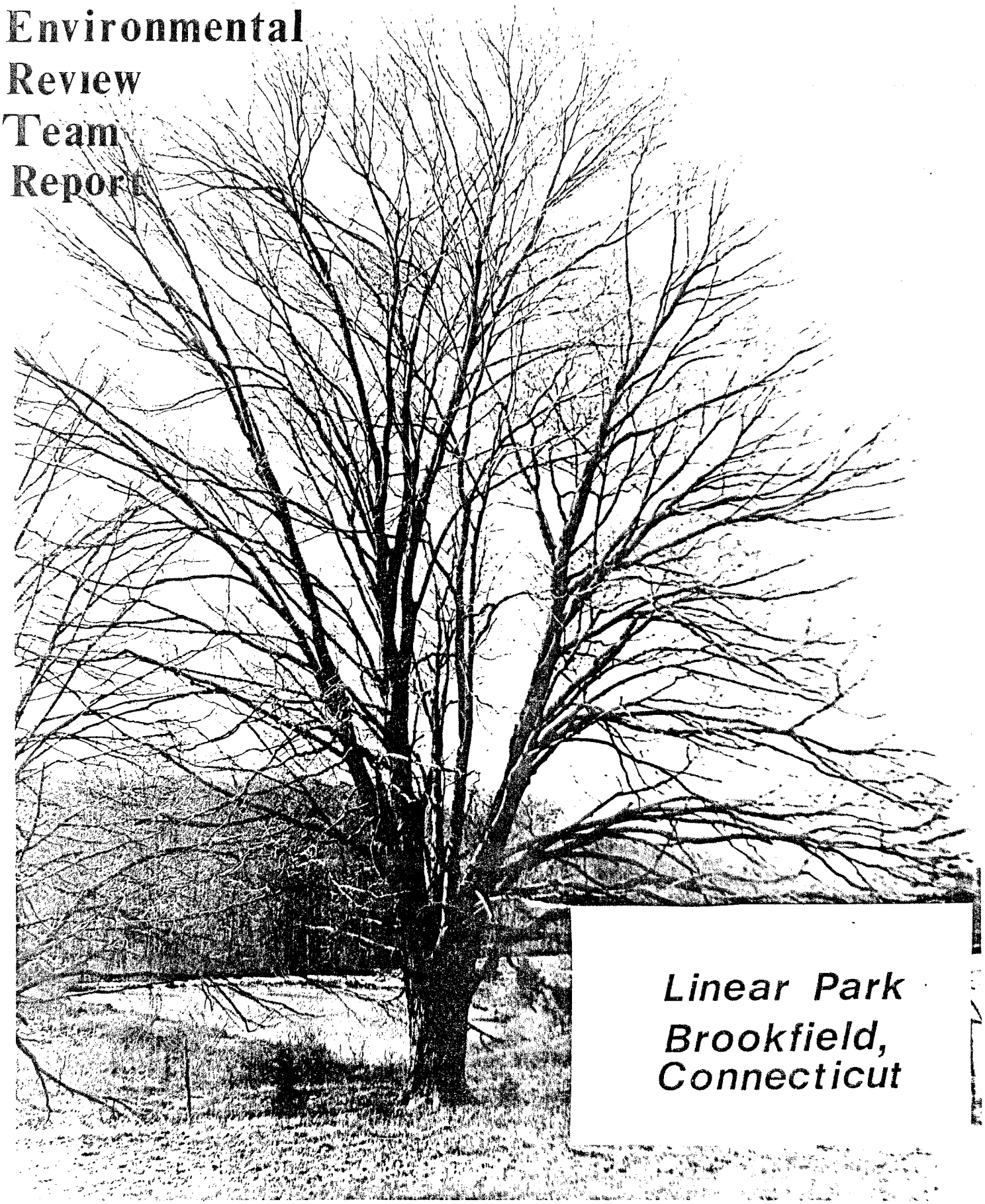
King's Mark Environmental Review Team Report



Linear Park
Brookfield, Connecticut

LINEAR PARK

BROOKFIELD, CONNECTICUT

Environmental Review Team Report

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

Wallingford, Connecticut

for the

Brookfield Parks and Recreation Commission

This report is not meant to compete with private consultants by supplying site designs or detailed solutions to development problems. This report identifies the existing resource base and evaluates its significance to the proposed development and also suggests considerations that should be of concern to the Parks and Recreation Commission and the Town. The results of the Team action are oriented toward the development of a better environmental quality and long-term economics of the land use. The opinions contained herein are those of the individual Team members and do not necessarily represent the views of any regulatory agency with which they may be employed.

DECEMBER 1987

ACKNOWLEDGEMENTS

The King's Mark Environmental Review Team Coordinator, Nancy Ferlow, would like to thank and gratefully acknowledge the following Team members whose professionalism and expertise were invaluable to the completion of this study:

* David Thompson, District Conservationist
  USDA - Soil Conservation Service

* Milan Bull, Bird Specialist
  Connecticut Audubon Society

* Robert Clapper, State Park Planner
  Department of Environmental Protection - Parks and Recreation

* Alberto Mimo, Environmental Education Specialist
  Department of Environmental Protection - Information and Education

I would also like to thank Laverne Mendela, Secretary, and Janet Jerolman, Cartographer of the King's Mark Environmental Review Team for assisting in the completion of this report.

Finally, special thanks to Christine Ragosta and Hoy Heise of the Brookfield Parks and Recreation Commission and Steve Pierce, Parks and Recreation Director, for their cooperation and assistance during this environmental review.

EXECUTIVE SUMMARY

Introduction

The Brookfield Parks and Recreation Commission requested that an ERT be done on the first phase of Brookfield Linear Park, a town-owned undeveloped park. The parcel is approximately 71 acres in size and is located in the central part of Brookfield between old Route 7 and new Route 7.

The Park is primarily forested with large areas of wetland. The Still River meanders through the property. Numerous wetland corridors exist around the river, dominated by Raypol, Rippowam and Saco soils.

The Town is interested in developing the area into a passive recreational area with nature trails, canoe landing and parking areas. The Town is also interested in the educational aspects of the property in hopes that it may become an environmental education resource for the schools. Therefore, the Town has asked the ERT to: (1) assess the potential of the area for nature trails, a canoe landing, access and parking; and (2) discuss natural areas and habitats that should be avoided or highlighted, keeping in mind the needs of the ecosystems and the need for education. The information generated by the ERT will be used by the Town to develop a conceptual site plan for the Park.

Below are the major findings of the ERT.

Soils

The Linear Park study area contains eight soil types which can be divided into two use categories: the dry uplands with year round use capability, and the wet flood plain with seasonal use capability. The two areas make contact along an escarpment that extends the full length of the river frontage. The flood plain has excellent scenic qualities and great educational value. The uplands are wooded and contain outcroppings of manhattan marble, an isolated wetland, a water course, and numerous stone walls.

The possibility for hiking trails is not limited by grade or hazard. A flood plain trail is highly recommended because the unusual character of the terrain. A trail along the crest of the escarpment would dramatize its serpentine form. A random system of interior trails would serve to highlight cultural features that relate to the history of Brookfield.

Birds

The Still River flood plain provides ample and varied habitat for a variety of bird species that utilize the area for foraging, breeding, and as a migration corridor. Most species of song birds common in Connecticut can be found at the site at one time or another throughout the year. The creation of a nature trail/boardwalk should not severely impact the environment. It is recommended that the trail be reserved for passive recreationalists as opposed to A.T.V.'s. In order to enhance the wildlife value of the area, wood duck and bluebird nest boxes are recommended.

Recreational Planning Considerations

Access to the park area will need the most development for identity and security. A signed access path should be developed. Two alternatives exist for development of the canoe landing. The first is to terminate the dirt road at the hairpin and install a turn around and the canoe landing on the bank. The second is to develop the grass area at the end of the road into a parking area.

It is recommended that all trails and development be above the 275 foot elevation to minimize flood damage and foot impact on boggy soils. A gazebo on the high knoll could serve as an entry point and interpretive center. An elevated boardwalk would allow for viewing of the flood plain and river with minimal impact. Extension of the trail to Phase 2 should be a part of Phase 2 since it would be a dead end trail.

Environmental Education Considerations

The Linear Park can be used to provide an educational experience for school children and adults. Recommendations for accomplishing educational objectives include an extensive trail system, matching environmental concepts to the existing school curriculum, writing a nature trail guide, writing a lab manual for high school students and establishing a clearinghouse for species lists and other information about the property.

TABLE OF CONTENTS

LIST OF FIGURES

NATURAL RESOURCE CHARACTERISTICS

The following soils have been identified on the study site (see Figure 2 and Appendix A for descriptions):

AfB-Agawam fine sandy loam, 3 to 8 percent slopes.
NfC-Nellis-Farmington fine sandy loams, very rocky, 3 to 15 percent slopes.
Nn-Ninigret fine sandy loam.
Ps-Pootatuck fine sandy loam.
Rb-Raypol silt loam.
Ro-Rippowam fine sandy loam.
Sb-Saco silt loam.
UD-Udorthents, smoothed.

Topography and Land Use

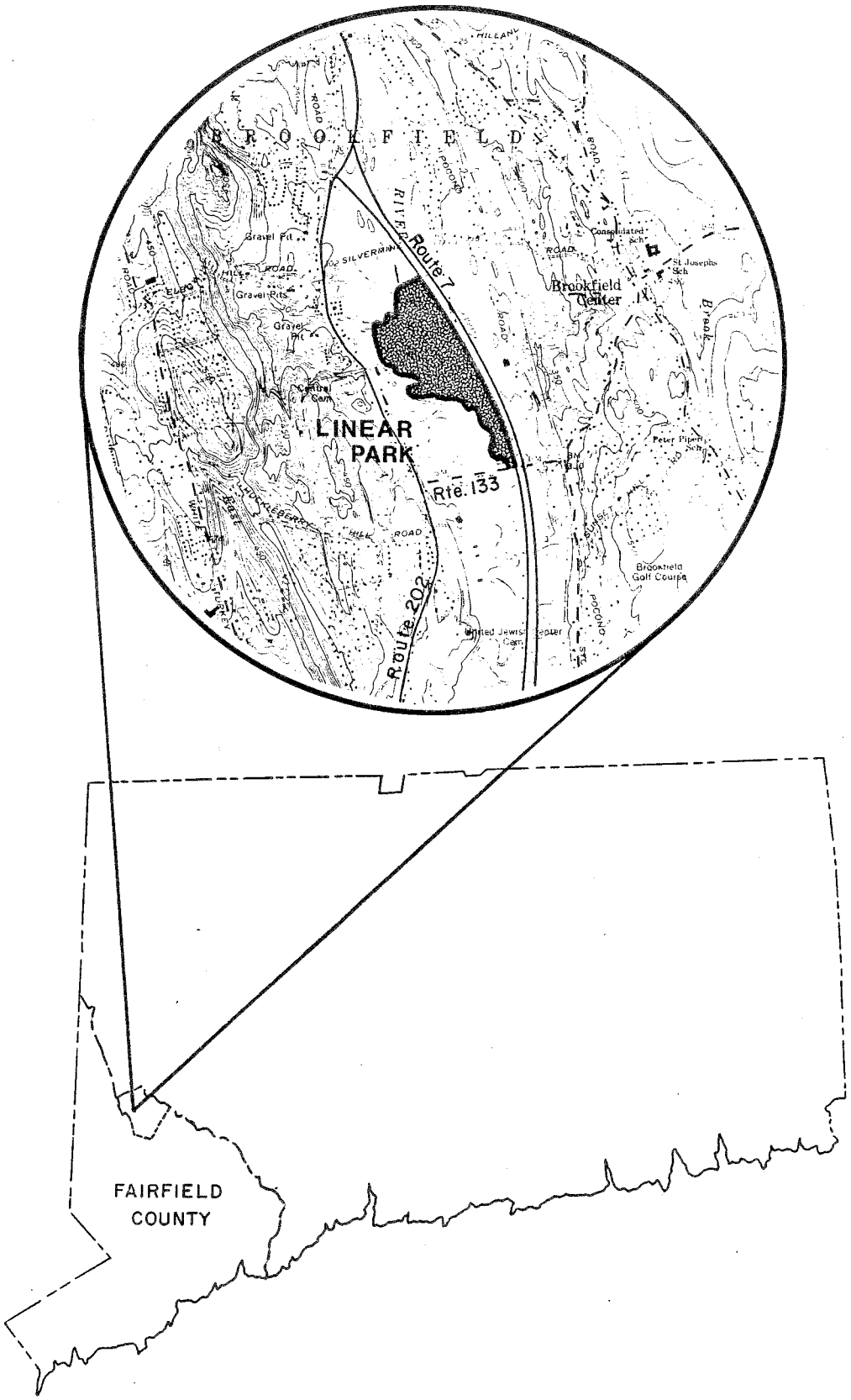
The site has a very interesting combination of topographic and cultural features. The most dramatic, perhaps, is the active flood plain paralleling the river. It is classic in both form and profile. It has excellent scenic qualities and great educational value. The uplands are wooded with a variety of tree species. The site also contains outcroppings of manhattan marble, an isolated wetland, a water course, and numerous stone walls indicating an agricultural heritage - as illustrated on the attached land use maps (see Figures 3, 4, 5).

