

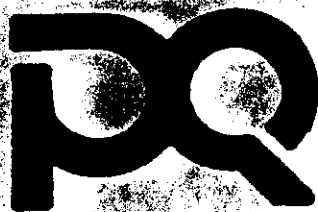
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**Natural Resources Inventory
at Eleanor Roosevelt
National Historic Site
Hyde Park, New York**

Overview Report

Pandullo Quirk
Associates



Science
Engineering
Design

Gateway "80" Office Park
Wayne, New Jersey 07470

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OVERVIEW REPORT
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1.0 INTRODUCTION

The 175 acre site of Eleanor Roosevelt's former home, Val-Kill, was established as a National Historic Site by Public Law 95-32 on May 26, 1977. A Natural Resources Inventory at Val-Kill was prepared in order to (1) identify Val-Kill's resources; (2) help to develop management alternatives for certain natural resources at Val-Kill; (3) establish baseline data for future monitoring studies, and (4) indicate resource-related problems which could affect preservation and use of Val-Kill's historic structures. This document presents an overview of the contents and conclusions of the Natural Resources Inventory.

The Eleanor Roosevelt National Historic Site (Figure 1-1) is located in Hyde Park, Dutchess County, New York, just east of the Hudson River about midway between Albany and New York City. The property lies approximately 1-1/3 miles east of the Franklin D. Roosevelt Home National Historic Site, east of New York Route 9G and south of Roosevelt Road.

Access to the site is from the west via the main entry road on New York Route 9G and from the north via the secondary access road on Roosevelt Road.

The buildings of historical significance are centrally located on the 175 acre site. These form the Historical Core and include the stone cottage, furniture factory, doll house and playhouse. Other historically significant facilities within the Historical Core include the stable, tennis court,

swimming pool and outdoor fireplace. The furniture factory served as Eleanor's home during the latter part of the historical period.

The major surface water stream on the site is the Fall Kill which flows from north to south, centrally through the property. This stream was dammed in 1925, just prior to construction of the historical structures, and forms a 7 acre pond west of the historical buildings. Several small tributaries of the Fall Kill drain the site.

Topography varies from nearly level to severely, sloping (30 percent slopes). The western portion of the site is characterized by gentle slopes with elevations ranging from 219 feet above sea level in the low, wet areas, to 234 feet above sea level in the vicinity of the historical core. The eastern portion of the site is hilly and is characterized by 8 to 30 percent slopes with elevations ranging from 235 feet above sea level near the Fall Kill, to a high point of 397 feet above sea level at the southeastern corner of the property.

The geological base of the site is composed of sedimentary rocks. These rocks are formed by the consolidation of particles that settled from overlying seas in geological history.

More recent glacial deposits of sand and gravel overly the bedrock in the central and western portions of the site. This material was deposited by movement of glaciers during the ice age. Recent stream alluvial deposits have been laid down by the Fall Kill and its tributaries and overly the sand and gravel deposits.

A wide variety of vegetation associations and corresponding wildlife habitats occur on the site (Figure 1-1). These include upland forest associations on the eastern portion of the site; old field vegetation on the transmission line easements and the old orchard; lowland red maple deciduous forest just east of the Fall Kill; wetlands in and around the streams and pond; open fields north and south of the main entry road; conifer plantations; and landscaped "suburban vegetation" within the historical core.

2.0 TERRESTRIAL ECOSYSTEM

2.1 Soils

Soils of the site were studied to identify the suitability of areas of the site for facility development. Features that severely limit development include poorly drained soils, highly erodible soils and shallow soils where the bedrock is at the surface (rock outcrop) or within 10 to 20 inches from the surface.

Application of these limiting soil characteristics to the site reveals four areas generally suitable for development of facilities such as dwellings without basements, shallow excavations and roads. These include the field south of the main entry road, land surrounding the caretaker's house; the white pine plantation north of the pond, the forested area immediately east of the secondary access road off of Roosevelt Avenue; and the area surrounding the historical core. Of these, the most extensive, undeveloped, easily accessible area is the field south of the main entry road.

Soil types on the site correspond well to existing land use and vegetative cover. The field north of the western entrance to the property is overlain by Fredon silt loam which exhibits severe limitations for visitor use and facility development due to a high water table. The field south of the western entrance and the open area west of the superintendent's house are overlain by Alton gravelly loam which exhibits only moderate to slight development limitations.

The wetland areas on the property that border Fall Kill and its tributaries are unsuitable for extensive visitor use. An exception might be a specialized boardwalk trail raised above the highwater line. These areas are characterized by Wyalusing silt loam in the lower elevations and Sun very stony silt loam in wet upland areas.

An area just west of the pond that is now an abandoned gravel pit appears to have formally been overlain with Alton gravelly loam soils. The fill from this pit was used for road construction and other facility development at Val-Kill. Because the site was excavated to below the water table this area is now poorly drained and exhibits severe limitations for development.

Lands surrounding the historic structures and adjacent forested land to the northeast are overlain by Hoosic gravelly loam which is suitable for facility development.

A small forested tract south of the historic area exhibits moderate to severe development limitations and is characterized by Nassau-Manlius shaly silt loams with moderate slopes.

Rocky, hilly soils cover the extensive forested on the eastern portion of the property. Woodlawn-Nassau-Rock outcrop complex soils are found in the north and Nassau shaly silt loam-Rock outcrop complex soils predominate in the south. Due to steep slope and shallow soils, these areas are unsuitable for facility development. However, with proper planning and maintenance, trail and picnic area development is feasible.

2.2 Vegetation

The various vegetation associations on the Eleanor Roosevelt Historic Site have been identified (Figure 1-1). A general description of these associations follows. Tabulation of component species and a description of their relative abundances are included in the final report.

Areas of higher elevation in the eastern portion of the property support Upland Mixed Oak Forest; Upland Hemlock/Mixed Oak Forest; Upland Mixed Species Deciduous Forest in wet, level areas; and, on steep moist slopes with shallow soils, Chestnut Oak-Eastern Hemlock Forest. Lowland Red Maple Forest occupies the moderately low elevations of the site between the wetlands of the Fall Kill and the upland forested area. Early successional ash/gray birch forest has colonized two previously open areas east of the Historical Core.

A major wetland area is associated with the Fall Kill. In an interview, Mr. William Steidle, of the N.Y. Department of Environmental Conservation, "was impressed with the quality of the wetland. The smartweed and other species are good waterfowl foods." He advises serious considerations of preservation before altering the area. The New York State Wetlands Act (1975) regulates development and disturbance of wetland areas.

The eastern part of the site supports a Hay Field which lies south of the main access road. North of this road is Herbaceous Field, Wet Meadow, and Shrub Swamp. Several Red

Maple/Sphagnum/Sedge Tussock Wetland swales dot this portion of the site.

An electric transmission line easement runs north to south through the eastern portion of the site and then east to west along the northern site boundary. This easement supports Woody Old Field vegetation. Species composition along the easement varies slightly as the line passes through dry areas and lowland, wetter areas.

Two 40 year old pine plantations are found at Val-Kill. A White Pine Plantation is located northeast of the pond, between the east-west transmission line easement and a tributary of the pond. A Scotch Pine Plantation was established south of the Historical Core and east of the Fall Kill. Arbor vitae were planted east of the Scotch Pine plantation. Black walnuts were seeded at the present location of the Scotch Pine and Arbor Vitae Plantations in 1932 by the New York State College of Forestry. Some may be seen growing in the arbor vitae plantation.

An old Apple Orchard lies south of the main entry road and south of the pond. This area supports an understory and groundcover of old field vegetation.

An abandoned Gravel Pit southwest of the superintendent's house is being colonized by woody, wetland species. A drier area east of the pit is occupied by old field vegetation. A purple loosestrife Wet Meadow area lies west of the pond and east of the gravel pit.

The Landscaped Historical Core supports a grassy understory and large native white oaks, gray birches, and shagbark hickories, as well as planted conifers, including Douglas fir, red pine, white spruce and others. White pines, scotch pines, Norway spruce, white spruce, red cedar and arbor vitae border the main entry road. These latter were planted by A. Curnan during the historical period. (Refer to Table 2-1 for more detail.)

Formulation of development plans must consider the relative sensitivities and wildlife values of the vegetation associations. Wetlands are most sensitive to disturbance and provide excellent wildlife habitat. Forested areas are also valuable wildlife areas although the pine plantations with minimal understory may be less productive. Development of open pasture areas would have the least impact on resident wildlife and vegetation. The proximity of development to a sensitive area must also be examined.

Some vegetation associations on the site are of historical significance such as the Historical Core and the pine plantations. This value must also be considered in park management plans.

TABLE 2-1
CULTIVATED AND SPECIAL PLANTS
HISTORICAL CORE
ELEANOR ROOSEVELT NATIONAL HISTORIC SITE

COMMON NAME

SCIENTIFIC NAME

POLYPODIACEAE

New York fern

Dryopteris noveboraceasis

PINACEAE

Norway spruce

Picea abies

Douglas fir

Pseudotsuga taxifolia

White spruce

Picea glauca

White pine

Pinus strobus

Scotch pine

Pinus sylvestris

Red pine

Pinus resinosa

Arbor-vitae

Thuja occidentalis

LILACEAE

Day lily

Hemerocallis fulva

Plantain lily

Hosta plantaginea

Tulip

Tulipa spp.

AMARYLLIDACEAE

Daffodil

Narcissus spp.

Snowdrop

Galanthus nivalis

IRIDACEAE

Crocuses

Crocus sp.

MARIANTACEAE

Yellow iris

Iris pseudocorus

JUGLANDACEAE

Shagbark Hickory

Carya ovata

BETULACEAE

Gray birch

Betula populifolia

TABLE 2-1 - Continued

<u>COMMON NAME</u>	<u>SCIENTIFIC NAME</u>
	FAGACEAE
White oak	<u>Quercus alba</u>
Swamp white oak	<u>Quercus bicolor</u>
	ULMACEAE
American elm	<u>Ulmus americana</u>
	NYMPHAECEAE
Bullhead lily	<u>Nuphar variegatum</u>
	RANUNCULACEAE
Peony	<u>Paeonia</u> sp.
	SAXIFRAGACEAE
Mock orange	<u>Philadelphus</u> sp.
	PLATANACEAE
American sycamore	<u>Platanus occidentalis</u>
	ROSACEAE
Apple	<u>Pirophorum malus pumila</u>
Crabapple	<u>Pirophorum prunifolia</u>
Sweet cherry	<u>Prunus</u>
	CELASTRACEAE
Winged euonymous	<u>Euonymous alata</u>
	ACERACEAE
Red maple	<u>Acer rubrum</u>
Sugar maple	<u>Acer saccharum</u>
	VIOLACEAE
Common blue violet	<u>Viola papilionacea</u>
	CORNACEAE
Flowering dogwood	<u>Cornus florida</u>
Rhododendron	<u>Rhododendron</u> sp.

