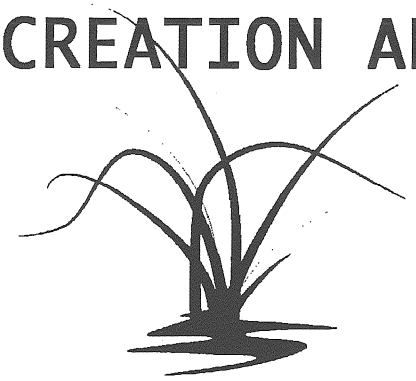
TYLER MILL/MUDDY RIVER CONSERVATION AND RECREATION AREA

WALLINGFORD, CONNECTICUT

KING'S MARK ENVIRONMENTAL REVIEW TEAM REPORT

KING'S MARK RESOURCE CONSERVATION AND DEVELOPMENT AREA, INC.

TYLER MILL/MUDDY RIVER CONSERVATION AND RECREATION AREA



Wallingford, 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
Conservation Commission
Wallingford, Connecticut

May 2002

CT Environmental Review Teams
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Acknowledgments

This report is an outgrowth of a request from the Wallingford Conservation Commission to the New Haven County Soil and Water Conservation District (SWCD). The SWCD referred this request to the King's Mark Resource Conservation and Development Area (RC&D) Executive Council 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 Thursday, October 11 and Monday, October 22, 2001.

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I would also like to thank Jeff Borne, chairman, Wallingford Conservation Commission, John Lathrop, Marty Moore, and Mary Halloran, members, Wallingford Conservation Commission, Don Roe, state and federal program administrator, Linda Bush, town planner, Brent Smith, environmental planner Roger Dann, Wallingford Water/Sewer Division, Henry McCully, Wallingford Department of Public Works, Norman Gray, UCONN, geologist and Sally Snyder, DEP, watershed coordinator, 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 and soils maps. During the field review Team members

were given additional information. Some Team members unable to attend the field review made visits on their own and others made additional field visits to the site. 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 review of this town land.

If you require additional information please contact:

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TABLE OF CONTENTS

List of Figures

1. INTRODUCTION

Introduction

Introduction

The Wallingford Conservation Commission has requested assistance from the King's Mark Environmental Review Team in reviewing a large assemblage of town owned properties. The largest parcel is the Tyler Mill/Muddy River Preserve. The study area is located in the southeastern corner of Wallingford and totals approximately 1400 acres. The northern area includes MacKenzie Reservoir, a public drinking water supply reservoir. Portions of the study area have been used for passive and active recreation, agriculture and forestry. Recreational activities include hunting (small game), horseback riding, hiking, mountain biking, cross-country skiing and fishing. A small portion has been developed into ballfields, soccer fields and a community garden. Some of the land is leased to local farmers and some of the forest land has been subject to forest management. This area has also been identified as a potential future site for a municipal water supply and a potential municipal golf course.

Objectives of the ERT Study

The Wallingford Conservation Commission and the Wallingford Parks Department has asked for assistance in the preparation of components of a Master Plan and management program for this area. The goal is to develop a long-term program that will provide for both stewardship and use options based on the preservation of area's natural resources, the possible need for a future water supply, and recreational uses compatible with preservation goals. The ERT is asked to assist with inventory and analysis of the natural, cultural and recreational resources of the area, to identify areas of concern and to highlight and recommend additional areas of study.

The ERT Process

Through the efforts of the Wallingford Conservation Commission, this environmental review and report was prepared for the town of Wallingford.

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 on Thursday, October 11, and Monday, October 22, 2001. The emphasis of the field review was on the exchange of ideas, concerns and recommendations. Some Team members made separate and/or additional site visits. 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.

Figure 1

Topographic Map
Scale 1" = 2000'

Figure 2

Open Space Map

Open Space

- Owned by Town of Wallingford
- Farmland Lease Program
- Baseball/Soccer Fields
- Potential Future Town Purchases
- Wallingford Land Trust
- Homeowners Association Open Space
- Development Rights Purchased

Scale: 1" = 1,200 ft.

Cooke Leased for Cattle

Cooke Golf Course?

Cooke Golf Course?

Winery

Tamarac Swamp

Bridge Closed

Morris Rock

Bertini Park

Summary of Open Space Land
Tyler Mill & Cooke Open Space

1. **East Center, Tyler Mill, Woodhouse, Tamarac**
   1,047.39 acres – Bulk of Town's contiguous open space. Most purchased from New Haven Water Company and Sartori family.

2. **Parks Adjacent to Open Space**
   a. Viet Nam Veterans – 21 acres of fields (first stop on trip
   b. Bertini Park – 76.5-acre former YMCA day camp on West Dayton Hill Road. Underdeveloped except for few dilapidated, former camp buildings
   c. Coyle & Carini Fields – 14 acres of soccer fields on Woodhouse Avenue near Morris Rock

3. **Cooke Property**
   a. Cooke Road, potential golf course
      1. 77 acres – west side planted in eggplant
      2. 105 acres – east side, behind homes
   b. Whirlwind Hill – 64 acres. Leased for cattle & crops – great view

4. **George Washington Trail**
   47 acres – two pieces referred to as the Neil property. Town acquired as ten (10) approved building lots

5. **Potential Town Purchases**
   a. Scard Road – ten (10) acres to connect Neil & Cooke
   b. East Center Street – 85 acre Williams farm next to Viet Nam Veterans Park

6. **Water Bodies**
   a. McKenzie Reservoir – 53.8 acres
   b. West Dayton Hill Pond – 4.5 acres

7. **Wallingford Land Trust**
   Ten (10) acres on Williams Road

8. **Development Rights Purchased**
   a. Gouveia – 140 acres – future winery
   b. Farnum – 69 acres – used for crops

9. **Homeowners Association**
   a. 24.5 acres off of Turnberry Road
   b. 70.88 acres off of Williams Road & Stoney Brook

10. **Farmland Lease**
    146.6 acres in this area, all in hay, some going to corn next year

WALLINGFORD OPEN SPACE

			Acres
A.	**State of Connecticut**		
1.	Wharton Brook State Park - Route 5		50
2.	Tri-mountain Park -North Branford Road		144
3.	Sleeping Giant State Park - South Turnpike Road		28
4.	Quinnipiac Park - Wilbur Cross Parkway		34
5.	North Farms Reservoir - Barnes Road		3
	North Farms Reservoir		(60)
6.	I-91 Rest Area - I-91		30
7.	DEP Canoe Launch - Main		1.28
	TOTAL	Land	290.28
		Water	(60)
B.	**Town of Wallingford Schools**		
1.	Mark T. Sheehan		44.5
2.	Lyman Hall High		51.6
3.	Dag Hammarskjold		30.7
4.	Moran		40.3
5.	Moses Y. Beach		6.0
6.	Cook Hill		11.36
7.	Highland		21.0
8.	Parker Farms		20.3
9.	Pond Hill		9.4
10.	Rock Hill		15.0
11.	Stevens		See Dag
12.	Yalesville		7.577
		TOTAL	257.74
C.	**Town of Wallingford Parks**		
1.	Pragemann - Oak		26.2
2.	Budelski - Main & Chapel		.15
3.	Lufberry - Cheshire Road		45.1
4.	Wallace - Quinnipiac & Ward		1.5
5.	Falconieri - South		5.95
6.	Kendrick - Grandview		9.2
7.	Doolittle - South Elm		15.36
8.	Marcus Cook - Old Rock Hill		34.6
9.	Harrison - Cedar		15.44
10.	Dutton - North Main		.2
11.	Community Lake - Hall		9.28
12.	Community Pool - North Main		7.0
13.	Bennett Field - Northfield & Birch		3.55
14.	Harriet Wallace - Maplewood & North Elm		.6
15.	Grand St. - Washington		.64
16.	Johanna Fishbein - Route 5		.67
17.	Vietnam Memorial Field - East Center		20.7
18.	Coyle & Carini Fields - Woodhouse		14.0
19.	William D. Bertini - West Dayton Hill		76.5
20.	Lakeside Park - Oak		10.0
21.	Lyman Hall Monument		.03
22.	Pat Wall Field - South Elm Street		8.4
23.	Richard Sheahan - Algonquin		.8
		TOTAL	305.87
D.	**Town of Wallingford Open Space Areas**		
1.	Sunrise Circle		2.91
2.	Grieb Road		8.30
3.	Kondracki Lane		1.76
4.	Reskin & Field Drive		3.35
5.	Mariot & Cardinal		3.10
6.	Lynn & Mohican		3.76
7.	Ridgeknoll & Gaye Lane		2.51
8.	Jenna Road		4.75
9.	Donat Drive -Ridgewood - Crestview		14.00
10.	Main Street		20.84
11.	Emerson Leonard Wildlife Area, So. Turnpike Road		20.00
12.	Community Lake Land		78.22
	Community Lake (formerly)		(77.68)
13.	West Dayton Hill Road		1.5
	West Dayton Hill Pond		(4.5)
14.	Whirlwind Hill, Scard, North Branford		329.17
15.	Ulbrich Reservoir		(160.9)
16.	Paug Pond		(80.0)
17.	East Center, Tyler Mill, Woodhouse, Tamarac Swamp		1,047.39
18.	McKenzie Reservoir		(53.8)
19.	Cheshire Road		68.71
20.	Cooke Road		182.1
21.	George Washington Trail		47.06
22.	High Hill Road		66.00
23.	Garden Road		4.5
		LAND TOTAL	1,909.93
		WATER TOTAL	(376.88)
E.	**Other Public Open Space**		
1.	City of Meriden Water Department		86.17
F.	**Wallingford Land Trust**		
1.	West Dayton Hill Woods - Fox Run & Riverside		46.22
2.	Conifer Drive Swamp - Conifer Drive		5
3.	Farnum's Cornfield - Williams		10
4.	Fresh Meadow's - Jeremy Wood & Rosick Road		70
5.	Brian Ridge - Huntington Ridge		6
6.	Watrous Woods - Parker Farms Road		6
7.	Orchard Glen		65.0
8.	Blossom Lane		9.22
9.	Three Meadows Farms		10.49
10.	Killen Road		17.52
11.	Taylor Lane		9.18
12.	Cheshire Road - Beach Property		6.316
		TOTAL	260.946

G. Development Rights Purchased

1.	Farnum - Whirlwind Hill	69
2.	Gouveia - Whirlwind Hill	140

Private Open Space

H. Institutional

1.	Farms Country Club - Cheshire Road	158
2.	Wallingford Country Club - Long Hill Road	110
3.	Harbour Ridge Golf Course - Harrison Road	150
4.	Blue Trail Range - North Branford Road	92
5.	Wallingford Rod & Gun Club - North Branford Road	97
6.	PNA Park - North Plains Industrial Road	17
7.	Meriden Road & Gun Club - New Cheshire Road	11
8.	Mountainside Outing Club - High Hill Road	22
	TOTAL	657

I. Homeowners' Associations

1.	Strathmore Farms - Highland & Chimney Hill	39.38
2.	Broadview - Broadview	19.26
3.	Stegos Drive - Stegos	5.17
4.	Rolling Meadows - Rolling Meadows	10.6
5.	Parker Farms Estates - Parker Farms Road	14.78
6.	Countryside East - Twin Oak Farm Road	21.89
7.	Turnberry - Turnberry	24.53
8.	Shoe Box East - Sharon Drive	6.0
9.	Woodwynd - Ben Court	5.175
10.	Nathan's Woods - Cook Hill Road	6.1
11.	Hallmark Hill - Cook Hill Road	60.0
12.	Woodhouse Hunt - Woodhouse	17.33
13.	Summerhill - Hall Road	35.0
14.	Oakdale Woods	33.0
15.	Woodlands - Mansion	14.66
16.	Fairview - Riverside Drive	6.05
17.	Fairview - Wildlife Drive	2.2
18.	Pond Hollow - Wildlife Drive	50.00
19.	Park Pond - Pond Court	3.17
20.	Brocketts Woods - Chimney Hill	9.28
21.	Laurel Ridge - Laurel Ridge	9.28
22.	Cedar Glen - Grieb Court	3.19
23.	Saddlebrook - Saddlebrook	2.89
24.	Fairlawn Farms 1-8 - Grieb Road	38.985
25.	Pond Hill Chase - Pond Hill	7.98
26.	Meadow Brook - Williams	70.88
27.	Wild Life Village - Wildlife Drive	45.0
28.	Brock's Meadow - Megan Lane	4.4
29.	Terrell Reserve - Church Street (Route 68)	18.72
30.	Autumn Farm - Williams Road	11.45
	TOTAL	596.35

J. Undedicated Open Space

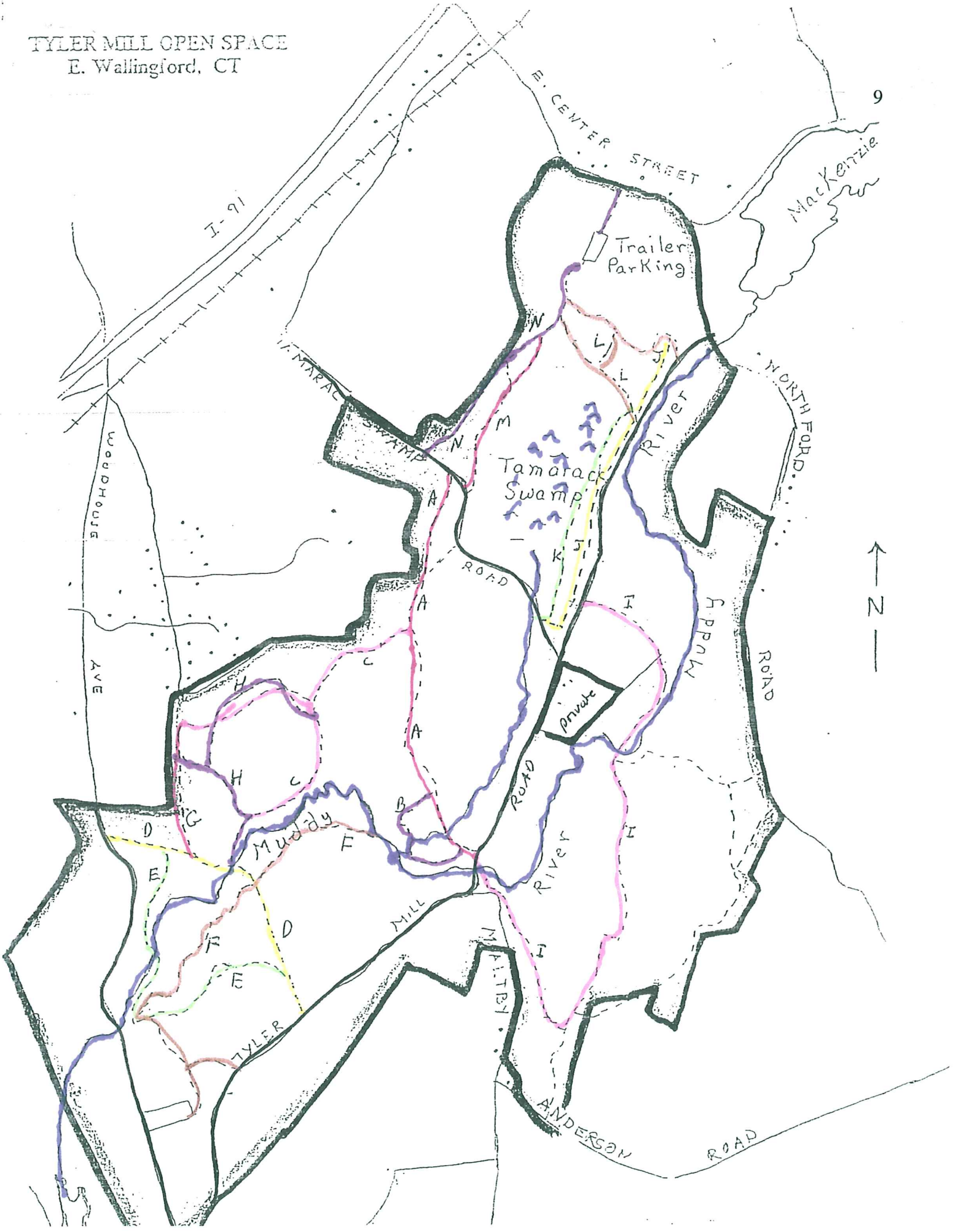
1.	Deer Run - Deer Run Road	1

K. Cemeteries

1.	Center Street	9.69
2.	Holy Trinity	3.09
3.	In Memoriam	17.0
4.	Masonic	1.95
5.	Saint Casimir's	4.28
6.	Saint John's	23.0
7.	Saint Peter & Paul's	7.0
8.	Beth Israel	1.82
	TOTAL	67.83

GRAND TOTAL ACRES 4,642.113
WATER (436.88)

TYLER MILL OPEN SPACE
E. Wallingford, CT



TRAIL MAP KEY

trail	map color & letter		length	description
Tyler Trot Trail	red	A	.9 mi	easy, wide
Fishermen's Loop	violet	B	.2	easy, short
Hayfield Trail	violet	N	.4	easy, slope
Cliffside Trail	red	M	.4	moderate, slope
Muddy River Ford Trail	yellow	D	.6	easy, river crossing
Powers Road Trail	red	G	.1	easy, dead end
Owl Ridge Trail	yellow	J	.7	moderate, steep
Tamarack Swamp Trail	light green	K	.4	moderate, rocky
Eagle Scout Trail	brown	L	.5	easy
River Edge Trail	pink	I	1.5	easy, river crossing
Moss Rock Run Around Trail	light green	E	.9	easy, river crossing
Moss Rock Ridge Trail	brown	F	1.0	mud, slopes
Back Side Run Trail	pink	C	.6	easy
Cellar Hole Hill Trail	violet	H	.8	easy, wide

Tyler Mill Road (Northford Road to bridge)	1.1
(bridge to Woodhouse Avenue)	1.0
Tamarack Swamp Road	.6

2. PHYSICAL CHARACTERISTICS

SOIL RESOURCES

WETLAND RESOURCES

Soils Resources

This soils report applies to a ±1,000 acre parcel known as the Tyler Mill/Muddy River Conservation and Recreation Area in the southeast corner of Wallingford, CT. The parcel is located south of East Center St., east of Interstate 91, north of Rt. 150 (Woodhouse Ave.) and west of Northford Rd. The information in this report is based on the soils series descriptions and the mapping units descriptions as presented in the 1979 USDA Soil Survey of New Haven County, and on field observations. The site can be found in sheet number 38 of the New Haven County Survey.

Wetland Soils

Map Unit AA

The AA map unit consists primarily of Adrian and Palm soils on 0 to 3 percent slopes. Adrian soils are very deep and very poorly drained. Typically, these soils have an organic layer 16 to 51 inches thick. The underlying layer is sandy or loamy in texture to a depth of 60 inches or more. These soils have a watertable within 12 inches of the soil surface.

Concerns:

- **Erosion / Siltation** - Northeast of Morris Rock a trail system encroaches on this wetland soil. The passive use of this trail has elevated to active uses in equestrian, mountain biking and ATV traffic. This increased, aggressive use has exacerbated the amount of exposed soil through the loss of stable vegetated cover. Trails have become rutted and depressions filled with water. This causes the users to move outward from the original trail centerline causing greater disturbance of soils and loss of ground cover.

Map Unit Ce

The Ce map unit consists primarily of Carlisle soils on nearly level, low depressions on outwash terraces and glacial till plains. Carlisle soils are very deep, very poorly drained muck soils formed in organic deposits in bogs. The muck is at least 51 inches deep and ranges in depth to 30 feet or more. Carlisle soils have a watertable at or near the surface throughout the year, and in wetter periods, are often ponded.

Map Unit Pv (Podunk) is now Ps - Pootatuck

The Podunk soil series is no longer used in CT. The map unit is composed primarily of Pootatuck soils on 0 to 2 percent slopes. These soils are very deep and moderately well drained. They formed in alluvial sediments on floodplains. Typically, the Pootatuck soils have sandy loam and fine sandy loam textures overlying sand and gravel to a depth of 60 inches or more. These soils have a seasonal high watertable between depths of 1.5 and 2.5 feet during the months of November through April. They are subject to flooding at a frequency of at least once every two years.

Concerns:

- **Erosion / Siltation** - East of Morris Rock is a floodplain where these soils reside. A network of trails have developed in this area. The ongoing intense active uses in close proximity to tributaries and the Muddy River have posed a significant threat to the water quality and the habitat corridor. In-stream traffic has resulted in the destabilization of stream banks from the loss of existing vegetation and accelerated erosion. Evidence of siltation in the watercourse has resulted in aggrading the streambed, covering benthic life and aquatic plants.

Map Unit Ra

The Ra map unit is composed of Raynham soils on 0 to 3 percent slopes. These soils are very deep and poorly drained. They formed in silty lacustrine deposits. Raynham soils are composed of stratified silt loam materials to a depth of 60

inches or more. These soils have a seasonal high watertable within 20 inches of the soil surface during the months of November through May.

Concerns:

- **Water Quality** - Vietnam Memorial Fields - The placement of athletic fields atop of these soils in a public water supply watershed and their proximity to watercourses should lead to examination of management practices of the park; in limiting access to sensitive areas, careful management of fertilizing and pesticide applications and the renovation of parking lot runoff introduced to the wetlands and the watercourse.

Map Unit Rb silt loam

The Rb map unit is nearly level. Raypol soils are poorly drained occurring in depressions on broad glacial lake and outwash terraces. Slopes are 0 to 3 percent. They formed in a mantle of silt loam or very fine sandy loam over sand, gravelly sand or stratified sand. This soil has a seasonal high watertable at a depth of about 8 inches from fall to mid spring.

Concerns:

- **Erosion / Sedimentation** - East of Morris Rock, toe of slope and trending in a southeasterly direction toward Field I on Woodhouse Ave. The active use of trails have disturbed these soils and traversed intermittent streams coursing through this area. This disturbance has resulted in the increased loss of vegetation, widened trail footprint, accelerated erosion and destabilized stream banks.
- **Nutrient Loading / Pesticides** - Field 1 on Woodhouse Ave. Hydrologic regime of this soil drains to the river through streams fringing the north side of the athletic field. Careful management of pesticide and fertilizer applications should be employed.

Map Unit Rv (Rumney) is now Ro - Rippowam fine sandy loam

The Ro map unit is a nearly level, poorly drained soil on flood plains of major streams and their tributaries. This soil ranges to a depth of 60 inches or more. It is subject to frequent flooding and has a seasonal high watertable at a depth of about 6 inches from fall until late spring.

Concerns:

- **Streambank Stabilization** - Soil type found along river corridor floodplain. Eroding banks introduce sediment downstream, aggrades streams, clog waterbodies and destroy habitat for fish and aquatic life.

Map Unit Sc - Saco silt loam

The Sc map unit consists primarily of Saco soils on 0 to 3 percent slopes. 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 water table at or near the surface most of the year. They are subject to very frequent flooding and commonly flood annually, usually in the spring.

Concerns:

- **Loss of Vegetative Cover / Streambank Stabilization** - Soil type found above and below the bridge on Tylers Mill Road. Lack of vegetative cover has exposed soils and accelerated erosion. Damage attributed to the high foot traffic from anglers, watering of horses, ATV and biking along and in the river. Second significant area of this soil type found approximately 1000 feet in a northwest direction from the bridge. Intense trail use has widened the trail profile in areas and resulted in loss of vegetative cover, excessive erosion and siltation.

Map Unit Wr - Wilbraham silt loam

The Wr map unit consists primarily of Wilbraham soils on 0 to 3 percent slopes. Wilbraham soils are very deep, poorly drained soils that formed in compact glacial till, derived mainly from red Triassic rocks and some basalt. Typically, they have a friable silt loam surface layer and subsoil over a silt loam, or loam, or fine sandy loam dense till substratum. Wilbraham soils have a perched water table within 1.5 feet of the surface much of the year. These soils have low chroma mottles throughout the subsoil.