The possibility for hiking trails is not limited by grade or hazard. A flood plain trail is highly recommended, albeit seasonal, because the unusual character of the terrain. A trail along the crest of the escarpment would dramatize its serpentine form and provide a safe viewing position during flooding events. A random system of interior trails would serve to highlight cultural features that relate to the history of Brookfield.

One drawback of planning by sections is that the improvements within each section must, for a time at least, be self-sustaining. In this case, the trail system will have one point of ingress and egress at the town hall. Variety in length of hiking preference will have to be provided by loop or cross trails until a through trail system can be completed.

Figure 1

LOCATION OF STUDY SITE



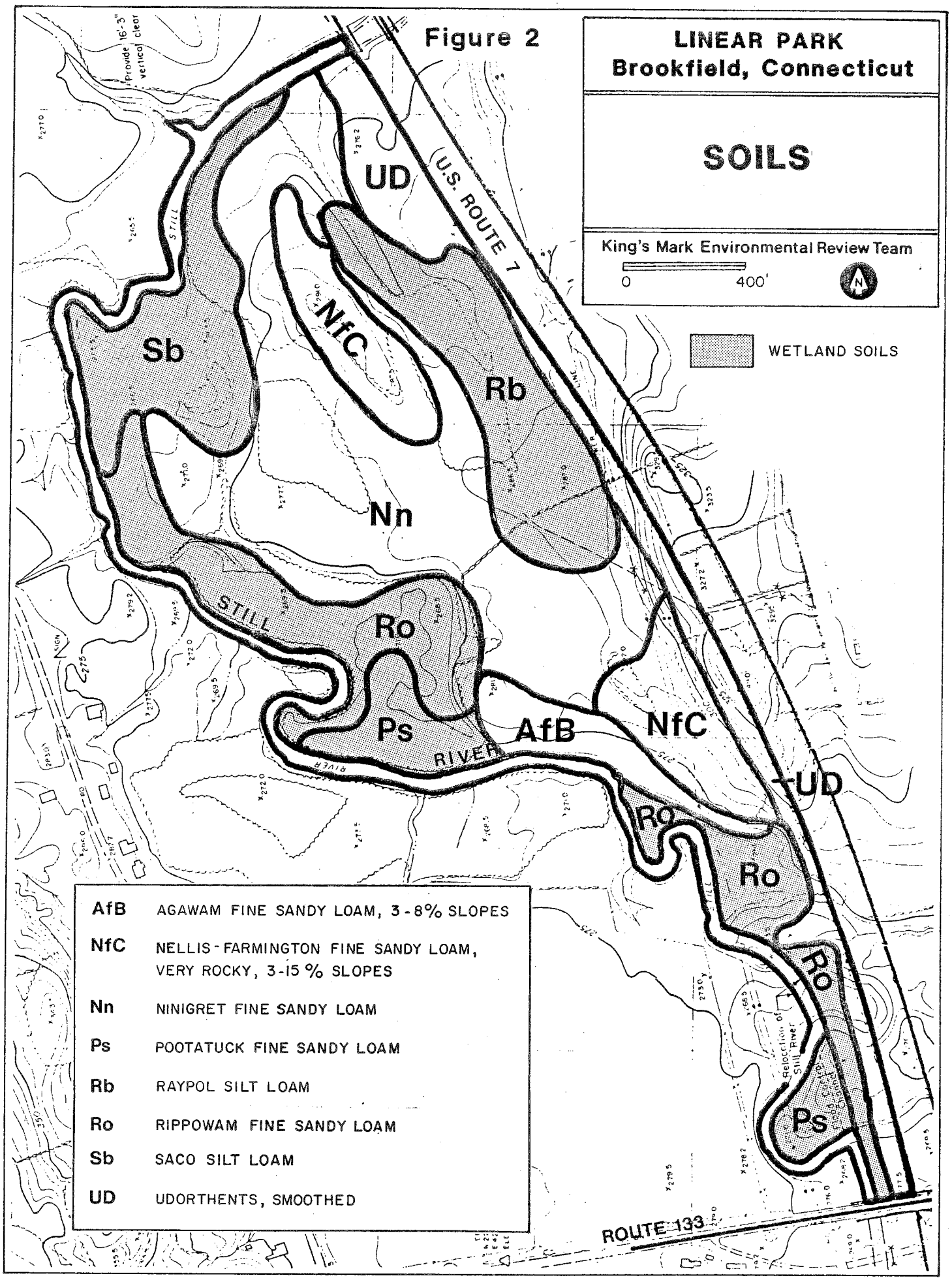


Figure 2
LINEAR PARK
Brookfield, Connecticut
SOILS
King's Mark Environmental Review Team
0
400'
WETLAND SOILS
U.S. ROUTE 7
STILL
RIVER
ROUTE 133
Provide 16'-3" vertical clear
Relocation of Still River
UD
NfC
Sb
Rb
Nn
Ro
Ps
AfB
NfC
UD
Ro
Ro
Ro
Ps
AfB AGAWAM FINE SANDY LOAM, 3-8% SLOPES
NfC NELLIS-FARMINGTON FINE SANDY LOAM, VERY ROCKY, 3-15 % SLOPES
Nn NINIGRET FINE SANDY LOAM
Ps POOTATUCK FINE SANDY LOAM
Rb RAYPOL SILT LOAM
Ro RIPPOWAM FINE SANDY LOAM
Sb SACO SILT LOAM
UD UDORTHENTS, SMOOTHED

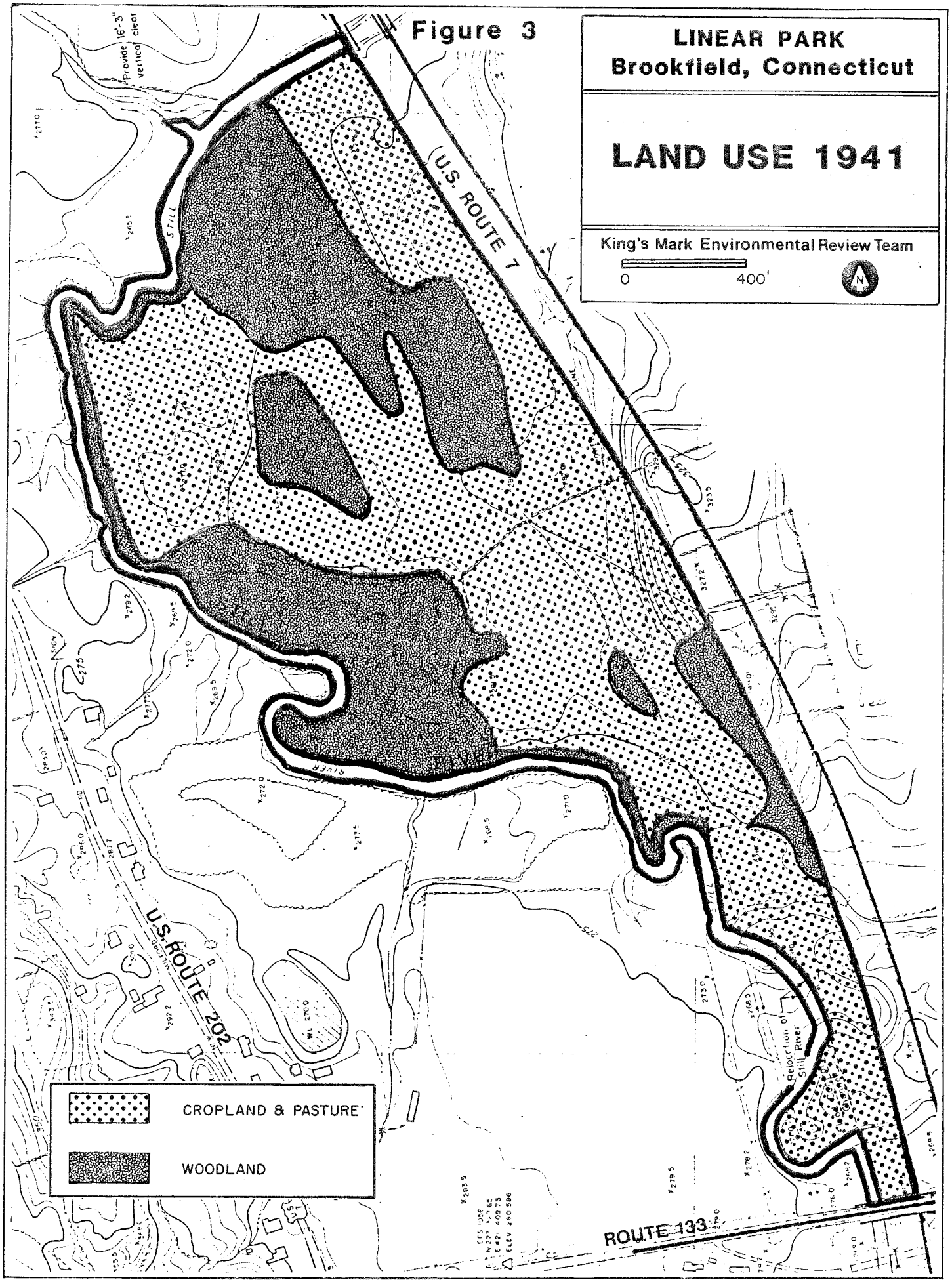


Figure 3
LINEAR PARK
Brookfield, Connecticut
LAND USE 1941
King's Mark Environmental Review Team
0
400'
U.S. ROUTE 7
U.S. ROUTE 202
ROUTE 133
STILL
RIVER
Relocation of Still River
Provide 16'-3" vertical clear
CROPLAND & PASTURE
WOODLAND

