



DEPARTMENT OF THE NAVY  
NAVAL TRAINING CENTER  
2701 SHERIDAN ROAD  
GREAT LAKES, ILLINOIS 60088-5001

NTCGLAKESINST 5090.12  
FAC

OCT 30 1995

NTC GREAT LAKES (COMPLEX<sup>2</sup>) INSTRUCTION 5090.12

From: Commander, Naval Training Center, Great Lakes

Subj: NATURAL RESOURCES PLAN

Ref: (a) OPNAVINST 5090.1B

Encl: (1) Natural Resources Plan

1. Purpose. To promulgate and establish management of natural resources for all commands and activities within the Naval Training Center, Great Lakes, Complex<sup>2</sup>.

2. Background. Reference (a) requires preparation and implementation of a comprehensive Natural Resources Management Plan. Program requirements, guidelines, procedures of the plan, and actions required to implement the plan are detailed in enclosure (1).

3. Action.

a. NTC Staff Civil Engineer (FAC). The NTC Staff Civil Engineer shall maintain a complex-wide natural resources management program, to include: (1) ensuring all applicable NTC Complex<sup>2</sup> projects are reviewed for natural resources impacts; (2) providing resources in support of program guidance, technical project reviews, and plan implementation; (3) acting as a liaison with regulatory agencies and local communities on natural resources issues; and (4) updating the Natural Resources Management Plan and regulatory or community agreements as required to maintain compliance.

b. All NTC Complex<sup>2</sup> Commands and Tenants: Shall adhere to the requirements established in enclosure (1) as applicable.

  
P. A. TRACEY

Distribution:  
NTCGLAKESINST 5216.5M  
Lists I, II (Case A) & III-A, B, C

COMPREHENSIVE NATURAL RESOURCES MANAGEMENT PLAN  
NAVAL TRAINING CENTER  
GREAT LAKES, ILLINOIS  
GREAT LAKES HOUSING AT NAVAL AIR STATION (NAS) GLENVIEW, AND  
GREAT LAKES HOUSING AT FORT SHERIDAN

1995



DISTRIBUTION CHECKLIST  
 FOR  
 NATURAL RESOURCES PLANS  
 (BASIC, LAND MANAGEMENT & FISH AND WILDLIFE SECTIONS)  
 NAVAL TRAINING CENTER, GREAT LAKES,  
 GREAT LAKES HOUSING AT NAVAL AIR STATION (NAS) GLENVIEW, AND  
 GREAT LAKES HOUSING AT FORT SHERIDAN

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The following checklist has been developed to assist in the distribution of Long Range Natural Resources Plans and as a means of identifying what offices or individuals have the three ring plan binders. All future Natural Resources Sections will be added to the binder. This list will be useful for distribution and for determining how many plans to print. Check only those offices actually having a binder in their possession and indicate how many.

	DISTRIBUTION	
	<u>SUGGESTED</u>	<u>ACTUAL</u>
COMMANDER, NAVAL TRAINING CENTER	-----	-----
STAFF CIVIL ENGINEER	-----	-----
ENVIRONMENTAL OFFICER	-----	-----
NATURAL RESOURCES MANAGER	-----	-----
COMMANDING OFFICER, NAVY PUBLIC WORKS CENTER	-----	-----
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NATURAL RESOURCES MANAGER	-----	-----

# **BASIC NATURAL RESOURCES INFORMATION**

BASIC SECTION  
OF THE NATURAL RESOURCES MANAGEMENT PLAN FOR  
NAVAL TRAINING CENTER (NTC), GREAT LAKES, ILLINOIS  
GREAT LAKES HOUSING AT NAVAL AIR STATION (NAS) GLENVIEW AND  
GREAT LAKES HOUSING AT FORT SHERIDAN

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## 1. INTRODUCTION

### PURPOSE

This Natural Resources Management Plan represents a multi-agency and multi-disciplinary effort to provide information on the natural resources that are present at the Naval Training Center (NTC), Great Lakes, Recruit Training Command (RTC), Great Lakes, Great Lakes Housing at Fort Sheridan, and Great Lakes Annex-Naval Air Station (NAS) Glenview. The plan should be used by Naval personnel to develop and evaluate alternatives for protecting and enhancing these resources.

According to 32 CFR 190 the Department of Defense shall act responsibly in the public interest in managing its lands and natural resources. The CFR requires that there be a conscientious and active concern for the inherent value of natural resources in all DOD plans, actions, and programs.

This Natural Resources Management Plan will encompass NTC Great Lakes, Great Lakes Housing at NAS Glenview, and Great Lakes Housing at Fort Sheridan.

### Purpose of Plan

The purpose of the Natural Resources Management Plan is to provide information needed to carry out a balanced and integrated program for soil, water and related natural resources management. The plan shall include all phases of natural resources management applicable to the installations, future requirements, and projects to be accomplished.

As a supplement to the Base's Master Plan, this plan will support the national defense mission, maximize multiple land use benefits and fulfill land stewardship responsibilities required by applicable Laws, Executive Orders, CFRs and Department of Defense directives.

### CONTENT

This section provides the reader with general information on the component parts contained in the individual Natural Resources Management Sections. Basic information pertinent to all natural resources programs at the Naval Training Center (NTC) and outlying installations are included here.

### Land Management

The land management program encompasses soil and water conservation; landscaping, land restoration, agricultural and grazing outleasing, noxious weed and poisonous plant control, ground maintenance and erosion control, including construction

sites and other outleased lands.

All grounds at the Naval Training Center (NTC) and outlying installations are grouped into four categories based on operational needs and intensity of maintenance required. The four categories are:

\* Improved Grounds: Areas on which development and maintenance measures are performed primarily to obtain a pleasing appearance.

\* Semi-Improved Grounds: Areas on which maintenance is performed primarily to provide an erosion resistant cover of vegetation, to control weeds and brush, and to reduce fire hazards.

\* Unimproved Grounds: All other unpaved areas not included in the improved or semi-improved categories and on which no maintenance is performed. This includes both forested and non-forested lands.

\* Other: Includes areas occupied by building, streets, parking areas, sidewalks and other paved areas.

Maintenance on the improved, semi-improved and other categories are performed by either grounds maintenance contracts or by installation personnel.

Landscape plans for new buildings are reviewed to provide optimum appearance and minimum maintenance cost. Renovations around existing buildings also utilize the same techniques.

#### Forest Management

The installation does not control any land areas which are suitable for, or have a potential for, commercial timber production. Since there is no forestry potential, there will be no Forestry Section in the Natural Resources Management Plan.

#### Fish and Wildlife Management

The installations have a wide variety of fish and wildlife species. The woodlands, streams, wetlands, grasslands and even certain buildings provide habitat for these species.

#### Wetlands and Floodplains

The wetlands and floodplains management program attempts to integrate floodplain management and wetlands protection into existing management, consultation, planning, decision making and public participation programs.

## Ecological Reserves and Research Natural Areas

The installation does not control any land areas that have significant and unique natural resources and ecosystems designated as Ecological Reserve Areas (ERA's) and Research Natural Areas.

## Natural, Cultural and Historical

The State of Illinois, as well as private organizations and committees, have been active in identifying sites of historic significance in the region. A portion of main side has received National Historic District Status. Compliance with the National Historic Preservation Act and other related laws requires that all Federal activities obtain surveys by competent professionals to determine if any sites of architectural, historical, cultural, and archaeological significance exist on the federal owned property in question.

