Mt. Tom Natural Resource Inventory

New Milford, Connecticut

King's Mark Environmental Review Team Report

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

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Natural Resource Inventory

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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
New Milford
Conservation Commission
and
Inland Wetlands Commission

May 1997

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Acknowledgments

This report is an outgrowth of a request from the New Milford Conservation Commission and the Inland Wetlands Commission to the Litchfield 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, December 19, 1996.

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I would also like to thank Adam Halasi-Kun, conservation commission chairman, Kimberly Brown, conservation commission member, Marsha LaTour, inland wetlands commission chairman, Carlos Caridad, Susan Simoneau and Phillip Louell, inland wetlands commission members, James Ferlow, New Milford wetland enforcement officer, Cathy Setterlin, the Pratt Center executive director and others who attended the field review 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. 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 development, 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 making your land use decisions for the Mt. Tom area.

If you require additional information please contact:

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Introduction

Introduction

The New Milford Conservation Commission and the Inland Wetlands Commission have requested assistance from the King's Mark Environmental Review Team in conducting a natural resource inventory and environmental assessment for the Mt. Tom area.

The ERT study area as outlined by the Town consists of approximately ±800 acres surrounding and encompassing Mt. Tom. It is an area characterized by steep slopes, wetlands, and is bounded on one side by the East Aspetuck River. The area is lightly developed but is currently undergoing development pressures, especially along Paper Mill Road. There are several large parcels of undeveloped land along with two parcels of protected land. (Figures 1 and 8).

Objectives of the ERT Study

The ERT has been asked to conduct a natural resource inventory for the Mt. Tom area to assist the town commissions in determining the appropriate level of development for this area with regard to the natural resource limitations and opportunities.

The ERT report is fairly general in nature due to the scale of the study area and focuses on an inventory of the natural resources with some guidance and recommendations for analysis of future development proposals.

The ERT Process

Through the efforts of the New Milford Conservation Commission and Inland Wetlands Commission this environmental review and report was prepared for the commissions.

This report provides an information base and a series of recommendations and guidelines which cover the topics requested by the commission. Team members were able to review maps and information 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; and
4. Presentation of resource management recommendations and land use guidelines.

The data collection phase involved both literature and field research. The field review was conducted on December 19, 1996. The emphasis of the field review was on the exchange of ideas, concerns and recommendations. Being on site allowed Team members to verify information and to identify other resources.

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

Figure 1

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Location and Topographic Map

Scale 1″ = 2000′

——— Approximate Site

Topography and Geology

Topography

Mt. Tom is a prominent, steep sided NNE trending ridge bounded on its east and west sides by the deeply incised valleys of the Aspetuck tributaries. Its peak rises 1000 feet above sea level and more than 600 feet above the floors of the adjacent valleys. The general topography mirrors the local geology. The valleys are underlain by soluble and thus readily eroded marbles and other calcareous rocks and higher ground by more resistant NNE trending granitic gneisses and amphibolites. The small NW-SE trending gullies and cols that cut across Mt. Tom ridge (Figure 1) follow linear zones of sheared and broken rock along regional master joints and small faults. However, the small scale topography of Mt. Tom seems to reflect the history of river incision and more recent subglacial erosion rather than the erodability of the underlying bedrock. In fact, the steeper slopes and most of the cliffs in the area on the SSE side of the mountain are undoubtedly a consequence of flowing ice preferentially plucking bedrock from the protected "down ice" side of obstructions in its path. Somewhat more problematic is the origin of a series of subtle but distinctive flat, near horizontal benches on the flanks of the ridge (Figure 2). The terraced topography can be best appreciated by hiking the trails leading to the summit of Mt. Tom. The trail system takes full advantage of the level stretches to provide brief respites from the otherwise steep ascent. The horizontal benches appear to be the remnants of once more extensive valley floors and terraces formed preglacially by the progressive downcutting and erosion of the Housatonic River and its tributary system.

Surficial Geology

A thin veneer of glacial till deposited subglacially at the height of the last ice age (20,000 years ago) covers much of Mt. Tom itself. Loose talus and colluvium, in places 10's of feet thick lies on top of the till blanket at the base of steeper slopes. Thick deposits of stratified sands and gravels transported by glacial meltwaters as the ice disappeared (12,000 - 14,000 years ago) are found only along the bottom of the deeper valleys. The Pratt House and farm along the East Aspetuck are built on kame terraces formed of stratified sands and gravels (see Figure 3).

Bedrock Geology

The bedrock geology of the Mt. Tom area is complex and has been mapped only on a preliminary reconnaissance scale. No detailed published bedrock maps are available for either the New Milford or Kent Quadrangles. The best synthesis of the available information is Rogers Bedrock Geologic Map of Connecticut at a scale of 1:250,000. Figure 4 reproduces the 1:24, 000 Quadrangle scale compilation maps used to produce the State map. The boundaries between the rock units are approximate only and may be significantly in error.

Mt. Tom lies just east of the so-called "Cameron's line" a major structural break between rocks which have always been part of the North American continent and those which prior to 400 million years ago were parts of island arcs in the Thetys Sea that may have been separated from North America by thousands of kilometers of deep ocean. Between 400 million years and 300 million years ago rocks lying east of Cameron's line collided with and were "welded" onto the North American continent. Prior to the formation of Cameron's line the geology of the Mt. Tom area was relatively simple - 400 million years old, undeformed, flat lying quartzites and limestones lay atop a granitic crust deformed and metamorphosed during earlier continental collision half a billion years earlier. The accretion of the Thetys island arc terrains deformed and metamorphosed rocks along the edge of North America and threw them into a series of tight isoclinal folds. Mt. Tom lies in the core of one of these major folds. The layer of Stockbridge marble (originally one of the limestone layers) which is wrapped over the top of the now deeply eroded Mt. Tom gneisses is now present only along the East and West Aspetuck valleys. Both amphibolite and granitic gneisses are exposed on Mt. Tom. The amphibolites were originally lava flows. The granitic gneisses are the metamorphosed equivalents of clastic marine sediments and muds. The prominent NNE near vertical foliation which characterizes all of the gneisses on Mt. Tom formed during recrystallization and metamorphism and reflects the deformation going on at the time and does not represent original sedimentary layering in the sediments.

Although prospect pits, trenches and even attempts at mining or quarrying are found elsewhere in the area there is neither a record of "mining" nor evidence for any serious prospecting on Mt. Tom itself.