TABLE 2-1 - Continued

<u>COMMON NAME</u>	<u>SCIENTIFIC NAME</u>
	OLEACEAE
Lilac	<u>Syringa vulgaris</u>
	LABIATAE
Mint	<u>Mentha</u> sp.
	APOCYNACEAE
Periwinkle	<u>Vinca minor</u>
	GRAMINAE
Meadow-grass	<u>Poa</u> sp.
	OLEACEAE
Greenstem forsythia	<u>Forsythia virdissima</u>
	LEGUMINOSAE
Chinese wisteria	<u>Wisteria chinensis</u>
	ANACARDIACEAE
American Smoke-tree	<u>Cotinus obovatus</u>
	CAPRIFOLIACEAE
Honeysuckle	<u>Lonicera morrowi</u>

Noteworthy Plants

Rare, Endangered, Threatened Endemic, Marginally Rare,
or Legally Protected Plant Species

The following are Protected Native Plants of New York
State, according to Section 9-1503 of the Environmental
Conservation Law, that may occur on the Eleanor Roosevelt
National Historic Site:

<u>Scientific Name</u>	<u>Common Name</u>	<u>Habitat</u>	<u>Eleanor Roosevelt Vegetation Association</u>
<u>Arisaema dracontium</u>	Green dragon	Rich or alluvial woods, thickets and swales	
<u>Chimaphila</u> spp.			
<u>C. umbellatum</u>	Pipsissewa	Dry woods	Mixed Oak Forest
<u>C. maculata</u>	Spotted wintergreen	Dry woods	Mixed Oak Forest
<u>Cornus florida</u>	Flowering dogwood	Acidic woods	Mixed Oak Forest, Historical Core
<u>Euonymus</u> spp. (Native)	Burning-bush	Rich woods and thickets	Scotch Pine Plantation
All ferns excluding:			Forested Areas, Road Sides
<u>Pteridium aquilinum</u>	Bracken		
<u>Dennstaedtia punctilobula</u>	Hay-scented fern		
<u>Onoclea sensibilis</u>	Sensitive fern		
<u>Gentiana</u> spp.	Gentian, ague-weed, blue-bottles		
<u>G. crinita</u>	Fringed gentian	Meadows, brook- sides, wet thickets, low woods (late Aug.-Nov.)	
<u>G. linearis</u>	Closed gentian	Bogs, wet meadows, swampy woods, wet ledges	

<u>Scientific Name</u>	<u>Common Name</u>	<u>Habitat</u>	
<u>Ilex</u> spp.			
<u>I. opaca</u>	Holly, inkberry, winterberry (black alder)	Moist woodlands	
<u>I. montana</u>	Mountain-winter- berry	Rich wooded slopes and moun- tain sides	
<u>I. verticillata</u>	Black alder, winter- berry	Swamps, pond- margins and damp thickets	
<u>I. laevigata</u>	Smooth winterberry	Wooded swamps	
<u>Kalmia</u> spp.			
<u>K. latifolia</u>	Mountain laurel	Rocky or gravel- ly woods and clearings. Sometimes swamps, in acid or sterile areas	
<u>Lilium</u> spp. (Native)			
<u>L. superbum</u>	Turk's-cap, lily	Swampy woods	Wet Meadow
<u>Lobelia cardinalis</u>	Cardinal-flower	Damp shores, meadows and swamps	
<u>Lycopodium</u> spp.	Clubmosses		Mixed Oak Forest, Red Maple Forest, Transmission Lines
<u>Mertensia virginica</u>	Virginia cowslip, bluebells, etc.	Rich woods, clearings and bottomlands	
<u>Monarda didyma</u>	Oswego tea, bee- balm	Richwoods, thickets and bottomlands	
<u>Nelumbo lutea</u>	Lotus	Ponds, quiet streams and estuaries	
<u>Orchidae*</u>	All native orchids		
<u>Orontium aquaticum</u>	Golden-club (arum family)	Sandy, muddy or peaty shores and shallow water	

Eleanor
Roosevelt
Vegetation
Association

<u>Scientific Name</u>	<u>Common Name</u>	<u>Habitat</u>	
<u>Panax quinquefolius</u> *	Ginseng	Rich and cool woods	
<u>Rhododendron</u> spp. (Native)	Azalea, great laurel (white laurel), honey-suckle, pinxter, rhododendron, rhodora		
<u>Sabatia</u> spp.	Sabatia		
<u>S. angularis</u>	Rose-pink	Open woods, clearings, prairies and fields	
<u>Sanguinaria canadensis</u>	Bloodroot	Rich woods, dry rocky slopes, along streams	
<u>Silene caroliniana</u> <u>var. pensylvanica</u>	Campion	Dry sandy, gravelly or rocky woods and openings	
<u>Trillium</u>	Trillium	Rich woods	Red Maple Forest
<u>Trollius laxus</u>	Spreading globe-flower	Rich meadows and swamps	
<u>Viola pedata</u>	Pansy-violet, Birds-foot violet,	Dry sunny openings, in argillaceous or siliceous soil, very rare in SE N.Y.	

#Only those species for which a vegetation association has been indicated were positively identified at the site.

*Indicates that the species is listed as endangered by the Federal Government (50 CFR 23).

2.3 Wildlife

Birds

The Eleanor Roosevelt National Historic Site provides a variety of habitats for avian fauna - open water, wetlands, forests, plantations, fields, and landscaped areas. Each of these is inhabited by a somewhat different bird community as structural characteristics and available food resources are appropriate for different species. Two formal bird surveys were conducted for the Natural Resources Inventory - one of winter birds and one of summer breeding birds (Table 2-2). Bird sitings recorded by the Ralph T. Waterman Bird Club and casual observations taken throughout the study period supplemented the formal surveys.

The bird community of landscaped habitat included species typical of forests and fields as it includes both lawn and grove areas. Typically, forest species are the American robin, white breasted nuthatch and the blue jay; those typical of fields are the starling, common yellowthroat, brown headed cowbird, and american goldfinch. Each of these species has adapted to existence along side human development. Other such species are song sparrow, house finch, grackle, house sparrow and the gray catbird.

The conifer plantations differ from native forest in that they have no understory vegetation and a reduced diversity of food resources. The survey results showing 22 species in the forest and only 11 in the plantations are representative of the relative use of these areas.

TABLE 2-2

ELEANOR ROOSEVELT NATIONAL HISTORIC SITE

SUMMER BIRD COUNT

<u>Species</u>	<u>Number</u>	<u>Habitat</u>				
		<u>Forest</u>	<u>Wetlands</u>	<u>Plantations</u>	<u>Field</u>	<u>Landscaped</u>
Green heron	1		X			
Mallard	1		X			
Broadwinged hawk	3	X	X		X	
Chimney swift	7		X		X	
Common flicker	7	X	X		X	
Hairy woodpecker	1				X	
Downy woodpecker	1	X				
Great crested flycatcher	2					X
Eastern phoebe	3	X	X			
Eastern wood pewee	4	X				
Tree swallow	1		X			
Rough winged swallow	1		X			
Barn swallow	2				X	
Bluejay	21	X		X		X
American crow	13	X	X	X	X	X
Blackcapped chickadee	11	X		X		
Tufted titmouse	11	X		X	X	
Whitebreasted nuthatch	7	X				X
Brown creeper	1			X		
Gray catbird	39	X	X	X	X	X
American robin	11	X	X	X		X
Wood thrush	9	X				
Veery	1	X				
Bluegray gnatcatcher	1	X				
Cedar waxwing	1		X			
Starling	32		X		X	X
Red eyed vireo	3	X				
Worm eating warbler	2	X				
Blue winged warbler	1				X	
Yellow warbler	5		X		X	
Common yellow throat	5		X		X	X
House sparrow	2					X
Northern oriole	1	X				
Redwinged blackbird	29	X		X	X	
Common grackle	1					X
Brown headed cowbird	3				X	X
Cardinal	28	X		X		
House finch	7		X			X
American gold finch	5				X	X
Rufous sided towhee	4	X		X		
Song sparrow	13	X		X	X	X
Total Number of Species		22	16	11	16	14

Forest species included the broadwinged hawk; flicker and downy woodpecker; the flycatchers - Eastern phoebe and wood pewee; blackcapped chickadee and tufted titmouse; white-breasted nuthatch; three species of thrushes - the American robin, wood thrush and veery and two species of finch - cardinal, and rufous sided towhee. Notably absent from the plantation survey were the red-eyed vireo, worm eating warbler, northern oriole, the blue gray gnatcatcher, above mentioned woodpeckers and flycatchers, and the wood thrush and veery.

The fields and wetland areas have many species in common as both are open areas. The feeding habitats of swifts and swallows restrict them to such areas. The yellow warbler and common yellowthroat are also typical of field habitats.

The mallard and green heron are dependent on the open water resources of the site as are the belted kingfisher, great blue heron, wood duck, and Canada geese, previously observed in the study area.

The diversity of habitats provides for a rich avian fauna on the site. The natural areas are sufficiently undisturbed by humans to maintain species less tolerant of such contact than those found in the landscaped area.

Mammals

Mammals of the site were documented both by observation and live trapping. Species documented are shown in Table 2-3.

Trapping produced unusually few catches indicating a sparse population. Species captured were the white footed

TABLE 2-3

MAMMALS OF THE ELEANOR ROOSEVELT NATIONAL HISTORIC SITE
HYDE PARK, NEW YORK¹

DIDELPHIDAE

Didelphis marsupialis

Opossum

SORICIDAE

Sorex cinereus

Sorex fumeus

† Blarina brevicauda

Cryptotis parva

Masked shrew

Smoky shrew

Shorttail shrew²

Least shrew

NOTE - only spp. "2"
 marked w/ footnote "2"
 were observed

TALPIDAE

Scalopus aquaticus

Eastern mole near edge
of range

Condylura cristata

Starnose mole

VESPERTILIONIDAE

Myotis lucifugus

Myotis keeni

Myotis sodalis

Myotis subulatus

Lasionycteris noctivagans

Pipistrellus subflvus

Eptesicus fuscus

Lasiurus borealis

Lasiurus cinereus

Little brown myotis

Keen myotis

Indiana myotis³

Small-footed myotis

Silver haired bat

Eastern pipistrel

Big brown bat

Red bat

Hoary bat

LEPORIDAE

Lepus americanus

† Sylvilagus floridanus

Sylvilagus transitionalis

Snowshoe hare

Eastern Cottontail²

New England cottontail

SCIURIDAE

† Tamias striatus

† Marmota monax

† Sciurus carolinensis

† Tamiasciurus hudsonicus

Glaucmys volans

Glaucmys sabrinus

Eastern chipmunk²Woodchuck²Eastern gray squirrel²Red squirrel²

Southern flying squirrel

Northern flying squirrel

URSIDAE

Ursus americanus

Black Bear

CRICETIDAE

Castor canadensis	Beaver
+ Peromyscus leucopus	White-footed mouse ²
Peromyscus maniculatus	Deer mouse
Neotoma floridana	Alleghany packrat (Eastern woodrat)
Clethrionomys gapperi	Boreal redback vole
Microtus pennsylvanicus	Meadow vole
Pitymus pinetorum	Pine vole
+ Ondatra zibethicus	Muskrat ²

MURIDAE

Rattus norvegicus	Norway rat
Mus musculus	House mouse

ZAPODIDAE

Zapus hudsonius	Meadow jumping mouse
-----------------	----------------------

CANIDAE

+ Vulpes fulva	Red fox ²
Vrocyon cinereoargenteus	Gray fox

PROCYONIDAE

+ Procyon lotor	Raccoon ²
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MUSTELIDAE

Mustela criminea	Shorttail weasel
Mustela frenata	Longtail weasel
Mustela vison	Striped skunk
Lutra canadensis	River otter

CERVIDAE

+ Odocoileus virginianus	White-tailed deer ²
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¹Species that potentially occur at Val-Kill as accounted for by Burt and Grossenheider, 1964.

