Executive Summary

Methodology

Based on extensive public consultation, landowner permission was obtained and a total of 1318.7 hectares (3258.5 acres) of natural area within the Big Creek watershed were inventoried during the 2009 field season, as part of the study. In the spring of 2009, field biologists undertook the initial biological inventories of each of the sites which included the determination of the spring flora and an examination of standing water for amphibian breeding. Throughout the remainder of the 2009 field season, the team of specialists undertook additional faunal surveys, including wildlife and amphibian inventories; completed the botanical inventories to document summer and autumn flowering species and woody vegetation (trees and shrubs); as well as complete vegetation community mapping. A complete floral and faunal inventory was produced for each of the sites documenting all rare species. The locations of significant species and any Species at Risk were recorded utilizing a hand-held Global Positioning System (GPS).

Evaluation Criteria

The following ten criteria were utilized by the study team, in order to document and evaluate a site's natural heritage significance. The first five criteria are based directly on the significant natural heritage features defined by the Provincial Policy Statement (PPS).

- Significant Wetland
- Significant Habitat of Endangered/Threatened Species
- Significant Woodland
- Significant Wildlife Habitat
- Significant Valleyland
- Ecological Function
- Diversity
- Significant Species
- Significant Communities
- Condition

Results

Soils

Upland soils within the watershed are mostly classified as Perth Clay (Pc), with some areas of Brookston Clay (Bc) in the southwest and northern portions of the watershed. In addition, Perth Clay Loam (Pcl) soils occur on the eastern side of the watershed and small areas of Burford Loam Shallow Phase (Bg-s) and Farmington Loam (Fl) occur in the northern portions of the watershed. The beach is classified as Eastport Sand (Es) and soils classified as Bottom Land (B.L.) occur mainly along the east branch of Big Creek. Wetland soils are classified as Marsh (Ma) and occur all along the Big Creek and Mans Marsh wetland areas.

Natural Heritage Significance

Lands within the watershed have been identified as within the Big Creek Marsh Provincially Significant Wetland (PSW), as a result of evaluation and mapping conducted by staff of the Ontario Ministry of Natural Resources (OMNR) during the 2009 field season. The watershed contains the Big Creek Marsh life science Area of Natural and Scientific Interest (ANSI) as

identified by the Ontario Ministry of Natural Resources (OMNR), signifying one of the best examples of shoreline marsh and associated wetland in the Province of Ontario. The watershed contains lands which are within the boundary of the Big Creek Significant Valleyland as mapped by the Essex Region Conservation Authority (ERCA). In addition, Big Creek has been identified as an Environmentally Significant Area (ESA) by ERCA, a Carolinian Canada Site and an Important Bird Area.

Ecological Function

The extensive wetland area within the watershed performs the ecological function of hydrological flow, water retention and purification; receiving water from upstream, and purifying it within the wetlands before flowing out into Lake Erie or filtering through the barrier beach. The main wetland area of the Big Creek marsh basin is the primary location where sediments settle out of suspension and nutrients and bacteria are metabolized by the extensive submergent aquatic wetland plant community. In addition, many portions of the watershed provide extensive linkage between the natural features at the mouth of Big Creek, along the Lake Erie shoreline, on Knapp's Island, and north of County Road 20.

Vegetation

The watershed exhibits extremely high diversity with respect to the number and types of vegetation communities, containing 115 vegetation types (ecoelements) in 22 Community Series as identified and mapped according to the Ecological Land Classification (ELC) System for Southern Ontario. Vegetation community composition is 63% wetland/aquatic and 37% terrestrial. The uplands support 53 woody and 13 herbaceous plant communities. The wetlands support 35 herbaceous and 14 woody plant communities. A total of 10 significant communities ranked as provincially rare occupy almost one quarter of the entire watershed area surveyed. The most significant of these communities is a 214 hectare (529 acre) American Lotus Floating-leaved Shallow Aquatic vegetation community which occupies over 16% of the watershed area surveyed. This may indeed be the largest population of this provincially rare plant and vegetation community in Ontario. The Big Creek watershed also contains the Region's largest (and perhaps only) stand of Wild Rice marsh, a community which requires fluctuating water levels in order to thrive.

