



# **Selleck's and Dunlap Woods Nature Preserve**



**Darien, Connecticut**

## **King's Mark Environmental Review Team Report**

**King's Mark  
Resource Conservation & Development Area, Inc.**

# **Selleck's and Dunlap Woods Nature Preserve Darien, Connecticut**



## **Environmental Review Team Report**

Prepared by the  
King's Mark Environmental Review Team  
of the  
King's Mark  
Resource Conservation and Development Area, Inc.

For the  
Parks and Recreation Commission,  
Darien Land Trust and the  
Friends of Selleck's Woods  
Darien, Connecticut

November 2009

## **Acknowledgements**

This report is an outgrowth of a request from the Darien Parks and Recreation Commission with the Darien Land Trust and the Friends of Selleck's Woods to the Southwest Conservation District (SWCD) and the King's Mark Resource Conservation and Development Area (RC&D) Council and ERT Subcommittee for their consideration and approval. The request was approved and the measure reviewed by the King's Mark Environmental Review Team (ERT).

The King's Mark Environmental Review Team Coordinator, Elaine Sych, would like to thank and gratefully acknowledge the following Team members whose professionalism and expertise were invaluable to the completion of this report.

The field review took place on Tuesday, May 27, 2009.

|                   |                                                                                            |
|-------------------|--------------------------------------------------------------------------------------------|
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I would also like to thank Susan Swiatek, director, Darien Parks and Recreation, Chris Filmer, president, Friends of Selleck's Woods and a trustee of the Darien Land Trust, and Shirley Nichols, executive director, Darien Land Trust for their cooperation and assistance during this environmental review.

Prior to the review day, each Team member received a summary of the proposed project with location maps. During the field review Team members were given additional information. Some Team members conducted a map review only. Following the review, reports from each Team member were submitted to the ERT coordinator for compilation and editing into this final report.

This report represents the Team's findings. It is not meant to compete with private consultants by providing site plans or detailed solutions to development problems. The Team does not recommend what final action should be taken on a proposed project - all final decisions rest with the town. This report identifies the existing resource base and evaluates its significance to the proposed use, and also suggests considerations that should be of concern to the town. The results of this Team action are oriented toward the development of better environmental quality and the long term economics of land use.

The King's Mark RC&D Executive Council hopes you will find this report of value and assistance in the management planning for the Selleck's Woods and Dunlap Woods properties.

If you require additional information please contact:

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# **Introduction**

## **Introduction**

The Darien Department of Parks and Recreation along with the Darien Land Trust and the Friends of Selleck's Woods have requested Environmental Review Team (ERT) assistance in conducting a natural resource study for the Selleck's Woods and Dunlap Woods Nature Preserve.

The Selleck's and Dunlap Woods Nature Preserve is located in the northeast corner of town bordered by I-95 on the north, Metro-North Railroad on the southwest and residential homes on the east. Selleck's Woods is a 28 acre parcel purchased by the town in 1963 and Dunlap Woods, 22 acres in size was donated to the Darien Land Trust in 1972. The two contiguous parcels are treated as one large nature preserve.

The Selleck's Woods and Dunlap Woods Nature Preserve contains almost two miles of trails through seven distinct ecosystems ranging from dense woodland areas to ponds, marshes and streams.

A seven acre pond (Dunlap Pond) was created during the construction of I-95 in the 1950's and a large highway service area was developed during the 1960's and 1970's. The service area has polluted the lake with debris and oil leaks. Problems with ATV's and dirt bikes causing heavy damage to the woods and wildlife also occurred. The Darien Land Trust, in the 1980's, began an initiative to clean up the preserve. The service area was fenced off and DOT installed a containment boom across the lake entrance. Little other conservation work was carried out and the site was even considered for senior housing. After the formation of the Friends of Selleck's Woods and its joint action with the Darien Parks and Recreation Department, the condition of the woods improved. A college student report in 1997 evaluated the site, described different ecosystems, and made some recommendations on its care and usage. Five bridges were built, trails were clearly marked and signed, and basic tree care was carried out. Vandals were confronted and garbage cleared on a regular basis. Since 2000 residents have become more aware of the property through sponsored events. Everything has been done to encourage public use and to discourage vandals.

## **Objectives of the ERT Study**

Through the efforts of the Town of Darien, the Darien Land Trust and the Friends of Selleck's Woods the property has been preserved and has become a popular destination for public recreation. Because it has become a popular destination there is a concern that the natural habitat may become jeopardized. The ERT was asked to provide information and guidelines as to how to manage this habitat going forward. Specific concerns include the management and restoration action needed to preserve, protect and restore natural habitats while balancing public, educational use and enjoyment of the preserve.

## **The ERT Process**

Through the efforts of the Darien Parks and Recreation Department, the Darien Land Trust and the Friends of Selleck's Woods this environmental review and report was prepared for the Town of Darien..

This report provides an information base and a series of recommendations and guidelines which cover the topics requested by the town. Team members were able to review maps, plans and supporting documentation provided by the applicant.

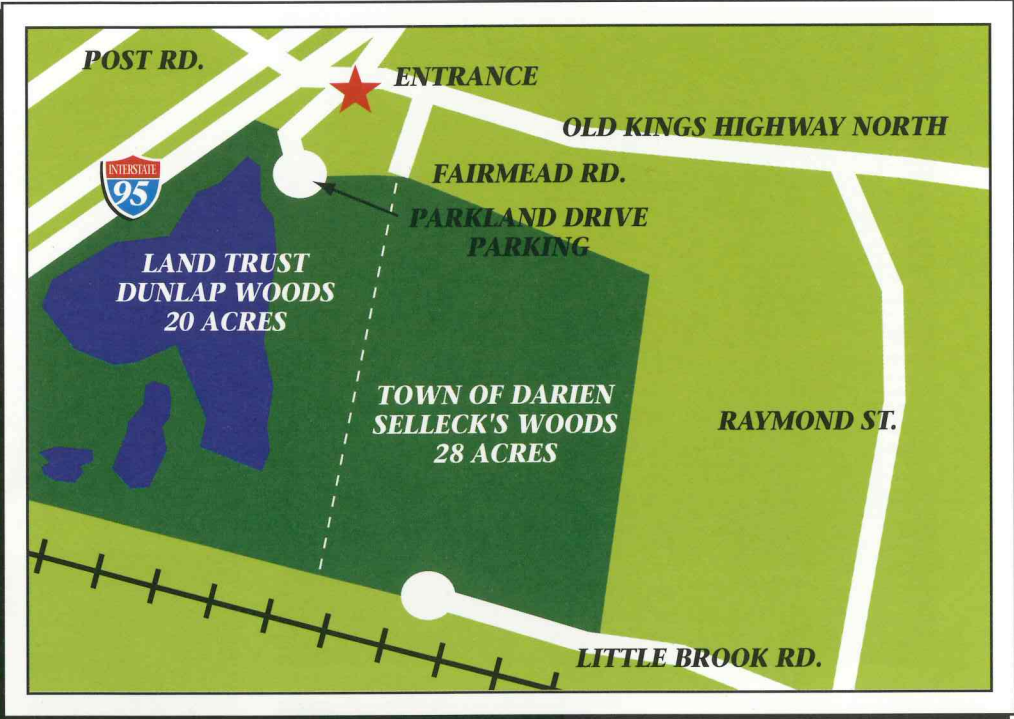
The review process consisted of four phases:

1. Inventory of the site's natural resources;
2. Assessment of these resources;
3. Identification of resource areas and review of plans; and
4. Presentation of education, management and land use guidelines.

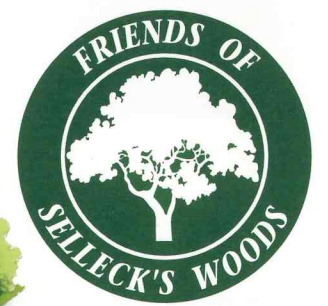
The data collection phase involved both literature and field research. The field review was conducted Tuesday, May 27, 2009. The emphasis of the field review was on the exchange of ideas, concerns and recommendations. Being on site allowed Team members to verify information and to identify other resources.

Once Team members had assimilated an adequate data base, they were able to analyze and interpret their findings. Individual Team members then prepared and submitted their reports to the ERT coordinator for compilation into this final ERT report.

HOW TO FIND SELLECK'S WOODS & DUNLAP WOODS



TRAIL MAP OF



SELLECK'S WOODS  
&



DUNLAP WOODS

# **Conservation District Review**

This soil resources report applies to the 50+/- acre parcel referred to as Selleck's and Dunlap Woods Preserve, which is bounded by 1-95 to the north, the Metro-North railroad along its southern border and suburban neighborhoods to the east and northeast of the parcel. The information in this report is based on the USDA's historical soils series descriptions and the new digital mapping unit descriptions as presented in the Soil Survey of Connecticut, remote survey interpretations plus field observations.

## **Mapping Units - Exhibit #1**

### **Wetland Soils**

#### **1) USDA Soil # 12 -Rb map unit -Raypol**

This map unit consists primarily of Raypol soils on 0 to 3 percent slopes. Raypol soils are very deep, poorly drained soils, formed in loamy over sandy and gravelly glacial outwash deposits. These soils have a watertable within 1.5 feet of the surface much of the year. Typically, they have a silt loam, very fine sandy loam surface layer and subsoil over a stratified and gravel substratum that extends to a depth of 60 inches or more. This soil type is located around the watercourse and southeast entrance of the park off of Little Brook Rd.

