Example of Open Habitat Management in New Hampshire

Species Focus
of conservation concern

Eastern meadowlark
These songbirds require fields larger than 15 acres, with tall grasses and a mix of wildflowers typical of fields that have gone un-mowed for up to five years. Meadowlarks will also breed in lush hayfields, but the fields must be of a sufficient size.


Eastern meadowlark

Bobolink
Bobolink, although not listed as a species of conservation concern, is the most common grassland-nesting bird found in New Hampshire fields. Ideal bobolink habitat is a lush hayfield larger than five acres, that is mowed once a year in September. Removing the hay from the field is also beneficial, as the birds prefer fields without thick thatch layers. A one- or two-acre border area might be mowed only every two or three years to provide a diverse mix of wildflowers such as milkweed, aster, goldenrod, and thistle. These plants attract a wide variety of insects that provide a rich food source for bobolinks and other birds.


Bobolink

Smooth green snake
Smooth green snakes live and feed in open habitats such as pastures, old fields, and wet meadows throughout New Hampshire. Edges of these habitats provide the rotting logs and mammal burrows in which smooth green snakes lay eggs in summer and hibernate in winter. They feed on insects, slugs, caterpillars and earthworms. Populations of smooth green snakes are in decline due to habitat loss. Frequent mowing and low mower blades can kill snakes. Insecticide spraying in agricultural fields (especially for slugs) may also impact smooth green snakes by reducing the amount of prey available.


Green snake

Managing Small Fields for Wildlife

Many landowners own fields smaller than five acres. These fields are still important for other wildlife species, and as foraging areas for grassland birds nesting in nearby larger fields or migrating songbirds passing through. Landowners can manage their fields to improve the overall plant and wildlife diversity by:

- Mowing fields only once every two or three years to increase wildflower and insect diversity.
- Mowing as late in the fall as possible (September-October) to allow late-blooming wildflowers to form and provide nectar sources for migrating butterflies.
- Maintaining some areas of bare ground (poor soils or heavily-grazed areas) for such species as killdeer and horned larks.
- Establishing a rotational mowing or grazing program in which different parts of a field are mowed/grazed at different times. This creates a patchwork of different grass heights that provides cover and feeding opportunities to the greatest number of wildlife. Contact your county UNH Cooperative Extension Agricultural Educator for more information on establishing a rotational mowing or grazing program on your land.

Historical
changes in grassland habitats

Historically, Native Americans and beavers were the primary forces responsible for creating and maintaining grassland habitats in New England. Native Americans created grasslands when they burned the land for agriculture and to improve forage for game species such as white-tailed deer. At the same time, ponds above abandoned beaver dams grew into grassy meadows after the water drained and the nutrient-rich soil was exposed to sunlight.

In more recent history, fire suppression and limits to where beavers are allowed to build dams has meant that grasslands are restricted mainly to agricultural areas. The peak of agricultural clearing in the state occurred in the mid-1800s. Since then, New England has been losing grassland habitats, which have grown back into forest. With their well-drained soils, tree-less fields, and ample road frontage, agricultural lands also offer attractive sites for development.

Today most grasslands in New Hampshire require maintenance by humans. If left alone, these habitats will grow back into shrubs and small trees, reverting eventually to forest.

Declines in grassland-nesting birds

Bird species that depend on grasslands have declined, along with their habitats, faster than any other group of birds in New England. Most grassland-nesting birds are "area sensitive," which means they won't nest in fields smaller than a certain size. The following list is a simplified guide to the required minimum field size and the preferred vegetation height in fields used by grassland-nesting birds:

Birds of smaller grasslands (<25 acres)		
Bobolink	5+ acres	dense grass taller than 3 feet
Eastern meadowlark	15+ acres	dense grass and wildflowers taller than 3 feet
Savannah sparrow	20+ acres	prefers sites with both short and tall vegetation
Birds of larger grasslands (>25 acres)		
Grasshopper sparrow*	30+ acres	prefers sites with short, sparse grass; uncommon
Northern harrier**	30+ acres	forages in short grass fields, nests in wet meadows
Upland sandpiper**	150 acres	prefers sites with short, spare grass; very rare

*state-threatened species **state-endangered species

Agricultural practices and bird nesting

Without the work of farmers and other landowners, most grasslands would quickly revert to forest. However, the timing of mowing can affect a field's ability to provide habitat for grassland-nesting birds and other wildlife. Farmers growing high-quality forage for livestock usually mow their fields two or three times during the summer. At least one of these mowings typically occurs between May and mid-July, a time that corresponds with the nesting season for most grassland-nesting birds. Mowing during this period can destroy nests and eggs, kill fledglings, or cause adult birds to abandon their nests.

Stewardship Guidelines for grasslands

- Grasslands of any size provide valuable habitat for wildlife in New Hampshire. If you own fields, maintain them by mowing in the fall at least once every three years to discourage trees and shrubs. It is much more difficult and expensive to create a new field than to maintain an existing field by mowing.
- Focus land conservation on large grasslands (greater than 25 acres in size), which benefit the greatest number of wildlife species and are increasingly rare in the state.
- In fields where intensive agricultural production is not an issue, mow fields after August 1st, the end of grassland-breeding bird season. Mowing even later (August-October) is ideal, since this allows late-flowering wildflowers such as aster and goldenrod to provide nectar for migrating butterflies. Areas where later mowing may be possible include airfields, capped landfills, fallow fields, edge habitats, marginal farmland, weedy areas, and fields producing bedding straw.
- In agricultural fields, modifications to mowing techniques can help reduce impacts on grassland-breeding birds during the breeding season (May through mid-July):
    - Raise mowing bar to six inches or more in areas with grassland bird concentrations.
    - Grassland birds roost in the fields at night, so avoid mowing after dark.
    - Use flushing bars on haying equipment (for more information, contact the Wildlife Division of the New Hampshire Fish and Game Department at 271-2461).
    - Delay mowing in wetter areas or in grasslands along rivers.


Tractor with flushing bar

- Farmers are faced with many pressures during the growing season—variable weather, equipment demands, planting schedules—making it difficult for them to incorporate a refined mowing technique and schedule to accommodate grassland-nesting birds. However, interested farmers have a number of federal and state cost-share programs available to help pay for practices that benefit wildlife. Contact your county UNH Cooperative Extension office or the Natural Resources Conservation Service (NRCS) for more information about these cost-share programs.
- Where possible, remove all shrubs and trees growing in the middle of fields, as these decrease the useable acreage as perceived by grassland-nesting birds.
- Burning fields, particularly in areas with poor soil, can improve soil nutrients and mimic historical disturbances to grassland habitats. Burning will also help spread native grasses (see below) if they already exist in a field. Some New Hampshire landowners have established partnerships with their local fire departments to burn fields on an annual basis as training for firefighters.


A controlled burn

- Warm-season grasses, many of which are native to the U.S., may be a viable alternative to (non-native) cool-season grasses as an agricultural hay crop. Warm-season grasses are more difficult to establish, but they offer some benefits to landowners willing to take on the challenge. They require less fertilizer, lime, and herbicides, and are more drought-tolerant. For wildlife, they offer better nesting cover (growing as in bunches, with space between for movement and nests), a more dependable food source, and better winter cover, since they don't mat down during heavy snows. The NRCS and UNH Cooperative Extension can provide advice and possible cost-share funds to plant warm-season grasses.

Wildlife found in grasslands

Grasslands of all sizes will be used by over 150 different wildlife species throughout the year. Below are some examples of species that depend on grassland habitats. Be on the lookout for these species, and follow the stewardship guidelines provided to help maintain or enhance grassland habitats in your area. Species of conservation concern—those wildlife species identified in the Wildlife Action Plan as having the greatest need of conservation--appear in **bold** typeface.

- **American bittern**
- American kestrel
- **Black racer**
- **Blanding's turtle**
- Bobolink
- **Eastern hognose snake**
- **Eastern meadowlark**
- **Grasshopper sparrow***
- **Horned lark**
- **Northern harrier****
- **Northern leopard frog**
- **Purple martin****
- Savannah sparrow
- Small rodents (important as prey species)
- **Smooth green snake**
- Turkey
- **Upland sandpiper****
- **Vesper sparrow**
- **Whip-poor-will**
- White-tailed deer
- **Wood turtle**

◆The threatened and endangered status of many wildlife species is under review. For the current list, visit NH Fish and Game's website at wildlife.state.nh.us

* state-threatened species
** state-endangered species

Where to get help

If you have information about a wildlife species of conservation concern, contact NH Fish & Game's Wildlife Division at 603-271-2461. Contact the UNH Cooperative Extension Wildlife Specialist at 603-862-3594 for technical assistance for landowners or your community.

Publications and assistance on forestry and wildlife topics are available through the UNH Extension Educators in Forest Resources in each county. Contact information for each UNH Cooperative Extension office is provided below. Additional publications, contact information, resources, and web versions of all brochures in the Habitat Stewardship Series are available on the UNH Cooperative Extension website at: **extension.unh.edu.**

Belknap County	603-527-5475	Grafton County	603-787-6944	Rockingham County	603-679-5616
Carroll County	603-447-3834	Hillsborough County	603-641-6060	Strafford County	603-749-4445
Cheshire County	603-352-4550	Merrimack County	603-225-5505	Sullivan County	603-863-9200
Coos County	603-788-4961				

Authorship

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About the Habitat Stewardship Series

Much of the land in New Hampshire is privately owned. These individuals are the primary stewards of our wildlife and forests, and also our clean water, scenic views, fresh air, natural and cultural heritage, and recreational resources. The Habitat Stewardship Series has been created to help landowners and land managers recognize the habitats critical for wildlife species at risk, and to illustrate the role private landowners can play in sustaining those species through conservation, management, and sound land stewardship.

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UNIVERSITY of NEW HAMPSHIRE COOPERATIVE EXTENSION

SUSTAINABLE FORESTRY INITIATIVE

Restoration Overlay R2

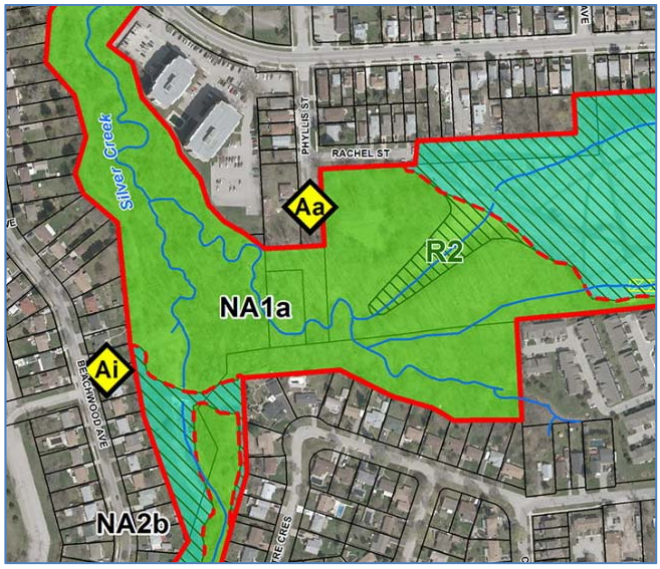
Intent of Management for R2

R2 located at the west end of Euston Meadows is a disturbed area that forms an approximately 150 metre long, narrow cleared embayment into the surrounding woodland. The objective is to restore native woodland of similar composition to the surrounding Dry-Fresh Sugar Maple Deciduous Forest (FOD5-1) to increase interior forest habitat. Given the proximity of surrounding forest, natural succession processes will lead to restoration of this area. Monitoring and adaptive management is recommended to control invasive species and to encourage and supplement native regeneration.

Management Actions Required for R2

The following are the key management actions identified for R2

- Removal of invasive species, particularly European Buckthorn
- Tree planting to encourage the establishment of deciduous forest
- Supplemental shrub and forb planting to restore native deciduous forest understorey vegetation



Record of Management Actions Taken for R2		
Date (dd/mm/yy)	**Management Action Taken**	**Contact Person**

Restoration Overlay R3

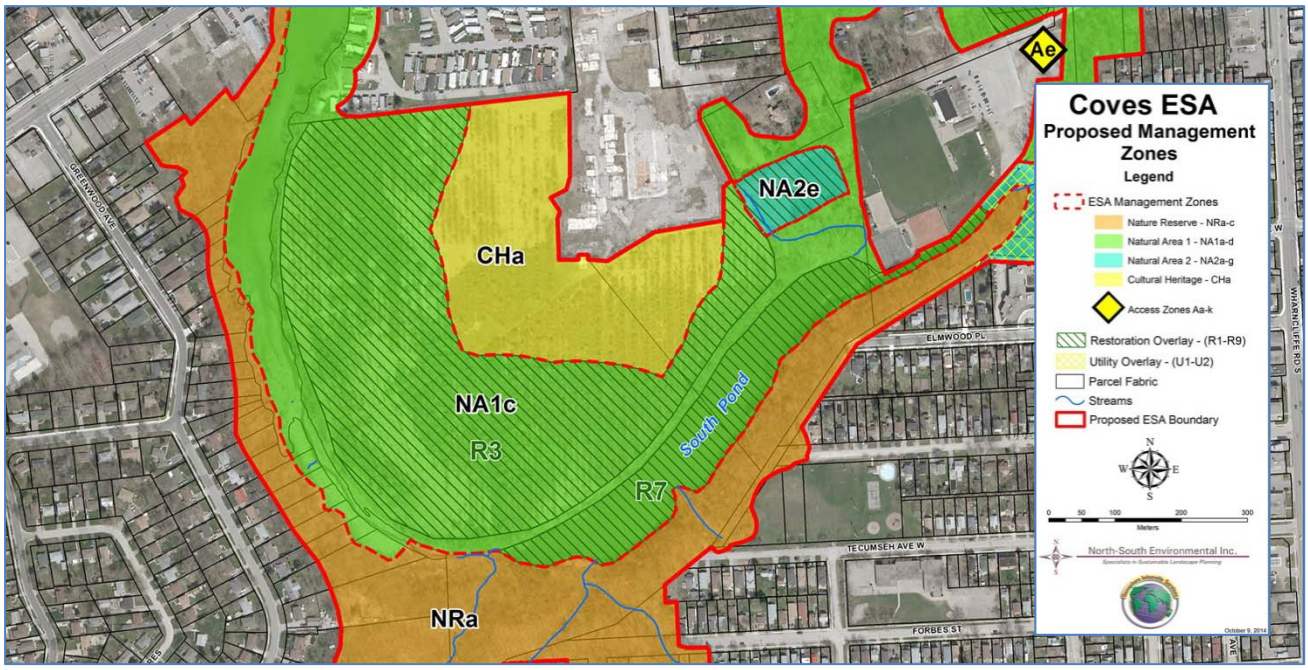
Intent of Management for R3

R3 located between the Coves West and South Ponds is an abandoned orchard undergoing natural succession. The objective is to restore a native, self-sustaining plant community. A comprehensive inventory and restoration plan is required to provide detailed information regarding goals, objectives, target species, restoration methods, monitoring and adaptive management.

Management Actions Required for R3

The following are the key management actions identified for R3

- Comprehensive flora and fauna inventory
- Development of a plan to establish goals and objectives for restoration and appropriate methods for implementation



Record of Management Actions Taken for R3		
Date (dd/mm/yy)	**Management Action Taken**	**Contact Person**

Restoration Overlay R4

Intent of Management for R4

R4 located north of Springbank Drive includes four open areas of mown lawn (M) and Cultural Meadow (CUM), where some tree planting has been initiated. The restoration objective is to restore these areas to native woodland to increase the ecological linkage of the Coves West Pond area to the Thames River. Restoration should consist of no mowing in these areas and the planting of native trees species selected based on adjacent Fresh-Moist Black Walnut Lowland Deciduous Forest (FOD7-4)

Management Actions Required for R4

Note management actions should be undertaken in consultation with the City of London Park Maintenance Department to ensure the required boulevard mowing is maintained and to ensure maintenance staff are aware of areas identified for restoration where no mowing is required.

The following are the key management actions identified for R4

- Consult with Park Maintenance Department to identify the boundary of areas to be restored
- Develop a list of appropriate tree species for planting based on trees present in adjacent natural area FOD7-4 Fresh-Moist Black Walnut Lowland Deciduous Forest
- Tree planting to encourage the establishment of deciduous forest vegetation
- Supplemental shrub and forb planting to restore native deciduous forest understorey vegetation
- Springbank Drive constitutes a substantial ecological barrier, enhanced ecological connectivity opportunities associated with the existing culvert should be investigated

Note: see main map for legend to map section shown below

Record of Management Actions Taken for R4		
Date (dd/mm/yy)	**Management Action Taken**	**Contact Person**

Restoration Overlay R5

Intent of Management for R5

R5 is located north of Springbank Drive and east of Greenside Avenue and includes two areas of Cultural Meadow (CUM) that were previously soccer fields and open mowed areas adjacent to Springbank Drive. The smaller and more easterly area includes Swallowtail Grove, open habitat being managed by Friends of the Coves (http://www.thecoves.ca/project.php?id=24). The long term management objective is to maintain open habitat in these two areas and this will require monitoring and adaptive management for periodic mowing, the control of invasive species and to encourage and supplement (where needed) native grassland species (see also information provided in R1 guidance on maintaining open habitat).

Management Actions Required for R5

Note management actions should be undertaken in consultation with the City of London Park Maintenance Department to ensure the required boulevard mowing is maintained and to ensure maintenance staff are aware of areas identified for restoration where no mowing is required.

The following are the key management actions identified for R5

- Removal of invasive species, particularly European Buckthorn
- Periodic mowing of all areas to reduce the establishment of woody tree and shrub growth
- Adopt an adaptive management approach should be implemented that includes ongoing monitoring of the establishment of woody plants and research to determine the best method(s) for their removal (e.g. mowing, prescribed burning, selective removal).

Record of Management Actions Taken for R5		
Date (dd/mm/yy)	**Management Action Taken**	**Contact Person**

Restoration Overlay R6

Intent of Management for R6

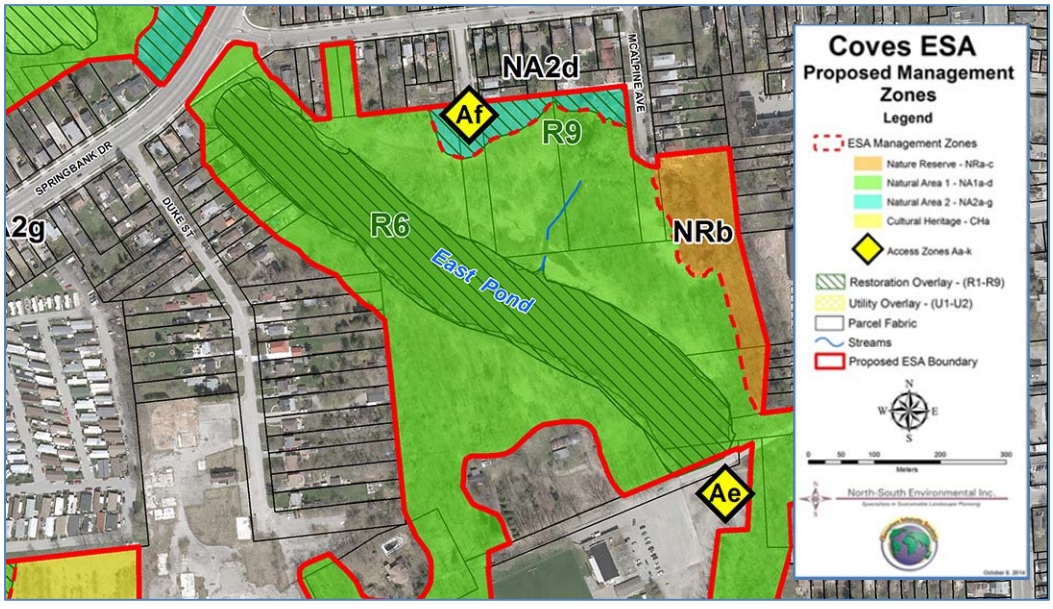
R6 located south of Springbank Drive includes the open water and shoreline areas of the East Pond. Restoration has been proposed for the East Pond focusing on strategies related to shoreline enhancement and pond deepening (see information provided below). These initiatives are consistent with the Coves Subwatershed Plan (Friends of the Coves 2004), which has identified management recommendations and actions.

