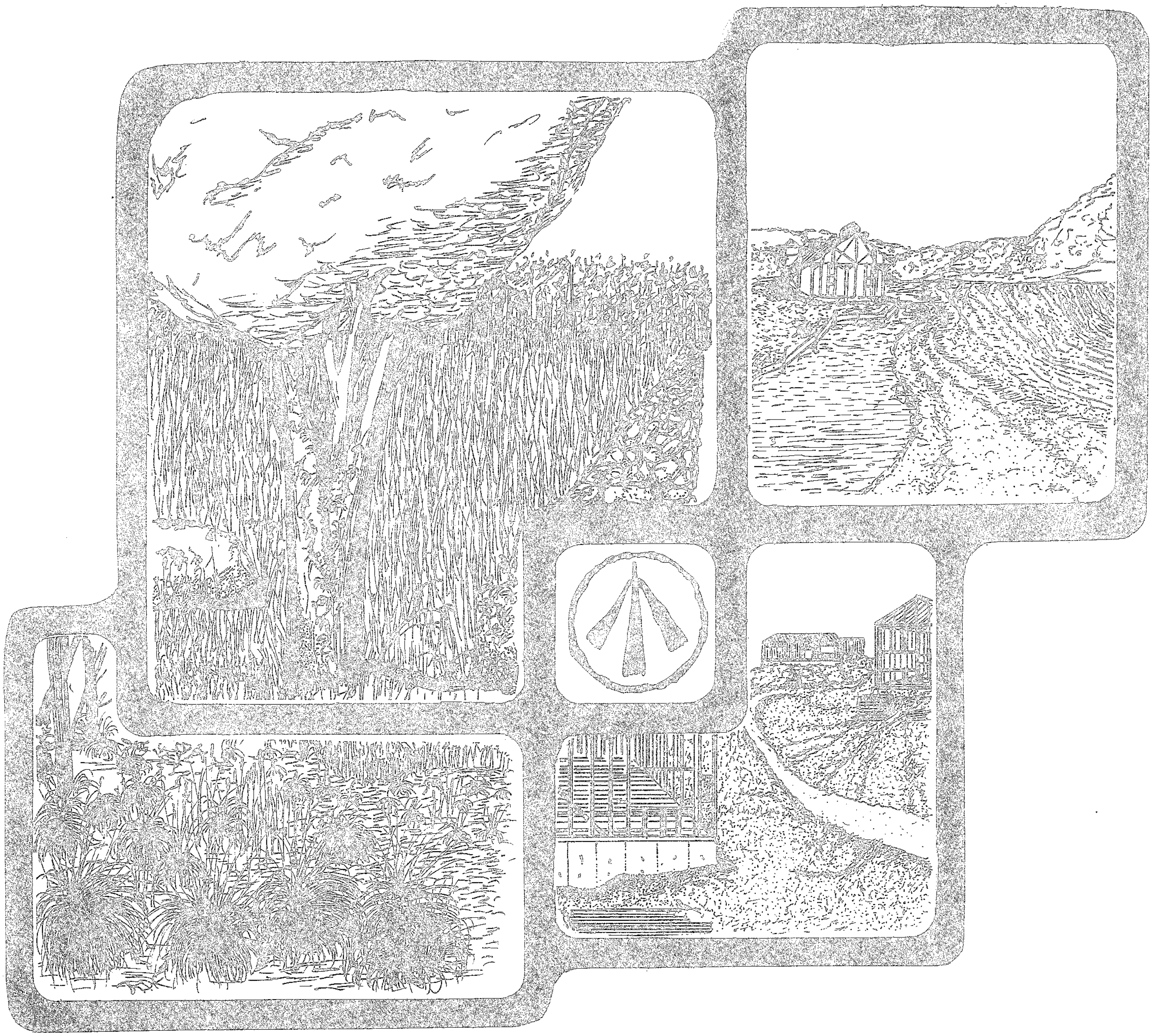
ENVIRONMENTAL REVIEW TEAM REPORT



COBBLE BROOK WATERSHED
KENT, CONNECTICUT

KING'S MARK
RESOURCE CONSERVATION & DEVELOPMENT AREA

KING'S MARK
ENVIRONMENTAL REVIEW TEAM REPORT

COBBLE BROOK WATERSHED
KENT, CONNECTICUT

MARCH 1982

King's Mark Resource Conservation and Development Area
Environmental Review Team
Sackett Hill Road
Warren, Connecticut 06754

ACKNOWLEDGMENTS

The King's Mark Environmental Review Team operates through the cooperative effort of a number of agencies and organizations including:

Federal Agencies
- U.S.D.A. Soil Conservation Service

State Agencies
- Department of Environmental Protection
- Department of Health
- University of Connecticut Cooperative Extension Service

Local Groups and Agencies
- Litchfield County Soil and Water Conservation District
- New Haven County Soil and Water Conservation District
- Hartford County Soil and Water Conservation District
- Fairfield County Soil and Water Conservation District
- Northwestern Connecticut Regional Planning Agency
- Valley Regional Planning Agency
- Central Naugatuck Valley Regional Planning Agency
- Housatonic Valley Council of Elected Officials
- Southwestern Regional Planning Agency
- Greater Bridgeport Regional Planning Agency
- Regional Planning Agency of South Central Connecticut
- Central Connecticut Regional Planning Agency
- Capitol Regional Council of Governments
- American Indian Archaeological Institute
- Housatonic Valley Association

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FUNDING PROVIDED BY
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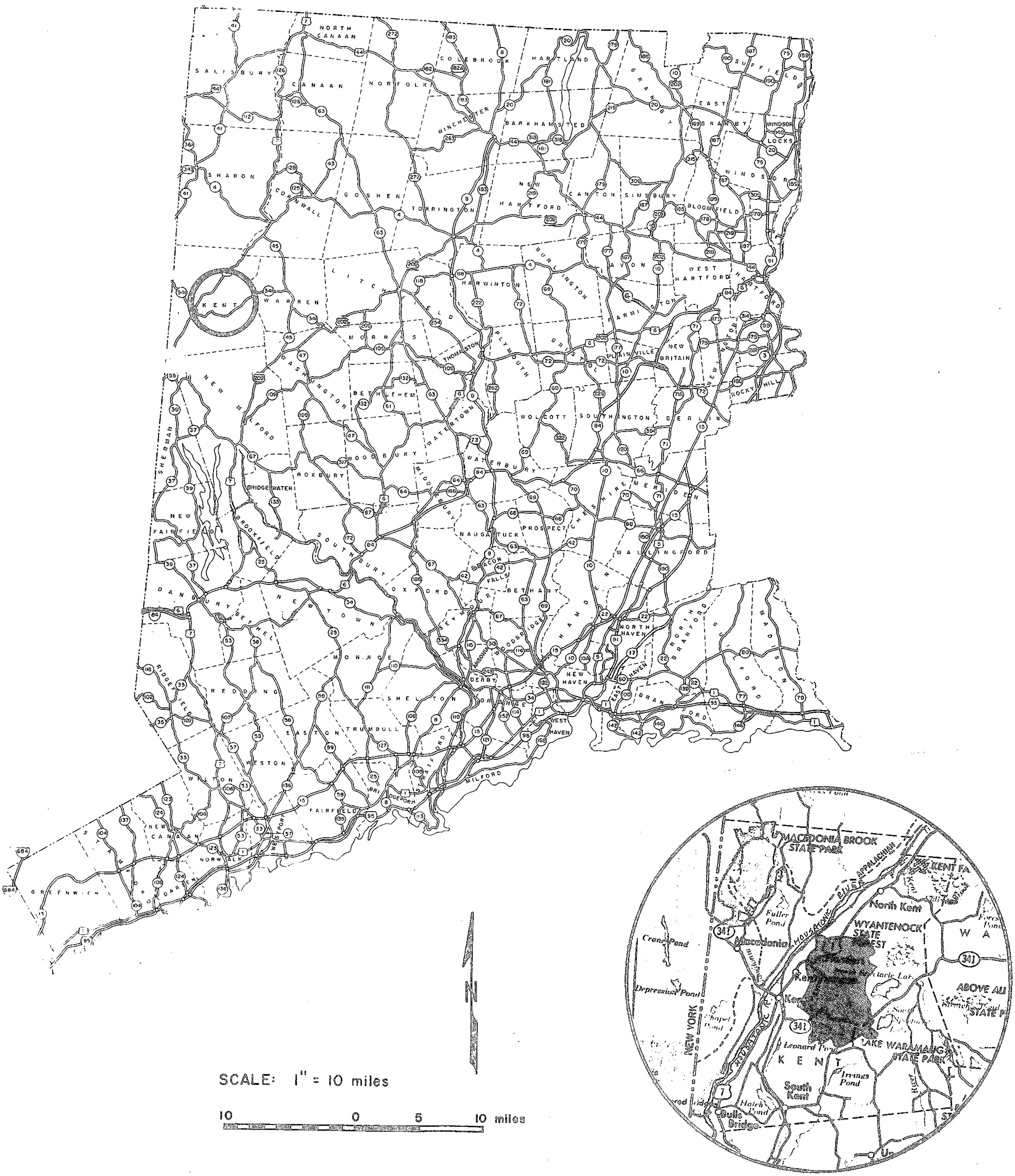
COBBLE BROOK WATERSHED
KENT, CONNECTICUT



ENVIRONMENTAL REVIEW TEAM REPORT
ON
COBBLE BROOK WATERSHED
KENT, CT

I. INTRODUCTION

The preparation of this report was requested by the First Selectman of Kent and the Kent Planning and Zoning Commission. The ERT was requested to prepare a natural resources inventory of the Cobble Brook Watershed and to discuss relevant land use planning issues. This information was requested to help the Town of Kent in better understanding the natural resource characteristics of the watershed, and in making future land use decisions.

The Cobble Brook Watershed is ± 2920 acres in size and located in the central portion of town (see Figure 1). The landscape is diverse and consists of farmland, wetland, steeply sloping wooded land and residential land. The land is zoned for residential use with minimum lot sizes of one acre. Surface runoff within the watershed drains to Cobble Brook, a tributary of Housatonic River.

In addition to providing environmental information to the Town of Kent, this report also provides a data base from which additional analyses is to be conducted by the Northwestern Connecticut Regional Planning Agency and the Housatonic Valley Association. This additional analysis will center on determining the best methods of retaining the rural character and natural resource base of the watershed. It is anticipated that this follow-up study will produce a "model" which can be used to help protect the character and resources of any rural watershed.

The ERT met and field reviewed the area on June 10, 1981. Team members participating on this review included:

Chuck Boster........	Regional Planner...........	Northwestern Connecticut Regional Planning Agency
Ralph Goodno........	Landscape Architect........	Housatonic Valley Association
Russ Handsman.......	Archaeologist..............	American Indian Archaeological Institute
Steve Jackson.......	Wildlife Biologist.........	Conn. Department of Environmental Protection
Fred Johnson........	Sanitarian.................	Conn. Department of Health
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Bob Orciari.........	Fishery Biologist..........	Conn. Department of Environmental Protection
Rob Rocks...........	Forester...................	Conn. Department of Environmental Protection
Mike Schaeffer......	Soil Conservationist.......	USDA Soil Conservation Service
Mike Zizka..........	Geohydrologist.............	Conn. Department of Environmental Protection

Prior to the review day, each team member was provided with a summary of the proposed project, a checklist of concerns to address, and a detailed soil survey map and topographic map of the subject area. Following the field review, individual reports were prepared by each team member and forwarded to the ERT Coordinator for compilation and editing into this final report.

This report presents the team's findings. It is important to understand that the ERT is not in competition with private consultants and hence does not perform design work or provide detailed solutions to development problems. The ERT concept provides for the presentation of natural resources information and preliminary land use analyses. All conclusions and final decisions rest at the local level. It is hoped the information contained in this report will assist the town of Kent in making environmentally sound decisions.

If any additional information is required, please contact Richard Lynn, (868-7342), Environmental Review Team Coordinator, King's Mark RC&D Area, Sackett Hill Road, Warren, Connecticut 06754.

* * * * *

II. HIGHLIGHTS

TOPOGRAPHY

- The topography of the Cobble Brook watershed is dominated by Kent Mountain, a high ridge that trends NNE-SSW. The maximum elevation in the watershed, approximately 1382 feet above mean sea level is reached on one of the mountain's several small peaks, along the northeastern portion of the watershed boundary. West of Mountain is the narrow, flat but terraced valley of Cobble Brook. The lowest elevation in the watershed, approximately 367 feet above mean sea level, is at the discharge point of the watershed, the confluence of Cobble Brook and the Housatonic River.