#### **2) USDA Soil # 13 - Wa map unit - Walpole sandy loam. Slopes 0 to 3 percent**

Walpole soils are nearly level, poorly drained soils that formed in depressions on broad outwash terraces. Typically, they have a fine sandy loam or sandy loam surface layer and subsoil over a substratum of stratified loamy sand and gravel. Walpole soils have a watertable within 1 foot of the surface from late fall to late spring. This soil type constitutes approx. 6% of the soils on site and is located along the east and northern fringes of the pond.

### **Concerns**

- Trails along and upslope of the pond receive a great deal of foot traffic, which has disturbed the ground cover and given rise to erosion on the trails and some portions of the shoreline.
- Loss of vegetative cover along the ponds banks has been the result of anglers gaining more access to the pond.

### **Recommendations**

- Provide additional buffering distances and reduce the width of the trails in close proximity of the pond.
- Harden access points to the pond for fishing, which will limit bank erosion and siltation of the pond.

### 3) USD Soil #15 - SCA - Scarboro Muck

These soils are very deep, very poorly drained and formed in glacial outwash. Scarboro soils have an organic surface layer up to 16 inches thick overlying sand to a depth of 60 inches or more. Depth to watertable is less than 12 inches for the entire year.

These soils are about 7% of the landscape in the south-central and southern portion of the site. Trails around these critical areas have been well maintained with a nominal footprint and limited potential erosion with wood chips.

#### **Recommendation**

- Construct waterbars or similar diversions to redirect surface water runoff along trails to reduce erosion / siltation of nearby watercourses and wetlands habitats.

### 4) USDA Soil #108 -Sb-Saco silt loam.

These very deep, very poorly drained soils are on low-lying floodplains. They formed in silty alluvial deposits. Saco soils typically have silt loam or very fine sandy loam textures to a depth of 40 inches and silt loam through loamy fine sandy textures below 40 inches. Saco soils have a watertable at or near the surface most of the year. They are subject to very frequent flooding and commonly flood annually, usually in the spring.

#### **Recommendation**

- There is approximately 5.5-acres of this wetland soil type along the eastern border of the parcel and off of Selleck's and Deer Trails. The trail system could be enhanced with raised walkways strategically sited as observation points that allow deeper access into these wetlands.



#### ▪ **Note**

**Potential Vernal Pools** - Some seasonally ponded areas in upland areas may support flora and fauna of vernal pools. These areas should be investigated and inventoried in a field study to qualify and quantify vernal pools on site. The study can assess and identify critical areas around potential vernal pools, their surrounding upland habitats, which would dictate buffering distances to limit access, reduce disturbances and preserve the viability of these potential vernal pools.

**Wetland Crossings and Trails** - Upland trails leading to the wetlands require greater buffering distances, erosion and siltation control plus less intrusive, raised walkways across wetland areas. Minimize the size of the crossing, provide hard armoring of the crossing and stabilize the upslope area leading to these crossings.

### **Non-wetland Soils**

#### **5) USDA Soil #21A - Map Unit Nn - Ninegret fine sandy loam, 0 to 3 percent slopes.**

These soils are very deep and moderately well drained. Ninegret soils formed in glacial outwash. Typically, they have a fine sandy loam surface and subsoil layer, overlying sand and gravel to a depth of 60 inches or more. They exhibit redoxamorphic features within a depth of 24 inches. These soils have a seasonally high watertable at 1.5 to 2.5 feet from late fall to early spring.

It constitutes approximately 5 % of the soils on site and the majority of these soils are located on the eastern portion of the park. The soil has **poor to fair potential** for community development. Permeability is moderately rapid in the surface layer and subsoil and rapid in the substratum.

#### **6) USDA Soil #32 A - Map Unit HcA - Haven silt loam 0 to 3 percent slopes.**

These very deep well-drained soils formed in loamy over sandy and gravelly glacial fluvial deposits. Typically, they have a silt loam, loam or very fine sandy loam surface layer and subsoil over a stratified sand and gravel substratum.

This soil has a **good potential** for community development. The hazard of erosion is moderate. Permeability is moderate in the surface layer and subsoil and very rapid in the substratum. Runoff is medium.

- Both soils 5 & 6 have a **moderate erosion hazard** associated with them and enhanced conservation measures are needed with any increase in steepness of slope. Currently, the established trails are chipped and remain relatively stable atop of these slight inclines.
- Provide runoff diversions at the top of slope. Utilize permanent diversions to direct runoff into vegetated or semi-armored areas to reduce runoff volumes and velocities. Install waterbars across trails at intervals dictated by slope angle at length shown.

#### **Waterbar Spacing Along Steeper Trails -**

|                        |                        |                  |
|------------------------|------------------------|------------------|
| <b>1% slope @ 440'</b> | <b>2% slope @ 245'</b> | <b>5% @ 125'</b> |
| <b>10% slope @ 78'</b> | <b>15% slope @ 58'</b> |                  |

### **Trails**

Maintaining a nominal footprint of trail width is important in protecting and preserving these areas. Any expansion of the trails width and their proximity to the wetlands would lead to the stripping of vegetation, accelerated erosion and give rise to the siltation of downslope environments.

- Maintain narrow trails and stabilize trailsides with ground covers.
- Blazing of new trails atop of steeper sections should be discouraged.

#### 7) USDA Soil #73C - CrC - Charlton-Hollis soil 3 to 15 percent slopes.

This complex consists of well-drained soils located on uplands where the relief is affected by underlying bedrock. The Charlton component has moderate or moderately rapid permeability. Runoff is medium to rapid. The Hollis component has moderate to moderately rapid permeability above the bedrock.

This complex has **fair to poor potential** for community development. The **Charlton component has fair potential** for development and the **Hollis has poor potential** for development due to its shallowness to bedrock. This soil type constitutes 30% of the sites soil type and trends north and south through the central portion of the site.

Intensive enhanced conservation measures such as temporary vegetation and siltation basins are frequently needed to prevent excessive runoff, erosion and siltation.

#### Concerns

Trails located atop of the soils should have diversions installed at mid-slope and at the top of slopes to limit concentrated runoff and reduce erosion potential.

- Hollis soils are limited by their shallowness to bedrock, which is approx. 10 to 20 inches in depth.
- The fine particulates of schist and gneiss associated with these soils stay in suspension for extended periods. Limiting land disturbances atop of these soils, which requires the rerouting of trails and limiting public access to these steeper areas, can avoid contamination from siltation.

#### 8) HpE - Hollis-Charlton-Rock Outcrop complex, 15 to 35 percent slopes. USDA Soil #75C

This complex has a **poor potential for development**. One soil is named Hollis. Hollis soils are shallow and well drained. They have fine sandy loam textures overlying consolidated bedrock at a depth of 10 - 20 inches. The other soil is named Charlton. Charlton soils are very deep well-drained soils formed in loose glacial till. Typically, they have fine sandy loam textures to a depth of 60 inches or more.

The rock outcrop consists of exposures of crystalline bedrock located on knobs and ledges. The Hollis soil dominates the area, followed by the Charlton and rock outcrop components. **Runoff is rapid** in both the Hollis and Charlton type soils. Both are limited by steepness of slopes and shallowness to bedrock, rock outcrops and stoniness. **There is a hazard of effluent seeping into cracks in the bedrock and polluting groundwater.**

These highly erodable slopes must employ intensive conservation measures such as the use of diversions, vegetative cover, mulching and siltation basins, which are needed to prevent excessive runoff, erosion and siltation.

### **Recommendation**

\* Avoid the disturbance of these steep upland soils and preserve these areas by limiting public access.

### **8) USDA Soil # 306 / 7 - Udorthents smoothed**

This map unit consists of a well drained to excessively drained soil. This mapping unit is comprised of cut and borrows areas where the surface layer and subsoil has been modified or removed. Slopes are generally less than 8 percent; there are steep escarpments at the edges of some filled areas along the pond and the stream on the ponds northern boundary.

The soil in this unit has a wide range of characteristics. Texture ranges mainly from sandy loam to silt loam or the gravelly analogs. Consistence ranges from loose to very firm. Permeability ranges from very rapid to slow.

## **Stormwater / Non Point Source (NPS) Management - Exhibit #2**

### **Rest Area Concerns:**

#### **Raw Water Quality:**

Stormwater discharges to the pond are inadequate to sequester solids and pretreat effluent before entering the confines of the pond. The wide array of associated contaminants from vehicle traffic and runoff from parking spaces has exceeded the abilities and capacity of the existing stormwater infrastructure of the rest area.

The current system provides a modicum of opportunity for contaminants to volatilize and provides sufficient renovation of the stormwaters non-point source contaminants before they are discharged to the pond. These contaminants are comprised of petroleum hydrocarbons, glycols, metals from vehicles, nutrients, pesticides, de-icing agents plus the thermal aspect from all impervious surfaces, which will degrade the water quality for benthic and aquatic life.