Management Actions Required for R6

Note the conveyance of stormwater through the Coves ponds to the Thames river is critical infrastructure for the surrounding urban neighborhood. Management actions must therefore be done in consultation with the Environment and Engineering Services Department of the City of London and the Upper Thames River Conservation Authority (UTRCA) and must ensure stormwater conveyance is maintained.

The following are the key management actions identified for R6

- sediment testing to consider the potential negative impacts of sediment disturbance prior to development and implementation of a restoration strategy;
- deepening along a portion of the historical river channel to provide suitable over-wintering habitat;
- creation of near-shore littoral habitat that connects to mid-depth and maximum depth areas to provide a greater diversity of habitat conditions;
- restoration of shoreline vegetation and structural diversity through appropriate aquatic vegetation plantings as well as logs, dead trees (snags) and rock; and
- creation of bays along the eastern shoreline that provide spawning habitat and thermal refuge during the spring through the installation of appropriate in-water substrate and aquatic vegetation.



Record of Management Actions Taken for R6		
Date (dd/mm/yy)	**Management Action Taken**	**Contact Person**

Coves ESA East Pond Aquatic Enhancement

Justification for Proposed Aquatic Enhancement

The Coves ESA protects ecologically significant aquatic and terrestrial environments associated with an oxbow (ancient river channel) of the Thames River. The Coves ESA is located within areas of urban development at the centre of the City of London representing an important natural area that is appreciated by residents.

The Coves ESA includes three inter-connected ponds (or "coves"); the aquatic habitat of the East Pond experiences fewer negative impacts from stormwater and surface erosion runoff because of its upstream location. The East Pond has a diverse aquatic and riparian flora and fauna including fish, turtles, frogs, birds, insects and a variety of plant communities.

Despite the more protected position of the East Pond the input of sediment contained in runoff from surrounding areas of urban development causes infilling of the East Pond resulting in more shallow water levels. Water levels are on average less than one metre. Sediment inputs and shallow water levels have a negative impact on flora and fauna that can be mitigated through rehabilitation.

Currently, the restoration proposed for East Pond as outlined below includes strategies for shoreline enhancement and pond deepening. While these initiatives are consistent with the recommendations of the Coves Subwatershed Plan (Friends of the Coves 2004) they should be reviewed with stakeholders prior to implementation.

The proposed rehabilitation is also consistent with City of London policies for encouraging management and rehabilitation measures that protect, maintain and enhance the ecological function and integrity of the Natural Heritage System (15.3.7), in particular to rehabilitate degraded shorelines of rivers and streams (clause d), and to protect, rehabilitate and/or create fish habitat, and to encourage a net gain of productive capacity (clause g).

Sediment Testing Prior to Restoration

The proposed restoration activities include actions that will result in disturbance of the existing sediments within the East Pond. As the quality of sediments is unknown and as disturbance of the sediments may result in negative impacts, sediment testing should be conducted as a first step in the development of a restoration plan.

Proposed Locations for Enhancement of Coves ESA East Pond

The proposed location for shoreline enhancement and pond deepening is shown on Figure below. The locations were chosen based on accessibility to undertake rehabilitation and the opportunity to obtain the greatest possible benefit from enhancement.

Target Species

A total of 16 fish species have been captured and recorded in the East pond, some of which are not preferred (common carp and goldfish). Enhancement could target native species of cool and warm water fish present in the East pond of the Coves (pers. comm. John Schwindt, Fish Biologist with UTRCA). Native species would benefit from deeper refuge habitat for overwintering and potential spawning bays with areas of submerged vegetation.

Target species will also include species of terrestrial wildlife, with particular focus on those that inhabit narrow wetlands characteristic of riparian areas, (see Table below). Enhancement of the East Pond for terrestrial wildlife will be configured to attract species with relatively specific habitat requirements, though target wildlife species must also be those that are relatively tolerant of urban habitat. The list provided below includes those that have more specific habitat dependencies than, for example, ubiquitous species such as American Robin or Song Sparrow. The table also includes recommended vegetation and habitat elements to be included in enhancement intended to attract these species.

Examples of target wildlife species recommended for restoration of the East Pond Aquatic Enhancement Area

Target Wildlife Species	Representative Habitat	Recommended Vegetation Species and other Habitat Elements
Birds		
Willow Flycatcher	• Thicket swamp	• shrub willows (e.g. slender willow, heart-leaved willow) • red-osier dogwood .
Common Yellowthroat	• Cattail marsh	• common cattail • bulrushes
Blue-gray Gnatcatcher, Warbling Vireo	• Treed riparian areas	• bur oak • sycamore • black willow
Wood Duck, Tree Swallow	• Tree cavities in treed riparian areas	• black willow • sycamore • nest boxes (smaller diameter for Tree Swallow, larger diameter for Wood Duck; requires protection from European Starling & House Sparrow)
Barn Swallow (Threatened in Ontario)	• Overhanging ledges near open areas for foraging	• shed or other small outbuilding (requires protection from cats)
Turtles		
Snapping Turtle, Midland Painted Turtle	• Deep water for overwintering • Sandy nest sites • Basking sites	• aquatic habitat with adjacent sandy open banks (requires protection from predators) • woody debris placed for basking sites
Frogs		
American Bullfrog	• Deep water for overwintering • Emergent vegetation for spawning habitat	• common cattail • bulrushes (e.g. river bulrush) • robust sedges (e.g. water sedge, lakebank sedge. beaked sedge)

Rehabilitation Methods

Enhancement of open water and shoreline habitat will improve the aquatic conditions in the East pond by providing a diversity of depths, substrate type, cover, seasonal refuge. Current depths found in the East pond in the north end range from 0.2 to 1.4 metres; depths which do not provide adequate deep water habitat for overwintering. A maximum depth of 3.7 to 4.6 metres in the East pond would provide ideal deep water overwintering habitat. The linear shoreline of the East pond has an abrupt transition from onshore terrestrial habitat and has a low diversity of aquatic vegetation and structural diversity present. Rehabilitation in the East pond would also include mid-depth enhancement areas 1.8 to 2.4 metres deep and near shore spawning bays 0.6 to 1.2 metres deep (see Figure below). Proposed rehabilitation will therefore consist of:

- deepening along a portion of the historical river channel to provide suitable over-wintering habitat;
- creation of near-shore littoral habitat that connects to mid-depth and maximum depth areas to provide a greater diversity of habitat conditions;
- restoration of shoreline vegetation and structural diversity through appropriate aquatic vegetation plantings as well as logs, dead trees (snags) and rock; and
- creation of bays along the eastern shoreline that provide spawning habitat and thermal refuge during the spring through the installation of appropriate in-water substrate and aquatic vegetation.

Equipment used for the dredging and construction of the new habitat will require a base to work from in order to access areas within the East pond that will be dredged. Discussion with the City of London has determined suitable access is available from two locations; (1) public property located adjacent to Springbank Drive at the north end of the East pond and (2) public property along the eastern shore of East pond accessible via an existing grassed entranceway or via the end of Brookdale Avenue (see Figure below). Substrate dredged from the area to provide deeper overwintering habitat can be used for littoral zone creation similar to a cut/fill balance. Suitable native substrate can be stockpiled and used for “toping” once final depths have been achieved in deeper areas. Coir (coconut husk) matting or a berm configuration will be used to keep fine grained sediments from migrating back into the pond and provide material to build the bays and associated shoreline improvements.

Expected Benefits

- increased biodiversity provided by species plantings and greater number and complexity of niche created;
- structural elements installed create expanded habitats for new and existing and species;
- in water and out of water structural diversity and habitats provided by plants
- water quality enhancement provided by shading that reduces water temperatures
- increased organic material (leaves and woody material) in water that adds physical structure to the habitat and food sources to feed aquatic organisms
- increased bank stability and reduced shoreline erosion

Improvements to the Aquatic habitat and littoral zones found in the east pond will have an overall benefit to the entire ecosystem. Ecological benefits to the East pond will be:

- diversity of habitat types that will support sport fish species and required life stages, as well as additional terrestrial wildlife species;

- improvements to water quality through the removal of fine grained sediments and the removal of non-native fish species (carp and goldfish) that disturb aquatic vegetation and sediments, factors which contribute to increased turbidity and reduced growth of macrophytes
- deeper over wintering areas may expose groundwater input, provide some thermal diversity and reduce winter kill of fish and additional wildlife such as turtles and frogs by providing over wintering habitat
- creation of woody shoreline habitat that will also benefit several bird species;
- creation of habitat elements such as basking logs and nest boxes that would be used as habitat by several species; and
- improvement to the social perception of the ecosystem health in the Coves

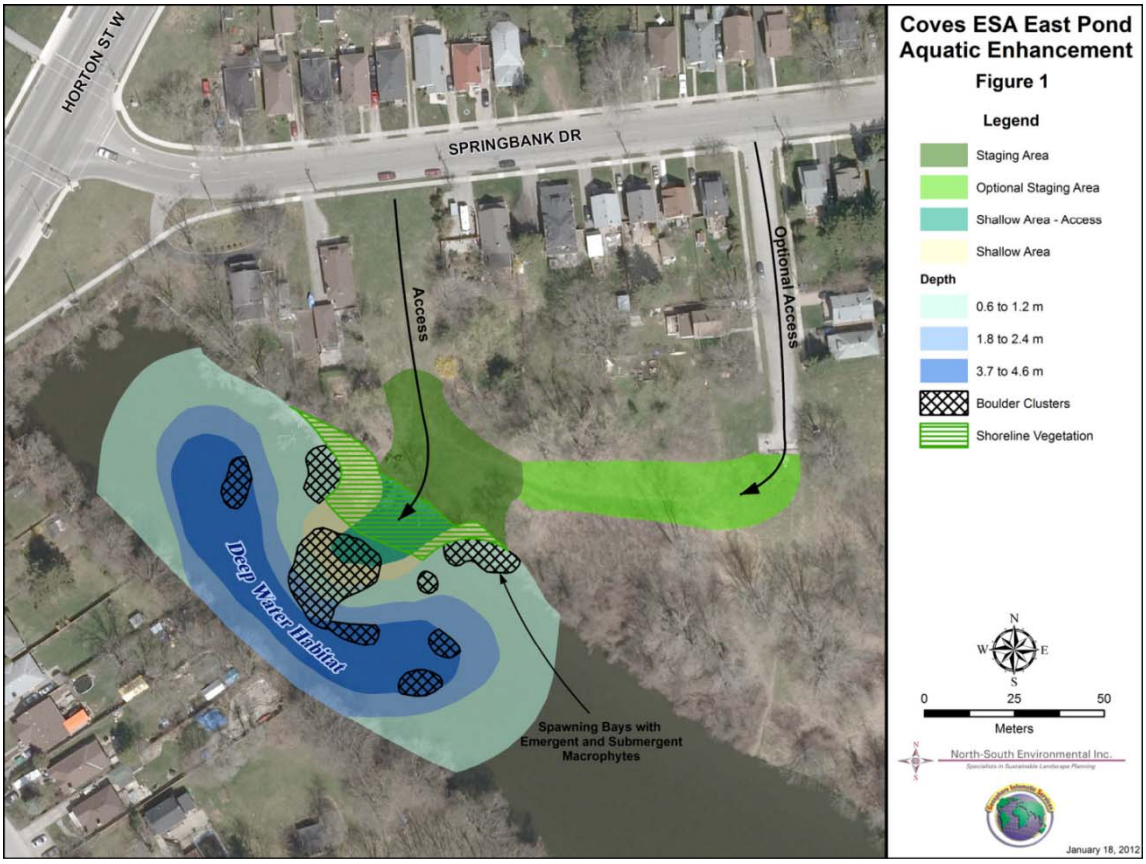
It will be important to determine the area that will benefit most from these improvements and protect surrounding areas during construction from sedimentation, damage to native vegetation and changes to water quality. Mitigation measures will be developed based on detailed design.

Expected Costs

1. Detailed engineering, design drawings for dredging and restoration plan for shoreline enhancement - $50K

2. Dredging to provide suitable over-wintering habitat and mid-depth littoral zones - $100K

3. Creation of bays along eastern shoreline and installation of shoreline cover - $50K



Restoration Overlay R7

Intent of Management for R7

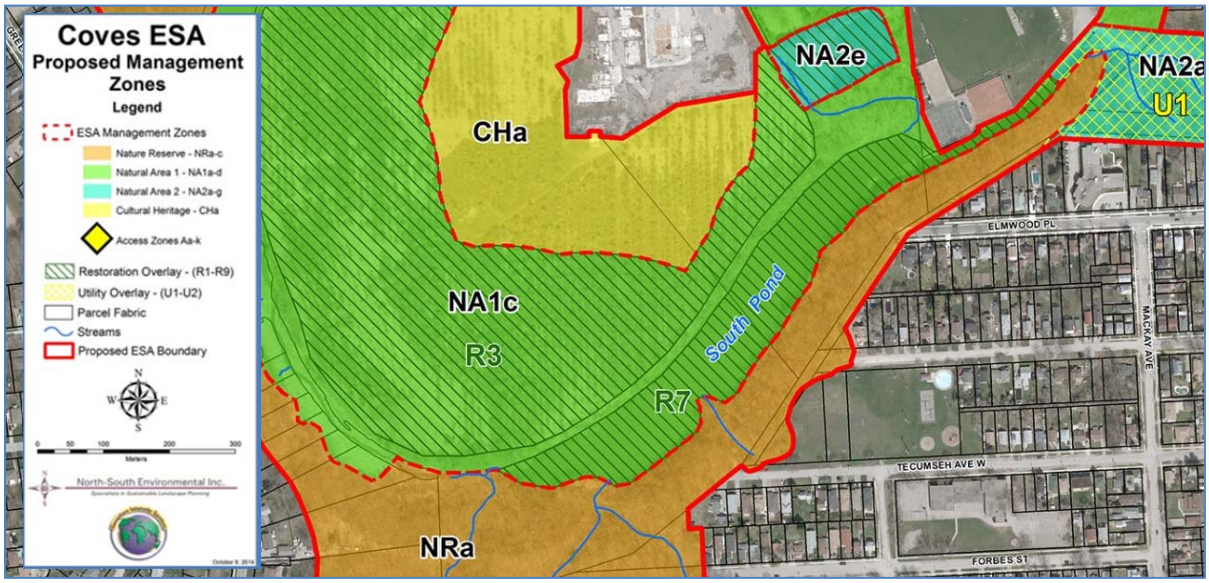
R7 is overlaid on the South Pond of the Coves due to the presence of a stormwater outfall that can have an impact on the hydrology, water quality and the associated accumulation of silt. Restoration options should be considered to reduce impacts that may be associated with the stormwater outfall, including recommendations to enhance the South Pond with objectives related to the mitigation of water quantity, water quality and sedimentation, while also ensuring the continued flow of stormwater through the South Pond and the prevention of flooding in the watershed.

Management Actions Required for R7

Note the conveyance of stormwater through the Coves ponds to the Thames River is critical infrastructure for the surrounding urban neighborhood. Management actions must therefore be undertaken in consultation with the Environment and Engineering Services Department of the City of London and the Upper Thames River Conservation Authority (UTRCA) and must ensure stormwater conveyance is maintained.

The following are the key management actions identified for R7

- Work with the Environment and Engineering Services Department and the Upper Thames River Conservation Authority (UTRCA) to identify restoration options within the Coves ESA and options that may apply outside with the ESA boundary within the Coves Subwatershed (see Dillon 2003, 2004) that may enhance the environment of the South Pond
- Monitor water quality of the South Pond (see CMP Section 5)
- Review the available information to assess changes in silt accumulation



Record of Management Actions Taken for R7		
Date (dd/mm/yy)	**Management Action Taken**	**Contact Person**

Restoration Overlay R8

Intent of Management for R8

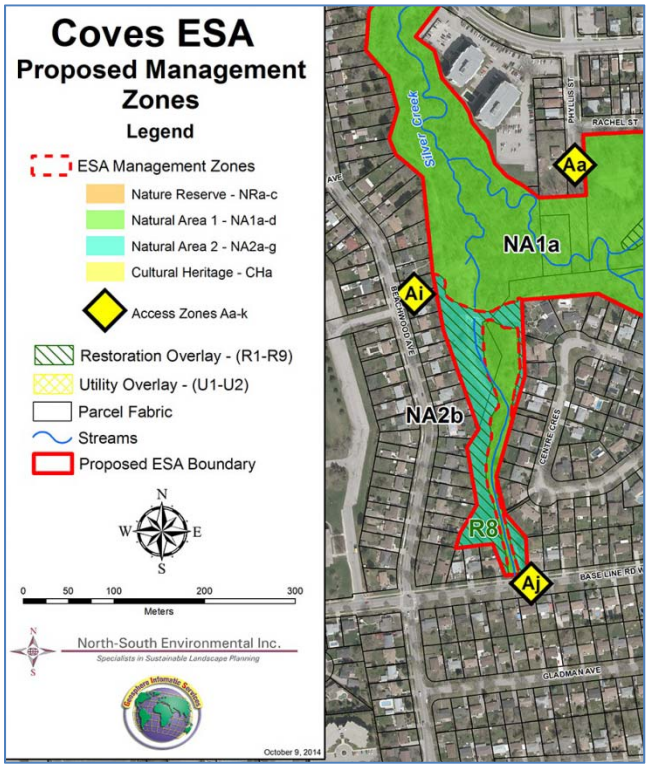
R8 is located north of Base Line Road West and includes an open area of mown lawn (M), where some tree planting has been initiated. The restoration objective is to restore these areas to native woodland to increase natural features and functions along the adjacent watercourse. Restoration should minimize mowing in these areas and increase the planting of native trees species selected based on the species composition of the neighbouring plant community Dry-Fresh Sugar Maple Deciduous Forest (FOD5-1)

Management Actions Required for R8

Note management actions should be undertaken in consultation with the City of London Park Maintenance Department to ensure the required boulevard mowing is maintained and to ensure maintenance staff are aware of areas identified for restoration where no mowing is required.