GEOLOGY

- Bedrock within the watershed is primarily composed of gneisses and schistose gneisses. Atop this bedrock in most of the watershed is a thin cover of glacial sediment known as till. The major valley of Cobble Brook however is filled with another glacial deposit known as stratified drift. Sand and gravel are the principal components of this stratified drift. One rather unique geologic landmark was identified in the watershed: a long sinuous ridge which, depending upon its specific origin, may be called either an esker or a crevasse fill. Although this natural landmark has been partially destroyed by gravel excavation, it would be educationally valuable to preserve as much of the remainder as possible.

HYDROLOGY

- The flow duration and peak flow characteristics of Cobble Brook are presented in the text. The flows in Cobble Brook can be expected to equal or exceed .53 million gallons per day 90% of the time with peak flows up to 600 mgd for a 100 year storm. Figure 5 shows the area which would likely be inundated by a 100 year storm event.

- The stratified drift deposits along Cobble Brook have a moderate protential for high yielding water supply wells. Based upon the Team's calculations, the total quantity of water potentially available from these deposits over a long period of time is 1,130,000 gallons per day.

- A high yield public water supply well presently exists near the juncture of Route 341 and Cobble Brook Road. This well is owned by the Kent Water Co. and has a yield of 165 gallons per minute and is known as well #3. This well presently is not being used as a public water supply well. However, the Kent Water Co. is under orders by the Department of Health Services, Water Supply Section, to eliminate its present surface water supply and initiate the use of the groundwater reservoir from this particular well, and perhaps another well to be developed in the future. The compliance schedule for when this well will go on line is January of 1983. Due to the importance of the Cobble Brook watershed as a future public water supply source for the Town of Kent, careful consideration should be given to the protection of well #3 and other potential well sites in the watershed.

SOILS

- *According to USDA Soil Conservation Service standards, 78% of the watershed soils have severe limitations for septic systems, 61% of the soils have severe limitations for homes with basements, and 57% of the soils present severe limitations for roads or driveways. Major limiting factors include any combination of the following: subject to flooding, wetness, slow percolation, slope, poor filtration, depth to debrock, large stones, low strength, ponding, and frost action. In many cases these limitations can be overcome by appropriate management practices; however, intensive on-site investigation and planning is required.*

- *There are approximately 419 acres of prime farmland in the watershed. Much of this land has already been developed for residential use or subdivided for future development. The largest concentration of prime agricultural land is near the juncture of Cobble Brook Road and Route 7.*

VEGETATION

- *The Cobble Brook watershed may be divided into eight major vegetation types. These include: transition mixed hardwoods and northern hardwoods (52% of area), hardwood swamp (11% of area), open fields (10% of area), old fields (10% of area), softwoods/hemlock (5% of area), softwoods/hardwoods (5% of area), open swamps (4%) and oak ridge (1%).*

- *Figure 9 identifies those areas having major limitations for forest management. Forest management practices are strongly recommended where feasible to increase the production of forest products, improve wildlife habitat, and enhance the overall condition of the woodland.*

WILDLIFE

- *The watershed presently offers a rich diversity of wildlife habitats. With good planning and management, the watershed has even greater potential for supporting a healthy population of wildlife.*

- *Wetland corridors, open fields, and woodlands interspersed with open fields are particularly valuable to wildlife. Special consideration should be given to protecting these areas where possible. Techniques for protection and management are presented in the text.*

FISHERIES

- *The upper section of Cobble Brook from the headwaters of its main branch to Route 341, is a small, steep gradient stream and is generally unsuitable for fish. North of Route 341, the gradient of the brook decreases and is more suitable for fish. Resident species of fish that would inhabit this section include native brook trout, blacknose dace, creek chub, and tesselated darter. Native brook trout and brown trout which have migrated upstream from the Housatonic River should provide a limited recreational fisheries in Cobble Brook. It should be noted, however, that brown trout in the Housatonic River rapidly accumulate PCB's and those trout migrating into Cobble Brook would remain tainted by the toxic chemical.*

CULTURAL RESOURCES

- *While no known prehistoric sites have been located within the project area, evidence from surrounding areas indicates that such resources should exist within the study area. The Cobble Brook watershed does contain several historic sites including Flanders, an historic nucleated settlement from the late eighteenth and early nineteenth centuries.*

PLANNING CONSIDERATIONS

- *Protection of groundwater is important in this watershed due to the presence of a major aquifer. Consideration should be given to adopting aquifer protection regulations for the Cobble Brook aquifer.*

- *Consideration should be given to the adoption of streambelt regulations as recommended in the Town Plan of Development. Effective enforcement of town regulations with regard to erosion and sediment control is also encouraged.*

- *Development within roadside corridors is perhaps the most critical aesthetic consideration in the watershed. Consideration should be given to protecting these scenic roads and their related views. Techniques for accomplishing this are presented in the text.*

- *Consideration should be given to changing the Town Plan of Development's "medium density" designation for the lower portion of the Cobble Brook watershed to "low density". This would help ensure the integrity of the Flanders Historic District and the very high scenic quality of the valley.*

- *With the exception of the Flanders Historic District, the entire Cobble Brook watershed is zoned RU-40 (rural residential). Minimum lot sizes in this zone vary from one acre to five acres depending upon the soil conditions.*

- *Nearly half of the 195 lots in the watershed are over five acres in size. This indicates that the development pattern of the study area has not yet been set, and that the future form of the study area can still be determined.*

III. TOPOGRAPHY

The topography of the Cobble Brook watershed is dominated by Kent Mountain, a high ridge that trends NNE-SSW (see Figure 1). The maximum elevation in the watershed, approximately 1,382 feet above mean sea level (msl), is reached on one of the mountain's several small peaks, along the northeastern portion of the watershed boundary (drainage divide). The western side of the mountain is a steeply sloping area; the gradients in some places are nearly vertical. East of the ridge crest, the land flattens out into a series of broad hills and valleys. One north-south trending cliff interrupts the generally gentle topography in this area. South of Kent Mountain, the land drops steeply to moderately steeply into the valley through which Connecticut Route 341 passes. Further south, the land rises moderately steeply to the summits of several hills and ridges (Segar and Geer Mountains, Treasure Hill). The westernmost section of the watershed (west of Kent Mountain) comprises a very steep ridge (The Cobble) and the narrow, flat but terraced valley of Cobble Brook. The valley contains a few rolling hills in the Flanders area, as well as one striking, glacially created ridge. The lowest elevation in the watershed, approximately 367 feet above msl, is at the discharge point of the watershed, the confluence of Cobble Brook and Housatonic River.

IV. GEOLOGY

The Cobble Brook watershed is encompassed by the Kent topographic quadrangle. Preliminary geological maps of the quadrangle have been filed with the Department of Environmental Protection's Natural Resources Center. No published geologic information about the quadrangle presently exists.

The major landforms within the watershed are pre-glacial in origin. Kent, Segar, and Geer Mountains, Treasure Hill, and The Cobble are structures that owe their existence primarily to the deformation and recrystallization (metamorphism) of ancient rock layers hundreds of millions of years ago. The rock itself is less than 10 feet from the surface in some areas of the hills, particularly where the slopes are steep. In contrast, the overall heights of the hills range from about 450 feet (The Cobble and Geer Mountain) to more than 800 feet (Kent Mountain). Although glaciation presumably wore down, or eroded, the hills to some degree, the total amount of hill depth lost was probably only a few tens of feet. The hills may therefore be described as "bedrock-controlled".

The bedrock itself is primarily composed of gneisses and schistose gneisses. Gneisses are metamorphic rocks in which layers of granular mineral grains alternate with bands of elongate grains. Schists are metamorphic rocks in which the elongate minerals are predominant and parallel, giving the rock a strongly layered appearance (foliation) and allowing it to be split into thin slabs or plates. A schistose gneiss has some characteristics of a schist or contains schist layers, but it is more characteristically gneissic. The accompanying bedrock geologic map (see Figure 2) describes the rocks of the watershed in more detail.

Most of the watershed contains a thin cover of glacial sediment known as till (see Figure 3). Till consists of rock particles of widely varying shapes and sizes. The particles were collected, transported, and redeposited by glacier ice. Although the upper portion of a till deposit will often be sandy and friable, till at depths of 5 feet or more will commonly be siltier and very tightly compact. Till is colloquially referred to as "hardpan".

The major valley of Cobble Brook (north of Route 341 and east of Cobble Road) is filled with glacial meltwater deposits, which are known as stratified drift. These deposits were laid down during a recessional phase of the last glaciation of the area, when stagnant masses of ice wasted in the valleys. Streams of meltwater transported rock debris away from the ice masses, sorting particles by size and weight and depositing them in layers. Most of the very fine sediment was transported far to the south; consequently, sand and gravel are predominant in the local stratified drift. The sediments show several of the characteristic landforms associated with stratified drift, including steep-faced, flat-topped terraces (near the intersection of Route 341 and Cobble Road) and irregular mounds called kames (just east of Cobble Road about 3000 feet north of Route 341). The most spectacular ice-contact feature is a long, sinuous, discontinuous ridge located about 2000 feet east of Flanders. This feature probably resulted when a tunnel or surface fracture in the ice was filled with meltwater deposits, and the deposits were subsequently let down as the ice wasted. Depending upon its specific origin, the feature may be called either an esker (tunnel deposits) or a crevasse fill (surface-fracture deposits). This natural landmark has been partially destroyed by gravel excavation; it would be educationally valuable to preserve as much of the remainder as possible.

After glacier ice had vanished from the valley, Cobble Brook began to carve through the stratified drift. During one or two time intervals, the stream may have ceased eroding and begun to deposit sediments on early floodplains that were higher than the present floodplain. In a few of the flatter areas of the valley that are several feet (more than 20 feet in some places) above the brook, it is not clear whether the top layers of sand and gravel are of glacial origin or whether they were deposited by the historical Cobble Brook. These areas are therefore identified only as "stream terraces" on the accompanying surficial geologic map (see Figure 3). The more recent and recognizable floodplain deposits of Cobble Brook are mapped as alluvium.

Other surficial materials deserving mention include swamp sediments, talus, and artificial fill. Swamp sediments include silt, sand, clay, and a high percentage of decayed plant material. They overlie till, stratified drift, or, occasionally, bedrock in wet areas. Talus consists of rocky debris that has accumulated along the sides or bottoms of steep slopes below eroding bedrock exposures. "Artificial fill" refers to distinct man-made deposits of sand, gravel, or other materials.

V. HYDROLOGY

A. Surface Flow Characteristics

By definition, the watershed of Cobble Brook comprises all land areas from which ground or surface water may ultimately enter the brook. A raindrop falling on the watershed boundary would have a 50 percent chance of passing into or out of the watershed. As shown on the topographic map (see Figure 1), the watershed boundary tends to follow the crests of local hills and ridges. It is to be expected that the true physical boundary may deviate to some extent from the boundary as mapped. The contours shown on the map are not completely accurate and small topographic details do not appear because of the 10 foot contour interval. Nevertheless, the boundary as mapped should be substantially correct and may be used as a reliable indicator of the general area of concern.

The watershed of Cobble Brook, as depicted in this report, comprises approximately 2920 acres. About 400 acres of the watershed contains stratified drift deposits; the remainder is largely covered by till. A method described in Connecticut Water Resources Bulletin No. 21 allows one to estimate the flow-duration characteristics of the brook. The table below sets out the results. Flows are given in units of both million gallons per day (mgd) and cubic feet per second (cfs).

Table 1. Flow-duration characteristics estimated for Cobble Brook at its confluence with Housatonic River.

Percent of time flow equalled or exceeded	1	5	10	30	50	70	90	95	99	99.9
Flow equalled or exceeded, in mgd	34.09	15.42	10.15	4.06	2.31	1.22	0.53	0.37	0.18	0.10
same flow in cfs	52.75	23.86	15.70	6.28	3.57	1.89	0.82	0.57	0.28	0.15
Standard error of estimate, in mgd	2.05	0.93	0.72	0.28	0.18	0.12	0.13	0.10	0.06	0.04
same error in cfs	3.17	1.44	1.10	0.43	0.28	0.19	0.20	0.15	0.09	0.05

The flow exceeded 1 percent of the time, as estimated in the table above, is much lower than the peak flows that may be achieved in the brook during significant storm events. It should be realized that a peak flow from a major storm will be sustained for only a few minutes and will occur, in general, less than once each year, whereas the flow exceeded 1 percent of the time will be equalled or surpassed for an average of 3.65 days per year. It is the peak flow, however, that is of concern in regard to the assessment of potential flood heights and damage that may occur along a given watercourse. There are several methods for estimating peak flows on an ungaged stream. The table following gives peak-flow estimates derived from the Weiss Method, as outlined in "Flood Flow Formulas for Connecticut", by Paul Biscuti of the Department of Environmental Protection.