Figure 2

Distribution of Terrace Remnants and Joint Controlled Lineaments

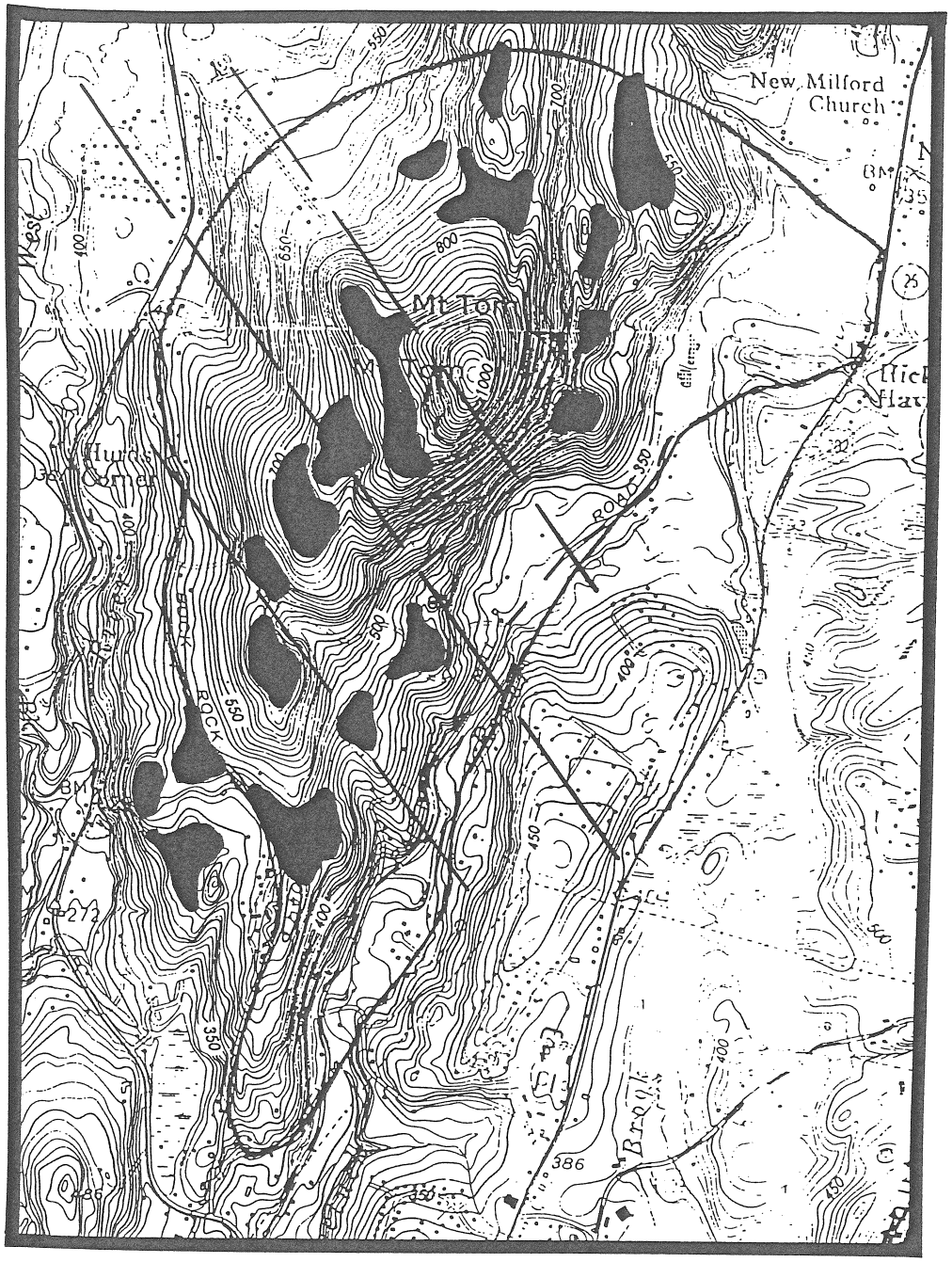
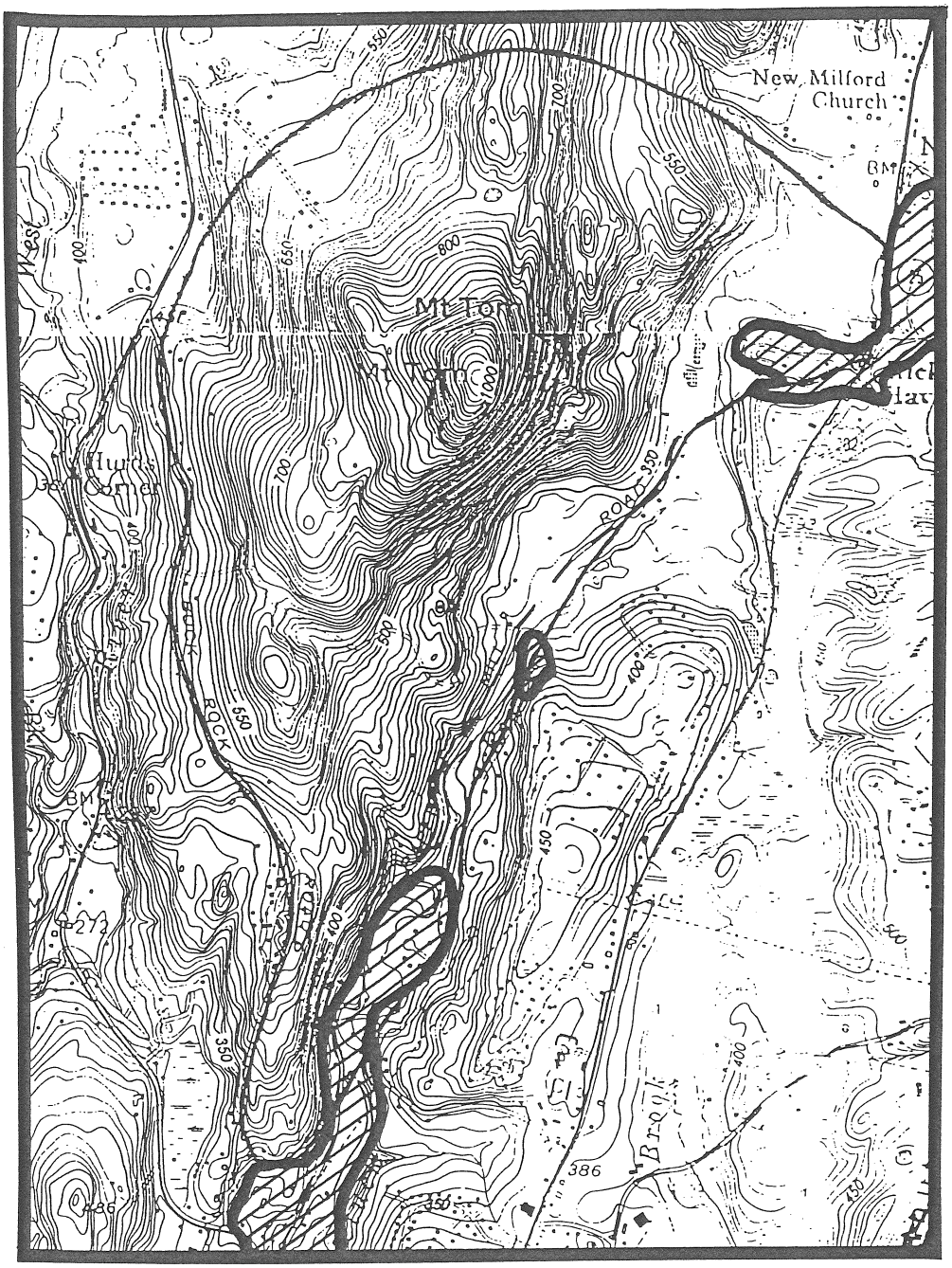


Figure 3

Surficial Geology



Explanation

Glacial Till

Sand and Gravels

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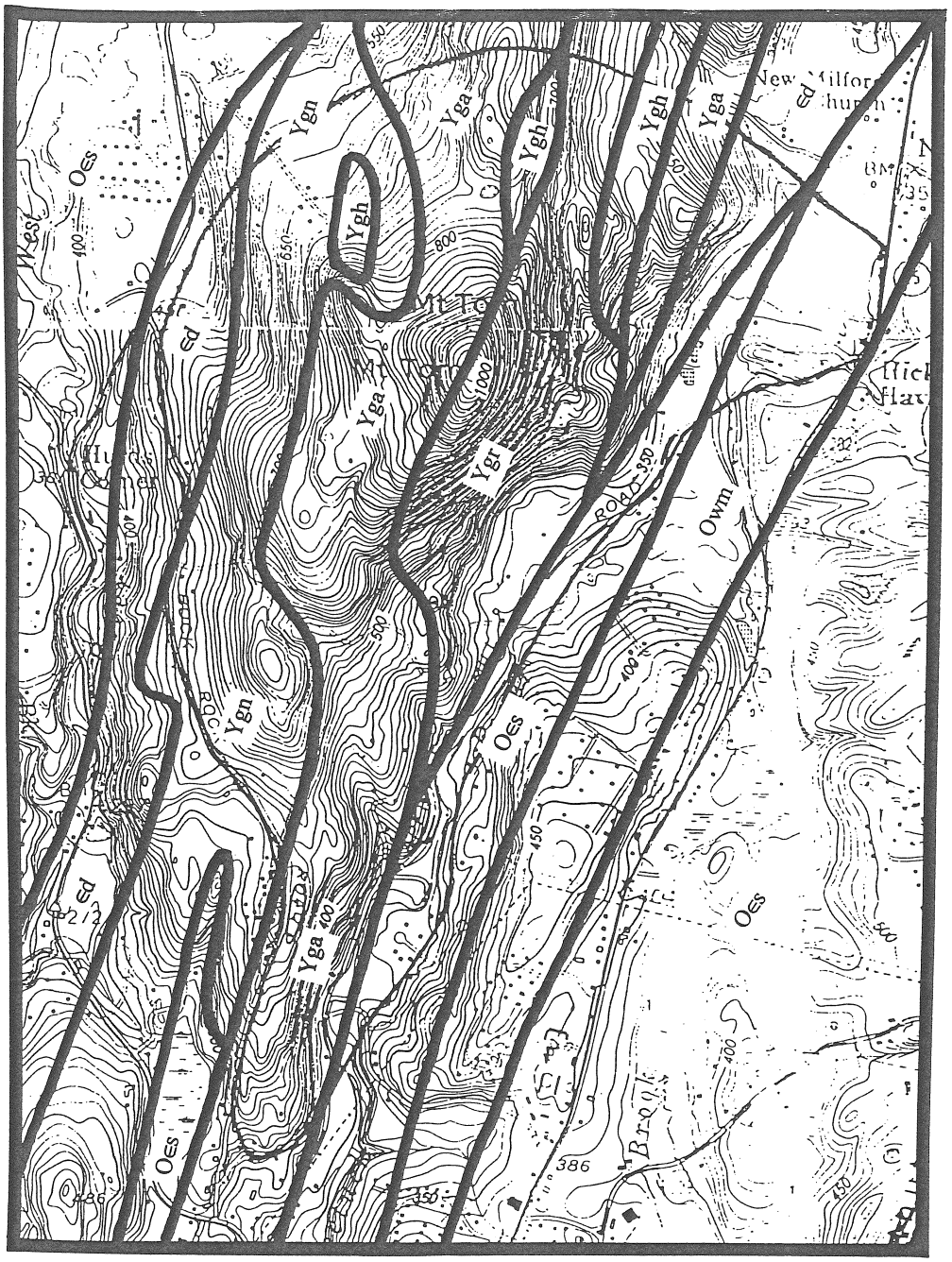
Scale