The following are the key management actions identified for R8:

- Consult with Park Maintenance Department to identify the boundary of areas to be restored
- Consult with the homeowners that have lots backing on this section of the Coves to engage their participation and acceptance of reduced mowing.
- Develop a list of appropriate tree species for planting based on trees present in adjacent natural area FOD5-1 Dry-Fresh Sugar Maple Deciduous Forest
- Tree planting to encourage the establishment of deciduous forest vegetation
- Supplemental shrub and forb planting to restore native deciduous forest understorey vegetation



Record of Management Actions Taken for R8		
Date (dd/mm/yy)	**Management Action Taken**	**Contact Person**

Restoration Overlay R9

Intent of Management for R9

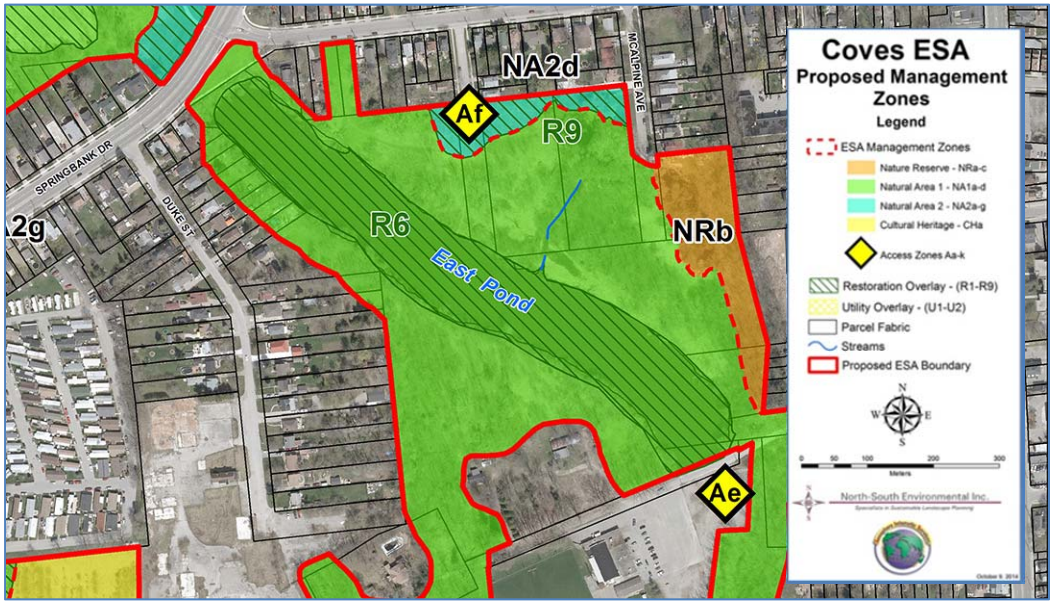
R9 is located along the boundary of the Coves ESA west of McAlpine Avenue and includes an open area of mown lawn (M). The restoration objective is to restore a portion of this area to native woodland adding to the adjacent natural areas. Restoration will minimize mowing and plant native trees and shrubs based on the species composition of the neighbouring plant communities Swamp Maple Mineral Deciduous Swamp (SWD3-3) and Cultural Woodland (CUW1)

Management Actions Required for R9

Note management actions should be undertaken in consultation with the City of London Park Maintenance Department to ensure the required boulevard mowing is maintained and to ensure maintenance staff are aware of areas identified for restoration where no mowing is required.

The following are the key management actions identified for R9:

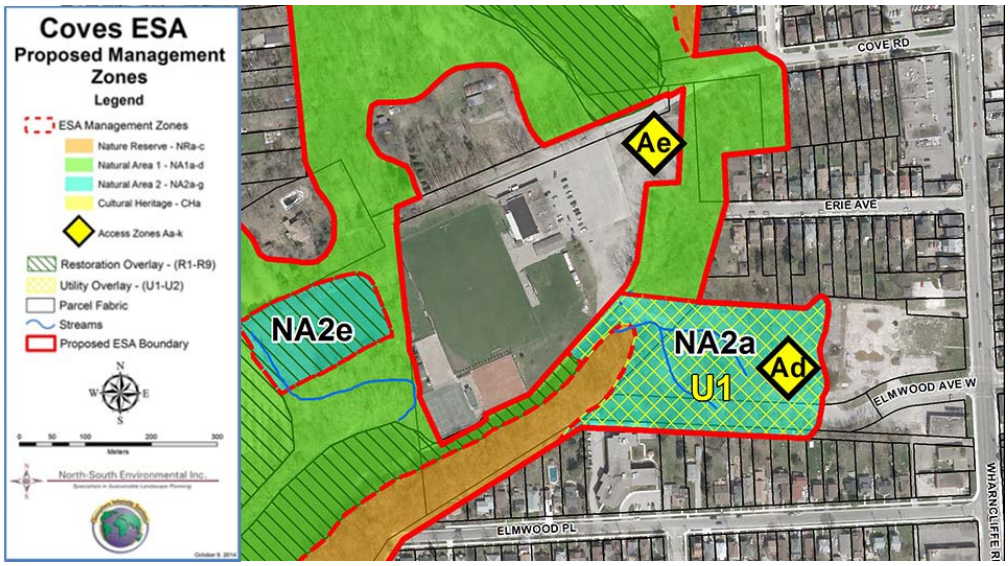
- Consult with Park Maintenance Department to identify the boundary of areas to be restored
- Consult with the homeowners that have lots backing on this section of the Coves to engage their participation and acceptance of reduced mowing.
- Develop a list of appropriate tree species for planting based on trees present in adjacent natural area Swamp Maple Mineral Deciduous Swamp (SWD3-3) and Cultural Woodland (CUW1)
- Tree planting to encourage the establishment of deciduous forest vegetation
- Supplemental shrub and forb planting to restore native deciduous forest understorey vegetation



Record of Management Actions Taken for R9		
Date (dd/mm/yy)	**Management Action Taken**	**Contact Person**

Utility Overlay U1

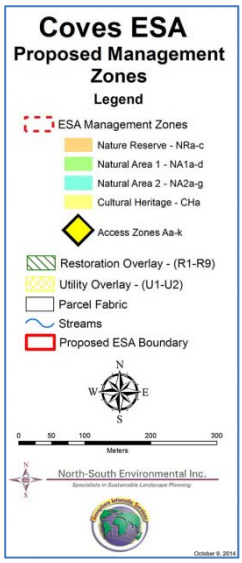
U1 is overlaid on Natural Area 2a due to the presence of a stormwater pipe that runs from Elmwood Avenue West through to the South Pond where an outlet is located. This infrastructure is critical to stormwater management within the Coves subwatershed and may require periodic maintenance to ensure it continues to function as required, conveying stormwater flow to the South Pond. In addition, in this location some areas within the Cove ESA and the adjacent Elmwood Gateway were a former landfill. Existing methane gas off-gassing infrastructure is installed within the area of Elmwood Gateway outside the Coves ESA. Ongoing monitoring of methane off-gassing may in future require maintenance and/or the installation of additional below ground gas collection piping and this may include areas within Natural Area 2a immediately adjacent to the Elmwood Gateway.

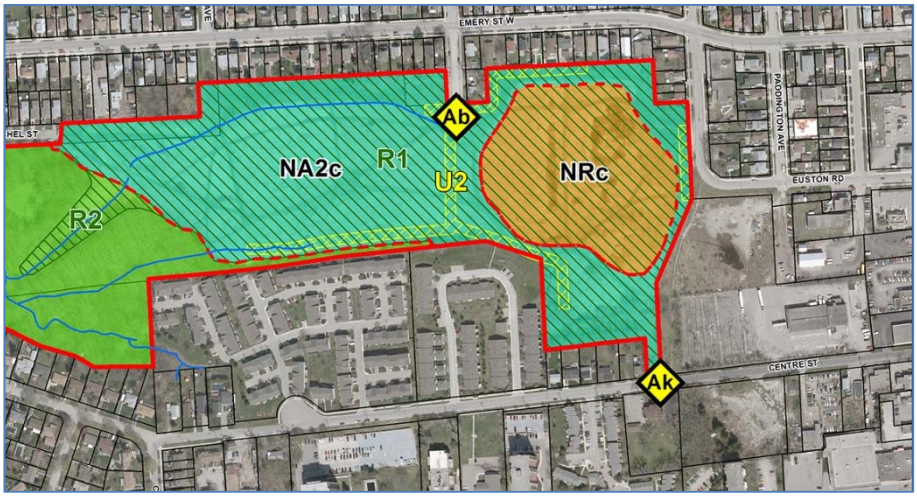


Record of Maintenance and/or Management Actions Taken within U1		
Date (dd/mm/yy)	**Maintenance/Management Action Taken**	**Contact Person**

Utility Overlay U2

Much of the Euston Meadows area was a former landfill. Utility Overlay U2 is overlaid on those areas in Euston Meadows where below ground infrastructure is located to vent gas arising from the decommissioned landfill. The infrastructure includes below ground pipes, wells, purge points and a fan house. Periodic maintenance of this critical infrastructure may be required, including digging to access below ground infrastructure.





Record of Maintenance and/or Management Actions Taken within U2		
Date (dd/mm/yy)	**Maintenance/Management Action Taken**	**Contact Person**

Areas of Encroachment within the Coves ESA

Intent of Management for Areas of Encroachment

To control the direct impact of encroachment which is resulting in the loss and/or displacement of native habitat and the disruption of natural growth and succession processes. To also control indirect impacts associated, such as the introduction of non-native, invasive species. The management of areas of encroachment is linked to the monitoring program for the Coves ESA which includes regular assessment of the boundary of the ESA to identify encroachment issues. Some current areas of encroachment areas within the Coves ESA have been identified on the figure provided in Section 2.

Management Actions Required for Areas of Encroachment

Note management of encroachment should be undertaken in consultation with Municipal Bylaw Enforcement Services of the City of London and should include the distribution of public education materials to ensure residents are aware of the impacts of encroachment (see sample and City Bylaws related to encroachment.

The following are the key management actions identified for Areas of Encroachment:

- Encourage the community to participate by completing and submitting City of London ESA Observation Forms (see copy of ESA Observation Form below)
- Conduct regular monitoring of the Coves ESA boundary to document encroachment issues noting the type and location of encroachment;
- Conduct follow-up visits with residents where encroachment issues have been identified.
- Report issues by phoning 519.661.4980
- Distribute educational material regarding encroachment to residents that border on the Coves ESA (see Living with Natural a Guide for Landowners below);

CITY OF LONDON ESA OBSERVATION FORM

The City of London, in partnership with the Upper Thames River Conservation Authority, manages seven different environmentally significant areas (ESAs) in the City. This form is provided so that members of the public may record observations arising from time spent in ESAs. The City of London will review the information received and take steps to incorporate your suggestions into our ESA Management efforts, subject to existing policies, approved conservation master plans, budget and environmental considerations. Please respect the natural environment during your visit, be aware of permitted and prohibited activities defined on the signs at the trail head and stay on the managed trail system.

OBSERVATIONS PROVIDED BY: **CONTACT INFORMATION:**

PLEASE IDENTIFY THE ENVIRONMENTALLY SIGNIFICANT AREA YOU ARE PROVIDING COMMENTS ON:

- ☐ Meadowlily Woods
- ☐ Westminster Ponds
- ☐ Warbler Woods
- ☐ Medway Valley Heritage Forest
- ☐ Kilally Meadows
- ☐ Sifton Bog
- ☐ Kains Woods

EXPLAIN GENERAL LOCATION (AND/OR GPS POINTS) OF OBSERVATIONS:

COMMENTS RELATE TO THE FOLLOWING:

- ☐ Trails
- ☐ Signage
- ☐ Dogs Off Leash
- ☐ Encroachments/Garbage
- ☐ Invasive Species
- ☐ Monitoring Requirements
- ☐ Habitat Restoration
- ☐ Others

To be filled out by observer	To be filled out by City of London						
		Action			Status		
Observations/Date:	Recommendations:	No Action Req'd	Routine Maintnc.	Capital Project	Target date	Completion Date	File Number

For information related to the City of London Environmentally Significant Areas, including maps, brochures and permitted activities, please visit both the City of London and Upper Thames River Conservation Authority web sites.

To speak with a person regarding ESA management activities, please contact the City of London's Environmental and Parks Planning section.

Please submit comment forms by mail or email to the attention of Linda McDougall lmcdouga@london.ca at the City of London Environmental and Parks Planning Office.

WWW.LONDON.CA
WWW.THAMESRIVER.ON.CA
PHONE: 519-661-4980

City of London Environmental and Parks Planning , 383 Richmond Street, Suite 1102, London Ontario N6A 4L9

Stepping out in ESAs

Since you live adjacent to an ESA you probably visit it often. The very features that make our ESAs precious are also those that could be easily damaged. By following the guidelines below, you can enjoy these natural areas without harming them, and leave them in a healthy state for all to benefit from.

Use only the official access points and trails. When people and dogs leave the marked trails, wildlife and plants are trampled and disturbed. Most ESAs are mapped, have signed entrances to a marked trail system, and trails marked with yellow blazes.
No Bikes except on the asphalt or crushed gravel paths in Kilally Meadows and Medway Valley.
Carry in/Carry out your trash. Do not leave anything in an ESA. Help out by picking up any litter that you find, and dispose of it properly.
Leashes Please! Natural areas are not dog parks. All pets must be on leash (maximum 2 meters/ 6 feet). Remember to stoop and scoop!
Do not disturb wildlife or plants. It is illegal. Respect all plants and wildlife. Leave natural areas as you found them and do not feed the deer.

What can I take from an ESA?

Nothing! Bring a camera and take photographs.

Leave all wildlife, plants, seeds, flowers, soil, substrate, and deadfall in place. Every part of the ecosystem has an important and vital role to play in keeping ESAs healthy.

What is an invasive alien species?

Alien alert! Invasive alien species are non-native species – plants, animals, fungi, etc. – that evolved in another part of the world (e.g., Europe or Asia) and were transported to Ontario by humans. Invasive alien species can easily outcompete native species and lead to a decline in native biodiversity and reduced ecosystem functionality wherever they occur. Globally and locally, invasive alien species are one of the primary causes of habitat degradation and biodiversity loss today.

More Information

Ontario Invasive Plant Council
http://www.ontarioinvasiveplants.ca/index.php/other_sites

Plant Selection for Environmentally Significant Areas
www.reforestlondon.ca/resources-healthy-city

City of London Information:
Environmental and Parks Planning
(519) 661-4980
Environmentally Significant Areas
Yard Waste Collection Information
www.london.ca

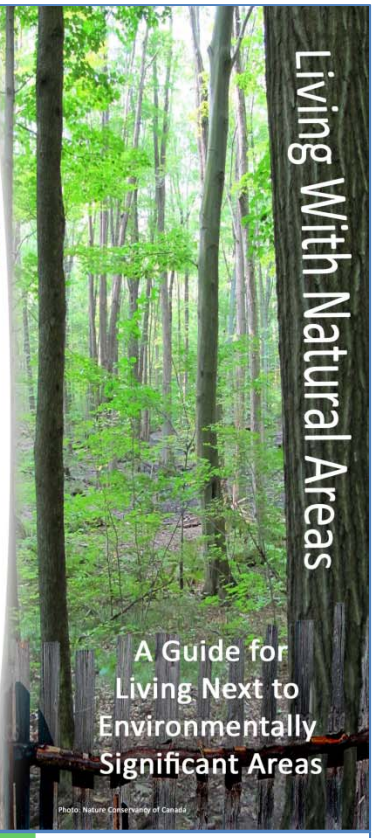
Reforest London
www.reforestlondon.ca

Upper Thames River Conservation Authority
www.thamesriver.on.ca
519-451-2800

London CANADA

UPPER THAMES RIVER CONSERVATION AUTHORITY

Brochure prepared and revised by EEPAC. (2014)



What is an ESA?

An **Environmentally Significant Area** (ESA) is a natural area that receives the highest level of protection within the City of London. ESAs contain rare and endangered species, unique landforms, and habitats that are prized for their quality and high biodiversity. ESAs contain wetlands, freshwater ponds and streams, meadows, forests, valley lands, and other relatively undisturbed wildlife habitat.

Why are ESAs important?

ESAs are essential to the health and well-being of all Londoners because they provide ecosystem services, the most important being habitat for our native biodiversity. Our native biodiversity – indigenous plants, animals, fungi, and other organisms – enables our ecosystem to function properly. A fully functional ecosystem filters our freshwater, provides oxygen for us to breathe, cleans our air, provides decomposition for fertile soil, and provides a beautiful, natural environment in which to de-stress from our busy lives.

Is there a problem?

Yes! Even though our ESAs are protected from development, they are suffering from invasive alien species (see inset), encroachment, and misuse by the demands of our ever-growing human population.

Is there a solution?

Yes! It is the responsibility of each and every Londoner to help keep our ESAs healthy and in a natural state.

Alien Tree Species Example

Norway Maple
(*Acer platanoides*)

Why this information is important to you!

You are one of the very fortunate members of the community who lives adjacent to an ESA; you have a special role to play. You are aware of the high value of your property, a way to keep that value is to minimize your impact on the ESA. You can help to maintain our ESAs in a healthy, natural condition that preserves the spectacular view from your home, and sustains the value of your home.

What you do around your home - impacts the environment.

Some of your actions may have a greater negative impact on the ESA. As such, it is important how you treat your yard and the area next to it.

Does it matter what I grow on my property?

Be careful when growing plants that are not native to Ontario (see INSET). Animals, wind, and water transport seeds, the mobile stage of a plant, from one place to another. Nature doesn't recognize property boundaries, and seeds can spread from gardens into ESAs.

Alien plants degrade natural habitats by reducing plant biodiversity, which in turn reduces animal biodiversity.

Native Planting brouchures
www.reforestlondon.ca

Can I dump my yard waste or pond waste in the ESA?

No! ***Do not dump any yard or pond waste into the ESA – it is illegal.*** **And, you may be inadvertently transporting alien plants or animals into the ESA. Seeds and other plant parts in your waste can germinate or regenerate once inside the ESA. Pond waste may contain alien animals (e.g. goldfish or exotic snails) or plants that can wreak havoc on our native ecosystem. Compost your waste on your property, or take advantage of the city's regular, curb side pickup of yard waste materials.**

Encroachment

Your lot ends at the property line. ***Any activity extending onto public land is illegal.*** Examples of encroachment include mowing, gardening, or installing structures such as sheds or fences in an ESA. Rear fences should not have a gate. Enter the ESA at designated access points, and use the official trails – don't make new ones. The cumulative impact of homeowners encroaching into the edges of ESAs effectively reduces their size, and threatens their integrity and value.

Your pets, did you know?

Cats and dogs can greatly disturb the wildlife and natural habitats so keep them from running loose in ESAs. Dogs and cats can hunt down and kill a variety of small animals, and cats kill thousands of birds each year. Our furry pets also disperse seeds of invasive alien plants. Seeds are transported in their fur, and in mud collected on their feet.

Don't release Aquarium stock or other household pets into ESAs. Aquarium plants and animals that you buy at pet stores are alien species in Ontario. Goldfish in particular have already been illegally released into our ESAs and are causing widespread damage. *It is illegal to release any live plants or animals into an ESA.*

THE COVES ENVIRONMENTALLY SIGNIFICANT AREA CONSERVATION MASTER PLAN

Section 4 – Trail Management in the Coves ESA

Photo Credit – Andrew Jackson (www.ontariowildlife.net)

THE COVES ENVIRONMENTALLY SIGNIFICANT AREA
CONSERVATION MASTER PLAN

SECTION 4 – TRAIL MANAGEMENT IN THE COVES ESA

In the Coves ESA, the footprint of trails may date back to First Nations settlements and some of the earliest explorers and settlers. Archaeological evidence and the location of potential areas of human occupation are frequently associated with sites such as the Coves that are located along the Thames River Valley and its major tributaries (Wilson and Horne 1995). Years of mostly informal use within the Coves has established trail networks that reflect urban settlement patterns and local use for recreation and community travel routes, rather than a planned trail system based on an ecosystem approach. With the increase of public access and the diverse nature of user groups, many of the existing trails within the Coves ESA are showing signs of overuse leading to damage to natural features and some are located within sensitive natural habitats. Trails located on steep slopes are more susceptible to erosion, while trails crossing wet areas lead to trail widening and soil compaction. Many trails are too close to watercourses or cut across the habitat of significant wildlife. These are key management issues that are addressed in the Coves CMP.

