

Ramsar Information Sheet

Published on 22 December 2023
Update version, previously published on: 11 May 1999

United Kingdom of Great Britain and Northern Ireland (Overseas territories)

Lover's Lake Nature Reserve



Designation date 11 May 1999 Site number 989

Coordinates 32°22'04"N 64°42'34"W

Area 2.14 ha

https://rsis.ramsar.org/ris/989 Created by RSIS V.1.6 on - 22 December 2023

Color codes

Fields back-shaded in light blue relate to data and information required only for RIS updates.

Note that some fields concerning aspects of Part 3, the Ecological Character Description of the RIS (tinted in purple), are not expected to be completed as part of a standard RIS, but are included for completeness so as to provide the requested consistency between the RIS and the format of a 'full' Ecological Character Description, as adopted in Resolution X.15 (2008). If a Contracting Party does have information available that is relevant to these fields (for example from a national format Ecological Character Description) it may, if it wishes to, include information in these additional fields.

1 - Summary

Summary

Lover's Lake is a near-natural, brackish/saline waterbody, located close to the coast. It is filled by saline tidal flows via subterranean channels, which favour the coexistence of both marine and brackish species. The lake is fringed by dense stands of Black mangrove Avicennia germinans, together with submerged beds of Widgeon grass Ruppia maritima and Turtle grass Thalassia testudinum and marginal saltmarsh plants. It supports an internationally important population of the Lover's Lake killifish Fundulus relictus, a rare and threatened species that is endemic to the Bermudian archipelago. It also supports an interesting invertebrate fauna and various bird species, including wintering and passage waterfowl. The coastal setting makes it an attractive recreational area. The lake hosts a significant number of educational field trips and has also been used to undertake taxonomic studies of the resident killifish population.

2 - Data & location

2.1 - Formal data

	2	1.	.1	- Name	and	address	of the	compiler	of this	RIS
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Responsible compiler

Institution/agency Bermuda Government

Postal address DENR Headquarters, the Botanical Gardens, 169 South Road, Paget, DV04, Bermuda

National Ramsar Administrative Authority

Institution/agency Department for Environment, Food and Rural Affairs

2.1.2 - Period of collection of data and information used to compile the RIS

Postal address

From year 1999

To year 2023

2.1.3 - Name of the Ramsar Site

Official name (in English, French or Spanish)

Lover's Lake Nature Reserve

2.1.4 - Changes to the boundaries and area of the Site since its designation or earlier update

2 Marsham Street, London SW1P 4DF

(Update) A. Changes to Site boundary Yes O No

(Update) B. Changes to Site area

(Update) For secretariat only: This update is an extension □

2.1.5 - Changes to the ecological character of the Site

(Update) 6b i. Has the ecological character of the Ramsar Site (including applicable Criteria) changed since the previous RIS?

2.2 - Site location

2.2.1 - Defining the Site boundaries

b) Digital map/image

<2 file(s) uploaded>

Former maps 0

Boundaries description

The geographical coordinates for the site are 32°22'4"N, 64°42'34"W. It is located towards at the north-east end of Bermuda on St. George's Island, on the North Shore within Ferry Point Park, 3.3 km WSW of the town of St. George. The boundary of the Ramsar Site follows the outline of the Lover's Lake Government Nature reserve.

2.2.2 - General location

a) In which large administrative region does the site lie?

Bermuda

b) What is the nearest town or population centre?

Town of St. George

2.2.3 - For wetlands on national boundaries only

a) Does the wetland extend onto the territory of one or more other countries?

b) Is the site adjacent to another designated Ramsar Site on the territory of another Contracting Party?

2.2.4 - Area of the Site

Official area, in hectares (ha): 2.14

Area, in hectares (ha) as calculated from 2.141 GIS boundaries

2.2.5 - Biogeography

Biogeographic regions

Regionalisation scheme(s)	Biogeographic region
Marine Ecoregions of the World (MEOW)	Tropical Northwestern Atlantic
WWF Terrestrial Ecoregions	Neotropic

3 - Why is the Site important?

3.1 - Ramsar Criteria and their justification

Criterion 1: Representative, rare or unique natural or near-natural wetland types

Hydrological services provided

The site does not provide any notable hydrological services.

