

8. Arrow and Dog

HEALTHY WATERS REPORT CARD

OFFSHORE	NA	ISLANDS	A
NEARSHORE	D	COASTAL WETLANDS	C
EMBAYMENTS & INSHORE	C	COASTAL TERRESTRIAL	A
TRIBUTARIES & WATERSHEDS	C	OVERALL B-	

Report card denotes general condition/health of each biodiversity target in the region based on condition/stress indices. See introduction to the regional summaries.



A Very Good	<i>Ecologically desirable status; requires little intervention for maintenance</i>
B Good	<i>Within acceptable range of variation; may require some intervention for maintenance.</i>
C Fair	<i>Outside of the range of acceptable variation and requires management. If unchecked, the biodiversity target may be vulnerable to serious degradation.</i>
D Poor	<i>Allowing the biodiversity target to remain in this condition for an extended period will make restoration or preventing extirpation practically impossible.</i>
Unknown	<i>Insufficient information.</i>



The mouth of the Current River, near Thunder Bay, Ontario. Photo credit: Ontario Ministry of Natural Resources

Summary/ Description

The Arrow and Dog regional unit is located on the northwestern shore of Lake Superior, and is 10,111.61 km² in size, including the associated nearshore waters. This regional unit extends from the international boundary in the west to just past the community of Thunder Bay in the east. Communities in this regional unit include the City of Thunder Bay, Fort William First Nation, Lac Des Mille Lacs First Nation, the Municipality of Oliver-Paipoonge, the Municipality of Neebing, the Township of O'Connor, the Township of Conmee, and the Township of Gillies. Several provincial parks, nature reserves and conservation areas are located in this regional unit. The Lakehead Region Conservation Authority's area of jurisdiction covers eight municipalities, including municipalities in the Dog/Arrow and Black Sturgeon regional units. The Arrow and Dog regional unit combines two tertiary watersheds, Arrow and Dog, and 17 quaternary watersheds. The watersheds are characterized by forests. The coast is dominated by cobble beaches with rocky shores and scattered coastal wetlands.

TABLE 8.1: Arrow and Dog BY THE NUMBERS

Land and Water Cover	Region (km²)	Region %	Lake Superior Total (km²)	Notes
Agriculture	78.16	0.69	1,441.07	
Developed	44.92	0.40	389.55	
Forest	9,439.22	83.86	107,747.13	
Associated Nearshore Waters	484.49	4.30	17,868.03	
Other	521.47	4.63	8,227.57	
Water (inland)	688.03	6.11	9,473.05	
Total Area	11,256.30	100	145,146.40	
Coastal Features	Region	Region %	% of Lake Superior Total for Coastal Feature	
Coastline (km)	308.97	NA	5.30	Based on SOLEC shoreline
Sand Beaches (km)	1.28	0.42	0.20*	*% of Lake Superior Total Sand Beaches
Coastal Wetlands (km ²)	17.31	7.34*	1.57**	*% of Regional Coastal Area ** % of Lake Superior Total Coastal Wetlands
Natural Cover in Coastal Zone	194.02	82.31*	3.14**	*% of Regional Coastal Area ** % of Lake Superior Total Natural Cover in Coastal Area
Number of Islands	109	NA	4.1	
Condition	Region	Region %	% of Lake Superior Total	
Population Density (persons/km ²)	5.75	NA		
Road Density (km/km ²)	0.74	NA		
Number of Dams and Barriers	2942	NA	12.4	
Artificial Shoreline (km)	36.83	11.92	16.16	
Land Ownership & Protection	Region (km²)	Region %	Regional Area (km²)	
Private	3,116.63	28.93	10,771.30	Regional area based on landmass
Public/Crown	7,306.71	67.84	10,771.30	
Tribes/ First Nations	63.49	0.59	10,771.30	
Parks & Protected Areas (total)	284.47	2.64	10,771.30	
Parks & Protected Areas (coast)	17.98	7.63*	235.72**	*% of Regional Coastal Area **Regional Coastal Area (km ²)

Important Biodiversity Features

Nearshore and Inshore Waters

- Thunder Bay is noted as a Lake Superior embayment important for Lake Sturgeon (Auer 2003). In the Arrow and Dog regional unit this embayment and the nearshore zone, which provides corridors for movement, are identified as critical management areas for Lake Sturgeon in the Lake Superior basin (Auer 2003).
- Cisco are an important feature in western Lake Superior. Large spawning aggregations of Cisco are found in Thunder Bay (S. Greenwood, pers. comm., March 11 2013).