As many trails are located within the Conservation Authority Regulation Limit, trail planning should be conducted in consultation with the Upper Thames River Conservation Authority (UTRCA) and in some cases may require written approval (permits) from the UTRCA prior to implementation.

Trail Assessment Results

Field work has confirmed and mapped the location of existing trails throughout the Coves ESA. The figures provided below summarize key issues including trail locations, existing issues, opportunities, constraints and a photographic survey, based on site investigations and discussions with the public, Friends of the Coves and City staff used in the development of a trail plan for the Coves ESA.

The key issues identified throughout the Coves ESA include:

- Presence of erosion and soil compaction where trails traverse steep slopes (>15%);
- Localized trampling of native vegetation;
- Branched or multiple trails in similar location;
- Unconnected trail segments;
- Ad hoc trail creation contributing to undercutting of soils and slopes;
- Exposed and damaged roots with the potential for destabilization of trees (potential risk to property and trail users);
- Flood prone sites – trails directly adjacent ponds and in low-lying areas;
- Sedimentation in tributaries and ponds;
- Widened trail sites (often in muddy areas);
- Lack of demarcation at entry points to trails;
- Multiple trail widths and surfaces i.e. mown, granular, overgrown, rugged track, access road, links along roads;
- Presence of invasive species originating where human disturbances occur within the ESA;
- Evidence of encroachment and access to public lands directly from private properties;

- Presence of dumped materials and garden waste; and
- Non-sign posted crossings of local roads.

The key opportunities identified throughout the Coves ESA included:

- Significant natural heritage resources afford opportunities for interpretation;
- The Coves is accessible to a large population within a 15 minute drive and is well served by transit and surrounding cycling routes and local trails;
- The Coves area provides passive nature-based recreational opportunities different from the adjacent Thames River Corridor thereby affording an "urban wilderness" experience;
- The ESA supports a range of habitats and populations of important species which will benefit from on-going protection;
- Co-ordination of trail planning with other projects such as the proposed future improvements for the Elmwood Gateway and any other projects;
- Signage of trails and for educational purposes has the potential to encourage responsible behavior, reduce conflict with private property owners, and reduce littering, dumping, encroachment and vandalism; and
- The Coves area is supported by a considerable volunteer network, a resource that may be relied upon to implement and manage trails within ESA.

The key constraints identified throughout the Coves ESA include:

- The landscape setting of the Coves as an Oxbow is comprised of valleyland characterized by incised slopes and flood prone lowlands. Consequently some areas with existing trails traverse areas subject to seasonal inundation, acute erosion and potential slope instability and this poses concerns related to environmental impacts, the safety of trail users and the long term sustainability of trails;
- Barriers to trail connectivity are present in the form of creeks, local roads, steep slopes, proximity of private property and the top of bank;
- Increased levels of use may spur the need for increased facilities, parking and visitor amenities which in-turn has the potential to impact the natural character of the Coves;
- Development of trails and the resultant increased use may result in increased disturbance to sensitive species and habitats;
- Some existing trails have the potential for disturbance to archaeological resources;
- Trails that provide access for a variety of users may lead to conflicts between user groups and potential impacts to the environment unless carefully managed (e.g. mountain biking within the ESA); and
- Existing trails that have the potential to fragment important habitat features.

Additional documents that should be considered in trail planning include:

- Planning and Design Standards for Sustainable Trails in ESA's (City of London 2012);
- London Bicycle Master Plan, (City of London 2005);
- Coves Conservation Master Plan Sub-Watershed Study (PEIL 2004);
- Accessibility for Ontarians with Disabilities Act (2005);
- Thames Valley Corridor Study (Dillon 2011);
- Trail mapping prepared by the Friends of the Coves Subwatershed Inc. (www.thecoves.ca); and
- Euston Naturalization Plan, 2004 (www.thecoves.ca);.

Addressing Trail Signage and Interpretation within the Coves ESA

The primary goal of a trail plan is to protect the natural features and functions of the ESA, while also providing a connected system of trails that enables visitor access to different landscape settings affording a variety of experiences, educational opportunities and interpretive programming.

There is a need to recognize the linkage and transition between trails inside and outside the Coves ESA. For example the Thames Valley Parkway runs through a portion of the Coves ESA and many on-road bikeways connect to trails within the Coves ESA. There is a need therefore, to erect signage at these transition points that clearly informs users they are entering the Coves ESA. The signage should inform users of the sensitivity and significance of the Coves as an Environmentally Significant Area and the more restrictive uses that are permitted, such as no bicycle riding.

To facilitate trail planning there is a need to build and install signage throughout the Coves ESA that conveys consistent, informative, and attractive messaging that addresses the following:

- identification of the trail system including the access points, parking, the trail hierarchy and points of interest within the Coves ESA;
- identification of permitted uses within the Coves ESA, including common “do’s and don’ts” for users;
- trail signage that considers the minimization of risk to public safety, such trails that intersect roads, steep slopes or water hazards;
- identification of accessible trails available within the Coves ESA;
- identification of connections to other trail systems such as the Thames Valley Parkway and neighbouring on-road bicycle trail systems;
- development of interpretive signage that reinforces the protection of natural features and functions of the ESA;
- identification of trails that have identified for closure, including information on the reason such as the presence of significant or sensitive areas (e.g. nature reserve zones, steep slopes, wetlands, areas of existing high impact); and
- identification of areas where there is ongoing active management such invasive species removal or woodland restoration.

Common “do’s and don’ts” that have been identified for the Coves ESA include the following:

- bicycle riding on the Coves ESA trails is not permitted;
- dogs should be kept on a leash and owners must clean up after their dogs;
- stay on trails to avoid impacts to natural areas;
- removal or destruction of native vegetation is prohibited;
- dumping or littering is prohibited;
- hunting is prohibited;
- access is from 6:00 am to 10:00pm
- no motorized vehicles are permitted

Trail Management Priorities within the Coves ESA

Trail management needs to be phased in over time due to the cost of implementation. The table below identifies the priorities and estimated costs of each trail management area identified for the Coves ESA.

Trail Management Area	Key Management Issues	Priority for Implementation	Estimated Cost
West Pond	• improved trail connections to Thames River and Thames Valley Parkway	• low	$300K
East Pond	• improved trail surfaces for public use • installation of boardwalk to protect wetland	• high	$620K
Elmwood Gateway	• improved trail connections from Gateway to Coves ESA • closure of trail and restoration of slope erosion	• high	$450K
Briscoe Woods & Murray Park	• improved trail surfaces for public use • establishment of accessible trail in Briscoe Woods • potential future north to south trail linkage	• medium	$80K
Euston Meadow	• re-alignment of trails to protect open habitat for species at risk • improved trail surfaces for public use	• high	$280K
Southcrest Ravine	• improved trail connection east to west across Silver Creek • installation of a safe trail crossing over Silver Creek	• high	$350K
Old Orchard	• potential future trail development • potential future cultural heritage appreciation	• low	$470K

The following pages and the accompanying figures provide detailed information on the environmental features and issues for trail planning within neighborhood areas prioritized for the Coves ESA.

LONDON COVES ESA

DRAFT TRAIL CONCEPT PLAN

Rev. October 10, 2014

LEGEND

- Proposed London Coves ESA Boundary
- Level 1 Hiking Trails
- Level 2 Pedestrian Trails
- Level 3 Pathway (Proposed)
- Thames Valley Parkway and Level 3 Trails (Existing)
- Level 4 On-Road Bike Route
- Proposed Bike Route Additions
- Existing Trails (Potential Closure)
- Proposed Access Zone
- Proposed Secondary Access Zone
- Proposed Node
- Existing Parking
- Proposed Parking
- Proposed Canoe Put In
- Proposed Pedestrian Bridge
- Proposed Overlook
- School Sites
- Public Open Space

ESA Management Zones

- Nature Reserve
- Natural Area 1
- Natural Area 2
- Cultural Heritage

INTERPRETIVE SIGNAGE LEGEND

HISTORICAL FEATURES

1. Cove Railway Bridge / Outlet of the Oxbow
2. Green Recycling Facility
3. Springbank Electric Railway (1896 - 1935)
4. Jeffrey Estate (Ca. 1918 - 1990)
5. Coe Rifle Range (Ca. 1900 - 1950)
6. River Meander Scrolls
7. Norton Site (Ca. 1400 - 1450)
8. J.P. Hunt Site
9. Bowman Site
10. Chestnut Hill, Residence of Andrew Weldon (1872 - Present)
11. McArthur House & Orchard (Ca. 1850 - Present)
12. Ice Houses
13. Cove Hospital (Ca. 1910 - 1925)
14. 264 Greenwood - Drill Grounds
15. Lord Simcoe Camped at the Coves
16. Curling was first played at the Coves

NATURAL FEATURES

1. oxbow formation
2. naturalization
3. ESA
4. sycamore overlook
5. Stormwater Management
6. Low Impact Development
7. river valley slopes / stabilization
8. remnant woodlot
9. ecological sensitivity
10. forest management / protection
11. former landfill

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Trail Management Priorities within the Coves ESA

Coves ESA Trail Management Area – West Pond

Key Trail Management Actions

- establish trail connections to Thames Valley Parkway
- establish trail connection to Thames River
- establish trail overlooks
- install signage at access points showing trail locations and ESA "do's and don'ts"

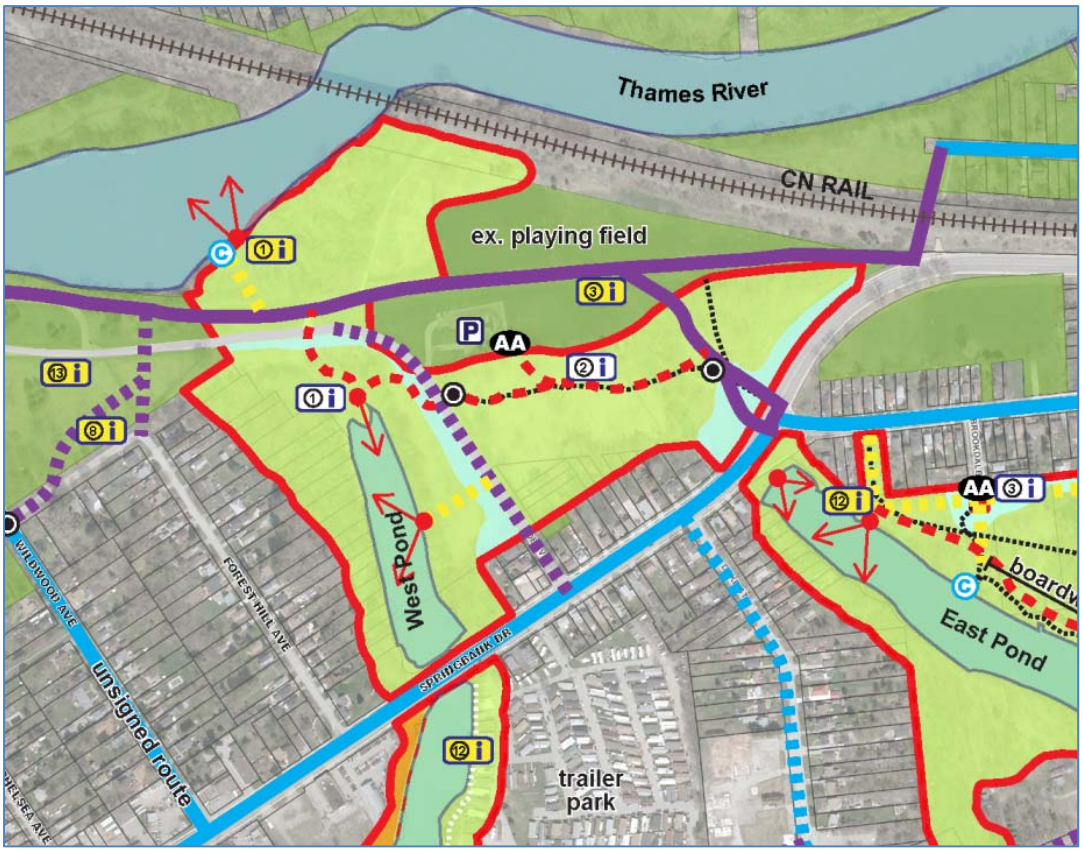
Historical Features

- CN railway crossing Thames River
- City of London Green Recycling Facility
- Location of Springbank Electric Railway (1896 to 1935)
- Norton Site (ca. 1400 to 1450)
- J.P. Hunt Site
- Coves Hospital Site (ca. 1910 to 1925)

Natural Features

- areas of open habitat restoration
- historic formation of oxbow in Thames River

Note: see main map for legend to map section shown below



Legend

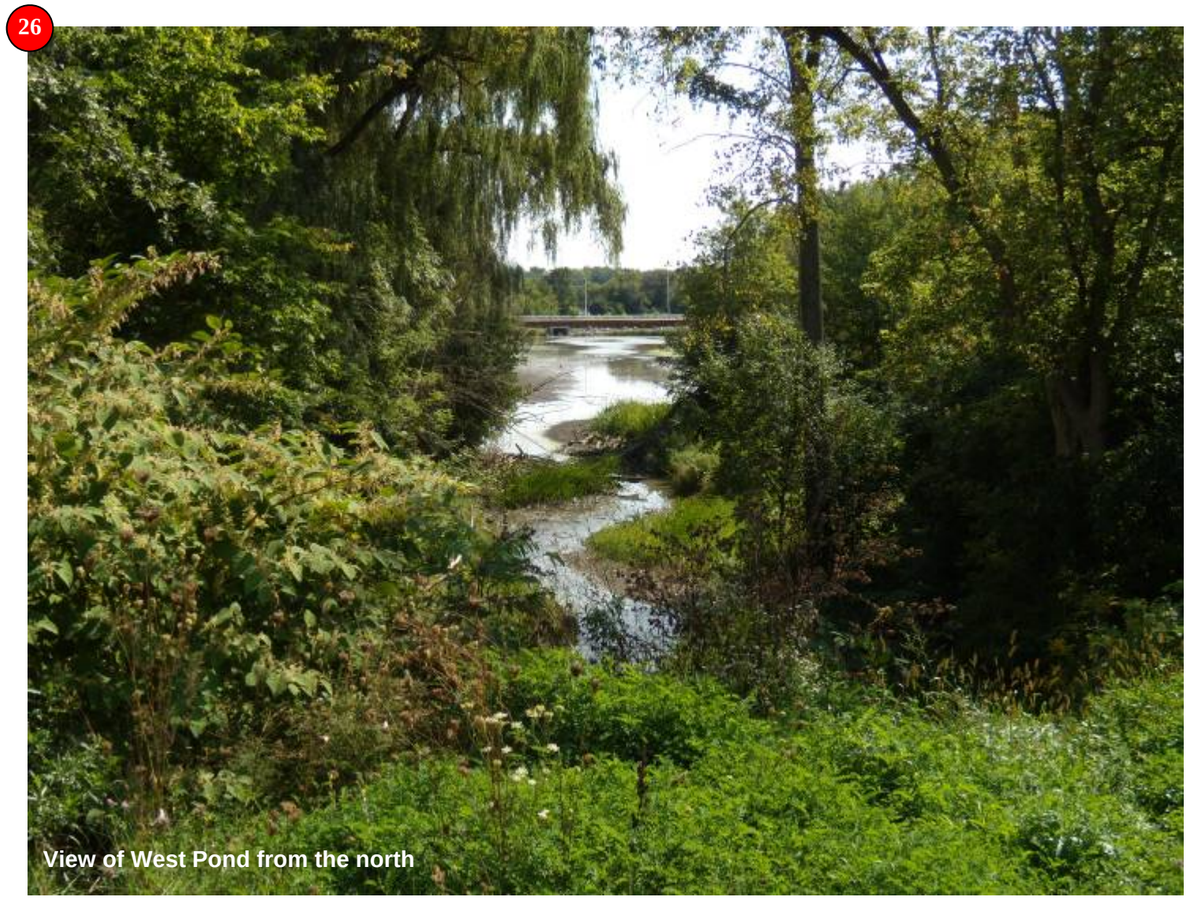
- Ecological Land Classification (see text for description)
- **Significant Species and Habitat**
  - Hackberry (S4)
  - Vernal Pool
- **Invasive Species**
  - Plants
- **Mangement Issues**
  - Encroachment
- Parcel Fabric
- Streams
- London Coves Existing ESA Boundary (Official Plan Schedule B-1)
- Photo Reference

Environmental Features and Concerns within West Pond and Greenway Park

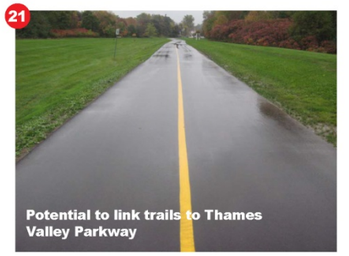
- plant and animal species inventory and wildlife habitat assessment
- rare vegetation community type FOD4-3 Dry-Fresh Hackberry Deciduous Forest
- a corridor maintains ecological linkage through wooded and open areas connecting the Coves West Pond to the Thames River Corridor
- a hydrologic connection conveys water from the Coves to the Thames River
- there are opportunities to enhance the ecological linkage through the restoration and management of woodland and open habitat
- the old orchard presents an opportunity for the interpretation of cultural heritage associated with First Nation and Early European farming of floodplain areas

Black Walnut lowland deciduous forest

Rice Cut Grass organic meadow marsh



View of West Pond from the north



A. Proposed ESA node/kiosk. Opportunities for this area could include interpretive programming and signage, addition of seating and demonstration areas for school groups. Proposed trails should consider on-going restoration work occuring in this area.

B. Opportunity to incorporate an overlook at the West Pond. Potential to link existing trails to lookout directly from parking lot. Connection requires across private road. Sightline issues are required to be addressed as well as an easement over the right of way to purification plant.

C. There is an opportunity to create a direct link from the Thames Valley Parkway to the lookout with a second road crossing.

0 50 100 200

N

LONDON COVES ESA INVENTORY
West Pond and Greenway Park

LEGEND
- Open Space
- Proposed London Coves ESA
- Existing Trails

10 Photo Reference

Slopes / Trail Implications
- 0-5% (site specific trail design)
- 5-15% (trail improvement)
- 15-25% (trail relocate / trail improvement)
- >25% (close trails)

EXISTING TRAIL ISSUES TO BE ADDRESSED IN CONSERVATION MASTER PLAN

Figure 2.6

Revised: January 14, 2014

NOTE: Refer Figure 1.6 for description of all environmental management zones.