²Species whose presence was documented by field investigation.

³Species recognized as a resident endangered species in New York State by the New York State Department of Environmental Conservation.

mouse, chipmunk, gray squirrel, Eastern cottontail and short-tail shrew. Deer and deer sign were observed on the site but again populations seem to be low. Dogs are common and their presence may be a causal factor to what appears to be a depauperate mammalian fauna. Ground hogs use the field areas and muskrats inhabit the pond wetlands. A black bear was sighted along the power line in winter during the mowing operation.

Reptiles and Amphibians

Val-Kill provides excellent habitat for a variety of reptile species. Fourteen species of reptiles and amphibians were encountered (Table 2-4). This resource should provide valuable educational opportunities for Val-Kill's visitors.

During the early spring survey numerous red-backed and spotted salamanders were found under rocks near the two upland ponds located in the southeastern part of the property. Both red-backed and lead-backed phases of the red-backed salamander were encountered. The high concentration of spotted salamanders suggests they had migrated to the ponds for breeding. A slimy salamander was also encountered near one upland pond on June 13, 1979. These upland ponds probably do not persist year round, thus excluding fish populations which might consume the spotted salamander eggs and larvae. The spotted salamander requires water for egg laying and larval development. The red-backed and slimy salamanders lay their eggs in damp logs, moss, etc. and do not have an aquatic larval stage. All three species prefer wooded areas.

TABLE 2-4
AMPHIBIANS AND REPTILES
OF VAL-KILL

Note: only spp marked w/
asterisk have been documented
by this report.

Family and Species ^{1,2}	Common Name	# Individuals ³ Observed POA
AMBYSTOMATIDAE		
* <u>Ambystoma maculatum</u>	Spotted salamander	8
<u>Ambystoma opacum</u>	Marble salamander	
<u>Ambystoma Jeffersonianum</u>	Jefferson salamander	
SALAMANDRIDAE		
<u>Notophthalmus viridescens</u>	Red-spotted newt	
PLETHODONTIDAE		
<u>Desmognathus fuscus</u>	Northern dusky salamander	
<u>Desmognathus ochrophaeus</u>	Mountain dusky salamander	
* <u>Eurycea bislineata</u>	Northern two-lined salamander	1
<u>Hemidactylium scutatum</u>	Four-toed salamander	
* <u>Plethodon cinereus</u>	Red-backed salamander	21
<u>Gyrinophilus porphyriticus</u>	Northern spring salamander	
* <u>Plethodon glutinosus</u>	Slimy salamander	1
<u>Pseudotriton ruber</u>	Northern red salamander	
RANIDAE		
* <u>Rana catesbeiana</u>	Bull frog	Common
* <u>Rana clamitans</u>	Green frog	Common
<u>Rana sylvatica</u>	Wood frog	
* <u>Rana palustris</u>	Pickerel frog	2
PELOBATIDAE		
<u>Scaphiopus holbrook</u>	Eastern spadefoot toad	
BUFONIDAE		
* <u>Bufo americanus</u>	American toad	3
HYLIDAE		
<u>Hyla versicolor</u>	Eastern gray tree frog	
<u>Hyla crucifer</u>	Northern spring peeper	
CHELYDRIDAE		
<u>Chelydra serpentina</u>	Common snapping turtle	
KINOSTERNIDAE		
* <u>Sternotherus odoratus</u>	Stinkpot	1
EMYDIDAE		
<u>Clemmys guttata</u>	Spotted turtle	
* <u>Clemmys insculpta</u>	Wood turtle	2*
<u>Clemmys muhlenbergi</u>	Bog turtle ⁴	
* <u>Emydoidea blandingi</u>	Blanding's turtle	2*
* <u>Chrysemys picta</u>	Eastern painted turtle	Abundant

TABLE 2-4
(Cont'd.)

Family and Species ^{1,2}	Common Name	# Individuals Observed PQA ³
SCINCIDAE		
<u>Eumeces fasciatus</u>	Five-lined skink	
COLUMBRIDAE		
<u>Natrix sipedon</u>	Northern water snake	
<u>Storeria dekayi</u>	Northern brown snake	
<u>Storeria occipitomaculata</u>	Northern red-bellied snake	
* <u>Thamnophis sauritus</u>	Eastern ribbon snake	1
* <u>Thamnophis sirtalis</u>	Eastern garter snake	1
<u>Heterodon platyrhinos</u>	Eastern hognose snake	
<u>Diadophis punctatus</u>	Northern ringneck snake	
<u>Carphophis amoenus</u>	Eastern worm snake	
<u>Coluber constrictor</u>	Northern black racer	
<u>Opheodrys vernalis</u>	Smooth green snake	
<u>Elaphe obsoleta</u>	Black rat snake	
<u>Lampropeltis triangulum</u>	Eastern milk snake	
<u>Agkistrodon contortrix</u>	Northern copperhead	
<u>Crotalus horridus</u>	Timber rattlesnake	

¹ Scientific nomenclature and phylogenetic order after Cochran and Goin (1970)

² This list includes species potentially occurring on the site.

³ Species observed during 1979 by Pandullo Quirk Associates,

⁴ Endangered species N.Y. Dept. of Environmental Conservation

* Specimen collected

Also encountered at the upland ponds were numerous eastern painted turtles, an eastern ribbon snake and a Blanding's turtle.

A second Blanding's turtle was encountered on the shore of the Fall Kill just below the dam at water quality sampling station C. This individual was recently dead and was collected. This species is currently being studied by Mr. Eric Keviat of Fishkill, N.Y. and Dr. John Behler, Curator of Herpetology, Bronx Zoo. Dr. Behler considers the Blanding's turtle a "rare species" in New York although it is not on the State Rare and Endangered Species List. The Blanding's turtle occurs in disjunct populations throughout the state. Several individuals have recently been found and tagged in Hyde Park on the Fall Kill (personal communication, Mr. Eric Keviat).

Other species observed were the northern two-lined salamander, the American toad, garter snake, pickerel frog and wood turtle.

Investigation for the endangered bog turtle in the wetland areas yielded no results. Verified reports of the bog turtle have been recorded for south and east Dutchess County but not in the vicinity of Val-Kill (Eric Keviat, personal communication).

The pond and Fall Kill provide excellent habitat for the eastern painted turtle which occurred in extremely large numbers. A stinkpot turtle was also encountered as were many green frogs and bull frog. In an interview at Val-Kill, Joseph Lash recalled that the sound of frogs calling at the pond was a familiar backdrop to his summer visits there.

3.0 AQUATIC ECOSYSTEMS

3.1 History of the Fall Kill and Pond

The pond has been an integral part of the history of Val-Kill since the conception of the retreat in 1925 by Eleanor Roosevelt, Marion Dickerman and Nancy Cooke. The cottage, original swimming pool and fireplace, and later the factory, tennis court and dollhouse were deliberately designed around the contour of the pond. The pond was and still can be used to fill F.D.R.'s swimming pool. The pond was used for canoeing, ice skating, duck hunting and some fishing during the historical period. Two abandoned docks are located on the western shore of the pond and on the eastern shore of the pond near the dam. An interview with John Roosevelt, son of Eleanor and Franklin, (1978) yielded some interesting historical information about the pond. John Roosevelt revealed that, to his memory, the pond was always full of macrophytes. A mowing machine was regularly utilized to relieve the plant-choked pond. In 1937 an attempt was made to dredge the pond. The pond was drained and a bulldozer was used to attempt to remove mud from the northern portion of the pond. The attempt was thwarted as the bulldozer disappeared into the muddy sediments. Nancy Cooke and Eleanor Roosevelt planted lily pads in the pond and "Uncle Hall," Mrs. Roosevelt's younger brother, introduced wild rice. Today, these macrophytes continue to contribute to the buildup of sediment and organic materials on the bottom of the pond.

John Roosevelt also recalls the flood of 1955 when the bridge over the dam was washed out and later rebuilt.

3.2 Physical Characteristics

The Fall Kill is the major stream which flows north to south centrally through the Eleanor Roosevelt Historic Site. The Fall Kill originates northeast of Hyde Park in the vicinity of Pleasant Plains. The Kill flows south through Hyde Park, then flows southwest through Poughkeepsie where it empties into the Hudson River. The Fall Kill is dammed on the Eleanor Roosevelt National Historic Site to form a 7 acre pond, west of the Historical Core, at an approximate elevation of 218 feet above sea level.

A survey of the pond bottom showed silt deposits of up to 4 feet in depth. Silt is carried from the upstream areas and settles as flow decreases in the pond. The eventual effect of such siltation would be to fill the pond.

3.3 Water Quality

According to the New York State Classification System the waters of the Fall Kill are Class C and shall be "suitable for fishing and all other uses except as a source of water supply for drinking, culinary or food processing purposes and primary contact recreation" (swimming, etc.).

A water quality sampling program was conducted during this study. Water quality generally appears to be good and in compliance with the State criteria. However, in late summer,

as temperature rises and micro and macroscopic aquatic plant growth peaks, dissolved oxygen decreases to low levels. This creates an undesirable condition for fish and invertebrates. Phosphate levels are moderately high which may suggest the influence of "gray water" or wash water wastes. Phosphate is a nutrient that enhances plant growth. Poorer water quality in summer is, therefore, caused in part by this fertilizing agent.

3.4 Aquatic Biological Resources

The aquatic ecosystems consists generally of three biotic groups - plants, invertebrates, and fish. Each group was sampled in the stream and pond at Val-Kill.