0 feet 4000

Figure 4

Bedrock Geology



Explanation

Orodovician Age (~ 480 my)

O∈s: Stockbridge Marble, White to gray colored dolomitic marble

Owm: Walloomsac Schist, Basal Marble dark- to light colored schistose marble

Cambrian Age (~ 500 my)

∈d: Dalton Formation, Gray to tan colored , feldspathic quartzite schist

Proterozoic Age (~1000 my)

Ygn Feldspathic Gneiss, Gray colored

Yga: Augen Gneiss, White to pink colored

Ygh: Hornblende Gneiss, Gray to black colored

Ygr Granitic Gneiss, Pink colored

N

Scale

0 feet 4000

Soils Descriptions

The soils of the Mt. Tom area are dominantly well drained, sloping soils formed in glacial till. Within the site there is significant variations in drainage class, slope, stoniness and parent material however. The soils are described in Appendix A of this report. The soils can be grouped into six major divisions for most land uses. The first of these divisions includes the steep, shallow to bedrock soils around Mt. Tom itself and along the southern tail of the site area. These soils include the HxC, HxE and Rh soil mapping units. The steep slopes and shallow depth to bedrock severely limits most land uses in this area.

The second division includes the soils underlain by sand and gravel which occur along the East Aspetuck River. This division includes the MyA, MyB, MyC, HbA, Tg and Twa soil mapping units. The Merrimac soils are somewhat excessively well drained. The Hartland soil is well drained. The Tisbury soil is moderately well drained. Farming, residential development, and sand and gravel mining may be feasible in this area. These soils tend to have poor effluent filtering capabilities. The HbA, MyA and MyB soil mapping units are classed as Prime Farmland.

The third division includes the soils formed in dense glacial till which commonly have a hardpan layer between 18 to 24 inches in depth. These soils occur in the northwest area of the site and again in the south central area of the site, near the East Aspetuck River. This division includes the PeC, PeD, PbB, PbC, PbD, WyB, WxB, WxC, WzC soil mapping units. The Paxton soils are well drained and the Woodbridge soils are moderately well drained. Except for the very steep D slopes, residential development and farming may be feasible on these soils. The PbB and WxB soil mapping units are classed as Prime Farmland.

The fourth division includes the soils formed in loose glacial till. These soils are found throughout the site area. The soil mapping units include: CaB, CaC, CaC2, ChB, ChC, ChD, CrC, CrD, and SvB. The Charlton soils are well drained. The Sutton soil is moderately well drained. Except for the very steep D slopes, residential development and farming may be feasible on these soils. The CaB and SvB soil mapping units are classed as Prime Farmland.

The fifth division includes the floodplain soils found adjacent to the East Aspetuck River. This division includes the Lm, Po, and On soil mapping units. These soils range from poorly drained to well drained. The use of these soils is regulated by the CT Inland Wetlands and Watercourses Act. These soils may be suitable for farming if the flooding does not last for more than 24 hours during the growing season. The On and Po soil mapping units are classed as Prime Farmland. Protecting these soils from land development is important for flood control in the East Aspetuck River Watershed.

The sixth division includes the upland wetland soils. This division includes the Lg, Wl and Bz soil mapping units. This division is not very extensive in the site area. The use of these soils is regulated by the CT Inland Wetlands and Watercourses Act and Federal Wetland Regulations. These soils are generally unsuited to most land uses. It may be feasible to build a pond in these areas but an on site investigation is needed. Protection of these soils, from any land disturbance, is beneficial for the multitude of benefits wetland areas provide.

Soils Limitations Analysis

The Soil Survey of Litchfield County, CT indicates that the soils in the Mt. Tom study area have serious limitations for development. The features limiting land-use potentials are shallow depth to bedrock, steep slopes, and a fragipan restricting subsurface water percolation. Without proper design, these intrinsic site limitations can lead to failing septic systems, polluted drinking water wells, flooded basements, and erosion problems. The soils map (Figure 5) taken in part from the Survey illustrates the spatial location of these soils on the site.

Soils are grouped on the map by land use potential. The yellow-colored area is occupied by lithic-restrictive geologic attributes (shallowness to bedrock). The pink-colored area is on lands of exposed bedrock and steep terraces. Green coloring indicates deep, coarse-loamy textured, well drained soils, derived from glacial till, on undulating to hilly sites. A smaller area of soils in the study area, colored blue, are on glacial till-derived soils, with a characteristic fragipan at about two feet below surface grade. Uncolored tracts along Paper Mill Road are on somewhat excessively well drained soils on nearly level to sloping terrain. These areas are mostly developed.

A small amount of land in the Mt. Tom study area have wetland soil types, marked on the map with blue and white striping. It is important to note that the soil survey information is generally precise to 2-acre tracts. Smaller micro-sites exist in the study area that are seasonally wet, owing to their position on the landscape and locally restricted drainage; in part due to depressions and fragipans.

The most common soil type occupying the study area is the Hollis (HxE, HxC, HrC) soil series classified as a loamy, mixed, mesic, Lithic Dystrochrept. The lithic description refers to a shallow depth to bedrock at about two feet below the ground surface. These soils are well drained, which complicates their shallowness to bedrock. Rapid percolation of water through the shallow soil to the bedrock, results in possible leaching of waters and nutrients offsite. Bedrock exposure areas classified as rock land (Rh) and steep terraces (Tg) also are present in the area.

A majority of the south-eastern part of the area is covered by the Charlton series (CrC, CrD, CaB, CaC, ChB, etc.), classified as coarse-loamy, mixed, mesic Typic Dystrochrepts. The Charlton soils occupy some steep slopes, as well as gentler mid-slope positions. The Paxton soil series is also present in the study area and characterized as a coarse-loamy, mixed, mesic Typic Fragiachrept. The most distinguishing feature of a Paxton soil is a fragipan at two feet below ground level, which restricts downward water percolation resulting in a seasonally-perched water table.

The rocklands, steep terraces, and Hollis soils present severe limitations to development utilizing onsite septic disposal systems and drinking water wells. Some lands occupied by the Charlton soil on steep slopes and shallow to bedrock are also

restrictive sites. The Paxton soils also have serious limitations owing to the fragipan and perched water table. However, sophisticated engineering controls are a possible tool to achieve utilization of onsite septic treatment systems in some fragipan-restrictive soils; but are often financially costly.

Important concerns for environmental impacts resulting from homes employing onsite septic systems are the loading of nutrients into the ground water and surface waterways. The misplacement of septic systems on lands incapable of supporting them is a formula for trouble. Because these same homes would rely upon private onsite drinking water wells, the potential for groundwater pollution and the resulting health effects need to be seriously considered. The ground water beneath the study area is classified GA. A public water supply is not readily available.

A review of the soils map illustrates that most of the Mt. Tom study area is not capable of supporting intensive development, particularly that requiring onsite sanitary systems. Perhaps there are some pockets that can support residential use; however, many of these lands are already developed. Any community sanitary system proposals would need a careful review and permit from the CT DEP Water Management Subsurface Disposal Program.

The activities of a residential development also pose additional serious post development problems associated with the destruction of the existing forested ecosystem. The forest ecosystem acts as a biofilter of air and water passing through it. Clear cutting of the forest cover on shallow, fragile soils on steep slopes, will result in loss of biotic regulation of biogeochemical flux (i.e., circulation and retention of nutrients), soil erosion, and sedimentation into surface water bodies. These environmental disturbances could compound the potential nutrient loadings from septic system failures. Storm water runoff characteristics will change because of the loss of forest ecosystem interception of precipitation, from slow release to rapid flow directed through storm sewer systems into natural surface water bodies. A storm water runoff plan would also be subject to a careful review and permit from the CT DEP Water Management Storm Water Runoff Program.

Figure 5

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Soils Map

Scale 1″ = 2000′

Wetland Resources

The most prominent wetland resources in this study area is the East Branch of the Aspetuck River, forming the eastern limit of the study area. Besides the extensive alluvial/floodplain soils associated with this river, there is only one other inland wetland soil map unit delineated in the Soil Survey of Litchfield County, Connecticut (1970) within the study area, which is a small map unit of a Walpole and Rayham complex. On recent aerial photos, a pond appears to have been created which occupies most of this map unit area. The Soil Survey also indicates several wetland "spot symbols" throughout the study area which denote wetland areas which are not large enough to map at the given scale of the Soil Survey. Aerial photo inspection also reveals that there appears to be several intermittent watercourses which drain off the slopes of Mt. Tom, which may be expected to co-exist with narrow bands of associated wetland soils. Of course, more intensive, site specific wetland soil surveys may further refine and/or add to what has been identified as part of this large-scale soil survey.