#### **Stormwater Retrofits:**

Multi-cell or Bioretention Basin Benefits - Raw Water Quality is enhanced by longer detention time, time of travel, additional solids settling, lower cost, lower maintenance, greater volatilization of petroleum hydrocarbons and poly nuclear aromatic hydrocarbons, uptake of nutrients by plants, cooler final discharges, sequestering of heavy metals and an increase in aquatic habitat.

The enhanced stormwater infrastructure would provide a reduced threat to water quality, ability to have more time and capacity to respond to hazardous spills, non-point source pollutants and impoundment failure.

### Alternate Configuration - Exhibit #2

- Gabion Forebays - At a minimum, consider siting adequately sized gabion forebays to sequester solids and effluent from the 4 discharge outlets and the stream inlet to the pond, which would also allow for the periodic removal of material.
- Maintenance Access - Adequate access to maintain these basins is important to assure the optimal performance of these facilities.

## Land Use Planning Opportunities

The property needs to have a long-term natural resource conservation / forest management plan, which encompasses goals and objectives for increasing and maintaining biodiversity, integrates year round passive recreational uses that can provide a platform for education that showcases and preserves its natural resources, provides public access, serves the citizenry of Darien while advocating for all environs on and abutting this site.

### Natural Resource History / Education Trails

Trails are the key to bringing people and wildlife together. Trail systems should be located to take advantage of terrain and existing habitat and conform to existing landscape textures. Effective trail planning and layout can enhance the learning and aesthetic aspects of passive outdoor recreation by providing easy access to varied habitats. A nature trail, including informational signs, provides insight into the ecology of an area. The information provided increases awareness, allows the general public to appreciate a particular animal, plant or habitat and its ecological value and fosters a stewardship of our natural resources that will serve our communities for generations to come.

- Guidance on developing a trail system can be obtained by contacting the CT Forest and Parks Association located on RT 66 in Middlefield, CT.
- Environmental Education - This site also offers a wide array of science based educational opportunities from the study of aquatic and terrestrial flora and fauna, forestry management, and the enhancement of a diverse habitat base that will serve as a sanctuary to the wildlife.

Specific habitats on site could utilize strategically placed staging areas along the trail systems that could serve as outdoor living classrooms throughout the property. This would expand and enhance all grade level science based curriculums in the school system, its citizenry and other environmental groups associated with the Township.

CT DEP can facilitate the development or enhancement of existing environmental programs in the City's school system through Project Wet and Project Wild.

## Wildlife Considerations

Wildlife habitat on the site includes mixed hardwood forest, open / reverting fields and wetlands. The wildlife can be managed through management of habitat. Optimum habitat diversity will maximize wildlife production. Suggestions include managing the wooded portions of the property, establishing open fields or early successional edge areas, providing small conifer patches, encouraging certain tree species and placing bluebird boxes at the edges of the fields. Controlling unwanted pioneer and invasive species of plants such as autumn olive and multiflora rose would allow for easier management of these properties and provide more opportunity to enhance the area with beneficial native species.

**Mixed Hardwood Forest:** This habitat type consists of a variety of hardwood species, including red maple, beech, red oak, elm, hickory, white oak and scattered white pine and cedar. Understory vegetation includes witch hazel, elderberry, multiflora rose, grape, blackberry and hardwood regeneration. Wildlife frequenting this habitat type includes deer, fox, raccoon, gray squirrel, woodpeckers (pileated, hairy and downy), barred owls, broad-winged hawks and various non-game species such as shrews, voles and snakes.

**Wetland / Riparian Habitat:** This habitat type consists of various combinations of streams / brooks, swamps and small marsh areas. Associated vegetation includes red maple, birch, alder, cattails, dogwood, jewel-weed, spicebush, sweet pepper bush, skunk cabbage, duckweed and various grasses and sedges. Signs of wildlife using these areas include deer, fox, raccoon and muskrat. Other creatures utilizing these areas are skunks, swallows, red-winged blackbirds, cardinals, grackles cedar waxwings, titmice, woodpeckers, wood ducks and numerous amphibians and reptiles, including water and garter snakes, salamanders, newts, spotted and painted turtles.

## State & Federal Administered Programs

- WHIP - Wildlife Habitat Incentive Program: Municipalities and Private Landowners are eligible to participate in a cost-share program for cities and towns in implementing practices to maintain or establish wildlife habitats. These practices include invasive plant control, early successional woodlands, riparian areas; state identified imperiled habitats plus streams and rivers.

WHIP is a voluntary program for people who want to develop and improve wildlife habitat primarily on private land. Through this program, NRCS provides both technical and financial assistance on grassland, riparian areas, state identified imperiled habitats, old fields, streams and rivers, early successional wetlands (tidal and non-tidal), and shallow and deep water habitats.

[For more information](#) or contact your nearest USDA Service Center: Wallingford Service Center - (203) 269-7509.

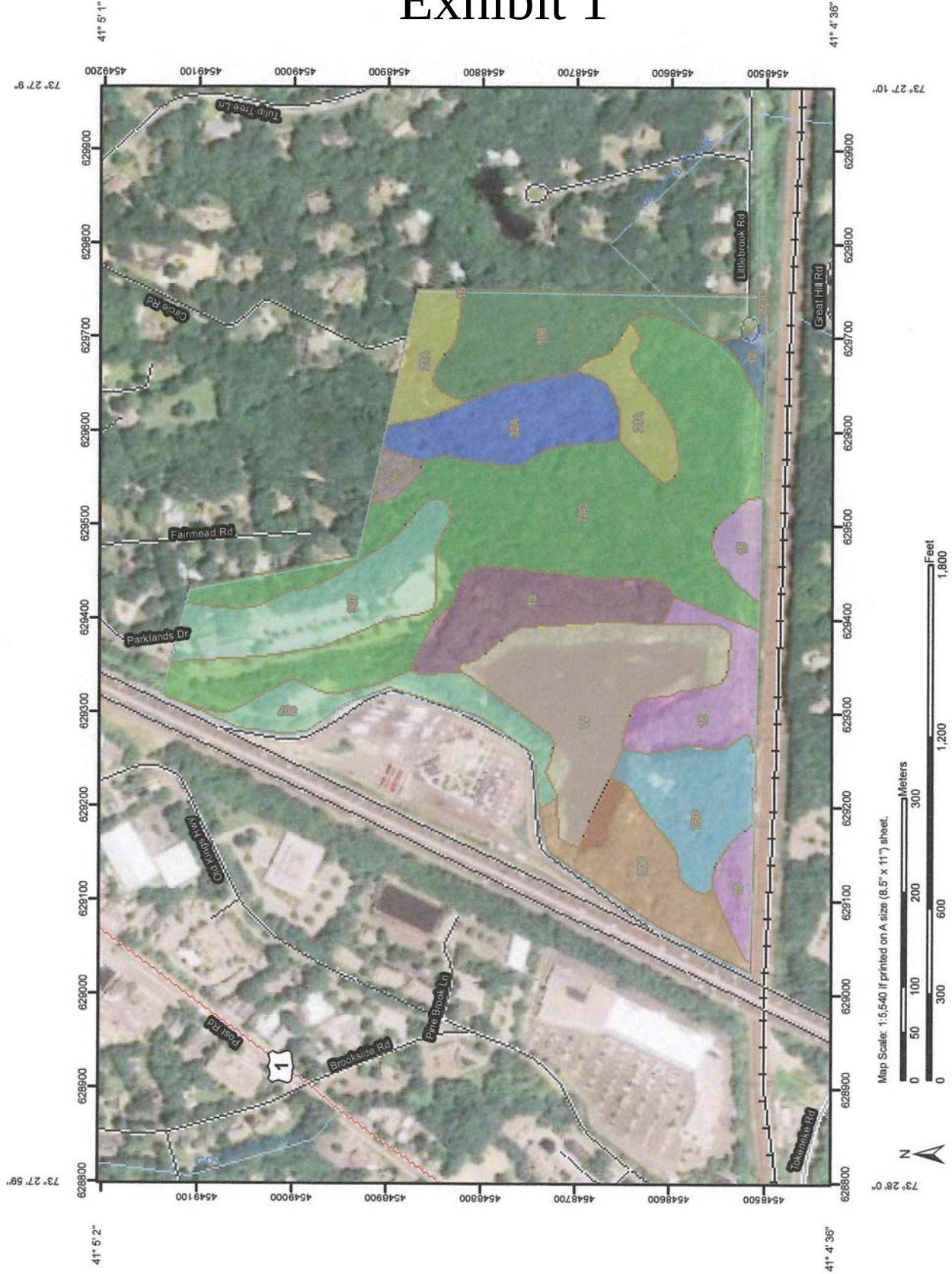
- Forestry Management - Develop a comprehensive forestry management plan to insure the health of the stand and its associated environments. Contact Forester Robert S. Rocks, CT DEP, Eastern District Headquarters, 209 Hebron Road, Marlborough, CT 06447. Telephone # 860-295-9523

The development of a comprehensive land use management plan for this property will greatly ensure the protection and preservation of the areas water quality, wildlife habitat enhancement and provide open space access to the community while promoting greater environmental awareness.

# Exhibit 1

17

Map Unit Name—State of Connecticut



Map Scale: 1:5,540 if printed on A size (8.5" x 11") sheet.