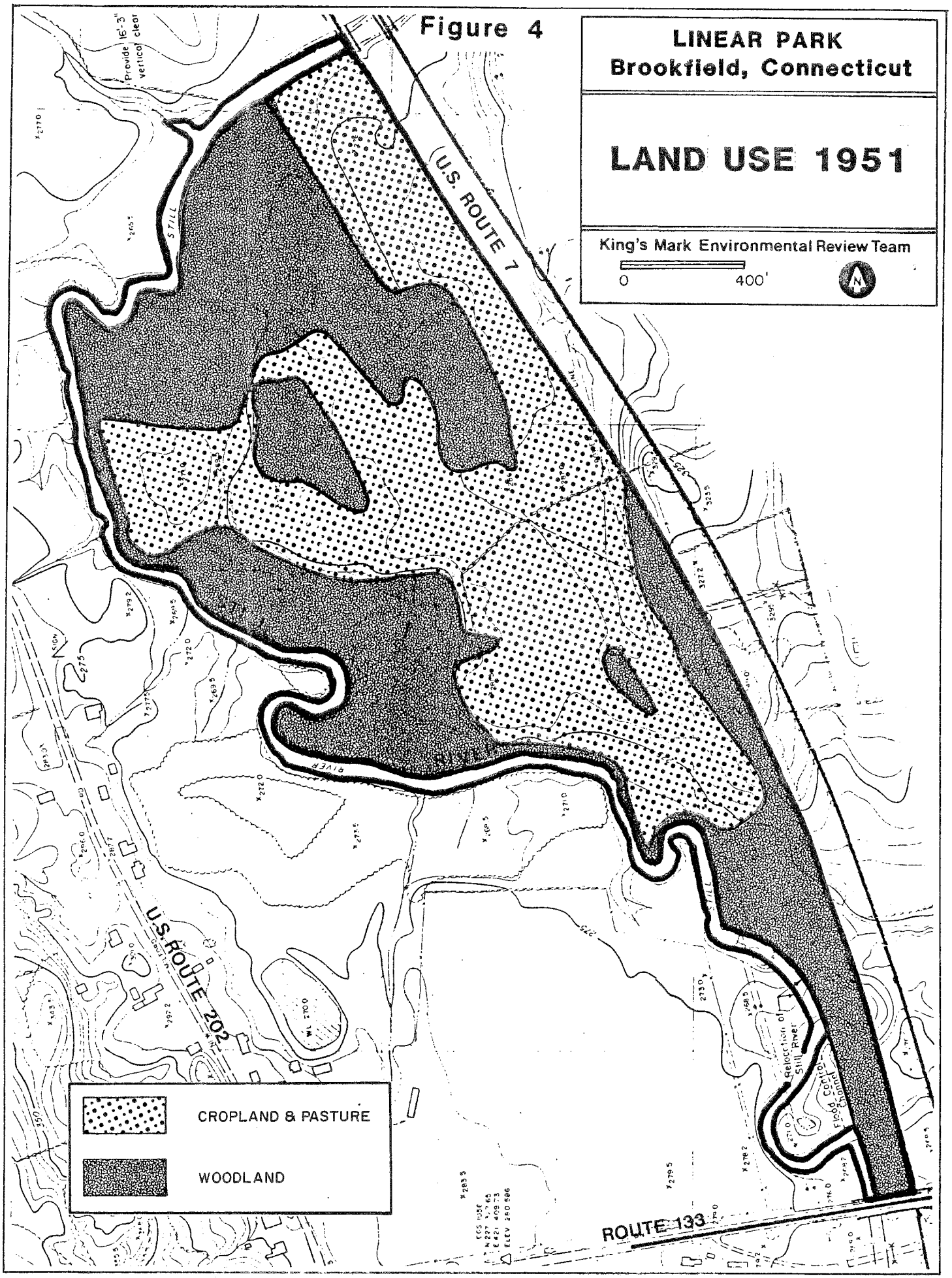


Figure 4
LINEAR PARK
Brookfield, Connecticut
LAND USE 1951
King's Mark Environmental Review Team
0
400'
U.S. ROUTE 7
U.S. ROUTE 202
ROUTE 133
STILL RIVER
Relocation of Still River
Flood Control Channel
Provide 16'-3" vertical clear
CROPLAND & PASTURE
WOODLAND

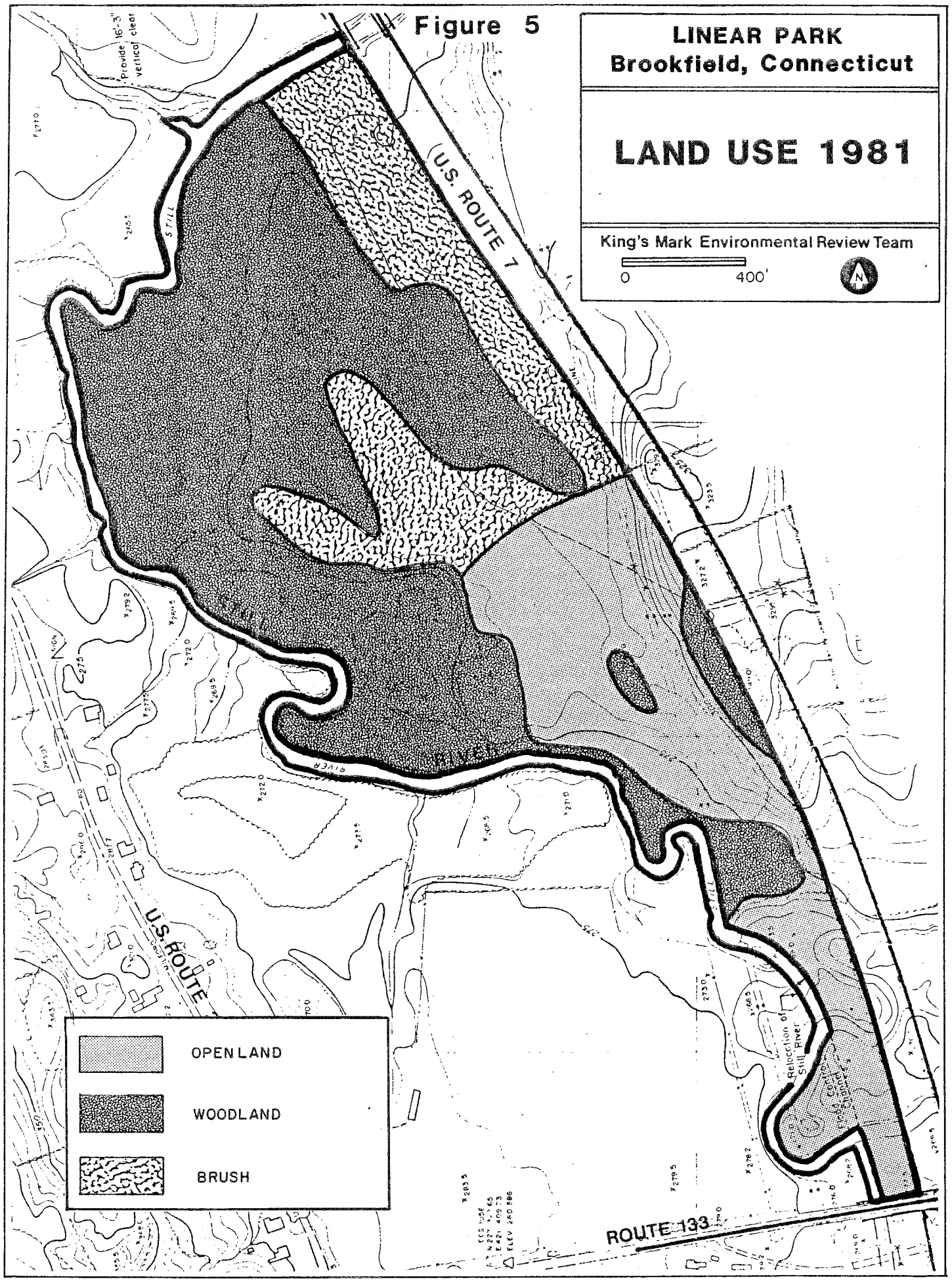


Figure 5
LINEAR PARK
Brookfield, Connecticut
LAND USE 1981
King's Mark Environmental Review Team
0
400'
U.S. ROUTE 7
U.S. ROUTE
ROUTE 133
STILL
RIVER
Relocation of Still River
Provide 16'-3" vertical clear
OPEN LAND
WOODLAND
BRUSH

BIRDS

Bird Habitat

The Still River flood plain provides ample and varied habitat for a variety of bird species that utilize the area for foraging, breeding, and as a migration corridor.

Most species of song birds common in Connecticut can be found at the site at one time or another throughout the year. Flood plain sites such as this are especially attractive to woodpeckers (Picidae), crows and jays (Corvidae), and chickadees, titmice (Paridae), and nuthatches (Sittidae), all of which forage for insects attracted to flood damaged trees. Waterfowl such as black ducks, mallards, and wood ducks also make significant use of the area, and leaf gleaners such as warblers (Parulidae), vireos (Virionidae), and kinglets (Sylviidae) are especially common during migration months (May and June).

The higher, upland areas of the site attracts sparrows and finches (Fringillidae) as well as blackbirds (Icteridae), and possibly thrushes (Turdidae) such as bluebirds.

Although the flood-plain habitat deserves to be protected from channelization and development, the creation of a nature trail/boardwalk should not severely impact the environment. It should also encompass as much diversity as possible (i.e. river front, flood plain, upland hardwoods, and meadowland). It is recommended that the trail be reserved for passive recreationalists as opposed to A.T.V.'s.

It is suggested that in order to enhance the wildlife value of the area, at least four wood duck nest boxes be located as indicated in Figure 6 (call Connecticut Audubon Society for details). In addition, four or more bluebird nest boxes erected on smooth metal poles at least 75 yards apart in the meadow areas (see Figure 6 for approximate locations) may help attract this species.