Plants

The amount of organic matter synthesized by organisms from inorganic substances is called primary productivity. The importance of primary producers lies in their position at the bottom of the food chain, the block from which all other life forms must draw energy. Phytoplankton and aquatic macrophytes are the two plant groups which constitute the primary producers in an aquatic system. For the purposes of this study, phytoplankton refers to microscopic drifting plant forms, and aquatic macrophytes, to larger forms, either rooted or drifting.

Primary producers also play a key role in eutrophication, a natural "aging" process of a lake or pond in which nutrient

levels and primary producers increase with a corresponding decrease in dissolved oxygen. Three stages in this process are oligotrophy (low productivity, high dissolved oxygen), mesotrophy (intermediate levels and eutrophy (high productivity, low dissolved oxygen). Although eutrophication is a natural occurrence, man's influence through environmental alteration hastens the process, commonly referred to as "cultural eutrophication" or pollution.

In natural or healthy water bodies, algal flora is represented by a high number of species, most of them with relatively small populations. In addition, diatoms predominate in healthy systems, with a few green and blue-greens present (Patrick, 1973). Pollution reduces species numbers and encourages growth of the more pollution tolerant forms.

In this study, pollution tolerant diatoms dominate in the pond. Species numbers remained relatively constant until later in the season (12 July 1979) when one diatom species appeared in appreciably higher quantities. This may indicate a degradation of water quality as the season progresses. Increase in temperature, decrease in flow and a decrease in dissolved oxygen due to biological decomposition, would all contribute to this degradation.

Aquatic macrophytes play a key role in the functioning of the pond ecosystem. Due to the shallowness of the pond, macrophytes contribute significantly to pond primary productivity.

In addition to their role as primary producers, aquatic macrophytes affect and regulate their biological, physical and chemical environment in other significant ways. Through photosynthesis they aid in regulation of the amount and proportion of dissolved oxygen and carbon dioxide present. Aside from direct consumption of plant material by other organisms, they bring new inorganic nutrients into the food chain in their decomposition. By trapping sediments, rooted macrophytes alter their physical environment. These sediments, in combination with the structure of the plant itself, provide protective habitats for many animal forms.

Aquatic macrophytes were sampled in the pond (Table 3-1). Of the ten species present, six represent a valuable food resource to fish either directly or by sheltering insects upon which fish feed. Cabomba caroliniana, fanwort, is an especially valuable direct food source for fish.

Species denoted as poor resources to fish may serve as food for other vertebrates. Seeds of Pontederia cordata, pickerelweed, may be eaten by ducks or muskrats. Birds are commonly seen grazing on duckweed (Lemna minor). Many turtle species, such as the painted turtle, abundant in the pond, have diets consisting mainly of vegetable matter.

Although vegetation is essential to a well balanced aquatic ecosystem, over time, factors which once proved beneficial to life in the system "destroy" the habitat and replace it with a new terrestrial ecosystem. Where plants become too abundant, decomposition reduces oxygen to dangerously low

TABLE 3-1

SPECIES LIST OF AQUATIC MACROPHYTES OBSERVED IN THE POND
AUGUST 9, 1979

<u>Scientific Name</u>	<u>Common Name</u>	<u>Estimated Percent Cover</u>	<u>Food Value* to Fish</u>
<u>Cabomba caroliniana</u>	Fanwort	45	G
<u>Ceratophyllum demersum</u>	Coontail	15	I
<u>Lemna minor</u>	Duckweed	45	P
<u>Lythrum salicaria</u>	Purple loosestrife	15	-
<u>Nuphar variegatum</u>	bullhead-lily	25	I
<u>Nymphaea odorata</u>	fragrant water lily	15	I
<u>Polygonum punctatum</u>	Water smartweed	45	G
<u>Pontederia cordata</u>	Pickeralweed	5	P
<u>Trapa natans</u>	Water chestnut	5	P
<u>Typha latifolia</u>	Cattail	15	I

* G = good, valuable

P = slight or poor

I = provides shelter for insects

levels. In addition, the effect of sediment trapping by extensive root systems will eventually turn the pond into a marsh and later, into a terrestrial ecosystem. These changes are all characteristic of the eutrophication process.

The pond at the Historical Core, the upper portion, in particular, appears to be approaching later stages of eutrophication as is evidenced in its physical, chemical and biological constituents. The process appears to be hastened by upstream development. If left to itself, the pond is likely to fill in leaving the stream channel the only remaining open water.

When maintenance of this system is considered, either by dredging, vegetation removal, or other methods, utmost care and careful planning must be employed so as not to negatively affect the biological community of the pond.

Invertebrates

Both floating (planktonic) and bottom dwelling (benthic) invertebrate species were sampled in the Fall-Kill and the pond. Analysis of the distribution variety and the type of species collected suggests that the aquatic system at Val-Kill is stable, is characteristic of unpolluted waters and provides abundant food for fish.

Fish

Each fish species has its own particular set of ecological requirements. For this reason, interactions of numerous

physical, chemical and biological factors are responsible for the state and type of fish community characteristic of a given water body. Physical characteristics such as shoreline, depth, flow, substrate and habitat space are important limiting factors in determining which species the aquatic system can support.

Table 3-2 represents a list of all fish species encountered. Overall, bluegills (Lepomis macrochirus) appeared to dominate both habitats. Schools of 10-15 individuals were commonly spotted from the surface on several sampling dates. Bluegills are known to use a wide variety of aquatic and terrestrial arthropods as a food source (Etiner, 1971). A greater abundance of bottom dwelling insect larvae and other arthropods in the stream benthic community may account for a seemingly higher incidence of bluegills in the stream fish community. Several sunfish nests of unknown species were also spotted along the stream edges.

The bluegill may, depending on environmental conditions, adapt to or tolerate certain pollutants which may eliminate or limit significant establishment of other species. This is especially common in smaller streams (Parrish, 1975). The finding of a relatively good diversity of other fish species in the study area indicates this not to be the case and also serves as a "biological qualitative voucher" with regards to overall habitat quality. The fact that this species appears to outnumber other species may be an indication of mild environmental stress.

TABLE 3-2
FISH SPECIES LIST

<u>Scientific Name</u>	<u>Common Name</u>	<u>Where Found:</u>	
		<u>Pond</u>	<u>Stream</u>
<u>Ambloplites rupestris</u>	rock bass		X
<u>Carassius auratus</u>	goldfish	X	
<u>Esox americanus</u>	redfin pickerel	X	
<u>Lepomis gibbosus</u>	pumpkinseed	X	X
<u>Lepomis macrochirus</u>	bluegill	X	X
<u>Uniden. Ictaluridae</u>	catfish	X	
<u>Uniden. Notropis sp.</u>	minnow	X	

With the exception of the minnows, all fish species collected are of recreational importance. Young of the year for both pickerel and sunfish were recovered indicating habitat suitability for spawning. Protection and management of these fisheries, especially the bass and pickerel, should be considered in future planning.

Sedentary species are also important biological indicators. These forms will tend to move up- or downstream during periods of environmental stress (Parrish, 1975). The finding, though not in great abundance, of sedentary catfish in the study site indicates relatively favorable conditions.

The main factors which appear to dictate the fish communities indigenous to the water bodies of Eleanor Roosevelt National Historical Site are water depth, abundant food resources (invertebrates) and aquatic vegetation. Of these, vegetation may play a key role. Important beneficial contributions of the aquatic vegetation include shade, protection against predators, spawning grounds, increased oxygenation of water and food, both for herbivores and carnivores preying on periphytic invertebrates. Through the middle and late summer months, however, intense vegetation blooms appear to have additional deleterious effects including overcrowding, deoxygenation of water through bacterial decomposition and sediment trapping. If left unattended, the pond may continue on its eutrophication process and fill in completely.

4.0 WATER SUPPLY AND SANITATION

Three wells have been located at Val-Kill servicing the caretaker's house, the stone cottage and the factory. The swimming pool is supplied by a surface water intake pump.

Groundwater may occur in either the unconsolidated rock deposits just below the land surface or in the underlying bedrock. The unconsolidated deposits are generally better sources of groundwater than bedrock because of the larger and greater number of pore spaces. Sands and gravels are better sources of groundwater than clays for the same reasons.

Based on available groundwater information, particularly Heath, 1964, the wells in Val-Kill appear to be drilled into rock which is composed predominantly of clays - the least productive of all water bearing bedrock types. The chemical analysis of the well water indicates that there is limestone as well as clay in the area. The water from both these types of rock is often characterized by its hydrogen sulfide content - as the water at Val-Kill certainly is.

Examination of groundwater nutrient levels (Table 4-1) shows that nitrogen groups are relatively high indicating that the wells may be receiving higher than normal nutrient input through groundwater percolation. This is possibly an indication of septic seepage from surrounding soils. Phosphorous concentrations are within acceptable limits.

All three wells show unacceptable levels of iron with the superintendent's well being the highest. This parameter bears

TABLE 4-1

GROUNDWATER QUALITY - DECEMBER 27, 1978

PARAMETERS TESTED	WELLS TESTED			
	SUPERINTENDENT'S HOUSE	FACTORY BUILDING	STONE COTTAGE	NYS ^a LIMITATIONS
pH	7.5	7.6	7.6	Non-corrosive
Hardness (as CaCO ₃)mg/l	197.9	150.2	159.4	Non-corrosive
Sulfate (mg/l)	128	85	100	250.
Sodium (mg/l)	5.7	8.6	11.2	Variable ^b
Chloride (mg/l)	260	320	460	250.
Phosphorous (mg/l)	0.01	0.048	0.02	None
Nitrate - N (mg/l)	0.408	1.03	0.32	10.0
Ammonia - N (mg/l)	0.104	0.236	0.094	None
Total Dissolved Solids (mg/l)	290	224	302	None
Iron (mg/l)	0.3	0.15	0.01*	0.3
Copper (mg/l)	0.15	0.05	0.01*	1.0
Total Coliforms	ND	ND	ND	ND ^c
Fecal Coliforms	ND	ND	ND	ND ^c

*Less Than

ND = Not Detected

^aNew York State Water System Supervision Program State Sanitary Code,
Effective June, 1977

^bDiet dependent 20 mg/l = limit for sodium restricted diets,
270 mg/l = limit for normal sodium diets.

^cTest dependent

watching. The problem may be within the soil or perhaps in the old piping system. Copper concentrations are within acceptable levels.

The results of the bacteriological testing, performed by the Dutchess County Health Department in October, 1978, showed the well at the stone cottage to be satisfactory with respect to coliform bacteria - an indicator organism of possible septic contamination. The well at the factory, which was still being actively used at time of testing showed unsatisfactory results on its original test, but satisfactory on its second trial. The same test at the superintendent's house showed unsatisfactory results on both trials. However, bacteriological tests performed in January and April, 1979 showed no detectable coliform bacteria at any of the wells.