The Water Quality Classification Map of Connecticut (1987) indicates that the East Branch of the Aspetuck River is classified as a B/A category. This means that the watercourse is not meeting Class A water quality criteria or one or more designated uses (potential drinking water supply, fish and wildlife habitat, recreational use, agricultural and industrial supply, etc.) yet the goal is to obtain Class A designation. Groundwater quality classification for the study area is assumed to be GA (groundwater within the area of influence of private and potential public water supply wells that is suitable for consumption without treatment). According to the map entitled Community Water Systems in Connecticut (1984) the New Milford Water Company has a water service area on the east side of river below Wellsville, but this occupies a small portion of the study area.

The primary functions of the alluvial/floodplain soils associated with the East Branch of the Aspetuck River are flood control and nutrient removal. The wildlife function of these wetlands has been impaired since much of the vegetation within the floodplain of the study area appears to be managed through cutting, thus limiting the diversity of vegetation and the wildlife that depends on it. All functions of this alluvial/floodplain area should be increased due to its relatively large size. The smaller more isolated wetland parcels within the study area, while not as large as the alluvial/floodplain area, should also be valued to a certain extent because of their ability to sustain wildlife through providing food and shelter and increasing the overall diversity of vegetation within the study area. If these wetland areas are hydrologically connected in an overland fashion, with the Aspetuck River, they also have the ability to detain storm flows and reduce downstream flooding potential.

To assist the Town of New Milford with their future land-use decisions concerning this study area, DEP Bulletin #22 - "Assessment of Nonpoint Sources of Pollution in Urbanized Watersheds - A Guidance Document for Urban Officials" (1995) has been

given to town officials (one copy distributed with this ERT report). This document was intended to provide information on stormwater and nonpoint source pollution, as well as a process for "evaluating and improving existing regulations and practices."

Fisheries Resources

Site Description

A reach of the East Aspetuck River, approximately 2 miles in length, is found within the bounds of the Mt. Tom study area. Through this reach, the East Aspetuck River has a channel approximately 30 feet in top of bank width and normal flow depths of averaging gradient channel produces surface flow predominated by moving pool interspersed with shallow riffle. Stream substrate is composed of small boulder, cobble, gravel, coarse sand, and sand silt fines. Dense growths of hardwoods and woody shrubs predominate as riparian vegetation and provide the East Aspetuck River with a nearly complete canopy. Physical in-stream habitat is provided by water depth, small boulders, undercut banks, and fallen woody debris.

Aquatic Resources

This reach of the East Aspetuck is a classic example of a moderate gradient, cold water stream. Limited development within the immediate watershed has provided a means of maintaining the river's physical habitat water quality. The Department of Environmental Protection classifies this reach of the east Aspetuck River as Class B/A" surface waters.

Surveys of the East Aspetuck River's aquatic resources have been conducted by the Fisheries Division. The most recent survey, shown as Figure 6, had been completed in 1992 and focused on a reach of stream approximately one (1) mile downstream of the Mt. Tom study area. Within this reach the stream was found to support a population of the following stream dwelling finfish species: brown trout, blacknose dace, longnose dace, bluntnose minnow, cutlips minnow, common shiner, spottail shiner, fallfish, tessellated darter, and white sucker. Additionally, bluegill sunfish and pumpkinseed sunfish were collected although these species are common to warmwater lakes and ponds. Most if not all of these species are anticipated to be found within the river reach of the Mount Tom study area.

The Fisheries Division manages the East Aspetuck River as a trout fishery. Figure 7 notes that approximately 3500 adult trout (a mix of brook, brown, and rainbow trout) are stocked annually in select river reaches from Lake Waramaug to the Housatonic River confluence which includes a portion of the river reach within the study area.

Division records indicate independent liberation of trout within the East Aspetuck River reach on property of the Pratt Center. Within this section of river, regulations imposed by the Pratt Center limit angling to fly fishing only with all trout caught required to be released.

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Impacts

Land use changes within a predominantly forested watershed such as that found within the Mount Tom study area have the potential to adversely impact East Aspetuck River habitats and resources should mitigative measures not be implemented. Anticipated impacts include:

- Soil erosion and subsequent sedimentation through increased runoff from unvegetated areas. Excessive erosion and sedimentation can degrade water quality and physical habitat in turn impacting the resident finfish population. Specifically, excessive siltation has the potential to:
    - cause a depletion of oxygen within the water column
    - disrupt fish respiration and gill function
    - reduce water depth resulting in a reduction of habitats used by fish for feeding, cover, and spawning
    - reduce fish egg survival
    - reduce aquatic insect production
    - promote growths of aquatic plants
- Influx of stormwater drainage may cause aquatic habitat degradation due to the release of "pollutants" from developed areas; such pollutants include gasoline, oil, heavy metals, road salt, fine silts, and coarse sediments.
- Removal of riparian vegetation along watercourses can result in the following:
    - remove the natural "filtering" effect of vegetation which has the ability to prevent sediment, nutrients, fertilizers, and other non-point source pollutants from upland sources from entry into watercourses; such non-point pollutants can degrade water and habitat quality
    - increase water temperature during the summer months (thermal loading) while decreasing winter water temperatures to levels where there may be a complete cover of ice
    - decrease bank stability thereby increasing watercourse siltation and habitat degradation

- eliminate or drastically decrease the supply of large woody debris to watercourses; such material provides critical physical habitat features for numerous species of aquatic organisms

- reduce a substantial proportion of food for aquatic insects which in turn constitutes a reduction in a significant proportion of food available for resident finfish

- stimulate excessive aquatic plant growth

- decrease of the riparian corridor's ability to serve as a "reservoir" storing surplus runoff for gradual release back into watercourses during summer and early fall base or low flow periods

- Nutrient enrichment from fertilizer runoff from manicured lawns will stimulate aquatic plant growth. Herbicide runoff from those areas may result in fish kills and water quality degradation.

Recommendations

The following should be considered in effort to mitigate impacts potentially affecting the East Aspetuck River:

- Maintain, at a minimum, a 100 foot open space buffer zone along any development's closest encroachment to all perennial watercourses and 50 feet along those surface waters of intermittent duration. Activities resulting in alteration of riparian habitat should not be allowed within these zones. Research has indicated that buffer zones of this width prevent damage to aquatic ecosystems that are supportive of diverse species assemblages; these buffers absorb surface runoff, and the pollutants they may carry, before they enter wetlands and aquatic habitats. Please refer to documentation in Appendix B which presents Fishery Division policy and position regarding riparian buffers.

- Establish comprehensive erosion and sediment control plans with mitigative measures (hay bales, silt fence, etc.) to be installed prior to and maintained through all development phases; land disturbance and clearing should be kept to a minimum with all disturbed areas being protected from storm events and re stabilized as soon as possible.

- Design and implement effective stormwater management plans to contain storm water runoff on-site and not allow direct discharge to surface watercourses;

stormwater detention basins/ponds should not be constructed in watercourses rather be located in upland areas.

- Wetland or watercourse crossings should be avoided. Unavoidable crossings should be by span bridge. Areas for crossing should be carefully selected to minimize riparian wetland impacts.

- Limit any permitted activities adjacent to riparian buffers to historic low precipitation periods of the year; reduced precipitation periods of summer - early fall provide the least hazardous conditions to work near sensitive aquatic environments.

- Limit liming, fertilizing, and the introduction of chemicals to developed land susceptible to runoff into watercourses.