Other ecosystem services provided

See section 4.5.

Other reasons

Lover's Lake is an example of a near-natural coastal lake. The site is filled by saline tidal flows via subterranean channels, which favour the coexistence of both marine and brackish species, It is the only saline pond on Bermuda bordered by a pure stand of black mangrove Avicennia germinans Bermuda is the most northerly location of mangrove growth in the Atlantic.

☑ Criterion 2 : Rare species and threatened ecological communities

The site supports an internationally important population of the Lover's Lake killifish Fundulus relictus. This is a rare and threatened species, which is endemic to the eastern end of the Bermudian archipelago and Optional text box to provide further now found only in three brackish and saline ponds: Lover's Lake, Cooper's Island pond and Bartram's information Pond. It is classified as Endangered under the Bermuda Protected Species Act (2003) based on IUCN Criteria. The site is important because it contains the largest Fundulus relictus population and the competitive non-native Gambusia fish has not been introduced.

Criterion 3 : Biological diversity

Justification

The site is an important location for biodiversity. It supports a regionally important near-natural, coastal lake, fringed by Black mangrove Avicennia germinans. Tidal flows favour the occurrence of both marine and brackish species. It is also important for various bird species, including wintering Pied-billed grebe Podilymbus podiceps and Northern waterthrush Parkesia noveboracensis, and the reintroduced Yellowcrowned night heron Nyctanassa violacea. It also provides seasonal habitat for passage waterfowl, and, in winter, for the Belted kingfisher Ceryle alcyon. There is also an interesting invertebrate fauna, including Upside-down jellyfish Cassiopea andromeda, polychaetes, anemones and holothurians (Synaptula sp.). A total of 66 bird species have been reported by local birders.

Criterion 7 : Significant and representative fish

Justification

See information presented under Criterion 2.

3.2 - Plant species whose presence relates to the international importance of the site

<no data available>

3.3 - Animal species whose presence relates to the international importance of the site

Phylum	Scientific name	Species qualifies under criterion	Species contributes under criterion 3 5 7 8	Pop. Size	Period of pop. Est.	% occurrence 1)	IUCN Red List	CITES Appendix I	CMS Appendix I	Other Status	Justification
Fish, Mollusc a	nd Crustacea										
CHORDATA/ ACTINOPTERYGII	Fundulus relictus	2 000		7907	2011-2012	69					Endemic to Bermudian archipelago; listed as Endangered under Bermuda Protected Species Act (2003)
Birds											
CHORDATA	Aves										

¹⁾ Percentage of the total biogeographic population at the site

3.4 - Ecological communities whose presence relates to the international importance of the site

<no data available>

4 - What is the Site like? (Ecological character description)

4.1 - Ecological character

Lover's Lake is located in an enclosed limestone valley close to the coast. It has a shallow margin that quickly gives way to two depressions, one of which connects to the ocean via a subterranean tunnel. The waterbody is tidal with a stable deeper layer of saline water, overlain by a variable layer of fresh or brackish water affected by evaporation and slow mixing. The tidal flows and variable saline nature favour the coexistence of both marine and brackish species.

The lake is fringed by dense stands of Black mangrove Avicennia germinans. The waterbody contains submerged beds of Widgeon grass Ruppia maritima and Turtle grass Thalassia testudinum. The drier margins of the lake behind the mangrove belt, are populated by saltmarsh plants such as Seaside purslane Sesuvium portulacastrum and Woody glasswort Sarcocornia perennis.

4.2 - What wetland type(s) are in the site?

Marine or coastal wetlands

Wetland types (code and name)	Local name	Ranking of extent (1: greatest - 4: least)	Area (ha) of wetland type	Justification of Criterion 1
l: Intertidal forested wetlands	Black mangrove belt	0	0.3	Representative
J: Coastal brackish / saline lagoons	Open water marine pond	0	0.38	Representative

Other non-wetland habitat

Other non-wetland habitats within the site	Area (ha) if known
Mixed coastal vegetation; Invasive woodland	1.46

4.3 - Biological components

4.3.1 - Plant species

Other noteworthy plant species

Phylum	Scientific name	Position in range / endemism / other
TRACHEOPHYTA/LILIOPSIDA	Thalassia testudinum	Bermuda is the northern limit of its range. Listed as Vulnerable under the Bermuda Protected Species Act 2003.

