*), Coral root orchids (*Corallorhiza spp.*) and Beech drops (*Epifagus virginiana*) (when Beeches are present) (MNFI 2009b).

4.1.2 Dry Northern Forest (26%)

Dry Northern Forests are Pine or Pine-hardwood dominated communities found on dry, sandy soils. They occur primarily on sandy glacial outwash and sandy lake plains and less often on sand ridges in peatland complexes on glacial outwash or glacial lake plains. Two distinct variants are included within this community type: Jack pine/Jack pine-hardwood dominated and Red pine dominated (Table E.4.2).

Prior to European settlement, Dry Northern Forests typically arose in the wake of catastrophic fire. Frequent, low-intensity ground fires maintained Red pine systems. Due to fire suppression, many stands of Dry Northern Forest are or have succeeded to more shade-tolerant hardwood and Aspen forests. In many areas where Dry Northern Forests failed to regenerate, Red and White pine plantations have been established and maintained. The successional forests of Aspen and Birch that replaced some Dry Northern Forests have been maintained and expanded by intensive silvaculture and wildlife management geared toward promoting pulp production and providing favorable habitat for game species that prefer early successional hardwood forests, particularly White-tailed deer, Turkey and Grouse (MNFI 2009a).

A unique feature of this forest type is the presence of Mosses (*Dicranum spp.*), Feather moss (*Pluerozium schreber*), Lichens (*Cladina spp.* and *Cladina spp.*) and Bracken fern (*Pteridium aquilinum*).

Dominant Canopy Trees	
Scientific Name	**Common Name**
Acer saccharum	Sugar maple
Acer rubrum	Red maple
Betula alleghaniensis	Yellow birch
Betula papyrifera	White birch
Fagus grandifolia	American beech
Fraxinus americana	White ash
Pinus strobus	White pine
Quercus rubra	Red oak
Thuja occidentalis	White cedar
Tilia americana	American basswood
Tsuga canadensis	Eastern hemlock

Dominant Subcanopy Trees	
Scientific Name	**Common Name**
Abies balsamea	Balsam fir
Ostrya virginiana	Hop-hornbeam
Ulmus americana	American elm

Dominant Shrubs	
Scientific Name	**Common Name**
Acer pensylvanicum	Striped maple
Acer spicatum	Mountain maple
Cornus alternifolia	Alternate-leaved dogwood
Corylus cornuta	Beaked hazelnut
Dirca palustris	Leatherwood
Lonicera canadensis	Fly honeysuckle
Ribes cynosbati	Wild gooseberry
Sambucus pubens	Red elderberry
Taxus canadensis	Canada yew
Viburnum acerifolium	Mapleleaf Viburnum

Prevalent Herbs	
Scientific Name	**Common Name**
Actaea pachypoda	White baneberry
Actaea rubra	Red baneberry
Allium tricoccum	Wild leek
Aralia racemosa	Spikenard
Arisaema triphyllum	Jack-in-the-pulpit

Prevalent Herbs	
Scientific Name	**Common Name**
Carex dewyana	Dewey sedge
Carex hirtifolia	Hairy sedge
Carex leptonervia	Nerveless woodland sedge
Carex plantaginea	Seersucker sedge
Carex woodii	Pretty sedge
Caulophyllum thalictroides	Blue cohosh
Circaea alpina	Enchanter's nightshade
Clintonia borealis	Blue-beard lily
Cornus canadensis	Bunchberry
Galium trifolium	Bedstraw
Maianthemum canadense	Canada mayflower
Mitchella repens	Partridge berry
Osmorhiza claytoni	Sweet cicily
Polygonatum pubescens	Solomon's seal
Smilacina racemosa	False spikenard
Streptopus roseus	Twisted stalk
Trientalis borealis	Star flower
Trillium cernuum	Nodding trillium
Trillium grandiflorum	Common trillium
Uvularia grandiflora	Bellwort

Michigan Indicator Species	
Scientific Name	**Common Name**
Aralia nudicaulis	Wild sarsaparilla
Betula alleghaniensis	Yellow birch
Botrychium virginianum	Rattlesnake fern
Caulophyllum halictroides	Blue cohosh
Circaea alpine	Enchanter's nightshade
Corylus cornuta	Beaked hazelnut
Dirca palustris	Leatherwood
Smilacina racemosa	False spikenard

Table E.4.1 Mesic Northern Forest Community Composition (Source: MNFI 2009b)

Dominant Canopy Trees	
Scientific Name	**Common Name**
Betula papyrifera	White birch
Pinus banksiana	Jack pine
Pinus resinosa	Red pine
Pinus strobus	White pine
Populus grandidentata	Bigtooth aspen
Populus trtemuloides	Trembling aspen
Prunus serotina	Black cherry
Quercus ellipsoidalis	Northern pin oak
Quercus rubra	Red oak
Dominant Subcanopy Trees	
Scientific Name	**Common Name**
Abies balsamea	Balsam fir
Picea glauca	White spruce
Picea mariana	Black spruce
Shrubs	
Scientific Name	**Common Name**
Arctostaphylos uva-ursi	Bearberry
Cornus canadensis	Bunchberry
Epigaea repens	Trailing arbutus
Gaultheria procumbens	Wintergreen
Gaylussacia baccate	Huckleberry
Vaccinium spp.	Blueberry

Prevalent Herbs	
Scientific Name	**Common Name**
Andropogon gerardii	Big bluestem
Apocynum androsaemifolium	Spreading dogbane
Aralia nudicaulis	Wild sarsaparilla
Aster macrophyllus	Big-leaved aster
Aster sagittifolius	Arrow-leaved aster
Brachyelytrum erectum	Grass
Campanula rotundifolia	Bluebell
Carex lucorum	Blue ridge sedge
Carex pensylvanica	Pennsylvania sedge
Chimaphila maculate	Striped wintergreen
Cornus canadensis	Bunchberry
Danthonia spicata	Poverty oats
Deschampsia flexuosa	Hair grass
Epigaea repens	Trailing arbutus
Fragaria virginiana	Wild strawberry
Maianthemum canadense	Canada mayflower
Malampyrum lineare	Cow-wheat
Mitchella repens	Partridgeberry
Oryzopsis asperifolia	Rice grass
Oryzopsis pungens	Rice grass
Schizachyrium scoparium	Little bluestem
Ferns & Clubmosses	
Scientific Name	**Common Name**
Dicranum spp.	Mosses
Pleurozium schreberi	Feather moss
Pteridium aquilinum	Bracken fern
Michigan Indicator Species	
Scientific Name	**Common Name**
Pinus bansiana	Jack pine
Pinus resinosa	Red pine
Quercus ellipsoidalli	Northern pin oak

Table E.4.2 Dry Northern Forest Community Composition (Source: MNFI 2009a)

4.1.3 Dry-Mesic Northern Forest (7%)

Dry Mesic Northern Forest consists of Pine or Pine-hardwood dominated communities on sand or loamy sand soils (Table E.4.3). They occur principally on sandy glacial outwash and sandy glacial lake plains, and less often on thin glacial drift over bedrock, inland dune rides, and coarse-textured end moraines. Dry Mesic Northern Forests are relatively rare, due to the fact that this forest community goes through compositional changes that favor tolerant species, such as Suger maple and Red maple, and that cause a decline in Aspen. Succession toward the Wet Mesic Forest type is common. Natural Red pine is under-represented, as are mixed White and Red pine stands. Fire suppression is also a limiting factor in places where soils would permit this forest type.

Like the Dry Northern Forests, prior to European settlement, these forests typically originated in the wake of catastrophic fires and were maintained by frequent, low-intensity ground fires. Widespread selective logging of White pine, Red pine and Hemlock occurred in the late 19th century/early 20th century, followed by extensive slash fires to create cropland. These activities greatly diminished the acreage of this forest type in the ERCOL. Many stands of remnant Dry Mesic Northern Forest that were not logged were succeeded by or are succeeding to the Mesic Northern Forest type.

As with Mesic Northern Forests, in areas where Dry-Mesic Northern Forest failed to regenerate, Red and White pine plantations were established and maintained. The successional forests of Aspen and Birch that sprung up in the wake of logging have been maintained and expanded by intensive silvaculture and wildlife management geared toward promoting pulp production and habitat for the game species of early successional forests, particularly White-tailed deer, Turkey and Grouse.

A unique feature of this forest type is the presence of chlorophyll-free, parasitic and saprophytic seed plants such as Indian pipes (*Monotropa unifolia*), Coral root orchids (*Corallorhiza spp.*) and Pine drops (*Pterospora andromedea*) (MNFI 2009).

4.1.4 Habitat Quality

The Project Powerhouse and land is located in the Village within a predominantly urban and residential area. Most of the tree species are non-native ornamentals, such as Flowering crabapple and Blue spruce. The native understory has been replaced by landscape shrubs - Boxwood, Japanese barberry, Burning bush, Yew, Lilac, Forsythia and Juniper, turf, and flower beds. Paved streets, parking areas, cement sidewalks, and residential and commercial buildings line the Elk River shoreline.

Although human development has decidedly fragmented and shrunk both upland and riparian habitat and substantially modified the lake shorelines, MNFI's biodiversity assessment has identified the Project Vicinity as containing unique, high quality ecosystems. The Torch Lake subwatershed above the Project Vicinity has also received this designation (MNFI 2008).

MDNR has designated the Skegemog Lake Wildlife Area within the Project Vicinity and the Grass River Natural Area upstream of the Project Vicinity as Special Conservation Areas.

Dominant Canopy Trees, All Sites	
Scientific Name	**Common Name**
Pinus resinosa	Red pine
Pinus strobus	White pine
Additional Canopy Trees, Mesic Sites	
Acer saccharum	Sugar maple
Betula alleghaniensis	Yellow birch
Fagus grandifolia	American beech

Dominant Subcanopy Trees, All Sites	
Scientific Name	**Common Name**
Acer rubrum	Red maple
Betula papyrifera	White birch
Populus grandidentata	Bigtooth aspen
Populus tremuloides	Trembling aspen
Quercus alba	White oak
Quercus rubra	Red oak
Quercus velutina	Black oak
Tsuga canadensis	Eastern hemlock
Additional Subcanopy Trees, Mesic sites	
Abies balsamea	Balsam fir
Ostrya virginiana	Hop-hornbeam
Picea glauca	White spruce

Shrubs	
Scientific Name	**Common Name**
Acer pensylvanicum	Striped maple
Acer spicatum	Mountain maple
Amelanchier spp.	Serviceberry
Arctostaphylos uva-ursi	Bearberry
Comptonia peregrina	Sweetfern
Cornus foemina	Grey dogwood
Corylus americana	American hazelnut
Corylus cornuta	Beaked hazelnut
Diervilla lonicera	Bush honeysuckle
Gaultheria hispidula	Creeping snowberry
Gaultheria procumbens	Wintergreen
Gaylussacia baccata	Witch hazel
Linnaea borealis	Twinflower
Lonicera canadensis	Fly honeysuckle
Parthenocissus quinquefolia	Virgina creeper

Shrubs	
Scientific Name	**Common Name**
Prunus virginiana	Choke cherry
Vaccinium angustifolium	Low sweet blueberry
Vacciniummyrtloides	Velvetleaf blueberry
Viburnum acerifolium	Maple-leaf Viburnum

Prevalent Herbs	
Scientific Name	**Common Name**
Aquilegia canadensis	Wild columbine
Aralia nudicaulis	Wild sarsaparilla
Aster macrophyllus	Big-leaved aster
Aster sagittifolius	Arrow-leaved aster
Brachyelytrum erectum	Bearded shorthusk
Chimaphila maculatea	Striped wintergreen
Clintonia borealis	Blue-beard lily
Cornus canadensis	Bunchberry
Danthonia spicata	Poverty oats
Epigaea repens	Trailing arbutus
lysimachia quadrifolia	Whorled loosestrife
Maianthemum canadense	Canada mayflower
Oryzopsis asperifolia	Rice grass
Polygala paucifolia	Fringed polygala
Streptopus roseus	Twisted stalk
Trientalis borealis	Star flower

Ferns & Clubmosses	
Scientific Name	**Common Name**
Dryopteris spinulosa	Spinulose woodfern
Lycopodium obscurum	Groundpine
Pteridium aquilinum	Bracken fern

Michigan Indicator Species	
Scientific Name	**Common Name**
Dalibarda repens	False violet
Pinus resinosa	Red pine
Pinus strobus	White pine
Pterospora andromedea	Pine Drops

Table E.4.3 Dry-Mesic Northern Forest Community Composition (Source: MNFI 2009)

Special Conservation Areas are areas of state forest land that have had one or more conservation objectives, interests or elements identified. The Skegemog Lake Wildlife Area is also being proposed as a High Conservation Value Area under the management plan being developed for the protection of the Massasauga rattlesnake, a species listed as threatened by both federal and state agencies. High Conservation Value Areas are areas of state land that have been recognized for their contribution to specific conservation values, objectives and ecological attributes or significant social values by legislation, administrative rule, or Director's and Natural Resource Commission Orders.

4.2. WILDLIFE

4.2.1 Data Challenges

MDNR is organized into Forest Management Units (FMU) but the Wildlife Management Units (WMU) the state uses for species management have different boundaries. For example, the Project Vicinity includes portions of three counties. Antrim County is part of the Gaylord District FMU, while Kalkaska and Grand Traverse Counties are part of the Traverse City District FMU. The applicable Wildlife Division Unit that covers the Project Vicinity also covers Michigan's entire Lower Peninsula. This division unit is further divided into ecoregions. Antrim County is located in the northeastern ecoregion and Kalkaska and Grand Traverse counties are located in the northwestern ecoregion.

These non-synchronous organizational units make it nearly impossible to get a picture of the wildlife ecology within an area like the Project Vicinity that crosses multiple organizational boundaries. The majority of wildlife and bird species found within the Project Vicinity are not managed and MDNR has not conducted wildlife surveys to determine the specific species found within the Project Vicinity or anywhere below the Bellaire Dam. As a result, no spatial distribution data is available from MDNR for non-game species and only limited data is available for game species.

As previously discussed, the Project Vicinity is one of the subwatersheds of the ERCOL. Since the majority of land within the ERCOL is located within Antrim County, information for Antrim County's wildlife and botanical resources has been used as one of the primary sources for this section of the PAD. Because Elk and Skegemog Lakes are connected by Torch River to the other three lakes below the Bellaire Dam, the five lakes' sub-watersheds form highly connected wildlife corridors (Figure E.4.2). Thus, wildlife data for the area above Skegemog Lake and below the Bellaire Dam is likely to also be relevant for the Project Vicinity.

The species lists presented in this section have been compiled from species lists included in the management plans for the five natural areas and nature preserves within the Project Vicinity and the four other natural areas located above Skegemog Lake and below the Bellaire Dam. These natural areas and nature preserves comprise 3,979 acres within the Project Vicinity and an additional 1,649 acres upstream (Table E.4.4 and Figure E.4.3).

4.2.2 Mammals

Species that have been observed within the Project Vicinity or elsewhere below the Bellaire Dam are listed in Table E.4.5. The continuing presence of River otters demonstrates the viability of this habitat. Otters use both aquatic and terrestrial habitats and require good quality wildlife corridors to move between them.

Natural Area/Preserve	Acreage
Elk Lake	
Battle Creek Natural Area	285
Kewadin Wetlands Natural Area	24
Palustra- Holm Nature Preserve	19
Skegemog Lake	
Seven Bridges Natural Area (on the Rapid River)	314
North Skegemog Nature Preserve	37
Skegemog Lake Wildlife Area	3,300
Clam Lake	
Grass River Natural Area	1,443
Lake Bellaire	
Golden Days Loon Preserve	16
Forest Home Township Loon Nursery Preserve	35

Table E.4.4 Natural Areas/Nature Preserves within the Project Vicinity or Upstream below the Bellaire

At the Project Site

No survey has been done of mammals found on or near the Powerhouse. Small mammals that are able to live in urban/suburban environments, such as Chipmunks, Red squirrels, Gray squirrels, Black squirrels, Raccoons, Opossums, and Bats, are found throughout the area. Ground squirrels, Moles, Voles, Shrews, Rabbits, Skunks and Mice inhabit the lawns and open spaces within the Village. Big game species such as White-tailed deer, Black bear and Turkeys are not found near the Powerhouse due to a lack of adequate habitat, but Deer and Turkeys have occasionally been observed wandering by. Mink and Muskrats have been observed along the undeveloped upper reach of the Elk River. Native species that have been observed by local residents in the riparian zone along the Elk River above the Powerhouse are listed in Table E.4.6.

4.2.3 Birds

The Project is located within the Mississippi Flyway and provides important migratory habitat for birds migrating from the Arctic and Canada to points south. The diversity of upland, wetland and aquatic habitats provides critical habitat for more than 65 bird species. MDNR cooperates with USFWS to manage migratory waterfowl. Elk and Skegemog Lakes are both staging areas for migratory waterfowl.

MDNR field staff conduct the Mid-Winter Waterfowl Count every January. The 2009 count recorded the following species in Antrim County: Mallard, Golden eye and Mute swans. The following categories of waterfowl were recorded: dabblers, divers, and ducks. The Spring Waterfowl Survey compiles data for the entire northern Lower Peninsula of Michigan. The following species were reported in the 2009 survey: Mallard, Black duck, Green-winged teal, Blue-winged teal, Scaup, Ring-necked duck, Bufflehead, Merganser, Wood duck, Canada goose, Mute swan and Sandhill crane (MDNR 2009h, 2009k).