New York State Regulations regarding wells and septic facilities were examined and applied to Val Kill facilities (N.Y.S. Dept. of Health, July, 1977). The regulations for domestic waste water facilities which specifically affect Val-Kill are as follows. Absorption fields must be at least 100 feet from wells and/or streams and lakes. A distance of 200 feet is required if the absorption fields drain toward the well or surface water. This regulation immediately prohibits further use of all septic tanks at Val-Kill if the wells are to be used in the future. The septic tanks servicing the Play House, located directly outside the bathrooms are less than 100 feet from the shoreline of the Fall-Kill and the wetland area.

The septic tanks at both the Factory and the Stone Cottage are within a 100 foot radius of the respective wells. The topography of the area is such that the septic tank at the Factory may be upstream of the well, therefore, requiring a 200 foot separation.

Although the soil type is designated as having only slight drawbacks for use as a leaching field, the groundwater table appears to prohibit the suitability for septic tank/leaching fields. The groundwater table, as noted in August (low flow season) of 1977 by the Park Service (M. Williams, 9/7/78) was only 18 inches below the ground surface near the Doll House. At this point, the soil became a dense clay. If this follows for the entire Historical Core, lateral seepage from the septic drainage fields will be augmented.

Sump pumps, which drain to the pond, have been installed in the basements of both the factory and Stone Cottage because of repeated flooding during high water seasons, indicating that a severe problem with the leaching field drainage might exist.

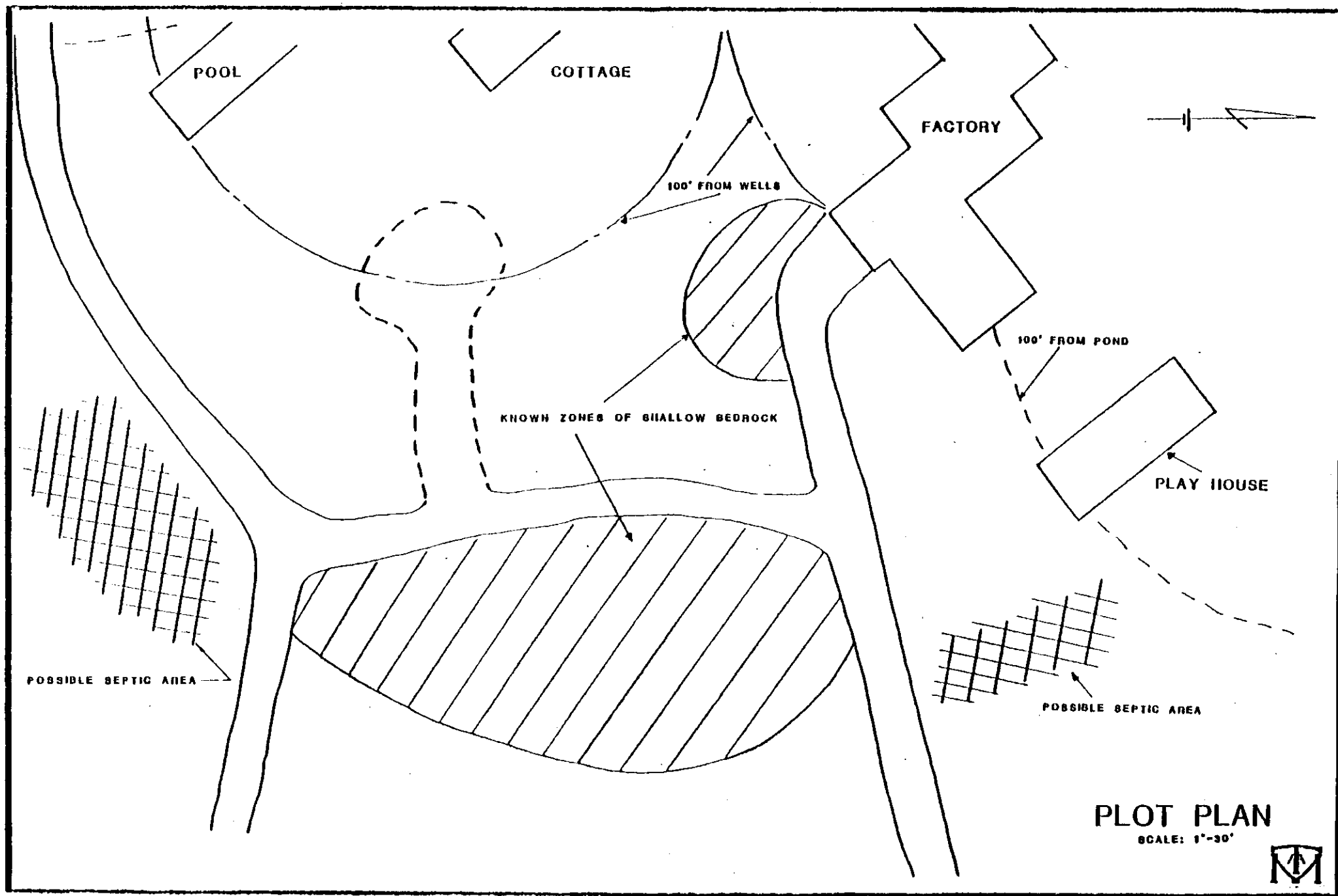
In order to comply with the New York State regulations, the water supply and wastewater treatment facilities at Val-Kill must be separated.

The existing water supply would be adequate to support a small number of Park Service personnel and some gardening activity. The use of this supply requires abandonment of existing septic systems.

In any case, future use of both playhouse septic systems and that of the cottage is precluded by proximity to the pond. The wastewater facility at the factory would require renovation before the Dutchess County Health Department would approve its use by Park staff and visitors.

In view of these identifiable limitations on further use, precise definition of design capacity of the septic systems seems unwarranted.

Figure 4-1 shows two potential locations for new subsurface disposal facilities. The southerly site was tested by Melick-Tully Associates. This area was found to be generally acceptable for such facilities. However, surface silty-sand materials may yield an unacceptably slow percolation rate. Soils below four feet may be acceptable. Percolation tests will have to be performed before a system is designed.



Potential sites suitable for septic drainage
Eleanor Roosevelt National Historic Assoc.

Figure 4-1

5.0 MANAGEMENT OF VAL-KILL RESOURCES

A variety of natural resources are present at Val-Kill making it an excellent location for ecological education programs. In addition to their intrinsic value, these resources are integral to the historical significance of Val-Kill. In order to maintain the ecological value of the site in conformance with the mandate of PL 95-32, considerations of use, maintenance, protection and expansion were reviewed and are described below.

5.1 Fall Kill Stream and Pond System Wetlands

Though basically healthy, the aquatic system is undergoing a process of eutrophication which reveals itself in the extensive macrophyte growth, sedimentation, and late summer degradation of water quality. This process may be accelerated by upstream development. Such development increases sediment loading and probably contributes to the high phosphorous concentrations in the waters on the site. A maintenance program will be necessary to preserve the quality of this system. Properly planned dredging and macrophyte control can arrest the eutrophication process. Phosphorous levels should be monitored to accurately determine the source and possible corrective measures.

As noted in the discussion of vegetation, the wetland communities on the site depict stages in vegetation succes-

sion from aquatic macrophytes to herbaceous wetland to shrub swamp and finally lowland forest. This community distribution provides an excellent opportunity for an educational program in natural ecological processes. However, to protect the resource itself, use should be carefully defined and restricted. Access to wetland areas should be limited to boardwalk walkways so as not to disturb the vegetation and hydrology. Specific bird observation points could be established to limit disturbance to breeding waterfowl.

Wildlife management practices could be applied to the wetland communities. Maintaining open water habitat is important to use by wildlife. The aquatic macrophytes already established in the pond provide good wildlife food. Nesting boxes and platforms could be installed for wood ducks and geese.

As the pond was an integral part of the aesthetic and recreational quality of Eleanor Roosevelt's home, preservation is essential. Further protection of the wetland ecosystem could be effected by purchase and preservation of wetlands immediately adjacent to the site. These wetlands together with the contiguous wetlands on the Vall-Kill property have been defined by the New York State DEC as being under the jurisdiction and regulations of the state Wetlands Act. A moderately large area which might be purchased surrounds the Fall Kill upstream from the Historical Core, north of the powerline and south of Roosevelt Avenue. As an alter-

native to purchase, wetlands which occur on residential properties might be protected as conservation easements.

If, within this parcel, a suitable site exists for construction of a readily accessible sedimentation basin, sediments could be removed from streamflow before entering the pond. Regular maintenance and dredging of such a basin could prolong the benefits of any dredging in the pond and eliminate disturbance of the pond by repeated dredging in the future.

5.2 Upland Vegetation

Like the wetlands, upland vegetation associations depict the successional process from herbaceous field to woody old field to early successional forest to climax upland of either mixed oak or oak/hemlock depending on topographic and soil conditions. In addition to their educational value in demonstrating this successional process, these areas provide habitat for a diverse bird community. The apparently low mammal population may be in part due to the presence of domestic animals.

Preservation of this system could be enhanced by acquisition of contiguous forested areas to the east. This area was used by the Roosevelts to walk to the "Dream House" and, therefore, also has some historic value. However, if use is limited in volume and restricted to the trails established by the Roosevelts, the integrity of the system on site would be

protected. The existing dirt roads through the upland area provide excellent access. Eleanor Roosevelt frequently used the trails for horseback riding. Some evidence of current use by people on horseback was observed and could be encouraged.

Additional foot trails could be established if precautions are taken. Proper topographic location of these trails would reduce erosion hazard. Regular application of woodchips to the foot trails would also reduce erosion impacts. A trail to the high point is recommended. The winter time view from this point is spectacular.

Gypsy moth populations should be monitored as recommended in the Forest Health section. Removal of fallen dead trees for firewood might reduce fire hazard. Standing dead or dying trees should be left as they provide important wildlife habitat.

5.3 Hay Field

The Hay Field might be leased as cropland or pasture. Cultivation of crops such as corn would attract wildlife. More cover should be provided within and around this habitat for the attraction of more wildlife species. These could be provided by brush piles or could be established by allowing some of the field to be colonized by woody species.

5.4 Plantations

The conifer plantations should be managed as recommended in the Forest Health section of the final report. Since they were established by Franklin D. Roosevelt they have historic significance and are part of the ambience of the site during the historic period.

5.5 Landscaped Areas

Replanting of the gardens as they were maintained during the historic period is recommended. These plantings significantly altered the aesthetics of the site from those existing today. Mrs. Roosevelt appreciated the visual attributes of the flower beds and regularly cut flowers for her home (John Roosevelt, conversation October 1978). Therefore, they are necessary to the historic integrity of the site.