Coastal Zone and Islands

- The Arrow and Dog regional unit provides several sites of Important Habitat for Lake Trout, including many in Thunder Bay and around Pie Island and Flatland Island. One location of Important Habitat for Lake Whitefish is noted along the shore, near the international border (Lake Superior Binational Program Habitat Committee 2006) (Figure 8.1).

Tributaries and Watersheds

- Historically 21 tributaries in Lake Superior had Lake Sturgeon spawning runs. Two of these historical spawning tributaries, the Kaministiquia River and the Pigeon River are in the Arrow and Dog regional unit (the Pigeon River is on the shared boundary between the Arrow and Dog and Baptism-Brule regional units). The Kaministiquia River population status is extant and the population trajectory is stable. The Pigeon River population status is extant, while the population trajectory is unknown (Golder Associates Ltd. 2011).
- A Lake Sturgeon Rehabilitation Plan for Lake Superior (Auer 2003) identifies the Kaministiquia and Pigeon Rivers as two of the seventeen tributaries to Lake Superior in which there should be a focus on Lake Sturgeon rehabilitation.
- Several Important Habitat Areas are located throughout the Arrow and Dog regional unit, including Castle Creek Provincial Nature Reserve and Fraleigh Lake Provincial Nature Reserve and Kashabowie Provincial Park. Important Habitat Sites are also located throughout the Arrow and Dog regional unit (Lake Superior Binational Program Habitat Committee 2006) (Table 8.3, Figure 8.3).