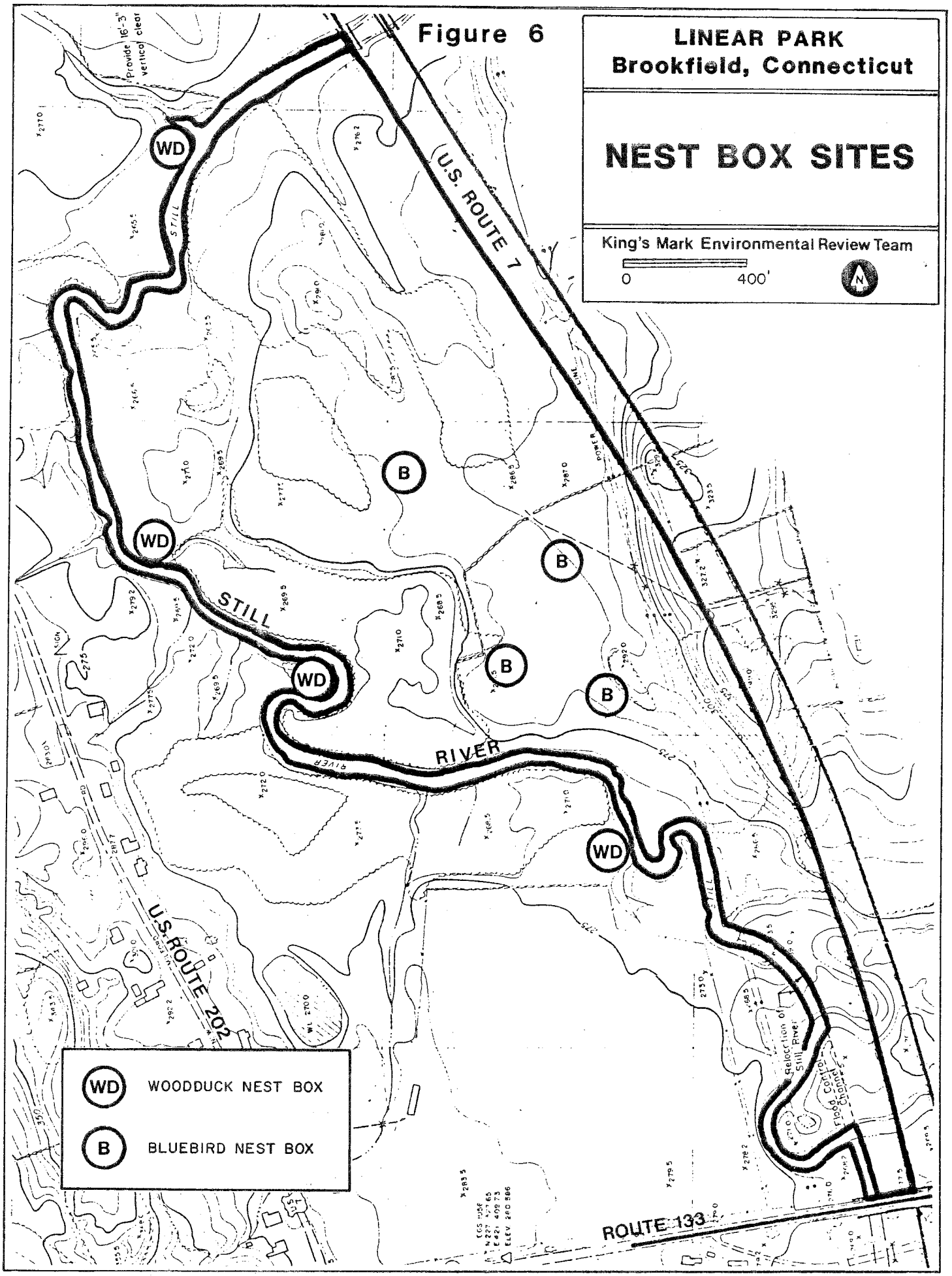


Figure 6
LINEAR PARK
Brookfield, Connecticut
NEST BOX SITES
King's Mark Environmental Review Team
0
400'
N
U.S. ROUTE 7
STILL
RIVER
U.S. ROUTE 202
ROUTE 133
Provide 16'-3" vertical clear
Relocation of Still River
Flood Control Channel
WD
B
WOODDUCK NEST BOX
BLUEBIRD NEST BOX

RECREATIONAL AND EDUCATIONAL CONSIDERATIONS

RECREATIONAL AND EDUCATIONAL CONSIDERATIONS

RECREATIONAL POTENTIAL

Site Analysis

Assuming parking is located at the Town Hall, pedestrian entry for the park should be located between the soccer field and police station. Currently there is no developed access. One must negotiate a scrub slope to an abandoned dirt road then wade through brush along the Still River to the Route 7 bridge.

Construction of the bridge incorporated a raised shelf adjacent to the river allowing access to the northeast corner of the property. Approximately one third of the site has wet boggy ground, roughly defined by the 275 foot contour line. The highest point is a rock knoll at 291 feet. Visually, the only open land on the site is the boggy shore of the river and an old field, going through succession, on the eastern side adjacent to Route 7. Travel on the site southward to the Route 133 bridge is complicated by DOT's fence along the river bank (see Figure 7).

Opportunities/Constraints

Opportunities

1. Site is a self contained unit protected by the river which limits uncontrolled access.
2. Variety of environments: old field, woodland, bog.
3. Highest point of land is opportunity for gazebo type information center.
4. Site is wide enough for loop trail.
5. Because site is located across Route 7 from town hall, parking and access can be provided by existing facilities.
6. Existing dirt road could provide vehicle access for canoe pick up.

Figure 7

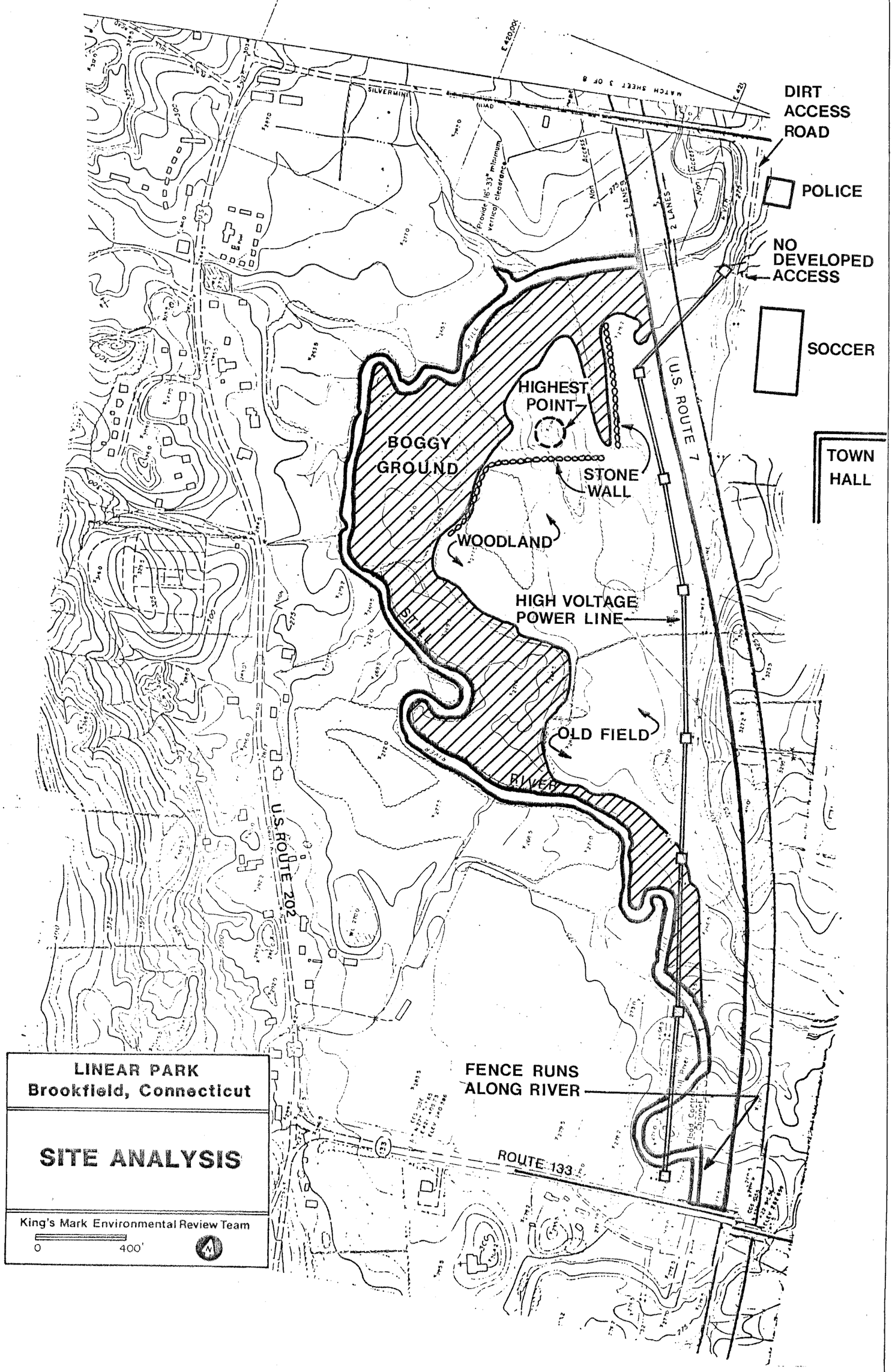
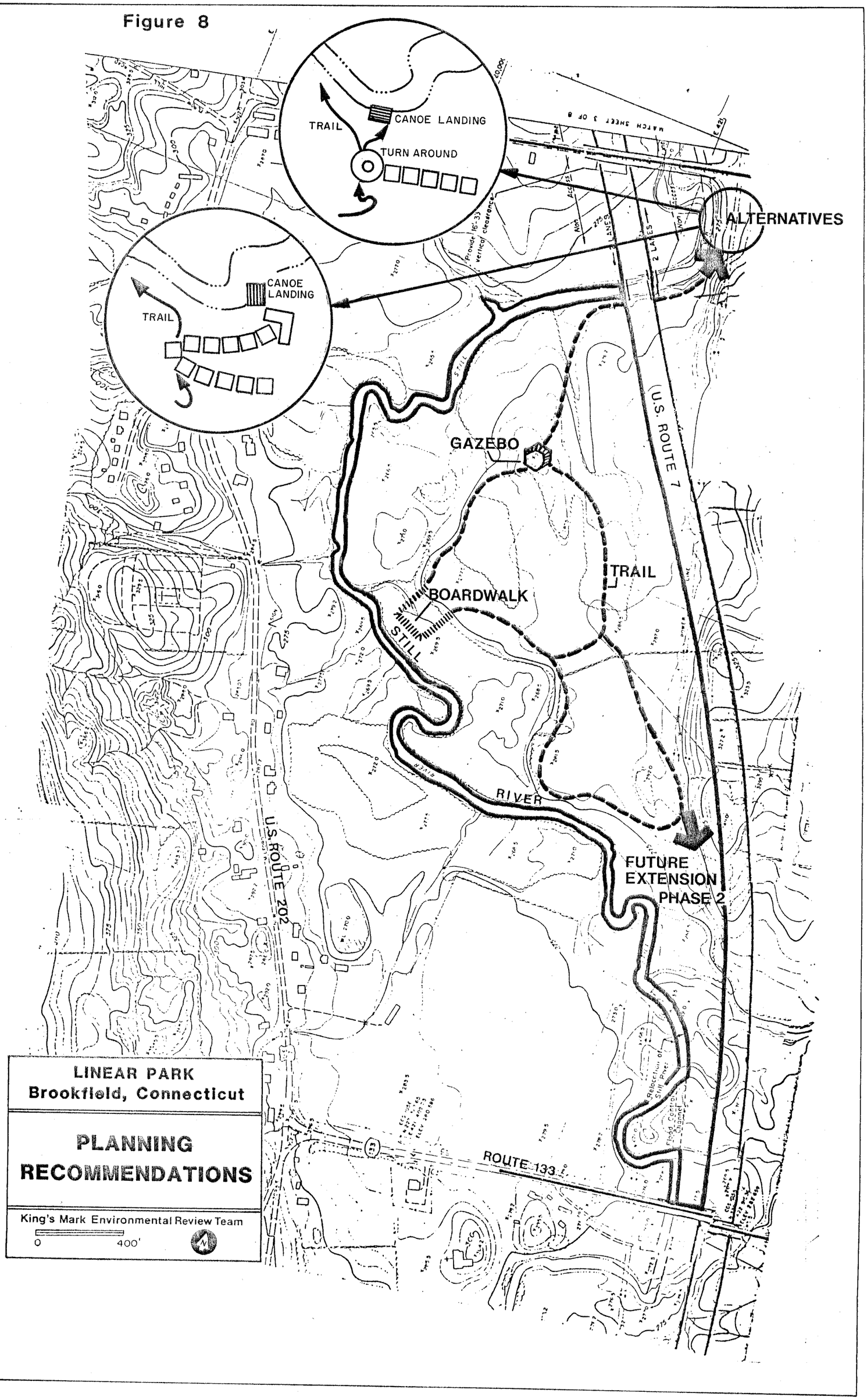