Figure 6

Fisheries Division Finfish and Habitat Survey Information for the East Aspectuck River, New Milford

STREAM NAME : EAST ASPETUCK RIVER SITE #: 4036
SITE DESCRIPTION: UPSTREAM OF WELLS RD., NEW MILFORD

SAMPLE LENGTH : 147. SAMPLE DATE: 07/30/92

PHYSICAL		CHEMICAL	MEAN	STD
AIR TEMP. . . .	:26.00 (C)	DISSOLVED OXYGEN (mg/l). . :	9.1	0.12
WATER TEMP. . .	:22.00 (C)	pH . . . . . :	7.3	0.02
VELOCITY. . . .	: 0.3370(m/s)	COND . . . . . (uS/cm3). . :	174.3	1.2
DISCHARGE . . .	: 0.5940(m3/s)	ALKALINITY .(mg CaCO3 eq/l):	62.3	0.46

	MEAN	STD	
WIDTH. . . . . :	9.56	3.27	(m)
DEPTH. . . . . :	25.27	21.37	(cm)
DOMINANT SUBSTRATE TYPE. . :	3	POOL/RIFFLE RATIO . .:	0.38
TYPE THREE SUBSTRATE . . . :	0.49 (%)	AIR/WATER TEMP. RATIO:	
EMBEDDEDNESS OF TYPE THREE :	61.83 (%)		
OVERHEAD CANOPY. . . . . :	73.00 (%)		
INSTREAM SHELTER . . . . . :	270.4 (m2)		

BIOLOGICAL

SPECIES	POPULATION SIZE (Number/ha)	STANDARD ERROR (Number/ha)
Lepomis macrochirus	268.8	63.9
Rhinichthys atratulus	2273.7	243.9
Pimephales notatus	7.3	0.0
Salmo trutta	268.8	19.0
juvenile centrarchid	14.5	0.0
Exoglossum maxillingua	43.6	0.0
Luxilus cornutus	479.4	25.2
Semotilus corporalis	602.9	16.5
Rhinichthys cataractae	283.3	39.3
Lepomis gibbosus	7.3	0.0
Notropis hudsonius	14.5	0.0
Etheostoma olmstedi	305.1	28.7
Catostomus commersoni	1794.2	76.3

Scientific name	Common name	Scientific name	Common name
Ameiurus nebulosus	brown bullhead	*Ambloplites rupestris*	rock bass
Catostomus commersoni	white sucker	*Ameiurus catus**	white catfish
Erimyzon oblongus	creek chubsucker	*Ameiurus natalis*	yellow bullhead
Esox americanus	grass pickerel	*Amia calva*	bowfin
Esox niger	chain pickerel	*Carassius auratus*	goldfish
Etheostoma olmstedi	tessellated darter	*Cyprinus carpio*	common carp
Fundulus diaphanus *	banded killifish	*Dorosoma cepedianum*†	gizzard shad
Lepomis auritus	redbreast sunfish	*Esox lucius*	northern pike
Lepomis gibbosus	pumpkinseed	*Ictalurus punctatus*	channel catfish
Luxilus cornutus	common shiner	*Lampetra appendix*	American brook lamprey
Notemigonus crysoleucas	golden shiner	*Lepomis cyanellus*	green sunfish
Notropis bifrenatus	bridle shiner	*Lepomis macrochirus*	bluegill
Notropis hudsonius	spottail shiner	*Lota lota*	burbot
Perca flavescens	yellow perch	*Micropterus dolomieu*	smallmouth bass
Rhinichthys atratulus	blacknose dace	*Micropterus salmoides*	largemouth bass
Rhinichthys cataractae	longnose dace	*Oncorhynchus mykiss*	rainbow trout
Salvelinus fontinalis	brook trout	*Oncorhynchus nerka*	sockeye salmon
Semotilus corporalis	fallfish	*Pimephales notatus*	bluntnose minnow
Cottus cognatus	slimy sculpin	*Pimephales promelas*	fathead minnow
Semotilus atromaculatus	creek chub	*Pomoxis annularis*	white crappie
Exoglossum maxillingua	cutlips minnow	*Pomoxis nigromaculatus*	black crappie
Enneacanthus obesus	banded sunfish	*Prosopium cylindraceum*	round whitefish
Etheostoma fusiforme	swamp darter	*Salmo trutta* ‡	brown trout
		Stizostedion vitreum	walleye
		Umbra limi	central mudminnow

Figure 7

Fisheries Division Fish Distribution Report (1995) Detailing Trout Liberated into the East Aspetuck River, New Milford

CATCHABLE TROUT DISTRIBUTION 1995

NAME AND LOCATION OF WATER BODY	BROOK TROUT YEARL 6-8"	BROOK TROUT ADULT 9-12"	BROWN TROUT ADULT 9-12"	BROWN TROUT SBS*	RAINBOW TROUT ADULT 9-12"	RAINBOW TROUT SBS*	TOTAL
HARTFORD COUNTY (continued)							
STONY BROOK, SUFFIELD		140	670	15	170		995
STRATTON BROOK, SIMSBURY		210	1,190		170		1,570
UNIONVILLE BROOK, FARMINGTON	380						380
WASH BROOK, BLOOMFIELD	150						150
TOTALS	4,170	5,080	25,110	35	6,790	80	41,265
LITCHFIELD COUNTY							
BLACK ROCK F/C IMPOUNDMENT, THOMASTON, WATERTOWN			710		500		1,210
BLACK ROCK POND, WATERTOWN		320	1,210		2,420		3,950
COLEBROOK F/C IMPOUNDMENT, COLEBROOK			2,730		2,020		4,750
EAST TWIN LAKE, SALISBURY			17,074				17,074
HANCOCK BROOK F/C IMPOUNDMENT, PLYMOUTH			180		170		350
HIGHLAND LAKE, WINCHESTER			11,000		8,800		19,800
LAKE MCDONOUGH, BARKHAMSTED, NEW HARTFORD			1,120		1,170		2,290
LAKE WINFIELD, PLYMOUTH			120		410		530
MAD RIVER F/C IMPOUNDMENT, WINCHESTER			1,060		520		1,580
MOHAWK POND, CORNWALL, GOSHEN		1,070	1,550		880		3,500
MT. TOM POND, LITCHFIELD, MORRIS, WASHINGTON			2,540		2,080		4,620
NORTHFIELD F/C IMPOUNDMENT, THOMASTON			560		550		1,110
TYLER POND, GOSHEN			2,600		2,960		5,560
WEST HILL POND, BARKHAMSTED, NEW HARTFORD			5,650		13,000		18,650
WEST SIDE POND, GOSHEN			910		1,460		2,370
WONONSCOPOMUC LAKE, SALISBURY			9,710				9,710
ASPETUCK RIVER, E. BRCH, NEW MILFORD - NEW PRESTON		710	2,480		310	40	3,540
BAKERSVILLE BROOK, NEW HARTFORD	290						290
BANTAM R. INLET, W. BRCH, GOSHEN, LITCHFIELD			100		170		270
BANTAM RIVER FLY AREA, LITCHFIELD, MORRIS		300	1,020		220	20	1,560
BANTAM RIVER OUTLET, LITCHFIELD, MORRIS		160	1,610		270	25	2,065
BANTAM RIVER TRIBUTARY, LITCHFIELD		110	1,440		220	20	1,860
BEAVER BROOK, BARKHAMSTED	590						590
BLACKBERRY RIVER, CANAAN, NORFOLK		530	1,560		350	15	2,455
BRANCH BROOK, THOMASTON, WATERTOWN	760						760

*Surplus Broodstock

Wildlife Resources

Introduction

The following evaluation was made based upon cursory field review and use of aerial photos of the area, along with existing resource information concerning the area.

Descriptions of Area/Wildlife Habitats

The approximate 800 acre study area is dominated by Mt. Tom, which is located in just about the center of the study area. Mt. Tom is 1000 in elevation and much of the study area is dominated by hilly terrain, with very steep slopes, especially on the eastern side of Mt. Tom. 'The study area is primarily dominated by contiguous forest land, except for the major power line running east to west across it. There is some development along the edges of the study site. There are homes along Paper Mill Road on the eastern side of the study area, a camp on Bucks Rock Road on the western side of the study site, and the housing development on Mt. Tom Road, in the northwest corner of the study site.

After a brief field review and aerial photo interpretation, it was determined that the area is comprised mainly of mature mixed hardwood forest with several large areas of mixed conifers. The majority of the conifers are located in the southern tip of the property and on the land owned by the Pratt Nature Center. Other habitat types found in the area are deciduous wetlands, wetlands associated with the intermittent streams in the study area and wetlands associated with the Aspetuck River. There are also some old field areas, on land owned by the Pratt Center and on the Nelson and Kelly-Heaton properties. There are some large lawn areas and some land maintained as open hay land, on the Pratt property and associated with the larger house lots, on Paper Mill Road (please see Figure 8).

Wildlife habitat is said to be the complex of vegetative and physical characteristics that provide for all the requirements of wildlife, that is food, shelter, resting, nesting and escape cover, water and space. The study site contains mixed hardwood forest land habitat, conifer or evergreen forested habitat, old field and hay field type habitat and deciduous and riparian wetland type habitat, which provides for the needs of a wide variety of wildlife.

Generally, the greater the habitat diversity and degree of interspersion of various habitat types, the greater the variety of wildlife there will be using an area. In other instances, large unbroken expanses of forest land provide important habitat for many species of wildlife, especially some species of migratory birds. There are however, many factors to consider when determining habitat use and quality of a study area, including the size of the habitat types, overall size of the study area, habitat types, quality and diversity, and juxtaposition with other neighboring habitat, etc.

Although the habitat interspersion on the study area is somewhat limited, the area provides good to excellent wildlife habitat, because it provides a relatively large contiguous expanse of quality forest land habitat. Large contiguous areas of habitat, with minimal development or none at all, (with homes, lawns, road crossings, parking lots, etc.) are becoming harder and harder to find in Connecticut, as development increases. Large areas of contiguous forest land provide habitat for a myriad of wildlife, but are particularly useful to species like the bobcat, fisher, goshawk, red eyed vireo, and black throated green warbler who prefer and/or require large unbroken tracts of forest land.