Figure 8.1: Arrow and Dog - Coastal and Watershed Features

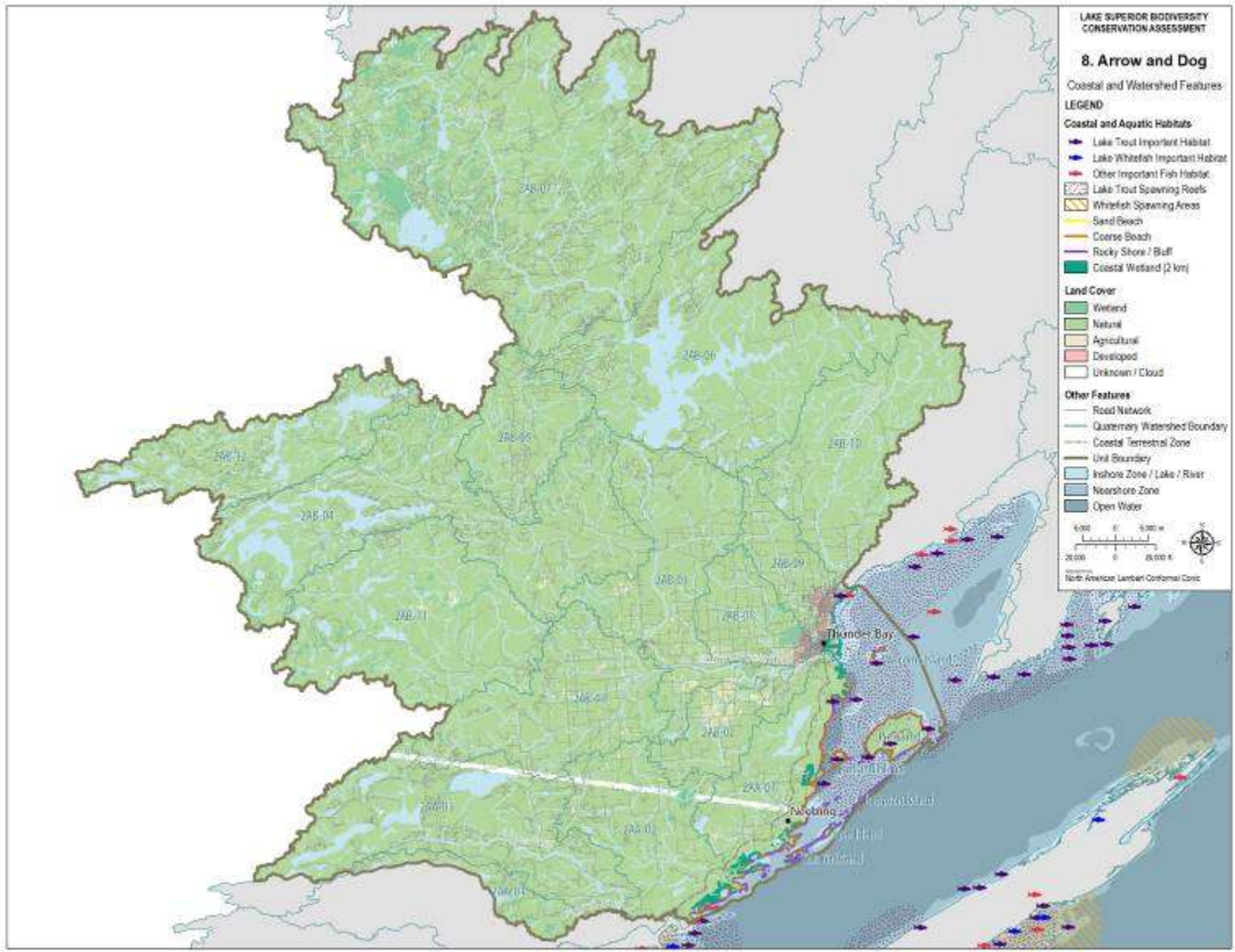


TABLE 8.2: Arrow and Dog CONDITION AND TRENDS

Target (Data Source)	Condition	Trends
Offshore ¹	NA	NA
Nearshore ¹	D (0.25)	Unknown
Embayments and Inshore ^{1,2}	C (0.40)	Unknown
Coastal Wetlands ^{2,3}	C (0.578)	Unknown
Islands ⁴	A	Unknown
Coastal Terrestrial ³	A (0.945)	Unknown
Tributaries and Watersheds ²	C (0.54)	Unknown

A: Very Good	<i>Ecologically desirable status; requires little intervention for maintenance</i>
B: Good	<i>Within acceptable range of variation; may require some intervention for maintenance.</i>
C: Fair	<i>Outside of the range of acceptable variation and requires management. If unchecked, the biodiversity target may be vulnerable to serious degradation.</i>
D: Poor	<i>Allowing the biodiversity target to remain in this condition for an extended period will make restoration or preventing extirpation practically impossible.</i>
Unknown	<i>Insufficient information.</i>

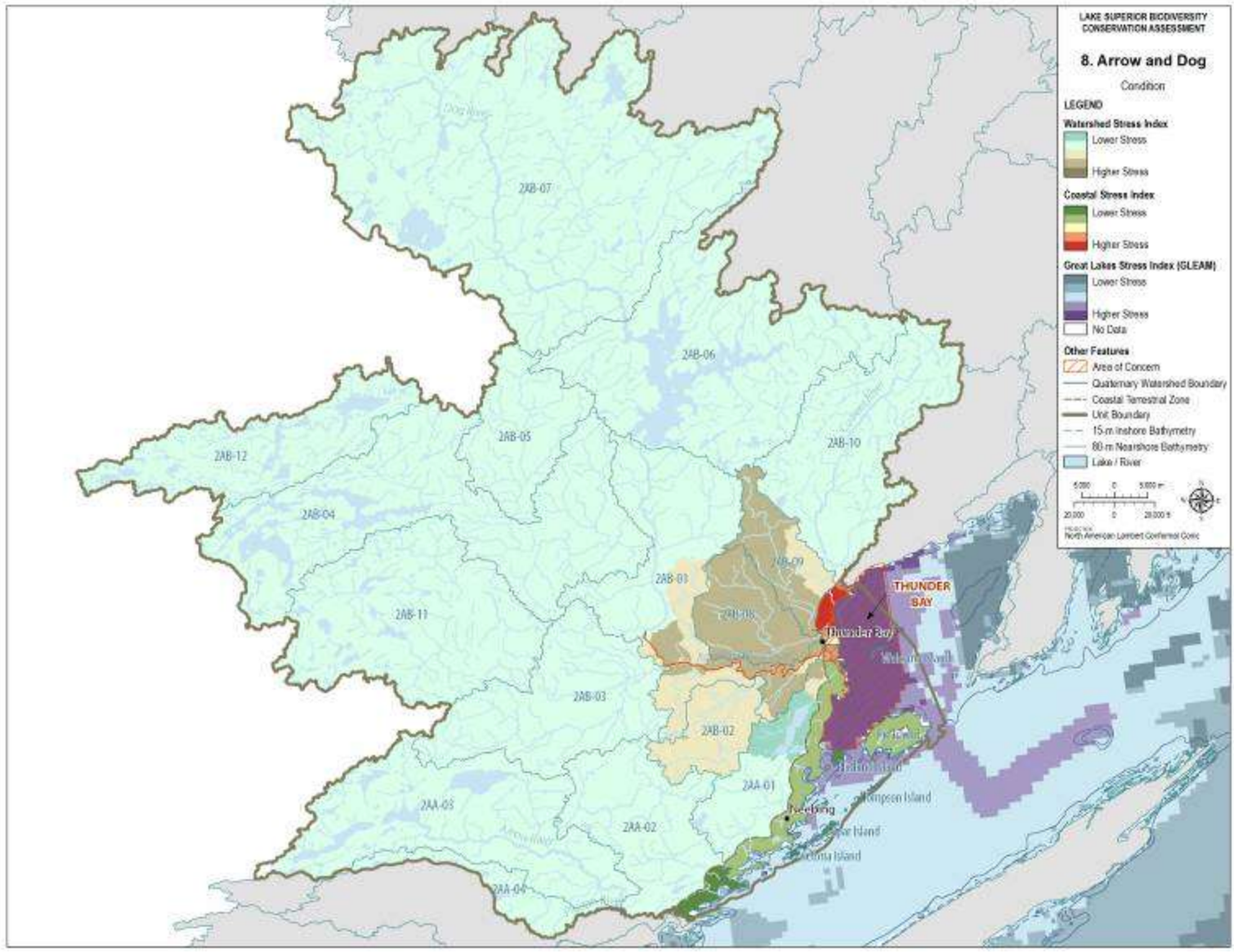
1: Great Lakes Cumulative Stress (GLEAM 2012, Allan et al. 2013)