## Outdoor Recreation

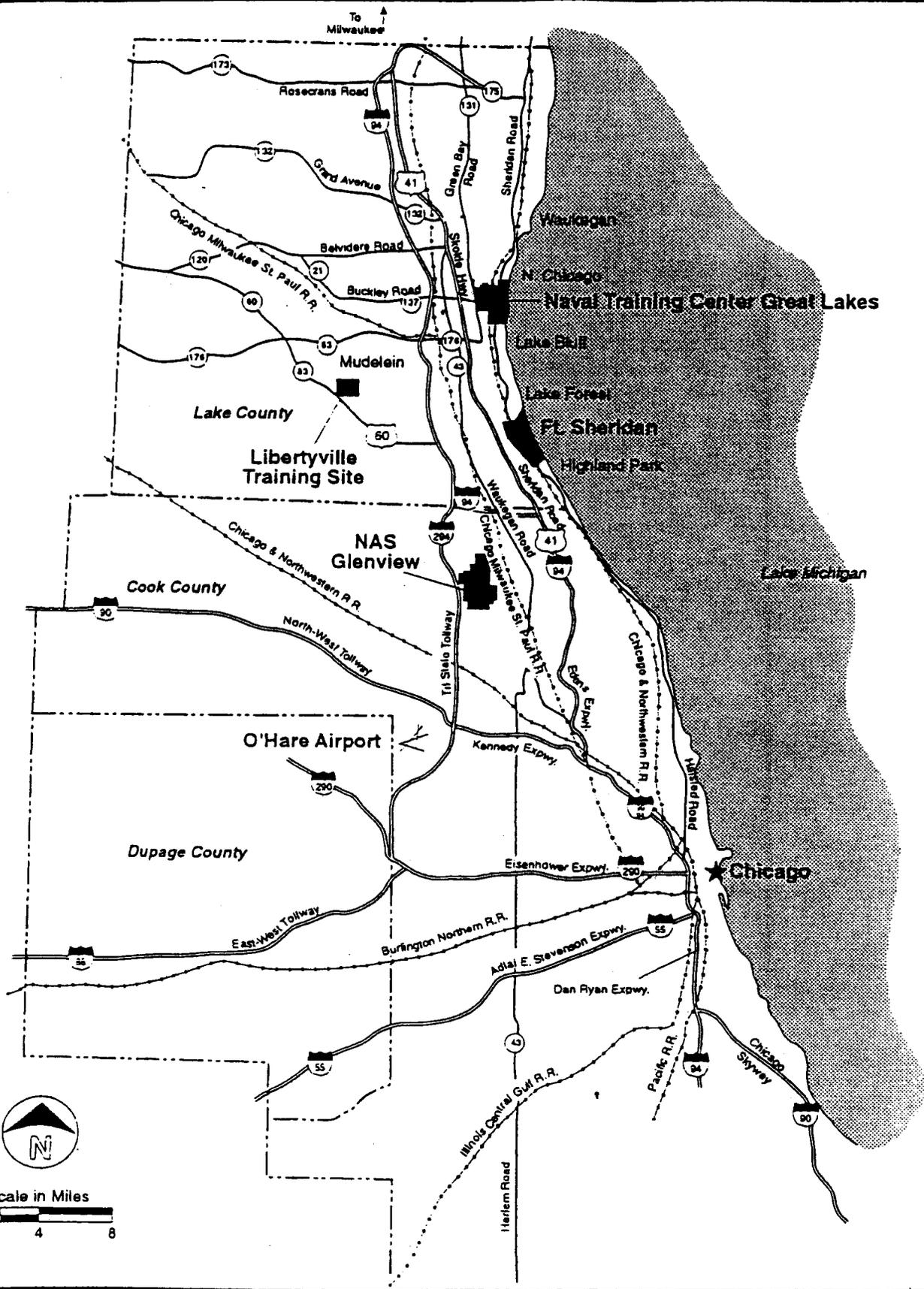
Outdoor recreation is the public or military use of natural resources for recreational purposes. Outdoor recreation includes nature trails, picnic and camping areas, scenic rivers, as well as other uses of natural resources. The installation's major outdoor recreation e.g. boating, swimming at beach areas are maintained by Moral Welfare and Recreation (MWR) and considered highly developed outdoor uses. Therefore, an Outdoor Recreation Section for this Natural Resources Management Plan is "not applicable".

## Cooperative Agreements

A Cooperative Agreement between the U.S. Fish & Wildlife Service, State of Illinois, and the Commander of the Naval Training Center Great Lakes is provided for by Law for the management of fish and wildlife resources. This agreement will be included in the Natural Resources Management Plan. Other beneficial cooperative agreements can be entered into with the U.S.D.A. Natural Resources Conservation Service, U.S. Forest Service, National Park Service and local soil and water conservation districts.

## DURATION OF PLANS

All individual management sections are written for a five year period. All sections are updated at five year intervals, unless required earlier by dramatic changes in land use or mission requirements.



**FIGURE 1.2-1**  
 Location of NTC Great Lakes, Illinois.

**Naval Training Center  
 Great Lakes**  
*Environmental Impact Statement*

SOURCE: WAR 1993.

## 2. GENERAL INFORMATION

### INSTALLATION DESCRIPTION

NTC Great Lakes was dedicated in 1911 and is now the largest Naval Training Center in the United States. Occupying 1,648 acres of land along the western shore of Lake Michigan, NTC Great Lakes is the largest military installation in Illinois. The entire installation comprises 1,153 buildings and 59 miles of road. NTC Great Lakes includes NTC Simplex Departments, 8 component commands and 42 tenant commands. The major component commands include: Recruit Training Command (RTC), Service School Command (SSC), Construction Battalion Unit (CBU) 401, Navy Public Works Center (PWC), Naval Dental Center, Naval Hospital (NAVHOSP), Transient Personnel Unit (TPU) and Navy Brig. The major Class 1 (Land) plant property holders are NTC, PWC, NAVHOSP and the Naval Reserve Readiness Center (NAVRESREDCEN).

Navy Public Works Center (PWC) Great Lakes, recently received 206 acres on Fort Sheridan Army Base. This area is currently being used for base housing.

Navy Public Works Center Great Lakes also received 93 acres from Naval Air Station (NAS) Glenview, which is being used as base housing. The long range Natural Resources Management Plan for NTC Great Lakes will include PWC Great Lakes Base Housing at Fort Sheridan and Great Lakes Housing at NAS Glenview.

### LOCATION OF INSTALLATION

NTC Great Lakes is located within the city limits of North Chicago, Illinois, approximately 35 miles north of downtown Chicago and 65 miles south of Milwaukee, Wisconsin (Figure 1.1). It is located on the western shore of Lake Michigan and is bounded on the north and west by North Chicago, on the south by Lake Bluff, and further west by unincorporated land of Shields Township.

Fort Sheridan is located 10 miles south of NTC Great Lakes and is within the city limits of Highland Park, Illinois (Figure 1.1). It is located on the western shore of Lake Michigan and is bounded on the north by Lake Forest, and on the south by Highland Park.

NAS Glenview is located 18 miles south of NTC Great Lakes which places it in Cook County (Figure 1.1). It is an inland base and is surrounded by unincorporated land of Glenview Village.

### MISSION/HISTORY

Naval Training Center, Great Lakes overall mission is to exercise command over and coordinate the efforts of the assigned

subordinate activities in basic indoctrination (recruit training) for enlisted personnel. Advanced technical training and specialized training is also offered at NTC Great Lakes in the form of "A" and "C" schools. Training is available for Naval Officers and Enlisted Personnel on Active Duty and the Naval Reserves.

The need for an inland naval training station located on one of the Great Lakes was first debated in earnest after the Spanish American War. Since over half of the Navy's recruits came from the Midwest it seemed logical to establish a training station near the principal source of personnel to encourage recruitment. In addition, an inland station provided better national security in time of war. On November 24, 1904 President Theodore Roosevelt authorized the establishment of a Naval Training Station at Lake Bluff.

Fort Sheridan originally housed the administrative headquarters of the Fourth U.S. Army, the U.S. Army Recruiting Command for Region V, and activities of the 74 Army Reserve Center in the seven-state midwest region. Fort Sheridan was officially closed on 28 May 1993 under the Base Realignment and Closure (BRAC) process. Fort Sheridan is approximately 695 acres in size. Although the base was officially closed, the Army has retained two tracts of land, one of approximately 90 acres in the southwest corner of the fort and the other of 14 acres in the northwest corner of the fort. PWC Great Lakes obtained 206 acres which includes 329 family housing units in three areas of the fort for assignment to Great Lakes personnel.