When the study area is considered in conjunction with the existing habitat that is just north of the study area, (Please refer to the ERT report published in 1986 on the Merryall section of New Milford) separated only by small secondary roads, the area is even more valuable as wildlife habitat. The large relatively undeveloped area north of the study area bounded by Rte 202 and Meetinghouse Road contains quality forest land, agricultural and hay land and some significant wetland areas. As development in Connecticut increases, large regional tracts of land with relatively little development become more and more important to wildlife.

The study site provides habitat for a wide variety of wildlife species, especially those species which require large unbroken tracts for forest land. An array of birds, mammals, reptiles and amphibians could be expected to utilize this area to serve all their needs while many more would find it a place to meet some requirements. Species likely to occur in the area include: bobcat, coyote, raccoon, turkey, ruffed grouse, woodcock, mink, otter, opossum, gray and red squirrel, deer, fox, pileated woodpecker, goshawk, red tailed hawk, red spotted newt, spotted salamander, garter snake, etc. along with many, many others.

There is one state listed threatened species and one species of special concern that have occurred on the study site according to the Department of Environmental Protection's Natural Resources Center Diversity Data Base (see Appendix C). This data base tracks and maps all known occurrences of state listed threatened, endangered and species of special concern in the state. The sharp shinned hawk (*Accipiter striatus*), a state threatened species and the golden-winged warbler (*Vermivora chrysoptera*) a state species of special concern have been recorded on the study site. Also recorded within the Data Base is the known occurrence of the golden crowned kinglet (*Regulus strapa*) a neotropical migrant species of bird. Neotropical migrant species of birds include those birds that for the most part breed in the United States and Canada and migrate to wintering grounds in the Caribbean, Mexico and the southward. Most research indicates that the populations of many of the birds belonging to this group have shown dramatic declines, in part due to destruction of habitat on their wintering grounds, but also due to habitat fragmentation (breaking up available habitat with the development of homes roads, etc.) and habitat loss on their breeding grounds here in the U. S., have also played a large role in their population decline. Some neotropical migrants require fairly large areas of brushy, shrubby habitat such as that found on the Pratt Center

property while others require large acreage of forest land to nest in. The group of birds that require large acreages of contiguous forest land to nest in (100 to 1000 acres) are collectively called "area sensitive species" or "interior breeding birds." Based on the habitat types occurring on the study area, and the size of the contiguous forested habitat, a variety of other neotropical migrants probably make use of the area also, including some of the interior breeding birds.

Forest Type Habitat

The study site is dominated by mixed hardwood forest with several large areas of dense conifer or evergreen stands. The mixed hardwood forest contains a variety of species including oak, hickory, sugar maple and beech. In some areas the under story is fairly thick, and contains barberry, witch hazel, and a variety of hardwood regeneration, while in other areas, the under story is sparse. Conifer species include hemlock and white pine.

Forested areas provide valuable wildlife habitat. Forests provide many things to wildlife including: cover, food, nesting places, denning sites and roosting places. In addition, trees provide a variety of food in the form of nuts, berries, catkins, buds and browse. Trees, both living and dead, also serve as a home to a variety of insects which in turn are eaten by many species of birds like woodpeckers, warblers and nuthatches.

The conifer stands provide important cover year round, but are especially important during the winter. Snow depths are usually less under conifer stands and temperatures tend to be higher during the winter because winds tend to be moderated. Many species of birds use conifers to nest in, such as the golden crowned kinglet, while many other use it for roosting cover.

The study site contains snag and den trees. Snag trees (dead and dying trees) are a source of insects for a variety of species. Den trees or trees with cavities in them can serve as nesting and denning places for animals such as squirrels, raccoons and fisher.

In addition to serving as habitat for a wide variety of birds and mammals, upland forest also serves as habitat for salamanders and reptiles. For example, the relatively abundant red-backed salamander uses forested areas extensively. It breeds and deposits eggs under rotten logs and rocks and spends it's adulthood under leaf litter. Many other species of salamanders utilize temporary pools for breeding and then spend the rest of their time in nearby forested uplands. In addition to high profile species of mammals and birds, forested areas provide habitat for a variety of other lessor known species.

Because this area of forest land is relatively unbroken (with the exception of the power line) and contains good quality forest land habitat it provides good to excellent wildlife habitat.

Wetland Type Habitat

Because wetlands increase the habitat diversity of an area and offer a variety of food and cover to wildlife they are important areas to consider for protection. Acre for acre some types of wetlands and their associated riparian zones exceed all other land types in wildlife productivity. In addition to their value as wildlife habitat, wetlands serve other valuable functions including, water recharge, sediment filtering, flood storage etc. Because of their values as wildlife habitat and the other important functions they serve, the development of, filling in and/or crossing should be avoided or limited whenever possible.

The study site contains riparian wetland habitat associated with the East Aspetuck River, areas of deciduous wetlands and various intermittent stream. Brooks and even intermittent streams and their associated wetland zones can provide important habitat for a number of species including various types of reptiles, amphibians and birds. Species like the song sparrow, catbird and yellow warbler tend to feed and nest in riparian habitat where cover is abundant.

The East Aspetuck River which forms the eastern boundary of the study area is characterized in this area as being a fairly fast moving stream with a rocky bottom, interspersed with slower sections offering a muddy/gravelly bottom. The river provides very important riverine type habitat (river and associated riverside) to a variety of species, such as mink, otter, beaver, muskrat, blue heron, kingfisher and raccoon.

Streams and brooks can also serve as important travel corridors for a variety of wildlife. They provide travel corridors for many species of wildlife, to travel within the site and to and from the site. Streams are often easier to travel along especially in the winter. Streams and even intermittent streams also offer a variety of food items like insects, various invertebrates and facultative wetland vegetation. Many species of wildlife would utilize some or all of these wetland/stream.

The wetlands reviewed in the field were located on the Pratt Center Property and included the East Aspetuck River and a small pond and a wet meadow complex located just off Rte 202. There are numerous other deciduous type wetlands mainly associated with the intermittent and perennial streams located in the study area. Many species of wildlife could utilize the Aspetuck as a major travel corridor, especially otter, mink, muskrat, beaver, fox and coyote. A variety of birds would make use of the brushy, shrubby cover along the East Aspetuck River and the adjacent reverting fields that have heavy herbaceous and brush cover in the area of the Pratt Center.

Old Field - Open Field Type Habitat

The study area contains some old reverting fields on the Pratt Center property, the Kelly-Heaton property and the Nelson Property. These old field areas are characterized by grasses and herbaceous growth, mixed with shrubs, hardwood saplings and

evergreens like red cedar. Some open fields are found in conjunction with the larger house lots on Paper Mill Road, which are probably mowed several times a year. The Pratt Center also contains some open herbaceous/hay fields along with the areas of old field.

The major power line right of way is maintained in an early successional stage by the power company. Grasses and herbaceous growth dominant some areas of the power line right of way, while in others there is a thick growth of saplings, shrubs and small trees.

These types of areas provide abundant food and cover for a variety of wildlife species. Cottontail rabbits, and small mammals like meadow voles, mice and moles use these areas, which in turn provide food for animals like fox, coyote, red tailed hawk and the great horned owl. Blue birds, sparrows, catbirds yellow finches, turkey and ruffed grouse also use these areas.

Threatened and Endangered Species and Species of Special Concern

According to the DEP Natural Resource Center's (NRC) Data Base, a pair of sharp-shinned hawks was sighted along with several young in the area of the Pratt Center, in the mid 1 980s. Based on this sighting information, it seems likely that a pair of sharp-shinned hawks nested in the vicinity of the study site. The sharp-shinned hawk is a state listed threatened species, because it is a rare to uncommon breeder in the state. According to Bevier (1994), the sharp-shinned hawk is a common migrant through the state, especially when weather conditions during September and October are appropriate. At these times many can be seen migrating through at prominent hawk watching spots in the state.

These hawks utilize extensive woodland in conjunction with forest openings that are used for foraging. They frequently nest in dense stands of conifers. The study area provides the extensive woodland needed by sharp-shinned hawks, along with the stands of dense conifers for nesting. Reverting fields and adjacent forest openings provide areas for foraging.

The golden winged warbler is currently listed as a species of special concern in Connecticut. DEP Natural Resources Center Data Base records indicates a confirmed nest in the area of the Pratt Center, in the mid 1980's. According to the "Atlas of Breeding Birds of Connecticut," it nests in Connecticut only in the northwest sector. It has historically occurred in small, local populations in the state, but such populations were formerly more widely distributed.