Table 2. Peak flows in Cobble Brook, at its confluence with Housatonic River, for several major storms. The number of years stated for each storm represents the long-range average frequency of recurrence of that storm.

Storm event		2-year	10-year	25-year	50-year	100-year
Rainfall amount (inches)		2.68	4.30	5.40	6.00	7.50
Peak flow	(mgd)	114	233	366	372	600
	(cfs)	177	360	566	575	928
Standard error	(mgd)	62	130	219	227	390
	(cfs)	96	201	340	351	603

Figure 5 of this report shows the area which would be inundated by a 100-year storm event, according to HUD flood mapping.

B. Groundwater Resources

The general groundwater flow pattern in the watershed parallels the surface flow pattern to a great extent. The shape of the water table (that level below which all rock and soil spaces are filled with water) is largely conformable with the surface topography, although minor surface features may not be reflected in the water table. The rate of groundwater movement depends upon the slope and the nature of the material through which the water is passing. In general, groundwater will pass most quickly through materials with large, continuous spaces. Gravelly stratified drift is usually the best medium for subsurface flow. The variable, nonsorted nature of till makes it a fair to poor conductor of groundwater, with the most rapid movement typically occurring in the upper few feet, which tend to be coarser. Groundwater passes through the bedrock in this area mostly by way of fracture networks within the rock.

Groundwater and surface water in all parts of the watershed are hydrologically connected. Groundwater is discharged to the surface in the form of springs or streams, or occasionally in a sheet-like flow. Surface flow is maintained during dry seasons by continuous groundwater discharge from storage. Since precipitation can penetrate stratified drift more easily, more storage of groundwater per inch of rainfall will occur in a given volume of stratified drift than in the same volume of till. Hence, streams in till-covered areas react more quickly and noticeably to weather variations: wet conditions may rapidly produce torrents, whereas dry conditions may dry up small streams.

Surface flow, in some instances, may become groundwater flow. A stream flowing down a till-covered hillside may disappear into coarse stratified drift near a valley center. Also, artifically induced flow of surface water into the ground may take place when groundwater wells are placed near streams or ponds, and the "cone of depression" (the localized drawdown of the water table in the vicinity of a pumping well) extends beneath the surface water body.

Because the flow of groundwater is most rapid in coarse stratified drift, this material holds the best potential for high-yielding wells. The term "aquifer" refers to any material which is capable of supplying usable amounts of groundwater; hence, it is misleading to use the term only in connection with stratified drift. Nevertheless, the slow transmission of water through till and bedrock usually restricts well yields from those sources to amounts suitable only for individual domestic or small commerical purposes. Substantial public water supply needs can be met only by surface reservoirs or by coarse stratified-drift deposits.

The stratified drift deposits along Cobble Brook have a moderate potential for high-yielding water-supply wells (see Figure 4). The deposits appear to have a high percentage of gravelly layers, but the saturated thickness of most of the deposits is probably less than 30 feet. It is beyond the scope of this report to attempt to provide detailed estimates of the volume of water that could successfully be withdrawn from the stratified drift without adverse consequences (drying up of Cobble Brook, etc.). However, the Team estimated the total quantity of water potentially available over a long period of time using methods outlined in Connecticut Water Resources Bulletin No. 21. Natural recharge to the stratified drift was first estimated: the average annual recharge is approximately 1,321,000 gallons per day (gpd); the recharge equalled or exceeded 7 years in 10 is approximately 1,109,000 gpd; and the long term minimum recharge is approximately 528,000 gpd. The flow of Cobble Brook into the stratified-drift area is estimated to exceed 21,000 gpd 90 percent of the time. As previously discussed, this flow could enter wells through induced infiltration. The total quantity of water potentially available over a long period of time may be estimated by adding the recharge equalled or exceeded 7 years in 10 to the 90 percent inflow rate of Cobble Brook: 1,109,000 gpd + 21,000 gpd = 1,130,000 gpd total.

Although attention has been given above specifically to the stratified drift deposits, it should not be reasoned that stratified drift is the only important aquifer in the watershed. Bedrock is actually the most common source of water to individual residential wells, so protection of the bedrock aquifer is also urgent. Nevertheless, to the extent that the high yields in stratified drift may serve a public water-supply function, the stratified drift aquifer represents a particularly sensitive and valuable resource.

VI. SOILS

The soils on the site range from the nearly level floodplain and wetland soils (associated with Cobble Brook and its tributaries) to the very steeply sloping rocky soils found scattered throughout the watershed and concentrated in a strip running north to south through the central portion of the watershed. Figure 5 shows the major soil groups present within the watershed.

The following discussion focuses on the suitability of the various soils for alternate land uses. Figure 6 identifies those areas least suitable for residential development.

A. Soil Suitability for Septic Systems

Approximately 78% of the watershed area soils (±2330 acres) have severe ratings for on-site sewage disposal systems. Reasons for the "severe" rating include any combination of the following:

- Subject to flooding
- Wetness
- Slow percolation (due to soil structure and texture)
- Slope
- Poor filtration (especially where significant aquifers are concerned)
- Depth to bedrock
- Large stones
- Subsides (sloughing of filtration trenches)
- Ponding

These limiting factors are listed in the soils limitation chart (see Appendix A) fo each particular mapping unit in order of importance. The severe rating indicates that the use of the soil (for the purposes mentioned, in this case: on-site sewage disposal) is seriously limited due to the reasons set forth above. This rating does not preclude using the soil for on-site sewage disposal; but generally indicates the need for intensive on-site investigation, as well as implementing costly management practices to overcome the natural restrictions imposed by the soil.

Approximately 14% of the area (± 430 acres) is represented by soils that hold moderate limitations for the proper functioning of on-site sewage disposal systems. The "moderate" rating indicates that although the soil imposes some restrictions on use, the problems can be avoided by using proper management practices at a somewhat higher price than for conventional systems.

The predominant reason for the moderate rating is relatively steep slopes (8-15%). Slopes in this range not only hamper construction, but also may cause effluent seepage from hillsides if not properly handled.

The remaining ± 240 acres (± 8%) of the area holds slight limitations for the installation and proper functioning of on-site sewage disposal systems.

B. Soil Suitability for Homes with Basements

For homes with basements, ± 1823 acres (± 61%) of the review area are represented by soils that hold severe limitations for development (see Soils Limitation Chart in Appendix A). The reasons for the severe rating include any combination of the following:

- Subject to flooding
- Wetness
- Slope
- Depth to rock
- Large stones
- Low strength or stability
- Ponding

Due to slopes ranging from 8-15% and/or areas where large stones have to be contended with, ± 884 acres of the watershed area (±29%) are represented by soils which impose moderate limitations for constructing homes with basements. Again, in most cases, these limitations can be overcome by using proper management practices.

Approximately 293 acres (±10%) of the area is mapped as soils imposing only slight limitations for constructing homes with basements.

C. Soil Suitability for Roads or Driveways

Approximately 57% (±1725 acres) of the area is represented by soils that impose severe restrictions for construction of roads or drives. Reasons for the severe rating include:

- Subject to flooding
- Wetness
- Slope
- Frost action
- Depth to rock
- Large stones
- Low strength
- Ponding

Nearly 34% of the area (± 1011 acres) is represented by soils that impose moderate limitations for the construction of roads and/or driveways.

About 264 acres (±9%) of the area represent soils with only slight limitations for constructing roads and/or driveways.

* * *

Management practices which may be implemented to overcome limitations for the above land uses are presented in Table 3 on the following page.

In all, ±659 acres, or 22% of the total area within the watershed have ratings of slight-moderate for all three of the construction phases listed above. All of the soils that make up this acreage are phases of either the Charlton or Copake soil series with slopes of 15% or less. According to the Land Ownership Patterns Map (see Figure 11) much of this acreage has either been developed or is subdivided into houselots. Much of the remaining acreage that has not yet been developed or slated for development is relatively inaccessible due to wetland, shallow to bedrock soils, or steeply sloping soils.

D. Prime Farmland

Prime farmland is the land best suited for agricultural production. It has the soil quality, growing season and moisture supply needed to produce sustained high crop yields when properly managed. Although the acreage below includes land that is developed, the developed land is technically not prime farmland.

In all, there are ± 419 acres of prime farmland soils in the watershed (see Figure 7). About ±169 acres of these soils overlap with soils with the least limitations for urban development. These soils include CwB (Copake Loam, 3-8% slopes) and CaB (Charlton Fine Sandy Loam, 3-8% slopes). Again, it appears from the property map that a good portion of this acreage is already developed or subdivided for future development.

Approximately 28 acres of the 419 total prime farmland acres are located on floodplain soil areas. Eel silt loam (Ee), and Ondawa fine sandy loam (On), are the two soils that represent this 28 acre portion. Flooding hazard for urban development would be severe in these areas. Extensive filling of the floodplain would be required to overcome this problem. This filling would reduce the floodwater retention capacity along Cobble Brook in the event of an intense rainfall.

Agricultural use appears to be the highest and best use for this 28 acres. On-site investigation to determine the feasibility of machine operations would be needed to confirm or negate this.

The largest concentration of prime agricultural land is near the junction of Cobble Brook Road and Route 7. There are also cleared fields west of Camp Ken-mount and off Jennings Road. Only the area near Route 7 is farmed by commercial farmers. Portions of the prime farmland shown in Figure 7 are forested and inaccessible.

As Kent has considerable acreage of excellent farmland along the Housatonic River, and there is very little "native" commercial agriculture, the prime agricultural land in the Cobble Brook watershed is not of major town-wide importance according to the county agricultural agent.

E. Miscellaneous

During the tour, it was noted that several private roads with houses along them within the watershed area traversed very steeply sloping areas with no place to turn around along stretches of road approaching ¼ mile in length. Fire protection and other emergency services in areas such as these could be severly hampered by the inability to maneuver equipment. Personal safety when icy or snowy conditions prevail also should be considered when planning and constructing roads, whether public or private.

* * * *

TABLE 3 Management Practices which <u>may</u> serve to overcome soil limitations*

Factors Restricting Soil Use	Alternative Management Practices which may overcome limitations
A. For Septic Systems:	
1. Steep slopes (8-15%)	- serial tile distribution
2. Slow percolation	- enlarge leaching area
	- restrict percolation testing to wet seasons
	- interceptor drains over hardpan
	- sand filter or mound system
3. Poor filtration	- sewage collection
	- control housing density
4. Depth to bedrock	- least suitable for use
	- intensive on site investigation for deep soil pockets
5. Large stones	- land shaping and/or stone removal
6. Wetness	- interceptor drains over hardpan
	- regional drainage

(Continued)

* Adapted from USDA Soil Conservation Service Criteria and Hill, D.E., Soil Interpretations for Waste Disposal, Connecticut Agricultural Experiment Station, Bulletin 776, June 1979.

(continued)

TABLE I. Management Practices which may serve to overcome soil limitations

Factors Restricting Soil Use	Alternative Management Practices which may overcome limitations
B. For Homes With Basements:	
1. Steep slopes (8-15%)	- Land grading
2. Depth to bedrock	- intensive on site investigation for deep soil pockets
3. Large stones	- land grading and/or stone removal
4. Wetness	- footing/foundation drains
5. Ponding	- land grading
6. Low strength	- least suitable for use
C. For Roads and Driveways:	
1. Steep slopes (8-15%)	- land grading - wide lot frontages
2. Wetness	- subsurface tile drainage
3. Depth to bedrock	- least suitable for use - extensive on site investigation for best route
4. Low strength	- least suitable for use
5. Ponding	- land grading
6. Frost action	- proper roadbase preparation - subsurface drainage along uphill side of pavement and along cut slopes as needed.

VII. SEPTIC SYSTEMS

This section discusses the feasibility of various methods of on-site subsurface sewage disposal in the watershed and the appropriate regulations that would govern the use of subsurface sewage disposal.

A. Local and State Review Procedures

Local health departments are responsible for the review and approval of household and small commercial subsurface sewage disposal systems of a conventional nature. Sewage disposal systems receiving flows of between 2000 and 5000 gallons per day, and where extreme conditions prevail such as high groundwater tables and shallow depth to bedrock soils are also required to be reviewed by the State Department of Health Services (DOHS) in addition to requiring local health department approval. For daily design sewage flows in access of 5000 gallons per day a State Discharge Permit is required from the Department of Environmental Protection (DEP) Water Compliance Unit, in addition to approval and review by the Local Health Department and the DOHS respectively. Any community sewage disposal system,which is defined as two or more separate residential buildings tied to a common sewage system, requires a discharge permit from the DEP and approval by the DOHS regardless of the flows to the system. This would include any sort of condominium, apartment or cluster housing type development.