2: Watershed Stress Index (GLEI 2013)

3: Coastal Condition Index (developed for this report)

4 : Island Condition Score (Henson et al. 2010)

Figure 8.2: Arrow and Dog - Condition



Important Issues & Threats

- The Thunder Bay Area of Concern (AOC) is located in the Arrow and Dog regional unit (Figure 8.2). The boundaries run along 28 km of shoreline and 9 km off shore, and the Welcome Islands are included in the boundaries. The issues associated with this AOC include Impairments to Fish Health, Impairments to Sediment Quality, Impairments to Water Quality and Impairments to Wildlife. These impairments were the result of discharges, largely from the forest products industry. Along the waterfront, fish and wildlife habitat was destroyed due to industrialization, dredging, release of pollutants, channelization and waste disposal (Environment Canada 2014d). Approximately \$165.6 million (Canadian dollars) has been spent to complete a number of remedial projects. The Public Advisory Committee (PAC) was re-established in 2009, following a six year hiatus after the Stage 2 report. The PAC is organized into five subcommittees to focus on the remaining beneficial use impairments (BUIs) (Thunder Bay RAP 2013). Many actions have been taken to improve the Thunder Bay AOC, including the remediation of contaminated sediment, upgrades to wastewater treatment plants due to federal and provincial regulations, habitat rehabilitation and shoreline softening. The remaining contaminated sediment requires remediation, and risk assessments are providing recommendations on remediation actions. The anticipated delisting date of the Thunder Bay AOC is 2025 (Environment Canada 2014d).

Conservation In Action

Parks & Protected Areas

- Centennial Park
- Cascades Conservation Area
- Wishart Conservation Area
- Hazelwood Lake Conservation Area
- Silver Falls Provincial Park
- Kashabowie Provincial Park
- Little Greenwater Lake Provincial Nature Reserve
- Matawin River Provincial Nature Reserve
- Arrow Lake Provincial Park
- Castle Creek Provincial Nature Reserve
- Divide Ridge Provincial Nature Reserve
- Fraleigh Lake Provincial Nature Reserve
- Kakabeka Falls Provincial Park
- Cedar Falls Conservation Area
- Le Pate Provincial Nature Reserve
- Thomson Island Provincial Nature Reserve
- Pigeon River Provincial Park
- Devon Road Mesa Provincial Nature Reserve
- Le Verendrye Provincial Park
- Caldwell Lake Nature Reserve (Thunder Bay Field Naturalists)
- Kam River Nature Reserve (Thunder Bay Field Naturalists)
- Painted Rock Nature Reserve (Thunder Bay Field Naturalists)
- Pine Bay Phase 1 Nature Reserve (Thunder Bay Field Naturalists)
- Pine Bay Phase 2 Nature Reserve (Thunder Bay Field Naturalists)
- William Bog Nature Reserve (Thunder Bay Field Naturalists)