The landscaped area also provides habitat for numerous wildlife species and presents a good comparison of the ecology of the human influenced environment to that of the more natural areas of the site.

5.6 Environmental Education Center

Establishment of a facility for environmental studies in the stables is recommended. This building provides a central location with easy access to the pond, wetlands, conifer plantations, the transmission line and the upland areas. The aesthetics of the area are also high, enhancing the desirability of the location. Responsibilities of the Environ-

mental Education Center could be forest management, pest monitoring and control, wildlife management, crops management, water quality monitoring and interpretive trail development as well as educational program development and implementation. Educational programs could focus on these areas of responsibilities. Programs might be offered to local schools in addition to the general public. This would allow the facility to offer both long term and short term programs.

2 Mammals

Mammals of the site were documented both by observation and trapping. Sherman traps were set out in upland forest, field, landscaped, and streamside locations to sample small mammals such as mice and chipmunks. Havaharts were used to sample larger mammals - racoons, rabbits. Species documented are shown in Table 2-8.

Trapping produced unusually few catches indicating a sparse population. Species captured were the white footed mouse, chipmunk, gray squirrels, Eastern cottontail short-tail shrew. Relative value of the various habitats cannot be ascertained from the data. Deer and deer sign were observed on the site but again populations seem to be low.

Dogs are common and their presence may be a causal factor to what appears to be a depauperate small mammal fauna. Ground hogs use the field areas and muskrats inhabit the pond wetlands. A black bear was sighted along the power line in winter during the mowing operation. A red fox was also observed on the site.

Also encountered at the upland ponds were numerous eastern painted turtles, an eastern ribbon snake and a Blanding's turtle.

A second Blanding's turtle was encountered on the shore of the Fall Kill just below the dam at water quality sampling station C. This individual was recently dead and was collected. This species is currently being studied by Mr. Eric Keviat of Fishkill, N.Y. and Dr. John Behler, Curator of Herpetology, Bronx Zoo. Dr. Behler considers the Blanding's turtle a "rare species" in New York although it is not on the state rare and endangered species list. The Blanding's turtle occurs in disjunct populations throughout the state. Several individuals have recently been found and tagged in Hyde Park on the Fall Kill (personal communication, Mr. Eric Keviat).

A northern two-lined salamander well-developed larva was collected on June 28, 1979 in the Fall Kill at water quality sampling station D located about midway between the dam and the southern property boundary.

A particularly good spot for reptile and amphibians is located along the dirt road which runs south along the Fall Kill then runs uphill across the powerline toward the high point. Where the road enters the upland forest east of the power line, the American toad, garter snake, pickerel frog were observed.

A wood turtle shell and a living specimen were encountered in a red maple forest area between the Historical Core and the Fall Kill.

Investigation for the endangered bog turtle in the wet-land areas yielded no results. Verified reports of the bog turtle have been recorded for south and east Dutchess County but not in the vicinity of Val-Kill (Eric Keviat, personal communication).

The pond and Fall Kill provide excellent habitat for the eastern painted turtle which occurred in extremely large numbers. A stinkpot turtle was also encountered as were many green frogs and bull frog. In an interview at Val-Kill. Joseph Lash recalled at the sound of frogs calling at the pond was a familiar backdrop to his summer visits there.

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3.2, Pond Bottom Contours). The wild rice is particularly attractive to water fowl.

John Roosevelt also recalls the flood of 1955 when the bridge over the dam was washed out and later rebuilt.

Mr. A. "Tubby" Curnan, a lifetime resident of the site, former Roosevelt employee and present employee of the National Park Service, was interviewed. He indicated that the pond was formed by construction of the Fall Kill dam in 1925. The pond area was excavated prior to dam construction. According to Mr. Curnan, the areal extent of the pond has remained constant although the depth of the pond has decreased in time due to siltation.

Comparison of historical aerial photos to those of 1978 to further elucidate the pond's history was impossible as the only photograph on record (1959) was damaged (U.S. Department of the Interior, EROS, Sioux Falls, S.D.).

An interview with Mr. Joseph Lash, a close friend of Mrs. Roosevelt's, was conducted on May 29, 1979. He recalls that the upper portion of the pond was always choked with weeds. More emergent, rooted vegetation is obvious now than was evident during the historical period.

An intensive search for existing literature on the Fall Kill and pond was conducted. Many agencies and institutions were contacted regarding the biology, water quality and hydrology of the Fall Kill and pond.

The Dutchess County Parks Department was contacted regarding the Fall Kill County Park located along an impoundment of the stream 1.7 miles south of Val-Kill. According to Glen Doctorman, Park Superintendent, the park, a former swimming facility, was closed due to high coliform bacteria counts. These bacteria may be associated with sewage contamination and/or high water fowl populations.

Mr. Alan Randyl of the U.S. Geological Survey could offer no Federal water quality data specifically for the Fall Kill. He did however, provide a publication, "Streams in Dutchess County, N.Y., Their Flow Characteristics and Water Quality in Relation to Water Problems" (Ayer and Pauszek, 1968) which contains general information on surface waters in the study area.

Mr. Richard Barnett, Professor at Dutchess County Community College, is Director of the College's water quality laboratory located on the Fall Kill at Creek Road, south of East Dorsey Lane. His students have occasionally conducted sampling programs on the Fall Kill in the vicinity of the lab, but he could not provide any recorded data. He characterized the stream quality as generally good. Coliform bacteria counts vary from 30 to 4,000 MPN. He suggested that the water quality upstream near Val-Kill was better and that the only pollution sources were "a few trailer parks and residential areas."

biological sampling stations on the Fall Kill. One is located northeast of the property in the vicinity of Crum Elbow Road and Quaker Lane in Hyde Park. The other is south of Val Kill, east of Creek Road, in Fall Kill Park.

Data received for the summers of 1973 through 1977 show the Fall Kill park station exceeded standards for total coliform at least four times, twice in 1973 and twice in 1974. Sampling data received for the upstream station is from October 30, 1978 to December 21, 1978. Total and fecal coliform levels ($> 20,000$ and $> 2,000$ MPN, respectively) exceeded standards on December 21, 1978.. Fecal streptococci concentrations for this date are also correspondingly high at 800/100 ml.

Both Vassar College and Bard College were consulted but could produce no water quality, biology or hydrology information on the Fall Kill.

Mr. John Porter of the Dutchess County Soil Conservation District (personal communication, December 14, 1978) was unaware of any available water quality information on the Fall Kill.

The Dutchess County Highway Department was contacted (February 13, 1979) with regard to the type of road salt used for deicing. Sodium chloride from Cayuga, N.Y. mines is utilized.

Mr. Michael Gann, Regional Fisheries Manager, New York Department of Environmental Conservation, (personal communication, February 23, 1979) searched fish stocking records between 1936 and the present and found no record of fish stocking for the Fall Kill.

Mr. Joseph Lash stated that the pond was stocked repeatedly with fish although he doesn't remember that anyone fished it. Mr. John Roosevelt, likewise, indicated that fishing was not a common diversion.

3.2 Physical Characteristics

The Fall Kill is the major stream which flows north to south centrally through the Eleanor Roosevelt Historic site. The Fall Kill originates northeast of Hyde Park in the vicinity of Pleasant Plains. The Kill flows south through Hyde Park, then flows southwest through Poughkeepsie where it empties into the Hudson River. The Fall Kill is dammed on the Eleanor Roosevelt National Historic Site to form a 7 acre pond, west of the Historical Core, at an approximate elevation of 218 feet above sea level.

Precipitation averages 40 inches per year. Between 1932 and 1965 precipitation ranged from 25.93 to 55.83 (Ayer and Pauszek, 1968). The period from 1960-1965 was a major drought. Outstanding floods due to hurricanes occurred in 1938 and 1955. A frequency analysis of the 34 years of record indicates that on the average, annual precipitation will be 25 inches or less once in about 40 years. Sixty inches or more of precipitation can be expected on the average of 1 year in about 45. July is the month of highest average rainfall (3.90 inches); February is the lowest (2.54 inches). For the most part, precipitation is uniformly distributed throughout the year (Ayer and Pauszek, 1968). On the average, 45 percent of annual precipitation flows overland to surface waters (stormwater runoff). The remainder percolates into the groundwater aquifers. Flooding probability is greatest from December through April due

to the seasonality of surface runoff intensity. Runoff rate determines high flow and low flow periods. High flow occurs in March and April; low flow occurs in the summer months between June and October (inclusive). The recent increase in development of the headwaters of the Fall Kill has probably increased the magnitude of flooding along its banks.

According to the Town of Hyde Park Data Bank (1970) the housing stock in Hyde Park has quadrupled in a 30 year period from 1,160 occupied dwelling units in 1940 to 4,727 in 1970. Since 1957 alone, more than 1,600 units have been constructed, most of them in subdivision developments of single family homes. In 1958, 1,753 acres within Hyde Park were in residential use and in 1970 2,075 acres were in residential use, an increase of 325 acres in 12 years. The majority of this development has occurred within the Fall Kill drainage basin upstream from the Eleanor Roosevelt National Historic Site. Major new development areas are located north of Roosevelt Road immediately north of Val-Kill and north of Crum Elbow Road, about 1-1/2 miles north of Val-Kill.

If one assumes that 25% of the surface area of residential units is impervious cover (Stankowski, 1974), the following figures are computed for changes in impervious cover due to residential development from 1958 to 1970 in Hyde Park.

	<u>Residential Developed Area (Acres)</u>		<u>Area of Impervious Cover</u>
1958	1,753	x .25 =	438
1970	2,075	x .25 =	519

due to residential development from 1958 to 1970. The majority of this development has occurred upstream from Val-Kill. Peak flood flows have been shown to be increased by increase of impervious cover due to increased rate of surface stormwater runoff (Stankowski, 1974). However, this increase is not very large compared to drainage basin area and should not have had a significant effect on the areal extent of the pond.

The United States Department of Housing and Urban Development, Flood Insurance Administration is presently conducting an intensive hydrologic study of Dutchess and surrounding Counties, including the project area, in order to delineate flood hazard areas (personal communication, Mr. Robert Renolds, February 13, 1979). A previous HUD mapping study (1976) identified a Special Flood Hazard area along the Fall Kill immediately south of Val-Kill. The present study will provide aerial photography, stream cross-section profiles, peak flood discharges, stream cores, land surveys and hydrologic backwater modeling. Preliminary information regarding upstream drainage areas and peak flood discharges for the 10 year, 50 year, 100 year and 500 year storms for the Fall Kill is presented in Table 3-1. These data are preliminary and subject to change.