The remaining acres on Fort Sheridan (approximately 385 acres) will be donated to the community. Several community organizations are negotiating for different areas of the base.

NAS Glenview was a Naval air training base. This base is scheduled to close in the summer of 1995. However, PWC Great Lakes will obtain the base housing for NTC personnel. In addition 240 housing units could be constructed at NAS Glenview within the area designated for Great Lakes housing (Great Lakes Annex at Glenview).

### 3. PHYSICAL DESCRIPTION

#### CLIMATE

The following climate description will include NTC Great Lakes, Fort Sheridan, and Great Lakes Annex-NAS Glenview. The climate type is continental, with warm summers and cold winters. Prolonged warm spells and major droughts are infrequent, but long spells of dry weather may occur during the growing season. The

TABLE 2.—TEMPERATURE AND PRECIPITATION  
(Recorded in the period 1951-80 at Chicago, Illinois)

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have—		Average number of growing degree days* Units	Average	2 years in 10 will have—		Average number of days with 0.10 inch or more	Average snowfall
				Max imum temperature higher than— F	Minum temperature lower than— F			Less than— In	More than— In		
January	28.3	12.1	20.2	35.2	10.5	0	1.83	1.03	2.99	4	11.8
February	32.7	16.4	24.6	38.9	14.5	0	1.30	.75	2.28	3	8.4
March	41.9	25.5	33.7	48.8	26.0	8	2.60	1.73	3.90	6	7.9
April	55.7	36.6	46.2	62.5	37.6	76	3.69	2.47	5.30	8	1.5
May	67.4	46.2	56.8	74.6	46.6	255	3.09	1.95	4.16	6	
June	77.1	56.1	66.6	82.4	57.2	506	4.09	2.19	5.92	6	
July	81.4	61.7	71.5	86.5	63.9	674	3.81	2.37	4.99	7	
August	80.1	60.8	70.5	84.9	62.4	641	3.48	1.05	5.50	6	
September	73.3	53.4	63.4	78.8	54.2	411	3.08	1.09	5.70	5	
October	62.3	42.8	52.6	67.4	42.2	162	2.33	1.00	3.59	5	1
November	47.2	30.7	39.0	52.0	31.6	23	2.21	1.26	2.94	5	2.3
December	34.1	19.1	26.6	39.1	17.5	0	2.14	1.26	3.65	5	9.1
Yearly:											
Average	56.8	38.5	47.6	60.8	40.5	2756	33.65	28.02	42.05	66	41.4
Extreme	---	---	---	---	---	---	---	---	---	---	---
Total	---	---	---	---	---	---	---	---	---	---	---

FIGURE 1.2

\* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50 degrees F).

region is characterized by frequent changes in temperature, humidity, cloudiness, and wind direction.

The main variation in the local climate pattern is caused by Lake Michigan. The slow temperature change of such a large body of water exerts a moderating influence on near-shore areas, but its effects, which rarely extend more than a few miles inland, are too infrequent to be considered a real climate factor.

Precipitation averages slightly less than 32 inches per year. Over half of this precipitation falls during the 155 day growing season from May through September. Thunderstorms are frequent from May to early July, and are occasionally accompanied by winds and hail. Average snowfall is 40 inches per year, most of which falls in the period from December to March (Figure 1.2).

The prevailing wind direction has a westerly component in all months except May, when the prevailing wind shifts to north-northeasterly.

#### GEOLOGY

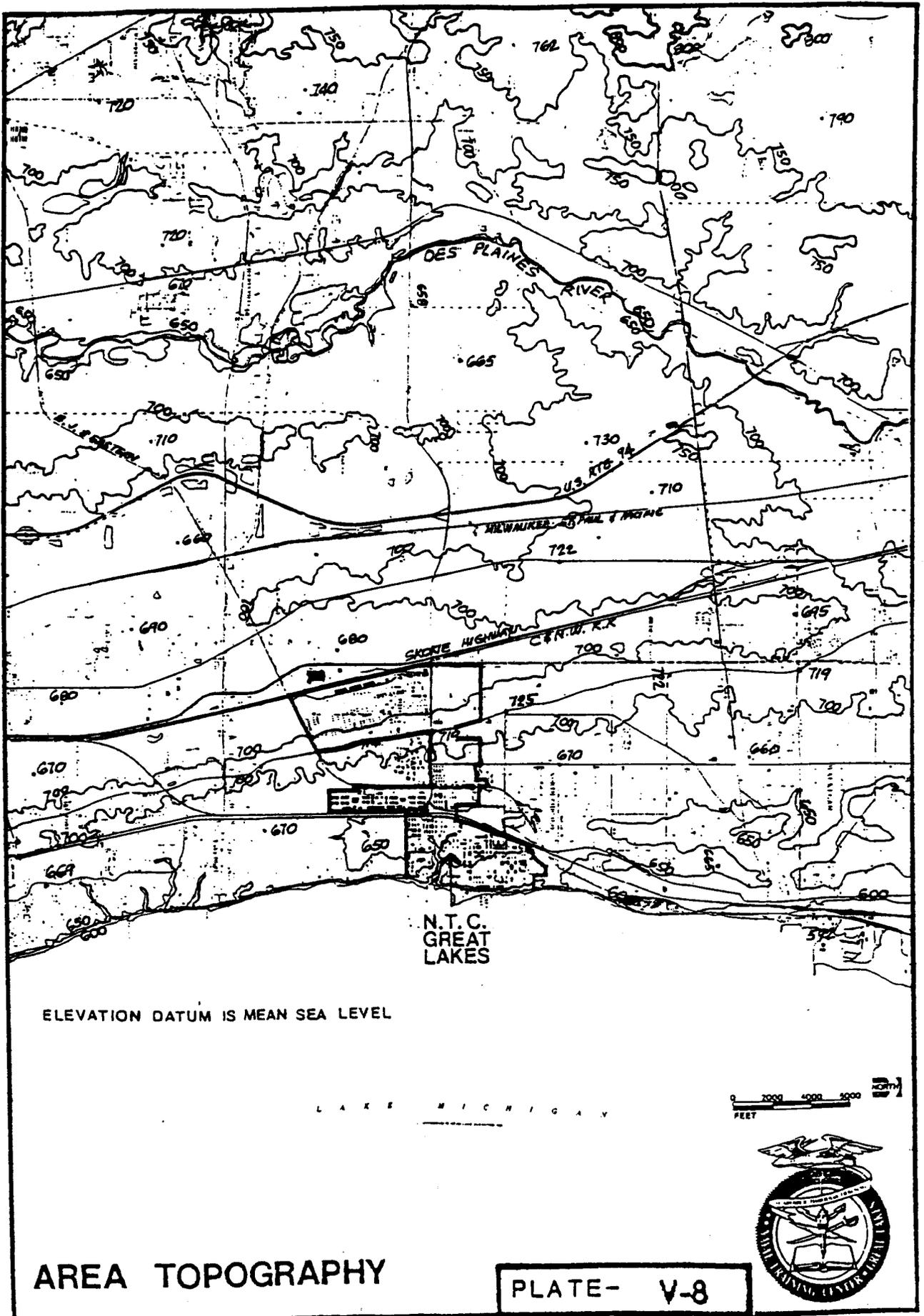
The following description will include NTC Great Lakes, Fort Sheridan and Great Lakes Annex-NAS Glenview. Lake County is located in the Wheaton Morainal Complex of the Great Lakes Section of the Central Lowland Province. NTC Great Lakes is within the Bluff-Ravine Complex, characterized by level table lands bordered by steep bluffs facing the shore of Lake Michigan and a network of interior ravines.