Existing Programs & Projects

- Fourteen Provincially Significant Wetlands (PSWs) are located in the Arrow and Dog regional unit. Caldwell Lake PSW (157.73 hectares), Cloud Bay PSW (270.61 hectares), Horseshoe Lake PSW (27.09 hectares), Matawin River PSW (742.93 hectares), Mills Block PSW (355.17 hectares), Mission Island PSW (54.26 hectares), Neebing Marsh PSW (35.80 hectares), Neebing River PSW (139.19 hectares), Pearson Wetland PSW (653.44 hectares), Pine Bay PSW (690.59 hectares), Rosslyn Wetland PSW (109.45 hectares), Sturgeon Wetland PSW (115.57 hectares), WhiteFish PSW (302.24 hectares) and William's Bog PSW (655.64 hectares) are dispersed throughout the southern portion of the regional unit. The fourteen PSWs provide a combined total of 4,309.70 hectares.
- The Ontario Ministry of Natural Resources (MNR) conducted an eight-year study to track adult Lake Sturgeon and monitor larval Lake Sturgeon in the Kaministiquia River below Kakabeka Falls (Thunder Bay RAP 2013). The fieldwork was completed in 2012 (M. Chase, pers. comm., June 3 2013). The purpose was to determine the impacts of water flow and water level variation on Lake Sturgeon spawning success. This research will help to protect spawning habitat and rehabilitate Lake Sturgeon populations which use the Kaministiquia River, as well as to guide future hydro-electric development and water management planning around Lake Superior. This work is being completed in partnership with Ontario Power Generation (OMNR 2013c).
- The Ontario MNR Upper Great Lakes Management Unit (UGLMU) has established the Fish Community Index Netting (FCIN) program on Lake Superior. Started in 2009, the FCIN program represents an ecosystem-based fish community approach, which provides trend-through-time information on the fish community. Emphasis is on the commercially important species of Lake Trout and Lake Whitefish, but the shift is away from a single species approach, to monitoring of fish population dynamics (Thunder Bay RAP 2013). The FCIN program is underway in the Thunder Bay, Peninsula Harbour and Jackfish Bay AOCs, as well as in Nipigon Bay (no commercial fisheries) (M. Chase, pers. comm., June 3 2013).
- The Kaministiquia River Walleye Radio Telemetry Project is a project which uses radio telemetry to record the movement patterns and seasonal distribution of adult Walleye in the Kaministiquia River. The project will help to identify critical habitat and migration routes, as well as to monitor improvements made to alleviate water quality barriers. The multi-year project started in 2009 (Thunder Bay RAP 2013).
- The Current River Walleye Assessment involves the periodic assessment of the spawning population of Walleye at the mouth of the Current River, within Thunder Bay harbour. Artificial spawning habitat was created in 1991 to replace historical spawning habitat lost due to construction and development. A mark-recapture protocol has been used during three phases (1991-1993, 1999-2000 and 2010-2012) to conduct spawning assessments (Thunder Bay RAP 2013).
- The Lakehead Region Conservation Authority (LRCA) undertakes a number of programs and services related to the Arrow and Dog regional unit. These include water control structures such as dams and channels, forest management and tree planting, and erosion control, among other programs (LRCA No date).
- Caldwell Lake Nature Reserve (Thunder Bay Field Naturalists)
- Kam River Nature Reserve (Thunder Bay Field Naturalists)
- Painted Rock Nature Reserve (Thunder Bay Field Naturalists)
- Pine Bay Phase 1 Nature Reserve (Thunder Bay Field Naturalists)
- Pine Bay Phase 2 Nature Reserve (Thunder Bay Field Naturalists)
- William Bog Nature Reserve (Thunder Bay Field Naturalists)

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- The Thunder Bay Field Naturalists have six nature reserves in the Arrow and Dog regional unit. Caldwell Lake Nature Reserve is 80 acres in total (40 acres of land and 40 acres of water), and is an Area of Natural and Scientific Interest (ANSI), part of the Great Lakes Heritage Coast, and is within the Lake Superior National Marine Conservation Area. Nipigon River Nature Reserve is 545 acres in total area and is adjacent to other conservation lands, is a Great Lakes Heritage Coast signature site, and contains provincially significant wetlands. Paradise Island Nature Reserve is 112 acres in total (58 acres of land and 54 acres of water). It is adjacent to conservation lands, a Great Lakes Heritage Coast signature site, an ANSI and within the Lake Superior National Marine Conservation Area (B. Yurkoski, pers. comm., February 16 2015).
- Peregrine Falcons have been reintroduced to Ontario, including in the Lake Superior basin, following their extirpation as a breeding species in Ontario in the early 1960s (Ontario Peregrine Falcon Recovery Team 2010).
- The Thunder Bay Field Naturalists have an active land securement program, and have recently purchased important coastal wetlands at Pine Bay.