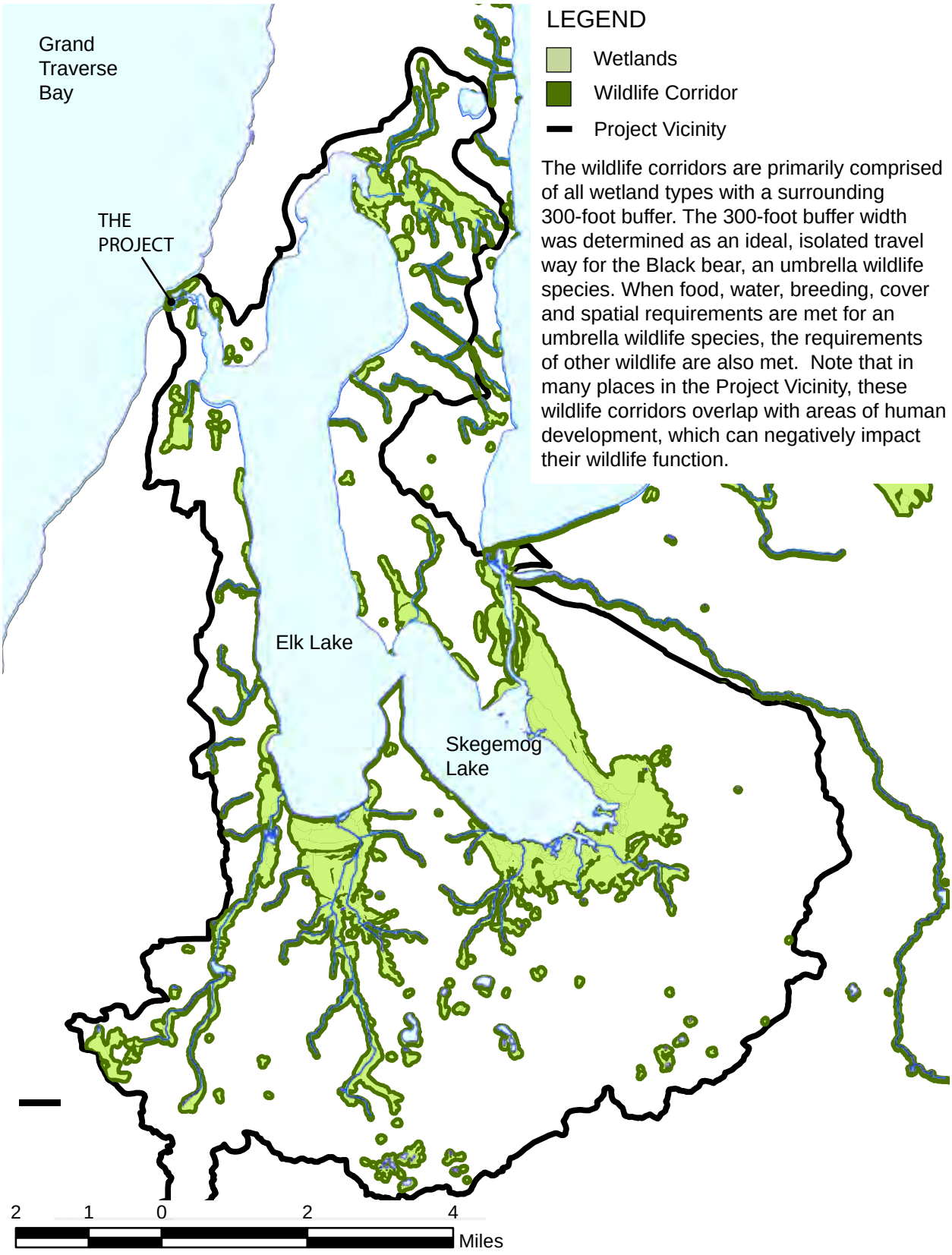

Figure E.4.2 Wildlife Corridors within the Project Vicinity (Source: Conservation Resource Alliance 2009)

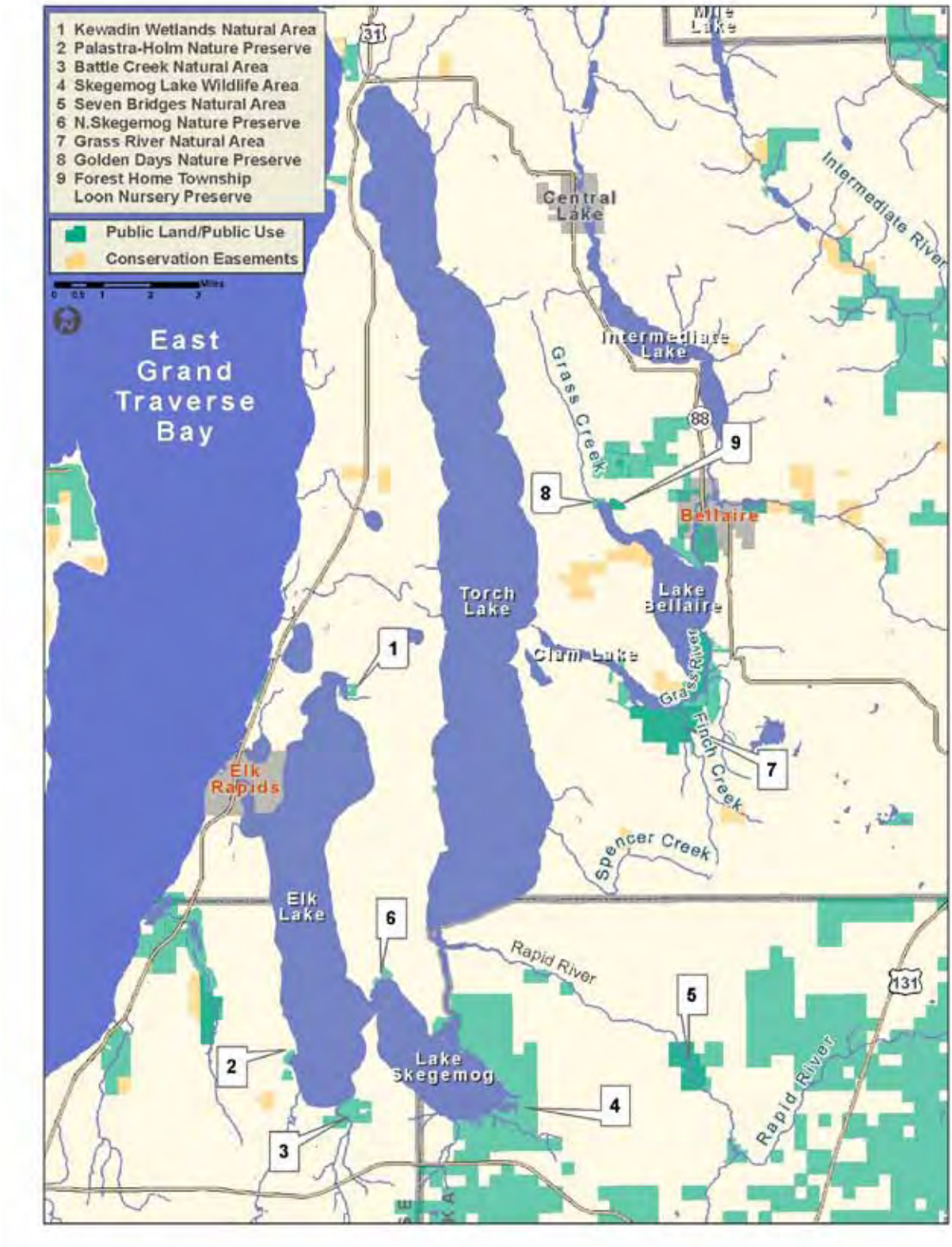

Figure E.4.3 Natural Areas/Nature Preserves below the Bellaire Dam (Source: Grand Traverse Regional Land Conservancy 2009a)

Scientific Name	Common Name
Blarina brevicauda	Short-tailed shrew
Canis latrans	Coyote
Castor canadensis	Beaver
Citellus tridecimlineatus	13- Lined ground squirrel
Clethrionomys gapperi	Red-backed vole
Condylura cristata	Star-nosed mole
Didelphis virginiana	Opossum
Eptesicus fuscus	Big brown bat
Erethizon dorsatum	Porcupine
Glaucomys sabrinus	Northern flying squirrel
Glaucomys volans	Southern flying squirrel
Lasionycteris noctivagans	Silver-haired bat
Lasiurus borealis	Red bat
Lasiurus cinereus	Hoary bat
Lepus americanus	Snowshoe hare
Lutra canadensis	River otter
Lynx rufus	Bobcat
Marmota monax	Woodchuck
Martes americana	Striped skunk
Microtus pennsylvanicus	Meadow vole
Mus musculus	House mouse
Mustela ermine	Shorttail weasel
Mustela frenata	Long-tailed weasel
Mustela rixose	Least weasel
Mustela vison	Mink
Myotis keeni	Keen myotis
Myotis lucifugus	Little brown myotis
Napaeozapus insignis	Woodland jumping mouse
Odocoileus virginianus	White-tailed deer
Ondatra zibethica	Muskrat
Peromyscus leucopus	White-footed mouse
Peromyscis maniculatus	Deer mouse
Pitymys pinetorum	Pine vole
Procyon lotor	Raccoon
Rattus norvegicus	Norway rat
Scalopus aquaticus	Eastern mole
Sciurus carolinensis	Eastern gray squirrel
Sciurus niger	Eastern Fox squirrel
Sorex cinereus	Masked shrew
Sorex palustris	Water shrew
Sylvilagus floridanus	Eastern cottontail rabbit
Synaptomys cooperi	Southern bog lemming
Tamias striatus	Eastern chipmunk
Tamiasciurus hudsonicus	Red squirrel
Taxidea taxus	Badger
Urocyon cinereoargenteus	Gray fox
Ursus americanus	Black bear
Vulpes fulva	Red fox
Zapus hudsonius	Meadow jumping mouse

Table E.4.5 Mammals Observed below the Bellaire Dam (Data Source: MNFI 2009d)

Scientific Name	Common Name
Blarina brevicauda	Short-tailed shrew
Citellus tridecimlineatus	13- lined ground squirrel
Condylura cristata	Star-nosed mole
Didelphis virginiana	Opossum
Eptesicus fuscus	Big brown bat
Glaucomys sabrinus	northern flying squirrel
Lasiurus borealis	Red bat*
Lasiurus cinereus	Hoary bat*
Lutra canadensis	River otter
Marmota monax	Woodchuck
Martes americana	Striped skunk
Microtus pennsylvanicus	Meadow vole
Mus musculus	House mouse
Mustela frenata	Long-tailed weasel
Mustela rixose	Least weasel
Mustela vison	Mink
Napaeozapus insignis	Woodland jumping mouse
Odocoileus virginianus	White-tailed deer*
Ondatra zibethica	Muskrat
Peromyscus leucopus	White-footed mouse
Peromyscus maniculaturs	Deer mouse
Procyon lotor	Raccoon
Rattus norvegicus	Norway rat
Scalopus aquaticus	Eastern mole
Sciurus carolinensis	Eastern gray squirrel
Sciurus niger	Eastern Fox squirrel
Sorex palustris	Water shrew
Sylvilagus floridanus	Eastern cottontail rabbit
Tamias striatus	Eastern chipmunk
Tamiasciurus hudsonicus	Red squirrel
Vulpes fulva	Red fox
Zapus hudsonius	Meadow jumping mouse

*Occasionally seen

Table E.4.6 Mammals Observed along the Elk River (Source: Yocum 2009)

The local and migratory species that occur within the Project Vicinity or elsewhere below the Bellaire Dam are listed in Table E.4.7.

4.2.4 At the Project Site

Fewer species are present near the Powerhouse due to the urban habitat and extensive use of non-native, ornamental plants in the Village. Some of the common native birds found in the Village include Robins, Chickadees, Cardinals, Goldfinches, Sparrows, Nuthatches, and Woodpeckers. Great blue heron and Bald eagle have been observed fishing along the upper reach of the Elk River.

4.2.5 Reptiles and Amphibians

The Project Vicinity is located within Zone 2 of the Michigan Frog and Toad Survey. The following nine species were identified in the 2007 survey: Fowler's Toad, Wood frog, Western Chorus Frog, Spring Peeper, Northern Leopard Frog, American Toad, Gray Treefrog, Green Frog and Bullfrog. Most species' trends appear to be stable. A list of reported reptiles and amphibians that occur within the Project Vicinity or elsewhere below the Bellaire Dam, including their preferred habitat, is set forth in Table E.4.8.

4.3. Game Species

MDNR manages small game species, upland game species, big game species, furbearing species and waterfowl species (2008d, 2009j). Data for specific species and their populations for the Project Vicinity or the area below the Bellaire Dam is not available.

Scientific Name	Common Name
Accipiter cooperii	Cooper's Hawk
Accipiter striatus	Sharp-shinned hawk
Accipter gentilis	Eastern Goshawk
Actitis macularia	Spotted sandpiper
Agelaius phoeniceus	Red-winged Blackbird
Aix sponsa	Wood Duck
Ammodramus savannarum	Grasshopper Sparrow
Anas discors	Blue-winged Teal
Anas platyrhynchos	Mallard
Anas rubripes	Black Duck
Archilochus colubris	Ruby-throated hummingbird
Ardea herodias	Great Blue Heron
Bartramia longicauda	Upland sandpiper
Bombycilla cedrorum	Cedar Waxwing
Bonasa umbellus	Ruffed grouse
Botaurus lentiginosus	American Bittern
Branta canadensis	Canada goose
Bubo virginianus	Great Horned Owl
Bucephala albeola	Bufflehead
Buteo jamaicensis	Red-tailed Hawk
Buteo lineatus	Red-shouldered Hawk
Buteo platypterus	Broad-winged Hawk
Butorides virescens	Green Heron
Caprimulgus vociferus	Whip-poor-will
Cardinalis cardinalis	Northern Cardinal
Carduelis tristis	American Goldfinch
Carpodacus purpureus	House Finch
Carpodacus purpureus	Purple Finch
Cathartes aura	Turkey vulture
Catharus fuscescens	Veery
Catharus guttatus	Hermit Thrush
Certhia americana	Brown Creeper
Ceryle alcyon	Belted Kingfisher
Chaetura pelagica	Chimney Swift
Charadrius vociferus	Killdeer
Childonias niger	Black Tern
Chordeiles minor	Common Nighthawk
Circus cyaneus	Northern harrier/ marsh hawk

Scientific Name	Common Name
Cistothorus platensis	Sedge Wren
Coccothraustes vespertinus	Evening Grosbeak
Coccyzus americanus	Yellow-billed Cuckoo
Coccyzus erythropthalmus	Black-billed Cuckoo
Colaptes auratus	Northern/common Flicker
Colinus virginianus	Bobwhite
Columba livia	Rock dove
Contopus borealis	Olive-sided flycatcher
Contopus virens	Eastern Wood-Pewee
Corvus brachyrhynchos	American Crow
Corvus corax	Common Raven
Custothorus palustris	Marsh Wren
Cyanocitta cristata	Blue Jay
Cygnus olor	Mute Swan
Dendroica caerulescens	Black-throated Blue Warbler
Dendroica coronata	Yellow-rumped Warbler
Dendroica fusca	Blackburnian Warbler
Dendroica pensylvanica	Chestnut-sided Warbler
Dendroica petechia	Yellow Warbler
Dendroica pinus	Pine Warbler
Dendroica virens	Black-throated Green Warbler
Denroica magnolia	Magnolia Warbler
Dolichonyx oryzivorus	Bobolink
Dryocopus pileatus	Pileated Woodpecker
Dumetella carolinensis	Gray Catbird
Empidonax alnorum	Alder Flycatcher
Empidonax minimus	Willow Flycatcher
Empidonax minimus	Least Flycatcher
Eremophila alpestris	Horned Lark
Euphagus cyanocephalus	Brewer's Blackbird
Falco sparverius	American Kestral
Gallinago gallinago	Common Snipe
Gavia immer	Common Loon
Geothlypis trichas	Common Yellowthroat
Haliaeetus leucocephalus	Bald Eagle

Table E.4.7 Birds Observed below the Bellaire Dam (Data Source: MNFI 2009d)

Scientific Name	Common Name
Hylocichla mustelina	Wood Thrush
Icterus galbula	Baltimore Oriole
Larus argentatus	Herring Gull
Larus delawarensis	Ring-billed gull
Lophodytes cucullatus	Hooded Merganser
Loxia curvirostra	Red Crossbill
Melanerpes carolinus	Red-bellied Woodpecker
Meleagris gallapavo	Wild Turkey
Melospiza georgiana	Swamp Sparrow
Melospiza melodia	Song Sparrow
Mniotilta varia	Black-and-white Warbler
Molothrus ater	Brown-headed cowbird
Myiarchus crinitus	Great-crested Flycatcher
Oporornis agilis	Connecticut Warbler
Oporornis philadelphia	Mourning Warbler
Pandion haliaetus	Osprey
Parcus atricapillus	Black-capped Chickadee
Parus bicolor	Tufted Titmouse
Passer domesticus	House Sparrow
Passerculus sandwichensis	Sanannah Sparrow
Passerina cyanea	Indigo Bunting
Phasianus colchicus	Ring-necked pheasant
Pheucticus ludovicianus	Rose-breasted Grosbeak
Picoides pubescens	Downy Woodpecker
Picoides villosus	Hairy Woodpecker
Pipilo erythrophthalmus	Eastern Towhee
Piranga olivacea	Scarlet Tanager
Podilymbus podiceps	Pied-billed Grebe
Polioptila caerulea	Blue-gray Gnatcatcher
Pooecetes gramineus	Vesper Sparrow
Progne subis	Purple Martin
Quiscalus quiscula	Common Grackle
Rallus limnicola	Virginia Rail
Regulus satrapa	Golden-crowned Kinglet

Scientific Name	Common Name
Riparia riparia	Bank Swallow
Sayornis phoebe	Eastern Phoebe
Scolopax minor	American Woodcock
Seiurus aurocapillus	Ovenbird
Seiurus noveboracensis	Northern Waterthrush
Setophaga ruticilla	American Redstart
Sialia sialis	Eastern Bluebird
Sitta canadensis	Red-breasted Nuthatch
Sitta carolinensis	White-breasted Nuthatch
Sphyrapicus varius	Yellow-bellied Sapsucker
Spizella arborea	American Tree Sparrow
Spizella passerina	Chipping Sparrow
Spizella pusilla	Field Sparrow
Stelgidopteryx serripennis	Northern rough-winged Swallow
Sterna caspia	Caspian tern
Strix varia	Barred Owl
Sturnella magna	Eastern Meadowlark
Sturnella neglecta	Western Meadowlark
Sturnus vulgaris	European Starling
Tachycineta bicolor	Tree swallow
Toxostoma rufum	Brown Thrasher
Troglodytes aedon	House Wren
Troglodytes troglodytes	Winter Wren
Turdus migratorius	American Robin
Tyrannus tyrannus	Eastern Kingbird
Vermivora chrysoptera	Golden-winged Warbler
Vermivora ruficapilla	Nashville Warbler
Vireo flavifrons	Yellow-throated Vireo
Vireo gilvus	Warbling Vireo
Vireo olivaceus	Red-eyed Vireo
Vireo solitarius	Blue-headed Vireo
Wilsonia canadensis	Canada Warbler
Zenaida macroura	Mourning dove
Zonotrichia albicollis	White-throated Sparrow

Table E.4.7 Birds Observed below the Bellaire Dam, cont'd (Data Source: MNFI 2009d)

		Habitat			
Common Name	**Scientific Name**	**Littoral**	**Wetland**	**Riparian**	**Upland**
Lizards					
Five-lined skink	*Eumeces fasciatus*			x	
Snakes					
Blue racer	*Coluber constrictor foxi*			x	x
Northern ringneck snake	*Diadophis punctatus edwardsi*			x	x
Eastern hog-nosed snake	*Heterodon platyrhinos*		x	x	x
Eastern milk snake	*Lampropeltis triangulum triangulum*			x	x
Northern water snake	*Natrix sipedon sipedon*	x	x		
Eastern smooth green snake	*Opheodrys vernalis vernalis*		x	x	x
Eastern Massasauga Rattesnake	*Sistrurus catenatus catenatus*		x	x	
Northern brown snake	*Storeria dekayi*			x	x
Midland brown snake	*Storeria dekayi wrightorum*		x	x	x
Northern red-bellied snake	*Storeria occipitomaculata occipitomaculata*		x	x	x
Eastern garter snake	*Thamnophis sirtalis sirtalis*		x	x	x
Northern ribbon snake	*Thamnophis sauritius septentrionalis*	x	x		
Turtles					
Snapping turtle	*Chelydra serpentina*	x	x		
Painted turtle	*Chrysemes picta*	x	x		
Spotted turtle	*Clemmys guttata*	x	x		
Wood turtle	*Clemmys insculpta*		x	x	x
Blanding's turtle	*Emydoidea blandingii*	x	x		
Common Musk turtle	*Sternotherus odoratus*	x	x		
Eastern box turtle	*Terrapena carolina carolina*		x	x	x

Table E.4.8 Amphibians and Reptiles Observed below the Bellaire Dam (Data Source: MNFI 2009f, McDuffie 2009)

4.3.1 Small Game Species

There are year-round hunting seasons for Opossum, Porcupine, Red squirrel, Skunk, Thirteen-lined ground squirrel, Weasel, Woodchuck, English (house) sparrow, European starling, and Feral pigeon (Rock dove). All of these species are common and widely distributed in Project Vicinity, but no population estimates are available.