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Coves ESA Trail Management Area – East Pond

Key Trail Management Actions

- improve trail surfaces for public use
- install boardwalk along wet sections of trail
- establish canoe launch
- create overlook at Sycamore tree
- establish parking area at access point
- install signage at access point showing trail locations and ESA "do's and don'ts"
- close multiple trails and restore natural vegetation

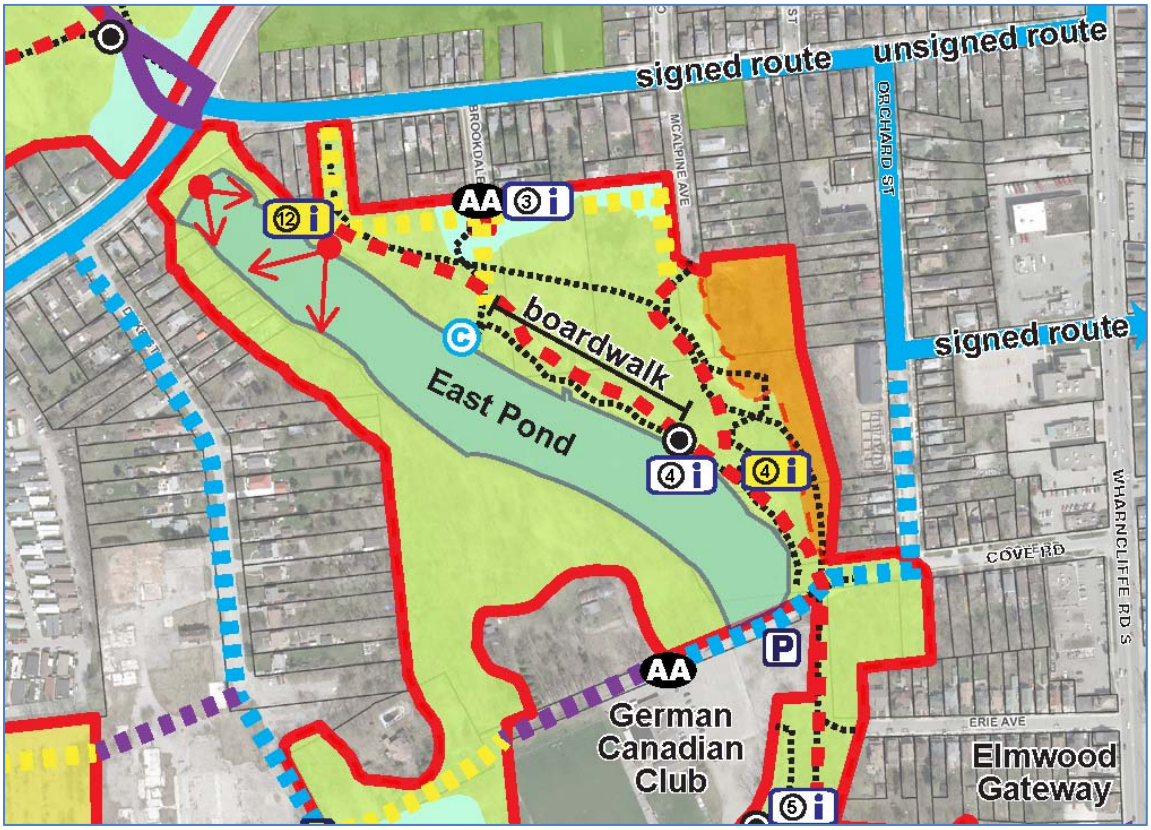
Historical Features

- location of Jeffery Estate (ca. 1918 to 1990)
- former site of ice houses and ice harvesting from the East Pond

Natural Features

- location of rare Hackberry Woodland
- location of distinctive Sycamore tree

Note: see main map for legend to map section shown below



Legend

- Ecological Land Classification (see text for description)
- **Significant Species and Habitat**
  - Hackberry (S4)
  - Deer Bedding Area
  - Vernal Pool
- **Invasive Species**
  - Fish
  - Plants
- **Mangement Issues**
  - Encroachment
- Parcel Fabric
- Streams
- London Coves Existing ESA Boundary (Officla Plan Schedule B-1)
- Photo Reference

Environmental Features and Concerns within East Pond

- plant and animal species inventory and wildlife habitat assessment
- rare vegetation community type FOD4-3 Dry-Fresh Hackberry Deciduous Forest
- identification of areas of encroachment from surrounding land uses
- wetland habitat and shoreline areas impacted by trampling
- suitable vernal pools are present to support breeding amphibians, however, amphibian surveys recorded few species and low abundance
- open water aquatic habitat is impacted by exotic carp creating turbid water conditions with limited aquatic vegetation
- there are opportunities to restore and enhance the aquatic environment

1

2

Unicorn Clubtail Dragonfly

3

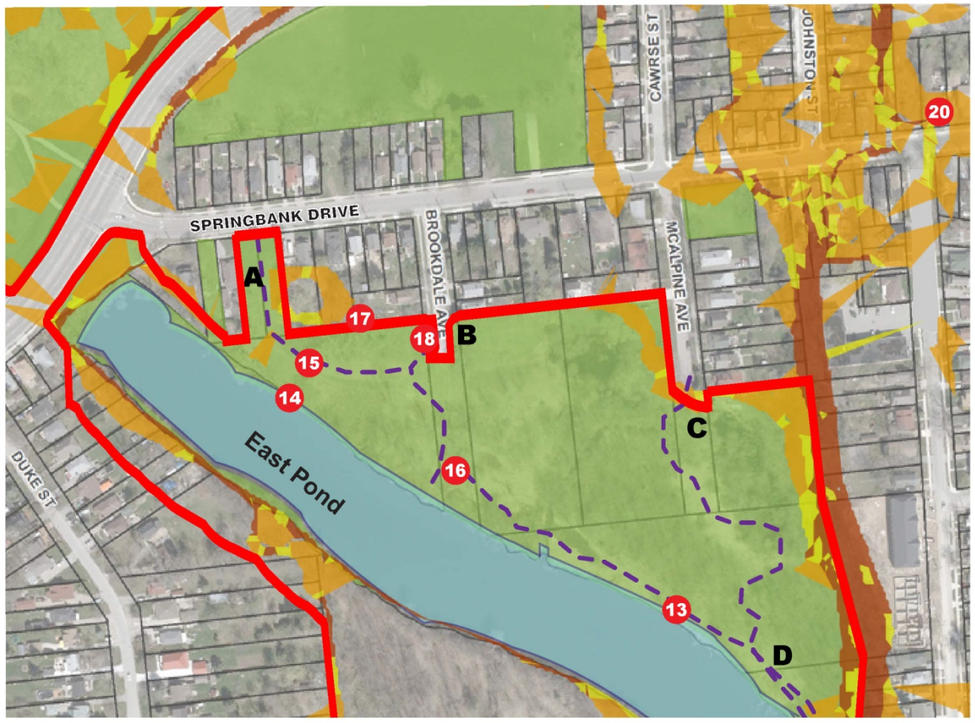
Monarch Butterfly on Swamp Milkweed

4

Silver Maple Mineral Deciduous Swamp

5

Dry-Fresh Hackberry Deciduous Forest



A. Existing mown trail link exists between A and B. The trail and existing vegetation is being well maintained and should be retained. The trail is not well defined from Springbank Drive nor is there a defined access point. Trail proposed to link to sidewalk network.
B. An opportunity for an alternate linkage between A and B could utilize existing easements.
C. In order to protect natural heritage features a linkage from location C to D should not be considered. Existing trails should be closed in this area.
D. Potential trail improvements could provide mitigation from impacts to the natural environment in this location and provide safer passage in this seasonally wet lowland. A trail through this section would be considered secondary. There are opportunities for sections of a proposed trail through this area to be accessible. Short sections of boardwalk may also be required through this area. A pond-side trail would require a 15m setback from the edge of the pond to minimize safety and management concerns ie. ice build-up at edge in winter, washout of trail.

0 50 100 200

N

LONDON COVES ESA INVENTORY

East Pond Woods

LEGEND

- Open Space
- Proposed London Coves ESA
- Existing Trails

10 Photo Reference

Slopes / Trail Implications

- 0-5% (site specific trail design)
- 5-15% (trail improvement)
- 15-25% (trail relocate / trail improvement)
- >25% (close trails)

EXISTING TRAIL ISSUES TO BE ADDRESSED IN CONSERVATION MASTER PLAN

Figure 2.1

Revised: January 14, 2014

NOTE: Refer Figure 1.1 for description of all environmental management zones.

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Coves ESA Trail Management Area – Elmwood Gateway

Key Trail Management Actions

- establish a connection from Elmwood Gateway to Coves ESA
- establish north to south connection within Coves ESA
- establish overlook
- establish parking area at access point adjacent to German Canadian Club
- install signage at access point showing trail locations and ESA "do's and don'ts"
- close trails and restore natural vegetation where excessive erosion has occurred

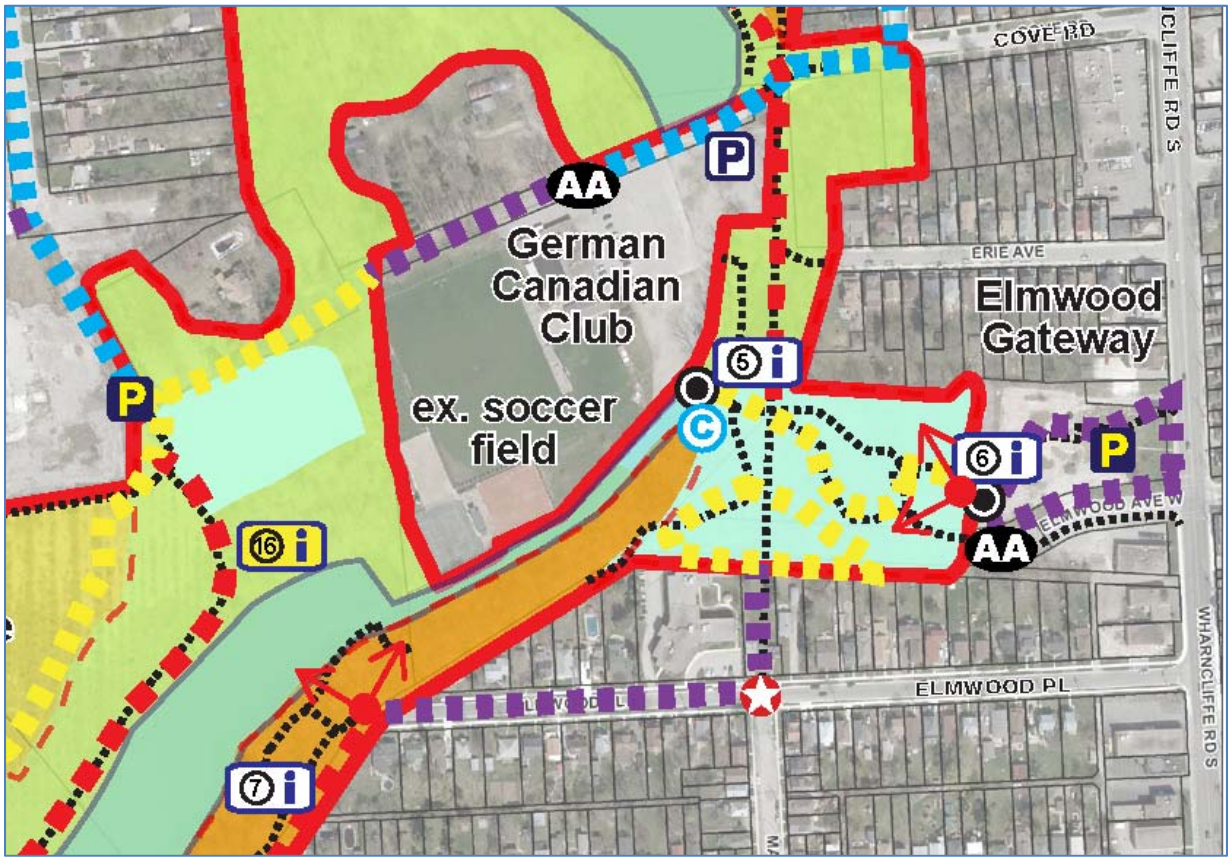
Historical Features

- curling was formally played on the South Pond

Natural Features

- opportunity for interpretation of stormwater management and Low Impact Development

Note: see main map for legend to map section shown below



Legend

- Ecological Land Classification (see text for description)
- Parcel Fabric
- Photo Reference
- **Mangement Issues**
- Streams
- Encroachment
- London Coves Existing ESA Boundary (Officla Plan Schedule B-1)

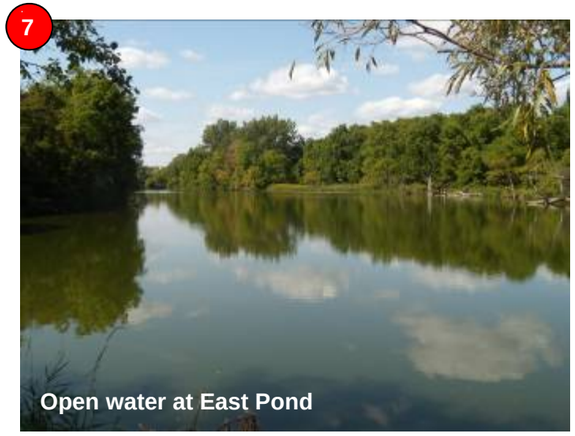
Environmental Features and Concerns within Elmwood Gateway

- plant and animal species inventory and wildlife habitat assessment
- a natural corridor maintains ecological linkage through wooded areas connecting the East Pond and South Ponds
- opportunities for restoration associated with Elmwood Gateway
- areas of significant trampling, erosion, and root exposure on steep slopes
- some areas of significant encroachment from surrounding land uses
- a stormwater outfall may reduce water quality of the Central (South) Pond
- a hydrologic connection conveys water from the East Pond to South Pond
- very steep wooded slopes adjacent to residential areas at the top of slopes

6

Steep slopes

7



Open water at East Pond

8

Sugar Maple deciduous forest

9

Standing snag with Pileated Woodpecker holes

A. Opportunity for looped accessible trail in Elmwood Gateway with linkage to ESA. Requires traversal of steep slope. Geotechnical investigation required. The proposed parking facility has potential for showcasing Low Impact Development features ie. biofiltration of run-off, permeable paving etc.
B. Steep slopes in this area require stairway and/ or ramp structure to provide access to valley floor. Slopes are prone to erosion and is evident in many areas. A proposed structure with interpretive potential could be located at the existing SWM facility. Encroachment is an issue with surrounding private residences in this area.
C. An informal trail follows the base of the valley slope and traverses seepage sites. A proposed trail should be positioned away from the toe of bank to minimize impact to existing vegetation as well as the potential to destabilize the slope during construction.
D. A flat open space behind the retirement residence provides an opportunity for a loop trail.

0 50 100 200 N

LONDON COVES ESA INVENTORY
Elmwood Gateway

LEGEND
Open Space
Proposed London Coves ESA
Existing Trails

10 Photo Reference
Slopes / Trail Implications
0-5% (site specific trail design)
5-15% (trail improvement)
15-25% (trail relocate / trail improvement)
>25% (close trails)

EXISTING TRAIL ISSUES TO BE ADDRESSED IN CONSERVATION MASTER PLAN

Figure 2.2

Revised: January 14, 2014

NOTE: Refer Figure 1.2 for description of all environmental management zones.

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Coves ESA Trail Management Area – Briscoe Woods & Murray Park

Note – the old orchard area is not currently in public ownership, option 2 trail linkage recommendations are provided should the City acquire the old orchard area in the future

Key Trail Management Actions

- improve north to south trail connections
- formalize on-road trail connections
- improve trail surfaces for existing trails
- establish accessible loop trail in Briscoe Woods
- establish overlooks to view South and West Ponds
- establish parking area at access point
- install signage at access point showing trail locations and ESA "do's and don'ts"
- close trails and restore natural vegetation where excessive erosion has occurred

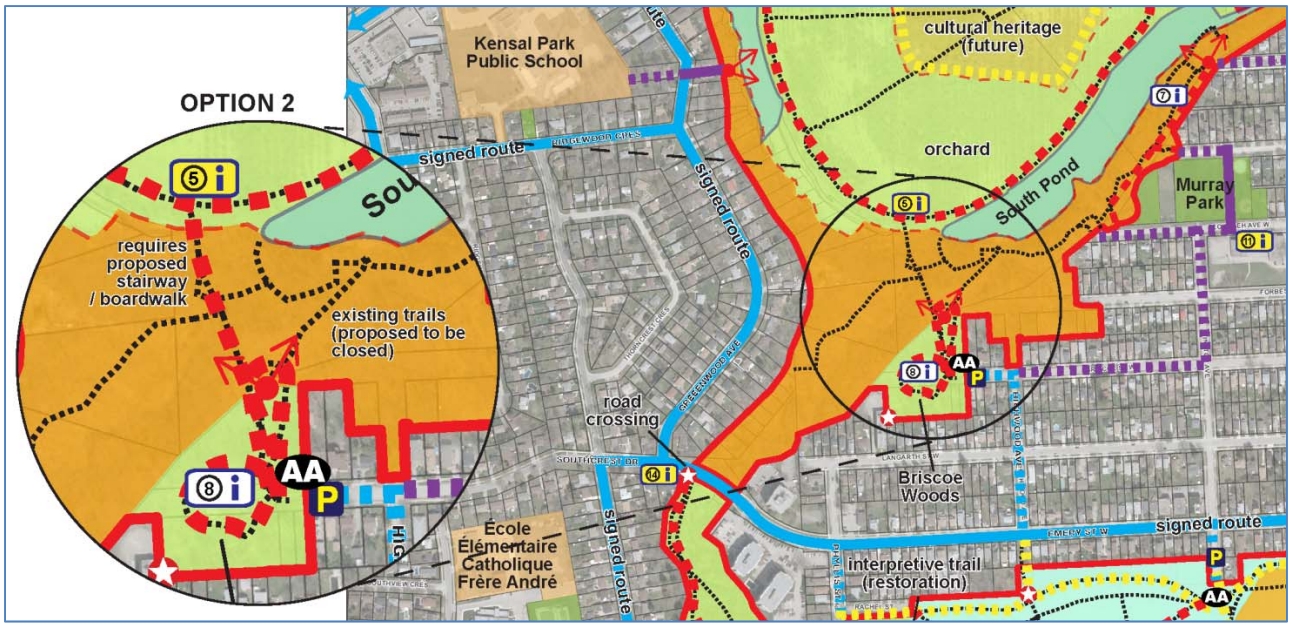
Historical Features

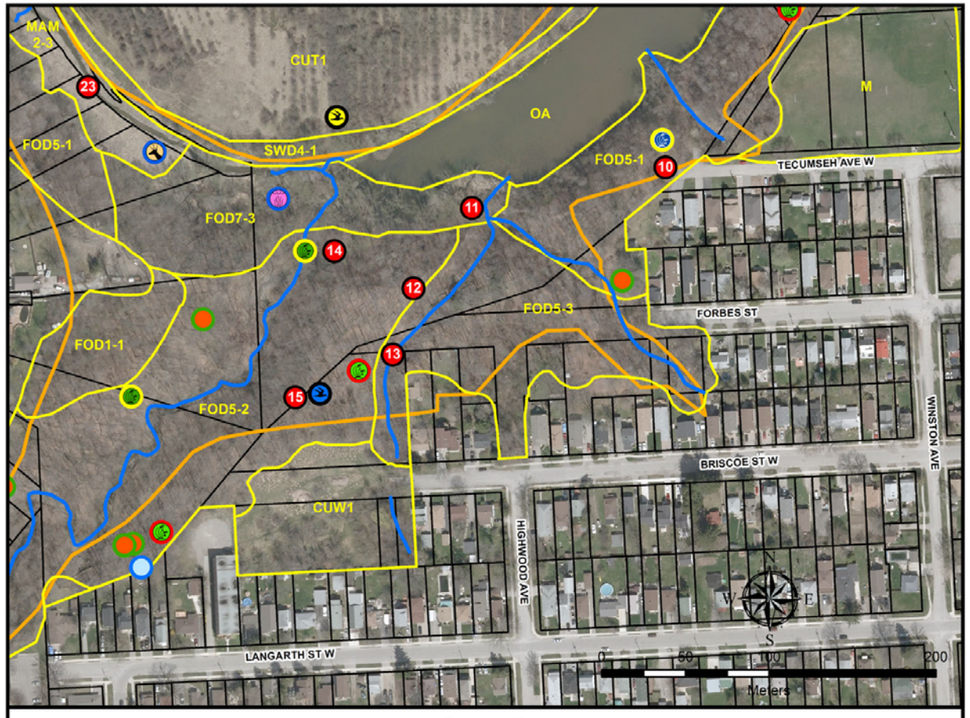
- view of area previously used for rifle range (ca. 1900 to 1950)
- view of area likely used when Lord Simcoe first camped in the area