Invasive alien plant species

Phylum	Scientific name	Impacts	Changes at RIS update
TRACHEOPHYTA/LILIOPSIDA	Asparagus densiflorus	Actual (major impacts)	No change
TRACHEOPHYTA/MAGNOLIOPSIDA	Casuarina equisetifolia	Actual (major impacts)	No change
TRACHEOPHYTA/MAGNOLIOPSIDA	Ficus microcarpa	Actual (minor impacts)	No change
TRACHEOPHYTAMAGNOLIOPSIDA	Ipomoea indica	Actual (major impacts)	No change
TRACHEOPHYTAMAGNOLIOPSIDA	Leucaena leucocephala	Actual (minor impacts)	No change
TRACHEOPHYTA/LILIOPSIDA	Livistona chinensis	Actual (minor impacts)	No change
TRACHEOPHYTAMAGNOLIOPSIDA	Schinus terebinthifolia	Actual (major impacts)	No change

4.3.2 - Animal species

Invasive alien animal species

Phylum	Scientific name	Impacts	Changes at RIS update
CHORDATAVAVES	Pitangus sulphuratus	Actual (minor impacts)	No change

Optional text box to provide further information

Non-native Great kiskadee Pitangus sulphuratus occasionally take killifish from the lake, but not in large numbers, as the depth of the water gives the fish ample places to hide from this surface fishing bird.

4.4 - Physical components

4.4.1 - Climate

Climatic region	Subregion
C: Moist Mid-Latitude climate with mild winters	Cfa: Humid subtropical (Mild with no dry season, hot summer)

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	1.4.E. Codiment'			
Sediment regime unknown □	.4.5 - Sealment regim		_	
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Modest amounts of sediment accumulate amongst the root systems of the mangroves and lake bottom; it is also likely than some tidal flushing

(ECD) Water temperature Temperature range degrees C 18.0-28.5 (mean 23.7) (Outerbridge, 2020)

4.4.6 - Water pH

takes place.

RIS for Site no. 989, Lover's Lake Nature Reserve, United Kingdom of Great Britain and Northern Ireland (Overseas territories)
^(Update) Changes at RIS update No change ⊙ Increase O Decrease O Unknown O
Unknown
4.4.7 - Water salinity
Mixohaline (brackish)/Mixosaline (0.5-30 g/l) ☑
^(Update) Changes at RIS update No change ⊙ Increase O Decrease O Unknown O
Euhaline/Eusaline (30-40 g/l) ☑
^(Update) Changes at RIS update No change (Opdate) Increase (Opdate) Decrease (Opdate) Unknown (Opdate)
Unknown
Please provide further information on salinity (optional):
Salinity typically ranges from 22-37 g/l with a mean of 30.3 g/l (Thomas et al. 1991)
4.4.8 - Dissolved or suspended nutrients in water
Mesotrophic ✓
^(Update) Changes at RIS update No change ② Increase O Decrease O Unknown O
Unknown □

4.4.9 - Features of the surrounding area which may affect the Site

Please describe whether, and if so how, the landscape and ecological characteristics in the area surrounding the Ramsar Site differ from the i) broadly similar O ii) significantly different O site itself:

Surrounding area has greater urbanisation or development OSurrounding area has higher human population density O

Surrounding area has more intensive agricultural use \Box

Surrounding area has significantly different land cover or habitat types $\ensuremath{\overline{\sigma}}$

Please describe other ways in which the surrounding area is different:

The Lover's Lake nature reserve, which is managed for nature conservation, is surrounded by the Ferry Point Park, which is managed as a recreation space. Ferry Point Park is predominantly dense woodland. The land surrounding the park has some of the lowest density residential areas in Bermuda. The nearest roads and houses are about 35 m south of the site boundary. Within 1 km of the site boundary there are low-density institutional developments, such as the Prison Farm, Oil Docks and the Bermuda Institute of Ocean Sciences. The L.F. Wade international airport lies across the water of Ferry Reach, 500m south of the site boundary.