DIRT ACCESS ROAD
POLICE
NO DEVELOPED ACCESS
SOCCER
TOWN HALL
HIGHEST POINT
BOGGY GROUND
STONE WALL
WOODLAND
HIGH VOLTAGE POWER LINE
OLD FIELD
RIVER
FENCE RUNS ALONG RIVER
(U.S. ROUTE 7
2 LANES
U.S. ROUTE 202
ROUTE 133
SILVERMINE
LINEAR PARK
Brookfield, Connecticut
SITE ANALYSIS
King's Mark Environmental Review Team
0
400'

Figure 8


TRAIL
CANOE LANDING
TURN AROUND
CANOE LANDING
TRAIL
ALTERNATIVES
GAZEBO
TRAIL
BOARDWALK
STILL
RIVER
(U.S. ROUTE 7
U.S. ROUTE 202
FUTURE EXTENSION PHASE 2
ROUTE 133
LINEAR PARK
Brookfield, Connecticut
PLANNING RECOMMENDATIONS
King's Mark Environmental Review Team
0
400'

Young children are first introduced to the world of DISCOVERY. Here they work with their senses to learn to appreciate our environment. Lessons where they feel, touch and see their surroundings are used. Once students are introduced to a discovery world, CONCEPTS in the environment are introduced. Here the students start to understand the why of things, and can inter-connect different parts of the discoveries. The next step in Environmental Education is to provide a setting for MEDITATION for the students. Meditation will introduce the students to critical thinking. Most of these concepts are introduced in Junior High School. Students will soon realize that good critical thinking can not be accomplished without FACTS. The knowledge of factual information is crucial for anyone who needs to make a decision. The final step is ACTION. This is the time when the student will work toward solutions of current problems and the prevention of new ones.

The recommended use of the 71-acre parcel is to provide a program which will allow visitors to accomplish the five step process described above: DISCOVERY-CONCEPTS-MEDITATION-FACTS-ACTION.

In order to accomplish the above educational objectives the following actions are recommended:

1. Provide extensive trail system consisting of:
   - Short Trail (for young children)
   - Long Trail (older children)
   - Longer Trail (adults)

   Trails should provide a diversity of habitats (see Figure 9).
   Development of environmental study stations for research.
   Establish natural areas with minimum impact.

2. Review Brookfield's School Curricula to match environmental concepts to present curriculum.

3. Write nature trail guide for the general public. This nature guide should be administered by the recreation department.

4. Write ecology/environmental lab manual for high school students.

Site Development

All trails and development, except boardwalk, should be above the 275 foot elevation to minimize flood damage and visitor foot impact on the boggy soils. A double trail loop is one alternative, the first loop in the woods, the second crossing the first stage succession field to the south (see Figure 8). A gazebo, or similar structure, on the highest knoll could serve as an entry point, trail intersection and interpretive center. An elevated loop boardwalk over a backwater of the river would allow for viewing of the bog and river in all seasons with a minimum impact. By locating the walk over the backwater the potential also exists for another canoe landing.

Connection of Phase 2

No trail extension to Phase 2 is recommended since this would be a dead end connection. In addition a suitable crossing of the flood control channel where it cuts off the river must be developed plus reconciliation of the DOT fence line with the property line. Extension of the trail should be developed as part of Phase 2.

ENVIRONMENTAL EDUCATION

Environmental Education is a process aimed at developing a world population that is aware of, and concerned about the total environment and its associated problems, and which has the knowledge, attitudes, commitments and skills to work individually and collectively toward solutions of current problems and the prevention of new ones (Stapp, 1979).

There is a logical sequence of steps that have to be followed in order to accomplish the goals established in Stapp's definition of Environmental Education.

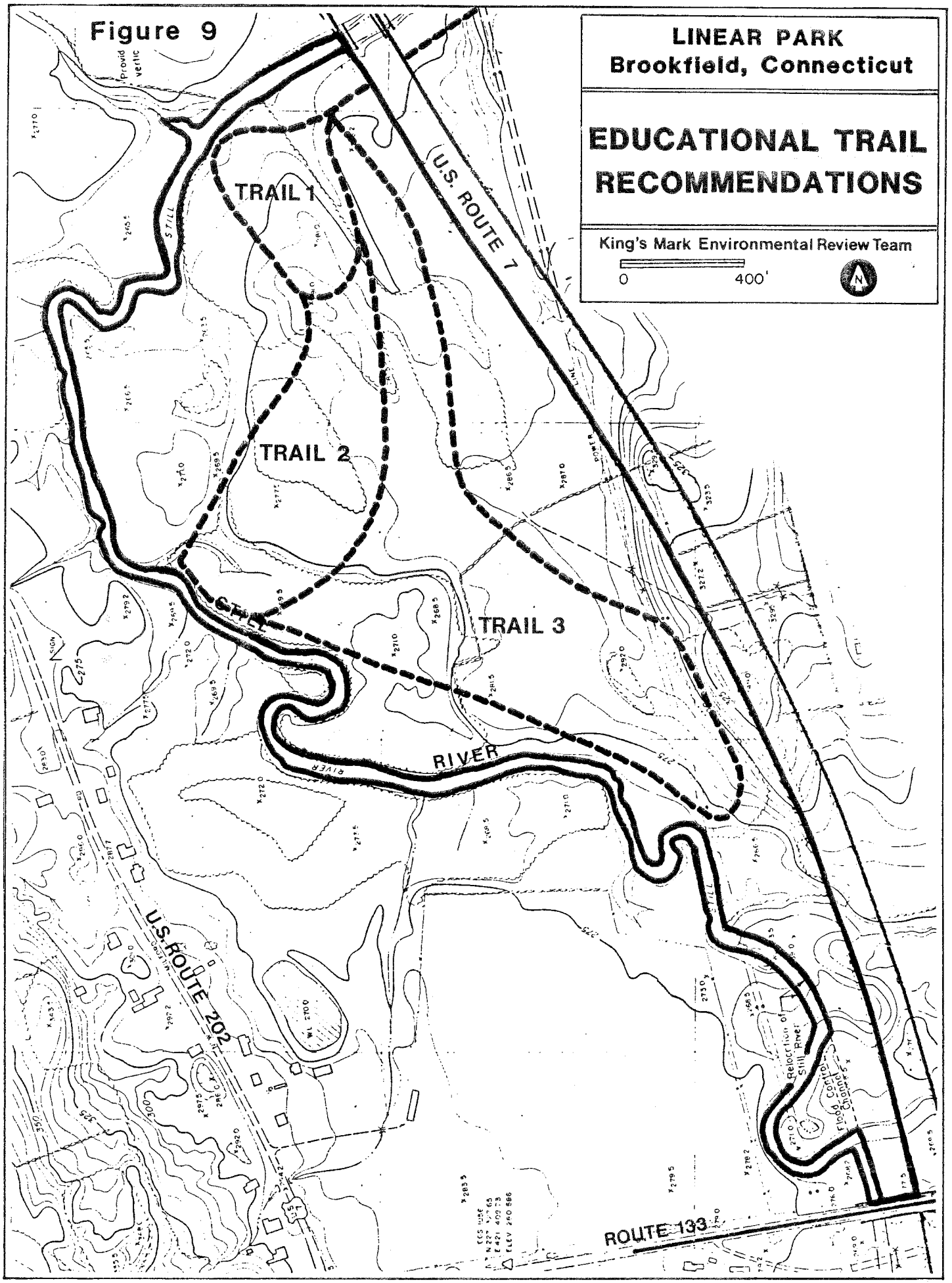


Figure 9
LINEAR PARK
Brookfield, Connecticut
EDUCATIONAL TRAIL RECOMMENDATIONS
King's Mark Environmental Review Team
0
400'
TRAIL 1
TRAIL 2
TRAIL 3
U.S. ROUTE 7
U.S. ROUTE 202
ROUTE 133
STILL RIVER
Relocation of Still River
Flood Control Channel

5. Establish a clearing house system to improve species list of the area and any other information. This can be done by the creation of a naturalist group.

The following pages will provide some information as to the type of activities that could be established to use the area to teach environmental education.

REFERENCES CITED

Stapp, William B. and Dorothy Cox, Environmental Education Activities Manuel, Willian B. Stapp and Dorothy Cox, 32493 Shady Ridge Road, Farmington Hills, MI 48018, 2nd Ed. 1979.

TEACHING IN THE OUTDOORS

HOW TO TEACH IN THE OUTDOORS

Capitalize on Natural Curiosity of Children

Establish purpose
Pre-plan
Time each experience carefully
Plan for proper pupil behavior
Make observations
Evaluate

Patterns of Pupil Experiences

Primary grades: Direct observation to find out what is happening at a particular moment in the outdoors and to maintain a sense of wonder.

Middle grades: Observation, with critical comparison and simple measurement

Upper grades: Comparative measurement, sustained experiments, calculation of results, and statistical evaluation

WHAT CAN BE TAUGHT OUTDOORS

Outdoor experiences should be part of many meaningful units of study. Such experiences can be used to initiate a unit of study, raise questions for research, or to test theories derived from reading. The outdoors can contribute to the curriculum in many other ways, e.g., for collecting data and specimens, observing natural phenomena, inspiring creative work, or helping to explain some concept introduced in the classroom. Each topic which follows is accompanied by a list of educational objectives:

Work Done by Solar Energy

To measure solar energy received as heat and light
To measure differences in solar energy absorbed by different colors
To concentrate solar energy into a high temperature source
To use solar energy to perform water distillation
To use solar energy to produce electricity

The Nature of Seasonal Change

To identify seasonal changes in trees, shrubs and flowers
To distinguish between annual and perennial plants
To distinguish between evergreens and deciduous trees

Deciduous Plants

To identify deciduous trees and shrubs when leaves are present
To identify deciduous trees and shrubs after leaves fall

Evergreen Plants

To compare evergreen trees and deciduous trees
To compare needles and cones of various coniferous trees
To locate and identify evergreens in a community

Flowers and Their Work

To identify the parts of a flower
To learn the value of flowers
To recognize similarities and differences between flowers
To relate the shape of flower parts to the method of fertilization

Seed Dispersal

To identify ways by which plants disperse their seeds
To relate the pattern of seed dispersal with the places where seedlings sprout
To find out why all seeds do not successfully produce plants

How Plants Multiply

To find how plants multiply other than by seeds
To describe how spreading plants are used to advantage in certain situations

Survival Needs of Invertebrates

To relate activities of insects to their basic biological needs for food, protection and reproduction
To identify some common insects and spiders
To locate various insect homes
To describe how man manages the environment to encourage some insects and spiders and to discourage others

Birds

To recognize common birds of area
To describe differences in behavior of various birds
To provide winter feeding station
To identify birds that are residents and seasonal visitors
To improve habitat conditions for birds

Interrelationships Within Little Environments

To find changes in the environment caused by weather
To find changes caused by plants and animals
To discover how one form of life affects another

Soil Erosion and Deposition

To be able to point out evidence of soil erosion and deposition
To identify the factors that accelerate erosion and those that slow it down
To correct a soil erosion problem in the community

The Nature of the Physical Environment

To measure climatic factors of temperature, rainfall, wind, relative humidity and sunshine
To identify microclimates within a larger climate zone and be able to identify the factors that produce these microclimates
To recognize major cloud formations and relate them to weather, air movements and the influence of the sun