4.3.2 Upland Game Bird Species

There are hunting seasons for American woodcock, Ring-necked pheasant, Bobwhite quail and Ruffed grouse. American woodcock and Ruffed grouse are found in the upland forests of the Project Vicinity, but no population estimates are available.

4.3.3 Furbearer Species

MDNR has trapping and fur harvesting seasons for the following wildlife species found in the Project Vicinity: Beaver, Otter, Fox, Coyote, Bobcat, Muskrat, Mink, and Raccoon. Beaver, Otter, Muskrat and Mink frequently are found in the Project Vicinity. Bobcat, Raccoon, Gray fox, Red fox and Coyote are commonly found in the uplands of the Project Vicinity. Antrim, Kalkaska and Grand Traverse counties are located in MDNR Hunting Zone 2. County-specific data is not available because harvest data is reported by zones. No population data is available.

4.3.4 Big Game Species

MDNR manages four big game species: White-tailed deer, Black bear, Elk, and Turkeys. All of these species are found in abundance in the Project Vicinity and the ERCOL, excluding Elk. Elk which are found only in two private game preserves in the area below the Bellaire Dam.

White-tailed Deer

Generally, deer densities are higher in the Project Vicinity because of the extensive spreads of private agricultural land and orchards. Deer population numbers and densities are higher in Antrim County than in Kalkaska and Grand Traverse counties. Based on a review of deer per square mile goals established by MDNR, the agency appears to estimate the deer population in the Project Vicinity as nearly 6,000 deer; however, no specific estimates are available (MDNR 2009a).

Black Bear

Bears occupy rolling topography dominated by northern hardwoods, as well as riparian areas and associated wetlands dominated by lowland conifers, hardwoods, Aspen and shrubs. These habitats are extensive within the Project Vicinity and the ERCOL.

Local bear hunters estimate the population of bears to be fewer than ten transient bears in the Project Vicinity with an additional 10-20 resident bears living in the subwatersheds upstream of the Project Vicinity and below the Bellaire Dam. However, no estimates were available from MDNR. The transient bears travel through the wildlife corridors that connect the ERCOL with the Jordan River watershed to the north and the Manistee River watershed to the south. The Skegemog Lake Wildlife Area is known to be an important territory for the Black bear.

Antrim County is located in the Red Oak Bear Management Unit and has an extended, archery-

only, hunt period. The harvest quota for the Red Oak unit in 2007 was 326 and in 2008 was 479; less than 25% of this number was harvested each season. Grand Traverse and Kalkaska Counties are located in the Baldwin Bear Management Unit. Eleven bears were taken in Kalkaska County in 2008. According to a map of the spatial distribution of Black bear in Michigan, both bear management units are located in an area of the state with a medium density of Black bears (MDNR 2009).

Turkey

MDNR regulates a spring and fall hunting season for Turkeys. Antrim County is located in Lower Peninsula Fall and Spring Turkey Hunting Unit J. Kalkaska and Grand Traverse Counties are located in Lower Peninsula Spring Turkey Hunting Unit K. Historical harvest information is not available by county. Local hunters estimate the Turkey population within the Project Vicinity to be approximately 300-400. No population data was available from the Michigan Turkey Federation or MDNR.

4.4. Invasive Species

4.4.1 Invasive Plants

MDNR and MNFI have developed a framework for action to meet the challenge of invasive plants in Michigan. It has identified three lines of defense: 1 - prevention, 2 - early detection and rapid response, 3 - control, management and restoration. There is little current information on the distribution and abundance of invasive plants in the state, but coarse scale surveys show that invasive species have colonized nearly every habitat type in Michigan.

Short lists of priority species for action have been identified for each of Michigan's four major ecoregions based upon currently known distribution and anticipated threat. Species are grouped into four categories:

- A list species: medium to high threat; mostly isolated occurrences, treat wherever found.
- B list species: medium to high threat; mostly local, designate areas for eradication, suppression or containment; may choose to control based on specific management goals and situations.
- C list species: medium to high threat; widespread; no action required; may choose to control based on specific management goals and situations.
- D list species: more information required; may choose to control based on specific management goals and situations.

The following invasive plant species have been identified on the state list as present Antrim County (MNFI 2009c). Local master gardeners and naturalists state that these species are found in the Project Vicinity:

A list species

- Garlic mustard (*Alliaria petiolota*)
- Japanese barberry (*Berberis thunbergii*)
- Leafy spurge (*Euphorbia esula*)
- Common Reed/Phragmites (*Phragmites australis*)

B list species

- Autumn olive (*Elaeagnus umbellate*)
- Baby's breath (*Gypsophila paniculatus*)
- Black locust (*Robinia pseudoacacia*)

C list species

- St.. Johns wort (*Hypericum perforatum*)
- Curly pondweed (*Potamogeton crispus*)
- Eurasian milfoil (*Myriophyllum spicatum*)
- Reed canary grass (*Phalaris arundinacaea*)
- Spotted knapweed (*Centaurea maculosa*)
- Variable-leaf pondweed (*Myriophyllum heterophyllum*)

D list species

- Purple loosestrife (*Lythrum salicaria*)

4.4.2 Invasive Wildlife

Feral dogs and cats within the Project Vicinity number over 1,000. They are significant predators on small mammals and birds. Mute swans (*Cygnus olor*) are found throughout the watershed. They have replaced the native Trumpeter swan (*Cygnus buccinator*) and are a major predator of chicks of the threatened Common loon (*Gavia immer*).

5. WETLANDS, RIPARIAN AND LITTORAL HABITAT

The Project Vicinity contains many acres of wetlands, riparian and littoral habitat. However, in areas with significant human incursion, these habitats are patchy and their quality can be poor. Areas that have remained largely undeveloped, including the various protected wetlands and natural areas within the Project Vicinity, continue to provide high quality habitat. Figure E.5.1 provides an approximate map of the wetlands, riparian and littoral habitat found within the Project Vicinity, while Table E.5.1 provides an estimate of habitat acreage. The habitat types are also broken out separately on maps within their relevant subsections.

Wetland Type	Acres
Emergent	559.4
Scrub-Shrub	376.2
Forested	3154.9
TOTAL	**4090.5**
Riparian Zone (100 ft Buffer)	**Acres**
Elk Lake	313.6
Skegemog Lake	134.4
Other Lakes & Ponds	48
Rivers & Streams	684.8
TOTAL	**1180.8**
Littoral Habitat	**Acres**
Elk Lake	614.4
Skegemog Lake	1851.7

Table E.5.1 Estimated Wetland, Riparian and Littoral Habitat within the Project Vicinity (Data Source: USFWS 2005, MGDL 2009, MDNR 1957, Table E.3.6)

Because no complete geospatial dataset was available for wetlands, riparian and littoral habitat within the Project Vicinity, different methods have been used to estimate acreage. Acreage of wetlands habitat has been estimated using the National Wetlands Inventory geospatial dataset. Acreage for riparian habitat has been estimated by creating a 100 foot buffer around the shoreline of each lake and mapped tributary in the Project Vicinity and calculating the resulting area. Acreage of littoral habitat has been estimated based on finding the bathymetric contours shown in MDNR's maps for Elk and Skegemog Lakes (Figures E.3.1 and E.3.2) that roughly correspond to recent secchi disk readings for each lake (Table E.2.6) and calculating the resulting area.

Plant and animal species information for this section is based on the abstracts of palustrine and terrestrial plant communities developed by MNFI, as well as species lists from several of the natural areas and preserves located within the Project Vicinity or upstream below the Bellaire Dam. Local inventory data is incomplete, as is the MNFI database, since both are dependent on volunteer reporting. However, these lists do accord with local observations and can be considered to be broadly accurate.

5.1. WETLANDS

5.1.1 Extent

The USFWS classifies palustrine wetlands into three major groups: forested, scrub-shrub and

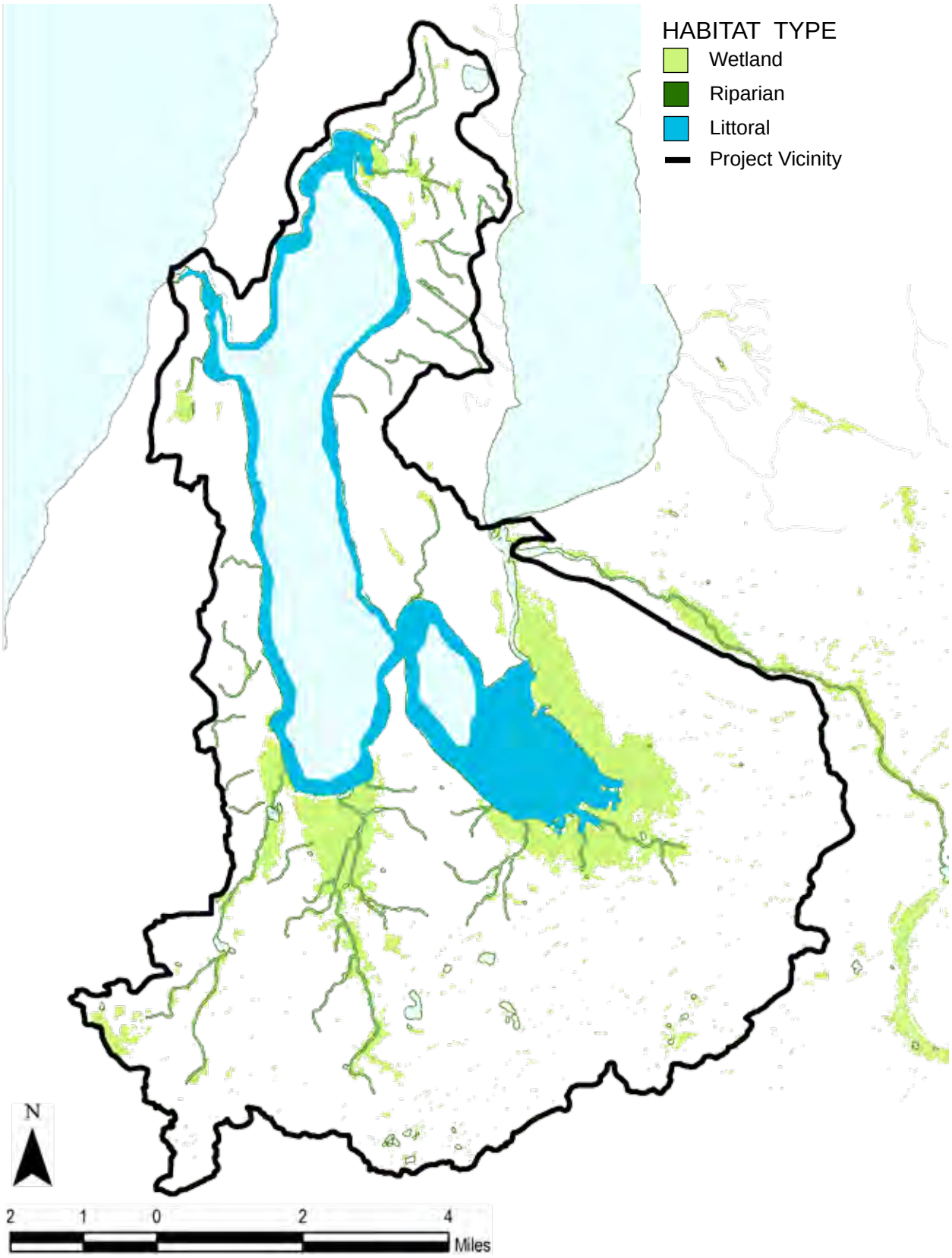

Figure E.5.1 Approximate Wetlands, Riparian and Littoral Habitat within the Project Vicinity (Data Source: USFWS 2005, MGDL 2009, MDNR 1957, Table E.2.6)

emergent. The MFNI further subdivides palustrine wetland communities into 31 subtypes under six major types: marsh (9 types), prairie (5 types), fen (4 types), bog (2 types), forest (7 types) and shrub (3 types) (MNFI 2009d). Wetland communities not only provide critical habitat for wetland species, they also provide wintering, feeding and nest-building habitat for many upland species, as well as feeding and nursery habitat for aquatic species.

The extensive wetlands around the east end of Skegemog Lake have been protected by MDNR as the Skegemog Lake Wildlife Area. The Grand Traverse Regional Land Conservancy and Whitewater Township have protected additional wetlands along the lake's south shore in the Battle Creek Natural Area. Extensive wetlands also exist in the northeast corner of Elk Lake near the outflow of Maplehurst Creek in Kewadin. There are additional wetlands within Spencer's Bay, along the south shore of Elk Lake, and along the Elk River within the Village.

According to MNFI, Michigan has lost approximately 35% of its inland wetlands and 70% of its Great Lakes coastal wetlands. USFWS conducted the National Wetland Inventory in 2005. Wetlands were classified as emergent, forested, or scrub-shrub. While the data within the inventory has not been verified in the field, it is used by agencies and environmental groups for general reference. It is also the only publicly available geospatial dataset that delineates wetlands across the entire Project Vicinity (Figure E.5.2). A map showing the wetlands along the Elk River is also provided (Figure E.5.3). These wetlands are not included on the National Wetland Inventory.

5.1.2 Quality

TOTM classifies many of the wetlands within the Project Vicinity as "high quality". They define high quality wetlands as wetlands that are large, contiguous wetlands on a major lake or stream, approximately 50 acres or greater in size, and identified on a USGS topographic map. All of the natural areas and nature preserves listed in Table E.4.4 have been classified as high quality wetlands. Because of their high quality, these wetland habitats have been protected by the State of Michigan, local governments, the Grand Traverse Regional Land Conservancy, and private property owners (via conservation easements). There are no protected wetlands on or adjacent to the Project site.

5.1.3 Plant Communities

MNFI has identified seven wetland habitat types within the Project Vicinity (Table E.5.2). A map of their locations was unavailable. The area adjacent to the Project along the Elk River contains Northern Shrub Thicket and fragments of Emergent Marsh but very little wetland habitat overall. The Project site has no wetland habitat.