Concerns:

- **Erosion / Siltation** - Soil map unit found on the southwest corner of Tamarac Swamp and bisected by Tamarac Swamp Road. This is a dirt road, which concentrates runoff from "C and D" slopes, and transports sediment, which is then introduced to the wetlands, and intermittent watercourse that flows in a southerly direction.

Map Unit WT - Wilbraham and Menlo extremely stony silt loams

The WT map unit is composed of Wilbraham and Menlo soils that are nearly level to gently sloping. These soils are so intermingled on the ground that they could not be separated on the map. Both soils formed in dense basal till in drainageways and depressions.

The **Wilbraham soils** are very deep and poorly drained. Typically, they have loam or very fine sandy loam textures to a depth of 60 inches or more. These soils also have low chroma mottles throughout the subsoil layers.

The **Menlo soils** are very deep and very poorly drained. Typically, they have an organic surface layer overlying fine sandy loam, loam, or silt loam materials to a depth range of 20 to 40 inches.

Concerns:

- **Erosion and Sedimentation Control** - Soil type located along the western boundary at the parcels midpoint is traversed in several areas by trails.

Intense active and passive use has widened the footprint of the trail system over time, which in turn reduced ground cover, exposed more soil and accelerated erosion. Transported material has been introduced to the wetlands and watercourse.

Non-Wetland Soils

Map Unit BoA- Branford silt loam, BoB and BoC

The BoA map unit consists primarily of Branford soils on 0 to 3 percent slopes. Branford soils are very deep, well drained soils that formed in loam over sandy and gravelly glacial fluvial deposits, derived mainly from red Triassic rocks. Typically, they have a fine sandy loam, loam or silt loam surface layer and subsoil over a stratified sand and gravel substratum that extends to a depth of 60 inches or more. Permeability is moderate or moderately rapid in the surface layer and subsoil, and rapid in the substratum. Surface runoff is slow and the available water capacity is moderate.

BoB 3 to 8 percent and BoC 8 to 15 percent slopes - Surface runoff is medium and the erosion hazard moderate on the "B" slope. **The "C" slope runoff is rapid due to increased steepness and the erosion hazard is considered severe. Intensive conservation measures may be required to prevent excessive runoff, erosion and siltation during periods of disturbance.**

Concerns:

- **Loss of Agricultural Land / Nonpoint Source Pollution** - This soil type is located south of East Center St. at Veterans Memorial Field as a community garden. In the past this area has served as a community garden. Surrounded by vegetative cover and adequate riparian buffer, it posed little threat to the wetlands and watercourse to its southern boundary. However, a plan to increase parking for the park is being considered. Impervious surface will increase, a wide array of pollutants from vehicles will be entrained in

stormwater runoff and be directly introduced to the wetlands and the watercourse of a public water supply area.

Map Unit CsB - Cheshire fine sandy loam, CsC and CsD

The CsB map unit consists primarily of Cheshire soils on 3 to 8 percent slopes. Cheshire soils are very deep, well drained soils formed in glacial till, derived mainly from red Triassic rocks. Typically they have a fine sandy loam, loam or silt loam surface layer and subsoil over a friable sandy loam, fine sandy loam, or loam substratum that extend to a depth of 60 inches or more.

Cheshire soils with these slopes have a **moderate erosion hazard.** If cultivated for crops, cropping systems should utilize practices that employ grasses and legumes, cover crops and minimum tillage to reduce runoff and control erosion due to its close proximity to a pond, watercourse and a significant wetland. Adequate buffers should be used to protect wetlands and watercourses.

Concerns:

- **Agricultural Land Use** -This soil type is located at the mid point of the parcel along the eastern boundary. The moderate erosion hazard of this soil requires the use of contour plowing, crop stripping, reduction of nutrient and pesticide loading and establishing adequate buffering of wetlands and watercourses. The utilization of post-season cover crops that fix nitrogen and stabilize the soil should become an integral part of the management plan.

CsC 8 to 15 percent slope and CsD 15 to 25 percent slope - Areas with these soils and slope designations possess a **severe erosion hazard.** Minimization of land disturbance should be considered and passive use recommended.

Concerns:

- **Erosion / Siltation / Integrated Crop and Pest Management** - The steeper slopes increase the erosive capabilities of runoff on agricultural lands and areas where the trail system exist. Reduction of nutrient and pesticide loading

should be required in the use of this land. Contour plowing and proper buffering of croplands should be employed.

- **Trails** - Diversions that break up slope length such as water bars, buffer strips and the re-establishment of vegetative cover along the trail system would reduce the transport of sediments into sensitive areas. The width of the trail system in several areas needs to be reduced. The traversing of streams should be modified with armored stream crossings, culvert crossings or bridges to minimize the impact of traffic on a stream.

Map Unit CtB - Cheshire very stony fine sandy loam

This map unit consists primarily of Cheshire soils on 3 to 8 percent slopes. Cheshire soils are very deep, well drained soils formed in glacial till, derived mainly from red Triassic rocks. Typically they have a fine sandy loam, loam, silt loam surface layer and subsoil over a friable sandy loam, fine sandy loam, or loam substratum that extends to a depth of 60 inches or more. The soil has moderate permeability. Runoff is medium. This soil has a **medium erosion hazard.**

Concerns:

- Erosion / Siltation - Soil type located northeast of the intersection of Tamarac Swamp Road and Tyler Mill Rd. Management of the trail system should be done on a regular basis to minimize impacts from erosion and siltation.

Map Unit CvC - Cheshire extremely stony fine sandy loam

This gently sloping and sloping, well drained soil is on hilltops and side slopes of hills and ridges and on foot slopes of steep slopes where the relief is affected by the underlying bedrock. The substratum extends to a depth of 60 inches which is friable, gravelly sandy loam with few discontinuous firm lenses up to 2 inches thick.

Runoff is medium to rapid. Permeability is moderate. This soil has a **moderate to severe erosion hazard.** If disturbed, this soil requires conservation measures such as vegetative cover and diversions to diffuse runoff in order to control excessive runoff, erosion and siltation.

Concerns:

- **Erosion / Sedimentation Control, Wildlife Habitat Protection** - Soil type located in the southwest corner of the parcel by the "S Curves" on Woodhouse Ave. E/S: Several trails bisect this entire area with ever increasing new trails cut in by mountain bikers. Develop management plan for trails system to maintain existing trails and provide guidance on creating new trails. Plan should include installation of water diversions, erosion controls, ground covers and stabilized crossings that reduce impacts on these highly erodible slopes.
- **Habitat Protection** - This region has several significant vernal pools that need to be protected and preserved for wildlife habitat. Closure and reclamation of these areas where new trails have been cut would be prudent to limit the loss of critical habitat.

Map Unit CyC - Cheshire-Holyoke complex

The CyC map unit complex consists primarily of two dominant soils that are so intermingled on the landscape that they could not be separated on the map. Slopes range from 3 to 15 percent. Both soils have medium to rapid runoff.
The first soil is named Cheshire. Cheshire soils are well drained, very deep to bedrock soils. Typically they have a fine sandy loam, loam, or silt loam surface layer and subsoil over a friable sandy loam, fine sandy loam, or loam substratum that extends to a depth of 60 inches or more. This soil has a moderate permeability.

The Holyoke soil component is limited in its depth to bedrock of 10 to 40 inches. This soil is droughty and has a severe erosion hazard and a moderate of tree windthrow due to the shallow root zone.

Map Unit Eh - Ellington silt loam

The Eh map unit consists primarily of Ellington soils on 0 to 3 percent slopes. Ellington soils are very deep, moderately well drained, formed in loamy over sandy and gravelly glacial outwash deposits. These soils have a seasonal high water table at l.5 to 2.5 feet in the late fall to early spring. Typically, Ellington soils have a silt loam, very fine sandy loam, or fine sandy loam surface layer and subsoil over a stratified sand and gravel substratum that extends to a depth of 60 inches or more. Ellington soils exhibit low chromas within a 24 inch depth.

Map Unit LpA - Ludlow silt loam LpB - 3 to 8 percent slopes

The LpA map unit consists primarily of Ludlow soils on 0 to 3 percent slopes. Ludlow soils are very deep, moderately well drained soils that formed in compact glacial till, derived mainly from red Triassic rocks. Typically, they have a friable loam or silt loam surface layer and subsoil over a firm loam or silt dense basal till substratum. These soils have a seasonally high water table at 1.5 to 2.5 feet from late fall to spring.

Map unit LvC - Ludlow extremely stony silt loam

The LvC map unit is gently sloping and sloping moderately well drained soil on the top of drumlins in slight depressions and near the base of drumlins and ridges of glacial uplands. This soil has a seasonal high water table at a depth of about 20 inches from late fall until mid-spring. Permeability is moderate in the surface layer and subsoil and is slow to very slow in the substratum. Runoff is medium to rapid. The **erosion hazard is moderate to severe** and conservation measures such as the use of permanent vegetative cover are needed to control runoff and erosion.

Concerns:

- **Erosion / Siltation:** Soil type found along the eastern and western border approximately mid-point of the parcel. The steepness of slope and the moderate to severe erosion hazard are of concern on this soil. The active use on the trail system requires attention to erosion and sedimentation controls.

Map Unit MgC - Manchester gravelly sandy loam

This map unit consists primarily of Manchester soils on 8 to 15 percent slopes. Manchester soils are very deep, excessively drained, and formed in sandy and gravelly glacial fluvial deposits, derived mainly from red Triassic rocks. Typically they have a gravelly fine sandy loam or gravelly sandy loam surface layer and upper subsoil over a stratified very gravelly loamy sand and very gravelly sand lower subsoil and substratum. The substratum extends to a depth of 60 inches or more.

Concerns:

- **Streambank and Slope Stabilization:** Northeast boundary of the parcel along the river, this soil type may benefit by stabilization controls installed on the streambanks and destabilized slopes.

Map Unit HZE - Holyoke-Rock outcrop complex

The HZE - Holyoke-Rock outcrop complex consists of moderately steep to steep, well drained to somewhat well drained soils on uplands. Slopes range from 15 to 35 percent. The rock outcrop consists of exposures of hard rock, commonly Basalt. The outcrops typically are on knobs, ledges and ridgelines. The Holyoke soil component is a well drained, shallow to bedrock soil. Typically they have a loam, silt loam or fine sandy loam surface layer and subsoil over hard bedrock at a 10 to 20 inch depth.

If these soils are disturbed, they require intensive conservation measures, such as mulching, re-establish vegetative cover, and diffuse surface runoff to control excessive runoff, erosion and siltation.

Concerns:

- **Erosion and Siltation:** Located on the east side of Tamarac Swamp. Trails have been established atop of these highly erodible slopes with no controls on runoff to reduce impacts of erosion.

Map Unit HuD - Holyoke-Cheshire complex

The HuD map unit consists of moderately steep and steep well drained and somewhat well drained soils on uplands where the relief is affected by the underlying bedrock. Slopes range between 15 to 35 percent. The complex has moderate permeability and runoff is rapid. It is limited mainly by steep slopes, shallowness to bedrock and rock outcrops. Disturbance of these soils would require intensive conservation measures such as diversions, vegetative cover and mulching to prevent excessive runoff, erosion and siltation.

Concerns:

- **Erosion and Siltation** - This complex is found throughout this parcel and has several trails over and around these highly erodible areas. These trails need to be modified to reduce concentrated runoff with diversions that direct flows to vegetated cover. Active use of these trails has increased the loss of vegetative cover that stabilizes a very thin veneer of soil. Once the cover is lost, runoff's erosive capability is accelerated and siltation of sensitive areas and the health of their critical habitats are placed in jeopardy or lost altogether.

Map Unit WcB

The WcB map unit consists primarily of Watchaug soils on 3 to 8 percent slopes. Watchaug soils are very deep and moderately well drained soils formed in glacial till, derived mainly from red Triassic rocks. These soils have a seasonally high watertable at 1.5 to 2.5 feet in the late Fall to early Spring. Typically, they have a

fine sandy loam, loam or silt loam surface layer and subsoil, over a friable sandy loam, sandy loam, or loam substratum that extends to a depth of 60 inches or more. Watchaug soils have low chroma mottles within a 24 inch depth.

The erosion hazard is moderate. The cultivation of this soil requires conservation measures of minimum tillage, cover crops and the inclusion of grasses and legumes in the cropping system to reduce runoff and control erosion.
Concerns:

- **Agricultural Use /Active Use** - Soil type is found south of soccer fields in Veterans Memorial Park. This area is used for a high quality hay crop, which serves to stabilize highly erodible soils. Unfortunately, around the perimeter and bisecting the fields, there is evidence of soil disturbance from uncontrolled active uses, such as mountain biking, ATVs and horse back riding through the fields. These users and abusers wind up creating a trail devoid of vegetation, which exposes the soil and erodes easily. Deep gullies have formed from the concentrated flows of runoff. The trail becomes too deep and treacherous for the users, so they abandon the old trail and denude and expose more soil to erosion. This practice of allowing active use through the middle of agricultural fields with moderate to severe erosion hazards should cease.

Map Unit WkB, WkC and WkD

The WkB unit consists of Wethersfield soils on 3 to 8 percent slopes. They are very deep, well drained soils that formed in compact glacial till, derived mainly from red Triassic rocks. Typically they have a friable loam or silt loam surface layer and subsoil over firm loam, silt loam, or fine sandy loam, dense basal till substratum. The surface layer and subsoil has moderate permeability and slow to very slow permeability in the substratum. Runoff is medium. **Erosion hazard is moderate.** This soil is very strongly acid or strongly acid in the surface layer and subsoil and very strongly acid to moderately acid in the substratum.

WkC 8 to 15 and WkD 15 to 25 percent slopes - Areas with these soils and slope designations have a **severe erosion hazard,** which would require rather intensive conservation measures to be employed to prevent excessive runoff, erosion, and siltation in the event of any land disturbance. The control of runoff and erosion is a major management concern if these soils are cultivated. These soils are found in the northeast corner and the south central portion of the property. They are currently under leased agricultural use, which seem to employ sound conservation practices that maintain the quality of the resource and properly buffers sensitive habitats adjacent these soils.

Map Unit WmB - Wethersfield very stony loam

The map unit consists primarily of Wethersfield soils on 3 to 8 percent slopes. These very deep, well drained soils that formed in compact glacial till, derived mainly from red Triassic rocks. Typically, they have a friable loam or silt loam surface layer and subsoil over firm loam, silt loam or fine sandy loam subsoil, dense basal till substratum. Permeability is moderate in the surface layer and subsoil and slow or very slow in the substratum. Runoff is medium. This soil has a **medium erosion hazard** and conservation measures are required to prevent runoff and erosion.

Map Unit WnC - Wethersfield extremely stony loam

The map unit WnC is gently sloping to sloping, well drained soil found on drumlins, ridges and hills on glacial uplands. Slopes range from 3 to 15 percent. This soil has a moderate permeability in the surface layer and subsoil and slow to very slow in the substratum. Runoff is medium to rapid and has a **moderate to severe erosion hazard.** Conservation measures are needed to prevent excessive erosion and siltation.

Concerns:

- **Erosion / Siltation** - Soils are located in the south central and southeastern portions of the property. Part of the trail system and some agricultural uses

are conducted atop of these soils, which require careful erosion and sedimentation management. The minimization of disturbance and the quick establishment of vegetative cover in cultivated fields, plus the use of runoff diversions to stable vegetated areas would reduce impacts to wetlands and watercourses.

WnD - 15 to 35 percent slope. Limited mainly by its steepness of slope and severe erosion hazard, this soil requires intensive conservation measures that employ timely revegetation of disturbed areas, water diversions to diffuse energy of runoff and limit transport of materials to sensitive areas.

Concerns:

- **Erosion /Siltation and Habitat Disturbance** - The existing trail system requires maintenance to control runoff and reduce the footprint of the trails. Unfortunately, new trails have been established in and through areas of potential vernal pools and upland habitats of the Eastern Box Turtle. Increased public awareness and posting of these areas needs to be addressed to establish buy-in and create a stewardship by those who use these town owned lands.

Map Unit YaC - Yalesville fine sandy loam

The map unit YaC consists of Yalesville soils on 8 to 15 percent slopes. This soil is a moderately deep, well drained soil formed in loose till, derived from red Triassic rocks. They have fine sandy loam textures overlying sandstone bedrock. The main limitations of the soil are its steepness of slope and its shallowness to bedrock, which occurs within the depth range of 20 to 40 inches. This soil has a **severe erosion hazard** if utilized for cultivated crops. Runoff is rapid in this soil and the control of runoff is a major concern. Stabilization of these fields through contour plowing, proper buffering and the establishing vegetative cover crops reduces the risk of sediment and nutrient transport. These soils are found south of the soccer fields of Veterans Memorial Park trending upslope. They are currently under leased agricultural use, which seem to employ sound

conservation practices that maintain the quality of the resource and properly buffers sensitive habitats adjacent to these soils.

Recommendations

Developing a comprehensive long-range plan to preserve natural resources, protect critical habitats, reduce resource impacts and manage the publics access to sensitive areas on this property would be of great benefit to the town of Wallingford in maintaining the quality of water and the natural environment as a whole. The plan should address and promote sound stewardship, reduce disturbance of highly erodible soils on steep slopes, perform streambank stabilization maintenance and enhance habitat corridors. Eliminate areas of in-stream crossings by installing controlled crossings, footbridges or wooden bridges that invite access for the public without jeopardizing the health of these resources.

Currently, the property is abused by over zealous active uses that are damaging all elements of Tyler Mill's natural resources. Permitted use with annual fees would support timely reparation of damage, that helps maintain, enhance the trail system and control the amount of active use. Developing a proactive plan and approach to manage this property would be prudent for the town to conserve and preserve this resource for future generations.

Figure 5
Soils Map
Scale 1" = 1320'

⇑

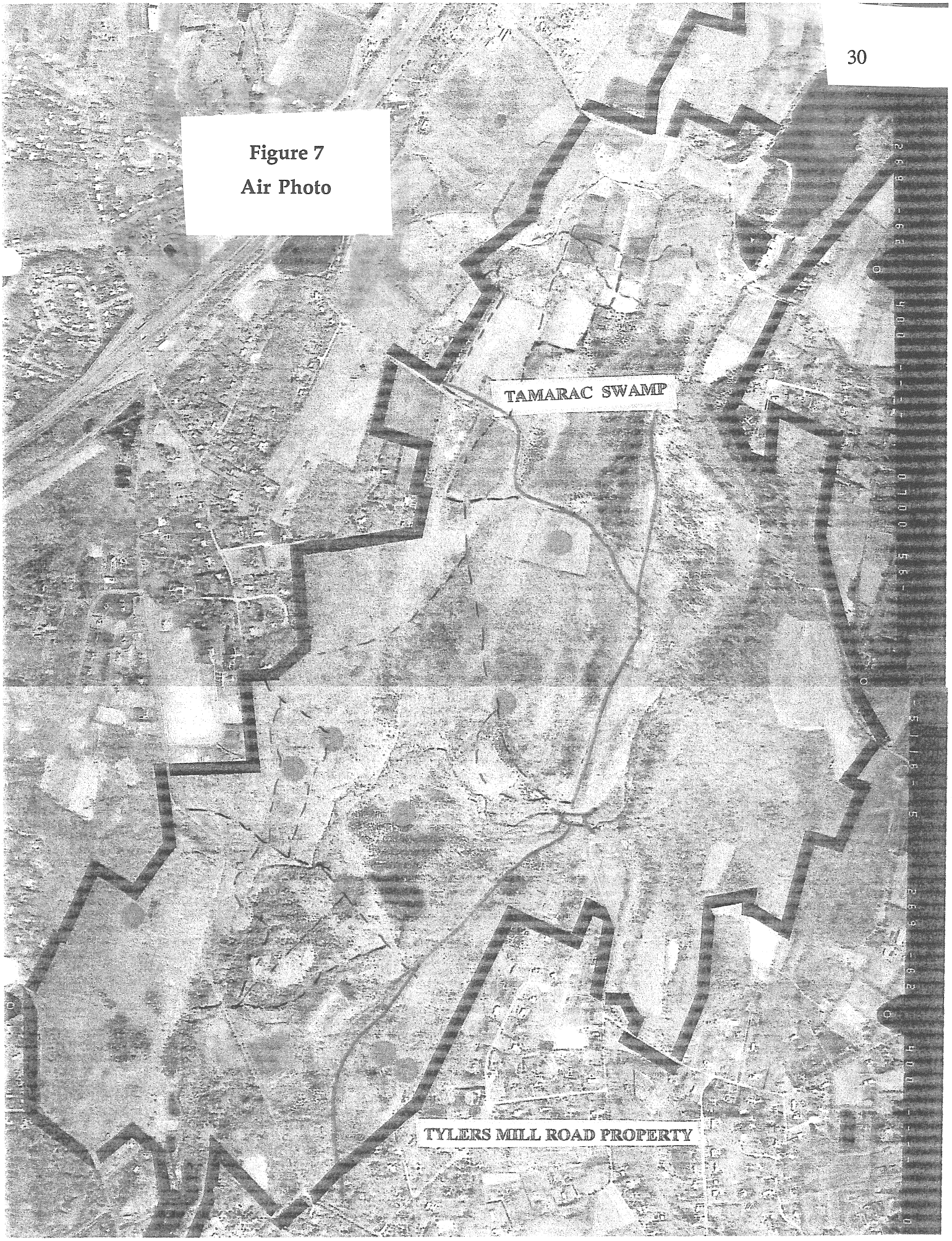
Figure 6

Tyler's Mill Property

Soils Map with Trails and Roads

Tyler's Mill Property
Scale: 1,320
- - - - - - Trail System
—·—·— Roads

Figure 7
Air Photo



Wetland Resources Review

Site Overview

The site is located in the south central part of town and encompasses four parcels. The largest of these is estimated to be approximately 1,200+ acres in size and will be referred to as the Area (Tyler Mill/Muddy River Conservation and Recreation Area). The other three parcels total plus or minus 64, 77, 105 acres north to south respectively. Most of the comments in this section will be specifically addressing the large parcel (the Area) unless otherwise noted.

Muddy River is the dominating watercourse in the study area. Entering the Area through the Mackenzie Reservoir, the river flows south along the east side of the Area and then cuts to the west looping north before continuing south to Dayton Pond where it exits the Area. Most all of the surface water leaves the Area at this point. The Muddy River drainage as a whole is major contributing watershed in the Quinnipiac River Basin.

The highest elevation in the Area is ±370 feet above sea level. It is located along the ridgeline on the southwest parcel boundary along one of the cul-de-sacs that runs east off of Woodhouse Avenue. Within the Area the hill west of MacKenzie Reservoir shows up at over 340 feet above sea level. The lowest points of elevation are along the watercourses. The highest of these elevations are at the MacKenzie Reservoir at 195 feet. The water level at Dayton Pond is approximately 108 feet. This shows a drop of about 87 feet over a length of just over three miles yielding an average slope of one half of one per cent.

Below the MacKenzie Reservoir various mapped resources show that there are five tributaries to the Muddy River. Other resources seem to show more.

Starting from the north, the first of these flows in from west of I-91 and joins the Muddy River just below the dam at the reservoir. This is the longest, furthest reaching and largest in areal extent of the five taking its headwaters northwest of, and passing under, Interchange 14 of I-91 .

The second tributary is entirely within the bounds of the study area. This is the localized watershed and stream that drains Tamarac Swamp. The report entitled: *The Tamarack Swamp* Watershed. An Ecosystem Characterization within the Tyler Mill Open Space* places the size of the watershed at 35 acres of which 25+ acres (71 %) are wetland. Calculations show this drainage to be about 58+ acres above Tamarac Swamp Road and 130+ acres above the confluence with Muddy River. While these are preliminary calculations and should be verified before they are used, they reflect a fairly accurate representation of the nature of this tributary and its drainage.