The Cobble Brook watershed is not a public water supply watershed, which means that any surface water flow on the watershed is not a tributary to a surface drinking water supply. Since this watershed is not a public water supply watershed, the separation distances from sewage disposal systems to any stream, pond, lake, surface water, ground water, celler, or building footing drain would be only 25 ft. as prescribed by the State Public Health Code, whereas, if any of the above mentioned water sources were on a public water supply watershed the separation distances to a subsurface sewage disposal system would be increased to 50 feet. Therefore, site limitations normally encountered when trying to satisfy the 50 foot separation distance on a public water supply watershed would not be expected during site development in the Cobble Brook watershed.

A high yield public water supply well presently exists near the junction of Route 341 and Cobble Brook Road. This well is owned by the Kent Water Co. and has a yield of 165 gallons per minute and is know as well #3. This well presently is not being used as a public water supply well. However, the Kent Water Co. is under orders by the Department of Health Services, Water Supply Section, to eliminate its present surface water supply and initiate the use of the groundwater reservoir from this particular well, and perhaps another well to be developed in the future. The compliance schedule for when this well will go on line is January of 1983. Apparently the Cobble Brook Valley east of Cobble Brook Road has been designated as a potential high yield aquifer area, and is being considered by the Kent Water Co. for another site for a high yield gravel pack well in excess of 100 gallons per minute. Persuant to the State Public Health Code Section 19-13-B51, wells with a required withdrawal rate of more than 50 gallons per minute must be approved by the State Department of Health, Water Supply Section. Consideration must also be given to the protection of such high yield wells against possible sources of contamination. No such well shall be located within 200 feet of a system for the disposal of sewage or any other source of pollution. If conditions warrent, greater distance shall be required. Sanitary conditions in the area within the radial distance required shall be under the control of the well owner by ownership, easement or other arrangements approved by the Commissioner of Health. Sewer lines may be constructed a minimum distance of at least 100 feet away from such wells if the sewer is constructed of extra heavy cast iron pipe with leaded joints or equal approved type of tight joint. Therefore, any development proposed in the Cobble Brook Valley east of the Cobble Brook Road should be reviewed in respect to possible impact on the groundwater supplies in this area. Any proposal for development in this area should be reviewed by the State Department of Health Services and the Department of Environmental Protection and coordinated with the Kent Water Company.

B. Overall Site Suitability for On-Site Sewage Disposal Systems

As previously discussed, the Cobble Brook watershed is approximately 2920 acres in size and consists of a wide variety of soil types and topographical features. In the north south trending Cobble Brook Valley which can be seen on either side of Cobble Brook Road, the soils consist primarily of well drained, to extremely well drained sands and gravels in the Copake, Hinckley and Terrace Excarpment soil series as described by the Soil Conservation Service. These soils tend to have a high degree of permeability, which lends itself well to the capacity of the soils to accept the hydraulic loading of subsurface sewage disposal systems. However, soils that are too well drained often do not provide adequate renovation of sewage effluent, thus warranting greater separation distances between sewage disposal systems and water supply wells. Sewage disposal systems constructed in well drained soils should be kept a greater distance than the four foot separation above ledge rock as prescribed by the State Public Health Code due to the poor filtering properties of the soils. Soils in the area of the "Cobble", and on Kent Mountain may provide severe limitations to the construction of on-site sewage disposal systems due to the steep slopes of greater than 15%, shallow depth to bedrock in various areas, and the general stony nature of the upland soils. This does not imply that these soils are totally unsuited for the development of on-site sewage disposal systems, but special design consideration will have to be exercised if development is to proceed in this area. Special design consideration may consist of, but is not limited to: groundwater intercepting drains for areas where there is a perched or high groundwater tables, importation of clean fill to build up an area where shallow depth to bedrock soils are present, and large leaching fields to overcome poor soil percolation and permeabilities.

On the east and southeast end of the watershed area the soil types are highly variable but generally consist of upland type soils. In the consideration of this area for development, specific site analysis appears to be the best way for determining the limitations for sewage disposal on each particular site. A very general idea of the limitations for the various soil types for waste disposal may be obtained by consulting the soils section of this report. Again it must be stressed that the denotation of a soil series as "severe for septic tank systems" does not imply that the soils are unsuitable, but that the soils require special design considerations by a qualified individual.

If cluster development utilizing a community sewage disposal system is proposed, advanced engineering and scientific study may be required to determine what impact the proposed discharge would have on the groundwater quality. Advanced study would particularly be warranted if the proposed discharge was in excess of 5000 gallons per day, and required a discharge permit from the DEP, or the discharge was proposed in the proximity of either the existing water supply well or a proposed public water supply well site. A study of this nature would consist of calculations showing the extent of renovation of the chemical constituents of the sewage effluent as it passed through the soil and unconsolidated sediments prior to it's discharge at either a surface water or groundwater supply.

The design of all subsurface sewage disposal systems must be based on the results of soil percolation tests made in the area of the proposed leaching system, as well as deep observation pits made in the same area which will determine if high groundwater levels and/or shallow depth to ledge rock conditions may interfere with the design of the sewage disposal system. In areas where it is found that high groundwater tables or shallow depth of ledge rock conditions prevail, it is required by the State Public Health Code that the design of any leaching system be prepared by a licensed professional engineer in the State of Connecticut. As with all site developments, on-site testing by trained personnel, and thorough and conscientious inspection of all construction practices is the ultimate factor that will insure the proper functioning of a subsurface sewage disposal system in a manner that will not jeopardize the public health or environment.

The staff from the State Department of Health Services, Sewage Disposal Section are available to the town of Kent for review and comment on any development proposals, site testing, or design.

VIII. VEGETATION

A. Introduction

The 2920 acre "Cobble Brook Watershed Area" is located within Connecticut's

Northwest Uplands eco-region of the Northern Uplands-Transitional Hardwoods zone. An eco-region is defined as "an area characterized by a distinctive pattern of landscapes and regional climate as expressed by the vegetation composition and pattern and the presence or absence of certain indicator species and species groups".[1] The dominant "transition hardwoods" of the Northwest Uplands eco-region include Northern red oak, basswood, white ash, and black birch. Included also are tree species of the Northern hardwoods zone, such as sugar maple, American beech and yellow birch, as well as Southern and Mid-western species more characteristic of the central hardwoods zone, such as white oak, black oak, shagbark hickory and bitternut hickory. White pine and hemlock are also frequent and locally dominant. The early phases of old field vegetation development are dominated by white pine. Several Northern shrub species such as hobblebush and mountain-winterberry are near their Southern range limits in the State here. A number of other Northern bog and forest species reach their extreme Southern range limits in the cooler habitats of this region, expecially in black spruce bogs. Some rare plant species of the region are bog rosemary, marsh willow-herb, Canada violet, and stiff club-moss.

For the purposes of this report, the Cobble Brook Watershed Area may be divided into eight vegetation types. For the most part the boundaries and acreages of these vegetative types, as presented in this report, are only approximate. In some places the vegetation types gradually grade into one another, causing wide transition zones where tree species dominant in one type are present in the other. These conditions cause difficulty in mapping. In other areas, transition zones are almost non-existent and mapping is greatly simplified. The geographic distribution of the eight vegetation types is presented in the vegetation type map (see Figure 8).

B. General Vegetation Descriptions (refer to Figure 8)

a. Transition Mixed Hardwoods and Northern Hardwoods - For the purposes of this report, the transition mixed hardwood and northern hardwood vegetation types are mapped together. These areas total approximately 1525 acres, or 52.2% of the total watershed area. The overstory in the mixed hardwood area is dominated by white oak, red oak, black oak, sugar maple, red maple, shagbark hickory, pignut hickory, black birch and basswood, while the northern hardwood areas are dominated by sugar maple, yellow birch, paper birch, American beech and white ash. The understory and ground cover vegetation varies widely within this mapping unit. Hardwood tree seedlings and saplings, including American chestnut, are widespread, along with many shrub species which include but are not limited to blue beech, witchhazel, hazelnut, mountain laurel, large leafed holly, flowering dogwood and ironwood. Ground cover is dominated by club moss, grasses, sedges and many species of ferns.

Many of the tree species which are present in the transition mixed hardwood and northern hardwood vegetation types have high commercial value for sawtimber and fuelwood. The condition of the trees is quite variable, as dictated by site conditions, past land use, and past vegetation management. Areas which are not designated as having major limitations (see Forest Management Limitation Map, Figure 9) have high forest product productivity potential which can be increased significantly through proper forest management. Trees in these areas will respond well to periodic thinnings aimed at removing the poorer quality trees. These thinnings will reduce

[1] Dowhan, J.J. and Craig, R.J., 1976, Rare and Endangered Species of Connecticut And Their Habitats; CT Geol. Nat. Hist. Survey Report Invest. #6.

competition between desirable species and result in a healthier, higher quality stand.

b. Hardwood Swamp - Forested wetlands are common throughout the study area. They total approximately 325 acres or 11.1% of the total watershed area. Red maple is the dominant tree species along with scattered white ash, and yellow birch. Eastern hemlock is locally abundant within some of these wetland areas. The understories throughout these areas vary widely in both species composition and diversity. High bush blueberry, spice-bush, sweet pepper bush and several species of viburnum are common throughout. Skunk cabbage, tussock sedge, cinnamon fern, sensitive fern and sphagnum moss are widespread as ground cover. The commercial utility of the trees in these areas must be evaluated on an individual wetland basis. Generally, tree growth potential is somewhat limited by the high water table and saturated soils which are present. Under these conditions, trees are shallow rooted and unable to become securely anchored, causing high potential for windthrow. These soil conditions also limit access and operability. Depending on the severity of these limitations, the feasibility of implementing timber management practices may be severely reduced or eliminated completely.

c. Open Fields/Agricultural Land - Some of the most highly productive areas in the study area are occupied by open fields. These areas which total 304 acres or 10.4% of the watershed are at present being utilized as either cropland, mowed fields vegetated with grasses and assorted wild flower and weed species, or somewhat less productive pasture land vegetated primarily with grasses. Many of these areas have the potential to produce high quality timber if planted to softwoods or allowed to revert to woody vegetation.

d. Old Fields - The old field areas which total approximately 289 acres or 9.9% of the watershed are either open fields which were abandoned and allowed to revert to woody vegetation, or areas which do not have enough soil or soil moisture to support trees. Generally these old field areas are understocked with quality tree species. Those tree species which are present include eastern white pine, gray birch, quaking aspen, big tooth aspen, red maple, sugar maple, eastern red cedar, black oak and apple trees. Shrub species are abundant throughout, with gray stemmed dogwood, silky dogwood, arrowwood, high bush blueberry, multiflora rose, male berry and staghorn sumac being most common. Ground cover is dominated by grasses, goldenrod and milkweed. The commercial utility of the tree species found within this vegetation type is poor at the present time.

e. Softwoods/Hemlock - This vegetation type which totals 146± acres or approximately 5% of the watershed is very similar to the softwoods/hardwoods vegetation type described below. However, Eastern hemlock is the dominant tree species present. Sugar maple, red maple, basswood, white oak, black oak, black birch and yellow birch are present, but widely scattered. The understory is dominated by hemlock seedlings, moosewood and mountain laurel. Ground cover is scarce throughout much of this area. The tree species present in this area have some commercial value. However, because of poor growth conditions, poor access and poor operability (discussed in "limitations" below), this value may be low.

f. Softwoods/Hardwoods - Eastern white pine and eastern hemlock are the dominant tree species present in this vegetation type which totals approximately 136 acres or 4.7% of the watershed. Scattered throughout are sugar maple, basswood, black oak, white oak, red maple, black cherry, American beech, black birch and yellow birch. Eastern white pine seedlings, hemlock seedlings, moosewood, low bush blueberry, huckleberry and mountain laurel are the most abundant vegetation forms in the understory. Ground cover is scarce throughout much of this area. Where it is present, club moss, grasses, sedges and Christmas fern dominate. The tree species present in this area do have commercial value. However, because of poor growth conditions, poor access and poor operability (discussed in "limitations" below), this value may be low.

g. Open Swamps/Marshes/Wet Meadows/Bogs - Many non-forested wetland areas are present within the study area. These wetlands total approximately 120 acres or 4.1% of the watershed. The diversity of vegetation within and between individual wetlands is very great. Some of these areas are dominated by red maple seedlings, but the majority of these areas are dominated by shrub species including high bush blueberry, sweet pepper bush, swamp azalea, red alder, speckled alder, spirea, leather leaf, silky willow, buttonbush, large cranberry and arrowwood. The herbaceous vegetation which is common within these wetland areas includes many species of sedges, grasses and sphagnum moss, along with purple loose strife, swamp loose strife, cattail and phragmities.

h. Oak ridge - The oak ridge vegetation type which totals approximately 26 acres or .9% of the watershed, is located on several extremely rocky and shallow to bedrock knolls. The vegetation which is characteristic of these areas includes very poor quality chestnut oak, black oak, black birch, yellow birch and Eastern hemlock. Many of these trees are stunted and malformed due to the lack of adequate moisture and harsh climatic conditions. Understory vegetation includes hardwood tree seedlings, hemlock seedlings and moosewood. Ground cover is dominated by grasses, Pennsylvania sedge, club moss, Christmas fern and rock poly pody. The trees which are present in this area have little or no commercial value.