Wetland Community	Elk River	Elk Lake	Skegemog Lake
Northern Shrub Thicket	x	x	x
Rich Conifer Swamp		x	x
Hardwood Conifer Swamp		x	x
Bog		x	x
Northern Fen		x	x
Northern Wet Meadow		x	x
Emergent Marsh	x	x	x

Table E.5.2 Wetland Plant Communities within the Project Vicinity (Source: MNFI 2008)

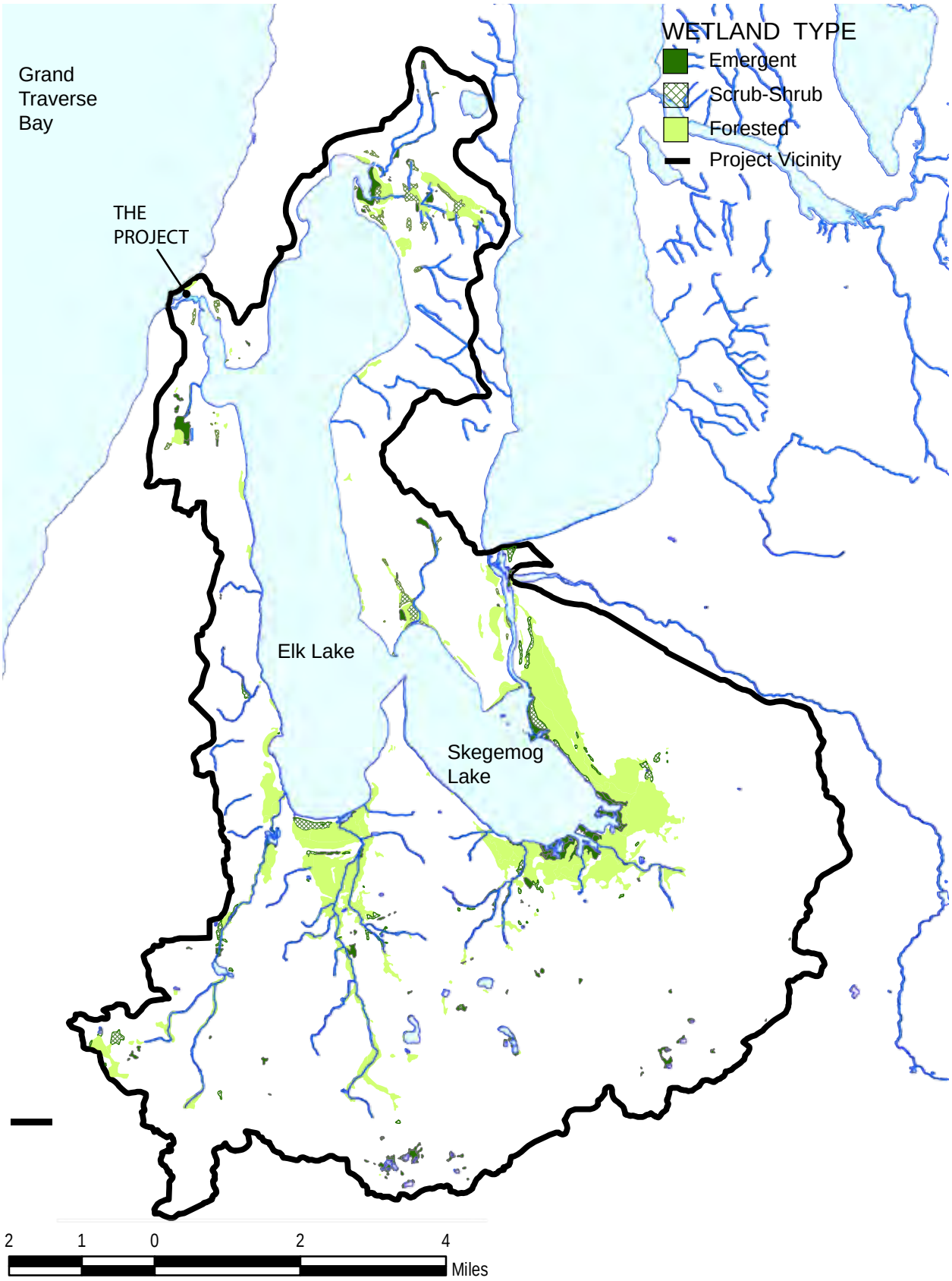

Figure E.5.2 National Wetland Inventory Delineation for the Project Vicnity (Source: USFWS 2005)

Figure E.5.3 Wetlands Along the Elk River (Source: Grand Traverse Regional Land Conservancy 2009c)

Approximately 150 wetland plant species have been observed in the Project Vicinity but no comprehensive plant survey has been conducted (Table E.5.3).

Bog		
	Scientific Name	**Common Name**
Shrubs	*Andromeda glaucophylla**	Bog- rosemary
	*Chamaedaphne calyculata**	Leatherleaf
	*Kalmia polifolia**	Swamp/ Bog-laurel
	Vaccinium macrocarpon	Cranberry
	Vaccinium oxycoccos	Small cranberry
Herbs and Grasses	*Caltha palustris**	Water-arum
	*Drosera rotundifolia**	Round-leafed sundew
	*Eriophorum gracile**	Slender cotton- grass
	*Eriophorum spissum**	Hare's tail cotton- grass
	*Eriophorum viridi-carinatum**	Dark scale cotton- grass
	Isotria verticillata	Whorled pogonia (P)
	Lamia polifolia	Dead nettle
	Platanthera ciliaris	Yellow/ orange-fringed orchid (P)
	*Rhynchosopora alba**	White beak-rush
	Sarracenia purpurea f. heterophylla	Yellow pitcher-plant (P)
Sedges	*Carex lasiocarpa**	Slender sedge
	*Carex oligosperma**	Running bog sedge
	Carex pauciflora	Few-flowered bog sedge
	Carex paupercula	Poor sedge
	*Carex trisperma**	Three-seeded bog sedge
Mosses	*Sphagnum capillifolium*	Live Sphagnum Moss
	Sphagnum cuspidatum	Toothed Sphagnum
	*Sphagnum fuscum**	Rusty Peat Moss
	*Spagnum magellanicum**	Magellan's Sphagnum Moss
	Sphagnum papillosum	Papillose Sphagnum
	*Sphagnum recurvum**	Recurved Sphagnum
	Sphagnum russowii	Russow's Sphagnum
	*Sphagnum teres**	Rigid Bog-moss
Northern Wet Meadow		
Herbs and Grasses	*Calamagrostis canadensis**	Bluejoint grass
Sedges and Rushes	*Carex lasiocarpa**	Slender sedge
	*Carex rostrata**	Beaked sedge
	Carex stricta	Common tussock sedge
	Carex vesicaria	Inflated sedge
	Gentiana linearis	Linear-leaved gentian
Protected Species	*Scirpus cypernis**	Wool-grass

Table E.5.3 Wetland Plant Species in the Project Vicinity (Source: MNFI 2009, Grass River Natural Area Inc. 1987)

Emergent Marsh		
	Scientific Name	**Common Name**
Herbs and Grasses	*Alisma plantago-aquatica*	Water plantain
	Glyceria borealis	Manna grass
	Leersia borealis	White grass
	Leersia virginica	Cut grass
	Lemna ssp.	Duckweed
	*Nuphar variegatum**	Yellow water lily
	*Nymphaea odorata**	Fragrant water lily
	Polygonum viviparum	Alpine bistort
	Pontederia cordata	Pickerel weed
	*Sagittaria lactifolia**	Broad-leaved arrowhead
	*Sparganium eurycarpum**	Common, giant burreed
	Wolffia ssp.	Watermeal
	Zizania aquatica	Wild rice
Sedges and Rushes	*Carex ssp*	Sedges
	Eleocharis obtusa	Spike rush
	Scirpus acutus	Great bulrush
	*Scirpus americanus**	Threesquare bulrush
	*Scirpus cyperinus**	Wool-grass
	*Typha angustifolia**	Narrow-leaved cattail
	*Typha latifolia**	Common cattail
Protected Species	*Armoracia lacustris*	Lake cress
	Beckmannia syzigachne	Slough grass
	Zizania aquatica v.Aquatica	Wild rice
	Zizania v. angustifolia	Wild rice
Hardwood Conifer Swamp		
Canopy	*Abies balsamea**	Balsam fir
	*Betula alleghaniensis**	Yellow birch
	*Fraxinus nigra**	Black ash
	*Larix larcina**	Tamarack
	*Pinus strobus**	White pine
	*Populus balsamifera**	Balsam poplar
	*Thuja occidentalis**	Northern white cedar
	*Tsuga canadensis**	Hemlock
	*Acer rubrum**	Red maple

Table E.5.3 Wetland Plant Species in the Project Vicinity, cont'd
(Source: MNFI 2009, Grass River Natural Area Inc. 1987)

Hardwood Conifer Swamp		
	Scientific Name	**Common Name**
Herbs and Grasses	*Arisemea triphyllum**	Jack-in-the-pulpit
	*Caltha palustris**	Marsh marigold
	*Gynocarpium Dryopteris**	Oak fern
	*Lycopus uniflorus**	Water horehound
	*Onoclea sensibilis**	Sensitive fern
	Symphlocarpus foetidus	Skunk cabbage
Sedges and Rushes	*Carex intumescens*	Shining bur sedge
	Carex seorsa	Swamp star sedge
	*Circaea alpine**	Enchanter's nightshade
	*Coptis trifolia**	Goldthread
	*Impatiens biflora**	Jewelweed
	*Iris versicolor**	Blue flag iris
	*Lycopodium obscurum**	Ground pine
	*Maianthemum canadense**	Wild lily of the valley
	Mentha arvensis	Field Mint
Sedges and Rushes	*Scutellaria galericulata*	Marsh/hooded skullcap
Protected Species	*Sphagnum ssp.*	Moss
Northern Fen		
Canopy	*Thuja occidentalis**	Northern white cedar
Shrubs	*Chamaedaphne calyculata**	Leatherleaf
	*Ledum groenlandicum**	Labrador tea
	*Potentilla fruticosa**	Shrubby cinquefoil
	Vaccinium oxycoccos	Small cranberry
Herbs and Grasses	*Gentiana procera*	Lesser fringed gentian
	*Parnassia glauca**	Grass of Parnassus
	Tofieldia glutinosa	False asphodel
Sedges and Rushes	*Carex aquitilis**	Water sedge
	*Carex lasiocarpa**	Slender sedge
	Carex limosa	Mud sedge
	*Cladium mariscoides**	Twig rush
	*Eleocharis obtuse**	Spike-rush
	*Eleocharis rostellata**	Beaked spike-rush
	Scirpus cespitosus	Tufted bulrush
	Scirpus hudsonianus	Alpine cotton-grass
Protected Species	*Cacalia plantaginea*	Indian plantain
	Droser anglica	English sundew
	Pinguicula vulgaris	Butterwort
	Solidago houghtonii	Houghton's goldenrod
	Sphagnum ssp.	Moss

Table E.5.3 Wetland Plant Species in the Project Vicinity, cont'd
(Source: MNFI 2009, Grass River Natural Area Inc. 1987)

Northern Shrub Thicket		
	Scientific Name	**Common Name**
Canopy	*Alnus rugosa**	Speckled alder
	*Fraxinus nigra**	Black ash
	*Thuja occidentalis**	Northern white cedar
Shrubs	*Aronia melanocarpa**	Chockeberry
	*Myrica gale**	Sweet gale
	*Vaccinium corymbosum**	High-bush blueberry
	Viburnum cassinoides	Northern wild-raisin/Withe-rod
	*Viburnum trilobum**	High-bush cranberry
Protected Species	*Equisetum telmateia*	Giant horsetail
	Listera auriculata	Auricled twayblade
	Stellaria crassifolia	Fleshy stitchwort
Rich Conifer Swamp		
Canopy	*Abies balsamea**	Balsam fir
	*Acer rubrum**	Red maple
	Alnus crispa	Mountain alder
	*Alnus rugosa**	Speckled alder
	*Betula alleghaniensis**	Yellow birch
	*Betula papyrifera**	Paper birch
	Picea glauca	White spruce
	*Picea mariana**	Black spruce
	*Thuja occidentalis**	Northern white cedar
	*Tsuga canadensis**	Hemlock
Shrubs	*Cornus alternifolia**	Alternateleaf dogwood
	*Cornus amomum**	Silky dogwood
	*Cornus racemosa**	Northern swamp dogwood
	*Cornus sericea**	Red-osier dogwood
Ferns	*Hylocomium splendens**	Mountain fern
Mosses	*Callicladium haldanianum*	Callicladium Moss
	*Pleurozium schreberi**	Big Red Stem Moss
	*Sphagnum squarrosum**	Spread-leaved Peat Moss
	*Sphagnum warnstorfii**	Warnstorf's Peat Moss
Protected Species	*Calypso bulbosa*	Calypso orchid
	Cypridium arietinum	Ram's head orchid
	Gymnocarpium robertianum	Limestone oak fern
	Mimulus glabratus v. michiganensis	Michigan monkey-flower

* = Plants appearing in the Grass River Natural Area Species Inventory, P = protected

Table E.5.3 Wetland Plant Species in the Project Vicinity, cont'd
(Source: MNFI 2009, Grass River Natural Area Inc. 1987)

5.1.4 Animal Species

The wetlands below the Bellaire Dam contain approximately 27 mammal species, 36 bird species and 30 species of amphibians and reptiles; however, no comprehensive biological survey has been conducted to determine the exact number of species or their precise locations. Indeed, the data challenges to compiling species lists for upland habitats apply equally to wetlands (see Section 4.2.1). Species listed are based on local observations and species lists compiled for the natural areas below the Bellaire Dam (Tables E.5.4 - E.5.6).

5.2. Riparian Habitat

5.2.1 Extent

MDNR defines the riparian zone as the area from the shoreline of lakes, rivers and streams to 100' upland (MDNR 2009i). Figure E.5.4 delineates the Project Vicinity's estimated riparian zone.

The State of Michigan permits property owners to install riprap and seawalls to prevent erosion and does not require maintenance of a greenbelt buffer. Regulations have been left to individual townships and municipalities. This policy has contributed to the loss of riparian habitat along the lakes. The Project Vicinity crosses multiple county, township and village jurisdictions. As a result, controls on riparian habitat use and development are presently inconsistent or nonexistent. However, local townships and villages are cooperating to develop shoreline protection overlay districts and are currently considering amendments to zoning ordinances in order to improve the greenbelt buffers on lakes and streams.

The vast majority of protected riparian habitat within the Project Vicinity or elsewhere below the Bellaire Dam consists of wetlands. MDEQ has funded projects to improve road-stream crossings, to repair erosion sites, and to install greenbelt buffers on public property. In 2009, Milton Township and Helena Township installed greenbelt buffers on public lands in cooperation with TWC and MDEQ.

The riparian zone in the Project Vicinity is about 80% developed. Preliminary estimates indicate that the Skegemog Lake shoreline is 80% developed, with patches of wetlands located on 74% of the shoreline parcels. Elk Lake is estimated to be 78% developed with patches of wetlands on 50% of the shoreline parcels (Fuller 2001). Over 80% of the Elk River's shoreline has been armored with seawall and riprap. Since there are no cities and only small villages within the Project Vicinity, shoreline development is primarily residential, with the majority of development being single family vacation and second homes. Developed parcels are less likely to have greenbelt buffers or maintain natural vegetation along the shoreline:

> [Along the lakes' shorelines,] there is only one tier of low density development, with the background area remaining in agriculture or forest. Buffer zones along the water's edge are encouraged by the lake homeowners associations, but there is inconsistency, with some homeowners exhibiting a natural shoreline and others, on the extreme, exhibiting heavily armored shorelines and heavily mowed and manicured lawns (Grant 2008) (Photos E.5.1-E.5.5).

Scientific Name	Common Name
Blarina brevicauda	Short-tailed shrew
Canis latrans	Coyote
Castor canadensis	Beaver
Clethrionomys gapperi	Red-backed vole
Condylura cristata	Star-nosed mole
Lasioycteris noctivagans	Silver-haired bat
Lasiurus borealis	Red bat
Lasiurus cinereus	Hoary bat
Lepus americanus	Snowshoe hare
Lutra canadensis	River otter
Lynx rufus	Bobcat
Mustela ermina	Shorttail weasel (ermine)
Mustela frenata	Long-tailed weasel
Mustela rixose	Least weasel
Mustela vison	Mink
Myotis keeni	Keen myotis
Myotis lucifugus	Little brown bat
Myotis lucifugus	Little brown myotis
Odocoileus virginana	White-tailed deer
Ondatra zibethicus	Muskrat
Rattus norvehicus	Norway rat
Sorex cinereus	Masked shrew
Sorex palustris	Water shrew
Sylviagus floridanus	Eastern cottontail rabbit
Synaptomys cooperi	Southern bog lemming
Ursus americanus	Black bear
Vulpes vulpes	Red fox

Table E.5.4 Wetland Mammal Species Observed below the Bellaire Dam (Source: Grass River Natural Area Inc. 1987, MNFI 2008)

Scientific Name	Common Name
Accipiter cooperii	Cooper's Hawk
Accipter gentilis	Northern Goshawk
Accipter striatus velox.	Sharp-shinned hawk
Actitis macularia	Spotted sandpiper
Aegolius acadicus	Saw-whet owl
Agelaius phoeniceus	Red-winged Blackbird
Aix sponsa	Wood Duck
Ammodramus savannarum	Grasshopper Sparrow
Anas discors	Blue-winged Teal
Anas platyrhynchos	Mallard
Anas rubripes	Black Duck
Archilochus colubris	Ruby-throated hummingbird
Ardea herodias	Great Blue Heron
Baeolophus bicolor	Tufted Titmouse
Bartramia longicauda	Upland sandpiper
Bombycilla cedrorum	Cedar Waxwing
Bonasa umbellus	Ruffed grouse
Botaurus lentiginosus	American Bittern
Branta canadensis	Canada goose
Bubo virginianus	Great Horned Owl
Bucephala albeola	Bufflehead
Buteo jamaicensis	Red-tailed Hawk
Buteo lineatus	Red-shouldered Hawk
Buteo platypterus	Broad-winged Hawk
Butorides virescens	Green Heron
Capella gallinago	Common Snipe
Caprimulgus vociferus	Whip-poor-will
Cardinalis cardinalis	Northern Cardinal
Carduelis flammea	Redpoll
Carduelis pinus	Pine siskin
Carduelis tristis	American Goldfinch
Carpodacus purpureus	House Finch
Carpodacus purpureus	Purple Finch

Table E.5.5 Wetland Bird Species Observed below the Bellaire Dam (Source: Grass River Natural Area Inc. 1987, MNFI 2008)

Scientific Name	Common Name
Cathartes aura	Turkey vulture
Catharus fuscescens	Veery
Catharus guttatus	Hermit Thrush
Certhia americana	Brown Creeper
Ceryle alcyon	Belted Kingfisher
Chaetura pelagica	Chimney Swift
Charadrius vociferus	Killdeer
Childonias niger	Black Tern
Chordeiles minor	Common Nighthawk
Circus cyaneus	Northern harrier/marsh hawk
Cistothorus platensis	Sedge Wren
Coccyzus americanus	Yellow-billed Cuckoo
Coccyzus erythropthalmus	Black-billed Cuckoo
Colaptes auratus	Northern/common Flicker
Colinus virginianus	Bobwhite
Columba livia	Rock dove
Contopus virens	Eastern Wood-Pewee
Corvus brachyrhynchos	American Crow
Corvus corax	Common Raven
Cyanocitta cristata	Blue Jay
Cygnus olor	Mute Swan
Dendroica caerulescens	Black-throated Blue Warbler
Dendroica coronata	Yellow-rumped Warbler
Dendroica fusca	Blackburnian Warbler
Dendroica pensylvanica	Chestnut-sided Warbler
Dendroica petechia	Yellow Warbler
Dendroica pinus	Pine Warbler
Dendroica virens	Black-throated Green Warbler
Denroica magnolia	Magnolia Warbler
Dolichonyx oryzivorus	Bobolink
Dryocopus pileatus	Pileated Woodpecker
Dumetella carolinesis	Gray Catbird
Empidonax alnorum	Alder Flycatcher
Empidonax minimus	Willow Flycatcher
Empidonax minimus	Least Flycatcher
Eremophila alpestris	Horned Lark