The third tributary flows in from the west just off the Area boundary and joins the Muddy just west of the north bend in the river.

The fourth tributary flows in from the hills east of Quigley Road and passes under Woodhouse Road where it joins the Muddy River. At about 1,800 feet in length this is the shortest of these five tributaries.

The fifth flows into the Muddy from the east by passing under Tyler Mill Road and joining the Muddy at Woodhouse Road. It is possible, and further investigation would reveal, whether this watershed is contained completely within the Area.

The first, third and fourth of these tributaries have their headwaters off of the parcel.

The Mackenzie Reservoir and Dayton Pond which represent the top and bottom of the Area respectively are the largest visually apparent wetlands on the maps and aerial photographs. Somewhat more conspicuous are the wooded wetlands. These include Tamarac Swamp and wooded areas in close proximity to the Muddy River especially those east of the Muddy River where it approaches Woodhouse Avenue.

The U.S. Fish and Wildlife Service has mapped and classified the wetlands and watercourses using a system of codes for all the topographic maps in the state. This Area occurs entirely on the Wallingford quadrangle National Wetland Inventory map. The wetland classifications for this Area comprise by two major classes: Riverine systems, which begin their coding with the letter R, and Palustrine which begins its coding with the letter P. Palustrine is defined as: *of or pertaining to a swamp; marshy.*

This map describes the Muddy River as R3OWH which is riverine (R), upper perennial (3), Unknown Bottom (OW), permanent (H). The wooded wetlands described above are PEME: Palustrine (P), Emergent (EM), Seasonally Saturated (E); while Tamarac Swamp is primarily PFO/SS1E- Palustrine, Forested (FO) with some scrub shrub (SS), broad leafed deciduous (1), and seasonally saturated (E). One northeast section of the swamp is classified as Palustrine forested needle leaved (these are the tamaracs) and also seasonally saturated.

The tributary streams that feed into the Muddy River and some of their accompanying wetlands are classified as PEME and PFO1E.

Water Quality

The surface water quality (which includes the wetlands and watercourses) of the area have been mapped by the DEP as follows:

- Muddy River and all of the tributaries and wetlands in the area are classified as AA. Although not all of these locations can be field-tested the assumption of quality is made based on a variety of indicators that point to excellent surface water quality in the drainage.

- The same is true for the ground water quality. The entire Area is classified as GAA which is the highest classification given in the state. As with the surface water, not all of this was field checked for the creation of the map but indications point to, and the result is mapped as, excellent water quality.

The water quality classifications as described in the: *Summary of the Water Quality Standards and Classifications (1997)* are as follows:

Inland surface water classifications

Class AA Designated uses: existing or proposed drinking water supply, fish and wildlife habitat, recreational use (may be restricted,) agricultural and industrial supply. Discharge restricted to: discharges from public or private drinking water treatment systems, dredging and dewatering, emergency and clean water discharges.

Groundwater Classifications

Class GAA Designated uses: existing or potential public supply of water suitable for drinking without treatment; baseflow for hydraulically connected surface water bodies. Discharges limited to: treated domestic sewage, certain agricultural wastes, certain water treatment wastewaters.

Leachate and Wastewater Discharge

A review of the Leachate and Waste Water Discharge Maps (Version 1997) of the DEP reveals one site of note within the bounds of this Area. Just below the dam

on the Mackenzie Reservoir a symbol denotes the presence of actively used - as of the date of the map - occasional/ regularly scheduled, the water filtration plant backwash occurring. The planners for the Area should have knowledge of this permitted activity and understand the implications it has for the water quality of the Muddy River.

Soils

A variety of soils underlie the Area. In general, the lower Muddy River and the watercourse that drains Tamarac Swamp to the Muddy are underlain by Bash and Saco silt loams; the upper Muddy by Bash Silt loam. Tamarac Swamp is classified as very poorly drained Carlisle muck, an organic soil. Other silt loams underlie various other wetlands in the Area.

Many of the wetland soils have formed over till which is present in the northwest, southwest and extensive in the central portion of the Area. The valleys of the Muddy River and its northern tributaries are dominated by sand, gravel and alluvium. Only one area of thick till occurs. That is in the southeast portion of the Area and measures 22+ acres.

Recommendations

This Area is very unique in that there is so much contiguous land that is, for the most part, unimpacted by roads, structures and general development of any kind. Forest and farm land dominate the land use and the town has done well to try to plan the most appropriate use of this rarely found large parcel acreage.

- The first and strongest recommendation is to get a wetland evaluation or at least a wetland inventory for the wetlands in the Area. This will provide a systematic, easily referenced, document that should show:
    - where all of the watercourses and wetlands occur on the property,
    - the function of the wetland and watercourse systems on the landscape,
    - which wetlands provide which high value functions, and
    - which wetlands might be in need of mitigation as a result of impacts by historic or current land use (loss of traditional buffer or riparian areas).

Until this asset is in hand a well-coordinated plan that seeks to protect the wetlands and watercourses aspect of the Area's environment will be incomplete. This can be accomplished in variety of ways and at different levels of expertise.

If there is money available, some or all the work can be done by a consultant. Often when there is no money available municipalities work with a local or regional college or university and have graduate students do the work. Over the course of a few years a fairly complete and generally useable document will be in hand.

The least of the work should be to obtain all the currently available maps that can be had, field verify the mapped information and use the results for any early planning that might take place. Maps such as the USFWS National Wetland Inventory, Soils maps, Water Quality, and Leachate and Wastewater Discharge are all available from the DEP Store at the DEP in Hartford. Also available there is the *Method for the Evaluation of Inland Wetlands in Connecticut - a Watershed Approach,* DEP Bulletin 9, which will provide a procedure to evaluate 14 different functional values. Often, planners select what they feel are their core 4 - 7 functions and have these applied to the wetlands evaluation, thereby reducing the scope of the work.

- There are several maps circulating as the map of Tyler Mill property. It is rare that any two consistently embrace the same geography. For this reason it has been unreliable to try to give accurate acreage of the main parcel and to represent wetlands as a percentage of the Area. The primary overseeing office or commission of the Tyler Mill/Muddy River Area in town should compile a single, definitive, dated map for all to recognize and use as the base for further study.

- At the initial ERT/town meeting for this site one of the stated goals was for an improved trail system in the Area. Discussion about the trails included goals of simplifying, restricting and providing a seemingly less chaotic experience for the public. Part of the emphasis on the planning for the trail system should be to ensure safe distances from the wetlands to protect the wetlands from sedimentation and to maintain protective distances from any vernal pools or other sensitive areas that might be located in the Area. (This information will be one of the spin-off values of the Area wide wetland evaluation.)

• Understand the local watersheds, their boundaries and their land uses that contribute to the Muddy River and plan accordingly. The tributaries to the Muddy River have the potential to greatly affect the excellent water quality the stream now has. Some contributing watersheds will have little to almost no impervious surfaces and the drainage and runoff will be natural. Others that originate from outside the Area will have storm waters directed to them and larger percentages of impervious surface causing flashy runoff.

- The Tamarac Swamp drainage offers an excellent opportunity for educational purposes. It is infrequent in Connecticut, and certainly more so in the more heavily urbanized areas, to have an entire watershed as lightly impacted as is this one. The current land use features only one (lightly used) road crossing, a

small amount of agricultural land (estimated 12-13 acres), and the balance dominated by forests and wetlands. An excellent educational opportunity exists here for local schools to study a barely impacted wetland/ watercourse system and drainage in a nearly natural state very close to home. The study of drainage basin characteristics, runoff rates, ecology, sedimentation, and water quality are just a few of the subjects that could be pursued.

- The report entitled: *The Tamarack Swamp* Watershed: An Ecosystem Characterization within the Tyler Mill Open Space, 1995,* by graduate students at the Yale School of Forestry and Environmental Studies provides a description of the ecological status of the tamaracks and the likelihood of their continued presence there. The report specifies measures that could be enacted to keep this group of trees regenerating. These measures must be in place before the trees age beyond their reproductive years.

  Lisa M. Toman's volume entitled: *Tyler Mill Trails: A Guide and Natural History* indicates that the few old tamaracks remaining in the tamarack swamp are not (no longer?) reproducing; and that red maple saplings are out-competing any young ones for sunshine in any event.

  The commissions in Wallingford should address this issue and make a decision about the future of the tamarack population, if it is not too late already. Based on the report(s), failure to address the issue is by default a decision to let this unique wetland species die off due to old age and competition.

- Ms. Toman alludes to a variety of wetland (and upland) wildlife in her above mentioned title. There are however no specific site locations provided, just generalities about locations of turtles, salamanders and frogs. If Ms. Toman

has dated observations and site locations this could be a good resource for a wetland wildlife community inventory for the town's records.

- Roman Mrozinski of the New Haven County Soil and Water Conservation District reported that a survey of vernal pools and their environs has been undertaken on all the Tyler Mill properties. The information that is yielded by this field investigation should be incorporated into the mapping and resource documentation for the Area. Understanding the wetland and upland needs of functional vernal pools will go far in the preservation of these wetlands and keep wildlife prospering there. Special concern should be applied to protecting these resources from trail use and forestry practices.

By extension the application of all this information if acquired and mapped as described above will benefit and protect the outlying parcels that make up this incredible open space entity.

Figure 8

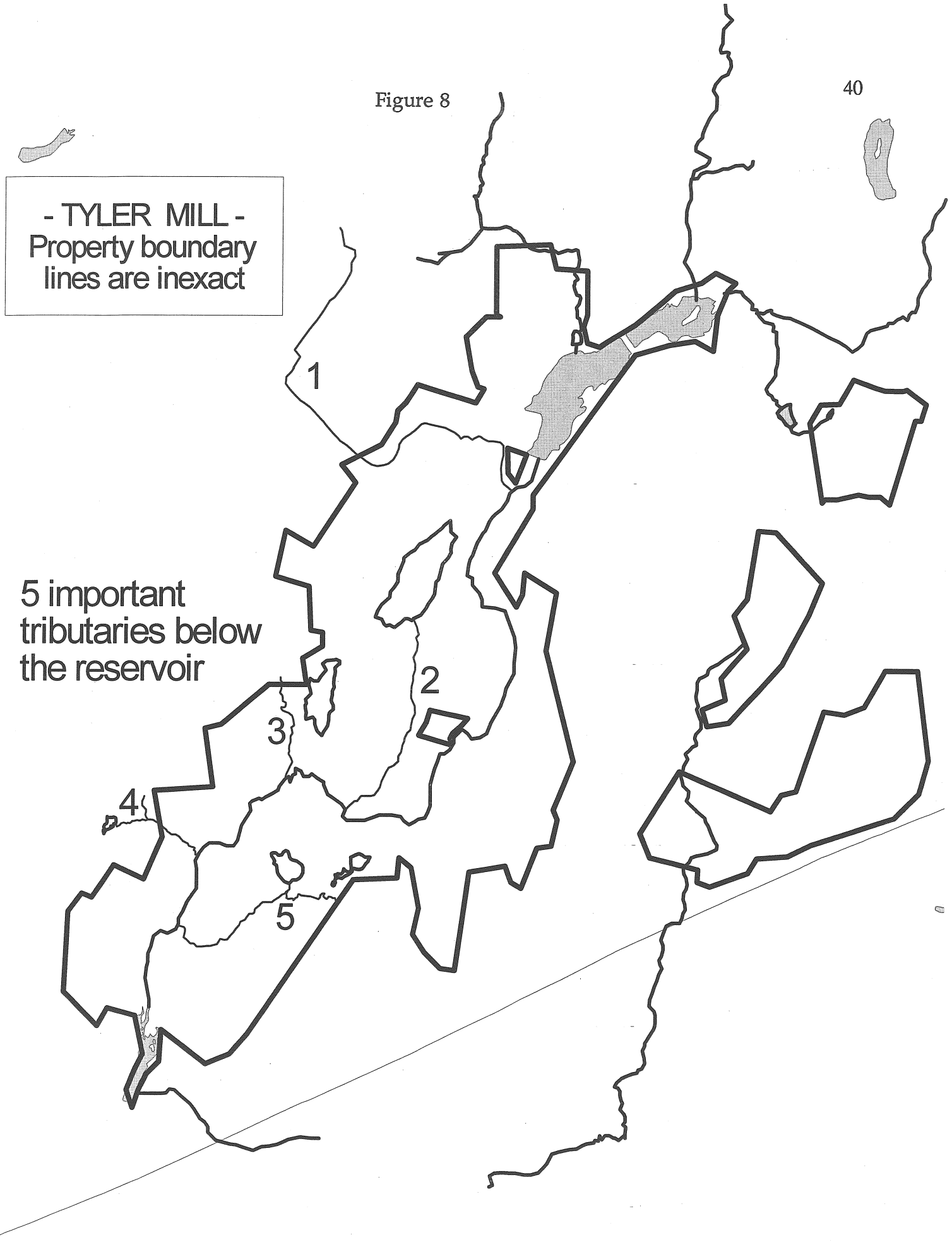
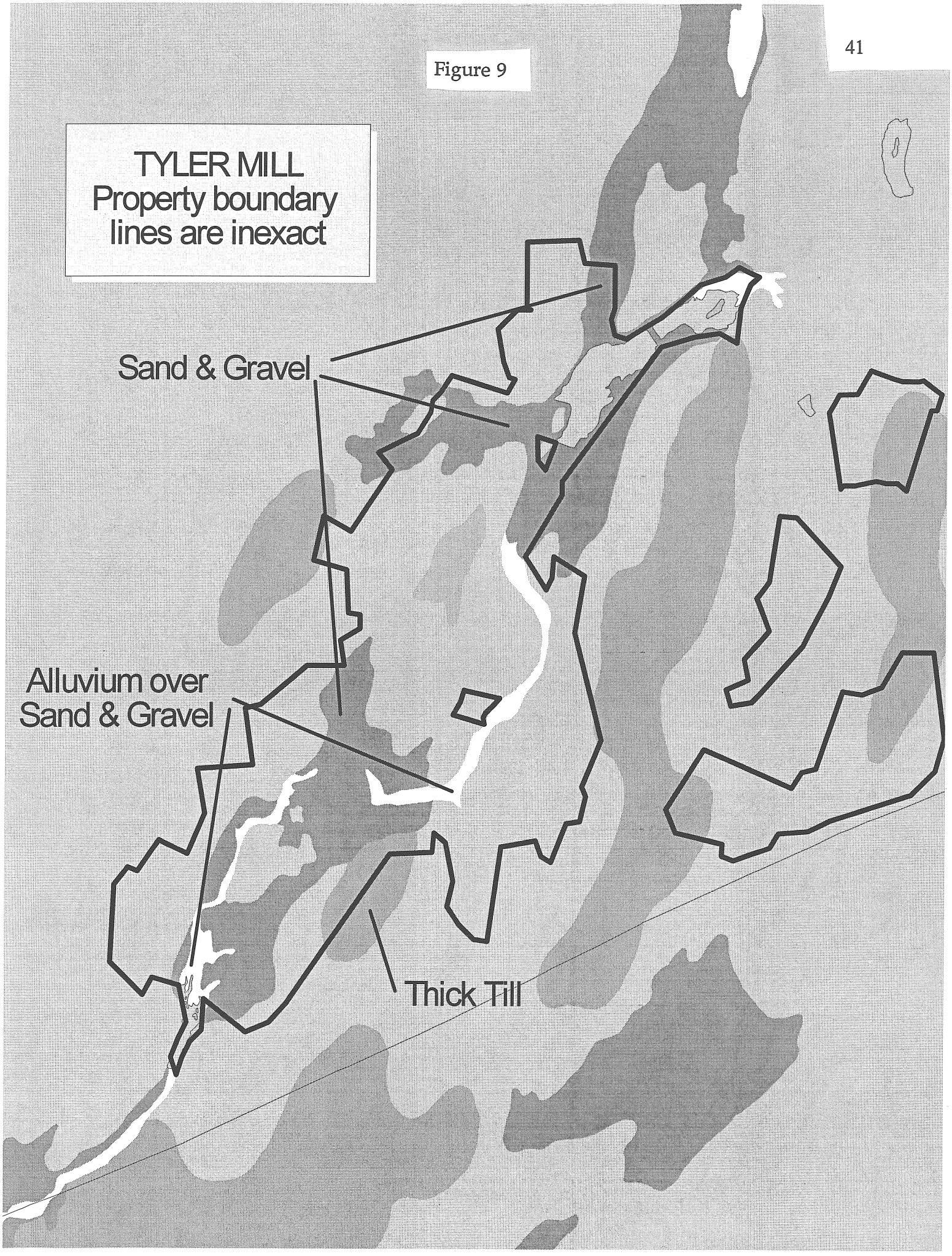

- TYLER MILL -
Property boundary lines are inexact
1
2
3
4
5
5 important tributaries below the reservoir

Figure 9


TYLER MILL
Property boundary
lines are inexact
Sand & Gravel
Alluvium over
Sand & Gravel
Thick Till

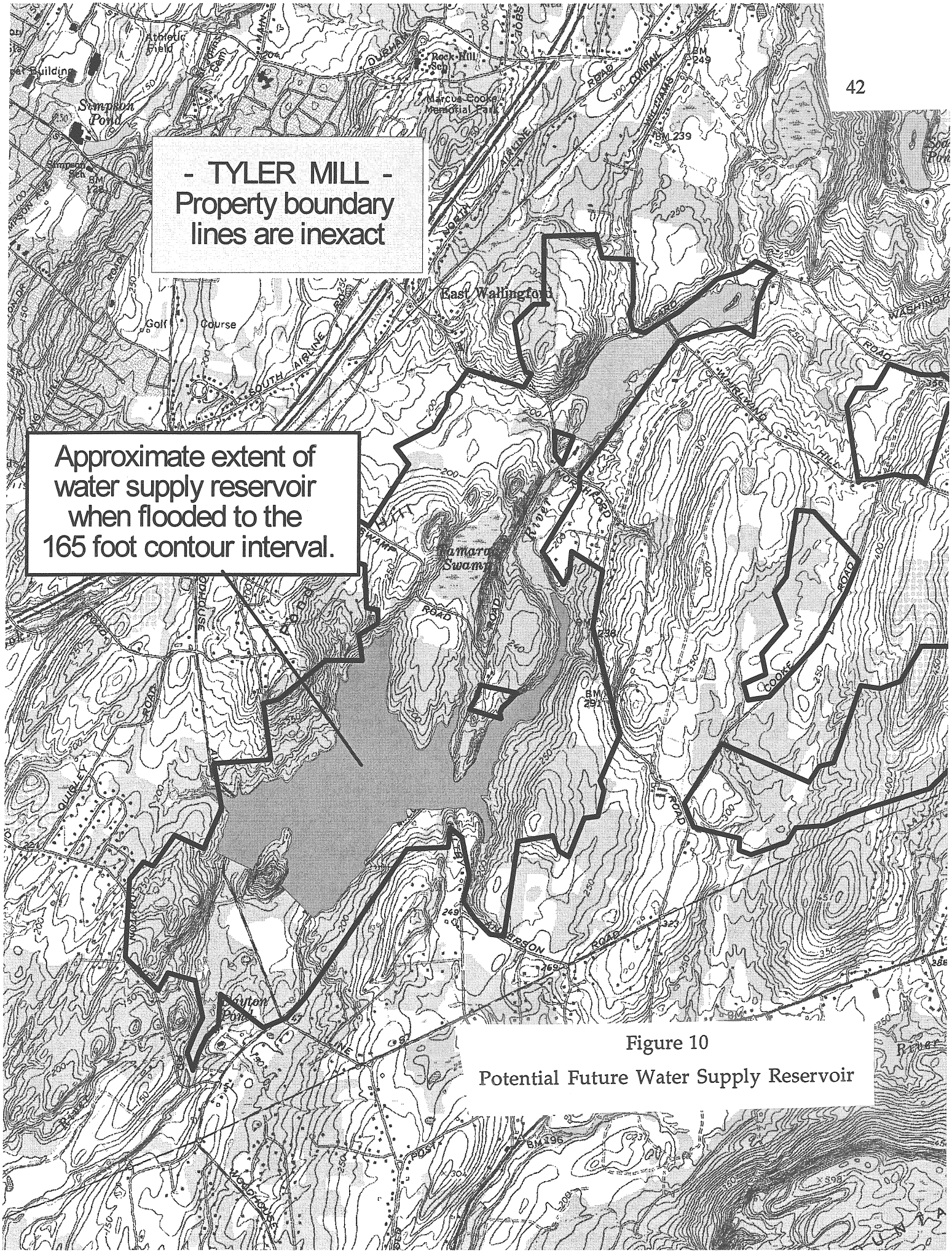


Figure 10

Potential Future Water Supply Reservoir

3. BIOLOGICAL RESOURCES

THE NATURAL DIVERSITY DATA BASE

AQUATIC RESOURCES

WILDLIFE RESOURCES

WILDLIFE TRENDS AND MANAGEMENT ISSUES

FOREST RESOURCES

The Natural Diversity Data Base

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

Natural Diversity Data Base information includes all information regarding critical biologic resources available to us at the time of the request. This information is a compilation of data collected over the years by the Environmental & 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.

Aquatic Resources

Watershed and Watercourse Characteristics

The Tyler Mill/Muddy River Conservation and Recreation Area (the "Area") encompasses a 1400 + acre tract of land in the south-east section of Wallingford. The Muddy River along with several unnamed tributary streams are found within the bounds of the Area.

The Muddy River and unnamed perennial streams within the Area are physically characteristic coldwater streams in Connecticut. These characteristics are moderate to steep gradient channels, surface flow of moving pool interspersed by riffle and a substrate composed of boulders, cobble, gravel, coarse sand, and sand-silt fines.

Throughout the Area, dense growths of hardwoods and woody shrubs predominate as riparian vegetation and provide the Muddy River and it's tributary streams with a nearly complete canopy. However, riparian vegetation has been cleared to the top of bank at several trail crossings. Physical instream habitat is provided by the water depth in pools, boulders, undercut banks, and fallen or overhanging riparian vegetation.

Although land use within the Area remains as forest, a significant length of the Muddy River had been impounded to create MacKenzie Reservoir, a potable water supply of the Town of Wallingford. The conservation of forest land both on the Area and within the watershed of MacKenzie Reservoir have to date provided a means of maintaining Muddy Rivers' water quality. The Department

of Environmental Protection classifies the Muddy River through the Area as Class AA surface waters. Designated uses for surface water of this classification are existing or potential public drinking water supply, fish and wildlife habitat, recreational use, agricultural and industrial supply, and other purposes. Recreational uses may be restricted.

Aquatic Resources

The Inland Fisheries Division (the "Division") has conducted fish surveys of the Muddy River through the Area periodically since the late 1970's. The primary purpose of the surveys is to evaluate the response of the river's fish population to water withdrawals from MacKenzie Reservoir. Division surveys of the Muddy River through the Area reveal a fish population comprised of brook trout (*Salvelinus fontinalis*), brown trout (*Salmo trutta*), rainbow trout (*Oncorhynchus mykiss*), blacknose dace (*Rhinichthys atatulus*), longnose dace (*Rhinichthys cataractae*), common shiner (*Luxilus cornutus*), fallfish (*Semotilus corporalis*), redfin pickerel (*Esox americanus*), tessellated darter (*Etheostoma olmstedi*), white sucker (*Catostomus commersoni*), and American eel (*Anquilla rostrata*). These fish species are common to coldwater stream systems in Connecticut.