TABLE 8.3: Arrow and Dog IMPORTANT HABITAT SITES AND AREAS

<i>Code</i>	<i>Site/ Area</i>	<i>Important Habitat Site/Area Name</i>	<i>Key Features</i>
ON-016	Site	Caldwell Lake	Wetland; rare plant and animal habitat
ON-049	Site	Keifer Terminal Floodway	Coastal wetland; waterfowl staging area and brood rearing
ON-057	Site	Matawin River Nature Reserve	System of productive wetlands; fish spawning habitat waterfowl staging area, rare plant habitat
ON-057	Area	Matawin River Nature Reserve	System of productive wetlands; fish spawning habitat waterfowl staging area, rare plant habitat
ON-059	Area	Cloud Bay	Coastal wetland, waterfowl migration habitat
ON-086	Site	Northwood Bog	Rare plant habitat
ON-098	Site	Prince and Jarvis	Undisturbed, diverse habitat; raised cobble beaches and Norwester Chain Mountains
ON-114	Site	Slate River Drainage	Waterfowl staging and brood habitat
ON-116	Site	South Fowl Lake	Rare plant habitat (provincially and locally rare plants); Rare animal habitat, excellent waterfowl habitat
ON-129	Site	West Whitefish Lake	Large inland wetland, waterfowl breeding and staging area, rare animal habitat
ON-141	Area	Castle Creek Nature Reserve	Cliff habitat, wetlands, rare plants
ON-144	Area	Devon Road Mesa Nature Reserve	Rare plant habitat
ON-145	Area	Divide Ridge Nature Reserve	Cliff habitat
ON-147	Area	Fraleigh Lake Nature Reserve	
ON-151	Area	Kakabeka Falls	Fish spawning habitat
ON-153	Area	Kashabowie	Fish spawning habitat
ON-155	Area	La Verendrye	Rare plant habitat, cliff communities, wild rice marshes
ON-158	Area	Le Pate Nature Reserve	Unique landform feature (mesa)
ON-160	Area	Little Greenwater Lake Nature Reserve	
ON-163	Area	Middle Falls	Fish spawning habitat
ON-181	Area	Thompson Island Nature Reserve	