Scientific Name	Common Name
Euphagus cyanocephalus	Brewer's Blackbird
Falco sparverius	American Kestral
Gavia immer	Common Loon
Geothlypis trichas	Common Yellowthroat
Haliaeetus leucocephalus	Bald Eagle
Hesperiphona vespertine	Evening Grosbeak
Hirundo rustica	Barn Swallow
Hylocichla mustelina	Wood Thrush
Icterus galbula	Baltimore Oriole
Junco hyemalis	Northern Junco
Larus argentatus	Herring Gull
Larus delawarensis	Ring-billed gull
Lophodytes cacullatus	Hooded Merganser
Loxia curvirostra	Red Crossbill
Melanerpes carolinus	Red-bellied Woodpecker
Melanerpes erythrocephalus	Red-headed Woodpecker
Meleagris gallapavo	Wild Turkey
Melospiza georgiana	Swamp Sparrow
Melospiza melodia	Song Sparrow
Mniotilta varia	Black-and-white Warbler
Molothrus ater	Brown-headed cowbird
Myiarchus crinitus	Great-crested Flycatcher
Nuttallornis borealis	Olive-sided flycatcher
Oporornis agilis	Connecticut Warbler
Oporornis philadelphia	Mourning Warbler
Pandion haliaetus	Osprey
Passer domesticus	House Sparrow
Passerculus sandwichensis	Sanannah Sparrow
Passerina cyanea	Indigo Bunting
Petrochelidon pyrrhonota	Cliff Swallow
Phasianus colchicus	Ring-necked pheasant
Pheucticus ludovicianus	Rose-breasted Grosbeak
Picoides pubescens	Downy Woodpecker
Picoides villosus	Hairy Woodpecker
Pinicola enucleator	Pine grosbeak
Pipilo erythrophthalmus	Eastern Towhee

Table E.5.5 Wetland Bird Species Observed below the Bellaire Dam, cont'd (Source: Grass River Natural Area Inc. 1987, MNFI 2008)

Scientific Name	Common Name
Pipilo erythrophthalmus	Rufous-sided towhee
Piranga olivacea	Scarlet Tanager
Poecile atricapillus	Black-capped Chickadee
Polilymbus podiceps	Pied-billed Grebe
Polioptila caerulea	Blue-gray Gnatcatcher
Pooecetes gramineus	Vesper Sparrow
Progne subis	Purple Martin
Quiscalus quiscula	Common Grackle
Rallus limicola limicola	Virginia Rail
Regulus satrapa	Golden-crowned Kinglet
Riparia riparia	Bank Swallow
Sayornis phoebe	Eastern Phoebe
Scolpax minor	American Woodcock
Seiurus aurocapillus	Ovenbird
Seiurus noveboracensis	Northern Waterthrush
Setophaga ruticilla	American Redstart
Sialia sialis	Eastern Bluebird
Sitta canadensis	Red-breasted Nuthatch
Sitta carolinensis	White-breasted Nuthatch
Sphyrapicus varius	Yellow-bellied Sapsucker
Spizella arborea	American Tree Sparrow
Spizella passerina	Chipping Sparrow
Spizella pusilla	Field Sparrow
Stelgidopteryx serripennis	Northern rough-winged Swallow
Sterna caspia	Caspian tern
Strix varia	Barred Owl
Sturnella magna	Eastern Meadowlark
Sturnella neglecta	Western Meadowlark
Sturnus vulgaris	European Starling
Tachycineta bicolor	Tree swallow
Toxostoma rufum	Brown Thrasher
Troglodytes aedon	House Wren
Troglodytes troglodytes	Winter Wren
Turdus migratorius	American Robin
Tyrannus tyrannus	Eastern Kingbird
Vermivora chrysoptera	Golden-winged Warbler
Vermivora ruficapilla	Nashville Warbler
Vireo flavifrons	Yellow-throated Vireo
Vireo gilvus	Warbling Vireo
Vireo olivaceus	Red-eyed Vireo
Vireo solitarius	Solitary/blue-headed Vireo
Wilsonia canadensis	Canada Warbler
Zenaida macroura	Mourning dove
Zonotrichia albicollis	White-throated Sparrow

Table E.5.5 Wetland Bird Species Observed below the Bellaire Dam, cont'd (Source: Grass River Natural Area Inc. 1987, MNFI 2008)

Scientific Name	Common Name
Turtles	
Chelydra serpentina	Snapping turtle
Chrysemes picta	Painted turtle
Clemmys insculpta	Wood turtle
Clemmysguttata	Spotted turtle
Emydoidea blandingii	Blanding's turtle
Sternotherus odoratus	Common musk turtle
Terrapena carolina	Eastern box turtle
Snakes	
Heterodon platyrhinos	Eastern hognose snake
Liochloraphis vernalis	Eastern smooth green snake
Natrix sipedon sipedon	Northern water snake
Sistrurus catenatus catenatus	Eastern Massasauga rattesnake
Storeria dekayi wrightorum	Midland brown snake
Storeria occipitomaculata	Northern red-bellied snake
Thamnophis s. sirtalis	Eastern garter snake
Thamnophis sauritius septent	Northern ribbon snake

Table E.5.6 Wetland Amphibian and Reptile Species Observed below the Bellaire Dam (Source: Grass River Natural Area Inc. 1987, MNFI 2008)

Frogs and Toads	
Acris creiptans blanchardi	Blanchard's cricket frog
Bufo americanus	American toad
Bufo woodhousei	Fowler's toad
Hyla versicolor	Eastern gray treefrog
Pseudacris crucifer	Northern spring peeper
Pseudacris triseriata	Western/Striped chorus frog
Rana catesbeiana	Bull frog
Rana clamitans	Green frog
Rana palustris	Pickerel frog
Rana pipiens	Northern leopard frog/Grass frog
Rana sylvatica	Wood frog

Salamanders	
Ambystoma maculatum	Spotted salamander
Hemidactylium scutatum	Four-toed salamander
Notophthalmus viridescens viridescens	Eastern newt/Red-spotted newt
Plethodon cinereus	Red-backed salamander

Table E.5.6 Wetland Amphibian and Reptile Species Observed below the Bellaire Dam, cont'd (Source: Grass River Natural Area Inc. 1987, MNFI 2008)

Riparian habitat along the Torch River is fairly flat and low-lying. Wetlands are present along about 75% of the shoreline; seawalls protecting residential and commercial development cover the remaining 25% of the shoreline. The head of the river flows under the Torch River Bridge at the south end of Torch Lake and through a stretch of gas docks, marinas, and commercial development. Residential development flanks the river's upper reach (Photo E.5.6).

Skegemog Lake has more than seven miles of undeveloped shoreline at its eastern end. This area is shallow; submerged logs and stumps are present quite a ways offshore. As in the Elk River, these logs and stumps are remnants of a lakeside conifer swamp that was inundated when the first dam was constructed at the Project site in the 1850s. The remaining three miles of Skegemog Lake's shoreline is single family residential development with some sandy shore.

Elk Lake has extensive wetlands along its northeast and south shores. Wetlands also exist along Spencer's Bay in the northwest portion of the lake just above the Elk River, although this wetland habitat was not mapped in the National Wetlands Inventory. As with Skegemog Lake, residential development along 80% of the shoreline has altered most of the riparian zone from natural vegetation to landscaping and manicured lawns.

The Elk River has limited riparian habitat. The river narrows and gets more shallow (4-6' deep) as it flows from Spencer's Bay toward the Project. Logs and stumps poke up from the water within the river's shallows just below the Bay. This area provides some riparian habitat between the river and the highway. The Antrim Conservation District recently enhanced the riparian buffer along this section of the shoreline with additional native wetland plants, such as Red-osier dogwood, Blue-flag iris, Joe-Pye-weed, and Swamp milkweed to supplement the native Cattails, Rushes, Sedges and Alder that were already present. The Elk River's shores are mostly seawall and rip-rap. The seawall protects the landscaped lawns of the restaurant, condominiums and other residential development along the river. Within the Village, urban trees and a narrow fringe of vegetation line the shore of the river's south channel.

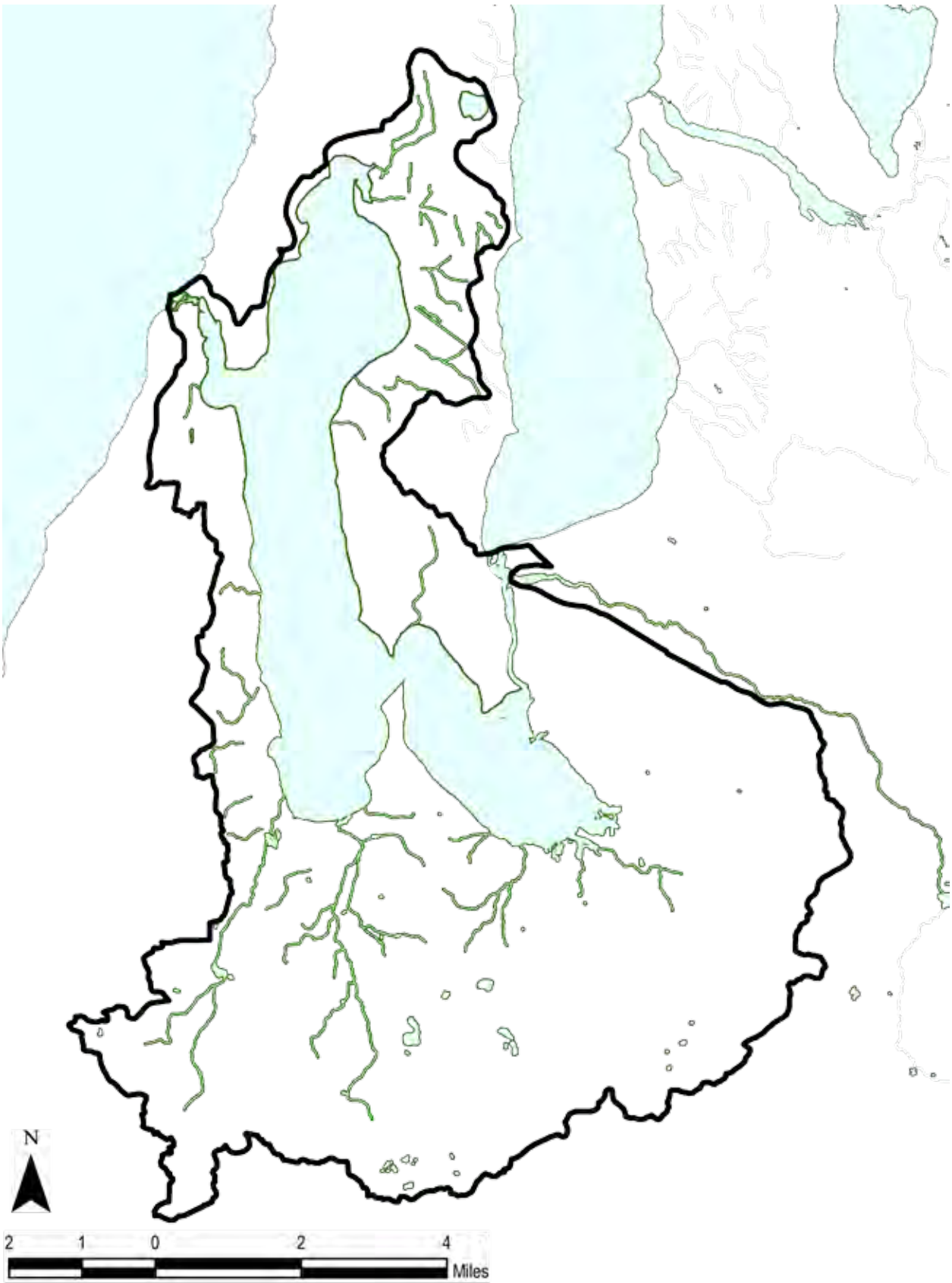

Figure E.5.4 Estimated Riparian Zone within the Project Vicinity (Data Source: MGDL 2009)

Photo E.5.1 Elk Lake (Photo Source: Grant 2008)
The shoreline is ringed with trees but the shoreline's appearance on each parcel is determined by the homeowner.

Photo E.5.2 Homes along Elk Lake (Photo Source: Grant 2008)
Homes on the lakes are generally very close to the shoreline and include one or two docks.

Photo E.5.3 A Typical Shoreline Parcel (Photo Source: Grant 2008)
Part of the shoreline (left side) is left natural while the other portion is armored, with a manicured lawn leading down to the water. Docks with pontoon boats are ubiquitous on the lakes. The boats get pulled during the winter.

Photo E.5.4 A Heavily Armored Shoreline on Torch River (Photo Source: Grant 2008)

Photo E.5.5 Another Typical Shoreline Parcel (Photo Source: Grant 2008)

Photo E.5.6 The Small Community of Torch River (Photo Source: Grant 2008)
The community lies at the entrance to Torch Lake.

In 2008, MDEQ funded a shoreline greenbelt survey of Torch Lake, conducted by TWC. The survey found that more than 86% of the Torch Lake shoreline is developed and 14% is undeveloped. Of the developed shoreline, 65% is landscaped and 35% is natural. Shoreline quality was rated as 11% excellent, 46% good or very good and 44% poor or very poor (TWC 2008a). Given the similarity in development patterns between the lakes, the riparian habitat along Elk and Skegemog Lakes is likely of similar quality. The quality of the Elk River's riparian habitat is likely to be rated generally poor or very poor, given that 80% of the shoreline is armored and the areas abutting the shoreline are relatively developed.

5.2.2 Riparian Plant Species

The undeveloped riparian areas along the shores of Elk Lake and Skegemog Lake and their tributaries consist of Mesic Northern Forest and extensive stretches of wetlands. These habitats are fragmented or no longer present in the more developed areas, but species from both these habitats appear throughout the Project Vicinity's riparian zones, including along the Elk River. See Tables E.4.2 and E.4.3 for lists of the species present in the Project Vicinity's Mesic Northern Forests and wetlands.

5.2.3 Riparian Animal Species

The data challenges to compiling species lists for upland habitats apply equally to riparian habitats (see Section 4.1). Species listed are based on local observations and species lists compiled for the natural areas below the Bellaire Dam (Tables E.5.7-E.5.9). Approximately 44 mammal species, 86 bird species and 23 species of amphibians and reptiles have been observed.

Scientific Name	Common Name
Blarina brevicauda	Short-tailed shrew
Canis latrans	Coyote
Castor canadensis	Beaver
Citellus tridecimlineatus	13-lined ground squirrel
Clethrionomys gapperi	Red-backed vole
Didelphis virginiana	Pine vole
Eptesicus fuscus	Big brown bat
Erethizon dorsatum	Porcupine
Glaucomys volans	Southern flying squirrel
Lasiurus borealis	Red bat
Lasiurus cinereus	Hoary bat
Lepus americanus	Snowshoe hare
Lutra canadensis	River otter
Lynx rufus	Bobcat
Marmota monax	Woodchuck
Martes americana	Striped skunk
Microtus pennsylvanicus	Meadow vole
Mus musculus	House mouse
Mustela ermina	Shorttail weasel/Ermine
Mustela frenata	Long-tailed weasel
Mustela rixose	Least weasel
Mustela vison	Mink

Scientific Name	Common Name
Myotis keeni	Keen myotis
Myotis lucifugus	Little brown myotis
Napaeozapus insignis	Woodland jumping mouse
Odocoileus virginana	White-tailed deer
Ondatra zibethicus	Muskrat
Peromyscus leucopus	White-footed mouse
Peromyscus maniculaturs	Deer mouse
Pitymys pinetorum	Opossum
Procyon lotor	Raccoon
Rattus norvehicus	Norway rat
Scalopus aquaticus	Eastern mole
Sciurus caarolinensis	Eastern gray squirrel
Sciurus niger	Eastern Fox squirrel
Sylviagus floridanus	Eastern cottontail rabbit
Synaptomys cooperi	Southern bog lemming
Tamias striatus	Eastern chipmunk
Tamiasciurus hudsonicus	Red squirrel
Taxidea taxus	Badger
Urocyon cineredargenteus	Gray fox
Ursus americanus	Black bear
Vulpes vulpes	Red fox
Zapus hudonius	Meadow jumping mouse

Table E.5.7 Riparian Mammal Species Observed below the Bellaire Dam (Source: Grass River Natural Area, Inc. 1987, MNFI 2008)

Scientific Name	Common Name
Actitis macularia	Spotted sandpiper
Aegolius acadicus	Saw-whet owl
Agelaius phoeniceus	Red-winged Blackbird
Archilochus colubris	Ruby-throated hummingbird
Baeolophus bicolor	Tufted Titmouse
Bombycilla cedrorum	Cedar Waxwing
Botaurus lentiginosus	American Bittern
Buteo lineatus	Red-shouldered Hawk
Cardinalis cardinalis	Northern Cardinal
Carduelis flammea	Redpoll
Carduelis pinus	Pine siskin
Carduelis tristis	American Goldfinch
Carpodacus purpureus	House Finch
Carpodacus purpureus	Purple Finch
Cathartes aura	Turkey vulture
Ceryle alcyon	Belted Kingfisher
Chaetura pelagica	Chimney Swift
Chordeiles minor	Common Nighthawk
Circus cyaneus	Northern harrier/marsh hawk
Cistothorus platensis	Sedge Wren
Colaptes auratus	Northern/common Flicker
Columba livia	Rock dove
Contopus virens	Eastern Wood-Pewee
Corvus brachyrhynchos	American Crow
Corvus corax	Common Raven
Cyanocitta cristata	Blue Jay
Dendroica coronata	Yellow-rumped Warbler
Dendroica fusca	Blackburnian Warbler
Dendroica pensylvanica	Chestnut-sided Warbler
Dendroica petechia	Yellow Warbler
Dendroica pinus	Pine Warbler
Denroica magnolia	Magnolia Warbler
Dryocopus pileatus	Pileated Woodpecker
Dumetella carolinesis	Gray Catbird
Empidonax alnorum	Alder Flycatcher
Empidonax minimus	Willow Flycatcher
Geothlypis trichas	Common Yellowthroat