USDA  
Natural Resources  
Conservation Service

Web Soil Survey 2.1  
National Cooperative Soil Survey

2/11/2009  
Page 1 of 3

Custom Soil Resource Report  
Soil Map



## MAP LEGEND

|                               |                                                                                     |                                                                 |                                                                                     |                                                                      |
|-------------------------------|-------------------------------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------|
| <b>Area of Interest (AOI)</b> |  | Area of Interest (AOI)                                          |  | Urban land-Charlton-Chatfield complex, rocky, 3 to 15 percent slopes |
| <b>Soils</b>                  |  | Soil Map Units                                                  |  | Walpole sandy loam                                                   |
|                               |                                                                                     |                                                                 |  | Water                                                                |
| <b>Soil Ratings</b>           |  | Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky |  | Not rated or not available                                           |
|                               |  | Charlton-Chatfield complex, 3 to 15 percent slopes, very rocky  |  | Cities                                                               |
|                               |  | Haven and Enfield soils, 0 to 3 percent slopes                  |  | Oceans                                                               |
|                               |  | Hollis-Chatfield-Rock outcrop complex, 3 to 15 percent slopes   |  | Streams and Canals                                                   |
|                               |  | Ninigret and Tisbury soils, 0 to 5 percent slopes               |  | Rails                                                                |
|                               |  | Raypol silt loam                                                |  | Interstate Highways                                                  |
|                               |  | Saco silt loam                                                  |  | US Routes                                                            |
|                               |  | Scarboro muck                                                   |  | Major Roads                                                          |
|                               |  | Udorthents-Urban land complex                                   |  | Local Roads                                                          |
|                               |  | Urban land                                                      |                                                                                     |                                                                      |

## MAP INFORMATION

Map Scale: 1:5,540 if printed on A size (8.5" x 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service  
 Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>  
 Coordinate System: UTM Zone 18N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut  
 Survey Area Data: Version 6, Mar 22, 2007

Date(s) aerial images were photographed: 7/16/2006

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Name

| Map Unit Name— Summary by Map Unit — State of Connecticut |                                                                      |                                                                      |              |                |
|-----------------------------------------------------------|----------------------------------------------------------------------|----------------------------------------------------------------------|--------------|----------------|
| Map unit symbol                                           | Map unit name                                                        | Rating                                                               | Acres in AOI | Percent of AOI |
| 12                                                        | Raypol silt loam                                                     | Raypol silt loam                                                     | 0.6          | 0.9%           |
| 13                                                        | Walpole sandy loam                                                   | Walpole sandy loam                                                   | 4.0          | 6.1%           |
| 15                                                        | Scarboro muck                                                        | Scarboro muck                                                        | 4.8          | 7.4%           |
| 21A                                                       | Ninigret and Tisbury soils, 0 to 5 percent slopes                    | Ninigret and Tisbury soils, 0 to 5 percent slopes                    | 3.4          | 5.3%           |
| 32A                                                       | Haven and Enfield soils, 0 to 3 percent slopes                       | Haven and Enfield soils, 0 to 3 percent slopes                       | 3.9          | 6.1%           |
| 73C                                                       | Charlton-Chatfield complex, 3 to 15 percent slopes, very rocky       | Charlton-Chatfield complex, 3 to 15 percent slopes, very rocky       | 19.4         | 30.1%          |
| 73E                                                       | Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky      | Charlton-Chatfield complex, 15 to 45 percent slopes, very rocky      | 0.5          | 0.7%           |
| 75C                                                       | Hollis-Chatfield-Rock outcrop complex, 3 to 15 percent slopes        | Hollis-Chatfield-Rock outcrop complex, 3 to 15 percent slopes        | 3.6          | 5.6%           |
| 108                                                       | Saco silt loam                                                       | Saco silt loam                                                       | 5.5          | 8.5%           |
| 273C                                                      | Urban land-Charlton-Chatfield complex, rocky, 3 to 15 percent slopes | Urban land-Charlton-Chatfield complex, rocky, 3 to 15 percent slopes | 0.0          | 0.1%           |
| 306                                                       | Udorthents-Urban land complex                                        | Udorthents-Urban land complex                                        | 3.8          | 5.9%           |
| 307                                                       | Urban land                                                           | Urban land                                                           | 7.7          | 11.9%          |
| W                                                         | Water                                                                | Water                                                                | 7.4          | 11.5%          |
| <b>Totals for Area of Interest</b>                        |                                                                      |                                                                      | <b>64.6</b>  | <b>100.0%</b>  |

## Description

A soil map unit is a collection of soil areas or nonsoil areas (miscellaneous areas) delineated in a soil survey. Each map unit is given a name that uniquely identifies the unit in a particular soil survey area.

## Rating Options

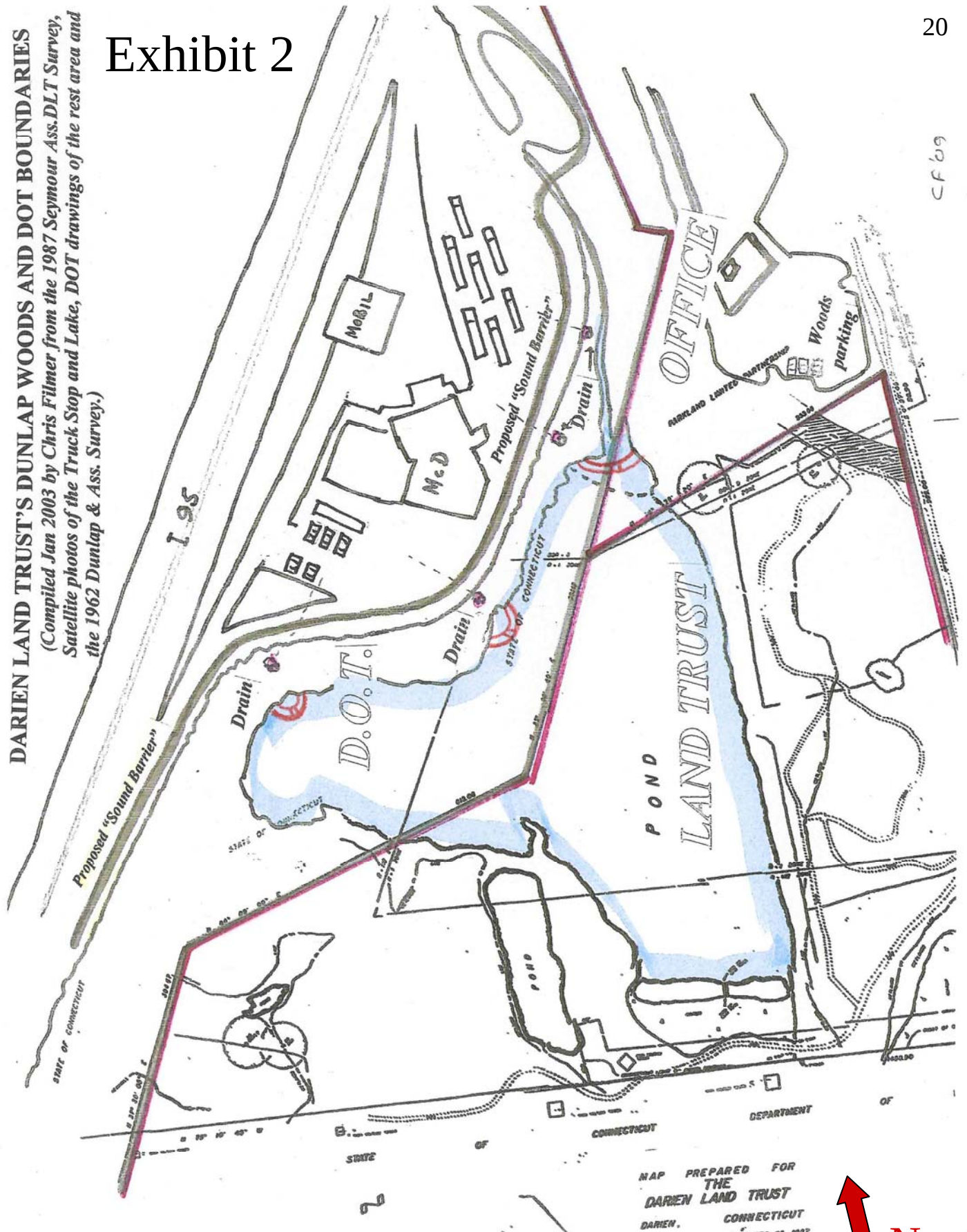
*Aggregation Method:* No Aggregation Necessary

*Tie-break Rule:* Lower

CF69

# Exhibit 2

DARIEN LAND TRUST'S DUNLAP WOODS AND DOT BOUNDARIES  
(Compiled Jan 2003 by Chris Filmer from the 1987 Seymour Ass.DLT Survey,  
Satellite photos of the Truck Stop and Lake, DOT drawings of the rest area and  
the 1962 Dunlap & Ass. Survey.)