Natural Features

- woodland present on steep slopes of historic glacial valleyland
- importance of the role of vegetation in the stabilization of soil on steep slopes

Note: see main map for legend to map section shown below





Legend

- Ecological Land Classification (see text for description)

Significant Species and Habitat

- Chinquapin Oak (regionally uncommon; S4)
- Hackberry (S4)
- Field Sparrow (L3)
- Ovenbird (L4; area-sensitive)

Significant Species and habitat (con't)

- Deer Bedding Area
- Vernal Pool

Invasive Species

- Plants

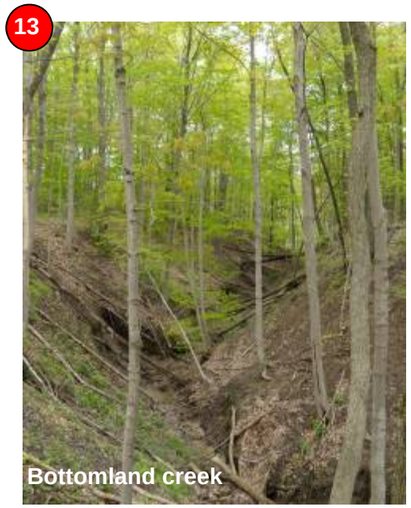
Mangement Issues

- Encroachment
- Parcel Fabric
- Streams
- London Coves Existing ESA Boundary (Official Plan Schedule B-1)
- Photo Reference

Environmental Features and Concerns within Briscoe Woods Park

- plant and animal species inventory and wildlife habitat assessment
- narrow steep sided wooded valleys convey surface water runoff through Silver Creek and other small tributaries to the Coves ponds
- a large area of regenerating Cultural Woodland (CUW1) is present on tableland at the end of Briscoe St W.
- steep slopes and a general lack of easy access protect areas of woodland that provide habitat for plants, birds and other animals such as deer


10 Evidence of beaver

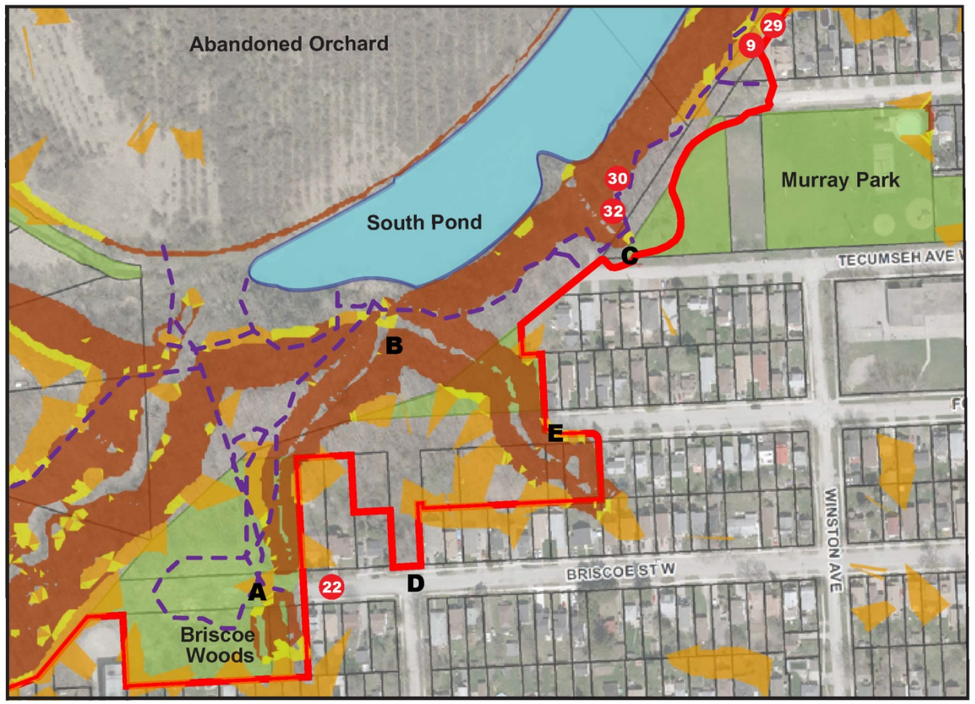

13 Bottomland creek


11 View of South Pond


14 Willow lowland deciduous forest


12 Steep slopes


15 Sugar Maple – Beech deciduous forest



A. Lack of parking. Existing guard rail. Earthen trails throughout tableland and traverse steep valley slopes causing some erosion and soil compaction.
B. Undercutting of soils on slope resulting in exposed roots and some minor erosion.
C. An existing informal trail accessed from the park follows the top of the bank along a very steep slope. The trail meanders in locations to avoid piles of yard waste. Some informal structures have been built to avoid seepage areas.
D. Existing dense canopy and undersotrey preclude access to this area. Narrow green space dead ends in two sharply incised gullies which prevent access.
E. Gully is steeply incised and inaccessible from end of road. Some illegal dumping evident. Invasive species present at edge.

0 50 100 200 N

LONDON COVES ESA INVENTORY
Southcrest Ravine - Northern Portion

LEGEND
- Open Space
- Proposed London Coves ESA
- Existing Trails

10 Photo Reference

Slopes / Trail Implications
- 0-5% (site specific trail design)
- 5-15% (trail improvement)
- 15-25% (trail relocate / trail improvement)
- >25% (close trails)

EXISTING TRAIL ISSUES TO BE ADDRESSED IN CONSERVATION MASTER PLAN

Figure 2.3

Revised: January 14, 2014

NOTE: Refer Figure 1.3 for description of all environmental management zones.

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Coves ESA Trail Management Area – Euston Meadows (previously Euston Park)

Key Trail Management Actions

- re-route trails around area protected for Eastern Meadowlark
- improve trail surfaces for existing trails designated Level 2
- establish parking area at access point
- install signage at access point showing trail locations and ESA "do's and don'ts"
- stop mowing trails designated for closure

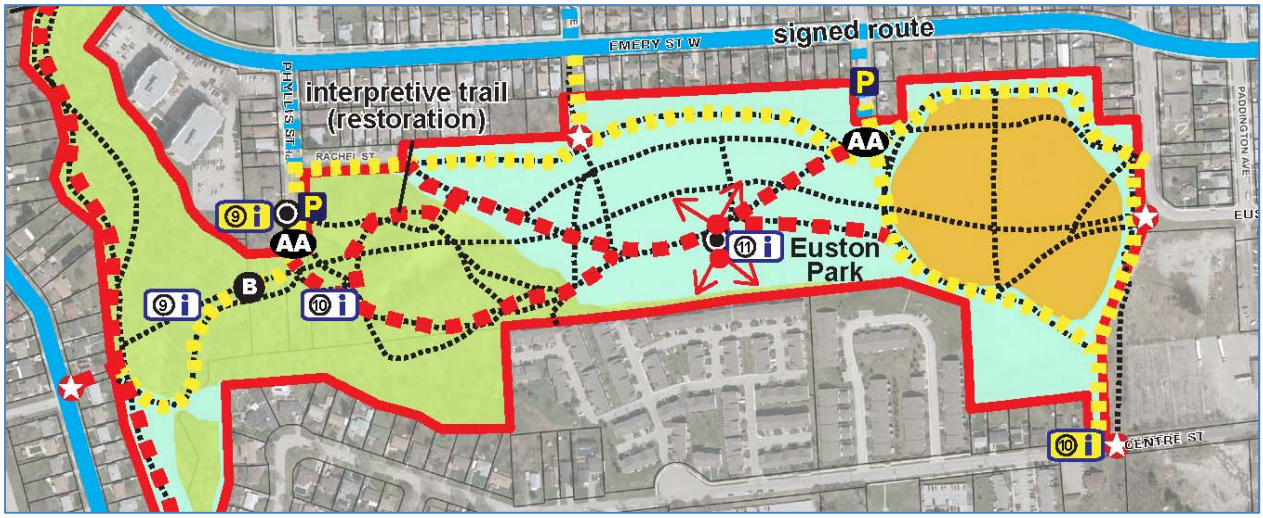
Historical Features

- Chestnut Hill, Residence of Andrew Weldon (1870 to present)
- historic landfill site for City of London

Natural Features

- large area of open habitat
- breeding habitat for Threatened Eastern Meadowlark

Note: see main map for legend to map section shown below



Coves ESA Trail Management Area – Southcrest Ravine

Key Trail Management Actions

- improve east to west trail connection
- install trail crossing at Silver Creek
- improve trail surfaces for existing trails
- establish parking area at access point
- install signage at access point showing trail locations and ESA "do's and don'ts"
- close trails and restore natural vegetation where excessive erosion has occurred

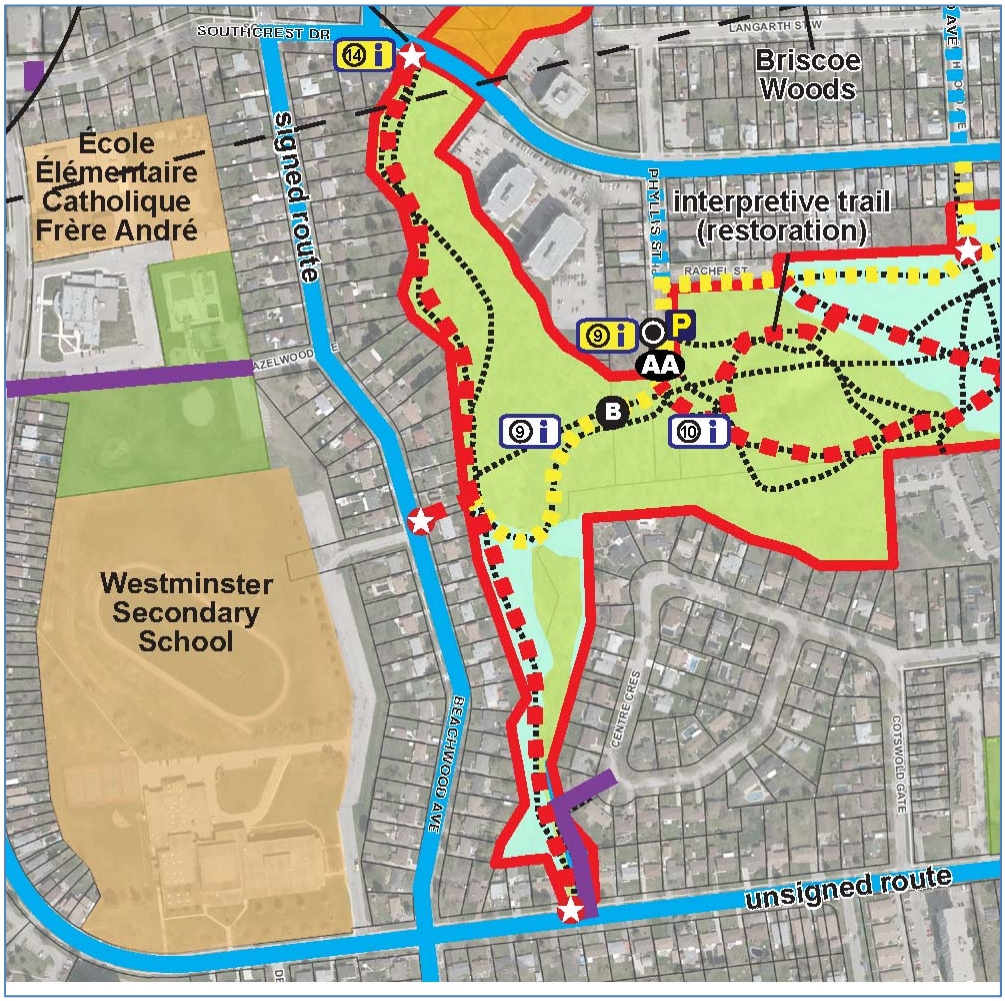
Historical Features

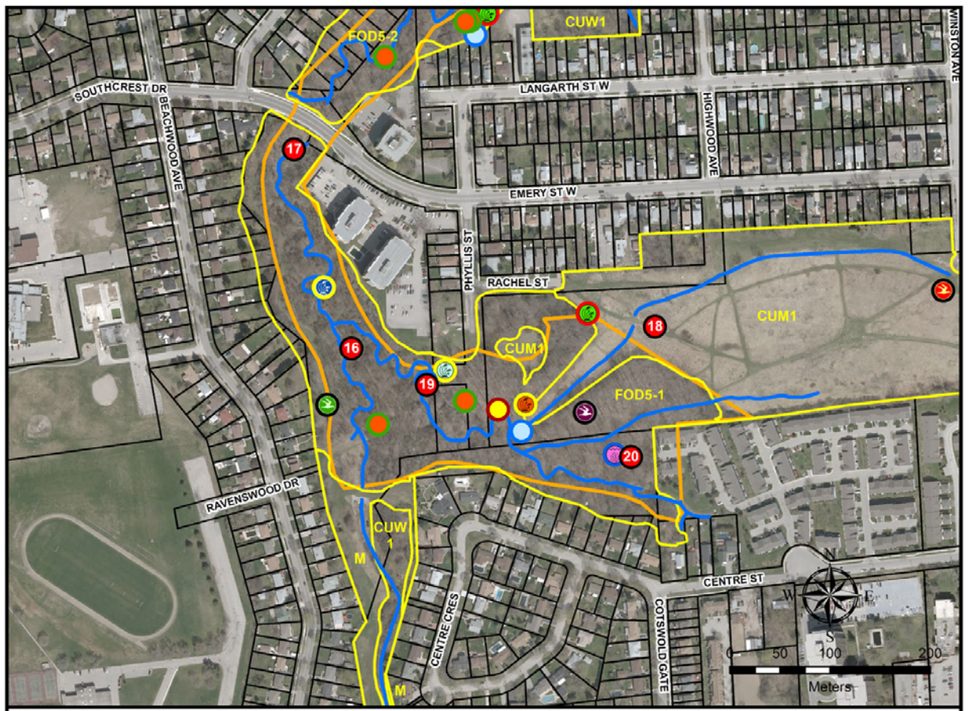
- location of Bowman Site
- location of 264 Greenwood Drill Grounds

Natural Features

- large area of woodland present on steep slopes along Silver Creek
- example native tableland woodland vegetation

Note: see main map for legend to map section shown below





Legend

Ecological Land Classification (see text for description)

Significant Species and Habitat

- Butternut (endangered; S3?)
- Hackberry (S4)
- Showy Tick-trefoil (S4)
- Vernal Pool

Significant Species and Habitat (con't)

- Black-throated Green Warbler (L2; area-sensitive)
- Magnolia Warbler (L1; area-sensitive)
- Savannah Sparrow (L1; area-sensitive)

Invasive Species

- Plants

Mangement Issues

- Encroachment
- Erosion
- Parcel Fabric
- Streams
- London Coves Existing ESA Boundary (Official Plan Schedule B-1)
- Photo Reference

Environmental Features and Concerns within Southcrest Ravine – Southern Portion

- plant and animal species inventory and wildlife habitat assessment
- deeply incised ravines and wooded slopes create unique urban valley system
- large area of open habitat associated with Euston Meadows
- large water flows in Silver Creek lead to excessive erosion with impacts to ravine woodland and siltation of Coves ponds

16

Sugar Maple deciduous forest

19

Ad-hoc trail in Sugar Maple deciduous forest

17

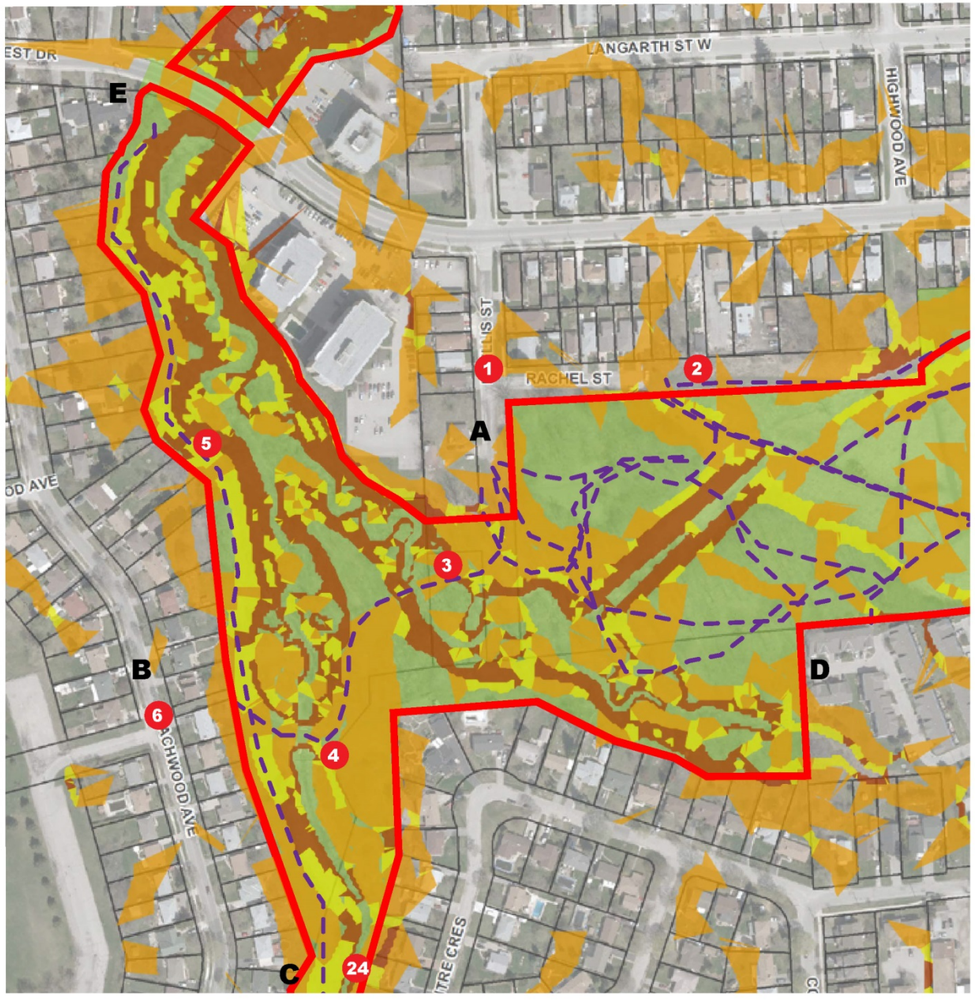
Red-spotted Purple butterfly on apple tree

20

Vernal pool in Sugar Maple deciduous forest

18

Cultural meadow




Potential access zone with information kiosk


Potential accessible trail


Informal trail


Existing creek crossing


Potential trail at rear lot


Neighbourhood crossing

A. A number of access points and redundant informal trails within Euston Park. Closure of a number of redundant mown trails in landfill area should be considered in lieu of edge trails which create a loop and are easily accessible from surrounding areas. Opportunities in Euston park include: off leash dogwalking area, interpretive and viewing nodes, informal parking areas at access points and passive walking trails.