C. Major Limitations to Forest Management

Areas which may present limitations to forest management activities are designated on the Forest Management Limitation Map (Figure 9). These areas fall into two major categories: 1) areas where poor access, extremely steep slopes and rockiness may limit forest management practices and 2) areas designated as inland wetlands where poorly drained and saturated soils may limit forest management feasibility.

In both areas poor operability as related to forest management activities may restrict or even preclude the actual implementation of forest management and harvest operations.

Tree growth, quality and health may be limited by the excessively drained soils, shallow to bedrock soils or saturated wetland soils found in these areas. These conditions may cause the trees which are present to have little or no commercial value.

It should be recognized, however, that the limitations described above do not necessarily preclude forest management. The feasibility of forest management within these areas should be evaluated by a qualified forester on an individual stand or woodlot basis. Proper planning and implementation is expecially essential in these areas to insure effective, efficient and environmentally sound forest management operations.

D. Management Considerations

The Forestry Unit of the Department of Environmental Protection encourages all woodland owners to manage their forest lands. When properly prescribed and executed, forest management practices will increase the production of forest products, improve wildlife habitat, and enhance the overall conditions of the woodland with minimum negative environmental impact.

To reach a healthy and productive state, individual forest stands should be periodically evaluated to determine present and future management needs. A public service forester from the Department of Environmental Protection may be contacted at 379-0771 to provide basic advice and technical assistance in woodland management. These services are provided free of charge. Services of a more intensive nature are available from private consulting foresters.

Forest Management and Water Quality

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 litter and humus associated with woodland areas contributes little or no sediment to streams.

Improper cultivation and harvesting of timber for 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); 5) Influx of nutrients caused by the application of fertilizer, soil conditioners and wetting agents (used in forest fire control). Research has determined that nutrient loss from normal silvicultural practices (i.e. practices involving the cultivation and harvesting of timber) does not, for the most part, result in significant deterioration of water quality.

Despite the potential adverse impacts to water quality, the harvesting of trees is a major and necessary tool used in forest land management. Adverse impacts to water quality can be minimized through good planning and responsible implementation.

A pamphlet entitled "Logging and Water Quality in Connecticut: A Practical Guide for Harvesting Forest Products and Protecting Water Quality" will soon be published and made available through the Department of Environmental Protection's Forestry Unit. A series of Best Management Practices (BMP's), which are recommendations designed to minimize the negative impact of silvicultural activities on water quality, are presented in this pamphlet.

A "BMP" as defined in the pamphlet is "a practical, economical and effective management or control practice which will reduce or prevent the generation of pollution".

Examples of recommended BMP's for preventing or reducing degradation of water quality resulting from silvicultural activities include:

Phase I. Planning the Job.

a. Locate all streams, wetlands and poorly drained soils (sensitive areas) on USGS topographic maps and/or county soils maps.

b. Plan preliminary locations of access roads, skid roads and yarding areas to avoid the sensitive areas. Locate potential stream crossings.

c. Plan for the best time of year to implement individual silvicultural activities. Sensitive areas that cannot be avoided should be planned for winter when the ground is frozen and more stable.

d. Plan Stream Management Zones which are aimed at protecting stream beds and stream banks.

Phase II. Implementing the Job.

a. Locate logging roads and skid trails so that the slopes of these roads do not exceed 10% except for short distances.

b. Locate yarding areas on well drained soils with a slight slope, avoiding drainage discharge directly into access roads or streams.

c. Locate Stream Management Zones and avoid equipment operation in these areas to the greatest extent possible.

d. Provide undisturbed buffer strips between streams and roads or yarding areas. The width of these buffer strips is generally between 30 and 100 feet but should depend on slope, soil erodability and the magnitude of road or yarding area drainage discharge.

e. Avoid, when possible, equipment operation on poorly drained soils, in swales and around or in stream channels.

f. Avoid complete clearing of vegetation in the Stream Management zone.

g. Avoid disturbing understory vegetation within 30 feet of a stream channel.

h. Avoid reducing overstory crown cover below 50% within 30 feet of stream channel.

i. Avoid felling trees in streams; if this occurs, remove debris as soon as possible.

j. Avoid stream crossings if possible; if not, consider building temporary bridges. Crossings should be made at right angles to the stream over stable rock or gravel bottoms, and should avoid steep or unstable banks.

Phase III. Completing the Job.

a. Install erosion control measures on access roads and primary skid trails, including properly placed waterbars and reconditioned cross drains, located at intervals which take into account road length, slope and common sense.

b. Remove all temporary bridges and culverts from streams.

c. Lime and seed specific critical areas, such as steeply sloped roads or problem areas.

d. Close roads to prevent continuing access.

Following these BMP's along with the use of common sense will help to avoid water quality degradation resulting from silvicultural operations.

* * * * *

The implementation of the recommended BMP's will most likely be of a voluntary nature, aided through an accelerated educational program and perhaps an incentive program, rather than through regulation. At this time, local regulation of forest product harvesting is contrary to State forestry policy.

Educational and incentive programs may be reinforced by the use of timber sale contracts which reflect the use of BMP's between landowners and loggers. A public or private professional forester can assist landowners in developing an effective timber sale contract. The posting of reasonable performance bonds by the logger may be necessary to help insure proper completion of the logging operation. Periodic on-site inspection may also be essential to see that the logging activities meet the contract terms. Proper education of the landowner and logger can be the key to successful use of BMP's in forest management.

Further guidelines to maintain water quality on managed woodlands may be found in the pamphlet "Timber Harvesting Guidelines" by the Wood Producer's Association of Connecticut. The principles set forth in this publication are aimed at protecting the forest ecosystem from thoughtless timber harvesting practices that may lower environmental quality in both the long and short run. Copies of this pamphlet are available from the Department of Environmental Protection's Forestry Unit and members of the Wood Producers' Association of Connecticut.

IX. WILDLIFE

The Cobble Brook watershed currently contains some of the wildest land left relatively undeveloped in Connecticut. The watershed is relatively undamaged by current development, however, some construction has occurred in areas of particularly high value to wildlife. There is good dispersal of agricultural, forested, and wetland habitat within the area and the area is abundant with wildlife at the present time. In many cases species are far more abundant than 100 years ago. Deer are abundant enough in the area to cause agricultural problems and adversely impact the habitat they live on. Beaver were reintroduced some 30 years ago and have been active in the area. The Canada goose has, in recent years, experienced a sharp increase in population due to the abundance of suitable nesting sites and minimal harvest. The wild turkey, reintroduced only six years ago, has become evident within this area. With sound management the Cobble Brook watershed has even greater potential for supporting a healthy population of wildlife.

Long range land use planning is the only reasonable approach to protecting the integrity of the land for wildlife. Short term parcel by parcel impact review is a salvage operation at best.

In order to preserve this wildlife heritage, and perhaps improve upon it, the following considerations should be incorporated into the planning process:

1. Public and conservation organization ownership of land should be encouraged where the wildlife value of the land is high.

2. Use of the Connecticut Agricultural Preservation Act should be encouraged where possible to ensure the retention of prime farmland and open space areas valuable to wildlife.

3. To retain the wildlife value of this area, development should be concentrated on the most suitable sites leaving the majority of the land undeveloped. Residential development on large lots (10+ acres) with homes close to existing roads or cluster development retaining a high acreage per unit ratio are the most compatible forms of development when considering wildlife values.

4. Wildlife managment including the tools of hunting and trapping should be employed to control animal populations, especially where necessary to control damage to crops, protect wildife habitat, and prevent wildlife disease.

5. Development proposals should include considerations for the impact of man on wildlife and wildlife on man. Management tools are available to minimize both types of impact. Vegetation planting, good forest management, and creating additional openings in the woods, can lessen the negative impact man has on wildlife when development takes place. Fencing, repellants, and controlled harvest of game species can reduce the negative impacts of wildife on man without seriously impacting the wildlife populations.

6. Consideration should be given to restricting development in areas of high value to wildlife. Generally, the greater the density of development, the greater the conflict between wildlife and human populations. For example, assume beaver are inhabiting an inaccessable wetland. Residential development in the area would likely lead to conflicts between the human and beaver populations with the ultimate removal of the beaver. Subsequently, the extent of wetland habitat would be reduced and consequently its value to wildlife would diminish.

Three major types of habitat are present in the area and consideration should be given to their protection where possible. These areas include:

1. <u>Wetland Corridors.</u> Much wildlife activity takes place in streambelt

areas. A streambelt ordinance as discussed in Appendix B of this report will help considerably in protecting this important habitat area. Streambelt corridors are shown in Figure 6 of this report. From a wildlife standpoint, crossing of wetlands by roads should be limited and constructed at elevations no lower than 3 feet above high flood and with special considerations if there is potential beaver activity in the area.

2. Open Fields. Important agricultural areas are shown in Figure 7. Although most agricultural areas benefit wildlife, some are more important than others. Secluded fields are very valuable to wildlife. Roadside areas, on the other hand, have lesser value. "Clean" farming is less valuable to wildlife than fields with stone walls and hedge rows. Grain, corn, alfalfa, and hay crops in small fields offer excellent habitat for wildlife.

3. Forested areas are another valueable type of habitat for wildife. Woodlands are of most value when interspersed with open fields. Diversity of both age and species of flora is important for a diversity of wildlife. Good forestry practices, including small clearcuts are generally very compatible with the wildlife resources. Mast (nut) producing trees are good food sources and a few of these, such as the oaks, should remain after any forestry operation. A few den trees should also be exempted from culling during a forest cut operation. Steeply sloping land and areas of bedrock outcrop usually provide nest and den potential for wildlife; bobcat and coyote may find this kind of area particularly valuable.

X. FISHERIES

Cobble Brook has essentially three distinct sections, each having distinct physical characteristics. From the headwaters of its main branch to Rt. 341, the upper section of Cobble Brook is a small, steep gradient stream. Because its water cascades over boulders and ledge, this section is generally unsuitable for fish. In the vicinity of Rt. 341, the gradient of the brook decreases and its main branch is joined by a substantial feeder stream. From this area to the vicinity of Rt. 7, Cobble Brook has a gravel-cobble substrate, with regularly spaced riffles and shallow pools. Vegetative cover is excellent along this middle section and production of fish food, in the form of aquatic insects, should be very high. Resident species of fish that would inhabit this section of Cobble Brook would include native brook trout, blacknose dace, longnose dace, creek chub, and tessellated darter. From the area of Rt. 7 to the Housatonic River, Cobble Brook becomes a meandering stream, having deep pools with silt-sand bottoms and riffles of coarse sand-cobble. Most protective cover for fish in this lower section is made up of trees and brush which have fallen into the brook. In addition to the species of fish present in the middle section, white sucker, fallfish, and common shiners would also be present in the lower section.

During low to moderate flows, a small falls located just upstream from the Housatonic River will limit upstream migration of river fish into Cobble Brook. However, during periods of high flow, species of fish such as spottail shiner, carp, smallmouth bass, and sunfish could move into the lower section of the brook. Additionally, brown trout would move even farther upstream into Cobble Brook, especially when high flows coincide with periods of hot weather.

Native brook trout and brown trout, which have migrated upstream from the Housatonic River, should provide a limited recreational fisheries in Cobble Brook.

It should be noted, however, that brown trout in the Housatonic River rapidly accumulate PCB's and those trout which migrate into Cobble Brook would remain tainted by the toxic chemical. This negative effect on Cobble Brook originates outside of its watershed. Within its own watershed, non-point sources of pollution are insignificant and would have virtually no impact on the fisheries of Cobble Brook.