The surface geology of Lake County is dominated by deposits that were laid down by glacial ice, water, and winds during several periods of glaciation over the past 600,000 years. This area is characterized by deposits of silt, clay, and sand of the Equality Formation. Underlying the lake deposits are the various members of the Lake Border Morainic System, which consists of gray clayey and silty clay till with a small portion of pebbles, cobbles, and boulders.

#### TOPOGRAPHY

The eastern boundary of the Naval Training Center is a sand beach on the western shore of Lake Michigan at an elevation of 580 feet above sea level. Moving westward the beach is backed by a steep bluff rising seventy feet above the beach. In southern Lake County the transition is also abrupt, with bluffs twenty to seventy-five feet in height.

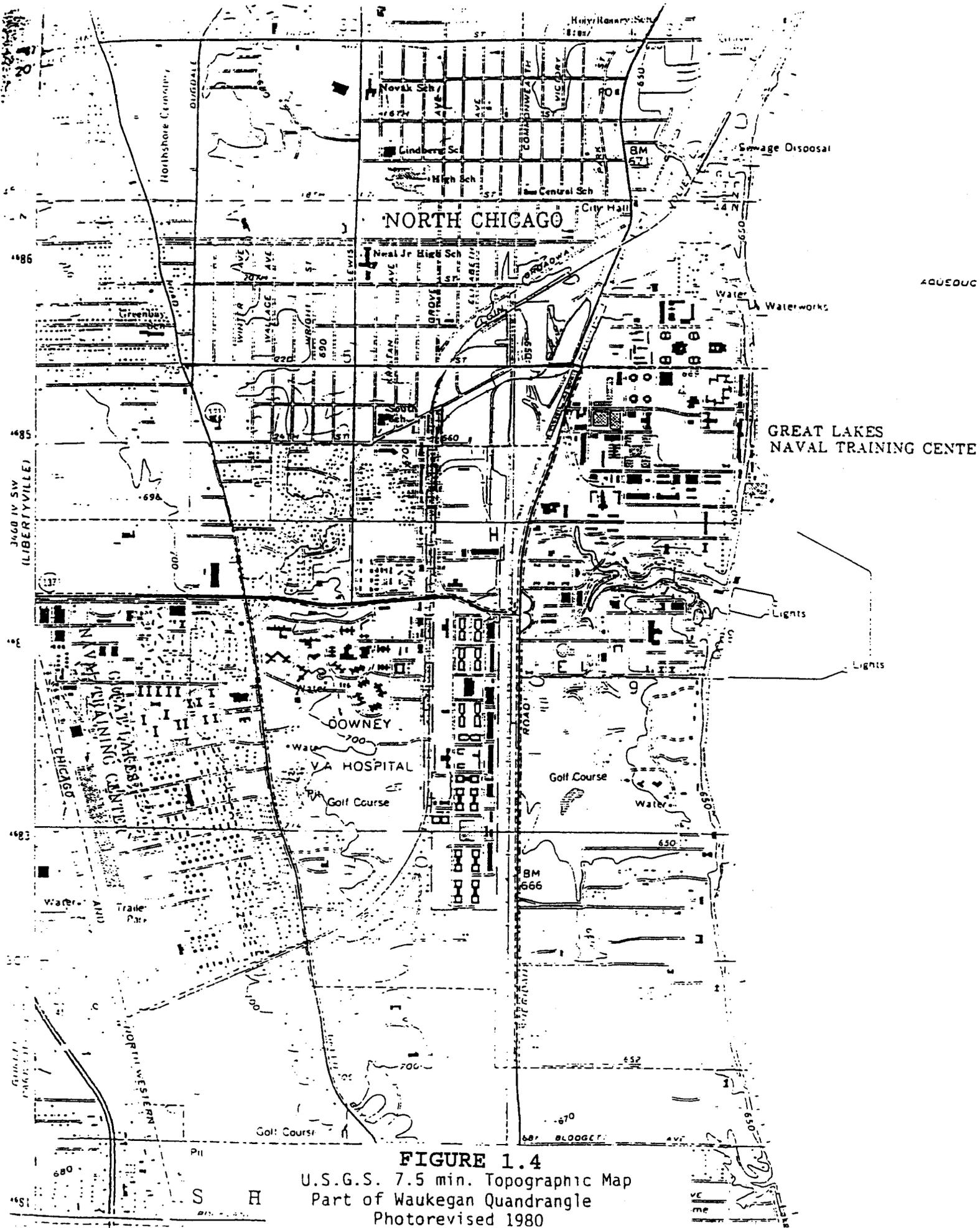
The plateau atop the bluff, at an elevation of approximately 650 feet above sea level, is divided by a branching ravine system, with Pettibone Creek and its tributaries at the bottom.



Section V.

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FIGURE 1.3



**FIGURE 1.4**  
 U.S.G.S. 7.5 min. Topographic Map  
 Part of Waukegan Quadrangle  
 Photorevised 1980

...CED AT GOVERNMENT EXPENSE

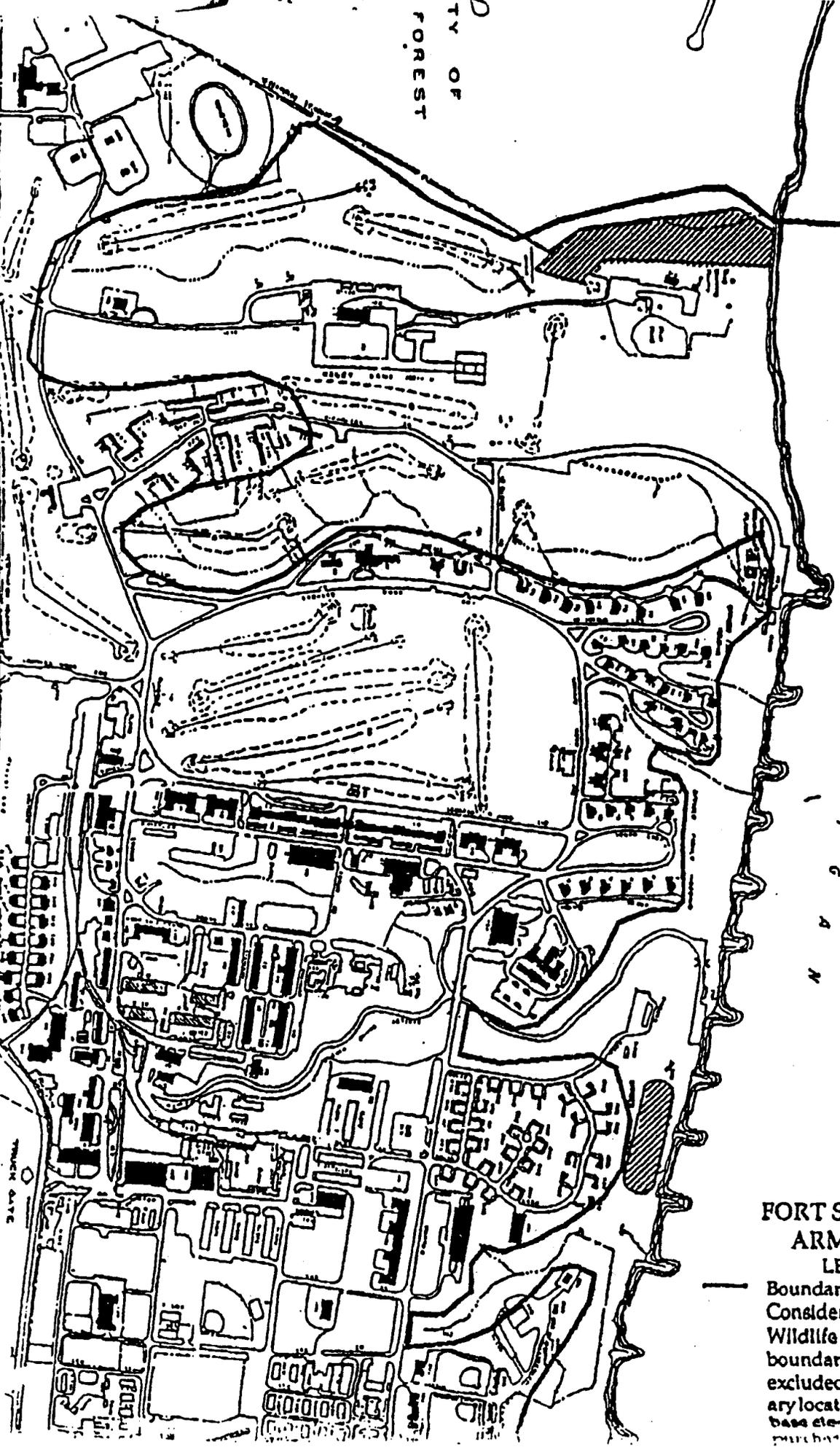
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NORTH GATE