Scientific Name	Common Name
Haliaeetus leucocephalus	Bald Eagle
Hesperiphona vespertine	Evening Grosbeak
Hylocichla mustelina	Wood Thrush
Icterus galbula	Baltimore Oriole
Junco hyemalis	Northern Junco
Melanerpes carolinus	Red-bellied Woodpecker
Meleagris gallapavo	Wild Turkey
Melospiza georgiana	Swamp Sparrow
Melospiza melodia	Song Sparrow
Mniotilta varia	Black-and-white Warbler
Myiarchus crinitus	Great-crested Flycatcher
Nuttallornis borealis	Olive-sided flycatcher
Oporornis philadelphia	Mourning Warbler
Passer domesticus	House Sparrow
Pheucticus ludovicianus	Rose-breasted Grosbeak
Picoides pubescens	Downy Woodpecker
Picoides villosus	Hairy Woodpecker
Pinicola enucleator	Pine grosbeak
Pipilo erythrophthalmus	Eastern Towhee
Piranga olivacea	Scarlet Tanager
Poecile atricapillus	Black-capped Chickadee
Polioptila caerulea	Blue-gray Gnatcatcher
Progne subis	Purple Martin
Quiscalus quiscula	Common Grackle
Regulus satrapa	Golden-crowned Kinglet
Riparia riparia	Bank Swallow
Sayornis phoebe	Eastern Phoebe
Seiurus aurocapillus	Ovenbird
Seiurus noveboracensis	Northern Waterthrush
Setophaga ruticilla	American Redstart
Sitta canadensis	Red-breasted Nuthatch
Sitta carolinensis	White-breasted Nuthatch
Sphyrapicus varius	Yellow-bellied Sapsucker
Spizella arborea	American Tree Sparrow
Spizella passerina	Chipping Sparrow

Table E.5.8 Riparian Bird Species Observed below the Bellaire Dam (Source: Grass River Natural Area, Inc. 1987, MNFI 2008)

Scientific Name	Common Name
Stelgidopteryx serripennis	Northern rough-winged Swallow
Strix varia	Barred Owl
Sturnus vulgaris	European Starling
Tachycineta bicolor	Tree swallow
Toxostoma rufum	Brown Thrasher
Troglodytes aedon	House Wren
Troglodytes troglodytes	Winter Wren
Turdus migratorius	American Robin
Vireo gilvus	Warbling Vireo
Vireo olivaceus	Red-eyed Vireo

Table E.5.8 Riparian Bird Species Observed below the Bellaire Dam, cont'd (Source: Grass River Natural Area, Inc. 1987, MNFI 2008)

Scientific Name	Common Name
Lizards	
Eumeces fasciatus	5-lined Skink
Snakes	
Coluber constrictor foxii	Blue Racer
Diadophis punctatus	Northern Ringneck Snake
Heterodon platyrhinos	Eastern Hognose Snake
Lampropeltis triangulum	Eastern Milk Snake
Liochloraphis vernalis	Eastern Smooth Green Snake
Sistrurus catenatus catenatus	Eastern Massasauga Rattesnake
Storeria dekayi	Northern Brown Snake
Storeria dekayi wrightorum	Midland Brown Snake
Storeria occipitomaculata	Northern Red-bellied Snake
Thamnophis sirtalis sirtalis	Eastern Garter Snake
Turtles	
Clemmys insculpta	Wood Turtle
Terrapena carolina carolina	Eastern Box Turtle
Frogs and Toads	
Acris creiptans blanchardi	Blanchard's Cricket Frog
Bufo americanus	American Toad
Bufo woodhousei	Fowler's toad
Hyla versicolor	Eastern Gray Treefrog
Rana clamitans	Green Frog
Rana pipiens	Northern Leopard Frog/ Grass Frog
Rana sylvatica	Wood Frog
Salamanders	
Hemidactylium scutatum	Four-toed salamander
Notophthalmus viridescens viridescens	Eastern Newt/Red-spotted Newt

Table E.5.9 Riparian Amphibian and Reptile Species Observed below the Bellaire Dam (Source: Grass River Natural Area, Inc. 1987, MNFI 2008)

5.3. Littoral Habitat

5.3.1 Extent

The littoral zone within lakes is defined as the nearshore area where sunlight penetrates all the way to the sediment and allows aquatic plants to grow. This zone extends from the ordinary high water mark along the shore into the lake to the depth where light still penetrates to the bottom (approximately 15'). This habitat supports submerged aquatic plants, as well as emergent and floating-leaved plants. The littoral zone provides important spawning and nursery habitat for fish and macroinvertebrates.

Because the lakes within the ERCOL were formed by receding glaciers, they have a shelf that extends out from shore and then drops off into the mid-lake basin. This shelf varies in depth from lake to lake. The extent of littoral habitat in the lakes also fluctuates due to seasonal changes in water levels and water clarity. No estimates of the littoral habitat in the rivers and streams has been calculated. An estimated location of littoral habitat within the Project Vicinity is shown on Figure E.5.5.

The littoral zone can be subdivided into three different regions depending on the type of vegetation able to grow there. The lower littoral zone usually contains submergent vegetation. The middle zone usually contains both submergent and floating aquatic plants. The upper zone contains floating and emergent aquatic plants, including the plants found in the Emergent Marsh wetland habitat type.

The MDNR maps for Elk and Skegemog Lakes show the approximate location of these different types of vegetation and the different bottomlands on which they are growing. However, the aquatic vegetation inventory data on these maps dates from 1957 and has not been updated. No more recent maps are available. According to the MDNR maps and Fuller's observations in 2001, submergent vegetation is the most common vegetation type in the lakes (MDNR 1957, Fuller 2001). Emergent vegetation is common in limited areas and floating-leaved vegetation is the least common. The Elk River has some emergent, submergent and floating vegetation but it has not been mapped.

Very limited dredging has been permitted in the harbors and marinas located within the Project Vicinity or in any of the lakes below the Bellaire Dam. As a result, bottomlands have remained stable for many years. Limited clear cutting and small scale urban development has also limited sediment deposition, so little organic matter has accumulated on top of the sand and marl which form the bottomlands of these lakes (Table E.5.10).

Habitat Type	Skegemog Lake	Elk Lake
Nearshore Bottom	Sand	Sand - Entire Shore Organic matter - Spencer's Bay, Kewadin Bay
Emergent vegetation	Almost entire eastern shore	Spencer's Bay
Submergent vegetation	Almost entire lake	Entire shoreline
Floating vegetation	North shore, southeastern shore	None
Brush shelters	More than 100 along the western shore	More than 600 around the lake

Table E.5.10 Littoral Habitat Overview (Source: MDNR 1957, Fuller 2001)

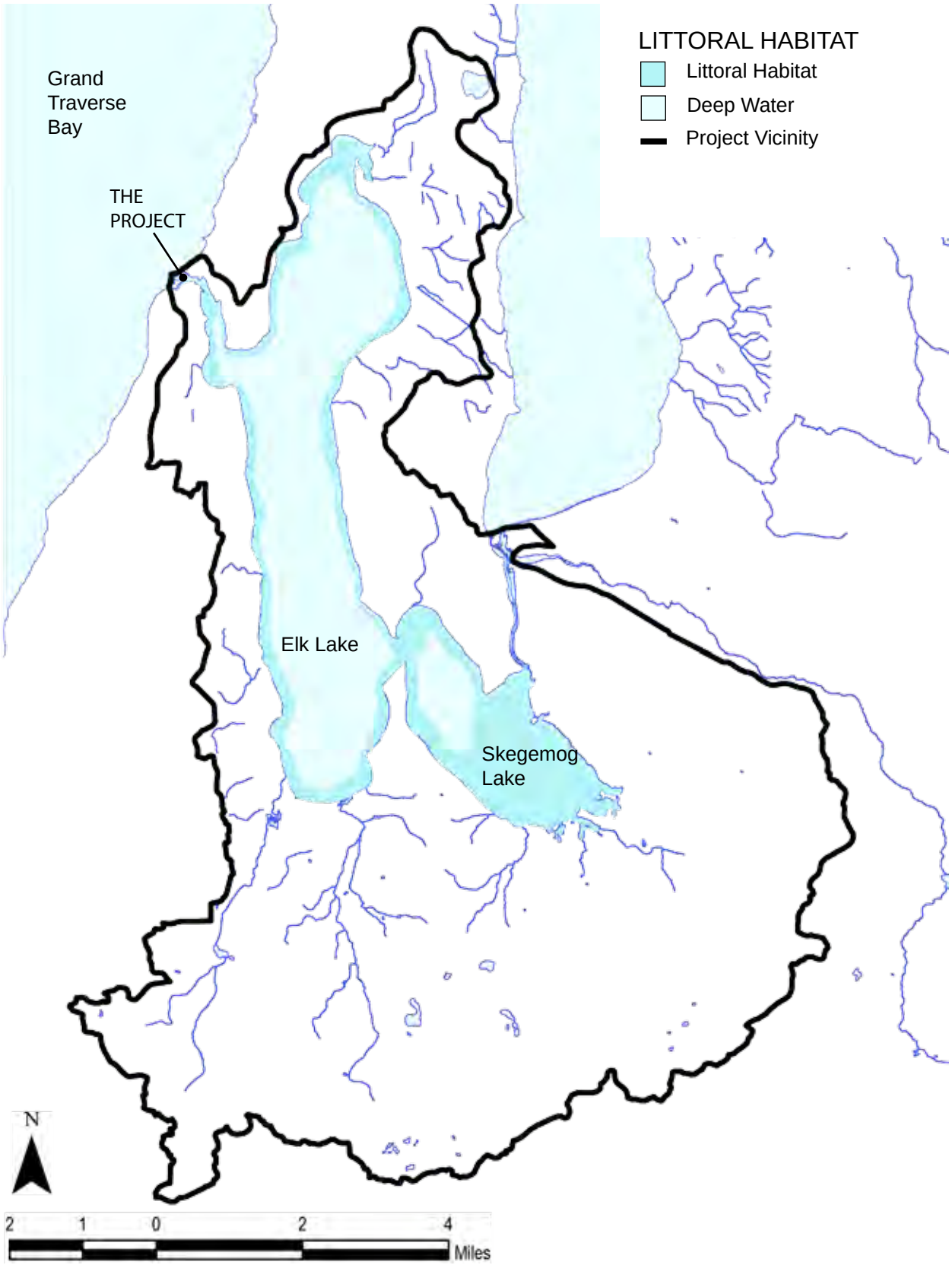

Figure E.5.5 Estimated Location of Littoral Habitat in Elk and Skegemog Lakes (Data Source: MDNR 1957, Table E.2.6)

5.3.2 Quality

No aquatic plant studies have been conducted within the Project Vicinity, so a formal evaluation of littoral habitat quality is unavailable. However, littoral habitat quality within the lakes is likely to be high. The lakes have not been overtaken by large-scale invasive plant monocultures. Habitat heterogeneity is good and the lakes support healthy fisheries. The littoral habitat is disturbed by humans and boat traffic during the two busiest summer months (July and August), but remains undisturbed during the rest of the year.

However, water quality testing, *Cladophora* surveys, and shoreline surveys conducted over the past 30 years, as well as observations by fishermen, indicate that littoral habitat in the Project Vicinity has changed over the past 50 years. Many riparian property owners have noticed an increase in the abundance of aquatic plants, a change in littoral sediments, and an increase in the area of the bottom covered by aquatic plants. More diverse species of plants and algae have also been observed. However, no studies have yet been done to quantify or analyze these changes or to determine whether they are good or bad.

5.3.3 Plant Species

No comprehensive survey of aquatic plants has been conducted in the Project Vicinity or elsewhere below the Bellaire Dam; however, 48 aquatic plant species have been observed in the area. Table E.5.11 has been compiled from the following sources: inventories conducted for the Grass River Natural Area and Skegemog Lake Wildlife Area, TLA bottom surveys of the lakes and observations made by lake association volunteers during water quality monitoring activities and other groups.

Scientific Name	Common Name
Anacharis canadensis	Waterweed
Anacharis nuttallii	Western waterweed
Brasenia schreberi	Water-shield
Caltha palustris	Common marsh marigold
Ceratophyllum demersum	Coontail/ Common hornwort
Hypoxis hirsuta	Yellow stargrass
Iris versicolor	Northern blue flag iris
Lemna minor	Lesser duckweed
Lysimachia thyrsiflora	Tufted loosestrife

Scientific Name	Common Name
Myriophyllum heterophyllum	Two-leaf milfoil
Myriophyllum spicatum (I)	Eurasian milfoil
Myriophyllum verticillatum	Whorled milfoil
Najas flexilis	Northern naiad
Najas guadalupensis	Southern naiad
Nasturtium officinale	Spring watercress
Potamogeton illinoensis	Illinois pondweed
Potamogeton nodosus	Longleaf pondweed
Potamogeton pectinatus	Sago pondweed
Potamogeton praelongus	Whitestem pondweed
Potamogeton richardsonii	Richardsons pondweed

Table E.5.11 Littoral Plants Observed in the Project Vicinity (Source: Grass River Natural Area, Inc. 2009, MDNR 2009i, ESLA 2008, Hotchkiss 1972)

Scientific Name	Common Name
Nuphar variegata	Yellow waterlily
Nymphaea odorata	White waterlily
Peltandra virginica	Arrow-arum
Polygonum hydropiperoides	Smartweed/water pepper
Pontederia cordata	Pickerelweed
Potamogetan amplifolius	Bigleaf pondweed
Potamogetan natans	Floating pondweed
Potamogeton crispus (I)	Curly pondweed
Potamogeton filiformis	Threadleaf pondweed
Potamogeton gramineus	Variable pondweed
Scirpus cyperinus	Woolgrass bulrush
Spirodela polyrhiza	Great duckweed
Typha latifolia	Cattail
Utricularia intermedia	Flatleaved bladderwort
Utricularia minor	Lesser bladderwort
Utricularia vulgaris	Common bladderwort
Vallisneria americana	Wild celery
Wolffia columbiana	Watermeal
Zosterella dubia	Water stargrass

(I) = invasive species

Table E.5.11 Littoral Plants Observed in the Project Vicinity, cont'd (Source: Grass River Natural Area, Inc. 2009, MDNR 2009i, ESLA 2008, Hotchkiss 1972)

Initial observations indicate that the number and area of aquatic plants is increasing in Grand Traverse Bay. According to Sarah U'Ren, Program Director for The Watershed Center:

> Aquatic plant beds provide important fish habitat, fish spawning areas, and fish food. The changes we are seeing may be due to increased nutrients being carried into the Bay by stormwater, increased transparency from Zebra mussels filtering the water, allowing more light to penetrate and more plants to grow, increased nutrients from the waste of Zebra mussels or a combination of these factors. Further research will be necessary to determine the exact cause of the changes and the effects of the changes on the Bay's ecosystem (U'Ren 2009).

5.3.4 Animal Species

Seven mammal species, 22 bird species and 22 species of reptiles and amphibians have been reported using the lakes' littoral zones (Table E.5.12). The data challenges to compiling species lists for upland habitats apply equally to riparian habitats (see Section 4.2.1). Species listed are based on local observations and species lists compiled for the natural areas below the Bellaire Dam. See Section 3.3 for information on fish and other aquatic species found in the lakes.

Common Name	Scientific Name
Mammals	
Castor canadensis	Beaver
Lasiurus cinereus	Hoary bat
Lutra canadensis	River otter
Mustela frenata	Long-tailed weasel
Mustela vison	Mink
Ondatra zibethicus	Muskrat
Sorex palustris	Water shrew
Snakes	
Natrix sipedon sipedon	Northern Water Snake
Thamnophis sauritius septent	Northern Ribbon Snake
Turtles	
Chelydra serpentina	Snapping Turtle
Chrysemes picta	Painted Turtle
Clemmysguttata	Spotted Turtle
Emydoidea blandingii	Blanding's Turtle
Sternotherus odoratus	Common Musk Turtle

Table E.5.12 Littoral Animals Observed Below the Bellaire Dam (Source: Grass River Natural Area Inc. 1987, MNFI 2008, MDNR 2009f)

Common Name	Scientific Name
Birds	
Aix sponsa	Wood Duck
Anas discors	Blue-winged Teal
Anas platyrhynchos	Mallard
Anas rubripes	Black Duck
Ardea herodias	Great Blue Heron
Branta canadensis	Canada goose
Bucephala albeola	Bufflehead
Butorides virescens	Green Heron
Ceryle alcyon	Belted Kingfisher
Childonias niger	Black Tern
Circus cyaneus	Northern harrier/marsh hawk
Cygnus olor	Mute Swan
Euphagus cyanocephalus	Brewer's Blackbird
Gavia immer	Common Loon
Haliaeetus leucocephalus	Bald Eagle
Larus argentatus	Herring Gull
Larus delawarensis	Ring-billed gull
Lophodytes cacullatus	Hooded Merganser
Pandion haliaetus	Osprey
Polilymbus podiceps	Pied-billed Grebe
Seiurus noveboracensis	Northern Waterthrush
Sterna caspia	Caspian tern

Common Name	Scientific Name
Frogs and Toads	
Acris creiptans blanchardi	Blanchard's Cricket Frog
Bufo americanus	American Toad
Bufo woodhousei	Fowler's toad
Hyla versicolor	Eastern Gray Treefrog
Pseudacris crucifer	Northern Spring Peeper
Pseudacris triseriata	Western/Striped Chorus Frog
Rana catesbeiana	Bull Frog
Rana clamitans	Green Frog
Rana palustris	Pickerel frog
Rana pipiens	Northern Leopard Frog/ Grass Frog
Rana sylvatica	Wood Frog
Salamanders	
Ambystoma maculatum	Spotted Salamander
Hemidactylium scutatum	Four-toed salamander
Necturus maculosus maculosus	Mudpuppy
Notophthalmus viridescens viridescens	Eastern Newt/Red-spotted Newt

Table E.5.12 Littoral Animals Observed Below the Bellaire Dam, cont'd (Source: Grass River Natural Area Inc. 1987, MNFI 2008, MDNR 2009f)

5.4. Invasive Species

5.4.1 Plants

Wetland Plants

Two very invasive non-native wetland plant species: Purple loosestrife (L*ythrum salicaria*) and Common reed (*Phragmites australis*) occur in the watersheds along Grand Traverse Bay adjacent to the ERCOL. However, to date, only Purple loosestrife has been identified in the watershed. These species have not yet found a foothold in this watershed due to community action. Riparian property owners have been vigilant, lake associations have conducted educational programs, and regional conservation organizations have conducted monitoring programs. Purple loosestrife plants in the Grass River upstream from the Project Vicinity are being monitored and controlled with beetles. The lake associations within the Project Vicinity and throughout the ERCOL assist riparian property owners to eliminate Purple loosestrife when it is found.

Riparian Plants

Invasive plants such as Spotted knapweed (*Centauria stoebe*), Queen Annes lace (*Daucus carota*), and Garlic mustard (*Allaria petiolata*) are found in the riparian habitat.