The Earth in the Solar System and the Universe

To locate apparent direction by sun's movement caused by rotation of the earth

To relate observed changes in the position of the sun and stars to the movements of the earth
To demonstrate size and distance relationship in the solar system
To be able to point out the North Star
To recognize some star constellations
To locate planet and first magnitude stars

CURRICULUM CONTENT BASED ON OUTDOORS

Energy of Sun is Necessary for All Life and Activity on Earth

Sun's energy affects climate
Plants use sun's energy
Growth patterns of plants and animals
Man's dependence on sun's energy

Movements of Earth in Space Produce Day and Night, and Seasonal Changes

Day and night caused by rotation of earth on axis
Seasonal changes result from movement of the earth around the sun and the 23 1/2° tilt of the earth's axis

Night Sky Shows Vastness of Universe

Solar system
Seasonal change in position of stars
Constellations
Direction and location determined from stars

Geological Structure of Earth's Crust Influences Topography and Determines the Distribution of Minerals

Geological structure affects man
Geological structure creates watershed
Geological structure is found in stream beds and road cuts
Geological structure provides parent material of soil

Natural Forces and Man Cause Changes In Earth's Surface

Farming activities
Stream action, wind erosion
Decomposition
Earthquakes
Volcanoes
Folding and faulting of earth's surface
Rising and sinking of surface

Climatic Conditions are Affected by Interrelated Conditions

Latitude
Altitude
Sunlight
Location of mountain systems
Movement of air
Shape and distribution of land and water surfaces
Ocean currents
Humidity
Surface vegetation

Climatic Conditions Affect Plant and Animal Life

Vegetation at different altitudes
Seasonal influence on plant growth patterns and reproduction
Seasonal influence on animal habits
Plants, animals and man adapt to climatic conditions

Certain Natural Processes, Occurring as Cycles, Influence the Interrelations and Interdependencies of all Living Organisms and have Significant Effects on the Physical World

Photosynthesis and respiration
Water cycle
Nitrogen cycle
Food chain
Reproduction cycles

The World, When Undisturbed by Man, Tends to Maintain A State of Interdependence, but not a True Balance

All living organisms have a place and a function
Change and modification are a continual process
Specific habitats show a state of interdependence

Man is a Great Factor Responsible for Upsetting Interdependencies in the Living Environment

Radioactivity
Air pollution
Water pollution
Misuse of natural environment
Urbanization

SCIENCE INVOLVEMENT IN TEACHING OUTDOORS

Minerals of Economic Importance

Methods used to identify
Formation of certain minerals
Comparative amounts of various minerals
Uses by man and natural life
Amounts of deposits necessary for economical use
Rate of consumption
How various minerals are extracted
Types of topography where a certain mineral is most often found
The part these minerals have played in the history and geography of the area
What man does to conserve minerals
Esthetic values
Recreational values

Rocks and Soil

Identification of rocks
How certain rocks were formed
Minerals common to various rocks
Relation of rock type to topography
How to read the rocks to determine the geological history of the area

Natural forces that cause rocks to break and wear away
How the formation of soil depends on the decomposition of rocks
What happens to rock particles that are worn away, other than those which make soil
How the natural forces aid in making soil
The various forms of plant and animal life that contribute to soil building
How soil fertility and types depend on various climatic and environmental factors
Amount of time needed to make good topsoil
The dependence of all life on soil
The identification and characteristics of soil types
The identification and characteristics of soil layers
What man can do to conserve and build up the soil in the community
How to test soil for its properties
Factors, both natural and man-made, which contribute to the depletion and destruction of soil
Constructive and destructive effects of erosion
Rate of time to destroy good topsoil
Various types of erosion
Nature's way of retarding erosion
Methods used to retard soil erosion in the community
Esthetic values
Recreational values

Water

Forms of water
The water cycle
Cloud formations and their meaning
Various forms of precipitation
Comparative effects, both destructive and constructive, of different types of precipitaion
Water's contribution to soil building
The uses of water by plants and animals
The watershed, its importance and implications
Identification of the watershed in which school is located
The influence that precipitation has in determining the types of plant and animal communities that inhabit the area
How water contributes to erosion
The results of either an overabundance or deficiency of precipitation during a year or a span of years
How precipitation affects climate
How man strives to conserve water and use it wisely
Water's effect on the locality
How a community can "save" water
Esthetic values
Recreational values

Plants

Differentiation and methods of identification
The various segments of the plant kingdom
The parts of plants and their purposes
Life cycles of the various types of plants in area
Explanation of pollination, its value and various methods by which it is accomplished
How seeds are formed and methods of dispersal; the value of seed dispersal
The basic necessities of all plant life are air, food, water, and sun:
    How green plants obtain necessities
    How parasitic plants obtain necessities

How varying amounts and types of these necessities influence the character of the plant community
Adaptations of plants to fit in with their environment
How plants adapt themselves to secure necessities
The struggle for survival among plants
How plants depend on animals and animals on plants (food chain)
The dependence of plants on water
The role of plants in the water cycle
How plants contribute to the storage of water
How plants depend on soil and how various types of soil affect plants
How plants help in building soil
How different plant parts protect the soil
The dependence of plants on minerals
The nitrogen cycle
The oxygen cycle
The effect of fire on various plant communities
The natural defenses of certain plants against fire
The recovery of plant communities after fire
Man's utilization and dependence upon plants including new uses and discoveries
The conservation of plants by man
Plants' role in the history of the community
Reading the history of a community through a knowledge of plants

Animals

Methods of identification
The various segments of the animal kingdom
The parts of animals and their functions
The life cycles of various types of animals
The basic necessities of animals -- air, food, water, shelter, space to live
The adaptations of various types of animals
How food chains contribute to interdependence
How animals depend on plants
The dependence of animals on soil
How animals contribute to soil building
The dependence of animals on minerals
Animals' role in the water cycle
The effect that climate has in determining the type of animal community
Animals' contribution to the nitrogen cycle
Struggle for survival among animals
Reading animals' characteristics by study of their tracks and droppings
The conservation of animals by man
How man has affected interdependence among wildlife
Animals' role in the history of a locality
The effect of fire on various animals
Esthetic value
Recreational value

Air and Weather

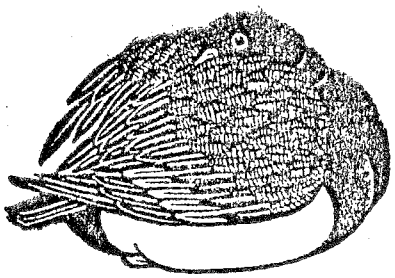
The components of air and their uses
Weather (high pressure, low pressure, precipitation, temperature, winds); their causes and effects
Various cloud formations; their origin and meaning
The water cycle
The understanding of humidity
The effects of dry and wet cycles
The oxygen cycle
The dependence of all living things on air

The effects of various types of topography upon the weather and their resultant effects on climate
Man's use of the various properties of the air other than for breathing
The effect of weather on the history of the locality
Esthetic values
Recreational values

Physical Forces

The dependence of all life on the sun's energy
The effect of various types of weather on the earth's surface
The meaning and effect of weather cycles
The effect of glaciers on topography
The cause and effect of various types of geological phenomena -- volcanoes, faults, landslides, earthquakes
The importance of the stars, planets and the moon to our earth
The composition of the earth
Esthetic values
Recreational values

APPENDICES



Appendix A: Soil Descriptions

AfB—Agawam fine sandy loam, 3 to 8 percent slopes. This gently sloping, well drained soil is on plains and terraces in stream valleys. The areas are mostly irregular in shape and range from 5 to 50 acres.

Typically, the surface layer is dark brown fine sandy loam 9 inches thick. The subsoil is brown fine sandy loam 20 inches thick. The substratum is light yellowish brown and pale olive sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of excessively drained Hinckley soils, somewhat excessively drained Merrimac soils, well drained Haven soils, and moderately well drained Ninigret soils. Included areas make up about 15 percent of this map unit.

The permeability of this Agawam soil is moderately rapid in the surface layer and subsoil and rapid in the substratum. Runoff is medium, and available water capacity is moderate. The soil dries out and warms up early in spring. It is very strongly acid to slightly acid.

Most areas of this soil are used for community and industrial development, and a few are used for corn, vegetables, and nursery crops (fig. 6). Some small scattered areas are wooded.

The rapid permeability of the soil causes a hazard of ground-water pollution in areas used for onsite septic systems. The soil is unstable and thus is limited for excavations. Quickly establishing plant cover, mulching, and using siltation basins help to control erosion and sedimentation during construction.

This soil is well suited to cultivated crops and trees. The hazard of erosion is moderate. Minimum tillage, stripcropping, and the use of cover crops help to control erosion and to maintain fertility. Machine planting is practical in areas used for woodland.

The capability subclass is IIe.

NfC—Nellis-Farmington fine sandy loams, very rocky, 3 to 15 percent slopes. This complex consists of gently sloping and sloping soils on hills and ridges. The areas are irregularly shaped and mostly range from 3 to 30 acres. They have an undulating topography marked with exposed bedrock and a few drainageways.

The complex is about 50 percent well drained Nellis soils, 35 percent somewhat excessively drained Farmington soils, and 15 percent other soils and exposed bedrock. The Nellis and Farmington soils are so intermingled on the landscape that it was not practical to map them separately.

Typically, the Nellis soils have a surface layer of very dark grayish brown fine sandy loam 8 inches thick. The subsoil is yellowish brown and is 19 inches thick. The upper 17 inches is fine sandy loam, and the lower 2 inches is loam. The substratum is very pale brown sandy loam to a depth of 60 inches or more.

Typically, the Farmington soils have a surface layer of dark brown fine sandy loam 10 inches thick. The subsoil is yellowish red sandy loam that extends to limestone bedrock at a depth of 16 inches.

Included with this complex in mapping are small areas of somewhat excessively drained Hollis soils, well drained Charlton and Stockbridge soils, and moderately well drained Georgia soils.

The Nellis soils have moderate permeability. Runoff is medium to rapid, and available water capacity is moderate. The soil is medium acid to neutral in the surface layer and upper part of the subsoil and neutral to mildly alkaline in the lower part of the subsoil and in the substratum. The soil dries out and warms up early in spring.

The Farmington soils have moderate permeability. Runoff is medium to rapid, and available water capacity is low. The soil is strongly acid to slightly acid in the surface layer and medium acid to mildly alkaline in the subsoil.

Many areas of this complex have been cleared and are used for pasture, hay, or corn. Some areas are in woodland, and a few small areas are used for community development.

The main limitations of this complex for community development, especially for excavations, are the shallow depth to bedrock in the Farmington soils and the areas of exposed bedrock. Quickly establishing plant cover, mulching, and using siltation basins help to control erosion and sedimentation during construction.

The shallow depth to bedrock and the areas of exposed bedrock make this soil poorly suited to cultivated crops. The exposed bedrock especially restricts the use of farming equipment. Minimum tillage and the use of cover crops and stripcropping help to control a moderate to severe erosion hazard in cultivated areas.

The exposed bedrock also hinders machine planting in areas used for woodland, but the soil is well suited to trees. The shallow depth to bedrock in the Farmington soils causes the uprooting of many trees during windy periods.

The capability subclass is IVe.

Nn—Ninigret fine sandy loam. This nearly level to gently sloping, moderately well drained soil is on plains and terraces in stream valleys. The areas are irregular in shape and mostly range from 3 to 15 acres. Slopes range from 0 to 5 percent.