4.5 - Ecosystem services

4.5.1 - Ecosystem services/benefits

Cultural Services

Ecosystem service	Examples	Importance/Extent/Significance
Recreation and tourism	Nature observation and nature-based tourism	Medium
Spiritual and inspirational	Aesthetic and sense of place values	Medium
Scientific and educational	Educational activities and opportunities	High
Scientific and educational	Important knowledge systems, importance for research (scientific reference area or site)	High

Supporting Services

Ecosystem service	Examples	Importance/Extent/Significance
Biodiversity	Supports a variety of all life forms including plants, animals and microorganizms, the genes they contain, and the ecosystems of which they form a part	High

Other ecosystem service(s) not included above:

The site primarily provides benefits through the rich diversity of lifeforms and ecosystems that it supports. It is also situated in an attractive coastal setting and used for recreation by locals and tourists, including birdwatching groups. The Bermuda Railway Trail is adjacent to and overlooks the lake, and it is heavily used by dog walkers, joggers and mountain bikers. Lover's Lake hosts a significant number of educational field trips from the nearby Bermuda Institute of Ocean Sciences (BIOS). It is accessed via a woodland walking trail through Ferry Point Park. Detailed research into the physical characteristics of the lake were conducted by Thomas et al. (1991); and taxonomic studies of the Fundulus relictus killifish population were carried out by Grady et al. (2001) (see also Outerbridge, 2020).

Outside the site:	1000s	

Have studies or assessments been made of the economic value ecosystem services provided by this Rams	ation of Yes O No
4.5.2 - Social and cultural values	
i) the site provides a model of wetland wise use, demonstra application of traditional knowledge and methods of managem use that maintain the ecological character of the	ent and \square
ii) the site has exceptional cultural traditions or records o civilizations that have influenced the ecological character of the	
iii) the ecological character of the wetland depends on its into with local communities or indigenous p	
iv) relevant non-material values such as sacred sites are pres their existence is strongly linked with the maintenance of the ec	

character of the wetland

<no data available>

4.6 - Ecological processes

<no data available>

5 - How is the Site managed? (Conservation and management)

5.1 - Land tenure and responsibilities (Managers)

5.1.1 - Land tenure/ownership

		owners	
I UL	JIIC	OWITEIS	HIIP

Category	Within the Ramsar Site	In the surrounding area
National/Federal government	 ✓	₽

Private ownership

Category	Within the Ramsar Site	In the surrounding area	
Other types of private/individual owner(s)		>	

Provide further information on the land tenure / ownership regime (optional):

The Lover's Lake Nature Reserve is owned by the Bermuda Government and managed by the Department of Environment and Natural Resources. It is surrounded on all sides by Ferry Point Park which is classed as an amenity park under the Bermuda National Parks Act 1986. Ferry Point Park is also owned by the Government of Bermuda and is managed by the Department of Parks. Outside of the park lands, the surrounding area is privately owned.

5.1.2 - Management authority

Please list the local office / offices of any agency or organization responsible for managing the site:

Please list the local offices of any Government of Bermuda, Department of Environment and Natural Resources; and Department of Parks

Provide the name and/or title of the person or people with responsibility for the wetland:

Senior Terrestrial Conservation Officer, Terrestrial Conservation Section, Department of Environment and Natural Resources

Postal address:

Department of Environment and Natural Resources Headquarters, Botanical Gardens, 169 South Shore Rd, Paget DV04, Bermuda

E-mail address: environment@gov.bm

5.2 - Ecological character threats and responses (Management)

5.2.1 - Factors (actual or likely) adversely affecting the Site's ecological character

Human settlements (non agricultural)

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Housing and urban areas	Low impact			No change	/	No change
Commercial and industrial areas	Low impact	High impact		No change	✓	No change

Transportation and service corridors

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes	
Utility and service lines (e.g., pipelines)	Medium impact	High impact	/	No change	2	No change	
Aircraft flight paths	Low impact	Medium impact	✓	No change	✓	No change	

Human intrusions and disturbance

Factors at affectin	 Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Recreatio tourism a	 Low impact	Medium impact	/	No change	/	No change

Invasive and other problematic species and genes

Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Invasive non-native/ alien species	Medium impact	High impact	✓	No change	✓	No change

Pollution

Poliulion						
Factors adversely affecting site	Actual threat	Potential threat	Within the site	Changes	In the surrounding area	Changes
Industrial and military effluents	Low impact	High impact	>	No change	⊘	No change
Air-borne pollutants	unknown impact		✓	No change	✓	No change