Figure 8.3: Arrow and Dog - Important Habitat Sites and Areas

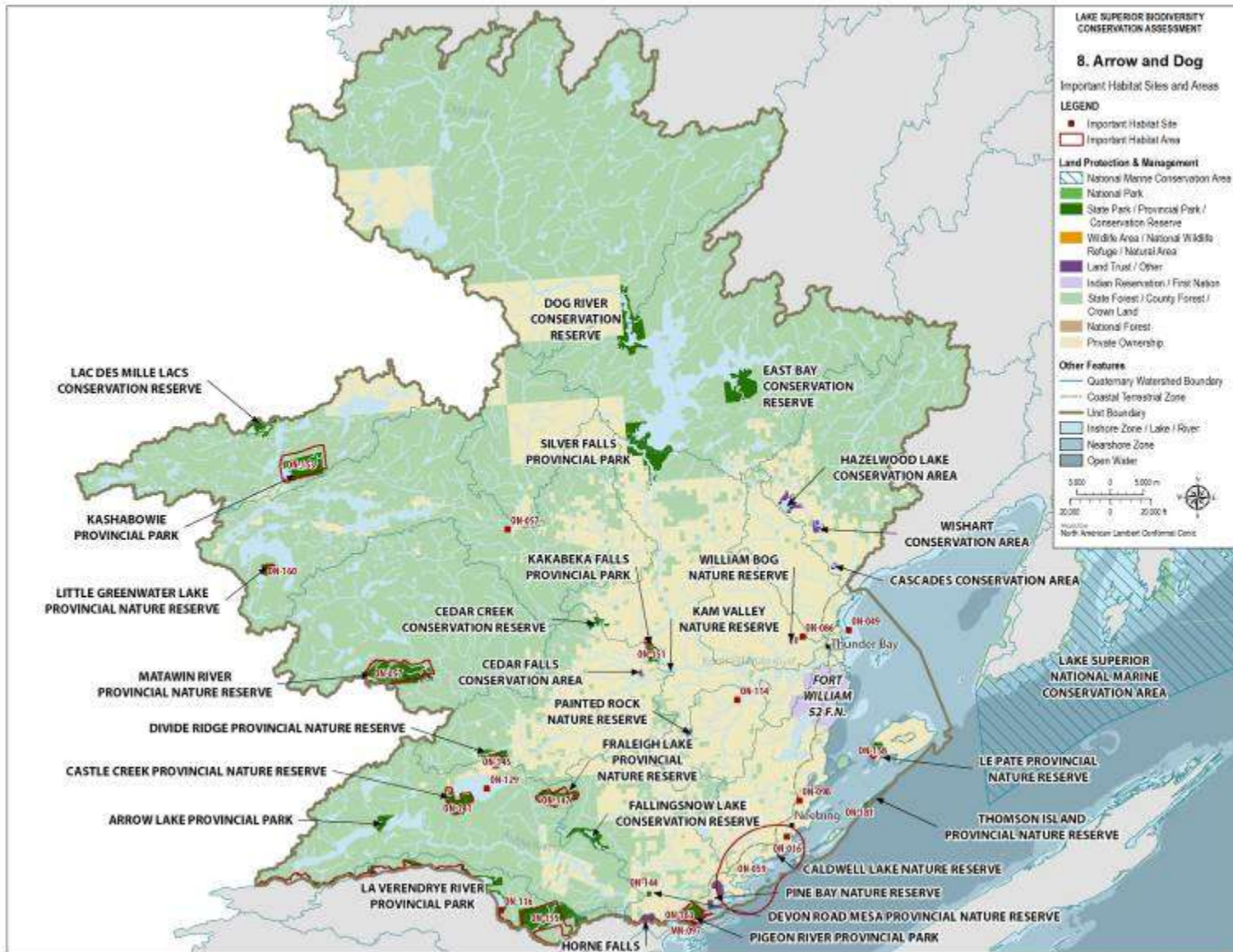


TABLE 8.4: Arrow and Dog LIST OF SPECIES AND COMMUNITIES OF CONSERVATION CONCERN

At least 96 species and communities of conservation concern have been documented in the regional unit. 53 of these have viability rankings which indicate the species or community is currently present, or was at the date of last sampling. The viability rankings of these species varies from A to E (A – Excellent predicted viability, B – Good predicted viability, C – Fair predicted viability, D – Probably not viable, E – Verified extant). 43 species and communities were once known to occur here, but have current conservation ranks of H (Historical).⁹

<i>Present Records (Viability Rankings of A to E)</i>	
Scientific Name	Common Name
<i>Adoxa moschatellina</i>	Muskroot
<i>Amphidium mougeotii</i>	A Moss
<i>Arigomphus cornutus</i>	Horned Clubtail
<i>Artemisia frigida</i>	Prairie Sagebrush
Basic Open Cliff Type	Basic Open Cliff Type
Boreal Open Seepage Fen Type	Boreal Open Seepage Fen Type
<i>Botrychium pallidum</i>	Pale Moonwort
<i>Botrychium spathulatum</i>	Spatulate Moonwort
Bur Oak - Saskatoon Berry Dry Deciduous Woodland Type	Bur Oak - Saskatoon Berry Dry Deciduous Woodland Type
<i>Calamagrostis purpurascens</i>	Purple Reed Grass
<i>Caprimulgus vociferus</i>	Whip-poor-will
<i>Carex praticola</i>	Northern Meadow Sedge
<i>Carex rossii</i>	Ross' Sedge
<i>Carex supina</i>	Weak Arctic Sedge
<i>Carex xerantica</i>	Dryland Sedge
<i>Chelydra serpentina</i>	Snapping Turtle
<i>Chlidonias niger</i>	Black Tern
<i>Cirsium flodmanii</i>	Flodman's Thistle
<i>Corispermum americanum</i>	American Bugseed
<i>Corispermum villosum</i>	Hairy Bugseed
<i>Cypripedium arietinum</i>	Ram's-head Lady's-slipper
<i>Dichanthelium leibergii</i>	Leiberg's Panic Grass
<i>Dichanthelium perlongum</i>	Long-stalked Panic Grass
<i>Dolichonyx oryzivorus</i>	Bobolink
Dry Fescue Mixedgrass Prairie Type	Dry Fescue Mixedgrass Prairie Type
<i>Erebia discoidalis</i>	Red-disked Alpine
<i>Erigeron glabellus</i>	Streamside Fleabane
<i>Falco peregrinus</i>	Peregrine Falcon
<i>Festuca hallii</i>	Plains Rough Fescue
<i>Gymnocarpium jessoense</i>	Nahanni Oak Fern
<i>Haliaeetus leucocephalus</i>	Bald Eagle
<i>Hesperostipa comata</i>	Needle-and-thread Grass
<i>Huperzia appressa</i>	Mountain Firmoss
<i>Juncus vaseyi</i>	Vasey's Rush
<i>Leucophysalis grandiflora</i>	Large-flowered Ground Cherry
<i>Listera auriculata</i>	Auricled Twayblade
<i>Lithospermum canescens</i>	Hoary Puccoon