Small numbers of the following species also appear in the Division fish surveys: largemouth bass (*Micropterus salmoides*), bluegill (*Lepomis macrochirus*), pumpkinseed (*Lepomis gibbosus*), redbreast sunfish (*Lepomis auritus*), yellow perch (*Perca flavescens*), and brown bullhead (*Ameiurus nebulosus*). These fish species are common residents in Connecticut lakes and ponds and are transient in riverine habitat such as that found within this Muddy River reach.

It should be noted that the fish community structure of the Muddy River through the Area was found to vary in response to available flow from

MacKenzie Reservoir. Trout and other intolerant species prevail only during years of ample precipitation. During years with average or below average precipitation, a shift in the species composition is observed with more stress-tolerant species being found in greatest abundance.

Several sections of the Muddy River through Wallingford and North Haven are open to recreational fishing. To satisfy angler demand, the Division annually liberates approximately 3,700 adult-sized brook, brown and rainbow trout. A portion of these trout are allotted to the Muddy River section within the Area.

Recommendations

The reported goal of the Wallingford Conservation Commission and the Wallingford Park and Recreation Department is to develop a long-term program that will provide for both stewardship based on preservation of the natural resources, the recreational uses compatible with the preservation goals, and the possible need for a municipal reservoir on the parcel. The following are recommended for incorporation into a long-term management plan for the Area:

- **Establishment of Riparian Buffers**

The creation of protective buffers would be an extremely effective mechanism to assure the long term viability of the aquatic habitats and resources found within the Muddy River through the Area. Riparian vegetation performs a variety of unique functions essential to a healthy riverine ecosystem. Such functions include filtering of sediments, nutrients, and other non-point pollutants from overland runoff; maintaining water temperatures suitable for survival of resident fish; providing bank and channel stability; supplying a source of large woody debris for physical habitat; providing a substantial food source for aquatic insects which represent a significant proportion of food for resident fish; and

serving as a "reservoir" storing surplus stormwater runoff for gradual release into the river during summer and early fall base flow periods.

It is recommended that the Wallingford Conservation Commission and the Wallingford Park and Recreation Department adopt the Division riparian buffer policy of maintaining a 100 foot wide buffer along the Muddy River. A 50 foot wide buffer should be maintained along tributary streams. Research has indicated that protected riparian buffers along watercourses prevents damage to aquatic ecosystems that are supportive of diverse species assemblages. The buffer zone boundaries should be measured from either (1) the edge of riparian inland wetland as determined by Connecticut inland wetland soil delineation methods or (2) in the absence of riparian wetlands, the edge of the stream bank based upon bank-full flow conditions. Please refer to the attached documentation presenting Division policy and position regarding riparian buffers for additional information.

- **Trail Relocation, Trail Maintenance**

There are a number of marked trails on the Preserve which are used for hiking, mountain biking, and horseback riding. Several of these trails cross the Muddy River. At the crossings, trail usage has caused significant stream bank erosion. Bank failure presents a two-fold concern for maintaining in-stream habitat and resource integrity. As banks become undermined and they collapse, fish habitat provided by bank undercuts is eliminated. Eroded bank materials are transported downstream and eliminate or degrade physical habitat once deposited. Ultimately, such deposition can decrease the Muddy River's ability to sustain the existing fish population. River bank failure also hinders the development of riparian vegetation.

The following are measures recommended for trail relocation and maintenance:

- Trail crossings of the Muddy River be eliminated and the eroded river banks restored. Separate loop trails should be developed making use of the Tyler Mill Road bridge over the Muddy River as a common crossing point.
- Trail crossing of Muddy River tributaries should be of span bridge or arch culvert design. These structures most adequately preserve physical in-stream habitat and do not create impediments to fish migration. Ideally, required stream crossings should be located at the site of previous crossings. Crossings should approach streams at a 90° angle.
- Pedestrian traffic should be limited to authorized trails only. The development of unauthorized trails should not be allowed and be eliminated if they are noted.
- Establish a trail maintenance plan to conduct routine trail inspections and make corrective repairs to those situations potentially causing erosion and sediment events.

- **Reservoir Development**

Wallingford Water Department staff report that the Area site has been selected for development of a reservoir on the Muddy River should there be future need for additional supply in the municipal system. As with the development of MacKenzie Reservoir, impoundments impart the following impacts on river systems: eliminate riverine habitat; become a barrier to upstream and downstream fish passage; raise water temperature and decrease dissolved oxygen levels; alter the river's sediment balance; modify natural river flow regimes.

Given the potential for both site specific and off-site impacts associated with development of a reservoir on the Muddy River within the Area, an alternate source for future supply should be developed. To enhance current conditions within the Muddy River, the Wallingford Water Department should work toward development of water withdrawal strategy for MacKenzie Reservoir

which balances water supply needs with the instream flow needs of the Muddy River.

DEPARTMENT OF ENVIRONMENTAL PROTECTION
INLAND FISHERIES DIVISION

POLICY STATEMENT
RIPARIAN CORRIDOR PROTECTION

I. INTRODUCTION, GOALS, AND OBJECTIVE

Alteration and exploitation of riparian corridors in Connecticut is a common event that significantly degrades stream water quality and quantity. Inasmuch as riparian ecosystems play a critical role in maintaining aquatic resource productivity and diversity, the Inland Fisheries Division (Division) recognizes that rigorous efforts are required to preserve, protect, and restore these valuable resources. Consequently, a riparian corridor protection policy has been developed to achieve the following goals and objective:

Goals

Maintain Biologically Diverse Stream and Riparian Ecosystems, and

Maintain and Improve Stream Water Quality and Water Quantity.

Objective

Establish Uniform Riparian Corridor Buffer Zone Guidelines.

II. DEFINITIONS

For the purpose of implementing a statewide riparian corridor protection policy, the following definitions are established:

Riparian Corridor: A land area contiguous with and parallel to an intermittent or perennial stream.

Buffer Zone: An undisturbed, naturally vegetated area adjacent to or contained within a riparian corridor that serves to attenuate the effects of development.

Perennial Stream: A stream that maintains a constant perceptible flow of water within its channel throughout the year.

Intermittent Stream: A stream that flows only in direct response to precipitation or which is seasonally dry.

III. RIPARIAN FUNCTION

Naturally vegetated riparian ecosystems perform a variety of unique functions essential to a healthy instream aquatic environment. The delineation and importance of riparian functions are herein described. Vegetated riparian ecosystems:

* Naturally filter sediments, nutrients, fertilizers, and other nonpoint source pollutants from overland runoff.

* Maintain stream water temperatures suitable for spawning, egg and fry incubation, and rearing of resident finfish.

* Stabilize stream banks and stream channels thereby reducing instream erosion and aquatic habitat degradation.

* Supply large woody debris to streams providing critical instream habitat features for aquatic organisms.

* Provide a substantial food source for aquatic insects which represent a significant proportion of food for resident finfish.

* Serve as a reservoir, storing surplus runoff for gradual release into streams during summer and early fall base flow periods.

IV. RIPARIAN CORRIDOR BUFFER ZONE GUIDELINES

Recognizing the critical roles of riparian corridors, the Division provides buffer zone guidelines that are designed to bring uniformity and consistency to environmental review. The guidelines are simple, effective, and easy to administer. The following standard setting procedure should be used to calculate buffer zone widths.

Perennial Stream: A buffer zone 100 feet in width should be maintained along each side.

Intermittent Stream: A buffer zone 50 feet in width should be maintained along each side.

Buffer zone boundaries should be measured from either, (1) edge of riparian inland wetland as determined by Connecticut inland wetland soil delineation methods or (2) in the absence of a riparian wetland, the edge of the stream bank based on bank-full flow conditions.

The riparian corridor buffer zone should be retained in a naturally vegetated and undisturbed condition. All activities that pose a significant pollution threat to the stream ecosystem should be prohibited.

Where the Division policy is not in consonance with local regulations and policies regarding riparian corridor buffer zone widths and allowable development uses within these areas, local authorities should be encouraged to adopt the more restrictive regulations and policies.

12/13/91
Date

James C. Moulton
Acting Director

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POSITION STATEMENT
UTILIZATION OF 100 FOOT BUFFER ZONES TO PROTECT RIPARIAN AREAS IN CONNECTICUT

BY
BRIAN D. MURPHY
TECHNICAL ASSISTANCE BIOLOGIST
INLAND FISHERIES DIVISION

I. INTRODUCTION

One tenet of the Inland Fisheries Division Policy on Riparian Corridor Protection is the utilization of a 100 foot buffer zone as a minimum setback along perennial streams. The adoption of such a policy is sure to be controversial. Laymen, developers and natural resource professionals alike will ask questions such as: Why was a standard setting method adopted? What's magical about 100 feet? Will 100 feet be sufficiently protective, or will it be overly protective? In response, this paper outlines the ramifications of adopting a riparian corridor policy including the use of a 100 foot buffer zone.

II. STANDARD SETTING VERSUS SITE SPECIFIC BUFFER ZONES

There are two approaches for determining buffer zone width; standard setting and site specific. Standard setting methods define an area extending from the streambank edge or highwater mark to some landward fixed point boundary. Site specific methods utilize formulas that incorporate and consider special site specific land characteristics, hence, the calculation of a variable width buffer zone. In both case, buffers are employed to define an area in which development is prohibited or limited.

A major advantage of standard setting methods is that they are easy to delineate and administer, thereby improving the consistency and quality of environmental assessments. Furthermore, valuable staff time would not be required to determine site specific buffer zones along each and every watercourse of concern.

The exact width of a buffer zone required for riparian corridor protection is widely disputed (Bottom et al. 1985 and Brinson et al. 1981). Buffer width recommendations found in the literature vary from as little as 25 feet to as great as 300 feet (Palfrey et al. 1982). The 100 foot buffer is widely accepted in Connecticut having been adopted by numerous inland wetland and conservation commissions as an appropriate minimum setback regulation for streambelts. In addition, Division staff have been recommending the utilization of the 100 foot buffer zone to protect streambelts since the early 1980's. Scientific research has not been generated to dispute the adequacy of utilizing 100 foot buffer zones to protect Connecticut's riparian corridors. In fact, to ensure that riparian functions are not significantly altered, recent scientific information points towards maintaining buffer zones that would be at a minimum, 100 feet in width (see section III).

Site specific methods define buffer widths according to the character and sensitivity of adjacent streamside lands. These buffer widths, also referred to as "floating buffers," consider physical site characteristics such as slope, soil type, and vegetative cover. The advantage of site specific methods is that buffer widths are designed using site characteristics and not an arbitrary predetermined width. Unfortunately, there is no "one" universally accepted formula or model and none have been developed for use in Connecticut. Most formulas are based on the degree to which sediment can be removed or filtered by natural vegetation, thus, the primary useage is sediment control. Other weaknesses of site specific techniques are (1) all areas must be evaluated on a case-by case basis and, (2) the subjectivity of different techniques (i.e. if the evaluation technique is inadequate, the buffer width will also be inadequate).

Additionally, these formulas only concentrate on one specific riparian function at a time and do not take into account multiple riparian functions, especially those of inland fisheries values as discussed in Section III. Consequently, site specific formulas approach riparian function on a single dimension rather than taking a more realistic, holistic approach.

In the absence of a scientific model to determine buffer widths suitable to protect Connecticut's riparian corridors, the utilization of a standard setting method is environmentally and politically prudent.

III. RIPARIAN FUNCTION

To assess the efficacy of a 100 foot buffer zone, the literature was searched to identify studies which have applied a quantitative approach to buffer width determination. Literature was searched for studies which both support and dispute the 100 foot zone. The following is a summary "by riparian function" of quantitative studies which assess buffer widths.

Sediment Control

Width, slope and vegetation have been cited as important factors in determining effectiveness of buffer zones as sediment filters (Karr and Schlosser 1977). Wong and McCuen (1981), who developed and applied a mathematical model to a 47 acre watershed, found that a 150 foot zone along a 3% slope reduced sediment transport to streams by 90%. Mannering and Johnson (1974) passed sediment laden water through a 49.2 foot strip of bluegrass and found that 54% of sediment was removed from the water. Trimble and Sartz (1957) developed recommendations as to width of buffer areas between logging roads and streams to reduce sediment load. They determined a minimum strip of 50 feet was required on level land with the width increasing 4 feet for each 1% slope increase. Buffer widths as determined by Trimble and Sartz (1957) have been characterized as evaluated guesses rather than empirically defined widths (Karr and Schlosser 1977). Rodgers et al. (1976) state that slopes greater than 10% are too steep to allow any significant detention of runoff and sediment regardless of buffer width. After a critical review of the literature, Karr and Schlosser (1977) determined that the size and type of vegetative buffer strip needed to remove a given fraction of the overland sediment load cannot be universally quantified. Existing literature does suggest that 100 foot riparian buffers will assist with sediment entrapment, although efficacy will vary according to site conditions.

Temperature Control

Brown and Brazier (1973) evaluated the efficacy of buffer widths required to ameliorate stream water temperature change. They concluded that angular canopy density (ACD), a measure of the ability of vegetation to provide shading, is the only buffer area parameter correlated with temperature control. Results show that maximum angular canopy density or maximum shading ability is reached within a width of 80 feet. Study sites were 9 small mountain streams in Oregon that contained a conifer riparian vegetative complex. Whether or not maximum angular canopy density is reached within 80 feet in a typical Connecticut deciduous forest riparian zone is doubtful. Tree height in Connecticut riparian zones is smaller than in Oregon (Scarpino, personal communication), therefore buffers greater than 80 feet in width would be required for temperature maintenance in Connecticut.

Nutrient Removal

Nutrient enrichment is caused by phosphorous and nitrogen transport from, among other things, fertilized lands and underground septic systems. Most research on nutrient enrichment has focused on overland surface flow. Karr and Schlosser (1977) report that 88% of all nitrogen and 96% of all phosphorous reaching watercourses in "agricultural watersheds" were found to be attached to sediment particles; thus, successful nutrient removal can be accomplished through successful sediment removal. There are conflicting reports on the ability of buffer widths to remove nutrients with most research being tested on grass plots. Butler et al. (1974) as cited by Karr and Schlosser (1977) found that a 150 foot buffer width of reed canary grass with a 6% slope caused reductions in phosphate and nitrate concentrations of between 0–20%. Wilson and Lehman (1966) as cited by Karr and Schlosser (1977) in a

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study of effluent applied to 300 m grass plots found that nitrogen and phosphorous concentrations were reduced 4 and 6%, respectively. Studies on subsurface runoff as cited in Clark (1977) found high concentrations of nitrates at 100 feet from septic systems with unacceptable levels at 150 feet. Clark (1977) recommended that a 300 foot setback be used whenever possible, with a 150 setback considered adequate to avoid nitrate pollution. Environmental Perspective Newsletter (1991) states that experts who commonly work with the 100 foot buffer zone set by the Massachusetts Wetlands Protection Act are increasingly finding that it is insufficient since many pollutants routinely travel distances far greater than 100 feet with nitrate-nitrogen derived from septic systems moving distances of greater than 1000 feet. Research indicates that the adoption of 100 foot buffer widths for Connecticut riparian zones will assist with the nutrient assimilation; albeit, complete removal of all nutrients may not be achieved.

Large Woody Debris

The input of large woody debris (LWD) to streams from riparian zones, defined as fallen trees greater than 3 m in length and 10 cm in diameter has been recently heralded as extremely critical to stream habitat diversity as well as stream channel maintenance. Research on large woody debris input has mainly been accomplished in the Pacific Northwest in relation to timber harvests. Murphy and Koski (1989) in a study of seven Alaskan watersheds determined that almost all (99%) identified sources of LWD were within 100 feet of the streambank. Bottom et al. 1983 as cited by Budd et al. (1987) confirm that in Oregon most woody structure in streams is derived from within 100 feet of the bank. Based on research done within old-growth forests, the Alaska region of the National Marine Fisheries Service, recognizing the importance of LWD to salmonid habitat, issued a policy statement in 1988 advocating the protection of riparian habitat through the retention of buffer strips not less than 100 feet in width (Murphy and Koski 1989). All research findings support the use of a 100 foot buffer zone in Connecticut for large woody debris input.

Food Supply

Erman et al. (1977) conducted an evaluation of logging impacts and subsequent sediment input to 62 streams in California. Benthic invertebrate populations (the primary food source of stream fishes) in streams with no riparian buffer strips were compared to populations in streams with buffer widths of up to 100 feet. Results showed that buffer strips less than 100 feet in width were ineffective as protective measures for invertebrate populations since sediment input reduced overall diversity of benthic invertebrates. Buffer strips greater than 100 feet in width afforded protection equivalent to conditions observed in unlogged streams. The ultimate significance of these findings is that fish growth and survival may be directly impacted along streams with inadequate sized riparian buffer zones. All research supports the feasibility of implementing a 100 foot buffer zone in Connecticut to maintain aquatic food supplies.

Streamflow Maintenance

The importance of riparian ecosystems in terms of streamflow maintenance has been widely recognized (Bottom et al. 1985). In Connecticut, riparian zones comprised of wetlands are of major importance in the hydrologic regime. Riparian wetlands store surplus flood waters thus dampening stream discharge fluctuations. Peak flood flows are then gradually released reducing the severity of downstream flooding. Some riparian wetlands also act as important groundwater discharge or recharge areas. Groundwater discharge to streams during drier seasonal conditions is termed low flow augmentation. The survival of fish communities, especially coldwater salmonid populations is highly dependent upon low flow augmentation (Bottom et al. 1985). Research, although documenting the importance of riparian zones as areas critical to streamflow maintenance, has not investigated specific riparian buffer widths required to provide the most effective storage and release of stream flows.

IV. OTHER POLICY CONSIDERATIONS

Measurement Determination

The proposed policy states that buffer zone boundaries should be measured from either the edge of the riparian inland wetland as determined by Connecticut inland wetland soil delineation methods or in the absence of a riparian wetland, the edge of the streambank based on bank-full flow conditions. This boundary demarcation is absolutely necessary to ensure that all riparian wetlands are protected. For example, if all measurements were to start from the perennial stream edge and extend landward for a distance of 100 feet, many riparian zones that contain expansive wetlands greater than 100 feet in width would be left unprotected.

Also, since boundary demarcation includes wetland delineation, the ultimate width of the buffer will vary according to site specific features. Consequently, buffer width determination as stated by Division policy is a "hybridization" of both standard setting and site specific methods. This hybridization of methods is advantageous since it acknowledges the sensitivity of streamside wetlands.

Home Rule

Where the Division policy is not in consonance with local regulations and policies regarding riparian corridor buffer zone widths, local authorities would be encouraged to adopt the more restrictive regulations and policies. This feature incorporates flexibility to acknowledge the importance of local "home rule" regulations or policies already in accepted practice. Conversely, towns and cities without accepted policies and regulations could choose to enact the Division policy.

Allowable Uses in Buffer Zones

The Division policy states that "the riparian corridor buffer zone should be retained in a naturally vegetated and undisturbed condition and that all activities that pose a significant pollution threat to the stream ecosystem should be prohibited." In essence, the buffer zone becomes an area where no development should be allowed. For this policy to be effective, there should be no exceptions, a blanket restriction of all uses would be recommended. Further clarification and more precise definitions of allowable uses will, however, be required in the future if the policy evolves into a departmental regulation.

Recently, the Connecticut Supreme Court has ruled that local agencies can prohibit specific development within buffer zones. The *Lizotte v. Conservation Commission of the Town of Somers, 216 Conn.320 (1990)* decision ruled that the construction or maintenance of any septic system, tank, leach field, dry well, chemical waste disposal system, manure storage area or other pollution source within 150 feet of the nearest edge of a watercourse or inland wetland's seasonal high water level can be prohibited (Wetlands Watch 1990). If this decision is a precursor of the future, Connecticut courts will continue to the support the use of buffers, especially those which restrict or prohibit detrimental activities.

V. CONCLUSIONS

The following actions are required to preserve, protect, and restore Connecticut's riparian corridors:

1. The Inland Fisheries Division needs to adopt and implement the proposed policy so that staff can use it as a guideline to assist cities, towns, developers and private landowners with making sound land use decisions. This policy will act to solidify a collective position concerning riparian corridor protection.

2. While the proposed policy in its "current form," represents a recommendation from the CTDEP Inland Fisheries Division, the ultimate goal of the Division should be to progressively implement this policy as either a CTDEP regulation or State of Connecticut statute.

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Wildlife Resources

Introduction

A cursory site visit was conducted on October 30, 2001 to evaluate existing wildlife habitats on a collection of parcels totaling +/- 1400 acres owned by the town of Wallingford. (Species observed/heard during the site visit are indicated with an asterisk (*)).

Existing Wildlife Habitats and Use on Town-owned Property

- **Tyler Mill/Muddy River Conservation and Recreation Area**

The Tyler Mill/Muddy River Conservation and Recreation Area (+/- 1400 acres) is town owned property located in the southeastern corner of Wallingford (east of Interstate 91 and Route 150, north of the North Branford town line, south of MacKenzie Reservoir and west of Northford Road). While Wallingford is a well-developed town with industrial parks, housing developments and numerous roads and highways, including I-91, it still retains major areas of agricultural land (both active and inactive) and forested lands The Tyler Mill/Muddy River area represents a major area of undeveloped open space land and is composed of contiguous parcels or closely adjacent parcels (separated by roads, suburban development or other undeveloped land).

The Area lands also provide a variety of recreational opportunities for the public. The area supports athletic fields, a community garden, and numerous hiking

and mountain biking trails. The property appears to be heavily used by the public, as evidenced by the well worn trails and number of people using the area during the midweek site visit. Eight hundred and forty acres are open to small game hunting under the permit required system, providing for a traditional wildlife based pursuit in an area where opportunities are very limited.

The Tyler Mill/Muddy River Area contains forestland, active agricultural land (cornfields, hayfields and pasture) a variety of wetlands (streams, river, hardwood swamp, ponds and a reservoir) and areas of old fields reverting to forestland. The Muddy River flowing southerly out of the Mackenzie Reservoir in the northern section of the Area generally bisects the property, providing a prominent landscape feature to act as a corridor for wildlife species. The preserve provides excellent wildlife habitat because the preserve is fairly large (over 1000 acres), the parcels are relatively contiguous and it contains a diversity of habitats, many of which are sizable and of good quality. The area contains a large amount of early successional stage habitats, which are habitat types of concern. And while the area lies embedded in a well developed landscape, there are other areas of currently undeveloped neighboring lands that augment the amount of wildlife habitat available on the town owned parcel.

The presence of such a large, diverse area of quality habitat for use by wildlife and people in a very urbanized area of the state represents a very significant natural resource for the town of Wallingford and from a regional scale, the state of Connecticut.

Wildlife and Wildlife Habitat

Wildlife habitat is said to be the complex of vegetative and physical characteristics that provide for all the basic requirements of wildlife, that is food, shelter, resting, nesting and escape cover, water and space. Vegetative

communities, such as fields, forestland and wetlands are examples of general types of wildlife habitats that provide for these requirements. Within these recognizable vegetative communities or habitat types there may be special features or habitat components that are required by a particular species of wildlife. For example, nuthatches will use small patches of mixed hardwood forest, but require the special feature of a cavity or hole in a tree, in which to nest. The wood frog requires temporary pools of water commonly called vernal pools for breeding, within a contiguous forested upland area to meet the remainder of its habitat requirements.

The majority of wildlife species use a variety of habitat types. For example, red tailed hawks nest in forested areas, but forage over open and wooded habitat. Deer and turkeys use forested areas, wetlands, and agricultural areas. Therefore, the greater the habitat diversity and degree of interspersion of various habitat types (edge), the greater the variety of wildlife there will be using an area. A wide variety of these "generalists" species, especially many of our more common ones, thrive in regions containing a variety of habitats.