BIRD GATE

TOWN



**FORT SHERIDAN  
ARMY BASE  
LEGEND**

— Boundary Around Habitat Considered of Value for Wildlife (line is not exact boundary; all buildings are excluded, and exact boundary location will depend on base closure plan and final purchase)

Continuing toward the west, the land is relatively flat ranging in elevation from 650 to 700 feet above sea level, with slopes in the one to one-and-one half percent (1% - 1.5%) range (Figure 1.3). The elevation generally rises as one moves toward the west until reaching the major drainage divide, approximately four miles inland, at an elevation of 710 feet above sea level. This divide separates the Lake Michigan Drainage Basin from the Des Plaines River water, one of many systems within the Mississippi River Drainage Basin.

Figure (1.4), a portion of the Waukegan, IL USGS 7.5 minute quadrangle (photo revised 1980), shows the topography of the Naval Training Center and surrounding areas.

#### ECOLOGICAL RESERVES AND RESEARCH NATURAL AREAS

The U.S. Fish and Wildlife Service, and Division of Refuges and Wildlife have found two areas on Fort Sheridan which have ecological potential. These agencies expressed interest in the possibility of establishing a wildlife habitat or endangered species recovery site. One of the sites located in the southern section of the base, in the ravine and bluff area, approximately 200 yards south of the landfill, is on Navy property (Figure 1.5).

#### NATURAL, CULTURAL, AND HISTORICAL

The Navy applied for and received National Historic District Status for a portion of NTC Mainside in 1986. The National Historic District includes properties that were a part of the original Naval Training Station or are in character with or enhance the original station. The district encompasses 193.2 acres and is located along the shore of Lake Michigan. The area includes 121 buildings, structures or sites, of which 45 are of major significance to the district and 15 are of minor significance. NTC Great Lakes is in the process of conducting a Historical and Archaeological Resources Protection (HARP) survey that will provide detailed descriptions of the structures.

The 22 acre housing site on the southern end of Fort Sheridan, may contain historical buildings. The northern portion of this site contains part of a group of wooden World War II barracks. A survey conducted by the Illinois Historic Preservation Agency (IHPA) in October 1993 indicated that this group of buildings may be eligible to be listed as historically significant (Callahan 1993).

#### WETLANDS/FLOODPLAINS

In general terms, wetlands are lands where saturation with water is the dominant factor determining the nature of soil development and the types of plant and animal communities living in the soil