Littoral Plants

Eurasian milfoil (*Myriophyllum spicatum*) and Curly-leaf pondweed (*Potamogeton crispus*) are found throughout the ERCOL. Their floating canopies can crowd out native water plants and also interfere with boating, fishing and swimming. Curly-leaf pondweed has been in the watershed so long that most people are not aware it is non-native. There is no program to control or eradicate either species because they are so pervasive. Several lake associations have undertaken small projects using weevils that eat milfoil to control the milfoil in Clam River and in Six Mile Lake, upstream from the Project Vicinity.

Hydrilla (*Hydrilla ssp.*) has not yet appeared in the ERCOL, but Michigan Sea Grant and the Michigan Lakes and Streams Association have undertaken an outreach program (the Hydrilla Hunt) to make people aware of the threat this species may pose if it reaches Michigan waterways. Hydrilla's many adaptive qualities allow it to overpower and diminish or even eradicate native species. Large, dense Hydrilla mats inhibit sunlight from penetrating the water and slow water movement, allowing sediments to build up. It is a serious threat to Michigan, because it is now found in two other Great Lakes states: New York and Pennsylvania (Source: MDEQ 2008).

5.4.2 Animals

Other than the two invasive aquatic species, Zebra mussel (*Dreissena polymorpha*) and Rusty crayfish (*Orconectes rusticus*) (see Section E.3.8), there are no known major animal invasive species problems within the Project Vicinity's wetland, riparian and littoral zones.

6. RARE, THREATENED AND ENDANGERED SPECIES

6.1. Overview of Protection Regime

There is no one list of threatened and endangered species for the State of Michigan. Different agencies use different lists for different purposes.

6.1.1 Federal

USFWS is responsible for the protection and conservation of species that are considered rare, threatened or endangered at the federal level. The species listed by USFWS are used to identify Fish & Wildlife Resource Conservation Priorities for the United States (USFWS 2002).

Species that use aquatic resources are also listed in a separate database - the Michigan Watershed Element Database. This database is used by the USGS, EPA and other federal agencies to list rare, threatened and endangered species by lake. Skegemog Lake – Elk Lake (HUC ID: 04060105040070) is included in the database (Source: MNFI 2008).

6.1.2 State

At the state level, MDNR is responsible for determining whether Michigan native species are rare, threatened, or endangered in Michigan. MDNR is also responsible for implementing any federal threatened and endangered species management plans developed by USFWS. Because UFSWS identifies priority species as part of its development of federal management plans for rare, threatened, endangered and migratory species, MDNR, in consultation with other state agencies and nongovernmental conservation organizations, has developed a state list of Species of Greatest Conservation Need. This list, which includes species that are not listed as rare, threatened, endangered or of special concern, is used to identify priority ecosystems in the state in order to set habitat management priorities. While MDNR has developed recovery plans for individual species in the past, like the USFWS, MDNR has recently changed its focus from individual species management to managing the habitats and ecosystems that support these species (MDNR 2006).

MNFI maintains the state's database of native plant and animal species and their locations. The current MNFI list became effective on April 9, 2009. The MNFI list includes species listed by the state as Species of Special Concern (SC). While not afforded legal protection under the Endangered Species Act, should these species continue to decline, they would end up being recommended for Threatened or Endangered status. As a result, the state flags these species for protection in order to try to prevent them from becoming Threatened or Endangered in the future. Some species are listed as SC because their status within the state is unclear; when sufficient information becomes available, these species may get listed as Threatened or Endangered or may be deleted from the list entirely.

6.2. Limitations on Data

As previously discussed, no comprehensive species inventories have been conducted for the Project Vicinity or for any of the areas below the Bellaire Dam. As a result, much of the information presented in this section has been inferred from the limited data sources available – the MNFI database, local observation, and the species lists available for the two protected natural areas below the Bellaire Dam: the Skegemog Lake Wildlife Area located within the Project

Vicinity and the Grass River Natural area upstream from Skegemog Lake, between Clam Lake and Lake Bellaire.

Additionally, the MNFI database and the species lists for the two wildlife areas are known to be incomplete as a result of clerical errors, incomplete reporting, and data entry backlog. All of the state agencies are currently understaffed due to severe budget cuts over the past 10 years and simply don't have the resources to correct errors. MNFI is 5-6 years behind in data entry; the ecological inventory conducted in 1988 for the Grass River Natural Area has yet to be entered into the database. MDNR has lost 60% of their staff and funding. Once an error is made in one list, the error often passes from one agency to another. For example, USGS reports Osprey as being present on Elk Lake; yet, according to Jerry Weinrich, MDNR's Eagle Survey Biologist, no Osprey nests or nesting pairs are currently found there (Weinrich 2009).

6.3. Listed Status

Only one of the species on USFWS's Michigan County Distribution List is found within the Project Vicinity:

- Eastern Massasauga rattlesnake (*Sistrus catenatus*) - listed as a candidate

Eighteen species on the state lists are known to be present in the Project Vicinity (Table E.6.1).

Additional state listed rare, threatened, or endangered species or species of special concern have been recorded in surveys of the natural areas within the Project Vicinity and/or observed by local experts but are not currently included in the MNFI database or identified by the state as occurring within the Project Vicinity (Table E.6.2).

Scientific Name	Common Name	Skegemog Lake	Elk Lake	Federal Status	State Status
Accipiter gentilis	Northern goshawk	x	x		Special Concern
Acipenser fulvescens	Lake Sturgeon		x *		Threatened
Buteo lineatus	Red-shouldered hawk	x	x		Threatened
Clemmys guttata	Spotted turtle	x	x		Threatened
Coregonus artedi	Lake herring	x	x		Threatened
Cypripedium arietinum	Ram's head lady's-slipper	x	x		Special Concern
Gavia immer	Common loon	x	x		Threatened
Haliaeetus leucocephalus	Bald eagle	x	x		Special Concern
Panax quinquefolius	Ginseng	x			Threatened
Pandion haliaetus	Osprey	x	x		Special Concern
Pterospora andromedea	Pine-drops	x	x		Threatened
Pyrgus wyandot	Grizzled skipper butterfly	x			Special Concern
Sistruruas catenatus catenatus	Eastern massassauga	x	x	Candidate	Special Concern

* formerly present but now either very rare or absent

Table E.6.1 Federal and State Listed Species in the Project Vicinity (Source: MNFI 2012, 2012a)

Scientific Name	Common Name	State Status
Acris crepitans blanchardi	Blanchard's Cricket Frog	Special Concern
Ardea herodias	Great Blue Heron	Protected
Botaurus lentiginosus	American Bittern	Special Concern
Circus cyaneus	Northern Harrier/Marsh Hawk	Special Concern
Custothorus palustris	Marsh Wren	Special Concern
Emydoidea blandingii	Blanding's Turtle	Special Concern
Clemmys insculpta	Wood Turtle	Special Concern
Mimulus glabratus var. michiganensis	Michigan Monkey Flower	Endangered
Parnassia palustris	Marsh Grass of Parnassus	Protected
Rubus acaulis	Dwarf Raspberry	Endangered
Terrapena carolina carolina	Eastern Box Turtle	Special Concern

Table E.6.2 Additional State Listed Species Observed in the Project Vicinity (Source: Whitewater Township 2008 and 2008a, McDuffie 2009)

6.4. Habitat Requirements

The Project Vicinity includes 14 habitats that support federal and state listed species. According to MNFI's plant community abstracts, the following habitat types support the following listed species found in the Project Vicinity. MDNR's Watershed Elements Database includes four aquatic habitat types found in the Project Vicinity which support Species of Greatest Conservation Need. The presence of these species on the listed water bodies has been confirmed by local experts (Table E.6.3).

Scientific Name	Common Name
Mesotrophic Lake (Skegemog Lake)	
Accipiter gentilis	Northern goshawk
Coregonus artedi	Lake herring
Gavia immer	Common loon
Pandion haliaetus	Osprey
Oligotrophic Lake (Elk Lake)	
Accipiter gentilis	Northern goshawk
Acipenser fulvescens	Lake Sturgeon
Coregonus artedi	Lake herring
Gavia immer	Common loon
Pandion haliaetus	Osprey
Medium Cold Rivers (Torch River)	
Gavia immer	Common loon
Haliaeetus leucocephalus	Bald eagle
Pandion haliaetus	Osprey

Scientific Name	Common Name
Warm Large Rivers (Elk River)	
Gavia immer	Common loon
Haliaeetus leucocephalus	Bald eagle
Dry-Mesic Northern Forest	
Accipiter gentilis	Northern goshawk
Haliaeetus leucocephalus	Bald eagle
Pterospora andromedea	Pine drops
Mesic Northern Forest	
Accipiter gentilis	Northern goshawk
Buteo leatus	Red-shouldered hawk
Panax quinquefolius	Ginseng
Dry Northern Forest	
Accipiter gentilis	Northern goshawk
Pandion haliaetus	Osprey
Pyrgus wyandot	Grizzled skipper butterfly
Sistrurua catenatus catenatus	Eastern Massasauga rattlesnake

Table E.6.3 Habitats within the Project Vicinity that Support Listed Species (Source: MDNR 2006, 2009d, MNFI)

Scientific Name	Common Name
Emergent Marsh	
Botaurus lentiginous	American bittern
Emydoida blandingii	Blanding's turtle
Bog	
Acris crepitans blanchardi	Blanchard's cricket frog
Ardea herodias	Great blue heron
Botaurus lentiginosus	American bittern
Circus cyaneus	Northern harrier/marsh hawk
Clemmys guttata	Spotted turtle
Gavia immer	Common loon
Haliaeetus leucocephalus	Bald eagle
Pandion haliaetus	Osprey
Pseudacris triseriata triseriata	Western/Striped chorus frog
Rubus acaulis	Dwarf raspberry
Sistrurua catenatus catenatus	Eastern Massasauga rattlesnake
Hardwood-Conifer Swamp	
Ardea herodias	Great blue heron
Buteo leatus	Red-shouldered hawk
Cyprideum arietinum	Ram's head lady's-slipper
Emydoida blandingii	Blanding's turtle
Glyptemys insculpta	Wood turtle
Haliaeetus leucocephalus	Bald eagle
Pandion haliaetus	Osprey
Terrapena Carolina carolina	Eastern box turtle
Northern Fen	
Botaurus lentiginous	American bittern
Circus cyaneus	Northern harrier/marsh hawk
Clemmys guttata	Spotted turtle
Emydoida blandingii	Blanding's turtle
Gavia immer	Common loon
Haliaeetus leucocephalus	Bald eagle
Pandion haliaetus	Osprey
Pseudacris triseriata triseriata	Western/Striped chorus frog
Rubus acaulis	Dwarf raspberry
Sistrurua catenatus catenatus	Eastern Massasauga rattlesnake
Terrapena Carolina carolina	Eastern box turtle

Scientific Name	Common Name
Northern Shrub Thicket	
Ardea herodias	Great blue heron
Emydoida blandingii	Blanding's turtle
Haliaeetus leucocephalus	Bald eagle
Pandion haliaetus	Osprey
Pseudacris triseriata triseriata	Western/Striped chorus frog
Sistrurua catenatus catenatus	Eastern Massasauga rattlesnake
Northern Wet Meadow	
Botaurus lentiginous	American bittern
Circus cyaneus	Northern harrier/marsh hawk
Clemmys guttata	Spotted turtle
Custothorus palustris	Marsh wren
Emydoida blandingii	Blanding's turtle
Glyptemys insculpta	Wood turtle
Parnassia palustris	Marsh grass-of-Parnassus
Pseudacris triseriata triseriata	Western/Striped chorus frog
Sistrurua catenatus catenatus	Eastern Massasauga rattlesnake
Rich Conifer Swamp	
Sistrurua catenatus catenatus	Eastern Massasauga rattlesnake
Buteo leatus	Red-shouldered hawk
Glyptemys insculpta	Wood turtle
Mimulus glabratus var. michiganensis	Michigan monkey flower
Pandion haliaetus	Osprey
Parnassia palustris	Marsh grass-of-Parnassus

Table E.6.3 Habitats within the Project Vicinity that Support Listed Species, cont'd (Source: MDNR 2006, 2009d, MNFI)

6.5. Status Reports and Recovery Plans

6.5.1 Bald eagle

In 2007, USFWS removed the Bald eagle from the Federal Endangered Species List. The species remains a species of Special Concern at the state level. MDNR implements the Bald Eagle Management Guidelines and Conservation Measures developed by USFWS as part of the Northern States Bald Eagle Recovery Plan. Eagles are monitored by aerial survey in early April to determine the number of pairs nesting and again in late May to determine the number of young.

According to Jerry Weinrich, MDNR Eagle Survey Biologist, there are now four pairs of eagles living below the Bellaire Dam, an increase of one pair since 1990. Two of the four pairs nest within the Project Vicinity. All four pairs have been successfully reproducing for many years (Weinrich 2009).

6.5.2 Common Loon

MDNR developed the Michigan Loon Recovery Plan for the threatened Common Loon in 1993. The Michigan Loon Preservation Association monitors more than 200 pairs of nesting Loons on registered lakes throughout Michigan. Not all lakes with nesting Loons are included in this program. Nesting Loons are monitored from spring through fall migration by loon rangers on lakes registered with the Michigan Loon Preservation Association's Michigan Loonwatch Program.

According to Peg Comfort, Michigan Loon Preservation Association Area Loon Ranger Coordinator, there are now ten nesting pairs of Common loons below the Bellaire Dam, an increase of five pairs since 1990. The Project Vicinity provides nesting habitat for up to six pairs annually. Elk Lake usually has 2-3 pairs and Skegemog Lake has 2-3 pairs. Artificial nesting islands, buoys and loon alert signs at boat launches, and educational programs, as well as vigilant loon rangers, have helped to maintain and improve reproductive success over the years.

For the past five years, reproductive success has been low, however no studies have been done to try to determine the cause and not enough time has passed to know if this is a trend. Common causes of low reproductive success in Loons are human disturbance during the nesting season and predation on eggs and chicks. There are many natural predators within the Project Vicinity, including Eagle, Snapping turtle, Raccoon, and Great Lakes muskellunge. Additionally, the Loons nesting on the lakes are not banded, so it is not possible to determine whether or not the same adults have returned to Elk Lake and Skegemog Lake every year (Comfort 2012).

6.5.3 Eastern Massasauga Rattlesnake

Because the Eastern Massasauga rattlesnake is a candidate for federal listing as a threatened species, MDNR developed a draft recovery plan in 2006. The plan is still pending approval and was not available for review.

6.5.4 Lake Sturgeon

According to local experts, Lake sturgeon (*Acipenser fulvescens*) have not been cited within the Project Vicinity or Torch Lake in a very long time and it is uncertain whether any are still

present. Considered rare or absent, any sturgeon remaining within the ERCOL's lakes and rivers are believed to be remnants of populations that migrated into the watershed in the 1800s, prior to the construction of the first dam across the Elk River.

Lake sturgeon are managed by MDNR under the Lake Sturgeon Rehabilitation Strategy (MDNR 1997). The Strategy evaluated present and potential Lake sturgeon habitat and prioritized potential rehabilitation areas for their ability to conserve and rehabilitate self-sustaining populations. Historically, Lake sturgeon were found in Elk Lake and Torch Lake. However, neither lake is listed in the Strategy as currently containing Lake sturgeon and none of the ERCOL's lakes or rivers is given a high suitability rating for rehabilitation and enhancement. Elk Lake and the Elk River receive low suitability ratings, while the Cedar River and Torch Lake receive a medium suitability rating.

6.5.5 Other Species

USFWS has compiled a list of Fish and Wildlife Resource Conservation Priorities for Region 3, which includes the Project Vicinity. Species are sorted by broad habitat type or ecosystem to allow for the delineation of geographic focus areas where the needs of multiple species can be met. This species-based approach to identifying key habitats for conserving natural resources and biodiversity now forms the basis for fish and wildlife management by the federal government. State and federal rare, threatened and endangered species, as well as species of special concern or greatest conservation need are included in this database.

Many of the species listed as species of special concern by MDNR are included on the Michigan Species of Greatest Conservation Need list. As a result, their habitats are the focus of funds, conservation actions, research and monitoring associated with the implementation of the Michigan Wildlife Action Plan (MDNR 2006, 2009d).

6.6. Extent of Habitat for Listed Species in the Project Area

The Common loon and the Bald eagle have frequently been observed fishing in the upper reaches of the Elk River and Spencer's Bay. The Project's operation and the intense recreational boat traffic along the river in July and August do not seem to deter these birds.

No federal or state listed species have been identified as living along the Elk River or on or adjacent to the Project site. Since habitat on the Project site and the Elk River is highly urbanized, it is unlikely that critical habitat for listed species exists in these locations. To date, none has been designated by federal or state agencies.

6.7. Distribution of Listed Species within the Project Vicinity

Detailed information was not available for all the listed species that are known to be present within the Project Vicinity. However, the presence of viable populations of Bald eagle and Common loon demonstrates that the habitats within the Project Vicinity are in very good condition.

6.7.1 Bald Eagle

The Bald eagle is a year-round resident within the Project Vicinity. During the winter (January-April) when Elk and Skegemog Lakes are frozen, the eagles fish Lake Michigan and the lakes within the ERCOL that do not freeze over. Eagles lay their eggs in February/March and the young hatch 35 days later.

Nesting sites for Bald eagles are not made public. Eagle nests have been monitored on the south and east shores of Skegemog Lake. The birds will often occupy the same nest for many years. Eagles have been observed fishing in the upper reaches of the Elk River and in Spencer's Bay on Elk Lake. A nesting pair of bald eagles requires a minimum territory of 100 square miles.

6.7.2 Common Loon

The Common loon is a seasonal resident of the Project Vicinity. The Loons arrive as soon as the ice leaves the lakes in March/April. After 3-4 years in the Gulf of Mexico or along the coast of Florida, juvenile male loons return to the lake where they were born. They usually return to this lake for 6-7 years before establishing a territory. Loon pairs will usually nest in the same location year after year. The loons leave the lakes in the fall. The juveniles are usually the last to leave and, depending on hte weather, they are gone by November.

Nesting sites for Common loons are not made public but have been made available for this report by Peg Comfort, area coordinator for the Michigan Loonwatch Program. Common loon nests have been monitored in the Project Vicinity at the following locations: Torch River, at the east end of Skegemog Lake, at the Narrows - between Skegemog Lake and Elk Lake, along the north shore of Skegemog Lake, along the south shore of Elk Lake and in the Kewadin wetlands in the north bay of Elk Lake. Loons have also been observed fishing in the upper reaches of the Elk River and in Spencer's Bay on Elk Lake.