B. Potential for linkage from ESA to nearby school École Élémentaire Catholique Frère André.
This would require a boardwalk/ bridge over the creek including restoration works to creek banks and slope. Any proposed trail alignments in this area should follow existing trail disturbances.

C. Potential for accessible trail between location C and E along rear lots in mown area. Some existing encroachment issues may require management. Some sections may require privacy screening.

D. A trail linkage between B to D not recommended as traverses undulating terrain, low lying areas and good quality forest habitat. Opportunity for linkage/ access to the private condo complex. Requires discussion with the private owner.


Private land ownership to edge of creek

0 50 100 200 N

LONDON COVES ESA INVENTORY
Southcrest Ravine - Southern Portion

LEGEND
- Open Space
- Proposed London Coves ESA
- Existing Trails

10 Photo Reference

Slopes / Trail Implications
- 0-5% (site specific trail design)
- 5-15% (trail improvement)
- 15-25% (trail relocate / trail improvement)
- >25% (close trails)

EXISTING TRAIL ISSUES TO BE ADDRESSED IN CONSERVATION MASTER PLAN

Figure 2.4

Revised: January 14, 2014

NOTE: Refer Figure 1.4 for description of all environmental management zones.

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Coves ESA Trail Management Area – Old Orchard

Note – this area is not currently in public ownership, trail recommendations are provided should the City acquire the old orchard area in the future

Key Trail Management Actions

- establishment of a loop trail
- establishment of an accessible loop trail
- establishment of a cultural heritage interpretation
- possible north to south connection to Briscoe Woods
- establish parking area at access point
- install signage at access point showing trail locations and ESA "do's and don'ts"
- close trails and restore natural vegetation to establish large contiguous undisturbed natural area

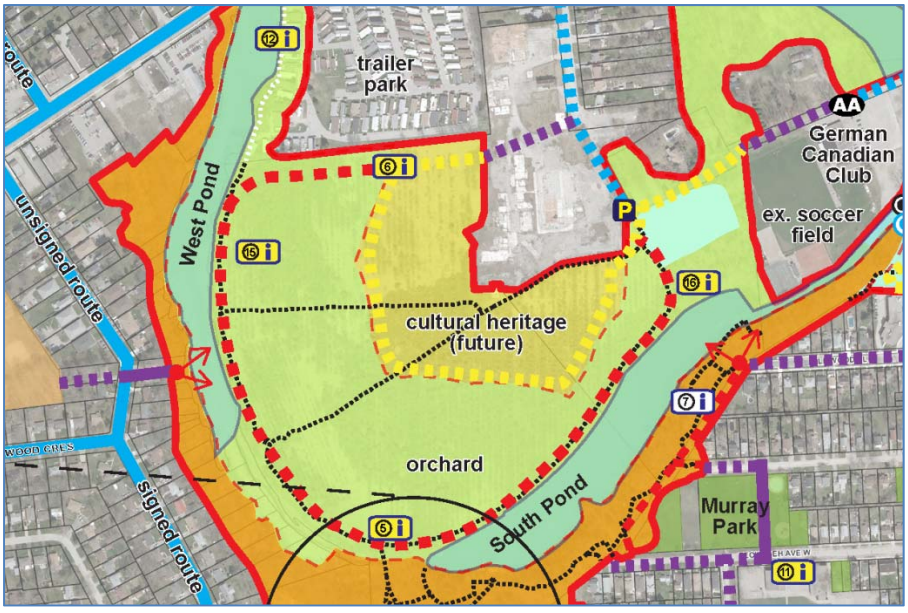
Historical Features

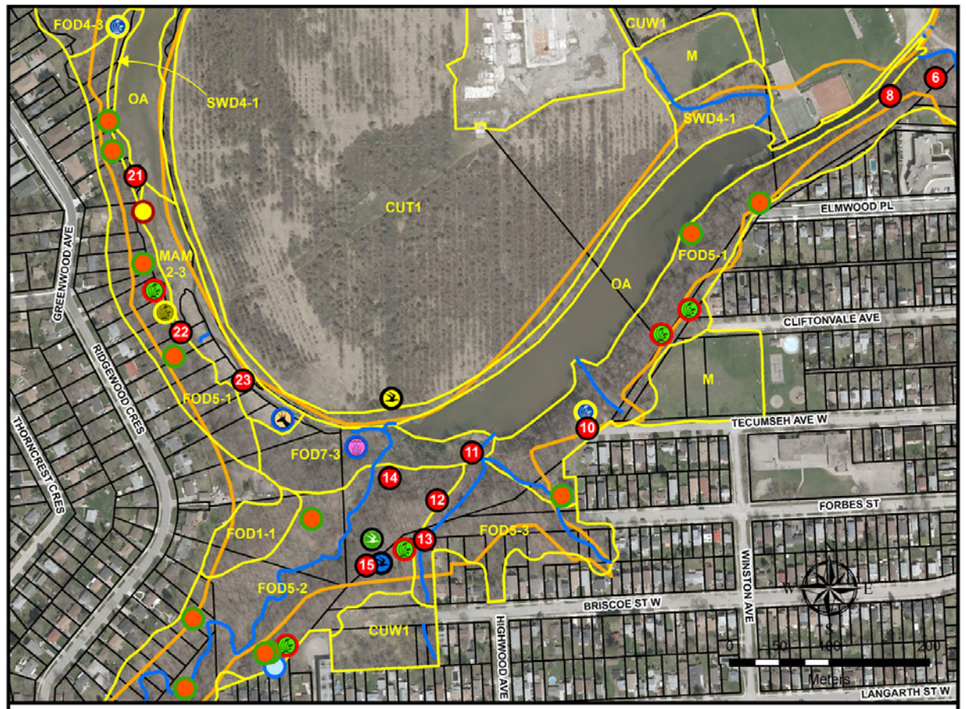
- area previously used for rifle range (ca. 1900 to 1950)
- area likely used when Lord Simcoe first camped in the area
- curling was formally played on the South Pond
- former site of ice houses and ice harvesting from the Coves' Ponds
- area of First Nation agricultural use
- area of European settlement and farming

Natural Features

- large area of successional habitat associated with old orchard
- centre of historic formation of oxbow in Thames River
- opportunity for interpretation of stormwater management and Low Impact Development
- view of surrounding steep slopes associated with glacial valleyland

Note: see main map for legend to map section shown below





Legend

- Ecological Land Classification (see text for description)

Significant Species and Habitat

- American Bladdernut (S4)
- Hackberry (S4)
- Black-throated Green Warbler (L2; area-sensitive)
- Field Sparrow (L3)
- Ovenbird (L4; area-sensitive)

Significant Species and Habitat (con't)

- Deer Bedding Area
- Vernal Pool

Invasive Species

- Plants

Mangement Issues

- Encroachment
- Erosion

- Parcel Fabric
- Streams
- London Coves Existing ESA Boundary (Official Plan Schedule B-1)
- Photo Reference

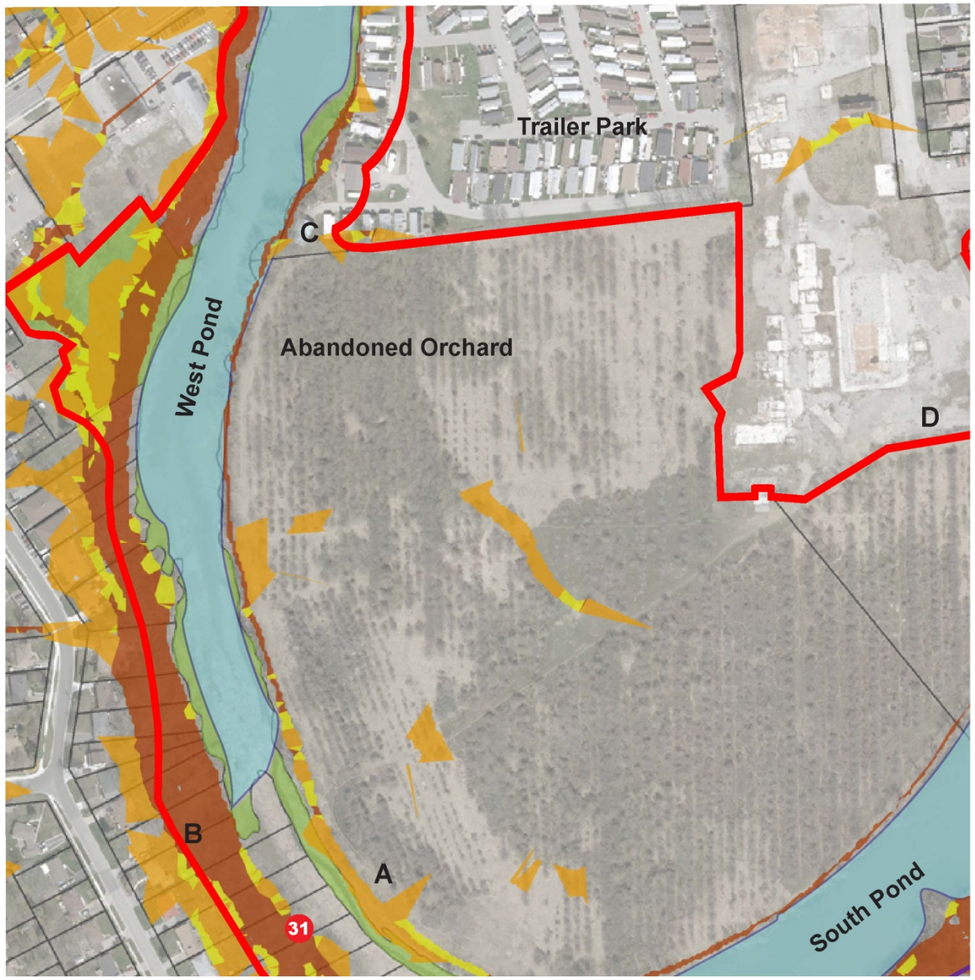
Environmental Features and Concerns within South Pond and West Pond

- woodland buffered by the Coves Ponds and adjacent abandoned orchard protects significant woodland areas which provide habitat for area sensitive forest birds
- abandoned orchard provides an excellent opportunity for ecological restoration
- steep valley walls are sensitive to trampling leading to erosions and root exposure
- limited areas of tableland woodland present at the top of slopes

21 View of West Pond (south of Springbank Road)

22 Slopes within Sugar Maple deciduous forest

23 Rice Cut Grass organic meadow marsh



A. Potential to locate a pond-side trail. Existing informal trail currently exists at the top of the east bank of the West Pond. Opportunity for cultural heritage interpretation of the existing orchard. The existing landform and vegetation of the Coves ESA and stormwater management initaitives in this areas could also be interpreted.

B. Valley slope west side of the pond is steeply incised and therefore not suitable for trails. Private ownership of lands within ESA requires that informal trail creation and encroachment issues be managed.

C. Potential to extend the trail to Springbank Drive from A along the bank of the pond with approval from the Trailer Park operator.

D. A potential shared parking arrangement with the German Canadian Club could service these trails. This opportunity is contingent on acquisition or partnership.

0 50 100 200

N

LONDON COVES ESA INVENTORY
Southcrest Ravine - Central South Pond

LEGEND
- Open Space
- Proposed London Coves ESA
- 10 Photo Reference

Slopes / Trail Implications
- 0-5% (site specific trail design)
- 5-15% (trail improvement)
- 15-25% (trail relocate / trail improvement)
- >25% (close trails)

EXISTING TRAIL ISSUES TO BE ADDRESSED IN CONSERVATION MASTER PLAN

Figure 2.5

Revised: January 14, 2014

NOTE: Refer Figure 1.5 for description of all environmental management zones.

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Future Trail Planning for the Coves ESA

Ecosystem Approach applied to Trail Planning in ESAs

The City of London Official Plan promotes an ecosystem approach to environmental planning. This approach, applied to trail planning, must recognize the dynamic nature of ecosystems and the potential for ecosystems to change over time following a trajectory determined in large part by natural and human-induced stresses that are placed on the system. The introduction of new trails of any type into a natural area where none previously existed must be recognized as a new stress on the ecosystem that will result in some unavoidable ecological effects associated with a semi-permanent to permanent trail facility and the presence of trail users. A trail system that is well planned and designed sustainably can mitigate disturbances to the environment by avoiding the most sensitive portions of natural areas, utilizing sustainable construction techniques and by providing users a defined path with education opportunities and varied user experiences. In this way new trails should not result in any permanent loss of natural features or ecological functions.

Research on natural area trail impacts has demonstrated that a properly managed trail system will limit the areal extent and severity of recreation impacts by concentrating traffic on resistant trail surfaces and through the use of appropriate structures such as bridges, fences, and boardwalks (Leung & Marion 2000). Depending on the type of trail system developed, the visitor experience may vary from one that is primitive and intimate with nature to one that is more developed and separate from nature (Stankey and Schreyer 1987; Hendee and Dawson 2002). Within ESAs, it is the intent to continue to create trail systems that protect key ecological features and functions while permitting passive nature-based recreation appropriate to the natural setting.

Goals and Objectives for Future Trail Concept Planning in the Coves

The goal of a trail plan is to protect the natural features and functions of the ESA, while also providing a connected system of trails that enables visitors access to different landscape settings affording a variety of experiences, educational opportunities and interpretive programming.

Some of the objectives that may be used in future trail planning for the Coves ESA include:

- Minimization of risk to public safety;
- Provision for accessible trails where feasible;
- Establish connections to the Thames Valley Parkway and neighbouring trail systems;
- Development of trails that protect the natural features and functions of the ESA, and provision for controlled use and access through marked trails, interpretive signage and compatible passive recreational opportunities;
- Promotion of passive, nature-oriented pathways and trails within the Coves ESA that support healthy lifestyles, promote wellness, provide for affordable, unstructured recreational pursuits, promote tourism opportunities; and foster cultural and natural heritage appreciation.
- Consultation with the Upper Thames River Conservation Authority (UTRCA) for advice and assistance in obtaining permits that may be required pursuant to the Conservation Authorities Act.
- Employment of the services of a geotechnical engineer (consistent with Official Plan policies under section 15.7.6) to verify existing slope conditions within the Riverine

Erosion Hazard Limit where either existing ad hoc trails are proposed to remain accessible or new trails are planned;
- Where possible incorporate existing informal trails that provide passive recreation opportunities where these trails are safe and where they would not result in negative impacts to natural heritage features and functions;
- Where trails are to be planned or remain accessible within hazard lands regulate trail development and public access in accordance with provisions set out in the London Official Plan and the Conservation Authorities Act;
- Trails should be set back from the edge of ponds and drainage features and outside the flood line to minimize safety and management concerns (e.g. impacts to natural features, prevention of ice build-up and avoidance of flooding);
- Where possible trails may be positioned to utilize the six (6) metre erosion access allowance identified in the Official Plan 15.7.1. i) (d) added to the valley top of slope or the combined toe erosion and stable slope allowances, required for the purposes of providing sufficient access for emergencies, maintenance and construction activities.
- Trails may incorporate nodes coincident with unique points of interest, outlooks and access (e.g. vantage points that provide look outs, canoe launch, major trail intersections);
- Trail planning should identify ad hoc trails for closure that located within significant/sensitive areas (e.g. nature reserve zones, steep slopes, wetlands, areas of existing high impact);
- Where existing trails are proposed to remain open, where necessary re-route trails to avoid sensitive natural features and provide improvements utilizing techniques designed to mitigate disturbance to sensitive environments including boardwalks, minor footbridges, pipe culverts or clearstone base material to promote cross drainage;
- Where trail improvements are proposed, restoration should include the planting of appropriate indigenous plants;
- Where necessary, use natural materials that mimic natural conditions;
- Implementation involving trail construction should specify an acceptable zone of disturbance to minimize impacts to vegetation and wildlife;
- Where aggregate is recommended for trail improvements to trail base or surfacing that the aggregate be free from fines to prevent siltation within natural areas;
- Trail planning consider looped trails where possible for safety and evacuation;
- Integration of sustainable and Low Impact Development (L.I.D.) initiatives where possible in the development of new trails and ancillary facilities i.e. parking areas;
- As identified in the Official Plan develop stewardship and encroachment agreements with neighbouring private land owners and/or acquire private lands as necessary to secure important trail linkages; and
- Trail planning should maximize opportunities for education, interpretation and cooperation with nearby schools \ i.e. outdoor classrooms.

Future Trail Concept Planning

The design and implementation of a trail system through the Coves ESA can provide enhanced recreational opportunities, neighbourhood connectivity, improved serviceability and in some cases all-season accessibility, encouraging the responsible use of the ESA by the community. However, it is also recognized that a trail system needs to be integrated into the overall management strategy for the ESA warranting a balanced approach to trail design which establishes key connections while respecting ecological sensitivity.

It is envisaged that potential future impacts resulting from increased use of the area will need to be mitigated through the implementation of a sensitively designed, functional trail system that accommodates demands for recreational use within the Coves ESA and surrounding area.

The trail system can be viewed as a mitigative measure to 'steer' users down the right path and out of sensitive environments. Within urban settings natural areas are often accessed from anywhere possible and quite often the local community enjoys walking off leash dogs. Controlling this behavior is not always possible by simply planning the right trail system fencing may be required in order to reduce the desire to access an area off the trail.

Nonetheless, there are ways in which trails can form an essential component of forest impact mitigation. These include:

- Reducing potential impacts to ground flora from ad hoc trail creation;
- Planning alignments thus minimizing compaction and preventing root exposure of trees;
- Preventing erosion that may impact natural area and watercourses;
- Enabling access to varied upland and lowland forest communities to provide varied experiences of nature as well as educational opportunities; and
- Providing signage to help educate and generate respect and an understanding of the complex and fragile natural processes in different landscape settings.

It is envisaged that a trail network for the Coves will include signage which could be integrated as part of a stewardship program or educational strategy potentially reaching out to casual trail users as well as school groups, summer camps and local interest/community groups. The routing of low impact trails (boardwalks) through the more sensitive areas could provide more intimate experience within the Coves ESA as well as interpretive opportunities and should encourage environmental stewardship.

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Section 5 – Monitoring Framework for the Coves ESA

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SECTION 5 –MONITORING FRAMEWORK FOR THE COVES ESA

Adaptive Management Approach

Establishment of baseline conditions in a CMP initiates implementation of an adaptive management approach. Baseline data as outlined in Section 2 provides a benchmark against which objectives related to ecosystem protection, environmental policies and management can be measured to ensure activities are sustainable and effective. The key to effective adaptive management is to implement rigorous monitoring and evaluation to ensure ecological objectives are being maintained while achieving community and social objectives.