Gabion Forebay 3 Places



N

# **A Watershed Perspective**

## **General Watershed Characterization**

The review area is described as the Selleck's and Dunlap Woods Preserve within the town of Darien. The Town of Darien requested assistance in conducting a natural resources inventory and assessment of this intensively managed area. A public-private partnership exists between the Town of Darien and the Darien Land Trust through which the land Trust manages the entire site which consists of adjoining private land trust and municipal land. The Town indicated two objectives:

- to develop a comprehensive management plan for the preserved lands;
- Recommend BMPs for stormwater entering Dunlap Pond from I-95 and the northbound rest area.

During this site review of the properties, the Friends of Selleck's Woods group provided an onsite tour and background information. The property is bounded by Metro-North to the south and I-95 to the northwest.

The major natural resources include forested rolling topography formed predominantly on glacial till in the western part of the site, glacial meltwater deposits to the east, and glacial lake/pond sediments in the southeastern portion of the site. Water resources on site consist of Dunlap Pond, and a small unnamed perennial stream draining to Tokeneke Brook. There is a well maintained network of trails and interpretive features intended to educate the public about wildlife and natural history of the site.

The Tokeneke Brook is a relatively small watershed encompassing portions of three municipalities: Darien, New Canaan, and Norwalk. Tokeneke Brook is a tributary to the Long Island Sound by way of Old Farm Pond. Changes in runoff intensity resulting from intensive urbanization and development in the watershed have caused considerable streambank destabilization and movement of sediment and bedload downstream in all of Darien's watercourses.

The Tokeneke Brook watershed reflects a human settlement pattern found in many other coastal watersheds in much of southwestern Connecticut. This sub-regional basin contains a highly developed suburban population across the upper reaches, transitioning downstream through a highway network and increasingly urbanized densely populated lower basin.

## **Water Quality Conditions**

### **Surface and Ground Water Classification**

Tokeneke Brook is not currently classified under the State of Connecticut surface water quality classifications due to its small flow volume, so its effective goals are the same as for Class A streams. It has not been determined whether Tokeneke Brook meets the water

quality criteria, which support designated uses. These surface waters have designated uses for: habitat for marine fish, other aquatic life and wildlife; recreational uses; and agricultural/industrial water supplies. The water quality goal (and the associated management actions) is the achievement of Class A criteria and the attainment of these designated uses. All permitted wastewater discharges are limited in Class A surface waters. The State of Connecticut Water Quality Standards, with associated Criteria for Surface Waters and Ground Waters, is available on-line at: [www.ct.gov/dep](http://www.ct.gov/dep).

The current Connecticut ground water classification for the area is GA. The designated uses for GA waters are: existing private and potential public or private supplies of water suitable for drinking without treatment; baseflow of hydraulically connected surface water bodies. CT DEP presumes that ground water in such areas is, at a minimum, suitable for drinking or other domestic uses without treatment. The management goal is to protect these designated uses of the Tokeneke Brook and associated ground water resources.

## **Watershed Planning Considerations**

### **Stormwater Management and Planning Considerations**

The USDA Natural Resources Conservation Service - CT Office (NRCS) produced a publication in 2005 of value to Town of Darien. Entitled, *Soil Based Recommendations for Storm Water Management Practices* CT-TP-2005-3), this report includes four soil survey interpretations that evaluate the suitability of Connecticut soils for four widely used post-construction stormwater runoff management systems. The purpose of these interpretations is to help people use soil survey information as a screening tool for successful selection and implementation of best management practices (BMPs) for stormwater runoff. NRCS personnel are available to provide information about these interpretations and provide guidance on additional site evaluations necessary to determine if some BMP types can be utilized in some areas. Contact Lisa Krall, Soil Interpretation Specialist, at the NRCS State office in Tolland at (860) 870-4942 X 110.

Another notable guidance document is the *2004 Connecticut Stormwater Quality Manual*. Information about urban stormwater characteristics can be found in Volume 2 of that manual. An online, downloadable version is also available on the Connecticut DEP website, at: [http://www.ct.gov/dep/cwp/view.asp?a=2721&q=325704&depNav\\_GID=1654](http://www.ct.gov/dep/cwp/view.asp?a=2721&q=325704&depNav_GID=1654). The DEP promotes this manual for use as a planning tool and design guidance document. The manual assists local (and state) land use commissions and government officials to design and review projects in a technically sound and consistent manner. A strong emphasis of the Manual is dedicated to site planning and design. This consists of preventative measures that address core causes of stormwater problems by maintaining the pre-development hydrologic functions and pollutant renovation mechanisms to the extent practical. Elements of such site design and planning include concepts raised in this review: alternative site design for transportation infrastructure and lot layout, watershed planning, and LID management practices. The manual recommends downstream resource selection criteria for several categories affecting estuary and coastal waterbodies.

## Recommended Action

South West Conservation District has provided proposed enhancements to stormwater treatment for Dunlap Pond in their section of this report. The best approach to implementing Best Management Practices would be to employ a treatment train approach designed to effectively treat the first flush from pavement, where multiple BMPs, that are maintainable, can be managed for the best possible outcome during typical storm events. At a site like the Darien northbound I-95 rest area, there will be compromises required to balance human needs, wildlife habitat, and water quality protection. Determination of specific requirements to ConnDOT and their vendors' stormwater treatment will be assessed when new stormwater permits are necessitated.

Non-structural practices like frequent sweeping and active litter-prevention programs may be a productive means to reduce contaminants in stormwater.

The existing use of an aquatic barrier to segregate an area, within Dunlap Pond, where sediments can settle, could provide a highly effective treatment of stormwater, if it were re-designed, upgraded, and maintained for optimum performance. The advantage to enhancing this treatment component is that a significant amount of existing trees and vegetation would not need to be removed. The undesirable impact to fish in the pond is minimal, since there is no connection to tributary streams affected, and impacts to the Pond's vegetated buffer are minimized as well.



Water quality swales and bio-retention areas could be designed to provide further benefits prior to stormwater discharge. Some disruption to aesthetic values might result from the removal of buffering vegetation that would be required to provide access to construct and maintain these types of practices.

The impacts of installing gabion forebays at stormdrain outfalls should be evaluated with respect to installation and maintenance requirements. The most desirable design would locate them upgradient from existing regulated wetlands; however there may not be sufficient space given slopes involved with necessary excavation. Given that they would require

periodic maintenance, the impacts upon site security, aesthetic, and habitat values must be evaluated.

## **Riparian/Wetland Areas**

When developing watershed management efforts, riparian/wetland areas are often the first place to look. This is true in part because a functioning riparian area (the interface between water and adjoining lands) can be an indication of a functioning watershed. Although riparian/wetland areas occupy a rather small footprint on most landscapes, their highly variable and complex combinations of physical and biological characteristics create tremendously productive ecosystems. The physical functions of healthy riparian systems include:

- sediment and pollutant filtering,
- bank stabilization, and
- surface/ground water storage and release.

When these physical features are working they are able to sustain a range of benefits or values such as fish and wildlife habitat, flood control, erosion and sediment control, recreational opportunities, and more. In brief, these areas serve as places of great ecological, social, cultural, historic and aesthetic importance.

Increased runoff from development within the watershed has inevitably resulted in some streambank instability, potential for loss of aquatic habitat, and movement of excess sediments downstream. At this time, the small tributary to Tokeneke Brook appears relatively stable. In the event of development of additional impervious surfaces in the upstream watershed, further evaluation of the streams morphology might reveal some recommended riparian habitat enhancements that could be implemented.

With water quality, shorelines can effectively trap and filter sediments and debris from rain events and snow melt. On average, wider shorelines are more effective than narrow shorelines. Further, vegetated shorelines comprised of trees, shrubs and grasses are more effective in this function than with just grass cover.

Another value to protect is that of shoreline stability. Native vegetation or well-designed naturalized plantings can stabilize these zones and reduce erosion potential. Within the stream channel, aquatic plants can help protect the abutting shoreline by deflecting and absorbing wave action.

The shorelines of Dunlap Pond are currently in a reasonably natural condition with little adverse effects due to excessive human traffic. If use of the facility grows dramatically, management measures such as stabilized access points to the water, for active and passive recreation might be warranted.

## Vernal Pool Wetlands

The site visits indicated that there may be a number of vernal pool wetlands within these parcels. The ERT request seeks input on land use and/or management plan guidelines for natural and cultural features, including these ephemeral and sensitive resources. Adequate protection appears to exist for these resources provided to property remains in a preserved state. Any proposals for new development in adjacent properties should preserve the vegetated upland buffers to the extent that it is feasible.

## Thinking About the Watershed Picture

Several key management strategies have direct relevance to the Town's ability to protect and manage the Selleck's and Dunlap Woods Preserve. These include the following:

- Mitigating the impacts of increased/increasing impervious surfaces from development
- Enforcing state-of-the-art stormwater management practices for all watershed development (both during and post-construction)
- Implementing municipal stormwater management program plans according to the Connecticut General Permit for the Discharge of Stormwater from Small Municipal Separate Storm Sewer Systems (MS4), including retrofits for existing stormwater drainages and outfalls on the river.
- Requiring developers of adjacent properties to incorporate low-impact site preparation and development techniques where prudent and feasible.
- Elevating the importance of watershed homeowners' and business' "housekeeping" responsibilities.
- Protecting existing and restoring degraded vegetative and riparian buffers where needed.

In addition, these strategies should be supplemented with an early focus on better site design for development proposals, which are then followed by required construction and post-construction practices.