While greater habitat diversity generally provides for a greater number of wildlife species using an area, there are many other species of wildlife, which are more specific in their habitat requirements. These species are often labeled "specialists" and require very specific habitat types and often needing a minimum amount of this habitat type in order to thrive and be successful as a population. For example, some species of neotropical migratory songbirds like the hermit thrush and the ovenbird, while often found in small areas of forestland, actually require large areas of unbroken forest to produce viable self sustaining populations. Still other species have very specialized habitat requirements, such as the suite of species referred to as grassland birds, most of which require large expanses of grasslands in order to thrive.

Nature is not static but rather dynamic and through the ecological process known as succession, one vegetative community grows or succeeds into another type in a predictable process. For example, fields created by clearing for agricultural purposes will over time be invaded by herbaceous plants, shrubs and trees and eventually revert back to forestland through this process. Habitats like fields, meadows, grasslands, shrublands and seedling sapling forested areas are referred to as "early successional stage" habitats, because they represent the early stages of succession.

Natural disturbances such as flooding, fire, storms, pathogens and the influence of wildlife like beaver (through tree cutting and flooding) occur regularly and work to create different successional stages or habitat types across the landscape. Man has interrupted and modified these natural processes greatly (suppressing wildfires for example). Wildlife habitat management is based on mimicking these natural disturbances where applicable through various techniques like mowing, herbiciding, prescribed burning and forestry operations.

Early successional stage habitats include grasslands, haylands, pasture, old field, shrublands and seedling/sapling forest areas. These habitats are declining due to natural succession, development, fragmentation and intensive agricultural practices (frequent mowing, monocultures of crops, elimination of fallow areas). In contrast to popular thought, these types of habitats and not forestland are the habitat types for which the greatest declines have been documented. With the decline of these habitats, the species dependent upon them such as bobolinks, meadowlarks, kestrels, northern harriers, indigo buntings, field sparrows, cottontail rabbits and various species of butterflies like the tiger swallowtail and monarchs have also declined quite drastically in some cases.

There are many factors to consider when determining habitat use and quality of an area for different species, including habitat types, size of habitat types and their quality, overall size of the study area, location, degree of isolation, diversity, and

juxtaposition with other neighboring habitat types, etc. The presence of so much early successional stage habitat on the Area, created through past and current agricultural/land use practices, represents an important area of uncommon habitat for wildlife. By modifying the current management practices and managing these lands for wildlife, the value of these important habitats and the area as a whole could be maximized.

Agricultural Lands / Active and Inactive - Croplands, Hay Fields, Pastures and Old Fields

Area farmers lease approximately 100 acres for agricultural production under a lease program administered by the town. Active agricultural land is that land being intensively managed for crop or livestock production and includes the corn fields, hayfields and pasture areas. There are other areas of inactive agricultural land that provide mixed grassy herbaceous patches and still other areas that are former fields growing up with shrubs and saplings that provide old field habitat for a variety of wildlife species.

- **Croplands**

While croplands like cornfields can provide food, cover and foraging areas for wildlife (often at the expense of farmers) it is generally not as valuable for wildlife as pasture and hayfields. This is because the fields are generally planted to a monoculture, which limits the food and cover value for many species of wildlife. Often, such crops as corn are highly attractive to common species of wildlife like crows, blackbirds, deer and turkey and in trying to utilize these food sources they often damage the crop under production. Once the crop has been harvested there is little cover value left behind in corn stubble, although the

waste corn often found on the ground provides food in the fall for birds and mammals.

- **Hay Fields**

Much of the 100 acres of agricultural land is being used to produce hay. These hay fields contain a mix of grasses and forbs and those that are mowed routinely, contain a much higher proportion of grasses. Hay fields, because they are open to the sun are areas of high production for sun loving insects. Bluebirds, swallows, bats, turkeys, grouse, turtles and snakes take advantage of this food source. Small mammals like mice, voles and moles find food and cover here and in turn provide food for hawks, owls, coyotes and foxes. The more diverse the vegetation in these hayfields, the more desirable it is for wildlife. Those containing wild flowers are attractive to insects and butterflies that feed on the nectar provided by flowering plants.

It is well established that grassland birds, habitat specialists which utilize both agricultural hayfields/grasslands and naturally occurring grasslands, are experiencing serious populations declines. Grassland birds have declined due to abandonment of farmland which has reverted back to forestland, habitat fragmentation, development of both naturally occurring and agricultural grasslands, more intensive agriculture (frequent mowings) and fire suppression. While some of the fields on the preserve may be attractive to some grassland specialists due to the vegetative composition, structure and size, any attempt to nest by these birds will likely be negated, due to the multiple mowings, which probably start in May or June. These birds, while often returning early, need fields that remain uncut until at least mid-July to ensure that they have adequate time to complete the nesting cycle. Intensive use of these fields and multiple mowings would also negatively impact other species of wildlife, since it would tend to reduce vegetative diversity and create more disturbance.

- **Pasture**

The amount of pastureland in the Northeast has decreased by approximately 70% since the 1950's (Wildlife Management Institute 2000). Farm abandonment (and subsequent reforestation) along with land-use changes with remaining agricultural land, (conversion to crops or development) have caused pastureland to be an uncommon habitat type. Grazed areas can provide a patchy distribution of grass heights and structure, so important for species like killdeer and meadowlarks. If well managed, pastures can often provide the required habitat for species of grassland birds like bobolinks, meadowlarks and Savannah sparrows.

The 60-acre Cooke property (north of Whirlwind Hill Road) is used to pasture cattle. It is characterized by grasses and forbs (leafy non-woody plants) interspersed with areas of standing weeds, saplings and shrubs, especially where there are stones or wet areas. With their diverse plant variety and structure of short grasses, taller herbaceous plants, saplings and areas of shrubs, theses pasture areas represent a highly attractive area for a variety of species. Grazing can help to create a more structurally diverse area, because livestock are selective in what they eat. Depending on the amount of trees and shrubs in these areas and how intensively they are grazed, these pastures can provide habitat for many of the same species that utilize more open fields including bobolinks, meadowlarks, butterflies, bats, swallows, turkey, fox, coyote, grouse and woodcock.

- **Old Field**

Old fields are former agricultural fields that were used for pasture or hay land that are no longer being farmed and are characterized by a mix of grasses, forbs or herbaceous plants and often invading tree saplings and shrubs. Old field areas are in many ways similar to pasture, but typically without the areas of very short

grass grazed down by livestock. Some old fields are dominated primarily by tall grasses, herbaceous plants and wildflowers, others have a much higher proportion of invading trees and shrubs. The area contains a significant amount of old field type habitat in various stages of succession.

Because of the plant structure and species diversity, these areas are extremely important for a wide variety of wildlife. These areas provide perching and nesting sites for species like red-tailed hawk, eastern kingbird, American kestrel, eastern screech owl, eastern bluebird and indigo bunting. Again, these areas make excellent areas for small mammals, which in turn attract both, avian and mammalian predators. As with pastures, these areas produce large amounts of insects during the spring and summer months, which are sought after by birds, reptiles and amphibians.

It must be noted that these inactive agricultural areas will naturally revert back to mature forestland in the absence of any type of disturbance. Man has greatly altered the natural disturbance patterns such as burning, flooding and, beaver activity that worked to create these types of open habitats. Our agricultural lands, both active and inactive now provide much of the habitat for species that have evolved to utilize these habitat types. Man must now manage these lands if they are going to continue to provide this important habitat type in the absence of natural factors. These areas must be mowed and/or herbicided in order to be maintained.

Forest Habitat

Most of the Area is mature, second growth mixed hardwood forest, dominated by beeches, maples and hickories. Hardwood forests provide an abundance of food in the form of mast (nuts, berries, buds, insects, and catkins). Cover value for wildlife is greatly enhanced by the presence of snags (dead standing trees), cavity

trees and large diameter den trees (trees with a large hole). Wildlife likely using the mature hardwood forest include scarlet tanager, white-breasted nuthatch, black-capped chickadee*, black and white warbler, eastern wood-peewee, American redstart, barred owl, broad-winged hawk, red-backed salamander and gray squirrel*. Mast produced by oaks, beeches and hickories provides forage for a variety of animals such as white-tailed deer, gray squirrel, wild turkey, blue jay, white-footed mouse and eastern chipmunk.

Conifer cover or areas of evergreen trees like pine and hemlock are very limited in the preserve and are only found scattered throughout the site. Areas of conifer provide food in the form of cones for squirrels, chipmunks and small mammals. They provide year round cover for songbirds, hawks, owls, turkeys, deer and many other species. This cover is of particular importance during the winter because it provides shelter from severe weather.

Wetlands

- **Forested Wetland Habitat**

Tamarac Swamp is a typical hardwood swamp dominated by red maples, sedge tussocks, sphagnum moss and skunk cabbage. There is a well developed understory of shrubs including spice bush, arrowwood viburnum, and high-bush blueberry. The hardwood swamp itself provides good food and cover in the form of berry producing shrubs and the mix of water (during some times of year) and diverse vegetation. There is also a stand of hemlocks bordering the swamp, which provides additional cover in close proximity to this wetland.

Forested wetlands (hardwood swamps) like Tamarac Swamp, typically contain a mix of vegetation including sedge tussocks, herbaceous vegetation, shrubs and trees, interspersed with standing water, depending on the time of year. These

areas produce an abundance of insects providing food for reptiles, amphibians, birds and bats. Many species of birds use forested wetlands at varying times of the year for breeding, feeding, and shelter. Examples include wood thrush, northern water thrush, common yellowthroat, and the eastern phoebe. Other wildlife likely using this habitat for food and cover are raccoons, star-nosed moles, wood frogs, pickerel frogs, spring peepers*, gray tree frogs and eastern garter snakes.

- **Open Water Habitat - Mackenzie Reservoir**

Mackenzie Reservoir is actually two fairly large bodies of water separated by Whirlwind Road. Roads run along two sides of both bodies of water and most of the vegetation along the edges of the pond are large trees right down to the water's edge. Because of the lack of vegetation both emergent and shrubby interspersed with water along the edges of the reservoir, the food and cover value of the reservoir is limited. Because of the open nature of the reservoir edge and lack of an associated emergent or shrub scrub wetland, waterfowl and wading bird nesting would be very limited. Canada geese and mallards could use the area for breeding. Despite this limitation, the reservoir would still provide some food like fish, frogs and insects to wildlife such as blue heron, otter, raccoon and mink. Open water habitat, such as Mackenzie Reservoir, provides an important roosting area for resident populations of waterfowl but especially migrating waterfowl.

- **Riparian Habitat Muddy River**

The Muddy River is a slow flowing stream interspersed with rocky riffles in places. For most of the length of the river running through the Area, its banks are heavily vegetated (some areas sparsely vegetated due to human disturbance such as bike trails) and it is contiguous to undeveloped areas of habitat. Riparian habitat is composed of the greenway of trees, shrubs and herbaceous plants, that follows the edge of streams, rivers, lakes and ponds. It provides habitat for many

aquatic-based organisms such as frogs, salamanders, toads, ducks, herons, muskrat, otter and mink. Vegetative diversity along the edges of watercourses provide valuable cover and nesting sites for wildlife as well as a diverse source of berry producing shrubs and vegetation for foraging. The vegetation found in this habitat is tolerant to periodic flooding and its presence causes floodwater to slow down and allows the soil to absorb the excess water. Rivers and streams often provide important travel corridors, and their value is increased greatly if the riparian zone contains healthy native plants, shrubs and trees. Muddy River would provide habitat for a myriad of species including; beaver, muskrat, otter, mink, green frogs, spotted and painted turtles, blue heron, kingfisher and tree swallow.

Wildlife Habitat Management Recommendations

- **General Recommendations for Habitat Management for Wildlife**

Large blocks of habitat, whether they be a mix of one type or one large block of quality habitat, are generally more valuable to wildlife than smaller blocks, so wherever possible, additional open space lands should be connected to existing parcels. Whenever possible, disjunct town holdings should be connected via corridors of existing habitat, along streams or rivers or ridgetops for example. This could be done through a variety of methods such as easements, outright purchases, and even short-term conservation agreements. The wider and larger the linking corridor, the better it will serve its purpose for wildlife.

Unless management priorities dictate otherwise, wildlife habitat management priorities should be based on conservation of those uncommon species or species of concern here in Connecticut or the Northeast that may be using the property or able to use the area given various management schemes. Such species might

include; cottontail rabbits, grouse, woodcock and various species of grassland birds.

- **Agricultural Lands**

The active and inactive agricultural lands on the preserve provide an outstanding opportunity to improve the current habitat conditions for wildlife. However, any and all management options/recommendations that follow must be weighed against the need for sustainable agriculture within the community, the ability of the town to manage the lands if farming is reduced and the priorities the town sets forth in managing a unique natural resource.

While the Northeast was primarily forested before the arrival of the European colonists, natural grasslands did exist. These natural permanent grasslands were uncommon and existed along river floodplains, wetlands, beaver meadows, salt marshes, coastal sandplains and heathlands. These communities existed because of the interaction of physical and biological characteristics including; soil, geological features, moisture, fire, competing plants and the activities of certain species of wildlife like beaver. Native Americans also played a role in creating and maintaining grasslands and open areas through agriculture and burning.

The European colonists cleared vast acreages of forest and drained wetlands to create land for pastures, hay and crops. Agriculture reached its zenith in the mid 1800's, when roughly 60 percent of Connecticut had been cleared of forest for agricultural purposes. Most experts agree that this great shift towards open habitats, coupled with the farming practices of the day (late season mowings, fallow areas, large amounts of land in hay and pasture) resulted in a hey day for grassland birds. With the movement of farmer's westward in the late 1800's, a shift to intensive agriculture and the increase in the human population and subsequent loss and fragmentation of natural and agricultural grassland habitats, many wildlife species dependent on these habitats have declined, precipitously

in some cases. Nationwide, Breeding Bird Surveys (BBS) conducted by the Biological Resource Division of the United State Geological Service and volunteers, have shown alarming declines (Jones and Vickery 1997). Within New York and New England, 9 species of grassland birds are recognized as regionally threatened or endangered in at least five states. In Connecticut, the following grassland species are state listed as species of special concern (SC), endangered (E) or threatened (T); grasshopper sparrow (E), Northern harrier (E), American kestrel (SC), and Savannah sparrow (SC). Bobolinks, while not a state listed species in Connecticut, are considered uncommon and are a species of regional concern throughout the northeast.

While it is not known if any grassland dependent species are using the areas within the Conservation and Recreation Area, they could potentially be using some of the areas, based on the available habitat. Modifying the management of these habitats could be make them much more desirable for these grassland dependent species for which population declines have been noted.

A variety of recommendations/options are presented. Which options are followed will be up to those charged with managing the land. All options/recommendations present benefits to various species of wildlife, while impacting others. Modifying management and carrying out various options will also impact human use of the area, both current and future.

If possible, determine which areas are currently being used by various types of birds through existing records of birding groups or arrange to conduct surveys through local Audubon chapters or other conservation groups. There may be additional information on the area available through studies conducted at colleges or universities. Knowing as much about what species are using the area will help set management priorities.

Pastures

Intensive grazing can cause plant diversity and cover loss. While some bare ground may be beneficial to some species like killdeer, large patches of bare ground are not desirable and may lead to erosion and sedimentation in streams and rivers. Maintaining all current pastureland, but using the recommended pasturing practices that follow will work to maximize wildlife habitat in these areas. (Much of the following is excerpted from "Conserving grassland birds; Managing agricultural land including hayfields, crop fields, and pasture for grassland birds." A copy will be provided for your use).

Pasture Management Recommendations

- In grazed pastures where birds are nesting, keep approximately 40% of the vegetation at a minimum height of 8 to 12 inches. Animals should be rotational grazed throughout the area to accomplish this and keeping some areas ungrazed during the summer nesting season will improve nesting success.
- Avoid overgrazing. While some bare ground is beneficial to wildlife in small, scattered patches, areas of extensive bare soil cause plant and animal diversity loss, lead to erosion and overgrazing may even destroy nests.
- Modify grazing regimes based on site specific characteristics. Depending on the type of soils, topography, and hydrology, the vegetation in various pastures will respond differently. In addition, the type of livestock grazed can also make a difference, since various domestic animals select for different plant types and species. Each site will have to be evaluated independently to determine the best grazing regime. The USDA's Natural Resource Conservation Service can offer advice on rotational grazing.

Management of Open Fields

All grassland birds have minimum grassland area requirements and have specific habitat needs, although a number of different species may use the same area, if it meets minimum requirements. For example, bobolinks require hayfields of at least five acres or more, before they will even utilize it for breeding and nesting. Within this 5-acre or larger patch of grassland area, each pair establishes a nesting territory approximately 1 to 6 acres in size. They prefer upland meadow or pastures and wet meadows but will also use old fields and reclaimed grasslands. Within these appropriately sized grasslands, they will use mixed grasses usually in lowlands with moist soil but prefer a mosaic of grasses, sedges and broad-leaved forbs with less than 25% shrub cover, small trees and posts that can be used as song perches. Savannah sparrows on the other hand, require a minimum grassland area of 20-40 acres, but establish a territory of only 1-2 acres. They prefer dryer upland sites and use meadows, pastures, old fields, sandplain grasslands, hayfields, blueberry barrens, cultivated fields and airports.

Based just on these two examples, it is clear that larger fields providing a diversity of vegetation, are of more value than small fields with limited plant diversity. Shape is also important to many of these birds; a long narrow 5-acre field is of less value than a large rectangular or square field. The long narrow field maximizes edge and creates more opportunity for predators to locate and depredate nests. Position within the landscape context is also important; areas of fields/grasslands have more value if close together than those that are isolated. If managing for grassland birds is a priority, managing larger fields, greater than 5 acres but preferably those 10 to 25 acres in size is most critical. These practices will also greatly improve hunting conditions for small game and pheasants.

Croplands Recommendations

- Minimize the amount of corn or other crops being grown on the agricultural lands.
- In areas where corn is grown, an uncut strip of corn (no less than two planter widths/25 feet wide) can be left to provide food and cover throughout the winter.

Small Fields/Grassland

While not of use to grassland specialists like the bobolink for breeding and nesting, smaller fields can be used for foraging by these species and are very valuable to other species like bluebirds, butterflies and cottontail rabbits. For smaller fields the following are options to enhance the existing wildlife habitat.

- Allow the farmer to continue to hay, but leave strips of uncut hay (no less than 25 feet wide) in the field after harvest to increase the wildlife value of agricultural fields, by increasing the amount of food and cover left behind. These strips are allowed to grow up, creating a transition from the field edge to the forest edge, containing grasses, herbaceous plants, shrubs and small trees. These strips should be cut every 3 to 5 years to maintain this edge and prevent it from growing into mature forestland.
- If possible, delay mowing the entire field or a portion until after July 15th, which will give species like turkey, and cottontail rabbits a chance to use these areas for nesting.

Large Grasslands

Large grasslands are not only important to a variety of species like deer, turkey, coyote, fox and bluebirds but they can provide that specialized habitat needed for

grassland birds. The area contains five actively used agricultural fields that are more than 10 acres, the largest being around 28 acres.

The following are recommendations/options for enhancing the habitat management on the Area;

- Modify traditional haying dates wherever possible, especially on the larger fields. Do not hay earlier than July 15th, but preferably after August 1st (They generally begin nesting in May, but may not be done nesting and fledgling young until the end of July.)
- If it is not possible to modify the haying dates, leave an uncut refuge area within a field where birds are known to be nesting. This can provide at least some habitat for these birds to nest and fledge young in, but requires careful observation of the site to determine what should not be cut.
- Fields currently used to grow corn could be replanted to hay using either cool season grasses or warm season grasses. Cool season grasses mature during the cooler months and are generally the species farmers traditionally plant for hay (timothy, orchard grass and bluegrass, for example). Warm season grasses put most of their growth on during the warmer months and have a tall, bunchy growth form, preferred by grassland birds.

Non-active Agricultural Field Areas

There are numerous scattered patches of grassy herbaceous growth on the Area, which should not be allowed to revert back into mature forest. These areas need to be managed by periodic mowing so that their value as early successional habitats can be conserved.

- Areas should be mowed every two to five years depending on the site specific management priorities for that particular parcel. (In general, mowing more frequently will provide habitat for those species using more

open grassy field habitat, mowing less regularly will usually result in a mix of grasses, forbs and flowering plants.)

- Areas with heavy reed canary *(Phalaris arundinacea L.)* grass growth could be converted to other more desirable species (a mix of warm or cool season grasses). Reed canary grass is an introduced hay species well suited to wet areas and sometimes used to feed livestock. It tends to be invasive and spread and take over an area, often resulting in a monoculture. While the plant provides cover for small mammals, it has little food value and no value for grassland birds. It does not provide optimal hunting cover because it has a weak stem causing the grass to fall over close to the ground after the frost, providing little cover for large birds like pheasant.

Old Field Management

The old fields should be managed on a rotational basis in order to provide a continual supply of this type of habitat.

- Fields with small invading saplings and shrubs can be selectively brush hogged.
- Fields which are more overgrown with larger diameter trees could be restored to more old field like conditions through hand cutting and/or brush hogging.
- Restoring some of the very over grown old field areas could be done through the use of specialized heavy-duty cutting head known as a brontosaurus, attached to a tracked machine. This machine can take down trees up to 8 inches in diameter, leaving behind large chips only.
- Newly cleared areas could than be allowed to regrow and recut on a periodic basis or they could be selectively herbicided.
- Stumps likely to resprout in newly cleared areas could be treated with a herbicide to prevent their regrowth. This is especially desirable for non-native invasive species.

- Where there is a heavy growth of non-native invasive shrubs, they may need to be herbicided before cutting, then cut and possibly herbicided again.
- Once old field areas are restored, they should be maintained through selective hand cutting, brush hogging and/or use of a brontosaurus.

- **Forestland Management**

Connecticut's landscape has changed dramatically in the last three centuries. While it was primarily forested when the colonists arrived, it was not a homogenous, stable, unchanging forest (Foster and O'Keefe 2000). It was quite diverse, both in age class, species type and pattern of vegetation. Natural disturbances such as hurricanes, other windstorms, ice storms, pathogens and fires caused by lightning created a diverse landscape. Natural variations in soil and hydrology created varying vegetation patterns. Areas impacted by beaver flooding and inundated annually by annual fluctuations in the water table supported herbaceous and shrub vegetation in contrast to the surrounding forest. Native Americans made clearings for their villages and crops and burned extensive tracts to improve hunting. The mosaic of diverse habitats supported a wide range of plant and animal species (Foster and O'Keefe 2000).

By the mid 1800's it has been estimated that Connecticut was approximately 60% agricultural land and only about 30% forested. Currently, these proportions are almost reversed with approximately 80% of the landscape forested. Much of this forest however is fragmented by heavy industrialization, highways, roads and urban and suburban development. Because most forests re-grew from the time when agriculture waned and the charcoal industry was replaced by oil, it is relatively even-aged. This same age forest, coupled with interrupted natural disturbances has created a structurally less diverse forest both within the forest stand (area of similar trees on homogeneous site) and across the landscape.

The Northeast currently lacks old growth forest (trees more than 100 years old) and young forest (seedling/sapling and brushy/shrubby growth). In the Northeast, 77% of the bird species and 88% of the mammal species use various combinations of tree size classes, that is seedling (less than 2.5 cm), sapling/pole (2.5 cm to 22.5 cm) and sawtimber (greater than 22.5 cm) size (Scanlon 1992). In general, most species of wildlife, be it bird, mammal, reptile or amphibian, need a variety of tree size classes or age classes to ensure their survival.

Creating a more diverse, healthy forest can be accomplished through professional, well-planned forestry operations. Using various silvicultural systems, such as even-aged management, can help diversify the age class of the forest across the landscape. Uneven aged management can help diversify the forest stand. Various types of harvests such as clearcutting, timber stand improvement or selection cutting all have their place depending on the current forest conditions and the desired future conditions.