This bird typically breeds in early successional type habitats that support sparsely distributed deciduous plants, such as old fields resulting from abandoned farmland bordered by second growth deciduous forests. The heavy brushy cover found in the old fields on the Pratt Center bordered by the forest land could provide the necessary habitat for this species, although no confirmed sightings have occurred in the last few years. It

must be stressed however, that old field areas and early successional stage forest land must be maintained through management efforts such as mechanical mowing and cutting and/or burning.

The Natural Resource Center Data Base also has a record of golden crowned kinglet nesting on the study site. Although not a species of special concern, it is an uncommon nester in the state. It belongs to the group of birds collectively know as neotropical migrants. According to Degraaf et al (1995) it breeds primarily in dense conifer forests, especially where spruce is present. There is a stand of planted Norway Spruce on the property owned by the Pratt Center, but it is not known if this habitat is being used by the birds.

Potential Wildlife Impacts

As with any development of an undeveloped area, additional development in this area would have a negative impact on the wildlife and wildlife habitat. The impact of additional housing developments in this area, especially into the interior of the undisturbed portion of land, would be extensive, since it would further encroach upon this area of relatively undisturbed habitat.

If an one or more areas of the study site were developed, the contiguous relatively undeveloped nature of the area would be now broken up by the construction of homes, roads, parking lots, walkways and lawns. Any new development would further encroach upon and reduce the size of this large tract of habitat.

An often overlooked impact of development is the general increased disturbance to wildlife caused by increased human presence, vehicular traffic, and free roaming children, dogs and cats. This could drive out the less tolerant species from the immediate area of development and even effect areas where there has been no physical change. The value of the study area for wildlife habitat would correspondingly decrease as the amount of development in the area increased.

Certain species which are adaptable to man's activities may increase due to this presence and associated nuisances may occur. Typical species which can become a nuisance include pigeons, starling and raccoons. Species sensitive to man's presence or the changes he will make at the site will either move out or perish.

Development of some portions of the study area could certainly negatively impact the Aspetuck river and its associated riparian habitat. Increased runoff from the development containing oils and various chemicals from roads and driveways, along with fertilizers applied to lawns could negatively impact the water quality of the river which in turn could degrade the wildlife habitat that now exists.

Wildlife Habitat Management

Maintaining and improving the existing wildlife habitat would benefit the sharp-shinned hawk, the golden winged warbler and the golden crowned kinglet, along with most of the other species currently occupying the site. Maintaining the extensive forest land by limiting new development would conserve this valuable habitat type. Planned professional forestry management such as timber stand improvement, shelter wood cuts, etc., should not negatively impact the habitat for any of the species now occupying the area, if carried out with wildlife habitat enhancement in mind. Managing the old field areas through mowing and/or burning would be necessary to maintain this stage of vegetation. Without some intervention, these areas will eventually grow back up or succeed into forest land once again.

New Milford is a large town that has seen tremendous growth in the last ten years, with many new homes being constructed every year. The Mt. Tom area appears to be one of the few remaining large areas of relatively undeveloped habitat in the town. A large portion of this area is owned by the Pratt Center and The Weantenogue Land Trust, so it will never be developed, and there is a sizable portion of land north of the study area that is under the farmland preservation program and will also never be developed. The large block of forest land in the Mt. Tom area provides important wildlife habitat in an area of the state undergoing rapid development. If looked at as just part of a larger tract or corridor of protected wildlife habitat already preserved through easements to the north, this tract of wildlife habitat is even more valuable.

Comments on PRD (Planned Residential Development) Concept

The designs of developments can augment or help decrease the negative effects of development on an area and the wildlife habitat provided by that area. Typically, clustering homes and leaving more open space (as long as the density of the cluster development is not increased too much) is more desirable than chopping an area up into small lots. Breaking up an area by creating many small lots 1/4 to 3 acres is usually the least desirable of all development alternatives. It results in the greatest habitat loss and disturbance from human development. Clustering homes (while not exceeding what the land will reasonably support) and leaving a large portion of the proposed development area in open space is desirable. If the number of homes clustered on a site greatly exceeds what would be allowed there under regular zoning, it likely that the cluster concept would result in a significant wildlife habit impact, because the majority of the area would still be developed.

Larger lots (10 acres or more) are much more desirable than small house lots, because overall, less habitat is lost because less land is disturbed with lawns, driveways, roads, houses, etc.

The pros and cons of various types of development design are highly dependent on the existing habitat types, quality and size, the juxtaposition of the development to proposed or existing open space, and the quality of neighboring habitats. The most

sensitive areas on a site should be furthest from the development and these are typically wetland sites, rocky steeply sloping sites, old fields and open hay fields and high quality oak forest land.

In a small but heavily developed and populated state like Connecticut, where available habitat continues to decline on a daily basis, it is critical to conserve, maintain and enhance where possible existing wildlife habitat.

Sources Cited

Bevier, I. R., ed. 1994. *The Atlas of Breeding Birds of Connecticut. State Geological and Natural History Survey of Connecticut*, Department of Environmental Protection. Bulletin 113.

DeGraaf, R. M., Rappole, J. H. 1995. *Neotropical Migratory Birds. Natural History, Distribution, and Population Change.* Comstock Publishing Associates. Ithaca and London. 676 pgs.

Figure 8
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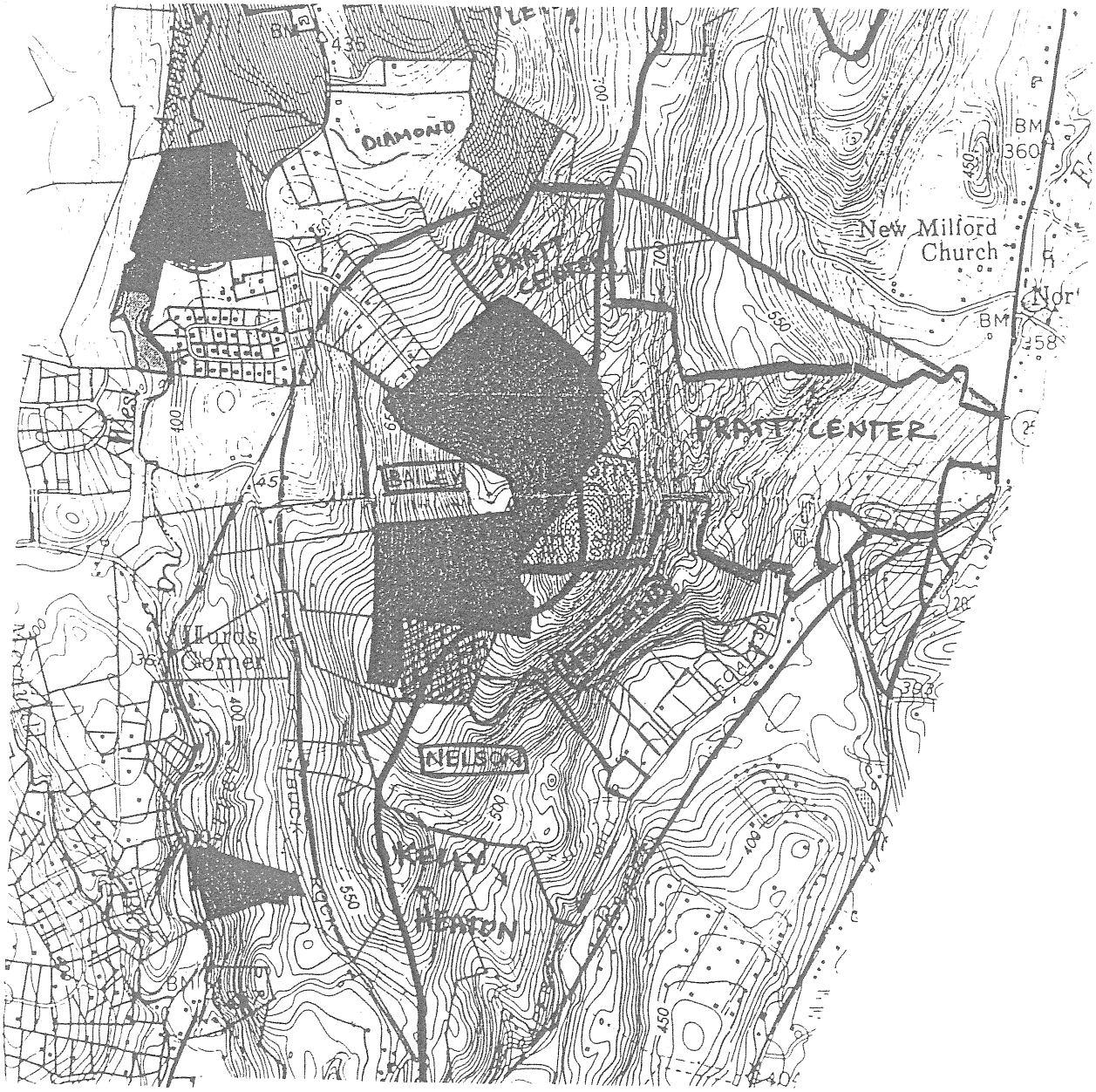
Property Map

(No Scale)



Archaeological Review

A review of the State of Connecticut Archaeological Site Files and Maps show six prehistoric Native American encampments located within the Mt. Tom study area along the Aspetuck River. These sites represent Indian camps occupied by hunter-gatherer groups utilizing the natural resources of the river drainage area. Two sites are relatively dated to over 4,000 years ago. The files suggest that the archaeological resources in the area are relatively shallow (within the upper two feet of soil). Any land use operations may have an adverse effect on these cultural resources.