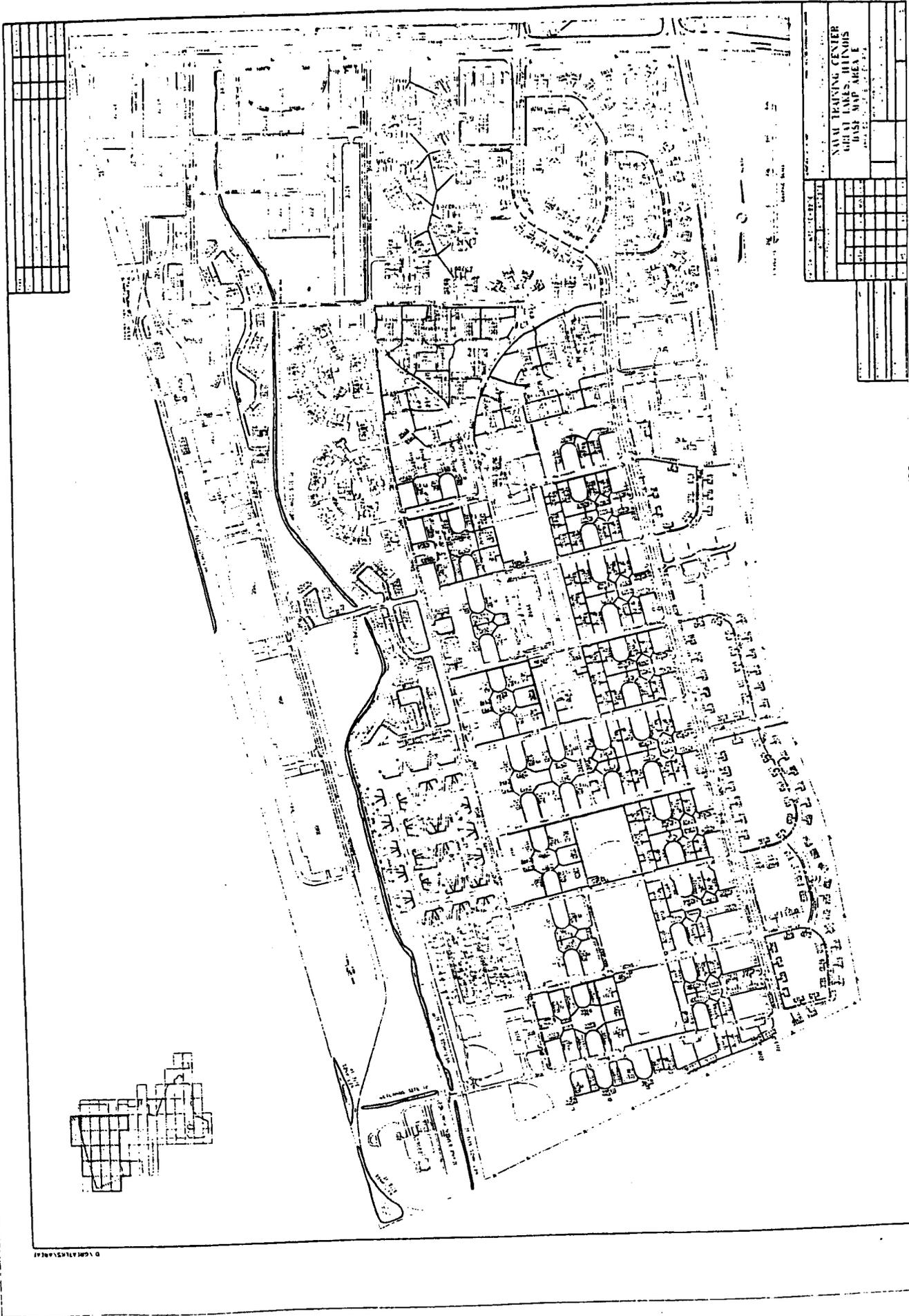


FIGURE 1 6





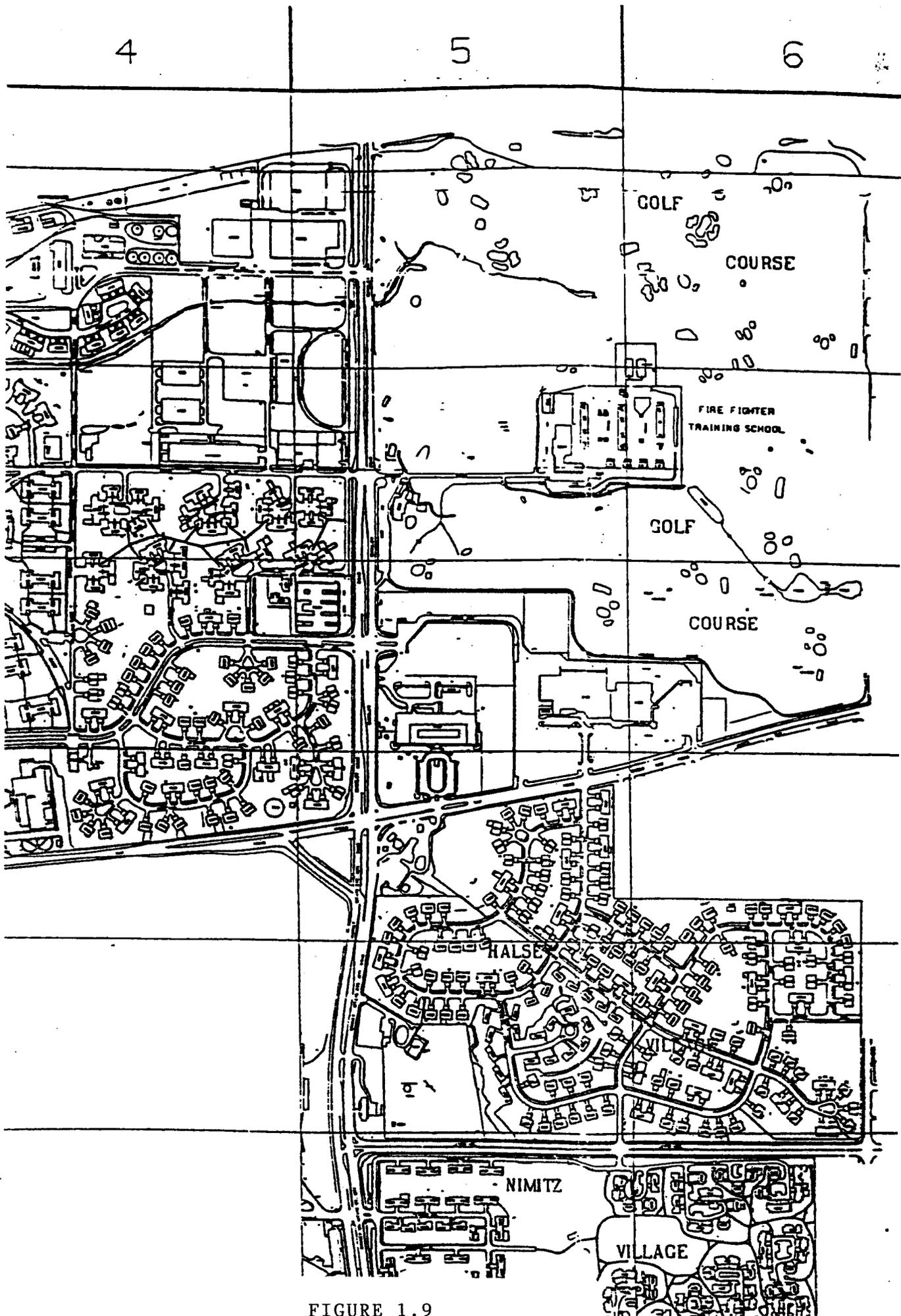
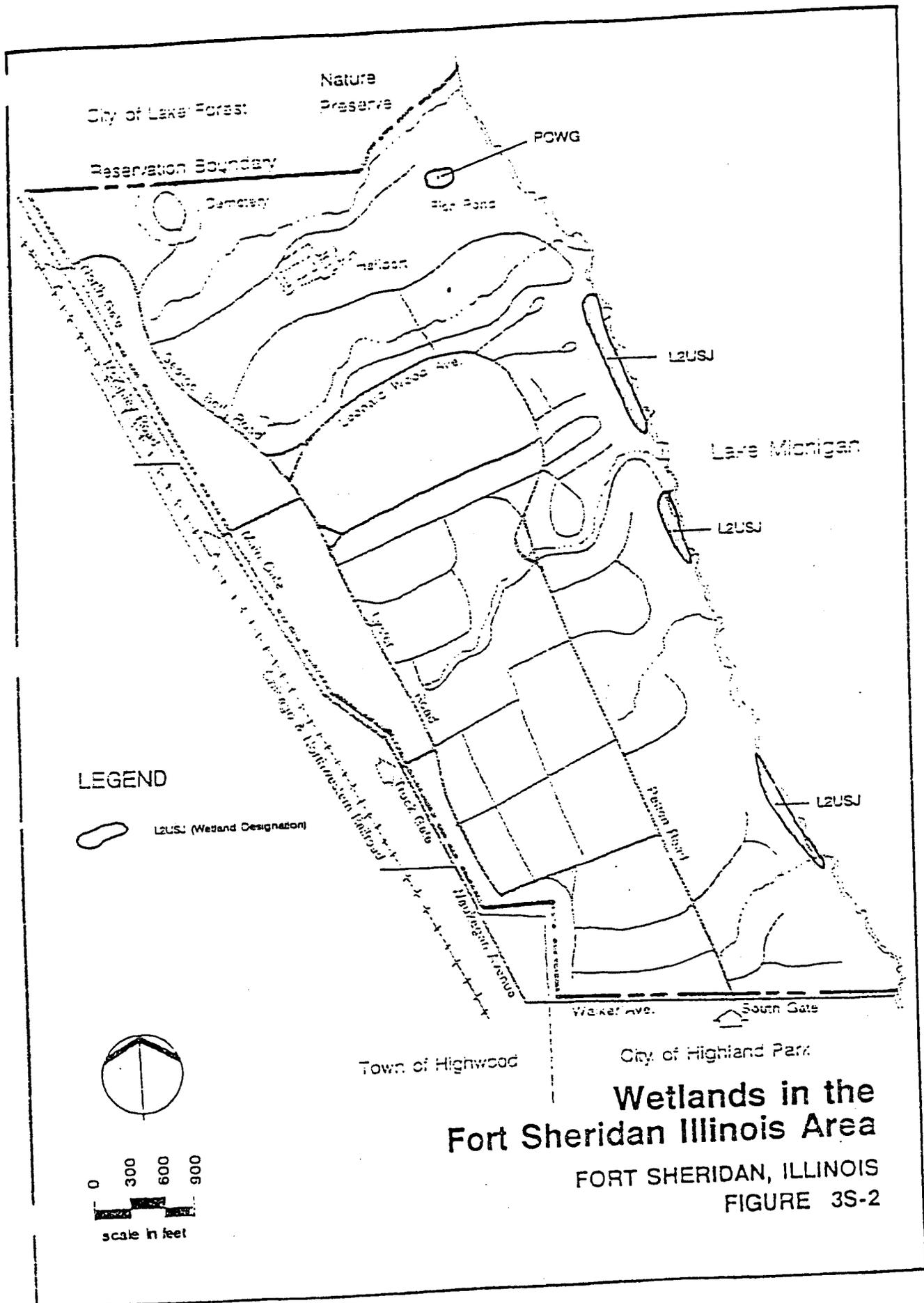