Creating some age class diversity within the forest is one option for improving the wildlife habitat for some types of species, especially those that can use seedling/sapling type habitat like the chestnut-sided warbler, prairie warbler, blue-winged warbler, grouse and turkey. For information on determining the feasibility and appropriateness of a forestry operation for any of the properties, the Connecticut DEP Service Forester should be consulted and/or his report herein in conjunction with the Wildlife Division's Habitat Management Program.

The Area lacks any significant stands of conifer cover, which is beneficial to wildlife. Conifer cover could be increased on a small scale through planting small clumps in fields and old fields. If feasible (depending on site conditions and seed source etc.), conifer cover may be increased through appropriate forestry

operations. Ideally, stands of conifer cover, of 1 acre to 5 acres in size, should compose about 5% to 15% of the forested area.

- **Open Water Habitat Management**

Maintaining the existing vegetative buffer along the reservoir is important if current wildlife value is to be maintained. If possible, surrounding food and cover value could be increased by planting native wetland type plants and shrubs along the edge of the reservoir. These plantings would likely have to be protected from deer browsing and potential beaver cutting. A wider more diverse vegetative buffer along the shoreline would improve waterfowl nesting habitat. breeding habitat for amphibians and reptiles, as well as cover for animals using the lake as source of water.

- **Riparian Habitat Management**

Riparian buffers should be a minimum of 100 feet in width. The banks of the Muddy River, at the closed bridge on Tyler Mill Road, are badly eroded due to human traffic. They should be stabilized and revegetated. This would prevent further sedimentation from entering the river, which could smother sections of the streambed and prevent breeding and survival of invertebrates. This in turn could effect the food chain, which could negatively impact fish and wildlife. Formalizing access to the river would prevent further erosion and degradation of the aquatic habitat.

- **Invasive Species**

The explosion of invasive, often non-native vegetation and animals into natural communities is an ever-expanding problem. There are many, many invasive, non-native plants growing on the Area lands. Plants belonging to this group

include species like autumn olive *(Alaeagnus umbellata Thunb.)*, Japanese bayberry *(Berberis thunbergii* DC), Asiatic bittersweet *(Celastrus orbiculatus Thunb.)* and multiflora rose *(Rosa multiflora Thunb.)* are found growing on the Area. While it can be argued that these species provide some cover and food to wildlife, the negative impact they have on native plant communities is overwhelming. They tend to out compete and smother native vegetation, creating monocultures of invasives in many cases. Native trees, shrubs and plants have evolved with our native wildlife and provide excellent food and cover.

A list of invasive plants has been enclosed. Control of invasive plants on the property and enhancement of native plants and shrubs would greatly benefit wildlife habitat. Control methods are dependent on the species being controlled, amount of area to be treated, etc.

Native shrubs could be planted in specific areas to increase the amount of food and cover available after areas have been treated for invasive control.

- **Recreation**

The preserve provides a wide variety of recreational opportunities including hiking, biking, and wildlife based pursuits like fishing, birding and hunting, all important to a wide spectrum of the public. An evaluation of trail placement and use should be made. Trails should be stabilized or rerouted where needed to avoid erosion or impacts to wetlands. Trails should avoid or be minimized in sensitive areas like grasslands (if they are being managed for grassland birds) during the nesting season (April - August). Seasonal restrictions may help in some cases. For example, hikers or bikers crisscrossing a field during the nesting season has a greater impact to wildlife than hunters using fields for hunting in the fall or cross country skiers skiing there in the winter. The area has the

capacity to provide for a wide range of recreational opportunities, if they are well planned and reasonable rules are instituted.

The use of motorized vehicles on any land being managed for wildlife habitat should be prohibited, as it has the potential to cause tremendous trail abuse and erosion along with a general disturbance to wildlife year round. Use of motorized vehicles on walking/hiking trails can cause potential safety problems.

Within the Area is the Wallingford Permit Required Hunting Area (840 acres), which provides hunting opportunities for Wallingford and Connecticut sportsmen. Under the "permit required hunting system" a permit is required to hunt small game and waterfowl in this area. A limited number of permits are available each day, so that the number of hunters in the field on any given day is limited. In addition to the small game hunting, opportunities for species such as squirrel, woodcock and ruffed grouse, natural populations are supplemented when pheasants are stocked in specific areas for the small game hunting season. Records from the permit required system demonstrate that the area is an extremely popular hunting spot for sportsmen.

Recreational Fields (Soccer and Baseball)

These intensively managed areas are of minimal value to wildlife in general. They tend to attract the more common species, like crow, pigeon (introduced non-native species), house sparrow (introduced non-native) and Canada geese. Some of these species like Canada geese can pose a real nuisance problem for people trying to use these areas. These extensive areas of short cut grass, especially those in proximity to the reservoir are highly attractive foraging areas for geese, who feed on the short grass growing there. Droppings left on these playing fields can cause problems for those trying to use the area.

There are various methods for discouraging geese, but none are 100 percent effective. Directly trying to scare the geese by fluttering banners, suspended hot air balloons and the discharge of firecracker shells, will often get the geese to move somewhere else temporarily. Modifying the habitat represents the best alternative for long term relief, combined with a harvest through hunting (if feasible in the area when considering state statutes and regulations). Allowing the grass to grow up as much as possible around the reservoir and any other water body will help discourage the geese from using the area, because it limits their ability to scan the distance for potential predators. For a complete summary of how to deal with nuisance geese problems please see the enclosed informational series sheet on Canada geese.

Golf Course Proposal

Building the golf course in the proposed location or in any location on the Area lands would negatively impact wildlife habitat because it would replace and fragment existing quality wildlife habitat with large areas of intensively managed grass fairways. These fragmented habitats tend to attract the more common species such as raccoon, woodchuck, Virginia opossum, European starling, brown-headed cowbird, American robin and crow. Canada geese are attracted to these areas of highly managed grass, especially if there is a large body of water nearby, like MacKenzie Reservoir. Many of these species because of their adaptability to man modified habitats quickly become nuisances for people using those places or those adjacent.

Further impacts to daily and seasonal movements of wildlife, especially the less mobile species like amphibians and reptiles can be expected. Large mammals, while being highly mobile may also have their daily and seasonal movements impacted. High levels of seasonal use by people would also impact wildlife using the golf course and surrounding areas. Golf courses tend to use high levels of

herbicides and pesticides, which if over used or used incorrectly can degrade soil, water and wildlife habitat.

- **Potential Purchase of the Williams Farm**

The Williams Farm (+/- 90 acres) has exceptional potential for quality wildlife habitat. It provides extensive and high quality early successional stage habitats, which are in rapid decline here in Connecticut and throughout the Northeast. Based on a cursory inspection, the 90 acres of property contains pasture, old field, wet meadow, riparian habitat, red maple swamp and areas of shrubs. The power lines bisecting the property will always be maintained in early successional habitat, helping to ensure that this area will continue to provide this type of habitat.

In order to guarantee that this area continues to provide this valuable early successional stage habitat, the area must be managed. This could be done through rotational grazing, hay cutting (if done after July 15th, preferably August 1st), mowing, replanting (warm season or cool season) or some combination thereof.

Conclusion

The Tyler Mill/Muddy River Conservation and Recreation Area provides outstanding wildlife habitat due to the large size of the open space acreage (+/- 1400 acres) and the variety and quality of the habitats on the area. The area contains a significant amount of early successional stage habitat types including pasture, old fields and hay land. If these habitats were more specifically managed with wildlife as a priority, the ability of these areas to provide for the needs of many declining species now and long into the future could be greatly enhanced. The potential to conserve and enhance all the habitats on the property for wildlife is tremendous. Adding more property to this area (such as the Williams

Farm) would only increase it value as an incredible natural resource to both people and wildlife.

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KEY

LIFEFORMS

T = tree
S = shrub
V = vine
H = herbaceous plant
G = grass
A = aquatic

HABITATS

U = uplands (all upland habitats including closed-canopy forests, second-growth woods, fields, grasslands, ridge tops, sand barrens, pitch pine scrublands etc.)
O = open areas (fields, grasslands, sand barrens, dry meadows etc.)
W = wetlands (swamps, marshes, wet meadows, fens, bogs, flood plains, flood plain forests, pond and stream shores)
L = lakes (ponds, in impounded water)
R = rivers (streams, in running water)
C = coast (sand dunes, rocky headlands, upper edges of salt water tidal marshes)

This list and the criteria for listing were developed by the George Safford Torrey Herbarium, University of Connecticut, in conjunction with the State Geological and Natural History Survey of Connecticut and the Connecticut Invasive Plant Working Group. For a copy of the Criteria, please visit the Invasive Plant Working Group web page **http://www.eeb.uconn.edu/invasives.**

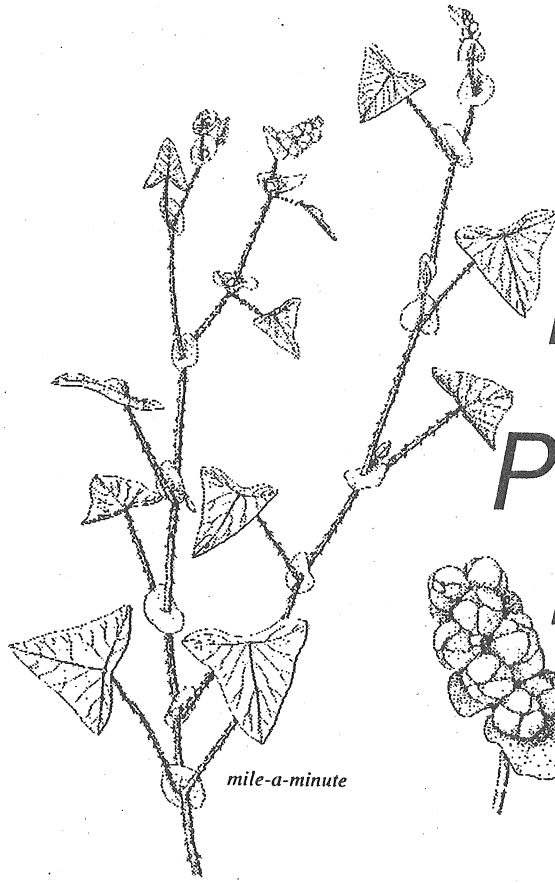
For more information on these species visit the New England Invasive Plant Atlas web page **http:/www.eeb.uconn.edu/invasives/neipa.htm.**

This list should be cited: Mehrhoff, L.J., K.J. Metzler, & E.E. Corrigan. 2001. Non-native and potentially invasive vascular plants in Connecticut. Center for Conservation and Biodiversity, University of Connecticut, Storrs.

CENTER FOR CONSERVATION & BIODIVERSITY • UNIVERSITY OF CONNECTICUT •

CONNECTICUT DEPARTMENT • ENVIRONMENTAL PROTECTION •

USDA



mile-a-minute

Non-native *Invasive* and *Potentially Invasive* Vascular Plants in Connecticut

This is a list of species whose intentional introduction into minimally managed habitats (preserves, sanctuaries, parks, wildlife management areas and other natural areas) should be discouraged. Species on the list are either **potentially invasive** or **invasive.** Invasive species are either **widespread** or have a **restricted** range in Connecticut. These two terms are geographic descriptors and do not imply degree of invasiveness. The list is intended to be an educational tool, is not static and will be reevaluated on an annual basis. A species as listed here includes all subspecies, varieties, forms, cultivars and synonyms. Life forms and broad habitat descriptors for habitats that are primarily threatened are noted.

MARCH 2001

WIDESPREAD AND INVASIVE

SCIENTIFIC NAME	COMMON NAME	LIFEFORM	HABITAT
Ailanthus altissima (Mill.) Swingle	Tree-of-heaven	T	U
Alliaria petiolata (Bieb.) Cavara & Grande	Garlic Mustard	H	U
Berberis thunbergii DC.	Japanese Barberry	S	U
Cardamine impatiens L.		H	U
Celastrus orbiculatus Thunb.	Asiatic Bittersweet	V	U
Centaurea maculosa Lam. syn. Centaurea biebersteinii DC.	Spotted Knapweed	H	O
Elaeagnus umbellata Thunb.	Autumn Olive	S	O
Euonymus alatus (Thunb.) Sieb.	Winged Euonymus	S	U
Euphorbia cyparissias L.	Cypress Spurge	H	O
Fallopia japonica (Houtt.) Decraene syn. Polygonum cuspidatum Sieb. & Zucc.	Japanese Knotweed	H	U, W
Frangula alnus Mill. syn. Rhamnus frangula L.	European Buckthorn	S	U
Hesperis matronalis L.	Dame's Rocket	H	U
Lonicera X bella Zabel	Bella Honeysuckle	S	U, W
Lonicera japonica Thunb.	Japanese Honeysuckle	V	U, W
Lonicera morrowii A. Gray	Morrow's Honeysuckle	S	U, W
Lythrum salicaria L.	Purple Loosestrife	H	W
Nasturtium officinale R. Br.	Watercress	H	W
Phragmites australis (Cav.) Trin.	Common Reed	G	U, W
Potamogeton crispus L.	Crispy-leaved Pondweed	A	R, L
Rhamnus cathartica L.	Buckthorn	S	U
Robinia pseudoacacia L.	Black Locust	T	U
Rosa multiflora Thunb.	Multiflora Rose	S	U
Vincetoxicum nigrum (L.) Moench syn. Cynanchum nigrum (L.) Pers. Cynanchum louiseae Kartesz & Gandhi	Black Swallow-wort	H,V	U
Vincetoxicum rossicum (Kleo.) Barb. syn. Cynanchum rossicum (Kleo.) Borhidi	Swallow-wort	H,V	U

RESTRICTED AND INVASIVE

SCIENTIFIC NAME	COMMON NAME	LIFEFORM	HABITAT
Ampelopsis brevipedunculata (Maxim.)	Porcelain berry	V	U
Cabomba caroliniana A. Gray	Fanwort	A	L, R
Egeria densa Planchon	Brazilian Water-weed	A	L, R
Froelichia gracilis (Hook.) Moq.	Cottonweed	H	O
Humulus japonicus Sieb. & Zucc.	Japanese Hops	H,V	W, U
Hydrilla verticillata (L. f.) Royle	Hydrilla	A	L, R
Iris pseudacorus L.	Yellow Iris	H	W
Lepidium latifolium L.	Tall Pepperwort	H	C, O
Lysimachia vulgaris L.	Garden Loosestrife	H	W
Microstegium vimineum (Trin.) A. Camus	Japanese Stilt Grass	G	U
Myriophyllum heterophyllum Michx.	Variable Water-milfoil	A	L, R
Myriophyllum spicatum L.	European Water-milfoil	A	L, R
Polygonum perfoliatum L..	Mile-a-minute vine	V, H	U
Ranunculus ficaria L..	Lesser celandine	H	UW
Rubus phoenicolasius Maxim.	Wineberry	S	U
Trapa natans L.	Water Chestnut	A	L, R
Tussilago farfara L.	Coltsfoot	H	U, W

POTENTIALLY INVASIVE

SCIENTIFIC NAME	COMMON NAME	LIFEFORM	HABITAT
Acer ginnala L.	Amur Maple	T	U
Acer platanoides L.	Norway Maple	T	U
Acer pseudoplatanus L.	Sycamore Maple	T	U
Aegopodium podagraria L.	Goutweed	H	W
Aira caryophyllea L.	Silver Hairgrass	G	O
Allium vineale L.	Wild Garlic	H	U
Amorpha fruticosa L.	False Indigo	S	W
Arthraxon hispidus (Thunb.) Makino		G	O, W
Berberis vulgaris L.	Barberry	S	U
Bromus tectorum L.	Drooping Brome-grass	G	O
Butomus umbellatus L.	Flowering-rush	H	W
Callitriche stagnalis Scop.		A	R, W
Cirsium arvense (L.) Scop.	Canada Thistle	H	O
Datura stramonium L.	Jimson-weed	H	C
Elaeagnus angustifolia L.	Russian Olive	S	U
Elsholtzia ciliata (Thunb.) Hylander	Elsholtzia	H	U
Euphorbia esula L.	Leafy Spurge	H	O
Geranium nepalense Sweet	Nepalese Crane's-bill	H	U
Glechoma hederacea L.	Gill-over-the-ground	H	W
Glyceria maxima (Hartman) Holmburg	Tall mannagrass	G	W
Impatiens glandulifera Royle	Tall impatiens	H	W
Kochia scoparia (L.) Schrader	Summer Cypress	H	C
Ligustrum obtusifolium Sieb. & Zucc.	Border Privet	S	U
Ligustrum ovalifolium Hassk.	California Privet	S	U
Ligustrum vulgare L.	European Privet	S	U
Lonicera maackii (Rupr.) Maxim.	Amur Honeysuckle	S	U
Lonicera tatarica L.	Tatarian Honeysuckle	S	U
Lonicera xylosteum L.	European Fly-honeysuckle	S	U
Lychnis flos-cuculi L.	Ragged Robin	H	O
Lysimachia nummularia L.	Moneywort	H	W
Marsilea quadrifolia L.	Water Shamrock	H	L
Miscanthus sinensis Anderss.	Eulalia	G	O
Myosotis scorpioides L.	Forget-me-not	H	W
Myriophyllum aquaticum (Vell.) Verdc.	Parrotfeather	A	L
Nelumbo lutea (Willd.) Pers.	American Water Lotus	A	L
Najas minor Allioni	Eutrophic Water-nymph	A	L
Nymphoides peltata (Gmel.) Kuntze	Yellow floating heart	A	L
Onopordum acanthium L.	Scotch thistle	H	C
Ornithogalum umbellatum L.	Star of Bethlehem	H	U
Paulownia tomentosa (Thunb.) Steudel	Empress-tree	T	U, C
Phalaris arundinacea L.	Reed Canary-grass	G	W
Poa compressa L.	Canada Blue-grass	G	U
Polygonum caespitosum Blume		H	U
Populus alba L.	White Poplar	T	U
Pueraria lobata (Willd.) Owhi	Kudzu-vine	V	U
Rosa rugosa Thunb.	Japanese Rose	S	C
Rumex acetosella L.	Sheep Sorrel	H	U
Silphium perfoliatum L.	Cup-plant	H	U
Solanum dulcamara L.	Climbing Nightshade	H, V	U, W
Valeriana officinalis L.	Garden-heliotrope	H	U
Veronica beccabunga L.	Brooklime	H	W

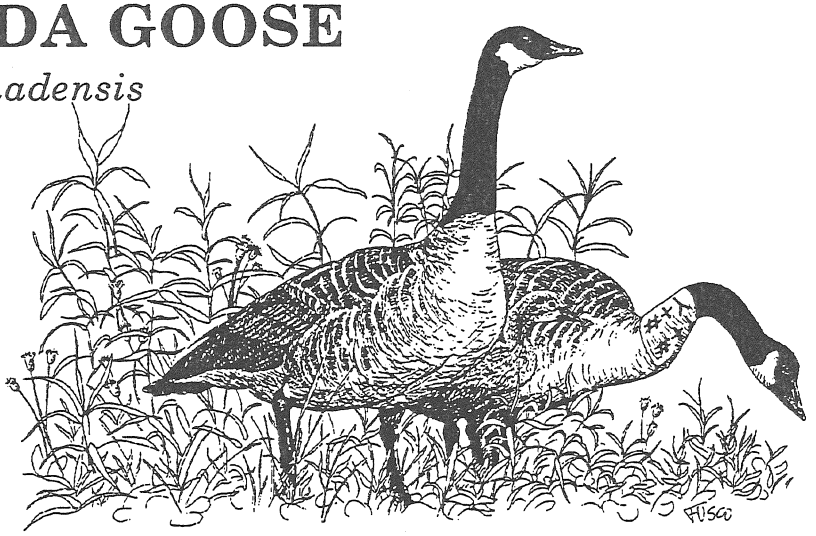
WILDLIFE IN CONNECTICUT

INFORMATIONAL SERIES

No. 14

CANADA GOOSE

Branta canadensis



Habitat: Lakes, marshes, fields, golf courses, park ponds, reservoirs. When inland freshwater areas freeze, the birds concentrate in the bays and inlets of Long Island Sound.

Weight: 6 to 13 pounds in Connecticut, depending on subspecies.

Length: 22 to 48 inches, depending on subspecies.

Food: Aquatic plants and seeds, clovers, cultivated grains, and lawn grass.

Identification: Connecticut's largest native waterfowl species, the Canada goose is easily recognized by its black head, bill and neck that contrast strikingly with its pale gray breast. The distinct white cheek patch, or chinstrap, that covers the throat is a characteristic field mark. The birds are gray-brown to dark brown on the back and wings and white on the belly; they have black rump and tail feathers which are separated by a narrow but distinct band of white feathers.

Range: The "migrant" populations of Canada geese nest in Alaska and northern Canada and winter to the southern United States. "Resident" populations of Canada geese, which are non-migratory, have become established since the 1950s and nest throughout the United States.

Reproduction: Canada geese are among Connecticut's earliest spring nesters. They may defend territories in March and nest in early April. Yearlings generally do not attempt to nest; about one-third of the two-year-old birds do nest, as do most of the three-year-olds. Canada geese are monogamous and pairs mate for life. They use a variety of nest sites, such as islands, man-made structures, muskrat and beaver lodges, and shoreline edges. Nest site requirements include proximity to water, cover for the nest, and good visibility for the incubating bird. Usually four to seven white eggs are laid and incubated by the female while the male stands guard a short distance away. Incubation lasts about 28 days. Hatching occurs from April through June, with the peak occurring the first week of May. Nesting success and gosling survival are generally high. Most nest losses are caused by flooding, desertion, and predation. Egg predators include raccoons, skunks, foxes, coyotes, dogs, and gulls. Young goslings may be preyed upon by snapping turtles, gulls, owls, and coyotes.

History in Connecticut: The Canada goose was abundant in Connecticut during colonial times, principally as a migrant. Unregulated hunting and market hunting in the 1700s and 1800s brought about a population decline; however, protective measures in the early 1900s gradually reversed this trend. Releases of geese by game breeders and sportsmen (following passage of legislation abolishing the use of live decoy flocks in 1935), as well as releases by private groups have greatly increased the population of resident geese.

Since winter waterfowl surveys began in Connecticut in the 1940s, Canada goose numbers have steadily increased from average midwinter counts of 138 in the 1950s to 5,000 in the 1990s. This phenomenal increase is apparently due to the goose's adaptation to man's

landscaping practices. Canada geese seem to be moving into every area of the state with the right combination of water, cover, and grazing areas. The hundreds of new ponds and lakeside lawns created since the 1950s have resulted in a large expansion of the goose population. The current high survival rate and moderate reproductive rate has also allowed the population to increase in size. Presently, geese nest statewide, with the highest number in Fairfield County.

Interesting Facts: Flocks of geese travel in long lines, flying in V-formations. Their raucous honking can be heard for miles. The resonant calls from flocks of migrating geese have long been a welcome harbinger of autumn.

Year-round resident geese breeding in the state are distinct from migratory populations that nest in the northern Canadian provinces. Most migrant geese that occur in Connecticut breed in Labrador, Newfoundland, and northern Quebec, arriving in Connecticut in early October. Migration continues through November with another peak number of arrivals coming in mid-December. Most migrant geese leave the state by mid-January to continue further south. However, in some years with mild winters, substantial numbers of migrant geese have remained in Connecticut the entire winter.

Resident geese sometimes serve as decoys, attracting migrant waterfowl. This can lead to crowded conditions and encourage the spread of diseases through the wild population. (Further complicating the situation in Connecticut is the feeding of geese by the public. Geese fed nutritionally deficient food, such as bread, may be more susceptible to disease.)