Field review of the Mt. Tom area indicates that much of the topographical and geological features of the land suggest a low probability for undiscovered archaeological sites due to excessive slope. Areas of high sensitivity occur when outcroppings of bedrock create a natural ledge providing places of shelter desirable for prehistoric encampments. These areas are limited and would require blasting of the bedrock in order to have an adverse effect. The main areas of archaeological concern consist of the Aspetuck River floodplain as far north as the New Milford Church and the initial terraces of well-drained soils overlooking the river drainage.

The Office of State Archaeology highly recommends an archaeological field review for any development project proposed for the above-named area. Site location information is confidential due to concerns of vandalism, however the Office of State Archaeology would be pleased to share this information with town officials making landuse decisions on properties within the Mt. Tom area. The Office of State Archaeology is available to provide any technical assistance necessary to conduct any cultural resource review for the project area and they look forward to working with the Town of New Milford in the preservation and conservation of its historical resources.

Appendix A

Soils

Scale 1″ = 1320′

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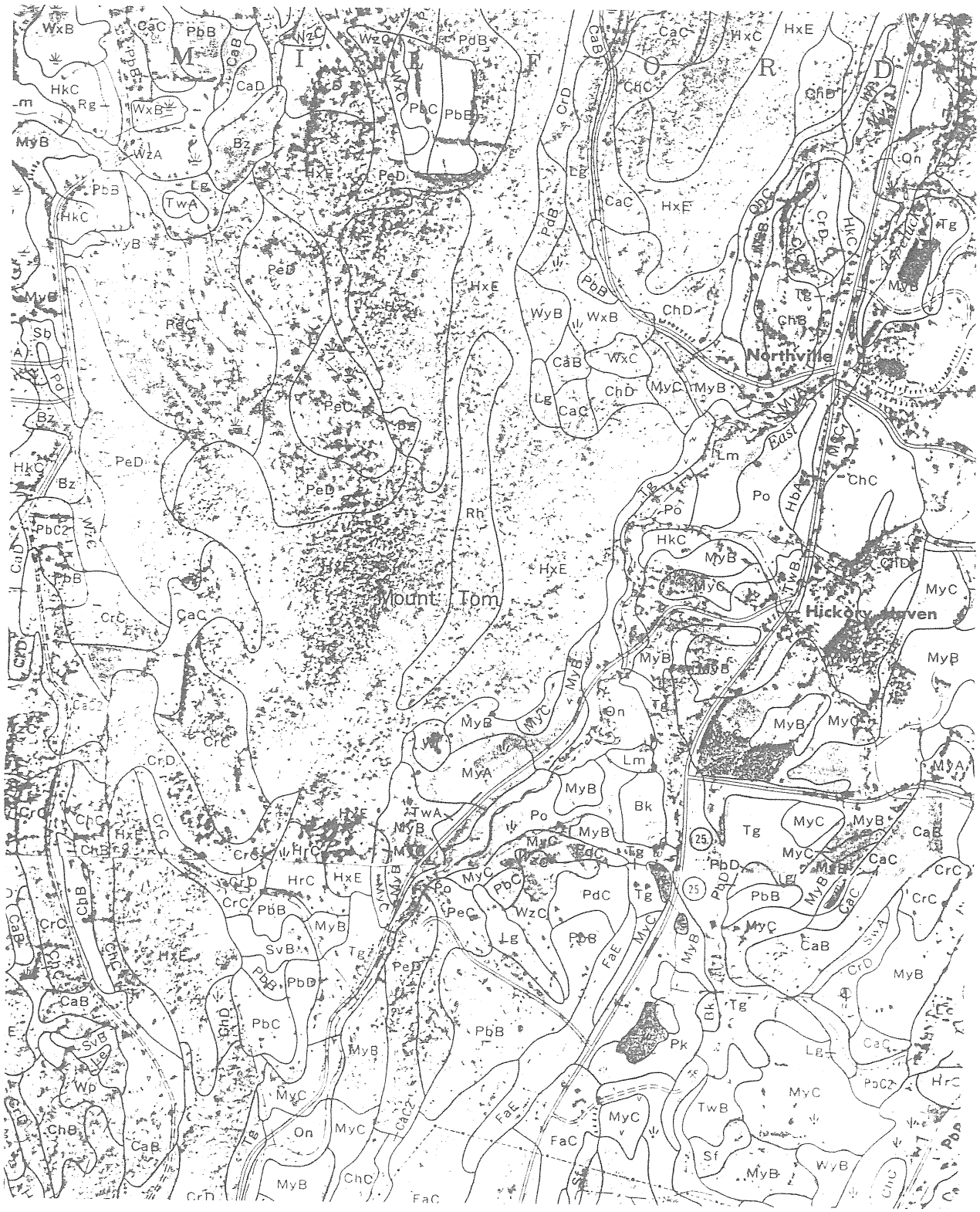

Appendix B

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

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

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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Attachment 2.

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Appendix C

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

NATURAL RESOURCES CENTER
79 Elm Street, Store Level
Hartford, CT 06106
Natural Diversity Data Base

December 10, 1996

Elaine Sych
Kings Mark Environmental Review Team
1066 Saybrook Road
P.O. Box 70
Haddam, CT 06438

re:Mount Tom Area Assessment(New Milford, CT)

Dear Ms.Sych:

I have reviewed Natural Diversity Data Base maps and files regarding the area delineated on the map you provided and listed above. According to our information, there are known extant populations of State Threatened sharp-shinned hawks (*Accipiter striatus*) , Special Concern golden-winged warblers (*Vermivora chrysoptera*) and other neotropical migrants such as golden-crowned kinglets (*Regulas strapa*) that occur within the vicinity of Mount Tom. I have sent your letter to Jenny Dickson and Julie Victoria (DEP-Wildlife) for further review.

Natural Diversity Data Base information includes all information regarding critical biological resources available to us at the time of the request. This information is a compilation of data collected over the years by the Natural Resources 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 substitutes for on-site surveys required for environmental assessments. Current research projects and new contributors continue to identify additional populations of species and locations of habitats of concern, as well as, enhance existing data. Such new information is incorporated into the Data Base as it becomes available.

Please contact me if you have further questions at 424-3592. Thank you for consulting the Natural Diversity Data Base. Also be advised that this is a preliminary review and not a final determination. A more detailed review may be conducted as part of any subsequent environmental permit applications submitted to DEP for the proposed site.

Sincerely,

D M. McKay

Dawn M. McKay
Biologist/Environmental Analyst

CC: Jenny Dickson
Julie Victoria

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION
FRANKLIN WILDLIFE MANAGEMENT AREA
391 ROUTE 32
NORTH FRANKLIN, CT 06254
TELEPHONE: (860) 642-7239

December 18, 1996

Ms. Elaine Sych
Kings Mark Environmental Review Team
1066 Saybrook Road
Haddam, CT 06438

re: Mount Tom Area Assessment, New Milford

Dear Ms. Sych:

Your request has been recently forwarded to me from Dawn McKay of the Department of Environmental Protection's (DEP) Natural Resources Center. Their records indicate that there are documented records for Sharp-shinned hawks (Accipiter striatus) at this site.

I have not seen any detailed plans of what is to take place at this site nor have I made an on-site inspection. Our data on Sharp-shinned hawk distribution and abundance in Connecticut is poorly documented. Sharp-shinned hawks build a large platform nest almost 2 feet across on the low side-limbs of an evergreen, only 12-14 feet from the ground. This species raises 6-8 young, the most of any raptor. I don't have a radius figure, but sharp-shinned hawks are vicious in defense of their nests. Only their small size prevents them from being dangerous to humans, for they make hard contact when they strike. They usually build a new nest in the same area year after year. They arrive in Connecticut at the end of March and leave in September.

Sharp-shinned hawks are 10-14 inches long with a wingspan of 20-27 inches. The body is long and slender, legs are bright yellow, and the wings are rounded. In the adults the upperpart is blue-gray and the underparts are white, heavily cross-barred with red-brown except the throat which is finely streaked. The tail end is square or slightly forked. The tail is cross-barred with three or four narrow bands of black.

I recommend that a survey be conducted in the spring to determine if this species is breeding on the property. If you need more information about this species please feel free to contact me.

Sincerely,

Julie Victoria
Wildlife Biologist

cc: D. McKay - 7963

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.