Typically, this soil has a surface layer of very dark grayish brown fine sandy loam 10 inches thick. The subsoil is brown fine sandy loam 16 inches thick and is mottled in the lower part. The substratum is light yellowish brown, mottled gravelly loamy sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of somewhat excessively drained Merrimac soils, well drained Agawam and Haven soils, and poorly drained Raypol and Walpole soils. Included areas make up about 15 percent of this map unit.

This Ninigret soil has a seasonal high water table at a depth of about 20 inches from late fall until midspring. Permeability is moderately rapid in the surface layer and subsoil and rapid in the substratum. Runoff is slow, and available water capacity is moderate. The soil dries out and warms up slowly in spring. It is very strongly acid to medium acid.

Many areas of this soil are used for hay, corn, vegetables, and nursery crops. Some scattered areas are used for community development, and a few small areas are wooded.

The seasonal high water table is the main limitation of this soil for community development. The water table makes special design and installation of onsite septic systems necessary. Slopes of excavations are commonly unstable. Where outlets are available, footing drains help prevent wet basements. Quickly establishing plant cover, mulching, and using siltation basins help to control erosion and sedimentation during construction.

This soil is well suited to cultivated crops and trees, but drainage is needed in some of the farmed areas. Minimum tillage and the use of cover crops help to control a moderate hazard of erosion in cultivated areas. Machine planting is practical in areas used for woodland.

The capability subclass is IIw.

Ps—Pootatuck fine sandy loam. This nearly level, moderately well drained soil is on flood plains of the major streams and their tributaries. Most areas are long and narrow and range from 4 to 20 acres. Slopes range from 0 to 2 percent.

Typically, this soil has a surface layer of very dark grayish brown fine sandy loam 4 inches thick. The subsoil is dark brown fine sandy loam and sandy loam 24 inches thick and is mottled in the lower part. The substratum is brown, mottled sand and gravelly sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of poorly drained Rippowam soils and very poorly drained Saco soils. Also included are a few small areas of well drained soils and soils that have a surface layer and subsoil of silt loam. Included areas make up about 15 percent of this map unit.

This Pootatuck soil is subject to frequent flooding. It has a seasonal high water table at a depth of about 20 inches from late fall until spring. Permeability is moderate or moderately rapid in the surface layer and subsoil and rapid or very rapid in the substratum. Runoff is slow, and available water capacity is moderate. The soil dries out and warms up slowly in spring. It is very strongly acid to slightly acid.

Many areas of this soil are wooded. A few areas have been cleared and are used for corn, hay, pasture, and vegetables. A few scattered areas have been filled and are used for community development.

Flooding limits this soil for community development, and slopes of excavations in the soil are unstable.

The soil is well suited to cultivated crops and trees. Its use is limited by the seasonal high water table and flooding, but most areas are seldom flooded during the summer growing season. Machine planting is practical in areas used for trees.

The capability subclass is IIw.

Rb—Raypol silt loam. This nearly level, poorly drained soil is in depressions on plains and terraces. The areas are irregularly shaped and mostly range from 3 to 45 acres. Slopes range from 0 to 3 percent.

Typically, this soil has a surface layer of black silt loam 6 inches thick. The subsoil is grayish brown and light brownish gray, mottled silt loam and very fine sandy loam 13 inches thick. The substratum extends to a depth of 60 inches or more. It is 3 inches of brown, mottled loamy sand underlain by mottled sand.

Included with this soil in mapping are small areas of moderately well drained Ninigret soils, poorly drained Walpole soils, and very poorly drained Saco and Scarboro soils. Also included are a few areas of soils that have loamy material to a depth of more than 40 inches. Included areas make up about 20 percent of this map unit.

This Raypol soil has a seasonal high water table at a depth of about 6 inches from fall until late spring. The permeability of the soil is moderate in the surface layer and subsoil and rapid or very rapid in the substratum. Runoff is slow, and available water capacity is moderate. The soil dries out and warms up slowly in spring. It is very strongly acid or strongly acid in the surface layer and subsoil and strongly acid to slightly acid in the substratum.

Most areas of this soil are wooded. A few scattered areas are used for hay, pasture, corn, and vegetables, and a few small areas are used for community development.

The seasonal high water table and the rapid permeability in the substratum limit this soil for community development. Ground-water pollution is a hazard in areas used for onsite septic systems. Excavations in the soil are commonly filled with water, and many areas do not have drainage outlets. Quickly establishing plant cover and using siltation basins help to control erosion and sedimentation during construction.

The soil is suitable for cultivated crops. Many areas need drainage, but a lack of suitable outlets makes the soil difficult to drain. The soil is poorly suited to trees. The high water table restricts root growth, and many trees are uprooted during windy periods.

The capability subclass is IIIw.

Ro—Rippowam fine sandy loam. This nearly level, poorly drained soil is on flood plains of major streams and their tributaries. The areas are long and narrow or irregularly shaped and mostly range from 3 to 30 acres. Slopes are less than 3 percent.

Typically, this soil has a surface layer of very dark grayish brown fine sandy loam 5 inches thick. The subsoil is brown and gray, mottled fine sandy loam and sandy loam 19 inches thick. The substratum is dark gray loamy sand and grayish brown gravelly sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Pootatuck soils and very poorly drained Saco and Scarboro soils. Also included are a few areas with a surface layer and subsoil of silt loam. Included areas make up about 15 percent of this map unit.

This Rippowam soil is subject to frequent flooding. It has a seasonal high water table at a depth of about 6 inches from fall until late spring. The permeability of the soil is moderate or moderately rapid in the surface layer and subsoil and rapid or very rapid in the substratum. Runoff is slow or very slow, and available water capacity is moderate. The soil dries out and warms up slowly in spring. It is mainly very strongly acid to slightly acid, but some layers above a depth of 40 inches are medium acid or slightly acid.

Most areas of this soil are wooded. A few areas are used for hay, pasture, and corn, and a few small scattered areas have been filled and are used for community development.

The frequent flooding and the seasonal high water table are the main limitations of this soil for community development. Extensive filling is needed for onsite septic systems. Excavations are commonly inundated by water, and slopes of excavations are unstable when wet.

This soil is suitable for cultivated crops. The high water table and frequent flooding limit farming, but most areas are seldom flooded during the summer. The soil is poorly suited to trees. Wetness limits the use of equipment, and the seasonal high water table restricts rooting depth and causes the uprooting of many trees during windy periods.

The capability subclass is IIIw.

Sb—Saco silt loam. This nearly level, very poorly drained soil is on low flood plains of major streams and their tributaries. The areas are mostly long and narrow and range from 5 to 60 acres. Slopes are mostly less than 1 percent.

Typically, this soil has a surface layer of black silt loam 14 inches thick. The substratum is dark gray and is 27 inches thick. The upper 20 inches is silt loam, and the lower 7 inches is very fine sandy loam. The substratum is dark gray gravelly sand to a depth of 60 inches or more.

Included with this soil in mapping are small areas of moderately well drained Pootatuck soils, poorly drained Rippowam soils, and very poorly drained Adrian, Carlisle, and Scarboro soils. Included areas make up about 15 percent of this map unit.

This Saco soil is subject to frequent flooding. The water table is at or near the surface most of the year. The permeability of the soil is moderate in the surface layer and subsoil and rapid or very rapid in the substratum. Runoff is very slow, and water is ponded on the surface of some areas. Available water capacity is high. The soil is strongly acid to slightly acid above a depth of 30 inches and medium acid to neutral below a depth of 30 inches.

Most areas of this soil are wooded or covered by marshgrasses and sedges. A few areas are used for pasture, and a few small areas have been filled and are used for community development.

The frequent flooding and high water table limit this soil for community development, especially for onsite septic systems, and make the soil generally unsuitable for cultivated crops or commercial tree production. The use of equipment is impractical, and a shallow rooting depth causes the uprooting of many trees during windy periods.

The capability subclass is VIw.

UD—Udorthents, smoothed. This unit consists of areas that have been altered by cutting or filling. The areas are commonly rectangular and mostly range from 5 to 100 acres. Slopes are mainly 0 to 25 percent. The material in these areas is mostly loamy, and in the filled areas it is more than 20 inches thick. Some of the filled areas are on flood plains, in tidal marshes, and on areas of poorly drained and very poorly drained soils.

Included with this unit in mapping are small areas of soils that have not been cut or filled. Also included are a few larger urbanized areas and a few small areas containing material such as logs, tree stumps, concrete, and industrial wastes. A few areas have exposed bedrock. Included areas make up about 30 percent of this map unit.

The properties and characteristics of this unit are variable, and the unit requires onsite investigation and evaluation for most uses.

This unit is not assigned to a capability subclass.

Appendix B: Still River Water Quality

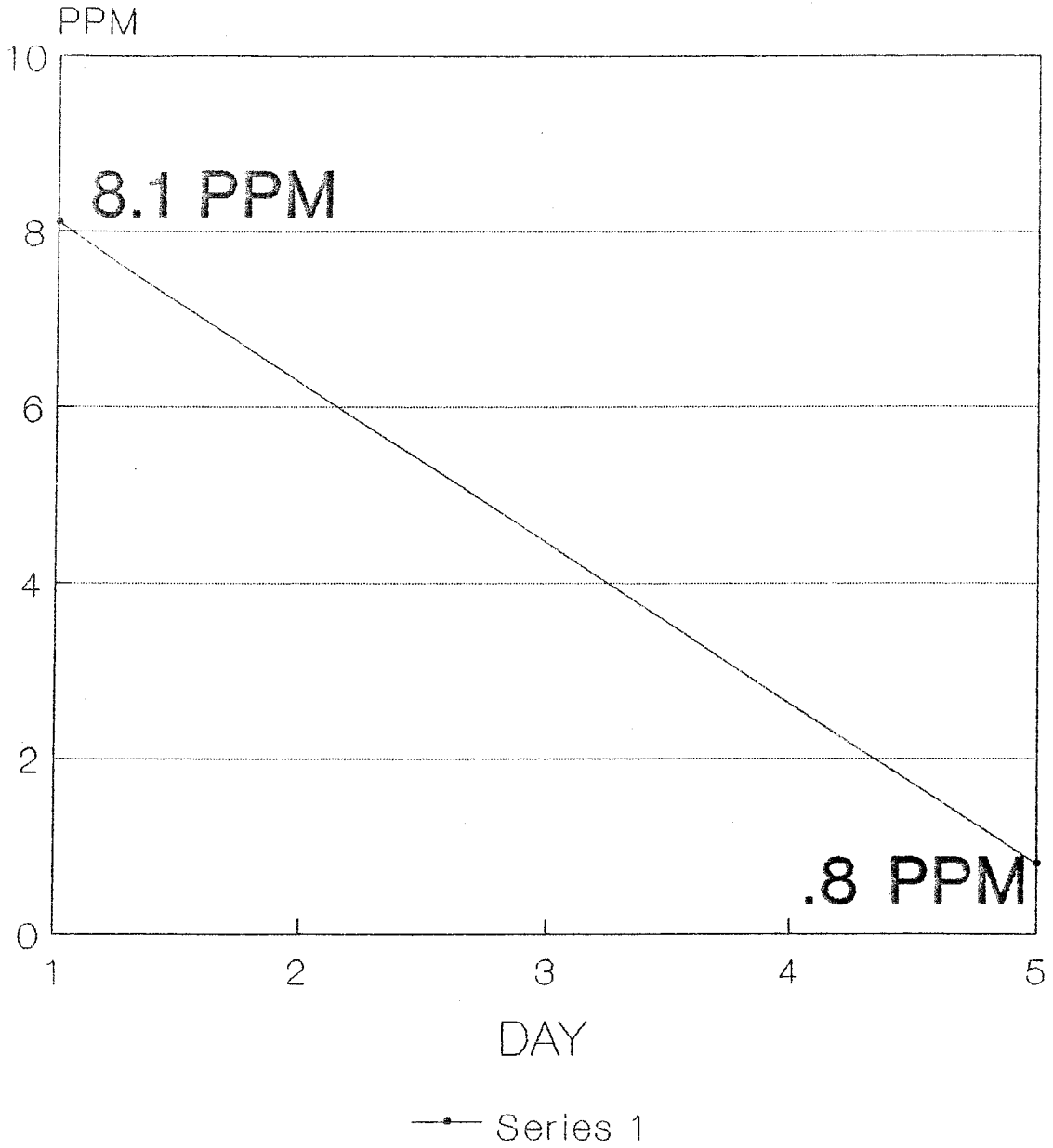
STILL RIVER CHEMISTRY

Chemistry Report	
Dissolved Oxygen	8.1 ppm
BOD	7.3 ppm
Temperature	12.0 C.
pH	6.7
P Alkalinity	0.0 ppm
T Alkalinity	144.0 ppm
Carbon Dioxide	12.0 ppm
Torel Ule Color Scale	9
Sechi disk visibility	3 feet
Nitrates	2.2 ppm
Phosphates	.6 ppm
Calcium Hardness	100.0 ppm
Magnesium Hardness	68.0 ppm
Total Hardness	168.0 ppm
Metal Content	> 1.00 mg/l