Conservation and Management: Canada geese, as well as all migratory game birds, are managed by the United States Fish and Wildlife Service. Biologists try to manage the migrant and resident populations differently even though the two overlap during fall and winter and are indistinquishable in appearance. Generally the migrant population is susceptible to high hunting pressure because of their long migration. The resident population has too little hunting pressure. Special hunting seasons, timed to occur when migrants are not present in Connecticut, are used to direct hunting pressure toward resident geese. Hunting is an effective management tool which can reduce nuisance problems. However, many nuisance geese problems occur in urban and suburban areas where hunting may not be a viable option.

Management of Nuisance Problems: The local resident goose population has had a different impact on the public's perception of these birds. Too many geese on public parks, ballfields, beaches, golf courses, and residential lawns can create nuisance problems and occasionally public health problems. Geese can litter an area with their droppings. Large flocks of geese can overfertilize water bodies with their droppings which could result in algae blooms. Geese can cause economic damage when feeding on newly planted farm crops, winter cover crops, and pasture areas. Such nuisance problems can cause the public's attitude toward geese to change from regarding them as an asset to a liability.

There are no easy solutions to nuisance goose problems. Canada geese are persistent when they have become habituated to an area. Control methods include modifying the habitat, putting up barriers, and frightening.

Modifying the Habitat: As long as favorable habitat is available, geese will be attracted to an area. Plant unpalatable vegetation, such as pachysandra, to replace some of the mowed lawn. Allow grass to grow tall which makes it unpalatable to the geese. Plant hedges or visual barriers between feeding areas and water. Be sure the geese are not being fed artificially by people.
Barriers and Exclusion Methods: Low fences are very effective at keeping geese from lawns especially during June and July when geese have molted their flight feathers and are unable to fly. A 3-foot high chicken wire or weld wire fence should be used. Soft or hard nylon fences are also potential barriers.
Frightening Methods: These methods are convenient and relatively inexpensive. However, geese can become accustomed to repetitious methods especially when they realize that it poses no danger. Frightening programs should be planned early to prevent the birds from establishing a daily feeding pattern. Efforts should be directed at sunrise and sunset when geese come in to feed. Do not allow even one goose to remain as a decoy. Be persistent because it will take several days to break habitual feeding patterns.
(1) Bird control pyrotechnics such as shell crackers (12 gauge shotgun) and whistler/screamer rockets fired over the flock travel up to 250 feet and will frighten geese away.
(2) Visual frightening methods such as helium balloons (mylar, rubber), flags, and scarecrows are most effective when used in conjunction with other methods. Large helium balloons tethered with 20-40 feet of line can be placed over lawns or ponds. Geese do not like objects moving above their heads. Flash tape, a one-half inch mylar plastic, strung like a string fence at one and two feet above the ground will act as a frightening barrier.
(3) Free-ranging dogs trained to chase geese are very effective. Even tethered, or slip-wired tethered dogs that permit extensive movement, have merit.

The Technical Assistance Informational Series is 75 percent funded by Federal Aid to Wildlife Restoration—the Pittman-Robertson (P-R) Program. The P-R Program provides funding through an excise tax on the sale of sporting firearms, ammunition, and archery equipment. The remaining 25 percent of the funding is matched by the Connecticut Wildlife Division.

Wildlife Trends and Management Issues

General Background

The town of Wallingford's open space properties provide diverse wildlife habitat in an urbanizing area. The diversity in wildlife habitat is directly linked to the size and diversity of the plant communities. The wildlife species diversity is a reflection of the diversity in the plant communities and their proximity to each other. The wealth and abundance of open space property in Wallingford can provide excellent recreational opportunities and an opportunity for long range management of habitats for a variety of wildlife species. This section will address a multitude of wildlife-related issues including the management of habitats, wildlife-based recreation, current threats to wildlife, and land management strategies that can be implemented by the Town of Wallingford.

Wildlife Resource

Wildlife are considered a natural resource. In the United States, wildlife belong to the public and are held in the public trust by the federal and state governments. There is some overlap in regulation of wildlife, but in general the United States Fish and Wildlife Agency regulates migratory wildlife species and State governments regulate non-migratory wildlife species. In Connecticut, the Department of Environmental Protection's Wildlife Division is entrusted with regulating and managing the wildlife resource within its borders. The management of wildlife in Connecticut has become

increasingly challenging because of a variety of factors including land use changes, funding, socio-economic, and public misconceptions.

Connecticut's landscape (about 3.2 million acres) has changed over time from being 75 percent field or pasture in the early 1800's to over 50 percent forested today. Greater than 80 percent of the land in Connecticut is privately owned. Most of the land is in private ownership, managing wildlife for the long term is difficult because ownership may change as well as the landowner's objectives. State and municipally-owned property are places that long-range wildlife management can occur. The town of Wallingford is comprised of 25,820 acres or about 40.3 square miles which provides a mosaic of land uses and habitats. The following statistics for Wallingford are from 1996 data from the DEP Natural Resources Center/ Geographic Information Systems:

Wallingford

Land Use/Land Cover	Acreage	Percent
1 - impervious surfaces	567.28	2.2
2 - high density residential/commercial	836.03	3.24
3 - medium density residential	4,740.06	18.36
4 - Roof surface	38.02	0.15
5 - Pavement: roads	3.34	0.01
6 - turf grass	946.92	3.67
7 - Soil/hay/grass	1,288.52	4.99
8 - grass/hay/pasture	4,098.44	15.87
9 - soil/corn	365.90	1.42
10 - grass/corn	199.02	0.77
11 - forest deciduous	9,140.43	35.40
14 - forest coniferous	302.38	1.17
15 - water - deep	373.28	1.45
16 - water - shallow	282.54	1.09
17 - wetland - nonforested	14.90	0.06
18 - wetland - forested	623.55	2.41
19 - barren soil	686.96	2.66

20 - bare soil	615.11	2.38
25 - road: major	698.03	2.70

Table 1 - Wallingford Land Use / Land Cover Statistics, DEP GIS Data, 1996

Wallingford's land use statistics show that it is approximately 40 percent forested, which is lower than the state wide average but this statistic alone can be misleading because if one adds in the 23 percent hay/grass/pasture figure you get another feel for the agricultural/rural character of the town.

Wildlife Trends and Management Issues

- **Management Issue #1 Forest Fragmentation**

Forest fragmentation is on the increase. As Wallingford is developed, forests will be further fragmented and wildlife corridors cut off or impaired. Forest fragmentation is a major detriment for less mobile wildlife species such as reptiles and amphibians. It is also a detriment to forest interior wildlife species such as Ovenbirds, Wood Peewees, and Wood Thrushes. Large tracts of unbroken forest are important to maintain the quality habitat for interior forest dwellers. As the forest is fragmented, parasitic birds such as the Brown-headed cowbird will increase as well as Blue Jays and American Crows which are nestling predators.

#1- Forest Fragmentation Management Opportunity

By continuing the purchase of appropriate open space properties, Wallingford can help reduce the effects of forest fragmentation. Buying land that interconnects forested areas and provides buffer zones between developed areas and natural areas is key to this effort. Maintaining and protecting large forested tracts of 250 acres or more from fragmentation. The town can also work with willing landowners to put conservation easements on forested portions of their properties to increase forest cover in protected status.

- **Management Issue # 2 - Early Successional Forest Wildlife Species Habitat Decline**

Statewide there has been a decline in early successional forest wildlife habitat. Wildlife species such as Whippoorwills, Blue-winged Warblers, Chestnut-sided Warblers, American Woodcock, and Rufous-sided Towhees require early successional forest habitat to nest and thrive. As our forest cover gets older and matures there is less and less young forest habitat. United States Department of Agriculture's statistics for Connecticut show a grim picture for early successional stage forest cover. In 1972, Connecticut's forestland was approximately 32 percent seedling/sapling stage forest (early successional stage forest), in comparison to today when Connecticut has only 5 percent of forestland in seedling/sapling stage. This downward trend in seedling/sapling stage forest is alarming for the species dependent on this age class.

#2 - Creation of Seedling /Sapling Stage Forest Areas Opportunity

There are numerous opportunities to manage early successional stage forest habitat in Wallingford. Although the word "clearcut" carries a bad connotation amongst the general public, it is the standard for habitat managers for creating critical nesting and foraging habitat for birds such as Whippoorwills, Blue-winged Warblers, Chestnut-sided Warblers, American Woodcock and Rufous-sided Towhees. Several ten acre clearcuts could be created and staggered at five year intervals to create young forest habitat. The clearcuts are short lived (about 10 years) and wildlife respond best during the early regrowth periods.

Historically, much of the early successional habitat was created through natural processes such as fires, hurricanes, and tornadoes. With today's fire suppression and management, relatively little forest cover is affected in Connecticut compared to the past. The wildlife division, recognizing the need

to create more early successional forest has developed a demonstration 14 acre clearcut which is available for viewing at its Sessions Woods Wildlife Management Area in Burlington.

Appropriate location and creation of clearcuts in Wallingford can be discussed at a later date with the team Wildlife Biologist.

- **Management Issue # 3 - Grassland Bird Habitat Decline**

Statewide there has been a downward trend on habitat for grassland birds species. Farm abandonment, housing development and mowing practices affect grassland-dependent wildlife species. Maintaining grasslands require careful timing of mowing to avoid times that ground nesters have young in the nest. Grasslands, depending on size and location, provide nesting habitat for songbirds such as Meadowlarks, Bobolinks, and Savannah Sparrows. They also provide habitat for birds of prey such as American Kestrels, Northern Harriers, and Short-eared Owls for hunting small mammals during summer or winter. Grasslands also provide habitat for small mammals such as meadow vole and cottontails and also a variety of dependent butterflies.

#3 - Grassland Management Opportunity in Wallingford

Some of Wallingford's open space property contains grasslands which can be managed long term for grass land wildlife species. Wallingford has an appreciable amount of grassland habitat potential (see Table 1) Some of the properties for which development rights were purchased can also be managed for grassland-dependent wildlife. Any grassland/hay/pasture 5 acres or larger in Wallingford can be a potential candidate for grassland habitat management for the long-range. Managing grasslands for wildlife involves timing mowing properly so that it doesn't impact ground nesting. Restoring grasslands with native warm season grasses is also an option to enhance conditions for wildlife. The Wildlife Division's District Biologist (860-675-8130) is available for consultation on grassland management, restoration and creation.

- **Management Issue #4 - Effect of Urbanization on Wildlife**

As Wallingford continues to be developed, there will be an effect on wildlife. Some wildlife are highly adapt able to development and others are not. As forested land is converted to suburban uses with typical housing lots and small forested patches, a predicable shift in wildlife species occurs. A downward trend in the population of successful forest interior nesting birds such as Ovenbirds, and Woodthrushes is likely to occur. Adaptable bird species such as American robins, Bluejays, Crows, and Northern Cardinals will increase and thrive on smaller fragmented acreages. As mentioned earlier in management issue #2, wildlife species such as Blue-winged Warblers and Whippoorwills in need of seedling/sapling age class forest will decline as this habitat becomes scarcer. Mammals requiring seclusion and larger forested tracts such as Bobcats will decline in abundance whereas adaptable mammals such as Eastern Coyotes, Red Foxes, Skunks, Raccoons, Opossums, Gray Squirrels, and White-footed mice will likely thrive. There may be a slight increase in the number of Black Bears in the short term because they are becoming more common in Connecticut partly because of our maturing forests and their adaptability. Reptiles and amphibians will maintain a presence in suburbia if vernal pools and travel corridors are maintained. Some reptiles such as the Wood Turtle and the Eastern Box Turtle will likely experience increases in mortality due to vehicle strikes and illegal collection near suburban areas. An increase in local nonnative predators will occur such as domestic and feral cats which will have a negative affect on ground nesting songbirds and fledglings of tree nesters. Increased number of dogs roaming unleashed will affect ground nesting songbirds and other wildlife in the area.

#4 - Reducing the Effects of Urbanization Opportunity

There are a variety of ways to reduce the effects of urbanization on wildlife. These are just a few:

A - Reducing the footprint of a development and maintaining natural areas and inter-connecting corridors.
B - Maintaining buffers around wetlands at a minimum of 100 feet.
C - Identifying and protecting vernal pools and inter-connecting habitat to uplands. This effort has been started by New Haven Soil and Water Conservation District and a report is available entitled **"Vernal Pool Study, Town of Wallingford"**, authors Kathy Cassella and Matt Kittredge, June 2001 (available at town hall).
D - Passing a leash law on cats and requiring their registration.
E - Banning the planting of invasive non-native vegetation (see Wildlife Resources section).
F - Public nature education programs at the school level and for adults. DEP has a variety of programs available for nature education: Project Wild, Project Learning Tree, Project Search, Project Wet -- for more information on these programs contact Diane Joy at Kellogg Center at 203-734-2513.

• **Management #5 - Spread of Invasive Non-Native Plants**

There will be a continued escape of invasive non-native plants from landscaped areas to surrounding forested areas. As suburban lots are planted with invasive non-native planting stock (see Wildlife resources section for list of non-native invasives), these invasives will become the seed sources for the invasion of surrounding woodlots. These non native invasives displace more valuable native plants. Native plants have co-evolved with local wildlife species. Non-native invasive disrupt the natural plant communities and ecology of an area.

#5 - Plant of only Native Plants and Non-native Non-invasives

Plant only indigenous native plants (see *Connecticut Native Tree and Shrub Availability List* for recommended native plantings and lists) or at a minimum non-native non-invasives. There are an increasing number of nurseries growing native trees, shrubs, wildflowers and grasses in

Connecticut. There are innumerable opportunities to enhance many of the open space areas with native plantings. Eroded streambanks is one example of where a planting could be done. Forest edges, eroded trail edges, and roadsides are further examples.

- **Management Issue #6 - Increase in Canada Goose Populations**

As development continues some wildlife species such as Canada Geese will increase locally due a variety of factors including a lack of predation and creation of habitat. For Canada Geese, golf courses and mowed grass areas interspersed with ponds or streams are prime feeding and nesting opportunities. These man-made grassed areas mimic the natural tundra-like environment of upper North America. Connecticut's resident goose population has been on an upward trend as people build more golf courses and replace woods with turf grass. A goose is capable of excreting approximately one quart a day of fecal material. As populations increase, it will become a serious pollution issue and potential human health and safety issue. Geese graze on turf grasses during the daylight hours and usually rest on open waters at night. Large and small flocks can be seen foraging on ball fields, large mowed fields around office buildings, park lands, cemetery properties, farm fields, and residential areas with lawn around ponds or lakes.

#6 - Reducing the Effect of Geese

Reducing the amount of foraging habitat can limit the number of geese locally. Habitat reduction techniques include reducing mowed areas. Allowing grass to go to seed and mowing it infrequently such as once a year. Geese are attracted to green, regularly cut grass. Reducing lawn sizes around water bodies and creating landscaped areas with taller grasses and shrubs.

Increasing hunting opportunities for licensed hunters in the Wallingford area. Hunting seasons in Connecticut have been modified to allow greater opportunity for hunters to harvest resident geese. There is an early September

goose season, a regular waterfowl hunting season, and a late hunting season that runs through February. A major constraint for the increased goose hunting season is the availability of suitable land to hunt geese. Although hunting seasons have been lengthened, access to geese has remained relatively limited. Wallingford could reduce local goose numbers by allowing hunting by permit on reservoir property especially on MacKenzie Reservoir, golf course property and larger agricultural fields.

The U S. Fish and Wildlife Service also grants special permits for egg addling and population control for Canada Geese. Some Connecticut communities have utilized special permits with limited success due to the tenacity and adaptability of adult geese and their ability to nest off-site and bring young back into unwanted areas.

The DEP wildlife division's recreation management biologist and waterfowl biologist is available for consultation regarding the Canada geese population management issue.

- **Management Issue #7 - Trail Use Causing Habitat Degradation**

Owners of off-road recreational vehicles, horses, and trail bicycles often have limited access to land for their activities. With limited public land available, illegal use of open space land will likely increase. This trend has been seen on State property as well as municipal and private land. There are a variety of environmental concerns regarding the illegal use of open space property. Excessive erosion of streamside banks, wetland degradation, and vernal pool disturbance and siltation are a few examples of potential problems. Destruction of nature trails, rutting of trails, and widening of foot trails are also a concern.

There is an increased demand by the public for nature-based recreation. This trend has been building over the last few years. Placing walking trails and

nature trails in appropriate locations on open space can help fill this demand. Trail placement should consider a variety of environmental factors and careful planning is needed. Trail planners should keep in mind that wildlife need some areas for seclusion and refuge especially during nesting seasons. Nature trails are unfortunately abused by off-road vehicle users and walkers with unleashed dogs Unleashed dogs cause problems during the bird nesting season that starts in early March for American Woodcock (ground nester) and goes to end of August for a variety of ground nesters.

#7- Managing Illegal Trail Use Issues

To stop the habitat degradation one must stop the access to the affected areas. How this is accomplished is subject to debate. Some communities have stepped up the enforcement of trespass laws and other laws prohibiting the activities. Reducing the effects of habitat degradation should be a priority for Wallingford, especially in or near wetland, vernal pool or streamside environments.

Limiting the number of foot trails on open space property can help reduce the potential for more areas to be accessed illegally. Often-times open space property are criss-crossed by numerous foot trails rather than one or two well-planned foot trails. An effort should be made to create a limited number of trails and eliminate unwanted criss-crossing trails by replanting and/or blocking off access.

The town of Wallingford should make an effort to educate its citizens regarding environmental concerns. Long range planning is needed on where trails should be placed, where they should be removed and where they should never be allowed. This may take an ongoing effort of an empowered committee that can prepare a long range planning document and implement strategies to increase understanding between the variety of constituencies that want to use nature trails and open space areas.

• **Management Issue # 8 - Hunting or Fishing Access to Open Space Property**

Access to property for hunting and fishing will become more difficult as land uses change and property sizes get smaller with multiple or absentee landowners. State and municipal properties can be places where Connecticut hunters and fisherman can pursue their recreational activities. Currently, small game hunting is allowed on a Permit-required basis on Wallingford property primarily on the Tyler Mill open space areas. Although the public perceives hunting to be dangerous, statistically it is one of the safest recreational activities according to the National Safety Council (1991)[DEP Connecticut Conservation Education Firearms Safety Handbook]. Hunting of wildlife species in Connecticut is strictly regulated and hunting laws are enforced. Hunting seasons and harvest limits are recommended by trained wildlife biologists relying on science-based facts in conjunction with cultural considerations. The permit-required system of hunting access allows the landowners (Wallingford) and the Department of Environmental Protection the ability to limit numbers of hunters, keep track of users, and monitor harvest of wildlife. The Wallingford Permit Required Hunting area is open only specified days of the week and hunters follow specific guidelines and regulations on what can be hunted and how many can be harvested.

#8 - Future of Hunting and Fishing Recreational Opportunities

The future of hunting and fishing on open space properties remains bright for hunters and fishermen. Rules and regulations need to continue to be adequately enforced. There should be a clear understanding amongst the various open space users on what areas to use and times certain activities are allowed. Efforts should continue to be made to educate the public on where and when the various activities are allowed. Local fish and game clubs can be a source of volunteer assistance for the town in putting up signage, cleaning up areas, and cooperative habitat management opportunities. As access to local farms and other private property diminishes, greater demand for

hunting access is likely on State and municipal open space. Further technical assistance is available from the Wildlife Division's recreation management Biologist (860-424-3011).

Additional Habitat Management Techniques or Options

There are additional habitat management options to improve Wallingford's open space properties that were not mentioned in the aforementioned trends. The following habitat management techniques can also be implemented:

A- Artificial Nest Box Placement - Placement and Management of nesting structures in appropriate areas can assist cavity-dwelling wildlife species such as bluebirds, tree swallows, flying squirrels, screech owls kestrels, wood ducks, and hooded mergansers. The Team Wildlife Biologist is available to provide nesting structure plans and field placement advice.

B - Creation of Super Brush Piles - To increase habitat for cottontails, salamander, toads, and a variety other wildlife, brush piles can be created along forest edges.

C - Create Snags or Dead or Dying Standing Wood - Create snags by girdling invasive trees and subordinate cull native trees to enhance primary (i.e. woodpeckers) and secondary (i.e. Tufted Titmouse) cavity users. Three to five snags per forested acre minimum requirement should be attained.

D - Creation of Winter Habitat - Clusters of evergreens can be planted to enhance winter cover habitat for owls, local songbirds and other wildlife. This practice can help mitigate the loss of Eastern Hemlock. Further information is available upon request.

E - Forest Resources Inventory and Management- A forestry consulting firm should be hired by the town to inventory all forest resources including forest health, plant diversity, age classes, stand densities, and forest boundaries. A long range forest management plan should be written and include goals and

objectives of the various Wallingford constituencies that utilize the open space properties. A quality forest inventory is key to managing for wildlife resources.

F - Comprehensive Wildlife Inventory - An comprehensive inventory of wildlife on open space proper ties should be made. This should include seasonal inventories during nesting seasons, migration periods and winter periods. Although a vernal pool study has been undertaken, seasonal monitoring for a few years will help get further information on vernal pool use and upland habitat use by amphibians.

Summary and Conclusions

This section has enumerated several trends that effect wildlife and gives potential solutions or mitigations to these trends. In order for any of the options to work, there must be an effort to educate the participants(i.e. public, town officials, sportsman, hikers, horse riders, trail bikers, off-road motorized vehicle users) about the contents of this report so the there is a level of common knowledge regarding wildlife needs and potential wildlife impacts. This may help to dispel misconceptions and half-truths that sometimes dominate the popular news reports. The Team Biologist is available upon request to give specifics regarding each management practice or wildlife-related management issue discussed in this report and is available for further consultation in implementing any strategies to improve conditions for wildlife, habitat and wildlife-based recreation.

Forest Resources

In 1993 Connwood Foresters, Inc. was contracted by the town of Wallingford to prepare a ten-year Forest Resources Management Plan for approximately 2000 acres of town open space. This open space was just about equally divided between Wallingford Water Division (WWD) and Wallingford Parks and Recreation Department (WPR) lands. Both the Tyler Mill and Muddy River Conservation and Recreation Areas were included in this plan.

The plan itself is a comprehensive, well thought-out document with many built-in checks and balances. The inventory data, vegetation/stand descriptions and type mapping appear to be complete and accurate. Management objectives were clearly summarized in the plan for both WWD and WPR properties:

> "Primary management objectives differ for the WWD and WPR properties. On WWD lands, the most important objective is to produce pure water from the forested watersheds supplying the town reservoirs. On WPR lands, the primary objective is to provide passive recreation and environmental educational opportunities for town residents.
>
> A secondary management objective common to both WWD and WPR lands is to maintain overall health of the forest ecosystem and manage the forest, where appropriate, to provide sustainable yields of revenue through the growth and sale of wood products (sawtimber and firewood). Revenues produced will be allocated toward making improvements on the properties to achieve the primary objectives.

> Additional objectives include maintaining and providing habitat conditions suitable for a variety of wildlife species, protecting rare and endangered plant and animal species, and providing a visually-pleasing landscape."

Management practices were scheduled in the plan to begin to meet these objectives.

Connwood Foresters Inc. was also contracted by the town to implement the first five years of the proposed and approved management program. This included implementation of several harvest operations on both WWD and WPR lands. In 1998 harvesting activities were suspended.

In 2003 it will be time to update this ten-year Forest Resource Management Plan including reevaluating the management objectives for both WWD and WPR lands. The new plan should address the widespread establishment of non-native plant species that is occurring and their control or management. It should also address the extensive clearing of vegetation that will occur should a municipal golf course or water supply reservoir be developed within these town properties.