FIGURE 1.9



Source: U.S. Department of the Interior, 1981

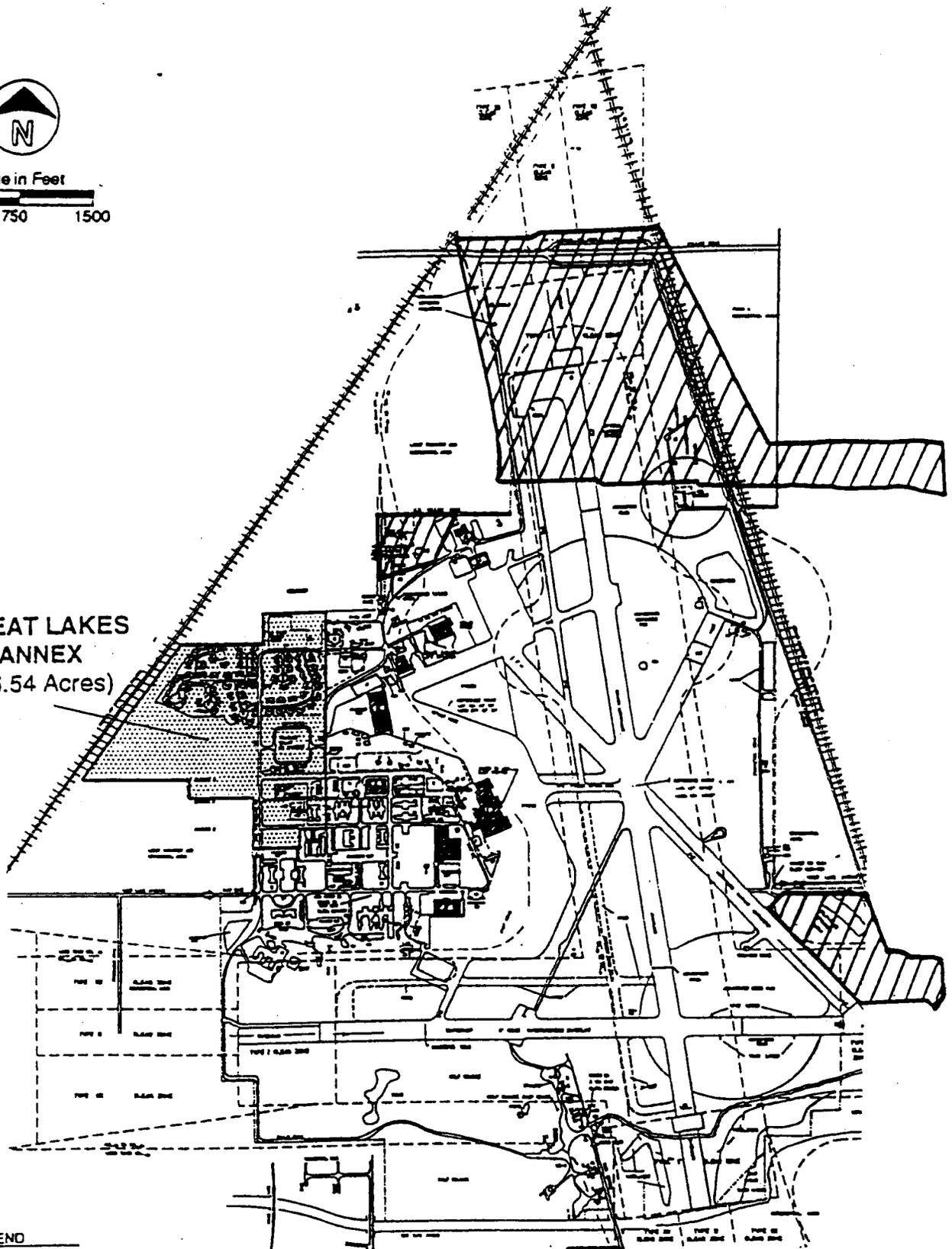
FIGURE 2.0





Scale in Feet  
0 750 1500

GREAT LAKES  
ANNEX  
(86.54 Acres)



LEGEND

 Flood Prone Areas

FIGURE 3.1.3-1.  
Flood-Prone Areas - NAS Glenview.

Naval Training Center  
Great Lakes  
Environmental Impact Statement

SOURCE: Department of the Navy 1993; NEESA 1988.

and on its surface. The recommended policy for wetlands is to maintain the basic natural function of these areas as natural ecological units, natural retention areas, and surface water storage.

Wetlands have been delineated on NTC Great Lakes (Figures 1.6-1.9), and Fort Sheridan (Figure 2.0). Great Lakes Annex-NAS Glenview has no potential or ecological value concerning wetlands.

Floodplains for the 100-year flood, as shown on the Federal Emergency Management Agency (FEMA) flood insurance rate map, do not intersect boundaries of the NTC Great Lakes Mainside. Historically, some flooding has occurred along Pettibone Creek and Skokie River, in isolated upland depressional areas, and, during major storm events, in the streets and building areas within the developed areas of the base (SOUTHNAVFACENGCOM 1993a). Flooding from high water levels in Lake Michigan should not affect NTC Great Lakes, or Fort Sheridan Housing, since they lie at elevations in excess of 70 feet above normal lake levels. Facilities along the shore below the bluff would be vulnerable to storm surge and wave run-up during severe storms (Figure 2.1).

Flood prone areas at NAS Glenview occur in the northern and southeastern portions of the base. Great Lakes Annex-NAS Glenview is located on the western side of the property and is not prone to any flooding problems (Figure 2.2).

#### HYDROLOGY

The following hydrogeologic description will include all three bases in the management plan. Five major, water-bearing hydrogeologic units are in the vicinity of NTC Great Lakes. The two uppermost units, the sand and gravel of the glacial drift and the Silurian dolomite, form a shallow aquifer system. Water is recharged to this system by local rainfall. The shallow aquifer system is thin or absent in some areas, and water quality is often poor because of the presence of naturally occurring gas, oil, and hydrogen sulfide. Where these two units are separated by a confining layer, the silurian dolomite aquifer contains water in the fractures and solution cavities of the upper one-third of the deposit (NORTHNAVFACENGCOM 1988a).

The remaining three aquifers occur in deep sandstone bedrock deposits separated by up to several hundred feet of confining layers consisting of dolomites and/or shales. In descending order, they are the Glenwood St. Peter Sandstone, the Ironton-Galesville Sandstone, and the Mt. Simon Sandstone. These aquifers are present throughout Lake County and typically have high yields of good quality water. The Ironton-Galesville Sandstone usually is the most dependable source. The Mt. Simon Sandstone becomes too saline for portable use beyond 200 feet