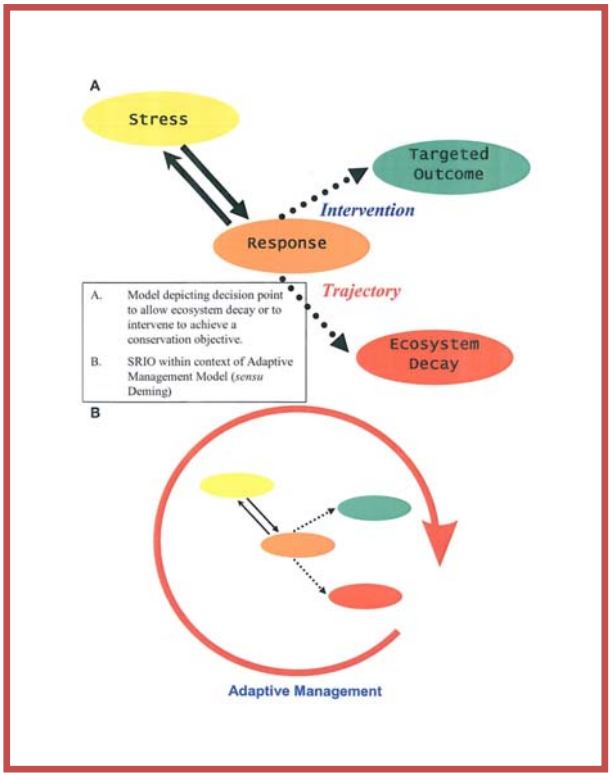
Adaptive Management – is a structured, iterative process of optimal decision making in the face of uncertainty regarding the effectiveness of our actions in achieving desired objectives – due to either gaps in our understanding or changes in the ecosystems we are trying to manage. Adaptive management provides a way to systematically reduce uncertainty over time via system monitoring and management intervention (Holling 1978; Murray and Marmorek 2004).

Monitoring Framework

Managing natural ecosystems involves evaluating existing conditions and current use through a decision framework such as the *Limit of Acceptable Change* (Cole and Stankey 1998) or the *Stress-Response-Intervention-Outcome* adaptive management framework (Bergsma and De Young 2007). These frameworks guide decisions about the acceptability and management of restoration initiatives, user impacts or ongoing management. Identification of an acceptable limit or targeted outcome establishes thresholds for permitted uses (e.g. trails) such that recreation use does not compromise protection of the resource beyond a minimally acceptable condition (Cole and Stankey 1998) that will contribute to ecosystem decay.

Monitoring begins by understanding the current conditions of an area to establish a baseline. Degraded areas require management plans for restoration and trail system improvements that are then monitored to track the success of management in achieving acceptable baseline conditions. The baseline of healthy natural areas must be monitored to ensure use of the trail system does not result in environmental impacts over time. Monitoring requires the regular collection of information that is analyzed to report on changing conditions over time (Marion 2008).

The table below identifies variables for monitoring, methods for monitoring, implementation partners, priorities and potential management responses.



Monitoring Variable	Indicator Type	Monitoring Methods	Implementation Partners & Cost	Priority	Management Response
Birds & Bats	• biodiversity & habitat conditions	• casual & targeted surveys by plant community type	• Friends of the Coves • McIlwraith Field Naturalists of London • City of London • Low cost	Moderate	Review every 5 years and meet to discuss changes
Amphibians	• water quality & habitat quality	• casual & targeted surveys of ponds & wetlands		Moderate	
Insects	• butterfly, dragonfly & damselfly biodiversity • pollinators	• casual & targeted surveys of open habitat, ponds & wetlands		Moderate	
Fish	• water quality & habitat quality • invasive species	• casual & targeted surveys of ponds & fishers		Moderate	
Spring Ephemerals	• biodiversity & high quality habitats	• casual off trail site walks • mapping/GPS locations		Low	
Invasive Species	• degradation of native biodiversity	• on trails • transect inventory • mapping/GPS locations		High	Prioritize and remove
Trampling/Erosion/ New Trails	• direct impact resulting in loss of habitat	• trail inventory • mapping/GPS locations		High	Prioritize, restore, install signage
Encroachment/ Inappropriate Uses	• direct impact resulting in loss of habitat	• transect inventory • boundary walk • mapping/GPS locations		High	Enforcement by City
Water Chemistry & Temperature	• aquatic habitat quality	• water sampling & testing	• Friends of the Coves • City of London • Moderate Cost	High	Work with City Engineering Department

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Section 6 – Community Engagement in the Coves ESA

Photo Credit – Andrew Jackson (www.ontariowildlife.net)

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SECTION 6 – COMMUNITY ENGAGEMENT IN THE COVES ESA

The City of London Planning and Design Standards for Trails in ESA's acknowledges the role of community engagement in natural areas protection and the trail planning process to build awareness, foster education and encourage participation in order to increase the capacity for creating a conservation culture that promotes natural areas as a common good and conservation as a collective responsibility.

The Friends of the Coves is a local community-based organization with the following mission statement:

> *We believe that the quality of life in our community is enhanced through the protection, conservation and wise stewardship of the Coves Subwatershed*.

The Friends of the Coves initiated the completion of the Coves Subwatershed Plan (PEIL. 2004) and supports 59 recommendations for the protection, rehabilitation, and stewardship of the Coves Subwatershed.

The Friends of the Coves website provides access to important information and resources including the full length documentary "***Crusaders for the Coves***" http://www.thecoves.ca/

Stakeholder engagement and the implementation of management recommendations should be aligned with organizations such as *Friends of the Coves*, *Nature London,* and *UTRCA* as well as members of the local community. Community engagement should take place at a relatively high frequency, through meetings, events and the distribution of educational materials. Sufficient information should be provided to local residents and users of the ESA to enable them to recognize and understand environmental impacts and encroachment issues, including how to document observations and report issues so they can be corrected.

Community Events

Community events can assist in raising the profile of issues and unite communities in a common initiative. Many municipalities arrange "clean-up days" where the public volunteers time to remove debris and garbage from valued amenities such as streams and woodlands. Other themes could include tree planting or removal of non-native plants. These can be facilitated by the municipality perhaps also in cooperation with the local Conservation Authority through organization and guidance, provision of services such as removal of trash and debris once it is collected to a central location, providing garbage bags and basic tools (shovels, etc.), and recognizing participants' contributions. Such events also result in the public investing time and energy in the maintenance of natural features, thus increasing their value, raising support for allocating funds for maintenance and increasing the likelihood of enforcement of use guidelines through peer pressure.

Community events in which the Coves ESA can participate include:

- ***Earth Day*** – held in late April each year organized by the Upper Thames Conservation Authority

- ***Gathering on the Green*** – held in late April each year organized by the Old South Community Organization
- ***Adopt an ESA*** – program organized by the City of London, Parks Planning and Design (see copy of Adopt an ESA flyer below)
- ***The Great Backyard Bird Count*** – organized by Friends of the Coves
- ***World Water Day*** – an event promoted by the United Nations
- ***Christmas Bird Count*** – held between December 14 and January 5 each year organized by Bird Studies Canada
- ***Thames River Clean*** – held in April each year organized by Friends of the Thames River
- ***London Clean and Green*** – held in June each year organized by the City of London
- ***Re-Forest London*** – a non-profit organization partnering to enhance environmental and human health in the Forest City, through the benefits of trees.
- ***Community Speaker Series*** – *held at local libraries*

Involvement of Local Schools

Local primary and high school students represent an exciting opportunity to extend ecological knowledge and stewardship of the Coves trails and natural spaces within the community. There are several options for engaging youth in the implementation of aspects of the trail development and environmental management initiatives including:

- In-Class Presentation and Feedback
- Spring into Action Volunteer Opportunity
- 40-Hours of Fall/Spring Youth Engagement (in fulfillment of high school volunteer requirements)

The options can be implemented individually but are designed to build on one another to strengthen stewardship of the woodlands amongst school children and youth. By participating in a creative in-class presentation, having an opportunity to provide input to ongoing management, and fulfilling volunteering activities such those suggested below, students can better understand the need for the management of sensitive habitats, and become more involved in community efforts to enhance and protect the site.

There are a variety of benefits for the students who participate in this exercise as well as for the broader community and other stakeholders as summarized in the table below.

Benefits for youth	Benefits for the Municipalities and other stakeholders
• Learn about the ecology of woodlands, watercourses, and natural area management • Develop a sense of environmental stewardship and ownership for the site • Provide volunteer efforts to contribute to on-going management • Fulfill community volunteer requirements for high school • Contribute to positive change in their community regarding conservation	• Interact with young people in positive, constructive ways • Build a stronger sense of an integrated community effort to preserve the site • Enhance the ecological integrity of a local green space • Contribute to programs that meet the needs and interests of youth

The target audience for this initiative is both primary and high school students from schools in the vicinity of the Coves. In particular, Grade ten students are an ideal audience as the Grade ten science curriculum introduces sustainability of ecosystems as well as ecosystem and human activity, both of which could directly relate to the management of the Coves ESA and contribute to respectful use of trails.

To realize these initiatives will require a coordinating committee to liaise between City staff and participating schools and students to coordinate implementation and stewardship activities as well as supervise field activities as required. The intention is to work with students in order to develop a few community activities that they can work to fulfill the 40-hour requirement.

Some potential opportunities include:

- Partnering with a biologist or City staff to do monitoring;
- Helping to build railings or boardwalks;
- Creating interpretative signage; or
- Delivering the in-class presentation to the other local schools or community youth groups.

The final details of the 40-hour work plan would be developed in consultation with City staff and participating schools to ensure that the curriculum requirements are met. Local schools that may be engaged include:

- Kensal Park Public School
- École Élémentaire Catholique Frère André
- Westminster Secondary School
- Victoria Public School

Coves Centre of Excellence for Sustainability of Urban Natural Areas

The City of London could benefit from a Centre of Excellence intended to provide a focus on research and education programs and provide a living model of urban communities capable of sustaining significant natural and cultural heritage features and functions. The Centre could promote environmental, cultural and social themes that reconnect people to nature and provide opportunities for individuals to create a vibrant sustainable culture.

The Coves ESA, which is centrally located in the City, represents a potential opportunity for Friends of the Coves and the City of London to provide leadership in the engagement of a wide variety of stakeholders, (University, Boards of Education, Conservation Authority, Private Industry, Federal, Provincial and Local Governments, Non-government organizations, Community Organizations, etc.) to the vision for a Centre for Excellence a reality.

Ongoing support, political buy-in, benefactors and funding are required investments to make the Coves ESA best in can be.

Conservation Easements and Land Securement

The Coves ESA includes both public and private lands (see figure showing public land ownership below). Conservation easements and land securement are legal mechanisms for natural areas or natural heritage lands which through a range of land securement methods facilitate long-term protection of public and private land in perpetuity. These methods rely on landowners who are willing to participate in the process, however, landowners may not

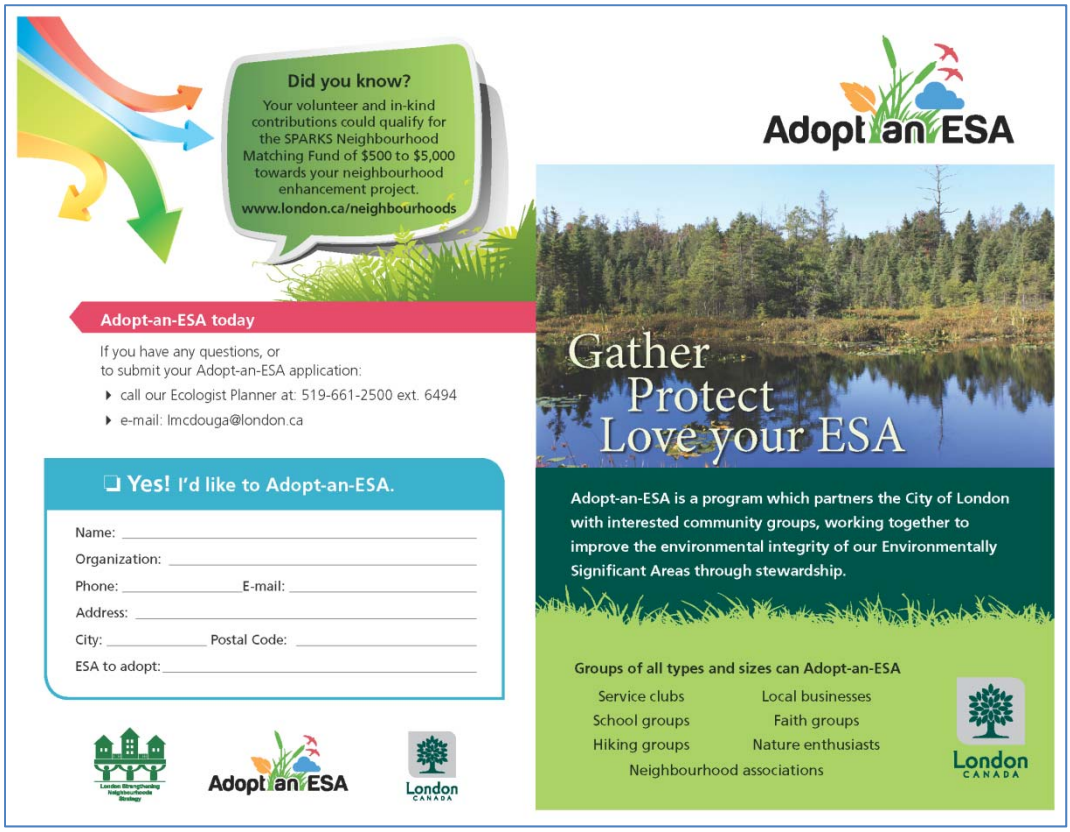
appreciate the range of opportunities available to them and there is an opportunity therefore for the City (or other stakeholders) to share information about the legal mechanisms available

The advantage of conservation land securement is that there are a range of securement methods available to the City, its partners, and the landowner that can adapt to each securement project on a case-by-case basis. This creates a win-win solution that will benefit the environment and all parties.

Conservation land securement can be done by any organization where their focus is on land securement or land conservation issues. Implementation of a conservation land securement strategy is a lengthy process that relies on fostering relationships with landowners and coordinating the work necessary to initiate each securement project. Considering the diverse range of conservation land securement tools and processes, an experienced staff member or consultant is typically required to oversee implementation of the strategy.

Conservation land securement tools may include the following:

- ***Land donation*** – simple & direct
- ***Split receipt*** – donate all of land receive $ value for a portion of land
- ***Conservation severance*** – severe & donate a portion of land owned
- ***Bequest*** – donate land & estate receives tax benefits
- ***Life interest agreement*** – commit to protection while owning land
- ***Conservation easement agreement*** – protection registered on title for perpetuity


Did you know?
Your volunteer and in-kind contributions could qualify for the SPARKS Neighbourhood Matching Fund of $500 to $5,000 towards your neighbourhood enhancement project.
www.london.ca/neighbourhoods
Adopt an ESA
Adopt-an-ESA today
If you have any questions, or to submit your Adopt-an-ESA application:
call our Ecologist Planner at: 519-661-2500 ext. 6494
e-mail: lmcdouga@london.ca
❑ Yes! I'd like to Adopt-an-ESA.
Name:
Organization:
Phone: E-mail:
Address:
City: Postal Code:
ESA to adopt:
Gather
Protect
Love your ESA
Adopt-an-ESA is a program which partners the City of London with interested community groups, working together to improve the environmental integrity of our Environmentally Significant Areas through stewardship.
Groups of all types and sizes can Adopt-an-ESA
Service clubs
Local businesses
School groups
Faith groups
Hiking groups
Nature enthusiasts
Neighbourhood associations
London CANADA


Environmentally Significant Areas (ESAs) have beautiful natural features and perform ecological functions that warrant their protection in a natural state. City-owned ESAs have a purpose and function distinct from City parks as governed by the Official Plan. The City, in partnership with the Upper Thames River Conservation Authority (UTRCA), manages our ESAs; Kilally Meadows, Meadowlily Woods, Medway Valley Heritage Forest, Sifton Bog, Warbler Woods, Kains Woods, The Coves and Westminster Ponds / Pond Mills.
Any of our City-owned ESAs are eligible for 'adoption'. As our ESAs are so large, a section of the ESA can be identified.
Stewardship of your adopted ESA can include:
❑ Litter clean-up along managed trails
❑ Exotic / Invasive species removal
❑ Tree and shrub planting
❑ Observation and reporting of hazards
Adopt an ESA
Stewardship of this ESA is enhanced through the efforts of
Your Name Here
Your group agrees to:
Work together with the City in coordinating projects
Host a minimum of two stewardship days per year, spring and fall, for at least two years
Consider hosting additional events and clean-ups throughout the year
Record volunteer hours and activities
London CANADA
Adopt an ESA
The City agrees to:
Provide the tools you'll need for a successful stewardship day – including garbage bags, gloves, first aid kits, safety equipment, vests and safety information
Help with any inquiries, assistance or guidance you may need
Erect an Adopt-an-ESA sign with your group's name on it, recognizing your commitment to stewardship of the ESA
Supply volunteer agreement, registration & waiver forms
Assist with the purchase of trees, shrubs and provide guidance and expertise on ecological restoration
Remove filled garbage bags from the ESA after you finish
The ESA and our whole community benefits
Adopting an ESA:
strengthens your connection to your neighbourhood and nature
brings your group together for a common goal – a great way to team build
gives you pride through actively benefiting your community
increases the environmental quality and stewardship of our ESAs


Thames River
Pond
West
East Pond
South Pond
Silver Creek
FORWARD AVE
RIVERVIEW AVE
O'BRIEN ST
THE RIDGEWAY
BECHER ST
EVERGREEN AVE
STANLEY ST
HORTON ST W
HORTON ST E
CAWRSE ST
JOHNSTON ST
BROOKDALE AVE
MCALPINE AVE
ORCHARD ST
BYRON AVE W
GREENWAY ENTRANCE
FOREST HILL AVE
GREENSIDE AVE
SPRINGBANK DR
DUKE ST
WILDWOOD AVE
MALCOLM ST
DONNA ST
CHELSEA AVE
CAROL ST
SEAWOOD AVE
CHESSINGTON AVE
GREENWOOD AVE
KERNOHAN PKY
ERIE AVE
COVE RD
ELMWOOD AVE W
ELMWOOD PL
WHARNCLIFFE RD S
MACKAY AVE
CLIFTONVALE AVE
COLLEY AVE
BLORAM AVE
RIDGEWOOD CRES
THORNCREST CRES
TECUMSEH AVE W
FORBES ST
HOLBORN AVE
WINSTON AVE
BRISCOE ST W
WANASEA AVE
SOUTHCREST DR
LANGARTH ST W
HIGHWOOD AVE
EMERY ST W
SOUTHVIEW CRES
PHYLLIS ST
RACHEL ST
PADDINGTON AVE
EUSTON RD
HAZELWOOD AVE
ROBIN RD
BEACHWOOD AVE
CENTRE ST
CENTRE CRES
COTSWOLD GATE
BASE LINE RD W
GLADMAN AVE
WEST ST
HUXLEY ST
MCGREGOR AVE
COMMISSIONERS RD W
Coves ESA
Legend
London Coves Proposed ESA Boundary
Public Lands
Streams
Parcel Fabric
N
W
E
S
0 50 100 200 300
Meters
North-South Environmental Inc.
Specialists in Sustainable Landscape Planning
October 6, 2014

THE COVES ENVIRONMENTALLY SIGNIFICANT AREA CONSERVATION MASTER PLAN

Section 7 – References for the Coves ESA

Photo Credit – Andrew Jackson (www.ontariowildlife.net)

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