XI. CULTURAL RESOURCES

A study of the area under consideration, undertaken by staff members associated with the American Indian Archaeological Institute, has identified several historic archaeological sites which would be threatened if intensive residential development was initiated. In addition, prior archaeological studies completed during the last decade have located several prehistoric sites along the shores of the region's upland, Holocene ponds. While these sites are outside of the immediate project area their presence indicates that the watershed has been used by prehistoric populations for thousands of years.

Geomorphological studies of this region, including the pioneering efforts of George Kelley (Late Pleistocene and Recent Geology of the Housatonic Region in Northwestern Connecticut, 1975), demonstrate that glacial ice had disappeared from the region by 13,000 B.P. Human populations began to inhabit the Housatonic Valley and its tributaries, including Cobble Brook, by 11,000 - 10,000 B.P. During the subsequent millenia these populations would have used the landscape within upland zones as well as along the valley floors. One recurring (though not constant) focus of prehistoric settlement in the uplands was large wetlands and shallow ponds. Elsewhere in Litchfield County - Robbins Swamp, for example - such features are surrounded by numerous prehistoric archaeological sites, some of which are quite large, suggesting the presence of permanent settlements.

While no known prehistoric sites have been located within the project area several resources have been discovered along the shores of North and South Spectacle Ponds as well as Hatch Pond, east and south of Cobble Brook's watershed. This data along with information gathered from adjacent streams including the West Aspetuck River suggests that prehistoric archaeological sites should exist within the study area.

Since the landscape along Cobble Brook is upland and has remained stable since 13,000 B.P., any archaeological record in this area is quite fragile, lying on or just below the modern ground surface. Although its "original integrity" has been disturbed by historic agricultural activities, archaeologists can study this record to isolate information about past behavior. Thus these archaeological resources, if present, are significant and could easily be destroyed or disturbed by any construction activities.

The Cobble Brook watershed also contains historic sites (eighteenth and nineteenth centuries A.D.) whose location and potential were studied briefly. A manuscript map of the Town of Kent's original division (original on file in the Archives and Manuscripts Division of the Connecticut State Library) indicates that the area was subdivided and settled as early as 1750 A.D. Flanders, an historic nucleated settlement from the late eighteenth and early nineteenth centuries, is situated at the lower end of Cobble Brook east of its confluence with the Housatonic River.

Several historic farmsteads or isolated structures are still standing in the area including two clusters along Route 341. This period is also represented by six historical archaeological resources in the southern end of the watershed. Such sites were once thriving farmsteads indicating that the area supported more agriculture (though less intensive) than it does today.

While few field studies have been conducted in the Cobble Brook watershed, previous investigations elsewhere and archival records suggest that some archaeological resources may exist. These sites are of varying ages, are associated with both the prehistoric and historic eras, and will be subjected to varying adverse effects if the area becomes a focus for future residential development.

Since much of that projected development would be initiated and financed entirely within the private sphere, extant federal or state preservation law does not offer such resources any viable protection. Further, the contemporary political climate indicates strongly that local preservation statutes--which would intensify government regulations--would be met with skepticism and defeat. Currently the American Indian Archaeological Institute is attempting to respond to this problem through educational programs as well as the development of an archaeological conservancy. Nevertheless, local officials and commissioners should understand that Litchfield County's landscape is covered with hundreds of archaeological resources whose age varies between 10,000 B.P. and the turn of the twentieth century. The fabric of such cultural resources is fragile and easily destroyed, resulting in the loss of non-renewable records.

XI. PLANNING CONSIDERATIONS

The Cobble Brook Watershed is a diverse area of uplands, steep slopes, cleared valleys, an historic village and scattered single family residences. If the existing qualities of the watershed are to be protected, then the town should consider following these basic goals: 1) Protection of water quality; 2) Protection of agricultural lands; 3) Proper management of forest resources; 4) Protection of scenic roads and views; 5) Encouragement of development forms that allow development to occur without destroying the highly scenic rural characteristics of the watershed. Each of these goals is discussed below.

1) Protection of Water Quality

Ground water - One important tool in maintaining the ground water quality in the watershed is enforcement of the Public Health Code. The Town should review its procedures, and make necessary changes if warranted, to insure that septic systems are being properly installed to prevent contamination of ground water.

Protection of ground water is important in this watershed due to the presence of a major aquifer. As previously discussed, this aquifer is composed of stratified drift and stretches from Rte. 341 north along the Cobble Brook Valley to Route 7 (see Figure 4). The Cobble Brook Aquifer has been tapped by the Kent Water Company, however the well has not been connected with the water company's supply lines.

It is recommended that the town consider adoption of aquifer protection regulations, similar to those prepared under the '208' water pollution control program, for the Cobble Brook Aquifer. Model aquifer protection regulations are available from the Northwestern Connecticut Regional Planning Agency in Warren (868-7341). Of particular interest are prevention of nutrient contamination by development at too intense a level, prevention of pollution from ruptured fuel storage tanks, and prevention of pollution from agricultural waste disposal facilities.

Surface Water - It is highly desirable that surface water quality be protected in the watershed for at least two reasons. First, Cobble Brook is a direct tributary to the Housatonic River. Given the extensive recreational use of the River, it is important that its water quality be maintained at, or improved to, a high level. Protection of Cobble Brook will help in this regard. Secondly, Cobble Brook flows through the Cobble Brook Aquifer. Normally water from the aquifer flows into the stream. However during dry periods, or when an aquifer is being pumped heavily, water may flow from the stream into the aquifer. If the surface water is contaminated, it may pollute the ground water.

In addition to enforcement of the sanitary health code and the town's inland wetlands regulations, the town should consider the adoption of streambelt regulations as recommended in the Plan of Development. Streambelt regulations are discussed in Appendix B of this report. Additional assistance in streambelt planning is available from the Litchfield County Soil and Water Conservation District and the Soil Conservation Service (567-8288).

It is also recommended that the town effectively enforce their regulations pertaining to erosion and sediment control. Principles of erosion and sediment control are described in the Connecticut Erosion and Sediment Control Handbook (available from the U.S.D.A. Soil Conservation Service). It is particularly important that the erosion and sediment control regulations be applied to new subdivisions, especially if they involve the construction of new streets, special permit uses, and single family homes when they are located on slopes greater than 15% or on easily erodible soils. Runoff control regulations should require a zero increase in runoff over predevelopment conditions. This would serve to maintain water quality and also to preserve streambanks, control flooding and erosion, and avoid the need for culvert enlargement by the town or state because of increased peak flows.

2) Protection of Agricultural Land

The State of Connecticut has long recognized the decline in active farm land in the State and has supported the need to preserve agricultural lands by taking numerous actions. A goal of the State draft Conservation & Development Policies Plan - Revision of 1982-85 states: "To maintain and increase a long-term in-state food producing capacity through conservation and preservation of prime agricultural lands and through removal of disincentives to the continuation and expansion of food-producing agriculture". Given the presence of large properties within the watershed and the disappearance of active farming in Kent, it is felt that protection of agricultural land should be undertaken along with private and public efforts to reestablish active farming in the watershed.

The ideal goal of farmland preservation within the watershed should be the protection of all prime agricultural lands from development. However, the protection of all such lands may not be feasible. A second alternative to protecting all lands is the protection of those prime agricultural lands which are 1) still under cultivation, 2) meadows, or 3) fields recently abandoned which have not reverted back to forest.

The State of Connecticut since 1978 has been engaging in the preservation of farmland through the purchase of development rights from farmers. While the concept of this program is excellent, lack of sufficient funds has in part prevented the implementation of this program on a wide scale. There are other options which may be available to help protect farmland. These include: 1) Acquisition of land by a foundation or land trust who, in turn, can lease the land to a farmer; 2) Acquisition of land by the town who in turn can lease it to a farmer; 3) Transfer of the development rights from the farmland to another area in town such as Kent center. Land receiving development rights would be allowed to be developed at densities higher than normally allowed. Kent center is recommended as a receiver area because existing water and sewer lines would permit higher densities without the limitations of on-site wells and septic systems.

3) Management of Forest Resources

Given the heavily forested nature of most of the watershed there is great potential for management of the forest resource to provide fuel and lumber for the residents of the watershed, and to improve wildlife habitat. Through forestry plans developed by the state or a private qualified forester, the woodlands can be culled of wood unsuitable for lumber but suitable for cord wood. All plans should meet the goal of water quality protection as discussed in the vegetation section of this report. Owners of five or more acres of land could conceivably obtain enough cord wood through proper management of their lands to meet their heating needs indefinitely.

It should be recognized that the concept of cluster development has several advantages over the conventional concept of single lot subdivision development in terms of multiple use forest management. Generally, cluster development, which does not exceed the number of individual dwelling units permissible under existing single lot subdivision regulations for a given parcel, will include common open space areas. These open space areas are usually large enough in size to allow for long term multiple use forest management. Ideally, actual development should be restricted to areas where environmental conditions are suitable, leaving environmentally sensitive areas undeveloped. Under this type of cluster design, the potential for management of the open space areas for recreation, wildlife habitat and the production of forest products is not lost, as it would be under conventional single lot subdivion design. Periodic revenues, which are generated by properly prescribed fuelwood or timber harvests, can be utilized for improvements and maintenance of these open space areas.

4) Scenic Roads and Development Form

The Northwestern Connecticut Regional Planning Agency in cooperation with the Rhode Island School of Design prepared a design analysis of the Region which is applicable to this watershed. According to the RPA/RISD analysis, "if the image of a rural town is to be retained it is worthwhile to evaluate how new individual lots and homes will fit in the landscape". New houses are typically sited either within full view of the road (suburban model) or behind a vegetative buffer (a rural model). If a rural wooded consistency of an area is the desirable norm, then the first mentioned siting is inappropriate. This suggests that all new residential construction should be required to conform to certain performance standards that insure the retention of rural roadside vegetation.

Development within roadside corridors is perhaps the most critical aesthetic consideration in the watershed. The foreground is the most sensitive. According to the above mentioned RPA/RISD report, "any construction in this area tends to be visible and if divergent from the normative character, intrusive unless adequately buffered". Figure 10 defines the land which is most vulnerable to modification.

The RPA/RISD report also notes "a landscape of varied topography will accept and absorb significantly more development with minimum apparent visual change. The landscape that is flat, open and extensive, inevitably changes with every new development".

There are some roads in the watershed which are outstanding in their scenic quality such as Cobble Road and Route 7. A combination of innovative regulation techniques and a private conservation program could succeed in protecting these scenic roads and their related views. There are several zoning techniques in addition to the acquiring of land in fee simple ownership or the use of conservation easements which could be used to protect the critical foreground areas. These include:

1) Using transfer of development rights to prevent the building of any residential structures in the foreground area.

2) Promoting the clustering of residential units on a property away from the foreground area. Although many clustering provisions provide for multifamily housing, given the rural nature of this watershed it is recommended that clustering be restricted to the grouping of single family homes in a village-like configuration. It should be recognized that such clustering may necessitate the use of a community water supply and/or septic system which would result in added responsibilities for the town.

3) Encouraging through the subdivision regulations the preservation of a percentage of land for open space purposes. The placement of this open space in proximity to scenic roads would help protect sensitive foreground areas.

4) Establishing an overlay zone for scenic roads and their foreground areas which would regulate activities. These may include regulations such as the following: (Note: Many of these ideas are taken from regulations established by the Martha's Vineyard Commission.)

a. In open areas sensitive to any development, prevent the extension of roof lines above the crest of any open hill or ridge visible from a scenic highway.

b. Based on the assumption that a building's intrusion is directly related to the height and distance back from a roadway, establish a sliding scale for building height with progressively taller buildings permitted further back from the road.

c. Limit the location of driveways onto a road for highway safety and aesthetic purposes. Driveways should follow existing contours wherever possible.

d. Prohibit the removal of existing stone walls and distinctive trees from the road right of way.

Flanders Village

Within the Cobble Brook Watershed is the Flanders Historic District. This district encompasses the village of Flanders, the first center of the town. Fortunately a significant cluster of historic homes and other buildings still remain. With the establishment of the Historic District, the architectural integrity of the village is insured. However, the area is not totally contained by natural features; therefore, it could be adversely impacted by development in the surrounding area. One method to protect the district boundaries would be the establishment of a greenbelt through purchase or easement of lands, streambelt regulations and other land preservation techniques.