Please describe any other threats (optional):

Bermuda's electricity is generated using imported fuel oil. The dock where ships land the fuel is less than a kilometre from Lover's Lake. If a fuel spill were to occur, it would likely enter the lake via the subterranean connections to the sea. Additionally, pipelines from the Oil Dock carry fuel to other parts of the island, and carry aviation fuel to the airport which lies 500m south of Lover's Lake. The lake also lies directly below the approach path to the international airport. Due to all of these factors, there is potential for a significant oil spill affecting the site, and contingency plans for this have been prepared. Impacts from recreational activities are limited to minor footpath erosion. No water sports, fishing or other activities take place on the lake, and it is inaccessible due to the surrounding mangrove trees.

5.2.2 - Legal conservation status

National	legal	designations	

Designation type	Name of area	Online information url	Overlap with Ramsar Site
Nature Reserve	Lover's Lake Nature Reserve	https://environment.bm/lovers-la ke	whole

5.2.3 - IUCN protected areas categories (2008)

la Strict Nature Reserve □
Ib Wilderness Area: protected area managed mainly for wilderness protection
Il National Park: protected area managed mainly for ecosystem protection and recreation
III Natural Monument: protected area managed mainly for conservation of specific natural features
IV Habitat/Species Management Area: protected area managed mainly for conservation through management intervention
V Protected Landscape/Seascape: protected area managed mainly for landscape/seascape conservation and recreation
VI Managed Resource Protected Area: protected area managed mainly

for the sustainable use of natural ecosystems

5.2.4 - Key conservation measures

Legal protection

Legal protection		
	Measures	Status
	Legal protection	Implemented

Habitat

T to to to to	
Measures	Status
Re-vegetation	Implemented

Species

Measures	Status
Threatened/rare species management programmes	Implemented
Control of invasive alien plants	Partially implemented

Human Activities

Measures	Status
Communication, education, and participation and awareness activities	Implemented
Research	Partially implemented

Other

The site is designated as a National Nature Reserve and forms an integral part of the larger Ferry Point National Park declared under the Bermuda National Parks Act (1986).

Lover's Lake was the donor site for the introduction of Fundulus relictus into two other nature reserves, thus widening the area of occupancy of this endangered endemic fish.

Invasive plant management has been ongoing in the valley surrounding Lover's Lake for over 40 years. Significant planting of endemic trees has taken place, for both woodland habitat restoration and tree species conservation (see section 5.2.6).

The site hosts a significant number of educational field trips from the nearby Bermuda Institute of Ocean Sciences (BIOS). Educational opportunities connected to tree planting and invasive plant clearance have been recently expanded. For example 89 species were recorded during a 'bioblitz' carried out with students from the Bermuda Institute of Ocean Sciences in 2020 to celebrate World Wetlands Day.

Detailed taxonomic studies of the Fundulus relictus killifish population were carried out by Grady et al. (2001) (see also Outerbridge, 2020).

Is there a site-specific management plan for the site? No

Has a management effectiveness assessment been undertaken for the site? Yes O No (9)

If the site is a formal transboundary site as indicated in section Data and location > Site location, are there shared management planning Yes O No opposesses with another Contracting Party?

Please indicate if a Ramsar centre, other educational or visitor facility, or an educational or visitor programme is associated with the site.

The nature reserve zoning of the site prohibits the building of a structure or facility on the site.

5.2.6 - Planning for restoration

Is there a site-specific restoration plan? No need identified

Further information

Extensive planting of IUCN Red Listed Bermudian endemic trees has taken place to replace invasive trees that were removed from within the site. These include Bermuda cedar Juniperus bermudiana (Critically Endangered), Bermuda palmetto Sabal bermudana (Endangered) and Bermuda olivewood Elaeodendron laneanum (Endangered).

The Bermuda Government and local fuel companies responsible for the Oil Docks have prepared emergency response procedures in the event of an oil spill in the marine environment. Consideration of the Lover's Lake marine water connection is included in the plans.