Water Quality and Forest Management

Healthy woodlands provide a protective influence on water quality. They stabilize soils, reduce the impact of precipitation and runoff and moderate the effects of adverse weather conditions. By so doing, woodlands help to reduce erosion, sedimentation, siltation and flooding. Research has shown that soil protected by the cover of leaf litter and humus associated with woodland areas contributes little or no sediment to streams.

Improper and careless harvesting of timber for development or commercial purposes may, however, lower water quality in several ways:

1) Erosion, siltation and sedimentation caused by improperly located and improperly constructed access roads, skid trails, yarding areas and stream crossings;

2) Siltation and sedimentation caused by logging debris left in streams, interfering with natural flows;

3) Thermal pollution resulting from complete or partial harvesting of streambank vegetation, eliminating shade;

4) Chemical pollution caused by improper application of herbicides and insecticides (it should be noted, however, that in Connecticut the widespread use of chemicals in forest management is not prevalent and therefore does not constitute a great threat to water quality at this time); and

5) Influx of nutrients caused by the application of fertilizer, soil conditioners and wetting agents (used in forest fire control).

In 1979, a field study and analysis of timber harvesting operations in Connecticut revealed no significant contribution to the degradation of water quality. However, this study did identify sedimentation resulting from erosion as a principal potential problem. Felling trees does not generally cause erosion. Approximately 90% of sedimentation from harvesting operations originates from exposed soil on logging roads, skid trails and yarding areas.

Most erosion and sedimentation associated with woodland harvesting activities occurs during and immediately after harvesting. The basic principles of erosion control needed to reduce or avoid damage to the environment include:

1. Disturb as little land as possible.
2. Use erosion control measures to protect disturbed areas.

3. Reduce the speed and volume of runoff.
4. Divert runoff from disturbed areas.
5. Install perimeter controls around disturbed areas.
6. Conduct conscientious maintenance of erosion controls.
7. Assign someone the direct responsibility of implementing and maintaining erosion control measures.

A carefully planned, executed and completed harvest will have little negative impact on the environment.

- **Planning the Harvest**

A plan should be developed by a Certified Professional Forester before starting each harvesting operation. A good plan, when followed, will reduce soil erosion and sedimentation and increase the efficiency of operations and profitability of the harvest. To minimize potential erosion problems, the harvesting plan must consider the watercourses, soils and topography of the area. Useful tools used in planning the harvest operation may include: topographic maps, aerial photos, USDA soil surveys and property maps. Use of these tools will not substitute for an actual site visit. Obtaining the proper permits will be necessary before executing the harvest.

- **Executing the Harvest**

Logging roads, skid trails and yarding areas should be located where water can be easily diverted, not in swales or other low points. Grades on logging roads should generally not exceed a 10% slope, however, short sections may approach a 20% slope to avoid obstacles. If possible skid trails should be kept on the high side of wet or steep areas. Streambeds or swales should never be followed as skid trails. Where unavoidable, streams may be crossed, but only at right angles.

Bridges or culverts may be needed where hard stream bottoms are not present. Streams, springs, seeps, wetlands, vernal pools, poor drainage areas, rock outcrops and other obstacles should be located so that they may be avoided. The potential for damage to logging roads, skid trails and yarding areas from water erosion is greatest during active harvest operations. The implementation of a harvest operation should be closely monitored by a Certified Professional Forester.

- **Completing the Harvest**

Erosion control measures should be properly installed as soon as possible after the harvest is completed or when harvesting has been temporarily interrupted for more than a few weeks. These measures include:

1. Grading major skid trails to fill in ruts and smooth rough surfaces.
2. Installing water bars where necessary to divert water.
3. Cleaning out drainage dips and natural drain areas.
4. Mulching skid trails on steep slopes with hay, brush and or slash to slow water flow and retain sediment.
4. Removing temporary structures such as culverts or bridges.
5. Grading approaches to stream crossings to approximate original conditions.
6. Cleaning up and grading yarding areas.
7. Seeding and mulching yarding areas, approaches to stream crossings and steep skid trail sections.
8. Closing off access to logging roads, main skid trails and yarding areas to discourage unauthorized use.
9. Periodically inspecting and maintaining erosion control measures.

Remember: A small amount of extra effort at the end of the harvesting operation can go a long way in protecting soil and water resources and in maintaining good landowner and public relations.

For more in-depth information please see "TIMBER HARVESTING AND WATER QUALITY IN CONNECTICUT; A Practical Guide for Protecting Water Quality While Harvesting Forest Products". Prepared by: Connecticut RC&D Forestry Committee, 1998.

This publication and additional technical advice and information on best management practices, forest products harvesting or other aspects of forest management may be obtained from:

State Forester's Office
79 Elm Street
Hartford, CT 06106
(860) 424-3630

DEP Eastern District HQ.
Division of Forestry
209 Hebron Road
Marlborough, CT 06447
(860) 295-9523

Extension Forester
Cooperative Extension System
139 Wolf Den Road
Brooklyn, CT 06234
(860) 744-9600

DEP Western District HQ.
Division of Forestry
230 Plymouth Road
Harwinton, CT 06791
(860) 485-0226

For additional information on wetlands and government regulations related to wetlands and water bodies please contact:

DEP Water Resources
79 Elm Street
Hartford, CT 06106
(860) 424-3706

Trees and forests have value in reducing climatic extremes, controlling runoff, filtering out pollutants from the air and water, reducing noise, providing aesthetic enjoyment, creating wildlife habitat, recharging aquifers, supplying wood fiber and functioning as a carbon sink. Healthy forests provide these long-term amenities. Therefore a good relationship between development and the retention of forested open space is essential if generations to come are to enjoy a high quality of life.

Tyler Mill/Muddy River Preserve
Wallingford, CT

Figure 11

4. CULTURAL RESOURCES

ARCHAEOLOGICAL REVIEW

Archaeological Review

A review of the State of Connecticut Archaeological Site files and maps show a prehistoric Native American archaeological site in the project area. The site (CT 148-01) is located along the northern boundary of the project area across from Tamarac Swamp, and appears to represent a hunting-gathering camp of unknown time period. Interior swamp/wetland areas were often used by Native Americans for thousands of years. Indian hunting and gathering economies required the movement of peoples through ecological territories on a seasonal basis. Interior wetland areas would have provided an abundance of natural resources for exploitation, as well as areas of protection from winter elements. In addition, the project area has many potential ledges of rock outcropping that could have served as rockshelters for Indians during these seasonal rounds. The project area contains the topographic and environmental variables that allow us to predict prehistoric utilization.

The highest archaeological sensitivity in the Tyler Mill/Muddy River Area will be associated with cultural adaptation to the various wetland systems. Hence, areas of well-drained soils associated with Tamarac Swamp and the Muddy River are where early prehistoric archaeological sites would be expected. Unfortunately, this area has never had a systematic archaeological survey, so the Area may contain many prehistoric/historic sites that have not been inventoried.

The Office of State Archaeology strongly recommends that any areas proposed for land use development have an archaeological survey prior to any construction activities. This survey should be conducted in accordance with the Connecticut Historical Commission's "Environmental Review Primer for Connecticut's Archaeological Resources". The Office of State Archaeology is

prepared to provide any technical assistance in conducting the recommended survey.

5. PLANNING REVIEW

LAND USE PLANNING CONSIDERATIONS

PLANNING AND LAND MANAGEMENT PERSPECTIVE

Land Use

Planning Considerations

Site Location

The Tyler Mill/Muddy River Conservation and Recreation Area is a ±1400 acre open space complex located in a rural part of southeast Wallingford near the North Branford/Durham town lines. The area is bounded by Center Street to the north, North Branford to the south, I-91 to the west and Durham to the east.

Site Characteristics

This vast open space network includes numerous significant and noteworthy natural features that influence the character of Wallingford. Important natural features such as the Mackenzie Reservoir, Tamarac Swamp, the Tyler Mill/Muddy River area and Morris Rock are part of this 1400 acre complex.

Over the past several years, the Town of Wallingford has been proactive in preserving the Tyler Mill/Muddy River area. The Town is purchasing land for open space and actively participating in the Farmland Lease Program. The town's Mackenzie Reservoir, is a crucial component to providing the town's water supply. The Reservoir is in the headwaters of the Muddy River, which runs the length of the Tyler Mill area. The Tyler Mill area, which includes the Tamarac Swamp, is a beautifully diverse habitat with many passive recreational opportunities.

The Cooke properties, recently purchased by the town, total 182 acres and are located on the western and eastern portions of Cooke Road. The western parcel is a 77 acre farm and the eastern portion is 105 acres, located behind several residential properties. The eastern parcel has a small right of way connecting the northern part of the property to Cooke Road. Town officials are considering constructing a municipal golf course on this 182 acres.

Traffic Circulation/Site Access

The open space properties in the Tyler Mill/Muddy River area are in close proximity to I-91 and are primarily served by local roads. Tyler Mill Road, a designated scenic road, runs north to south from Northford Road to Woodhouse Avenue, providing direct access to the Tyler Mill trail system and the Muddy River. Although the Tyler Mill Bridge has been closed to vehicular traffic for over ten years, the bridge is open to foot traffic, with parking available on one side of the bridge. The feasibility of closing Tyler Mill Road to vehicular traffic has been questioned. The southern entrance point (Woodhouse Road) is closed to vehicular traffic. In addition, by closing Tyler Mill Road at the northern entrance point (Northford Road), as well as Tamarac Swamp Road, access and parking would be limited to visible areas normally patrolled by local police. Therefore, unauthorized uses, such as illegal dumping and nighttime parties, can be more closely monitored.

If the town decides to develop the Cooke properties as a municipal golf course, secondary roads in the area, including Cooke Road, Whirlwind Hill Road and East Center Street will likely experience increases in vehicular traffic.

Land Use Considerations

The area is zoned Rural Residence District - 120, which requires a minimum lot area of 120,000 square feet or three acre lots. The area's density level is predominately low to moderate with detached single-family residential housing.

There are several significant land uses that comprise the Tyler Mill/Muddy River area, these include the Mackenzie Reservoir, Tyler Mill/Tamarac Swamp, Bertini Park, the recreational fields of Vietnam Veterans Park and the Coyle and Carini Fields, and various agricultural operations. The following is a description of each land use in the area.

- The Mackenzie Reservoir provides for the town's water supply and fire protection, therefore development and recreational opportunities are not recommended.
- The Tyler Mill/Tamarac Swamp area should be protected as an important environmental and cultural resource. Intense development should be non-existent, with the town initiating additional properties for the Farmland Lease Program.
- Bertini Park is town owned and is located on Dayton Hill Road. The park is a 76.5 acre former YMCA camp that is currently gated and locked, town officials may want to make a policy decision as to whether this should remain an undeveloped park. Once developed as an official park, the property has the opportunity to connect with Coyle and Carini Field, Morris Rock and the Tyler Mill open space preserve.
- The recreational fields of the Veterans Park, Coyle and Carini Fields should remain as the only intense land use in the area.
- Agricultural uses make up the remaining land use in the area. Town officials should be commended for their effort in preserving and retaining farmland/agricultural production in this area.

Two properties that deserve special attention are the Cooke properties, which are currently owned by the town. These two properties are being considered as a future municipal golf course. Town officials should consider utilizing the CT DEP Best Practices for golf course management to ensure potential impacts to area water supplies are considered.

Town officials have indicated two parcels for future purchase. The first parcel, known as the Williams Farm, is a 93.7 acre parcel on East Center Street. If acquired, the parcel should give the Town an opportunity to build additional recreational that would connect with the adjacent Vietnam Veterans recreational fields. Development of this parcel for intense recreational use is consistent with the adjacent use, as it is in a central location and in close proximity to local highways. If the parcel is acquired using the State DEP Open Space grant, program guidelines will only allow passive recreational uses. Town officials may want to take this opportunity to create a small linear park, set back from East Center street, and running the length of the Williams property and Vietnam Veterans Park and also act as a noise and aesthetic buffer to adjacent homeowners. The linear park could be a natural wildlife habitat or a landscaped park with walking paths. To get the town residents involved, local schools and volunteer organizations could assist in the construction of fundraising for the park. The second parcel is approximately ten acres on the southern side of Scard Road. The acquisition of this property would connect two town owned parcels and perhaps offer additional watershed protection to MacKenzie Reservoir.

Agricultural and Passive Recreation Opportunities

As potential development sites are limited, passive recreational opportunities and non-intensive farming operations should be encouraged and integrated into

a long-term natural resource management plan. The Farmland Lease Program and the purchase of development rights are successful programs that should be continued and expanded where appropriate. The CT DEP stocks the Muddy River with brook trout on a yearly basis, providing an excellent opportunity for stream fishing. Successful trout fishing is dependent on stream capacity. Low stream capacity has proved to be an issue over past years.

Special consideration should be given to increasing the recreational opportunities of the area, in particular trail based recreation. The Tyler Mill/Muddy River area has an extensive trail system and is promoted as an environmental education trail. Although, the trails are considered as non-strenuous, town officials have the opportunity to make this a multi-purpose trail (hiking and horse riding). When considering what an allowable trail use is, stakeholders should be sensitive to the contours of the land and a trail usage plan should reflect an agreement among all types of trail users. As suggested above, with the possible closing of Tyler Mill Road to vehicular traffic, consideration may be given to opening the road as a horse trail. Proper management can ensure the trails are not destroyed.

Management and Organization Issues

To ensure the environmental integrity of the Muddy River/Tyler Mill area, the town has been acquiring property and anticipated the purpose of additional land for the preservation of this environmentally diverse area. To ensure the highest protection of the Town's drinking water supply and to preserve the delicate balance of diverse wildlife and vegetation of the Tyler Mill area, natural resource management is crucial. The natural resource management plan should include a strategy for water supply, intense recreational uses, trail-based recreation, management of existing and future biota, fishing and wildlife control, and lastly agricultural management.

Planning and Land Management Perspective

The following comments reflect a combination planning and land management perspective for the substantial municipal and other open space holdings in East Wallingford which greatly influence the character of this portion of town. These properties are the result of an aggressive municipal acquisition program in addition to dedication of subdivision open space and state acquisition of farmland development rights (PDR Program).

As the Pistapaug Pond-Ulrich Reservoir water supply complex abutting Durham Falls is outside the scope of this review, no detailed comments are offered. General observations include: (1) the additional watershed protection provided by Tri-Mountain State Park, (2) the suggestion to acquire more watershed especially around Spring Brook Reservoir, and (3) a question as to the extent of protection on the Durham side of Pistapaug Pond on Pistapuag Mountain.

The primary subject of the review is the Tyler Mill/Muddy River Conservation and Recreation Area along Muddy River together with the adjoining Vietnam Veteran's Fields, Bertini Park, and the Coyle and Carini Fields. Comments will include discussion by land use function or activity as well as facility management recommendations.

Existing or potential activities with suggested recommendations include:

- **(1) Water Supply Production** - Purchased largely from the former New Haven Water Company, the area offers potential for development of a new reservoir with the spillway at the 165' contour. As provision of an adequate water supply is a necessity for society and as potential development sites are limited in Connecticut's central valley, the overriding management priority must be to maintain this opportunity while allowing only compatible interim or continuing recreational and/or natural resource management activities.

- **(2) Developed/Intensive Recreation Areas** - The two intensive examples include the Vietnam Veteran's Fields at the northwest corner of the property on East Center Street and the Coyle and Carini Fields near the southwest corner on Woodhouse Avenue. No other intensive development has been proposed or seems necessary except on acreage recommended for acquisition adjoining the Vietnam Veteran's Fields. Said location offers ready road access as well as proximity to centers of population.

- **(3) Trail-Based Recreation** - A trail system should be integrated, accessed at suitable control points (see under management considerations below), emphasizing points/areas of interest, and avoiding fragile soils (floodplain, seasonally wet areas, steeply sloping areas, etc.). Types of trail use should be compatible and reflect a local consensus among trail user groups. Although motorized trail use likely will be deemed inappropriate, the question of joint hiking and mountain biking use of trails should be addressed, with at least some steep areas, such as Owl Ridge, limited to hiking. In addition, horse trails use must be considered, with roads, wood roads, and other areas or non-fragile soils being especially appropriate.

It is the Team planner's opinion that the existing trail network may need revision following guidelines above. The basic framework of the system could be as indicated on the attached map (Figure 12), with additional trails, trail segments possible as desired or appropriate.

- **(4) Natural Area Protection** - The most significant ecological site type is Tamarac Swamp which should be managed as a natural area, with possible vegetation management to maintain the site's uniqueness left to professional judgment. Morris Rock also may deserve recognition at least in terms of interpretive signage.

- **(5) Fishery and Wildlife Management** - The existing state management of the Muddy River fishery is expected to continue and needs no further comment. However, wildlife management is a more complex issue involving such factors as public safety, potential use conflicts, the opportunity for small game hunting, and the occasional need for controlled hunts to prevent serious damage to the property's vegetation. Political as well as professional input will be required.

- **(6) Silvacultural Management** - To maintain the area's vegetative health and offer the opportunity for harvest of forest products compatible with other community objectives such as amenity, scenic preservation, and outdoor recreation, an active silvacultural program should be considered. A prime example would include salvage of threatened hemlock and other declining/dying stands and encouragement of stand regeneration, however signage explaining to the general public the rationale or need for such an activity is recommended.

- **(7) Agriculture** - Wallingford should be commended for actively leasing land for continued agricultural use and thereby helping maintain a land

base for agriculture in Central Connecticut. A continuation and expansion of this program where possible and appropriate is recommended.

Management considerations are an essential element of a site plan to achieve needed control and thus avoid typical problems as dumping, nocturnal partying, and other problem behavior. The key factor involves control of access, and limiting access to selected locations with visible parking areas readily patrolled by local police. The two main entry points should remain at Vietnam Veteran's Fields and at Coyle-Carini Fields, including gated parking areas. Lesser entry points with limited parking are seen on either side of the former Muddy River bridge.

Gates are suggested at both ends of Tyler Mill Road to limit vehicular traffic and permit its use for trail-related recreation. Similarly, although a low railroad overpass requires Tamarac Swamp Road to remain open for fire and emergency vehicle access to a subdivision, Wallingford may wish to consider gating with a key access for official vehicles and agricultural lessees.

Also, Bertini Park area should be managed as a "no development" part of the property because of its isolated location and lack of site resources. Any existing structures should be removed, with gating in place to control access and potential management problems. Furthermore, since the name "park" implies a developed area with some facilities, a name change is suggested, perhaps to "tract".

Physically connected to the Tyler Mill open space complex is the much smaller MacKenzie Reservoir Property whose sole function is water supply production. No recreational access to this tract seems necessary or desirable. In addition the Neil and Cooke lots on opposite sides of Scard Road, provide additional watershed protection. Agricultural activity compatible with the primary water supply function of the watershed should be acceptable on both

the Cooke parcel and the adjoining PDR acreage. Opportunities to increase watershed protection through acquisition or dedication of subdivision open space should be pursued whenever available.

To the east of the Tyler Mill area are located two former Cooke parcels along Cooke Hill Road. Although the western parcel in particular is presently in active agricultural use (vegetable production), the town eventually will have to make a policy decision on the best long term sue of this land. The relative merits of the pro and con sentiments of possible development of a municipal golf course are beyond the scope of this review, except to note that the two tracts are physically connected by an easement and that there appears to be no physical constraint to such a development. However, such action could attract comment from the South Central Connecticut Regional Water Authority about possible impact on its Farm River Watershed which supplies Lake Saltonstall. In the interim, continuation of agricultural activity on a lease is recommended, with wooded areas managed as undeveloped open space.

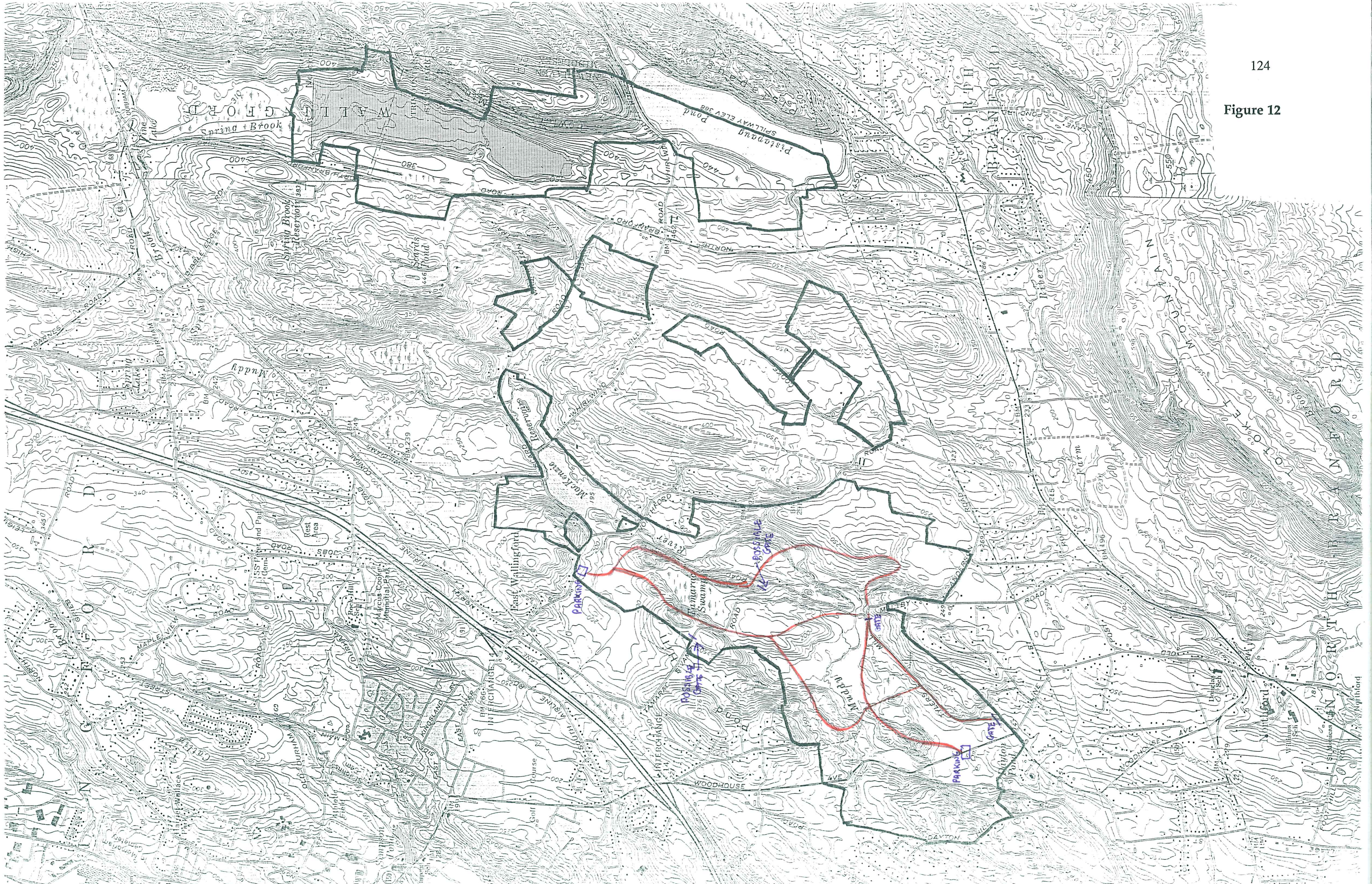

WALLINGFORD
Spring Brook
Pistapaug Pond
SPILLWAY ELEV 388
Spring Brook Reservoir
Muddy
Mackenzie Reservoir
East Wallingford
Tamarack Swamp
River
PARKING
POSSIBLE GATE
GATE
WOODHOUSE
AVE
NORTH BRANFORD
TOTOKET MOUNTAIN
Northford
INTERCHANGE 14
Rest Area

Figure 12

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 Soil and Water 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 Soil and Water 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, P.O. Box 70, Haddam, CT 06438. The telephone number is 860-345-3977.