## LID Site Planning and Design Considerations

Low Impact Development (LID) is a site design strategy intended to maintain or replicate predevelopment hydrology through the use of small-scale controls integrated throughout the site to manage stormwater runoff as close to its source as possible (*2004 Connecticut Stormwater Quality Manual*). Infiltration of stormwater through LID helps to remove sediments, nutrients, heavy metals, and other types of pollutants from runoff. As impervious cover in a watershed increases, less water filters into the ground. LID techniques infiltrate stormwater on site before it runs off into storm drains that eventually discharge untreated water to local rivers, streams, lakes, and estuaries. LID also helps to regulate water quantity by decreasing the volume of stormwater runoff and recharging local groundwater resources.

Key strategies for effective LID include: infiltrating, filtering, and storing as much stormwater as feasible, managing stormwater at multiple locations throughout the landscape, conserving and restoring natural vegetation and soils, preserving open space and minimizing

land disturbance, designing the site to minimize impervious surfaces, and providing for maintenance and education. Water quality and quantity benefits are maximized when multiple techniques are grouped together. In areas of compacted and/or possibly contaminated soils, soil suitability should be further investigated prior to selecting optimum treatment and/or remediation measures. Subsurface contaminants may be a concern at this site, such that pervious pavement may not be recommended.

Where soil conditions permit, LID techniques can include:

- the use of pervious pavement or grid pavers (which are very compatible for parking lot and fire lane applications), or impervious pavement without curbs or with notched curbs to direct runoff to properly designed and installed infiltration areas;
- the use of vegetated swales, tree box filters, and/or infiltration islands to infiltrate and treat stormwater runoff (from building roofs, roads, and parking lots);
- the minimization of access road widths and parking lot areas to the maximum extent possible to reduce the area of impervious surface;
- the use of dry wells to manage runoff from building roofs;
- incorporation of proper physical barriers or operational procedures for special activity areas where pollutants could potentially be released (e.g. loading docks, maintenance and service areas, dumpsters, etc.);
- the installation of rainwater harvesting systems to capture stormwater from building roofs for the purpose of reuse for irrigation (i.e. - rain barrels for residential use and cisterns for larger developments);
- the use of residential rain gardens to manage runoff from roofs and driveways;
- the use of vegetated roofs (green roofs) to detain, absorb, and reduce the volume of roof runoff

In addition to protecting water quality and regulating water quantity, LID can preserve features that are important to a town's character, help balance the need for growth with environmental protection, reduce the costs associated with infrastructure maintenance, and calm traffic through the use of narrowed roads and street plantings.

More detailed information on LID site design can be found in the Prince George's County *Low-Impact Development Design Strategies: An Integrated Design Approach* Manual at: <http://www.epa.gov/owow/nps/lid/lidnatl.pdf>.

Contact Jessica Morgan, the CT DEP LID Coordinator, at 860-418-5994 or [jessica.morgan@ct.gov](mailto:jessica.morgan@ct.gov) for more information and /or resources on LID site design.

# Landscape Ecology

## **Invasive Plants**

### **A. Clarification of terminology related to invasive plants in Connecticut**

1. In Connecticut, “Invasive Plant” means a plant that is not native and causes harm in minimally managed areas. In 2004, an official state list of Invasive and Potentially Invasive Plants was developed. That list, including which species have been banned from being sold in the State as of July 2009, is available at <http://www.ct.nrcs.usda.gov/plants.html> in two versions (ordered by common name or ordered by scientific name).
2. Table 8 in the 1997 Site Report, entitled “Non-Native Invasive Species List”, is a mixture of species that are:
  - a. on the official 2004 Connecticut list of Invasive and Potentially Invasive Plants (i.e., they are non-native and considered to cause harm in minimally-managed habitats),
  - b. weedy, non-native plants of roadsides and other disturbed habitats that are not on the official state list, and
  - c. non-invasive agricultural legacies (apple trees).
3. False Indigo (*Amorpha fruticosa*), Queen Anne’s Lace (*Daucus carota*), and Common Mullein (*Verbascum thapsus*) are the weedy, non-native species that are often found in disturbed habitats and were listed as non-native invasive in Table 8. However, they are not on the official invasive plants list and should not be called “invasive” in Connecticut because “invasive” now has a meaning that has been defined legally in Public Act 03-136 <http://www.cga.ct.gov/2003/act/Pa/2003PA-00136-R00SB-01046-PA.htm> .
4. Similarly, the native species referred to in Table 8 as “Native Invasive Species”, should not be confused with “Invasive” species, though for certain people’s management goals, they may be equally unwanted. Those species were Sweetgum (*Liquidambar styraciflua*) and two species of Greenbrier, Cat-brier (*Smilax glauca*) and Horse-brier (*Smilax rotundifolia*).
  - Note that common names in the genus *Smilax* are not consistently applied
  - *Smilax rotundifolia* is a coarse, tough plant with heavy thorns; and where it grows enthusiastically, can be an unwanted, prickly pest.
  - Sweetgum, though quite prolific on the project site, actually is not very common in Connecticut. It is a southern tree that is found naturally in Connecticut only in Fairfield County.

### **B. Invasives Seen or Reported on the Site**

- Asiatic (aka Oriental) Bittersweet (*Celastrus orbiculatus*) – sun-loving woody vine

- Autumn-Olive (*Elaeagnus umbellatus*) – sun-loving shrub of disturbed sites
- Black Locust (*Robinia pseudoacacia*) – tree of drier sites; sprouts back into nasty thickets when cut
- Common Reed aka Phragmites (*Phragmites australis*) – wet sites
- Garlic Mustard (*Alliaria petiolata*) – herbaceous plant that is dangerous because it outcompetes woodland wildflowers
- Glossy Buckthorn (*Frangula alnus*) – the 1997 report mentioned the related Common Buckthorn (*Rhamnus cathartica*) in area 2b, a species this Team member did not happen to observe; Glossy Buckthorn is a shrub that can overtake the understory in wetlands and on moist soil
- Japanese Barberry (*Berberis thunbergii*) – prickly shrub of shaded understory
- Japanese Honeysuckle (*Lonicera japonica*) – vine
- Japanese Knotweed (*Fallopia japonica*; aka *Polygonum cuspidatum*) – tall, leafy, bamboo-like stems overwhelm all vegetation growing beneath them
- Multiflora Rose (*Rosa multiflora*) – prickly, sun-loving shrub with multiple, scented, white flowers
- hollow-stemmed Shrub Honeysuckles (*Lonicera* spp.) – the 1997 report specifically lists Tatarian Honeysuckle (*Lonicera tatarica*), one of the several non-native (hollow-stemmed) Shrub Honeysuckles
- Privet (*Ligustrum*) – the 1997 report lists Common Privet (*Ligustrum vulgare*); shrub with opposite leaves (leaves growing in pairs, one on either side of a twig); tough, deciduous leaves may stay on late in the season; white flowers, dark berries
- Tree-of-Heaven (*Ailanthus altissima*) – tree; aggressive on sterile sites
- Winged Euonymus, aka Burning Bush or Winged Yahoo (*Euonymus alatus*) – shrub, tolerant of understory shade
- Yellow Iris (*Iris pseudacorus*) – there are no large native yellow Irises. Unlike the native Blue Flag Iris, the corms (fat, underground, root-like stems) of Yellow Iris are salmon-colored when cut into.



The aquatic habitats were not examined for invasive plants.

With the exception of Privet and Yellow Iris, identification information is available at <http://www.ct.nrcs.usda.gov/invas-factsheets.html>

### C. Some Invasive Issues at the Site

#### 1. Garlic Mustard

Garlic Mustard is a biennial plant that is shade tolerant. It comes up early in the spring and shades out native wildflowers. It also exudes substances from its root that inhibit the growth of the mycorrhizal fungi that are needed in the soil for woody plant seedlings to thrive.

**Recommendation:** Pull this plant where it occurs at the trailhead so as to cut back on the spread of seeds along trails. Whenever flowering stems are pulled they should be bagged and removed from the site because the pulled stems tend to have enough nourishment in them to allow viable seed pods to develop. Control of Garlic Mustard is a multi-year effort because its seeds are many and not all of them come up the first year.

## 2. The Powerline/Railroad Track Area

**Recommendation 1:** Although this invasive plant jungle does not represent desirable native vegetation, it is recommended to leave it as is for two reasons:

- (a) the dense tangle of vegetation shields the railroad tracks from unwanted foot traffic
- (b) the level of initial and follow-up effort demanded to control invasives in this area would dramatically suck time and money away from the efforts in other areas where the existing vegetation is of greater value and success is more likely

**Recommendation 2:** Create a learning site in this area by labeling the invasives

## 3. Walking into the trail-less area there appeared to be an infestation of the invasive Forget-me-not (*Myosotis scorpioides*).

**Recommendation #1:** Determine whether the Forget-me-not is the invasive *Myosotis scorpioides* or the native *Myosotis laxa*.

General identification of a Forget-me-not

- flat-topped, blue flowers with yellow centers; 5 petals per flower
- after the petals fall off, there is a fruit composed of 4 smooth nutlets (sometimes 1 or more nutlets may fail to develop)
- leaves alternate (not in pairs)

*M. scorpioides* and *M. laxa* both grow on streamsides, in wet soils, or in shallow water.