⁹ Data included here were provided by the Ontario Ministry of Natural Resources and Forestry. Copyright Queen's Printer for Ontario (2012).

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Mannia pilosa	A Liverwort
Moist - Fresh Sugar Maple - Yellow Birch Deciduous Forest Type	Moist - Fresh Sugar Maple - Yellow Birch Deciduous Forest Type
Ophiogomphus anomalus	Extra-striped Snaketail
Ophiogomphus carolus	Riffle Snaketail
Oxytropis borealis var. viscida	Sticky Boreal Locoweed
Pascopyrum smithii	Western Wheat Grass
Pelecanus erythrorhynchos	American White Pelican
Podiceps grisegena	Red-necked Grebe
Salix myricoides	Blue-leaved Willow
Schoenoplectus heterochaetus	Slender Bulrush
Senecio eremophilus	Desert Ragwort
Solidago missouriensis	Missouri Goldenrod
Tamarack - Black Spruce Coniferous Organic Swamp Type	Tamarack - Black Spruce Coniferous Organic Swamp Type
Taxidea taxus	American Badger
Trichophorum clintonii	Clinton's Clubrush
Woodsia scopulina	Mountain Woodsia
Historical Records	
Scientific Name	Common Name
Acipenser fulvescens pop. 3	Lake Sturgeon (Great Lakes - Upper St. Lawrence River population)
Antennaria parvifolia	Small-leaved Pussytoes
Antennaria rosea	Rosy Pussytoes
Aquila chrysaetos	Golden Eagle
Arnica lonchophylla	Long-leaved Arnica
Asterella gracilis	A Liverwort
Astragalus adsurgens	Laxmann's Milk-vetch
Bromus pumpellianus	Pumpelly's Brome
Bryum blindii	A Moss
Carex atratiformis	Scabrous Black Sedge
Cerastium alpinum	Alpine Chickweed
Chenopodium leptophyllum	Slim-leaved Goosefoot
Cirsium drummondii	Drummond's Thistle
Coregonus hoyi	Bloater
Coregonus zenithicus	Shortjaw Cisco
Coscinodon cribrus	Copper Coscinodon
Cuscuta cephalanthi	Buttonbush Dodder
Cystopteris laurentiana	Laurentian Bladder Fern
Diplophyllum taxifolium	A Liverwort
Euchloe ausonides	Large Marble
Great Lakes Arctic-Alpine Basic Open Bedrock Shoreline Type	Great Lakes Arctic-Alpine Basic Open Bedrock Shoreline Type
Gymnocarpium robertianum	Limestone Oak Fern
Ichthyomyzon fossor	Northern Brook Lamprey
Juncus subtilis	Creeping Rush
Lanius ludovicianus	Loggerhead Shrike
Lycaena helloides	Purplish Copper
Mannia sibirica	A Liverwort
Moehringia macrophylla	Large-leaved Sandwort
Myotis septentrionalis	Northern Myotis
Oeneis macounii	Macoun's Arctic
Pannaria conoplea	A Lichen
Phacelia franklinii	Franklin's Scorpionweed
Planorbella corpulenta whiteavesi	Whiteave's Capacious Rams-horn
Poa secunda	Curly Blue Grass

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Polystichum braunii	Braun's Holly Fern
Rhizocarpon oederi	A Lichen
Scapania degenii	A Liverwort
Stereocaulon subcoralloides	A Lichen
Syngrapha selecta	
Viola epipsila	Northern Marsh Violet
Viola novae-angliae	New England Violet
Woodsia alpina	Alpine Woodsia
Xanthocephalus xanthocephalus	Yellow-headed Blackbird