Pond Bottom Contours

Water depth was measured along five transects across the pond (Figure 3-1). Water elevation is approximately 218 feet above sea level. The water was 0.7 feet above the dam on the sampling date (January 30, 1979). Two readings were

measured using a 10 foot long rod. The first reading was depth to the top of the mud or muck deposited on the pond bottom. The second reading was taken by applying pressure to the rod until it stopped. In the portion of the pond nearest the dam, this bottom reading was taken at a sandy, gravelly bottom. In transect E, a sandy bottom was not encountered in the middle of the pond; the organic mud may extend well below the seven foot depths from water surface recorded. Depths recorded were plotted along the transect lines to yield the pond profiles presented in Figures 3-2, 3-3, 3-4, 3-5 and 3-6. A contour map of the pond bottom is shown in Figure 3-1. Depth of water to mud surface averaged approximately 4 feet in the southern portion of the pond and was close to 3 feet further north.

Depth of mud to bottom varied from zero beneath the bridge, to at least 4 feet in the northern part of the pond. Mud depth averaged 1-1/4 feet in thickness in the southern portion of the pond. The depth of mud was greatest in the northern portion (averaging 3-2/3 feet) because that is where the streams enter the pond. Flow rate is decreased in this area and the waters deposit their suspended solids. This thick muddy bottom is typical of a eutrophic body of water. Available nutrients are probably high. Eutrophication has probably been accelerated above the natural rate due to sedimentation caused by new home construction upstream along the Fall Kill, roadway runoff, and the inflow of nutrient-rich septic system effluent.

Total mud volume can be determined by multiplication of surface area times depth of mud. It is calculated that approximately 35,890 cubic yards of muddy silt is deposited on the pond bottom. If siltation is assumed to be uniform since the pond was dammed in 1925, the yearly rate of deposition is approximately 677 cubic yards per year. This rate has probably varied with construction activity and land use upstream.

On the sampling date, channel current locations were obvious due to a variable ice cover. These were also evident from the pond profiles. A major channel flows along the eastern shore of the pond. The flow of water from two influent streams was noted. One stream enters from the extreme northeastern corner of the pond. The Fall Kill enters from the north and flows across the pond, joining the other stream's channel on the opposite shore just before transect E (see Figure 3-1). This movement of open water through the pond probably helps maintain an adequate winter oxygen supply for aquatic biota.

3.3 Water Quality and Chemistry

Water Quality Sampling Program

Exceptional Season - Winter 1978

Sampling was conducted for the Fall Kill and the pond on two winter dates - November 27, 1978 and December 27, 1978, at a total of 6 locations. The results are presented in Table 3-2. These data may be compared to United States Environmental Protection Agency Water Quality Criteria

Class C waters (Part 704, Title 6, Code of New York State, September 20, 1974).

According to the New York State Classification System the waters of the Fall Kill are Class C and shall be "suitable for fishing and all other uses except as a source of water supply for drinking, culinary or food processing purposes and primary contact recreation" (swimming, etc.).

Water quality during the "exceptional season" generally appears to be good and in compliance with the State criteria. Dissolved oxygen levels, crucial to the survival of aquatic fauna, are adequate. Biochemical oxygen demand is high and approaches the value for domestic sewage, approximately 170. This is probably due to the influence of bottom muck which is high in undecomposed organic matter. Fecal coliform levels are low. These may be used to indicate domestic sewage contamination which apparently was not significant at the time of sampling. Phosphate levels are moderately high which may suggest the influence of "gray water" or wash water wastes. Chloride concentrations are elevated for the December 27, 1978 samples. This may be a result of stormwater runoff from salted (NaCl) roadways, although sodium levels are low.

High Flow - Spring 1979

Available water quality data from the spring/summer sampling period is presented in Table 3-3. Water quality appears to be very good. Several trends may be noted.

period is 1.91 mg/l at station B, the pond. This follows, in view of the heavy concentration of vegetation and negligible flow in this area.

Low dissolved oxygen levels are usually associated with intensive bacterial decomposition and hence a high BOD. In this study, low BOD's were generally the rule. Settling of particulate matter can change this pattern. Both flow and suspended solids were low. Therefore, in this case, most decomposition may occur in the substrate. Only slight decomposition would occur in the water column, resulting in a low BOD here. Oxygen drawn out of the water column to the substrate by bacterial action would also explain the low dissolved oxygen levels observed.

Phosphate levels continue to be rather high and in most cases after the June 13 sampling data exceed federal standards (see Table 3-2 for USEPA standards). Though phosphorous is usually the primary limiting nutrient in aquatic ecosystems, external sources probably remove these limitations to primary productivity at Val-Kill. The continual, substantial decrease in the amount of nitrate nitrogen corroborates this hypothesis. One example is pond station B, with a maximum nitrate nitrogen concentration of 0.776 mg/l in April which decreases to 0.01 mg/l in August.

For the most part, the remaining trends present during earlier parts of the study are still evident. PH remains in the neutral range with a seasonal maximum of 7.91 at Station C on June 28 to a minimum of 6.77 at Station E on June 13.

Coliform counts increase into the summer months but still remain well within Federal standards.

Overall, the pond appears to exhibit typical features of a water body entering mid to later stages of eutrophication. Nutrients are common but rarely present in pollutional levels. Saturated oxygen levels in winter and early spring decrease into the summer months. Increasing temperatures, shallow water and low flow in combination with bacterial decomposition result in a meager oxygen supply.

One facet of this cycle which must not be overlooked is the fact that larger vertebrates and invertebrates may have to migrate up or down stream to avoid these less than favorable summer conditions. In so doing, these organisms become dependent upon stream flow for escape and survival. If the flow of the stream is altered or blocked for any amount of time during this critical period, it could have serious effects on the biological population of the area. This fact should be carefully reviewed prior to any environmental alteration.

TABLE 3-1

HUD FLOOD INSURANCE ADMINISTRATION
PRELIMINARY DRAINAGE
AREA AND PEAK FLOOD FLOW DATA
FALL KILL STREAM
ELEANOR ROOSEVELT NATIONAL HISTORIC SITE
HYDE PARK, N.Y.

CROSS SECTION LOCATION	CROSS SECTION NO.	DRAINAGE AREA (SQ.MI.)	FLOOD DISCHARGES (CFS)			
			10-YR	50-YR	100-YR	500-YR
South of Park	FK-2A	12.16	850	1,450	1,775	2,850
South of Park	FK-2B	11.99	845	1,439	1,763	2,835
South of Park	FK-2C	11.91	843	1,434	1,757	2,828
Southern Park Boundary Below Lower Pond Dam	FK-2D	11.86	841	1,431	1,753	2,824
Between Pond and Lower Pond	FK-2E	11.81	840	1,428	1,750	2,820
Between Pond and Lower Pond	FK-2F	11.41	828	1,402	1,721	2,785
Between Pond and Lower Pond	FK-2G	11.22	823	1,390	1,707	2,769
Pond Dam	FK-3	11.21	823	1,390	1,706	2,768
As Fall Kill enters Pond	FK-3A	10.76	810	1,361	1,674	2,729
Northern Park Boundary	FK-3B	10.73	809	1,359	1,672	2,726
Between Roosevelt Road & Northern Park Boundary	FK-3C	10.69	808	1,357	1,669	2,723
Roosevelt Road	FK-4	10.43	800	1,340	1,650	2,700

PLEASE NOTE: All flood discharges are preliminary and subject to change.

TABLE 3-5

POND PHYTOPLANKTON SPECIES LIST AND RELATIVE ABUNDANCES

NUMBERS REPRESENT $\times 10^3$ CELLS/LITER

	Station B <u>6/13/79</u>	Station B <u>6/28/79</u>	<u>7/12/79</u>
CHLOROPHYTES: (green algae)			
<u>Ankistrodesmus falcatus</u>		7	27
<u>Chlamydomonas sp.</u>		15	
<u>Cladophora sp.</u>	9	44	90
<u>Closterium sp. 'A'</u>		4	
<u>Closterium sp. 'B'</u>			9
<u>Closterium sp. 'C'</u>			9
<u>Coelastrum microporum</u>		4	
<u>Cosmarium sp.</u>			9
<u>Pediastrum tetras</u>			108
<u>Scenedesmus quadricaudata</u>		30	108
<u>Staurastrum sp.</u>	9		
CHRYSOPHYTES: (brown algae)			
<u>Ulothrix uvetula</u>	17		
CYANOPHYTES: (blue green algae)			
<u>Scillatoria tenuis</u>		7	1,854
DIATOMS:			
<u>Achnanthes sp.</u>	34		9
<u>Amphora ovalis</u>			18
<u>Cocconeis placentula</u>	17	15	36
<u>Cymatopleura solea</u>			18
<u>Fragilaria sp. 'A'</u>	9	104	3,690
<u>Fragilaria sp. 'B'</u>	17		648
<u>Gomphonema acuminatum</u>			9
<u>Gomphonema angustatum</u>	9	4	27
<u>Gyrosigma spencerii</u>			9
<u>Melosira varians</u>	17	56	945
<u>Meridion circulare</u>		4	99
<u>Navicula cryptocephala</u>	9	4	72
<u>Navicula cuspidata</u>		4	
<u>Navicula elginensis</u>			9
<u>Navicula viridis</u>	17	4	18
<u>Navicula spp.</u>			54

TABLE 3-5
(Cont'd.)

	Station B <u>6/13/79</u>	Station B <u>6/28/79</u>	<u>7/12/79</u>
<u>itzschia acicularis</u>			36
<u>itzschia sigmoides</u>			27
<u>itzschia sp.</u>	17	4	72
<u>innularia sp.</u>	9		9
<u>medra acus</u>			36
<u>medra ulna</u>	17	4	18
ELENIDS:			
<u>glena gracilis</u>			27
<u>glena sp.</u>			9
<u>brachelomonas sp.</u>		4	9
	<u>207</u>	<u>318</u>	<u>8,127</u>

TABLE 3-6

PHYTOPLANKTON BIOMASS ON SEVERAL SAMPLING DATES

BIOMASS IS GIVEN IN GRAMS OF DRY WEIGHT/M³*CHLOROPHYLL A IS GIVEN IN mg/m³

Fall Kill Sampling Station	6/13/79		6/28/79		7/12/79		7/25/79		8/9/79	
	<u>Chl a</u>	<u>Biomass</u>	<u>Chl a</u>	<u>Biomass</u>	<u>Chl a</u>	<u>Biomass</u>	<u>Chl a</u>	<u>Biomass</u>	<u>Chl a</u>	<u>Biomass</u>
A	0.773	51.79	1.159	77.65	11.125	745.38	2.73	182.91	4.208	281.9
B	0.319	21.37	1.467	98.29	0.94	62.98	1.18	79.06	2.661	178.3
C	0.233	15.60	2.409	61.40	1.70	113.9	0.85	56.96	0.946	63.4
D	1.606	107.60	0.570	38.19	0.875	59.97	1.19	79.73	4.480	300.2
E	1.077	72.16	6.624	403.61	8.645	579.22	1.55	103.85	4.192	280.9

* Biomass was determined according to Standard Methods (APHA-AWWA-WPCF, 1975). By assuming that Chlorophyll a constitutes, on the average, 1.5 percent of the dry weight organic matter (ash-free weight) of the algae, one can estimate the algae biomass by multiplying the chlorophyll a by a factor of 67.