Town Plan of Development

The Plan of Development for Kent, approved in 1975, places most of the Cobble Brook watershed in a "Low Density Residential" classification. A smalle area around Flanders is designated "Medium Density Residential" while the Cobble Brook streambelt is indicated as "open space and streambelt". The Plan calls for the "Low Density Residential" or "Rural District" to be maintained as a single family, low density area as long as the developments are serviced by individual wells and septic systems. The minimum lot size should be one acre where physical conditions are good according to the Plan. Where physical conditions are less than good, lot size should be a minimum of two to five acres as determined on a case-by-case basis.

A medium density designation is given to the lower portion of the Cobble Brook watershed. It includes land on either side of Rt. 7 north from Kent Center up to and including Flanders. Also designated is an area along Cobble Road from Flanders south 1,000 feet beyond Cobble Lane. The Plan proposes that this area be developed at a residential density of one family per acre with pro vision for an increased density with the extension of utility services (water and sewer).

The streambelt of Cobble Brook and its tributaries as defined by the Litchfield County Soil and Water Conservation District (see Figure 6) is recommended for protection under the Plan. Under the streambelt concept (see Appendix B), use of land adjacent to the streams is restricted so that water quality is not adversely affected.

The Plan of Development stresses throughout the report the importance of using soils characteristics for establishing the development patterns in Kent. The soils characteristics should be reflected in development density and septic system testing specifications.

In reviewing the Plan of Development's Land Use Plan it is recommended that consideration be given to changing the area designated 'medium density' to 'low density'. This is recommended for the following reasons: 1) The Flanders area is a valuable historic resource in Kent. Its value is due in large part to the cohesiveness of the village and its distinct separation from surrounding undeveloped areas. The development of high density residential un in proximity to the Historic District, possibly under a medium density designa would be damaging to the uniqueness of the area. 2) Likewise, the possibilit of high density development in the open valley floor along Cobble Brook would have a severe effect on the very high scenic quality of the valley. A new bou between the medium density and rural land use designation would have to be determined by the Planning and Zoning Commission after much discussion. A possi bility might be the streambelt of the unnamed stream flowing through Kent Furr

Zoning

With the exception of the Flanders Historic District, the entire Cobble Brook watershed is zoned RU-40 (rural district). The Kent Planning and Zoning Commission recently revised the zoning regulations for this district to provide for minimum lot sizes based on soil types. Under this zoning, minimum lot sizes vary from one acre to 5 acres depending upon the soil condtions.

In addition to one and two family dwellings, other uses permitted in this District include (with conditions): agriculture, forestry, professional office, cemeteries, and parks and playgrounds. The following uses may be permitted in the Rural Districts subject to special permit provisions: private schools and colleges, privately operated hospital, churches, community centers, campgrounds, golf courses, funeral homes, hotels or motels, indoor restaurants, private kennels.

There are also provisions for cluster subdivisions under the Kent Regulations which allow for a reduction in required lot area with reservations of appropriate open space lands.

The lower portion of the watershed lies within the inner and outer corridor of the Housatonic River District. Within this District, special attention should be paid towards activities permitted within the Rural Districts which might have a detrimental effect on the scenic qualities and water quality in the Housatonic River Valley.

Land Ownership Patterns

As can be seen from Figure 1, the Cobble Brook Watershed is lightly developed. According to the Kent Tax Maps, there are 195 lots within the watershed, varying in size from less than one acre to over 200 acres. The following chart identifies the number of parcels in different size ranges.

Parcel Size	No. of Parcels
0-2 acres	54
2-5	48
5-10	37
10-25	17
25-50	17
50-100	10
100+	12

The above chart shows that nearly half of the existing lots in the watershed are over 5 acres in size. This indicates that the development pattern of the study area can still be determined. It should be noted that approximately 130 acres of land in the watershed is owned by the Wyantenoge Land Trust and is therefore free from development pressure. Other major landowners in the watershed include Camp Kenmont and the Stanley Works.

Population projections by the State Office of Policy and Management indicate that through the year 2000, the population growth in the Town of Kent will increase roughly 3-5% every five years. The Cobble Brook watershed can be expected to absorb a portion of this growth. It is hoped that this report will assist the Town of Kent in better understanding the important natural and cultural resources of the Cobble Brook watershed, and that future planning and development in the watershed will be sensitive to the character and capacities of the land.

* * * * *

APPENDIX

APPENDIX A

SOILS LIMITATION CHART COBBLE BROOK WATERSHED, KENT, CT

(refer to map symbols in Figure 5 or 6)

MAP SYMBOL	SOIL NAME	ACRES/%	SEPTIC SYSTEMS	BLDG. W/BASEMENTS	ROADS OR DRIVEWAYS	LANDSCAPING
*Am	Alluvial land	15/.5	Severe; floods, wetness	Severe; floods, wetness	Severe; floods, wetness, frost action	Severe; floods, wetness
ApC	Amenia very stony silt loam, 3-15% slopes	3/.1	Severe; percs slowly, wetness	Severe; wetness	Severe; frost action	Slight-moderate; Slope
+ BaA	Belgrade silt loam, 0-3% slopes	18/.6	Severe; wetness	Severe; wetness	Severe; frost action	Slight
*Bz	Birdsall silt loam	54/1.8	Severe; wetness, percs slowly	Severe; wetness	Severe; wetness, frost action	Severe; wetness
+ CaB	Charlton fine sandy loam, 3-8% slopes	36/1.2	Slight	Slight	Slight	Slight
CaC	Charlton fine sandy loam, 8-15% slopes	6/.2	Moderate; slope	Moderate; slope	Moderate; slope	Moderate; slope
CaD	Charlton fine sandy loam, 15-25% slopes	6/.2	Severe; slope	Severe; slope	Severe; slope	Severe; slope
ChB	Charlton stony fine sandy loam, 3-8% slopes	58/1.9	Slight	Slight	Slight	Moderate; Large stones
ChC	Charlton stony fine sandy loam, 8-15% slopes	80/2.7	Moderate; slope	Moderate; slope	Moderate; slope	Moderate; slope, Large stones
ChD	Charlton stony fine sandy loam, 15-25% slopes	34/1.1	Severe; slope	Severe; slope	Severe; slope	Severe; slope
CrC	Charlton very stony fine sandy loam 3-15% slopes	329/11	Slight-moderate; slope	Slight-moderate; slope	Slight-moderate; slope	Moderate; large stones, slope
CrD	Charlton very stony fine sandy loam, 15-35% slopes	212/7.1	Severe; slope	Severe; slope	Severe; slope	Severe; slope
+ CwB	Copake loam, 3-8% slopes	133/4.4	Slight	Slight	Slight	Slight

SOIL SYMBOL	SOIL NAME	ACRES/%	SEPTIC SYSTEM	BLDG. W/BASEMENTS	ROADS OR DRIVEWAYS	LANDSCAPING
CwC	Copake loam, 8-15% slopes	17/.6	Moderate; slope	Moderate; slope	Moderate; slope	Moderate; slope
*+Ee	Eel silt loam	12/.4	Severe; floods, wetness	Severe; floods, wetness	Severe; frost action, wetness, floods	Severe; wetness, floods
+EsB	Enfield silt loam, 3-8% slopes	16/.5	Severe; poor filter	Slight	Moderate; Frost action	Slight
EsC	Enfield silt loam, 8-15% slopes	12/.4	Severe; poor filter	Moderate; slope	Moderate; slope, frost action	Moderate; slope
DoC	Dover fine sandy loam, 8-15% slopes	4/.1	Severe; percs slowly	Moderate; slope	Moderate; slope, frost action	Moderate; slope
FmE	Farmington extremely rocky silt loam, 15-35% slopes	27/.9	Severe; slope, depth to rock	Severe; slope, depth to rock	Severe; slope, Depth to rock	Severe; slope, Depth to rock
*Fr	Fredon silt loam	31/1	Severe; floods, wetness	Severe; floods, wetness	Severe; wetness, frost action	Severe; wetness
GrC	Groton gravelly sandy loam 3-15% slope	25/.8	Severe; poor filter	Slight-moderate; Slope	Slight-moderate; Slope	Severe; droughty
+HbB	Hartland silt loam, 3-8% slopes	13/.4	Slight	Slight	Severe; frost action	Slight
+HeA	Hero loam, 0-8% slopes	13/.4	Severe; wetness	Severe; wetness	Moderate; frost action	Slight
+HeB	Hero loam, 0-8% slopes	15/.5	Severe; wetness	Severe; wetness	Moderate; frost action	Slight
HkC	Hinckley gravelly sandy loam, 3-15% slopes	31/1	Severe; poor filter	Moderate; large stones, slope	Moderate; large stones, slope	Moderate; small stones, droughty, slope
HmC	Hinckley gravelly loamy sand, 3-15% slopes	19/.6	Severe; poor filter	Moderate; large stones, slope	Moderate; large stones, slope	Moderate; small stones, droughty, slope

SOIL SYMBOL	SOIL NAME	ACRES/%	SEPTIC SYSTEM	BLDG. W/BASEMENTS	ROADS OR DRIVEWAYS	LANDSCAPING
HoC	Hollis rocky fine sandy loam, 3-15% slopes	49/1.6	Severe; depth to rock	Severe; depth to rock	Severe;depth to rock	Severe; thin soil layer
HrC	Hollis very rocky fine sandy loam, 3-15% slopes	302/10.1	Severe; depth to rock	Severe; depth to rock	Severe; depth to rock	Severe; thin soil layer
HrC	Hollis very rocky fine sandy loam, 15-35% slopes	265/8.8	Severe; depth to rock, slope	Severe; depth to rock, slope	Severe; depth to rock, slope	Severe; thin soil layer, slope
HxC	Hollis extremely rocky fine sandy loam, 3-15% slopes	22/.7	Severe; depth to rock	Severe; depth to rock	Severe; depth to rock	Severe; thin soil layer
HxE	Hollis extremely rocky fine sandy loam, 15-35% Slope	191/6.4	Severe; depth to rock, slope	Severe; depth to rock, slope	Severe; depth to rock, slope	Severe; thin soil layer, slope
*Lc	Leicester fine sandy loam	3/.1	Severe; wetness	Severe; wetness	Severe; wetness, frost action	Severe; wetness
*Le	Leicester stony fine sandy loam	4/.1	Severe; wetness	Severe; wetness	Severe; wetness, frost action	Severe; wetness
*Lg	Leicester, ridgebury & whitman very stony fine sandy loams	186/6.2	Severe; large stones, wetness	Severe; large stones, wetness	Severe; large stones, wetness, frost action	Severe; large stones, wetness
*Lm	Limerick silt loam	11/.4	Severe; floods, wetness	Severe; floods, wetness	Severe; floods, wetness, frost action	Severe; floods, wetness
+MyA	Merrimac sandy loam 0-3% slopes	14/.5	Severe; poor filter	Slight	Slight	Slight
+MyB	Merrimac sandy loam, 3-8% slopes	21/.7	Severe; poor filter	Slight	Slight	Slight
MyC	Merrimac sandy loam, 8-15% slopes	21/.7	Severe; poor filter	Moderate; slope	Moderate; slope	Moderate; slope

MAP SYMBOL	SOIL NAME	ACRES/%	SEPTIC SYSTEM	BLDG. W/BASEMENTS	ROADS OR DRIVEWAYS	LANDSCAPING
*+On	Ondawa fine sandy loam	16/.5	Severe; flooding, poor filter	Severe; flooding	Severe; flooding	Severe; flooding
* Pm	Shallow muck	16/.5	Severe; wetness, floods, subsides	Severe; wetness, floods, low strength	Severe; wetness, floods, low strength	Severe; wetness, floods, excess humus
* Pk	(Carlisle) Peat and muck	35/1.2	Severe; floods, wetness	Severe; wetness, low strength, floods	Severe; low strength, wetness, floods	Slight
+PbB	Paxton fine sandy loam, 3-8% slopes	48/1.6	Severe; percs slowly	Moderate; wetness	Moderate; frost action, wetness	Slight
PbC	Paxton fine sandy loam, 8-15% slopes	4/.1	Severe; percs slowly	Moderate; slope, wetness	Moderate; frost action, wetness	Moderate; slope
PdC	Paxton stony fine sandy loam, 8-15% slopes	11/.4	Severe; percs slowly	Moderate; slope, wetness	Moderate; slope, frost action, wetness	Moderate; slope, large stones
PeC	Paxton very stony fine sandy loam, 3-15% slopes	32/1.1	Severe; percs slowly	Moderate; slope, wetness	Moderate; slope, frost action, wetness	Moderate; slope, large stones
PeD	Paxton very stony fine sandy loam, 15-35% slopes	80/2.7	Severe; slope, percs slowly	Severe; slope	Severe; slope	Severe; slope
*Rc	Raynham silt loam	17/.6	Severe; percs slowly	Severe; wetness	Severe; frost action, wetness	Moderate; wetness
*Rd	Ridgebury fine sandy loam	11/.4	Severe; percs slowly, wetness	Severe; wetness	Severe; wetness, frost action	Severe; wetness
*Ru	Rumney fine sandy loam	21/.7	Severe; floods, wetness, poor filter	Severe; floods, wetness	Severe; floods, wetness, frost action	Severe; wetness, floods