In 2010, Michigan Audubon, with the support of local donors, initiated a project in the ERCOL watershed called the Loon Network. Over the past two years, more than 20 loons have been banded with individual color bands and USFWS numbered bands by biologists from Common Coast Research and Conservation, and some have also received archival tags. The results of this research have not been published yet. The Loon Network has also recruited more than a dozen loon scouts in the Project Vicinity. Outreach activities have informed more than 300 people living in this watershed.

6.7.3 Eastern Massasauga Rattlesnake

The Eastern Massasauga rattlesnake is a year-round resident within the Project Vicinity. It is found extensively throughout the Skegemog Lake Wildlife Area. The rattlesnakes may occupy some of the other wetlands around both Elk Lake and Skegemog Lakes; however, no distribution surveys have been conducted.

6.7.4 Lake Sturgeon

As noted above, it is uncertain whether any Lake sturgeon remain within the Project Vicinity.

7. RECREATION AND LAND USE

In a letter dated February 26th, 2009, Angie Tornes, Hydropower Assistance Program Coordinator, Midwest Region, of the National Parks Service (NPS), requested that the County undertake a recreation study to describe the existing conditions of all recreational facilities linked to the Impoundment which are located within the Project Boundary and to assess these facilities' ability to meet current and projected use demand. In response, the County conducted a survey of the Impoundment's existing recreational facilities. Revelant state, county and local planning documents were also reviewed to assess whether the existing recreational access to the Impoundment is sufficient to meet current and future needs. Interviews were then conducted with county and local officials to determine whether county and local plans and priorities have changed since the publication of the most recent recreation plans and whether additional recreational needs have since been identified.

Existing water access to the Impoundment is deemed sufficient to meet current and future recreational needs at all jurisdictional levels. None of the jurisdictions believe there is a need for additional access points to the Impoundment, and, other than the Village of Elk Rapids, which wishes to enhance water access to downtown Elk Rapids (see below), none of the jurisdictions believe there is a need to enhance existing access points.

An overview of the Recreation Study is set forth below. The full study is attached as Appendix.

7.1. Overview of Recreation Population and Planning

All of the communities around the Impoundment have small residential populations that almost double during the summer when seasonal residents and tourists come to stay. Many of the area's seasonal homes are now getting converted to permanent homes as people retire. Hence, the area's demographics are shifting towards an older permanent population.

The bulk of recreation planning and management around the Project Boundary occurs at the local level. While the counties set county-wide goals and seek to coordinate among the townships and villages, decision making, operation and management of specific resources is devolved to the townships and villages. The communities welcome the income that tourism and new residents bring. They are also keenly aware that the area's pristine lakes and streams and rural/semi-rural lifestyle are what draw people to the area. As a result, the communities around the Impoundment are committed to maintaining access to the Impoundment and balancing that access with habitat preservation and protection.

7.2. Existing Water Access Points

There are 39 public water access points and 3 harbors/marinas on or below the Impoundment, as well as numerous access points on the waters adjacent to the Impoundment. The public access points consist of paved boat launches, street ends, beaches, parks, overlooks and walking trails. Many of the street ends are narrow parcels, suitable for the launch of small non-motorized watercraft. All of the residential and tourism-related properties along the Impoundment's shorelines also have some kind of water access, such as open space overlooking the lakes, and most have floating docks. A site inventory and field survey was conducted on August 28, 2011. All sites are in good to excellent condition. Figures 7.1 and 7.2 indicate the locations of the

Figure E.7.1 Public Access Sites Around the Impoundment (Source: MGDL 2011, updated by ERHP 2011)

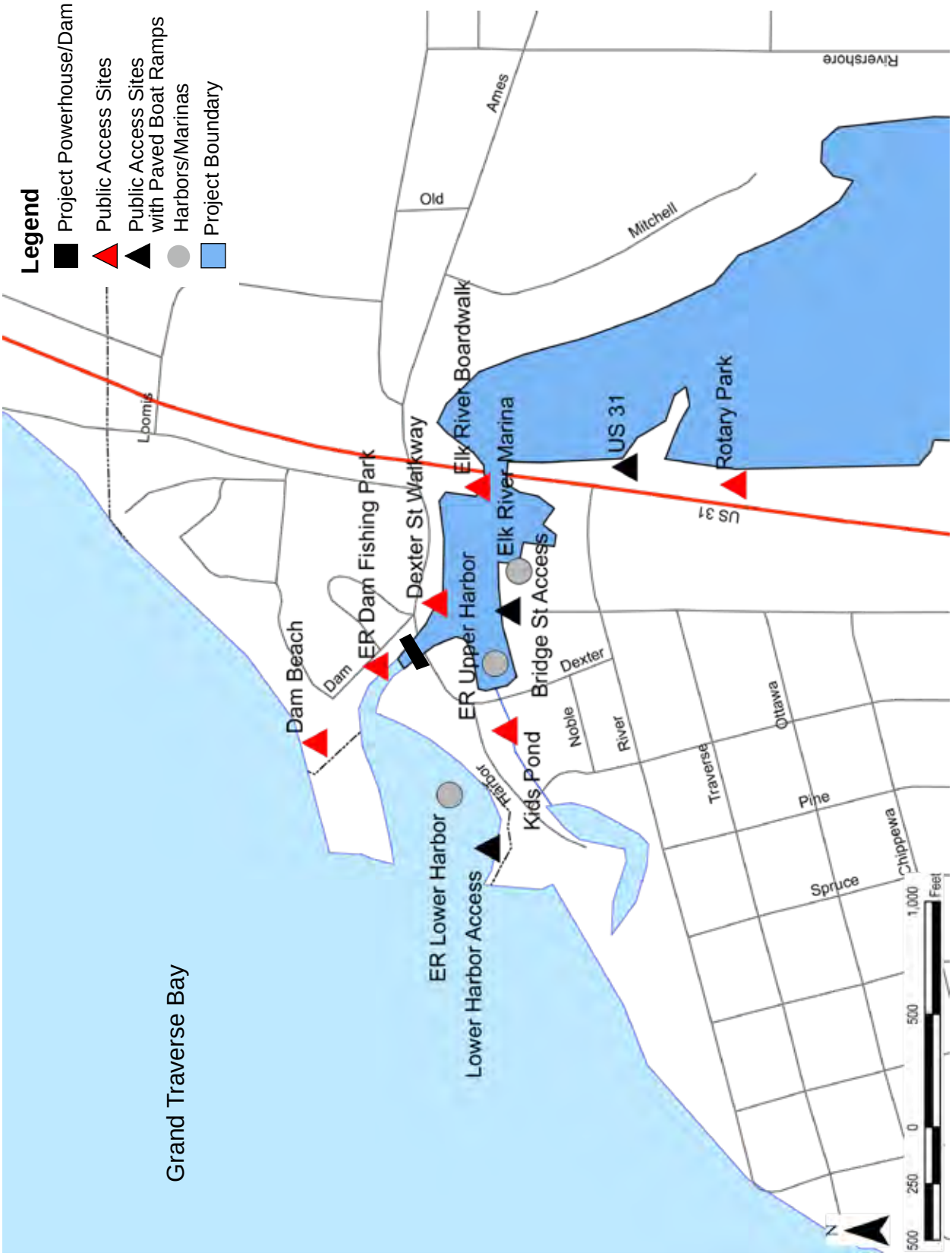

Figure E.7.2 Village of Elk Rapids Public Access Sites (Source: MGDL 2011, updated by ERHP 2011)

public water access sites and marinas around the Impoundment. See the full Recreation Study for a description of each access point. In addition, as discussed in Section 4.2.1 above, the Impoundment's shores include several regionally important wildlife areas, nature preserves, and wetlands, portions of which are accessible to hikers and small watercraft.

Since the Powerhouse and related facilities occupy all of the Project's land, the Project itself does not include any formal recreational facilities. Under the Settlement Agreement that was part of the Project's license extension in 1999, the County agreed to continue to provide tailwater access to fishermen from the walkway above the tailrace; this spot continues to be a popular spot with fisherman. The fishermen also use the Project's parking lot when the parking lot is not being used for Project purposes.

Photo 7.1 Fishing Access Along the Project Tailrace (Photo: ERHP 2009)

Adjacent to the Project Boundary within the Village are several other water access sites. Below the Project's tailrace lies Edward C. Grace Memorial Harbor. The Harbor underwent two expansions in the late 1980s and is now one of the largest marinas on Grand Traverse Bay, with 213 slips. Above the marina is a public park with lawns and picnic tables.

The Dam Fishing Park and Dam Beach are located adjacent to the Project Boundary below the Project tailrace on the Elk River's north bank (Photo 7.2). The Dam Fishing Park includes a parking lot and public restrooms. These facilities are owned by the County and are located on the same parcel as the Project. However, as discussed in Exhibit A Section 1.1, the parcel, excluding the Project's physical structures, is leased to the Village of Elk Rapids under a 99 year lease. The leased portion of the parcel includes a public park on the southwest bank of the tailrace which is part of the public park above Edward C. Grace Memorial Harbor (Photo 7.3). Below the Project

Photo 7.2 Recreational Facilities Along the Project Tailrace (Photo: ERHP 2009)
The lawn joins the park above Grace Memorial Harbor off left of the photo. Dam Fishing Park and North (Dam) Beach are seen across the tailrace.

Photo 7.3 Edward C. Grace Memorial Harbor (Photo: ERHP 2009)

bypass spillway, the Elk River's south channel passes through the Kids' Pond and Veterans Memorial Park before discharging into Grand Traverse Bay. These facilities and other gardens that dot the riverbank are owned and maintained by the Village.

Upstream of the Powerhouse, a new, landscaped boardwalk follows the river's north bank (Photo 7.4). The boardwalk provides an off-street connection for pedestrians and bicyclists traveling between the Village center and the condominiums and restaurants along the river. The Elk River Marina, Bridge Street paved boat launch, and Elk Rapids Upper Harbor are located on the opposite bank (Photo 7.5). The Village has recently acquired additional land to expand the Upper Harbor facilities with additional slips for recreational boat moorage and possibly an additional paved launch.

Because all of the lakes in the ERCOL south of the Bellaire Dam are connected, recreational boaters are also able to access the Impoundment from upstream of the Impoundment. Only those accesses with paved boat launches and boat rental facilities are shown on Figure E.7.3. There are numerous other public access points located upstream of the Project Boundary as well.

7.3. Current and Future Recreation Needs Identified in Local, State, or Regional Conservation and Recreation Plans

All of the counties, townships and villages have similar characteristics with respect to their recreational needs. All the jurisdictions have large seasonal populations and are also seeing an influx of urban dwellers seeking a quieter life and seasonal homeowners retiring into the area. Because new residents tend to be older, populations are skewing towards middle-aged and older individuals. Tourism continues to be the fastest growing industry in the area. Residents recognize that people come to the area to visit and stay because they want to be closer to nature. Consequently, all the jurisdictions and their residents place a high priority on protecting the natural environment and water quality.

All of the jurisdictions are also experiencing the same challenge of balancing growth with the preservation of the area's natural resources. The tourism and population influx that economically supports the area is putting pressures on the natural environment. The use of Lake Skegemog, Torch River, and Torch Lake by day boaters has exploded over the past decade, threatening water quality and the fisheries. Clearwater Township's Recreation Plan (2008-2013) notes that fishery biologists are concerned about the impact of recreational boat traffic on Torch River fish and fish habitat. During the summer, hundreds of boats per hour pass under the Torch River Bridge between Torch River and Torch Lake. The health of the wetlands along Torch River and Lake Skegemog are critical to the preservation of the area's valuable fisheries and could be threatened if boat traffic increases even further.

The jurisidictions around the Impoundment consider the existing level of water access to be sufficient to meet current and future recreational needs. The only jursidictions that have noted a need to enhance existing water access points are the Village and Township of Elk Rapids. According to Bob Bassett, Chair of Elk Rapids' Recreation Committee, Upper Harbor currently does not have enough slips to accommodate all boaters who would like to moor up in the Village. Upper Harbor is also lacking a sufficient number of courtesy slips for temporary tie-ups, such

Photo 7.4 Dexter Street Boardwalk (Photo: ERHP 2011)

Photo 7.5 Elk Rapids Upper Harbor (Photo: ERHP 2011)

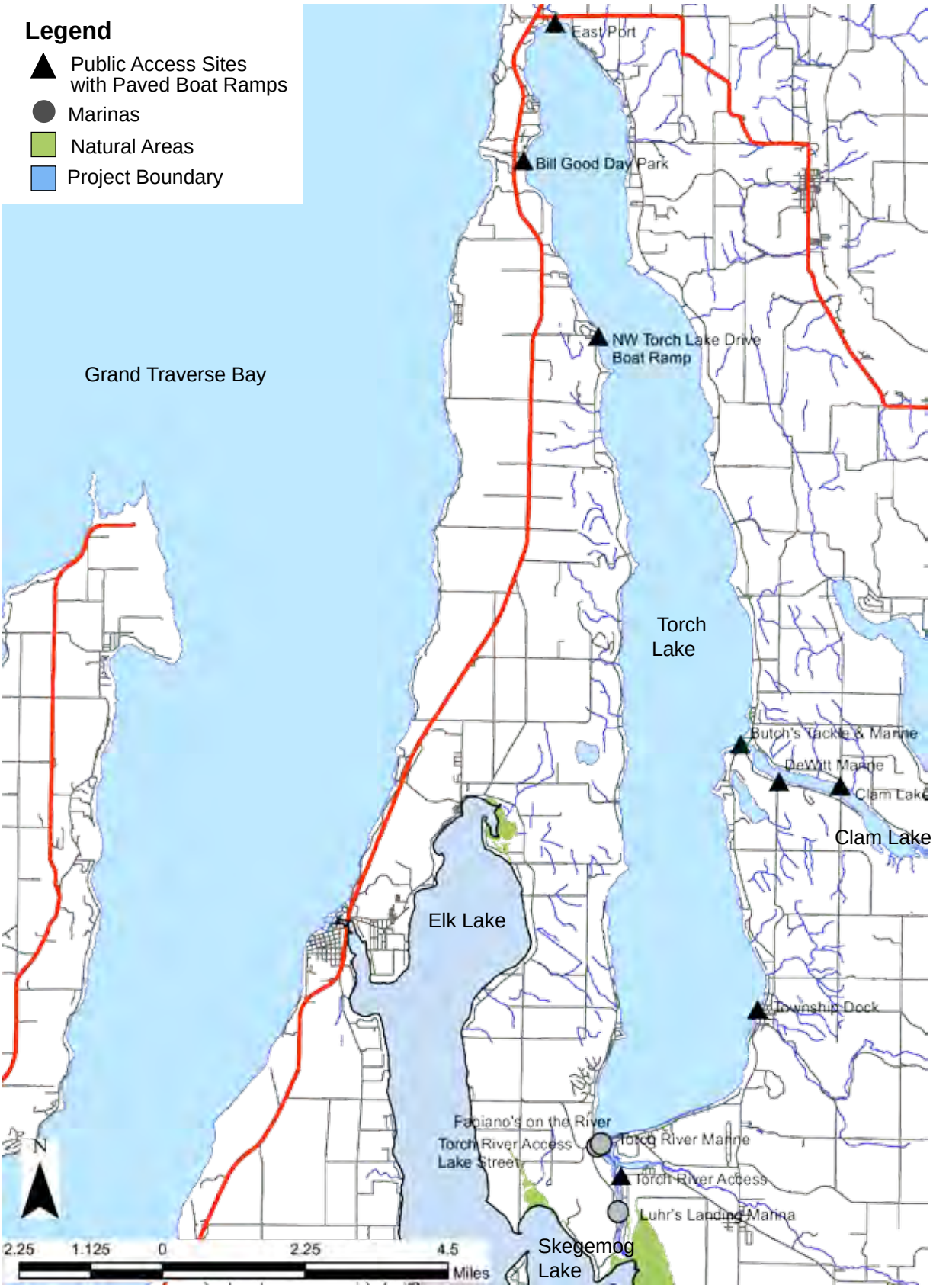

Figure E.7.3 Paved Boat Access Sites Upstream of the Impoundment (Source: MGDL 2011, ERHP 2011)

as when a lakeshore resident wishes to drive their boat to the Village rather than drive their car. The Village sees an expansion of water access downtown as the best way to meet the needs of motorized boaters and support economic development within the Village.

Fortunately, with the County's support and cooperation, the Village has recently solved this problem. The Bech property is located opposite Upper Harbor along the west bank of the Elk River between the Project Tailrace and the Project's Bypass Spillway. In April 2011, after a decade of negotiations, the Village was finally able to purchase the Bech Property in order to expand Upper Harbor. The Village's current plans for the property include doubling the number of slips for Upper Harbor, adding more courtesy slips, and adding an additional paved boat launch, parking and other amenties. The County has been working closely with the Village to ensure that the expansion of Upper Harbor meets the Village's needs without interfering with the Project operations. As of July 2012, the Village had already demolished the buildings on the Bech Property and built the new docks, adding several acres of new public open space and water access adjacent to the Powerhouse. With this expansion of Upper Harbor, the Village and Township believe they have sufficient public water access points to the Impoundment to accommodate future needs.

7.4. Adjacency to Designated River Segments

The Project is not located within or adjacent to a river segment designated as part of, or under study for inclusion in, the National Wild and Scenic River System or that is a state-protected river segment.

7.5. National Trails System and Wilderness Areas

No Project lands are under study for inclusion in the National Trails System or designated as, or under study for inclusion as, a Wilderness Area.

7.6. Regionally or Nationally Important Recreation Areas in the Project Vicinity

Elk Lake and Skegemog Lake include several regionally important wildlife areas, nature preserves, and wetlands (see Figure E.4.3). Also see Sections 4 and 5 above.

7.7. Non-Recreational Land Use and Management within the Project Boundary

The land within the Project Boundary is used solely to generate and transmit hydroelectric power. The waters within the Project Boundary are used by the County to generate hydroelectric power. See Section 2.4 above for a description of other uses of Project waters. As discussed in that section, the other non-recreational uses of Project waters are primarily for conservation and environmental management.

7.8. Recreational and Non-Recreational Land Use and Management Adjacent to the Project Boundary

Land use adjacent to the Project Boundary is a mix of residential and commercial uses and parks. See Section 10 below.