To distinguish the invasive *M. scorpioides* from the native *M. laxa*:

|                                                        | Invasive                              | Native                           |
|--------------------------------------------------------|---------------------------------------|----------------------------------|
| <b>Flower color</b>                                    | Sky blue                              | Pale blue                        |
| <b>Flower Size</b>                                     | ¼" to 1/3" across                     | 1/8" to ¼" across                |
| <b>Sepals</b>                                          | Joined much more than ½" their length | Joined less than ½" their length |
| <b>The style sticking up between the 4 nutlets is:</b> | Taller than the nutlets               | Shorter than the nutlets         |
| <b>Growth Habit</b>                                    | Often creeping                        | In small clumps                  |
| <b>Stem</b>                                            | Angled, somewhat succulent            | Round, very slender              |

*Notes: The sepals are the 5 triangular-tipped green structures that are joined together in a unit right below the colored part of the flower. Where the flower goes down into the sepals it is yellow, rather than blue. You will probably need a hand lens to see the height of the style (a very important characteristic). In sunny sites,*

*Myosotis scorpioides* covers over shallow, open water and out-competes native plants at the water's edge.

**Recommendation #2:** If the plant is the invasive Forget-me-not, begin control by pulling it out.

4. The Japanese Knotweed (on the boundary on the way to the fern area):

It was not clear to me if that was within the boundary of the project area.

**Recommendation:** Decide how far you are willing to have this patch spread and control it back each year (or get rid of it all). Note: Japanese Knotweed takes a good deal of multi-year effort to control.

5. **General Recommendation:** Learn to recognize the known invasives, mark up a map to show where they have been spotted, and always plan to pull a few each time you come to the site. Over time, you will understand which places need a concerted effort.

#### D. General Notes on Invasive Plant Management

1. There is no law that says every invasive plant should be addressed
2. Priorities for control are places where invasive plants impinge upon your desired management goal (e.g., their presence or the threat of their continued spread will harm valued plants or places)
3. Understand the difference between eradication (remove all individuals) versus control (beat the population back down to a level you can live with)
4. For invasive plants at the water's edge, consider a control method that does not disturb the soil (so as to prevent erosion)
5. Recognize that invasive plant management is a long-term proposition because of seeds buried in the soil, sprouting stems, and new seeds
6. Recognize that the removal of shrubby invasives often creates disturbed soil and sunny openings that promote the establishment of invasive plant seedlings (of the original invasive or of other species).
7. Following control efforts, come back annually to eliminate re-growth/new invasives
8. Many invasive shrubs are most easy to locate in the Spring when they have leafed out, but the native species have not. (Begin looking when the daffodils bloom.) Similarly, you may spot invasive shrubs in the fall after native shrubs have lost their leaves.
9. Hand-pulling is a viable option when soils are moist. Weed wrenches and other hand tools also work best then.

## Deer Management

#### A. Typical Effects of Deer on Vegetation

1. Deer are known to reduce the diversity and density of understory tree seedlings, shrubs, and herbaceous plants – deer browsing (and perhaps an increased amount of forest floor shade as the area changed from open to forest) perhaps explain wildflower losses at the Selleck's and Dunlap Woods site.

2. Some sources consider Sweetgum trees to be deer resistant (though in reality, no plant can resist huge herds of deer). When the site was more open, if there were other tree seedlings more preferred by deer, then Sweetgum might have come more thickly than desired. Although Sweetgum is considered intolerant of shade, seedlings may show up in the forest understory, particularly on rich sites.

## **B. Desirable Number of Deer**

### **1. Under a Variety of Management Goals**

Historically, deer management has focused on having the maximum number of deer that an area can support without having such a high number of deer that the health of the herd was compromised (because of lack of available forage). Or, management was concerned with limiting the number of deer to ensure regeneration of timber species. When maintenance of ecological diversity (not just timber tree species) is desired, deer density should be further reduced.

It has been estimated that prior to European settlement, with hunting by Native Americans (which was a factor in the ecosystem in which the native plant communities developed), the average number of deer in the northern hardwood forests of Pennsylvania was 4 deer per square kilometer (about 10 deer per square mile). Oak forests or areas that include old fields rich in deer forage might support more deer, perhaps (a guess) 20 deer per square mile.

### **2. Population Size for Combined Selleck's and Dunlap Woods Assuming Management for Ecological Diversity**

A square mile is 640 acres. In a 50 acre site, 10 to 20 deer per square mile works out to 0.78 to 1.56 deer. Assuming that one of those deer is a female that produces two fawns a year, it is obvious that frequent deer control is desirable.

## **C. Notes on Deer Control**

Recommend consulting *Managing Urban Deer in Connecticut: A guide for residents and communities*, 2<sup>nd</sup> edition (a 34 page reference that makes mention of the 2005 hunt in Darien). It is available on the CT Department of Environmental Protection website at <http://www.ct.gov/dph/lib/dph/urbandeer07.pdf>

## **D. Management of Deer Exclosure**

1. Keep annual records of what happens inside the exclosure and in the adjacent "control" area
  - a. number of plants of each species that were planted and what happened
  - b. plant species list (expect greater diversity of species over time inside exclosure)
  - c. photographs (say every July) to show thickness of vegetation (expect increased density of vegetation cover inside exclosure – elsewhere dramatic changes have been observed)



2. It is important to maintain the fence so the deer do not get in and destroy the evidence.

## Plant Species of Potential Note

The CT Department of Environmental Protection's Natural Diversity Data Base has no records of rare species on the property. However, there were two species of potential interest noted in the 1997 site evaluation report.



- A.** *Liatris* sp. in Area 1a (Xeric Disturbed Upland). Note that New England Blazing Star (*Liatris scariosa* var. *novae-angliae* {formerly *Liatris borealis*}) is of Special Concern in Connecticut. It is an attractive, uncommon species that is subject to being over-collected from the wild. It also is planted horticulturally. It would be interesting to see if the *Liatris* sp. reported for the xeric disturbed upland is the New England Blazing Star. (See photos and description at <http://www.ct-botanical-society.org/galleries/liatrisscar.html> .)

- B.** *Viburnum prunifolium* (Black-haw aka Smooth Black-haw) was reported from Areas 5 and 7 (Wet-Mesic Wooded Wetland and Wet Wooded Wetland) in the 1997 site evaluation. This is an uncommon species of Special Concern in Connecticut that is typically found south of Connecticut. The USDA PLANTS database maps it growing in the wild in Connecticut only in Fairfield County. It was not noticed by the ERT landscape ecologist during the 2009 ERT visit.



## Forest Planning

### A. Understory Diversity

There is a nice diversity of understory shrubs and herbaceous plants that it would be desirable to maintain. Controlling deer will contribute to this.

### B. Consider Possible Forest Interior Birds

The size of the tract (some 50 acres) is small in comparison to the hundreds of acres required by birds of the forest interior. However, before any cutting is done, it would be well to make sure that the birds known to frequent the area are not interior forest birds.

### C. Reasons for the reported wildflower disappearance may include:

Deer overbrowsing and/or closing in of the forest canopy (less light to the forest floor). Spring ephemeral wildflowers that come out before the trees leaf out are often sensitive

to being eaten by hungry deer (though some are unpalatable) or out-competed by Garlic Mustard

#### **D. Consider Potential Effects of Logging on Invasive Plants**

Note that any cutting will bring light to the forest floor and may encourage existing invasive plants to flourish. If cutting is to be done, the site should be monitored for invasive plants before and after cutting. Skid trails should not go through areas where invasive plant seeds are likely to be picked up.

#### **E. Should professional forestry advice be desired**

1. Note that the CT Department of Environmental Protection maintains a list of certified forest practitioners in the state of Connecticut.  
[http://www.ct.gov/dep/lib/dep/forestry/forest\\_practitioner\\_certification/directry.pdf](http://www.ct.gov/dep/lib/dep/forestry/forest_practitioner_certification/directry.pdf)
2. On sites where timber production is not the primary concern, it is important to interview a prospective forester to determine that they have a strong interest in wildlife and recreation values of a site.

### **People Issues**

#### **A. Dogs**

For some ideas, refer to: [http://www.conservect.org/ctrivercoastal/give\\_a\\_bark.shtml](http://www.conservect.org/ctrivercoastal/give_a_bark.shtml)  
(*Pet Waste, Water Quality & Your Health* pamphlet may be found in the Appendix)

#### **B. Trails**

The manicured trails send a good message that this area is well cared for.

#### **C. Presence of Land Trust Members**

The more Land Trust members use the site, the more likely problems will be observed when they are small and the more likely more treasures of plants and animals will be spotted.

## **The Natural Diversity Data Base**

The Natural Diversity Data Base maps and files for the project site have been reviewed. According to our information, there are no known extant populations of Federal or State Endangered, Threatened or Special Concern Species at the site in question.

Natural Diversity Data Base information includes all information regarding critical biological resources available to us at the time of the request. This information is a compilation of data collected over the years by the Environmental and Geographic Information Center's Geological and Natural History Survey and cooperating units of DEP, private conservation groups and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigations. Consultations with the Data Base should not be substituted for on-site surveys required for environmental assessments. Current research projects and new contributors continue to identify additional populations of species and locations of habitats of concern, as well as, enhance existing data. Such new information is incorporated into the Data Base as it becomes available.