TABLE 3-7

SPECIES LIST OF AQUATIC MACROPHYTES OBSERVED IN THE POND

AUGUST 9, 1979

<u>Scientific Name</u>	<u>Common Name</u>	<u>Estimated Percent Cover</u>	<u>Food Value* to Fish</u>
<u>Sagittaria caroliniana</u>	Fanwort	45	G
<u>Ceratophyllum demersum</u>	Coontail	15	I
<u>Lemna minor</u>	Duckweed	45	P
<u>Lythrum salicaria</u>	Purple loosestrife	15	-
<u>Nuphar variegatum</u>	bullhead-lily	25	I
<u>Nymphaea odorata</u>	fragrant water lily	15	I
<u>Polygonum punctatum</u>	Water smartweed	45	G
<u>Pontederia cordata</u>	Pickernelweed	5	P
<u>Trapa natans</u>	Water chestnut	5	P
<u>Typha latifolia</u>	Cattail	15	I

* G = good, valuable

P = slight or poor

I = provides shelter for insects

TABLE 3-8

AQUATIC INVERTEBRATE SPECIES LIST

	Pond		Stream	
	Zooplankton		Zooplankton	
	No. Per Liter	Pond Benthos	No. Per Liter	Stream Benthos
	#/l	#/m ²		
Coelenterata (hydroids)				
Athecata				
<u>Hydra sp.</u>	1			118
Platyhelminthes (flat worms)				
Tricladida				
<u>Curtisia foremani</u>				151
Rotatoria (rotifers)				
Ploima				
<u>Lepadella sp.</u>	15		26	
<u>Colurella sp.</u>	21		13	
<u>Trichocera porcellus</u>			33	
<u>Trichocera sp.</u>	6			
<u>Brachionus sp.</u>			33	
<u>Monostyla sp.</u>			13	
<u>Scaridium sp.</u>			7	
Nematoda (roundworms)	3	7		
Gordiacea (horsehair worms)		13		11
Annelida (aquatic earthworms and leeches)				
Pleisiopora				
<u>Enchytraeidae</u>	3	+		11
<u>Stylaria fossularis</u>	1	7		
<u>Nais communis</u>		16		11
Rhynchobdellida				
<u>Helobdella stagnalis</u>		7		
<u>Helobdella fusca</u>				11
<u>Glossiphonia heteroclita</u>				11
Arthropoda				
Cladocera (water fleas)				
<u>Alona costata</u>	3			
<u>Alonella sp.</u>	3			
<u>Simocephalus exospinosus</u>	6			
<u>Daphnia sp.</u>		7		
<u>Ceriodaphnia sp.</u>	9			
<u>Eurycerus lamellatus</u>	6	7		
<u>Chydorus sp.</u>	3			
Copepoda				
<u>Cyclopidae</u>	6		26	
<u>Eucyclops agilis</u>	12			
<u>Pleuroxus denticulatus</u>	3		66	
Ostracoda (see shrimps)	12		7	
Isopoda (aquatic sow bugs)				
<u>Asellus intermedius</u>		3		936

TABLE 3-8
(Cont'd.)

	Pond Zooplankton No. Per Liter #/l	Pond Benthos #/m ²	Stream Zooplankton No. Per Liter #l	Stream Benthos #/m ²
Amphipoda (scuds)				
<u>Hyalella azteca</u>	2	23	20	118
<u>Crangonyx gracilis</u>		3		11
Collembolla (springtails)				
<u>Sminthurides sp.</u>		3		
Chironomoptera (may flies)				
<u>Tricorythodes sp.</u>				43
<u>Caenis sp.</u>				32
<u>Stenonema sp.</u>				22
Trichoptera (caddis flies)				
<u>Cheumatopsyche sp.</u>				22
<u>Stactobiella sp.</u>				22
<u>Uniden. Trichoptera</u>				11
Coleoptera (beetles)				
<u>Hydrophilidae</u>	+			
<u>Stenelmis sp.</u>				75
<u>Macronychus glabratus</u>				11
Diptera (two-winged flies,				
mosquitoes, midges)				
<u>Chironomidae (formerly</u>				
Tendipedidae)	56	19	3	775
<u>Procladius sp.</u>		7		
<u>Chironomous sp.</u>		13		
<u>Calospectra sp.</u>		13		
<u>Pseudochironomous sp.</u>		10		
<u>Culex sp.</u>				32
<u>Palpomyia tibialis</u>				11
<u>Probezzia sp.</u>	+		20	
Hemiptera (plant lice)				
<u>Aphididae</u>		3		
Malacostraca				
Mesogastropoda				
snails & Limpets)				
<u>Physa integra</u>	+	16		
<u>Physa sayi</u>				11
<u>Amnicolidae</u>				11
<u>Ferrissia sp.</u>				11
Heterodontida (clams)				
<u>Shaeriidae</u>		13		54
Total # Individuals	175	220	384	2,532
Total # Species	22	19	14	30

Cumulative total # Species - 53

Indicates presence of less than one individual per unit.

TABLE 3-9

FISH SPECIES LIST

<u>Scientific Name</u>	<u>Common Name</u>	<u>Where Found:</u>	
		<u>Pond</u>	<u>Stream</u>
<u>Ambloplites rupestris</u>	rock bass		X
<u>Carassius auratus</u>	goldfish	X	
<u>Esox americanus</u>	redfin pickerel	X	
<u>Lepomis gibbosus</u>	pumpkinseed	X	X
<u>Lepomis macrochirus</u>	bluegill	X	X
<u>Uniden. Ictaluridae</u>	catfish	X	
<u>Uniden. Notropis sp.</u>	minnow	X	

5.0 MANAGEMENT OF VAL-KILL RESOURCES

A variety of natural resources are present at Val-Kill making it an excellent location for ecological education programs. In addition to their intrinsic value, these resources are integral to the historical significance of Val-Kill. In order to maintain the ecological value of the site in conformance with the mandate of PL 95-32, considerations of use, maintenance, protection and expansion were reviewed and are described below.

5.1 Fall Kill Stream and Pond System Wetlands

Though basically healthy, the aquatic system is undergoing a process of eutrophication which reveals itself in the extensive macrophyte growth, sedimentation, and late summer degradation of water quality. This process may be accelerated by upstream development. Such development increases sediment loading and probably contributes to the high phosphorous concentrations in the waters on the site. A maintenance program will be necessary to preserve the quality of this system. Properly planned dredging and macrophyte control can arrest the eutrophication process. Phosphorous levels should be monitored to accurately determine the source and possible corrective measures.

As noted in the discussion of vegetation, the wetland communities on the site depict stages in vegetation succes-

sion from aquatic macrophytes to herbaceous wetland to shrub swamp and finally lowland forest. This community distribution provides an excellent opportunity for an educational program in natural ecological processes. However, to protect the resource itself, use should be carefully defined and restricted. Access to wetland areas should be limited to boardwalk walkways so as not to disturb the vegetation and hydrology. Specific bird observation points could be established to limit disturbance to breeding waterfowl.

Wildlife management practices could be applied to the wetland communities. Maintaining open water habitat is important to use by wildlife. The aquatic macrophytes already established in the pond provide good wildlife food. Nesting boxes and platforms could be installed for wood ducks and geese.

As the pond was an integral part of the aesthetic and recreational quality of Eleanor Roosevelt's home, preservation is essential. Further protection of the wetland ecosystem could be effected by purchase and preservation of wetlands immediately adjacent to the site. These wetlands together with the contiguous wetlands on the Vall-Kill property have been defined by the New York State DEC as being under the jurisdiction and regulations of the state Wetlands Act. A moderately large area which might be purchased surrounds the Fall Kill upstream from the Historical Core, north of the powerline and south of Roosevelt Avenue. As an alter-

native to purchase, wetlands which occur on residential properties might be protected as conservation easements.

If, within this parcel, a suitable site exists for construction of a readily accessible sedimentation basin, sediments could be removed from streamflow before entering the pond. Regular maintenance and dredging of such a basin could prolong the benefits of any dredging in the pond and eliminate disturbance of the pond by repeated dredging in the future.

5.2 Upland Vegetation

Like the wetlands, upland vegetation associations depict the successional process from herbaceous field to woody old field to early successional forest to climax upland of either mixed oak or oak/hemlock depending on topographic and soil conditions. In addition to their educational value in demonstrating this successional process, these areas provide habitat for a diverse bird community. The apparently low mammal population may be in part due to the presence of domestic animals.

Preservation of this system could be enhanced by acquisition of contiguous forested areas to the east. This area was used by the Roosevelts to walk to the "Dream House" and, therefore, also has some historic value. However, if use is limited in volume and restricted to the trails established by the Roosevelts, the integrity of the system on site would be

TABLE 4-4

SEPARATION DISTANCES FROM WASTEWATER SOURCES

<u>Wastewater Sources</u>	<u>Well or Suction Line(a)</u>	<u>To Stream, Lake or Water Course(c)</u>	<u>Property Line</u>
House Sewer (Watertight Joints)	25' if cast iron pipe 50' otherwise	25'	10'
Septic Tank	50'	50'	10'
Effluent Line to Distribution Box	50'	50'	10'
Distribution Box	100'	100'	10'
Absorption Field	100'(b)	100'	10'
Seepage Pit	150'(b)(more in coarse gravel)	100'	10'
Dry Well (Roof and Footing)	50'	25'	10'
Fill or Built-up System	100'	100'	10'
Evapotranspiration-Absorption System	100'	50'	10'
Sanitary Privy Pit	100'	50'	10'
Privy, Watertight Vault	50'	50'	10'

(a) Water service and sewer lines may be in the same trench if cast iron sewer with lead-caulked joints is laid at all points 12 inches below water service pipe; or sewer may be on dropped shelf at one side at least 12 inches below water service pipe, provided that sewer pipe is laid below frost with tight and root-proof joints and is not subject to settling, superimposed loads or vibration. Water service lines under pressure shall not pass closer than 10 feet of a septic tank, absorption life field, leaching pit, privy or any other part of a sewage disposal system.

(b) Sewage disposal systems located of necessity upgrade in the general path of drainage to a well should be spaced 200 feet or more away.

(c) Mean high water mark.

Source: N.Y.S. Department of Health "Waste Treatment Handbook - Individual Household Systems" July, 1977