5.2.7 - Monitoring implemented or proposed

Monitoring	Status
Animal species (please specify)	Implemented

The Fundulus relictus population of Lover's Lake was assessed in 2004/2005 and then again in 2011/2012 using mark/recapture techniques to estimate population size – see Outerbridge (2020).

6 - Additional material

6.1 - Additional reports and documents

6.1.1 - Bibliographical references

Grady, JM, Coykendall, DK, Collette, BB & Quattro, JM (2001) Taxonomic diversity, origin, and conservation status of Bermuda killifishes (Fundulus) based on mitochondrial cytochrome b phylogenies. Conservation Genetics, 2(1), 41-52.

Hepburn, I, Oldfield, S & Thompson, K (1992) UK Dependent Territories Ramsar study: Stage 1. Unpublished report to Department of the Environment, European and International Habitat Protection Branch, Bristol, from International Waterfowl and Wetlands Research Bureau/ NGO Forum for Nature Conservation in UK Dependent Territories, Slimbridge/Sandy (Research contract, No. 7/2/126).

IUCN (2022) The IUCN Red List of Threatened Species. https://www.iucnredlist.org/

Outerbridge, M.E., Davenport, J. and Glasspool, A.F. (2007) Distribution, population assessment and conservation of the endemic Bermuda killifishes Fundulus bermudae and Fundulus relictus, Endangered Species Research, 3: 181-189.

Outerbridge, M.E. (2020) Recovery Plan for the killifishes of Bermuda (Fundulus bermudae & Fundulus relictus). Department of Environment and Natural Resources, Government of Bermuda. https://environment.bm/s/Killifishes-Recovery-Plan-FINAL-July-2020.pdf

Pienkowski, M (ed.) (2003) A sense of direction: a conference on conservation in UK Overseas Territories and other small island communities, Bermuda 22nd–27th March 2003. UK Overseas Territories Conservation Forum, Peterborough. www.ukotcf.org

Pienkowski, MW (ed.) (2005) Review of existing and potential Ramsar sites in UK Overseas Territories and Crown Dependencies. (Contractor: UK Overseas Territories Conservation Forum, Peterborough.) Final report on Contract CR0294 to the UK Department for Environment, Food and Rural Affairs, Bristol. www.ukotcf.org

Proctor, D & Fleming, LV (eds.) (1999) Biodiversity: the UK Overseas Territories. Joint Nature Conservation Committee, Peterborough. Scott, DA & Carbonell, M (eds.) (1986) A directory of neotropical wetlands. IUCN/IWRB, Cambridge/Slimbridge.

Thomas, MLH (1993) Mangrove swamps in Bermuda. Atoll Research Bulletin, 386, 1-17.

Thomas, MLH, Eakins, KE & Logan, A (1991) Physical characteristics of the Anchialine Ponds of Bermuda. Bulletin of Marine Science, 48(1), 125-136.

Wingate, DB (1984) Taking stock of Bermuda's wetland heritage. Department of Agriculture and Fisheries, Hamilton.

Previous versions of RIS

Lover's Lake Nature Reserve Ramsar Information Sheet UK41003. Version 3.0, 13/06/2008, produced by JNCC. Lover's Lake Ramsar Information Sheet GB989RIS. Dated 10 February 1999.

Related websites

Lover's Lake Ramsar BioBlitz 2 January 2020, available from https://www.inaturalist.org/projects/lover-s-lake-ramsar-bioblitz-2020 Bermuda Government webpage https://environment.bm/lovers-lake

Ferry Point ebird sightings https://ebird.org/hotspot/L1550243

Lover's Lake ebird sightings https://ebird.org/hotspot/L2721000

6.1.2 - Additional reports and documents

i. taxonomic lists of plant and animal species occurring in the site (see section 4.3)

<no file available>

ii. a detailed Ecological Character Description (ECD) (in a national format)

<no file available>

iii. a description of the site in a national or regional wetland inventory

<no file available>

iv. relevant Article 3.2 reports

<no file available>

v. site management plan

<no file available>

vi. other published literature

<1 file(s) uploaded>

6.1.3 - Photograph(s) of the Site

Please provide at least one photograph of the site:

View looking Northeast
across Lover's Lake (Alison
I. Copeland, 05-04-2009)

6.1.4 - Designation letter and related data

Designation letter

<1 file(s) uploaded>

Date of Designation 1999-05-11