MAP SYMBOL	SOIL NAME	ACRES/%	SEPTIC SYSTEM	BLDG. W/BASEMENTS	ROADS OR DRIVEWAYS	LANDSCAPING
+SvB	Sutton fine sandy loam, 3-8% slopes	6/.2	Severe; wetness	Severe; wetness	Moderate; frost action	Slight
SwB	Sutton stony fine sandy loam, 3-8% slopes	13/.4	Severe; wetness	Severe; wetness	Moderate; frost action	Moderate; large stones
SwC	Sutton very stony fine sandy loam, 3-15% slopes	64/2.1	Severe; wetness, large stones	Severe; large stones, wetness	Moderate; slope, large stones, frost action	Severe; large stones
Tg	Terrace escarpments	217/7.2	Severe; poor filter	Moderate; large stones, slope	Moderate; large stones, slope	Moderate; small stones, slope, droughty
+TwB	Tisbury and sudbury soils, 3-8% slopes	14/.5	Severe; wetness, poor filter	Severe; wetness	Severe; frost action	Moderate; wetness
*Wmx	Wareham loamy fine sandy (nonacid variant)	6/.2	Severe; ponding, poor filter	Severe; ponding	Severe;ponding, frost action	Severe; ponding, excess humus
+WvB	Windsor loamy fine sand, 3-8% slopes	2/.1	Severe; poor filter	Slight	Slight	Moderate; droughty
WvC	Windsor loamy fine sand, 8-15% slopes	2/.1	Severe; poor filter	Moderate; slope	Moderate; slope	Moderate; slope, droughty
*Wp	Whitman stony fine sandy loam	2/.1	Severe; percs slowly, ponding	Severe; ponding	Severe; frost action, ponding	Severe; ponding
WxC	Woodbridge fine sandy loam, 8-15% slopes	6/.2	Severe; percs slowly, wetness	Severe; wetness	Severe; frost action	Moderate; slope, large stones, wetness
WzC	Woodbridge very stony fine sandy loam, 3-15% slopes	49/1.6	Severe; percs slowly, wetness	Severe; wetness	Severe; frost action	Moderate; slope, large stones, wetness

* Inland Wetland Soils.

+ Prime Farmland Soils.

EXPLANATION OF RATING SYSTEM:

1. SLIGHT LIMITATION: indicates that any property of the soil affecting use of the soil is relatively unimportant and can be overcome at little expense.
2. MODERATE LIMITATION: indicates that any property of the soil affecting use can be overcome at a somewhat higher expense.
3. SEVERE LIMITATION: indicates that the use of the soil is seriously limited by hazards or restrictions that require extensive and costly measures to overcome.

Note: Soil limitations based upon USDA Soil Conservation Service criteria.

APPENDIX B

STREAMBELTS - A SYSTEM OF NATURAL ENVIRONMENTAL CORRIDORS (Refer to Figure 6).

The environmental quality of the Cobble Brook area of Kent is in large part dependent upon Cobble Brook and its tributaries, along with the corridors of land associated with these streams. These corridors may be called "streambelt environmental corridors". Within these corridors, land and water are vital natural resources deserving priority consideration with respect to land use planning and management.

The area under consideration is still relatively undeveloped. Implementing a streambelt approach to planning and zoning is still feasible.

By controlling the distribution and amount of urbanization within the watershed area (in accordance with the streambelt approach), streams and their associated wetlands could be protected to a great degree from future degradation of quality. The following information on streambelt planning and implementation has been prepared by the USDA Soil Conservation Service.

The components of streambelts are:

1. Critical components

   a. The watercourse of a defined perennial stream including banks, bed, and water.
   b. Lands subject to stream overflow.
   c. Associated wetlands.
   d. Shorelines of lakes and ponds associated with the stream.
   e. Areas in proximity of streams where certain developments or land uses probably would have adverse environmental effects, i.e., pollution and health hazards, erosion and sedimentation, destruction of ecological systems.

2. Optional components

   a. Contiguous lands with special environmental values, i.e., wildlife habitat, esthetic, public recreation, scenic, historic, etc.
   b. Potential water development sites of public significance.
   c. Other areas necessary as links to form a continuous streambelt system.

The objective of a streambelt system is the identification, development, and management of a network of environmental corridors according to standards that curtail pollution and siltation, reduce hazards of flood loss, provide quality recreation areas, promote scenic beauty, and protect important ecosystems. Streambelts are intended to serve the needs of people for open space.

Planning a Streambelt System

In the interest of public health, safety and welfare, a streambelt system is intended to conserve natural resources of vital significance, permitting and encouraging the wise use of these resources. In advancing these principles, the specific intents are:

1. To promote such development or land uses that would not have probable adverse environmental effects.
2. To promote the health, safety, and welfare of residents and property owners near streams and in areas subject to flooding, and to prevent further occupancy in floodprone areas.
3. To maintain natural drainage courses sufficient to carry abnormal flows of storm water in periods of heavy precipitation and prevent the future need of excessive public expenditures for water disposal, and to reduce the need for costly flood prevention measures by retention of floodplains and floodprone areas in open space.
4. To maintain a framework of environmental corridors of high quality for public access with close proximity to neighborhood and population centers.
5. To help stabilize stream flow.
6. To protect water quality.
7. To retain sites for beneficial water uses such as flood control, water supply, wildlife habitat, and recreation.
8. To protect areas of importance to the preservation of significant ecological systems.
9. To maintain and encourage the improvement of environmental qualities including beauty, recreational opportunity, plant and animal life, scenic and other natural values.
10. To preserve areas of unique, scientific, or historic interest and to retain areas with special significance for scientific study, ecological research, and conservation or nature education.
11. To retain contrast in the landscape and provide buffer zones between incompatible land uses.
12. To protect and improve fish and wildlife habitat.
13. To help protect groundwater areas that are important to water supply.

Land Use Determinations

1. Land Uses Compatible with Soil Characteristics

   a. In all areas of the streambelt:

      (1) Wildlife preserves, preservation of scenic, historic, natural, and scientific areas and nature study.
      (2) Forestry and wildlife habitat.

   b. In addition to those stated in 'a' above, other uses and operations are compatible in certain areas as follows:

      (1) Natural soil groups* A-1a, A-1b, A-1d, A-1e, A-2, B-1a, B-1b, B-1c, B-2, C-1a, C-1b, C-1c, C-2, E-1 and E-2.

      Agriculture activities including plant nurseries, cropland, hayland and livestock pasture (with livestock watering devices) provided erosion and pollution are controlled.

*Refer to: Know Your Land - Natural Soil Groups for Connecticut, USDA Soil Conservation Service and Connecticut Cooperative Extension Service, No. 71-56. This publication is available at the Litchfield County Conservation District (567-8288).

Outdoor recreation uses such as parks, playgrounds, campsites, golf courses, hunting areas and trails.

Uses that maintain permanent vegetative cover including extensive recreation.

(2) Natural soil groups A-1c, B-1d, B-1e, C-1d, C-1e, D-1, and D-2. Uses that maintain permanent vegetative cover including extensive recreation.

2. Conditional Land Uses Based on Soil Characteristics

The following land uses will require regulation and the application of a sound conservation plan to avoid undue deterioration of the streambelt.

a. In all areas of the streambelt:

(1) Highways, roads, utility transmission and pipe lines, dams, bridges, mining, quarrying, earth removal, and dredging.

(2) Small recreational buildings, boat docks, ramps, etc. (These will be subject to state statutory provisions, local ordinances, and other environmental review procedures.)

b. In addition to those state in 'a' above, certain other uses are conditional in the following areas:

Natural soil groups A-3, B-3, C-3, and F-1: embankment, dugout, and bypass ponds for irrigation, recreation, wildlife, etc., level ditching, and other wetland wildlife improvements. (These uses are conditional on conservation plans and engineering designs provided or approved by the soil conservation district or other state resource agencies.)

3. Restricted Land Uses Based on Soil Characteristics

The following land uses generally are not compatible with the objectives of a streambelt system.

a. In all areas of the streambelt:

(1) Residential, commercial, industrial, and institutional buildings.
(2) On-site sewage disposal.
(3) Any solid or liquid waste or refuse disposal including sanitary landfills.
(4) Junk yards, commercial and industrial storage.
(5) Barns, stables, feedlots, barnyards, dry lots, poultry buildings, and farm waste disposal.
(6) Access to watercourses by domestic livestock.

b. In addition to those uses stated in 'a' above, certain other uses are restricted:

Natural soil groups A-3, B-3, C-3, E-3 and F-1: cropland, hayland, and pasture and drainage and land filling.

Implementing a Streambelt System

An early step in implementing a streambelt system is a public information program. The Litchfield County Conservation District can assist with such a program. Full use should be made of public meetings and the news media in order to obtain consideration by the public of their objectives with respect to a streambelt program.

Several means of achieving public goals are:

1. Obtain wise land use and natural resource development on public and privately owned lands within streambelts by promoting local participation in the activities of the Litchfield County Soil and Water Conservation District.

2. Public acquisition of streambelt lands.

3. Acquisition by private land trusts.

4. Conservation easements.

5. Effectively implement regulations of the state relating to health and sanitation, water pollution, stream channel encroachment, inland wetlands, etc.

6. Adhere to flood hazard or flood insurance programs.

7. Utilize programs offered by the King's Mark Resource Conservation and Development Area.

8. Have local agencies such as the NWCRPA and the LCCD review applications and plans for changes in land use within streambelt areas.

Land use regulations: As a prerequisite to enactment of streambelt regulations, the towns should have a comprehensive plan which reflects its objectives for preserving and wisely using the streambelts. The comprehensive plan (consisting of of maps and other information) should show in general the areas delineated as the streambelt.

In addition to planning maps, there should be an official streambelt map established by the planning and zoning commissions (or other designated body) and adopted by the legislative bodies as part of the streambelt ordinance.

Where this is done, town comprehensive plans may include streambelts consisting of two main categories--a core or streambelt protected by special regulations, and associated areas included in the overall streambelt and controlled only by the normal zoning regulations.

In the second category mentioned above are areas or sites that towns have planned as part of an overall streambelt system, but where special land use controls are not justified or practical. These areas or sites would have special or significant values as open space and for public use. For instance, scenic overlooks and features, historic sites, areas with potential for public recreation, etc.

Time is the most important consideration. Each day there is new evidence of damage by encroachment, pollution, or other types of destruction of streambelts. The identification of environmental corridors and wise decisions by local people on how to manage and implement streambelts will help considerably in protecting the quality of the environment in the Cobble Brook watershed area of Kent.

The Litchfield County Conservation District has prepared a streambelt map of the Cobble Brook watershed. Due to the complexity of this mapping, only one copy was prepared (available at the Litchfield County Conservation District office). A simplified version of this map however is presented in Figure 6 of this report. The criteria used in establishing the setback distances for this mapping is based upon natural soil groups and USDA Soil Conservation Service standards. More information on streambelt planning and regulation is available from the Litchfield County Conservation District.

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, foresters, climatologists, soil scientists, landscape architects, recreation 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 - a 47 town area in western Connecticut.

As a public service activity, the team is available to serve towns and developers within the King's Mark Area --- free of charge.

PURPOSE OF THE TEAM

The Environmental Review Team is available to help towns and developers in the review of sites proposed for major land use activities. To date, the ERT has been involved in the review of a wide range of significant activities including subdivisions, sanitary landfills, commercial and industrical 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 project site and highlighting opportunities and limitations for the proposed land use.

REQUESTING A REVIEW

Environmental Reviews may be requested by the chief elected official of a municipality or the chairman of an administration agency such as planning and zoning, conservation, or inland wetlands. Requests for reviews should be directed to the Chairman of your local Soil and Water Conservation District. This request letter 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 purposes of review, and a statement identifying the specific areas of concern the team should address. When this request is approved by the local Soil and Water Conservation District and the King's Mark RC&D Executive Committee, the team will undertake the review. At present, the ERT can undertake two reviews per month.

For additional information regarding the Environmental Review Team, please contact your local Soil Conservation District Office or Richard Lynn (868-7342), Environmental Review Team Coordinator, King's Mark RC&D Area, P.O. Box 30, Warren, Connecticut 06754.