Please be advised that this is a preliminary review and not a final determination. A more detailed review may be conducted as part of any subsequent environmental permit applications submitted to DEP for the proposed site.

# **Appendix A**

# **General Guidelines For**

## **Protecting Wildlife Resources When**

### **Developing Trails**

Some properties may lend themselves to providing a variety of recreational opportunities (e.g., hiking, hunting, fishing, nature study and photography, horseback riding, mountain biking.) Properly designed trails can provide excellent opportunities to increase public appreciation for wildlife and the ecological values of various habitats. Trails should be designed to enhance the learning and aesthetic aspects of outdoor recreation while minimizing damage to the landscape. They should be laid out to pass by or through the various cover types and other special features represented on the property while avoiding those areas prone to erosion or that contain plants or animals that may be impacted by human disturbance. Uses that are generally considered “compatible” could impact sensitive resources depending on the location, timing and frequency of their occurrence. For example, while regulated fishing is considered an accepted form of outdoor recreation, there could be impacts associated with it, such as streambank erosion at heavily used sites. The overall level of disturbance to vegetation/habitat and wildlife can be significantly reduced by establishing one or two (will depend on property size and degree of importance to natural resources) multiple-use trails rather than several single/exclusive-use trails.

Some guidelines to follow when developing a trail system include:

- Narrow, passive-use recreation trails with natural substrate that would require minimal vegetation removal, maintain forest canopy closure, prohibit the use of motorized vehicles, and require dog owners to keep their dogs under control, are preferred to reduce environmental impacts and disturbance to wildlife. Abandoned roadways (e.g., farm/logging roads) should be incorporated into the trail system whenever possible and appropriate to minimize cutting activity/vegetation removal;
- If a paved, multi-purpose trail is established, avoid the use of curbing. If it is necessary, Cape Cod style curbing (curbing at 45 degree angle) is recommended;
- Know the characteristics of the property and plan the layout so that the trail passes by or through a variety of habitat types;
- Make the trail as exciting and safe as possible and follow a closed loop design. Avoid long straight stretches of >100'; trails with curves and bends add an element of surprise and anticipation and appear more “natural”;
- Traversing wetlands and steep slopes should be avoided whenever possible to minimize erosion and sedimentation problems; where wetlands must be crossed, a boardwalk system should be used;
- The property boundaries and trail should be well marked. It is best to provide a map/informational leaflet describing the wildlife values associated with the property

(e.g., value of wetlands, various habitat types/stages of succession, habitat management practices) and guidelines for responsible trail use;

- Potential impacts of trails on private property owners should be identified. Where trails bisect private property, the access should be of adequate width and the trail well-marked to help avoid potential conflicts (e.g., trespass by trail users);
- For more specific guidance on trail design and construction contact the Connecticut Forest & Park Association (860-346-2372 or [www.ctwoodlands.org](http://www.ctwoodlands.org)) or Appalachian Mountain Club ([www.outdoors.org](http://www.outdoors.org));
- For an extensive literature review about the effects of different types of recreation activities on wildlife, visit web site [www.Montanatws.org](http://www.Montanatws.org) – 307 page document published in 1999 entitled, “Effects of recreation on Rocky Mountain wildlife: A review for Montana.”

*Prepared by the CT DEP Wildlife Division for the Partners In Stewardship Program (June 2002)*

*Questions? Contact CT DEP Wildlife Division at 860-295-9523 (Eastern CT) or 860-675-8130 (Western CT)*

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What is grosser than picking up dog poop? Stepping in it! What is even grosser than that? Swimming in, fishing from or drinking water with dog poop in it.

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 Cleaning up after your pet is good for both you and your local environment!

 Nutrients in pet waste can promote the growth of algae and aquatic plants in streams, rivers, ponds and lakes.

 Pet waste contains bacteria, parasites and viruses that can make swimming, boating or drinking unsafe.

 Pet waste left on the road, sidewalk or even in the woods can harm water quality and human health.



Important  
Pet Waste  
Information

## Pet Waste, Water Quality & Your Health

*Pet Waste is...*

### **POLLUTION!**

Uncollected pet waste can end up in nearby water resources

### **AN ENVIRONMENTAL RISK!**

Pet waste contains nutrients that can degrade water quality

### **A HEALTH RISK!**

Microorganisms in pet waste can make people or pets sick



*Prevent Water Pollution*

*Protect Your Health*

*Clean Up After Your Pet*

Connecticut River Coastal Conservation District  
deKoven House Community Center  
27 Washington Street  
Middletown, CT 06457  
(860) 346-3282



## Pet Waste, Water Quality & Your Health: Why You Should Give a Bark



When rain or snow melt runs over the land it can carry pollutants like uncollected pet waste directly or by way of a storm drain into nearby streams, lakes, ponds or wetlands. This polluted stormwater runoff, also called *Nonpoint Source Pollution*, can degrade water quality, impair aquatic health, and make waters unsuitable for recreation.

### Why is Pet Waste Pollution?

Pet waste is the source of two types of pollutants: pathogens and nutrients. *Pathogens* are disease causing microorganisms that can contaminate water resources, making them unsafe for swimming or drinking. *Nutrients*, such as nitrogen and phosphorous, can cause runaway growth of algae and aquatic weeds, making the water murky, green and smelly.

When the excess growth of algae and aquatic plants, or even the pet waste itself, decomposes in the water it uses up dissolved oxygen needed by fish to survive, and releases compounds such as ammonia that can harm aquatic life.

### Why is Pet Waste a Health Risk?

Pathogenic bacteria, parasites and viruses in pet waste are a health risk to both people and animals. Leaving pet waste on the ground in your yard or in public areas may expose children, adults and even other pets to diseases. There is also a real risk of getting sick from drinking or swimming in waters contaminated by pet waste.

### Is Your Pet the Problem?

It may seem that your pet does not have much of an impact, but consider all the other pets in your neighborhood, town, and even in the state. That is a lot of pets doing their daily business! Even if only a fraction of pet waste is not picked up it can really add up.

But isn't animal waste natural? It is, but in developed areas, where there are paved surfaces and lawns, pet waste can be carried by runoff directly into nearby water resources. In naturally vegetated areas pollutants from

decomposing waste can be captured by the underlying soils; however, in parks and open spaces popular with dog walkers, waste can build up, becoming a serious problem.



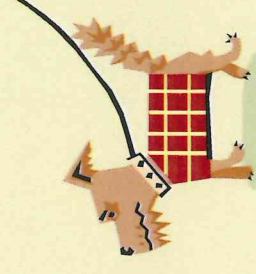
## WHAT TO DO WITH PET POO

Always **bring a plastic bag** or two when you walk your dog.

Use the bag like a glove, **scoop the poop**, then turn the bag inside out and seal.

Put the **bagged waste in a trash can** or flush unbagged waste down the toilet.

Never throw dog waste down a storm drain. They lead directly to a water resource such as a stream, lake, pond or wetland.



To learn more, visit

[www.conservect.org/ctrivercoastal](http://www.conservect.org/ctrivercoastal)

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## **About the Team**

The King's Mark Environmental Review Team (ERT) is a group of environmental professionals drawn together from a variety of federal, state and regional agencies. Specialists on the Team include geologists, biologists, soil scientists, foresters, climatologists and landscape architects, recreational specialists, engineers and planners. The ERT operates with state funding under the aegis of the King's Mark Resource Conservation and Development (RC&D) Area - an 83 town area serving western Connecticut.

As a public service activity, the Team is available to serve towns within the King's Mark RC&D Area - *free of charge*.

### **Purpose of the Environmental Review Team**

The Environmental Review Team is available to assist towns in the review of sites proposed for major land use activities or natural resource inventories for critical areas. For example, the ERT has been involved in the review of a wide range of significant land use activities including subdivisions, sanitary landfills, commercial and industrial developments and recreation/open space projects.

Reviews are conducted in the interest of providing information and analysis that will assist towns and developers in environmentally sound decision making. This is done through identifying the natural resource base of the site and highlighting opportunities and limitations for the proposed land use.

### **Requesting an Environmental Review**

Environmental reviews may be requested by the chief elected official of a municipality or the chairman of an administrative agency such as planning and zoning, conservation or inland wetlands. Environmental Review Request Forms are available at your local Conservation District and through the King's Mark ERT Coordinator. This request form must include a summary of the proposed project, a location map of the project site, written permission from the landowner / developer allowing the Team to enter the property for the purposes of a review and a statement identifying the specific areas of concern the Team members should investigate. When this request is reviewed by the local Conservation District and approved by the King's Mark RC&D Executive Council, the Team will undertake the review. At present, the ERT can undertake approximately two reviews per month depending on scheduling and Team member availability.

For additional information regarding the Environmental Review Team, please contact the King's Mark ERT Coordinator, Connecticut Environmental Review Team, [Connecticutert@aol.com](mailto:Connecticutert@aol.com), P.O. Box 70, Haddam, CT 06438. The telephone number is 860-345-3977. [www.ctert.org](http://www.ctert.org)