Results

Area studies and chemistry of the Still River, indicate the river should not be used for any type of water sports such as canoeing, swimming, etc. Plankton study and BOD results show the area to be very active of microfauna. A Coliform test should done. Further testing should be done on the river. Nitrate and phosphate results are high and there is a metal contamination. Please see map and inventory of leachate sources for the basin.

STILL BROOK
BIOCHEMICAL OXYG. DEMAND



11-4-87 TO 11-9-87

LEACHATE AND WASTEWATER DISCHARGE SOURCES

FOR THE

HUDSON, HOUSATONIC RIVER BASINS

CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION
WATER COMPLIANCE UNIT

JUNE 1984

LEACHATE & WASTEWATER DISCHARGE SOURCES

HUDSON, HOUSATONIC MAJOR BASINS

BASIN 6402 BALL POND BROOK

1. Widespread subsurface sewage system failures
2. Consolidated School - failing septic system
3. New Fairfield - salt storage
4. Conn. DOT - former salt storage
5. Ryder Oil Co. - spill of 1,000 gallons #2 fuel oil

BASIN 6500 WEST ASPETUCK

1. Century Brass - sludge drying lagoons
2. New Milford - salt storage

BASIN 6501 MENYALL BROOK

1. Manure, milk lagoon

BASIN 6502 EAST ASPETUCK RIVER

1. Warren - salt storage
2. Warren - closed mixed waste landfill
3. Inn on Lake Waramaug - failing septic system
4. Lemarweck Inn - former septic system
5. Milk lagoon
6. Conn. DOT - salt storage
7. New Milford - Balder Boehm Co., tolulene, xylenes, cyanide to ground

BASIN 6600 STILL RIVER

1. Newmont Exploration - former metals discharge to ground water
2. Metallic Art - metals discharge to lagoons & sludge beds

LEACHATE & WASTEWATER DISCHARGE SOURCES	HUDSON, HOUSATONIC MAJOR BASINS

3. Chayes Dental - former oils and grease to ground waters
4. Danbury - closed bulky waste landfill
5. Caruso Products - spill of 3,000 gallons soybean oil
6. Danbury - closed bulky waste landfill
7. Gallagher - former septage, solvents, metal hydroxide sludge disposal
8. Public well contaminated with TCE
9. The Strippery - former ground discharge of lead & solvents
10. Former discharge of photo chemicals to septic system
11. Danbury - closed bulky waste landfill
12. Borden Corp. - cooling water discharge
13. American Cyanamid - cooling water discharge
14. National Steel, Republic Foil - cooling water discharge
15. Electronics Metal Finishing - metal finishing discharge
16. Electronics Metal Finishing - metal hydroxide sludge beds
17. American Radiatonics - cooling water discharge
18. Union Metallics - petroleum, PCB spills, junkyard
19. Danbury - salt storage
20. Risdon - metal finishing discharge
21. Risdon - former metal hydroxide sludge beds
22. GAR, Precision Products - metal finishing lagoons
23. Qualitron - metal finishing discharge
24. National Semi-Conductor - neutralized acid rinse discharge
25. Berol - industrial wastewater lagoons
26. Berol, (Eagle Pencil) - cooling water discharge
27. Conn. DOT - salt storage

28. Brookfield - salt storage
29. Hoffman's chicken farm - former manure storage
30. Elmco - petroleum spill
31. Elmco - ground water treatment system with ground water discharge
32. Wells contaminated by petroleum spill
33. Gasoline contamination of ground water
34. A.D. Tuck - metal hydroxide sludge lagoon
35. A.D. Tuck - metal finishing discharge
36. Septage disposal site
37. Septage disposal site
38. Sega Sand & Gravel - ground discharge of gravel washwaters
39. Septage disposal site
40. Septage disposal site
41. New Milford - active mixed waste landfill
42. Layton Fuel Co. - spill of 600 gallons #2 fuel oils (New Milford)
43. Banet Roofing - spill of 400 gallons #2 fuel oil (Danbury)
44. Action Circuits - heavy metals discharge (Danbury)
45. National Semi-Conductor - solvent & metals spill (Danbury)
46. Conn. DOT - waste disposal site (Brookfield)

BASIN 6601 MINY BROOK

1. Columbia Diamond Ring - former soap, ABS, gold, rhodium discharge to leach field
2. Well contaminated by Carten Systems discharge
3. Carten Systems - former chromium discharge to ground

Appendix C: Science Curriculum

Mark Atwood
Huckleberry Hill School

SCIENCE CURRICULUM

Who?
What?
When?
Where?

Using land along the Still River in Brookfield as a Park.

Proposed by the League of Women Voters

Who: I will work with approx. a dozen students at a time conducting different experiments and observations along the banks of the Still River in Brookfield. I intend to encourage parents to participate along side their child.

Where: These experiments, observations, walks and discussions will take place along the banks of the Still River in Brookfield. One or two experiments will be conducted along the Housatonic River. (for comparison-contrast purposes)

What: ① to expose river life ecosystems to the students

②. to expose the students to pollution in a small river.

③ To make observations and conduct experiments concerning the level/s of pollution and its possible effects upon the natural habitat.

④. The students will observe how woodland and field eco-systems sometimes interact with and are at times dependent upon each other.

What: continued

⑤. the students will offer suggestions about how to improve their environment with regards to human eco system – River environment eco system ties.

List of Activities the Students will Participate in.

①. Identify plant life within a given area near the River

②. Keep a scrapbook of pressed weeds, flowers, grasses, tree leves, seeds etc. found within a given area along the River

③. Compare plants found along the River with plants / flowers found in other areas preferably away from the River, i.e. meadow, woodland, fields.

④. Compare the types of trees found near the River with those types found in other areas away from the River.

⑤ Observe and determine the effects of River bank soil erosion

⑥. Keep a journal of observations and notes about the exploration of the River + its banks.

⑦ Make lists of various animal life that inhabits the River, its banks and the immediate surrounding environment; animals, reptiles, amphibians.

⑧. Measure the speed and flow of the still River.

⑨ Compare the speed of the current of the still River with that of the Housatonic River.

(10) Make plaster casts of animal (mammal), reptile and bird tracks along the River Bank.

(11). Identify the animal, that the foot/track print belongs to.

(12). List plans, drawings for a nature trail along the Banks of the River

(13). List the name of all the different trees within a specified area along the River.

(14). Test the acidity of the soil near the River.

(15) Identify and draw and label different insects within a given area along the River Bank.

a. spiders
b. crickets
c. ants
d. butterflies
e. grasshoppers
f. misc. insects.

(16). Students will construct insect cages to hold and observe insects.

~~(17) Students conduct pollution tests with the River water.~~

(17). Theorize about, conduct experiments and make conclusions about where some of the pollutants in the River are originating.

(18). Students will be encouraged to take pictures; to keep a photographic record of observations, experiments of the River - the surrounding environment.

(19). Students will write original short ~~story~~ stories poems / prose involve their observations of the animal life.

(20). Make a collection of different wild flower seeds. List how each seed is dispersed from its pod on the plant stem.

(21). ~~Study~~ Describe in writing the different textures of trees and small plants.

(22) ~~Measure~~ Record the temp of the River water in different places. Theorize about the differences in temperature

a. depth of River
b. speed of River

Objectives

① The students will become familiar with different field guide books and know how to use them properly and efficiently.

② The students will appreciate the environment and eco systems of the river

③. The students will appreciate their own environment.

④ The students will offer suggestions about how to improve their environment and river eco sytems.

⑤ The students will be able to identify differences in animal species by their color and markings.

⑥. Students will keep a journal of notes, observations and pictures.

⑦. Parents will participate with their child. They will work together with experiments and observations.

⑧. Students will be able to identify the different parts of a flower.

⑨. Students will be able to list the steps taken in order to test and determine the speed at which the river is flowing.

⑩. Students will be able to list the steps nececessary to test the acidity of the soil.

Objectives continued

(11). Students will ~~[illegible]~~ form opinions and come to conclusions about the origin of some pollutants in the River.

(12). Students will be able to identify certain trees by their bark and leaves.

(13). Students will be able to list at least 1 major eco system as well as 2 or more sub eco-systems.

When: Activities / Projects will take place on Saturdays. Occasional trips (perhaps 2 a month) will also take place during the school week. After school work + activities will also be considered.

Saturdays will most likely suit ~~everybody's~~ everybody's ~~[illegible]~~ schedule; more time can be spent on the objectives and activities. More parents can ~~be~~ become involved on weekend days.

Some long term activities, observations, experiments can be started in the Fall and worked on all through the school year. Comparisons / contrasts can be observed in the eco systems depending upon the season.

Compiled by
Mark Atwood
Huckleberry Hill School

NOTES

ABOUT THE TEAM

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

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

PURPOSE OF THE ENVIRONMENTAL REVIEW TEAM

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

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

REQUESTING AN ENVIRONMENTAL REVIEW

Environmental Reviews may be requested by the chief elected official of a municipality, or the chairman of an administrative agency such as planning and zoning, conservation, or inland wetlands. Environmental Review Request Forms are available at your local Soil and Water Conservation District, and the King's Mark ERT Coordinator. This request form must include a summary of the proposed project, a location map of the project site, written permission from the landowner/developer allowing the Team to enter the property for purposes of review, and a statement identifying the specific areas of concern the Team should investigate. When this request is approved by the local Soil and Water Conservation District and King's Mark RC & D Executive Committee, the Team will undertake the review. At present, the ERT can undertake two (2) reviews per month.

For additional information regarding the Environmental Review Team, please contact your local Soil and Water Conservation District or Nancy Ferlow, ERT Coordinator, King's Mark Environmental Review Team, King's Mark Resource Conservation and Development Area, 322 North Main Street, Wallingford, Connecticut 06492. King's Mark ERT phone number is 265-6695.