Significant Woodland

The Big Creek watershed contains woodlands which fulfill the Significant Woodland criterion, based on the following criteria:

- 2 hectares in size or larger,
- presence of interior forest habitat more than 100 m from the edge,
- greater than 0.5 hectares in size located within 30 metres of fish habitat likely receiving ecological benefit, and/or
- greater than 0.5 hectares in size consisting of a vegetation community with a provincial ranking of S1, S2 or S3 (as ranked by the Ontario Ministry of Natural Resources' (OMNR) Natural Heritage Information Centre (NHIC)).

Fifty-two (51) different wooded vegetation communities were identified throughout the watershed, with four (4) of these communities currently ranked as provincially rare.

Floral Species

Floristically, the watershed's flora has a mean Coefficient of Conservatism (CC) of 5.10 and a Floristic Quality Index (FQI) value of 104.23. This indicates that the watershed's flora is relatively intact with high floristic quality, an extremely rare condition representing a significant component of Ontario's native biodiversity and natural landscapes. The Wetness Index for the site, calculated from the mean Coefficient of Wetness (CW) of all native taxa recorded from the site inventory, is -0.36 indicating that the site has a predominance of wetland species.

A total of 562 plant species were identified from 4458 observations recorded during the botanical inventory for the watershed. A total of 56 significant floral species were documented, 5 of which are listed as Species at Risk. These include Red Mulberry (*Morus rubra*) [Endangered], Willow Aster (*Aster praealtus* var. *praealtus*) [Threatened], Kentucky Coffee-tree (*Gymnocladus dioicus*) [Threatened], Hop Tree (*Ptelea trifoliata*) [Threatened], and Golden Seal (*Hydrastis canadensis*) [Threatened] species.

Wildlife

A total of 259 animal species were identified from 2562 observations recorded during the faunal inventory for the watershed. A total of 159 species of birds, 16 species of mammals, 10 species of reptiles, 6 species of amphibians, 38 species of butterflies, and 30 species of Odonata (dragonflies and damselflies) were documented within the Big Creek watershed during the 2009 faunal surveys. A total of 66 significant faunal species were documented, 9 of which are listed as Species at Risk. These include King Rail (*Rallus elegans*) [Endangered], Prothonotary Warbler (*Protonotaria citrea*) [Endangered], Eastern Foxsnake (*Pantherophis gloydi*) [Endangered], Least Bittern (*Ixobrychus exilis*) [Threatened], Blanding's Turtle (*Emydoidea blandingii*) [Threatened], Butler's Gartersnake (*Thamnophis butleri*) [Threatened], Peregrine Falcon (*Falco peregrinus*) [Threatened], Chimney Swift (*Chaetura pelagica*) [Threatened], and Stinkpot or Eastern Musk Turtle (*Sternotherus odoratus*) [Threatened].

Significant Wildlife Habitat

The Big Creek watershed contains colonial bird nesting sites of Least Bittern, Forster's Tern, Black Tern, Marsh wren, Red-winged Blackbird and Common Grackle. The open water wetlands are significant as a waterfowl stopover and staging area, while the diverse upland areas within the watershed provide landbird migratory stopover areas as well as stopover habitat for the Monarch butterfly. Some areas within the watershed provide Turkey Vulture summer roosting areas as well as suitable areas of reptile hibernacula for the following species: Eastern Foxsnake, Butler's Gartersnake, Northern Watersnake, DeKay's Brownsnake, Snapping Turtle, Midland Painted Turtle, Blanding's Turtle, Common Map Turtle, and the Common Musk Turtle. The wetland is of sufficient quality to support a population of Bullfrogs. Ten (10) different provincially rare (S1 to S3) vegetation communities were also identified within the watershed. The faunal inventory recorded the presence of area-sensitive bird species. Some areas of forest

are extensive enough to provide interior forest habitat. In addition, the forested areas within the watershed contain numerous amphibian woodland breeding ponds. The beach shoreline provides significant opportunities for turtle nesting, and many areas within the watershed provide habitats for species of conservation concern. Many areas within the watershed are located on sections of Big Creek and/or its tributaries which function as animal movement corridors.

Finally, it is important to note that this very extensive and diverse wetland is extremely productive with respect to wildlife breeding, especially marsh birds. The conditions which lend themselves to this area being such an extremely productive wetland are largely due to the fact that most of the wetland area is privately owned and managed. This wetland would not be as productive biologically if this area was intensively used by the public during the breeding season. The current owners and managers are to be commended for their outstanding stewardship and management of their properties.