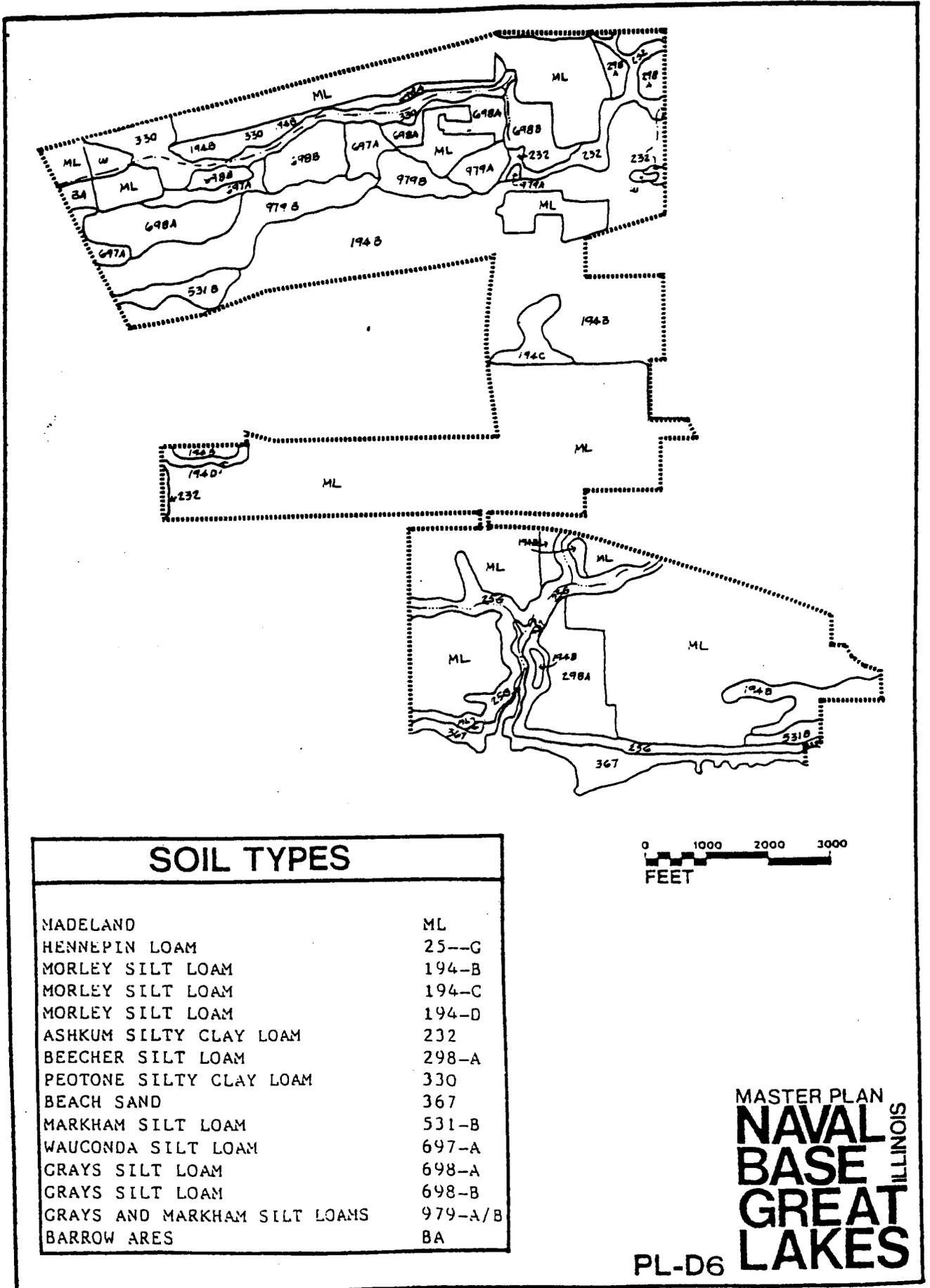


FIGURE 2.3

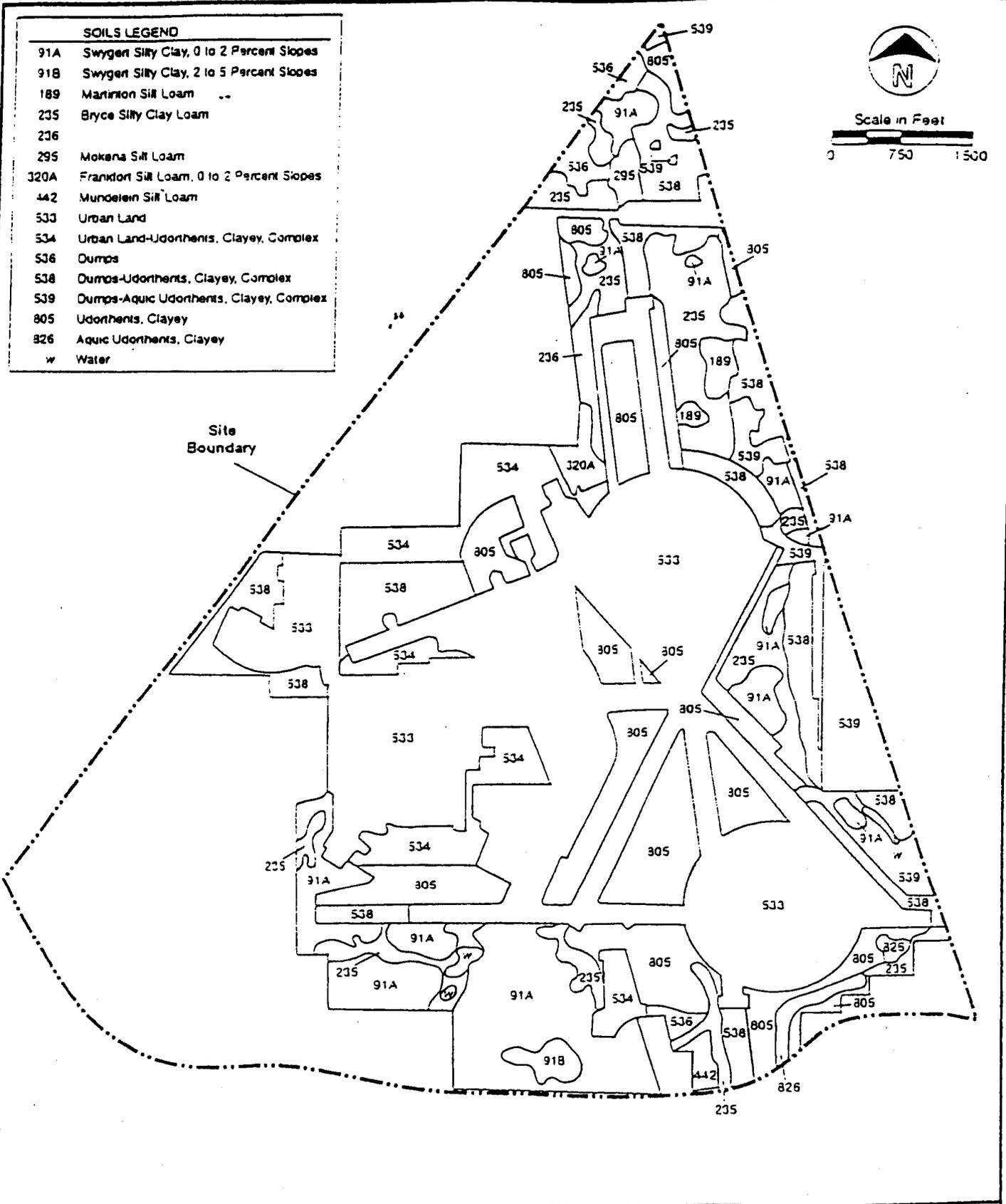


FIGURE 3.1.1-2.  
Soil Types Present - NAS Glenview.

Naval Training Center  
Great Lakes  
*Environmental Impact Statement*

SOURCE: NORTHNAVFACENGCOM :988b.

into the formation, and because of its depth (approximately 2,000 feet below ground surface), it is not commonly used as a source of groundwater (NORTHVAVFACENGC0M 1988a).

## SOILS

Soils at NTC Great Lakes primarily consist of the Made Land Soils map unit. This unit consists of areas of man-made cuts and fills and areas almost entirely covered with roads and buildings. Cuts are of various depths, and fills consist of various materials (Figure 2.3).

Other dominant soils at NTC Great Lakes, east of Sheridan Road, include hennepen loam (30 to 60 percent slopes), Beecher silt loam (0 to 2 percent and 2 to 4 percent slopes), and beach sand. The hennepen loam occurs on the bluffs along Lake Michigan and the steep ravines along Pettibone Creek and its tributaries. This soil is too steep for most uses other than forestry, recreation, and wildlife habitat. The Beecher silt loam is a level to gently sloping somewhat poorly drained soil with an underlying clayey subsoil that limits water movement and maintains a seasonal high water table. This soil is farmed intensively where it occurs in agricultural areas. Beach sand consists of sand and water-rounded stones occurring as a strip along the entire shoreline of Lake Michigan. It is not stable enough to support significant vegetation, and it is suited only for recreational uses.

The most prevalent soils other than Made Land at NTC Great Lakes, west of Sheridan Road, are morley silt loams, grays silt loams, and grays and markham silt loams. The morley silt loam is well drained to moderately well drained, but it allows only moderately slow movement of water through the soil. Grays silt loams and grays and markham silt loams are well drained to moderately well drained (SOUTHNAVFACENGC0M 1993a).

Less common soils at NTC Great Lakes include Borrow Area; Wauconda and Frankfort silt loam, Wauconda silt loam, and Markham silt loam; and Peotone and Ashkum silty clay loams. These soils are represented by at least several acres each. The Markham silt loam is moderately well drained, but allows only moderately slow movement of water through the soil. The Wauconda silt loams and Wauconda and Frankfort silt loams are somewhat poorly drained soils found on outwash plains. Peotone and Ashkum silty clay loams are hydric soils that occupy low-lying areas or drainage ways and represent a serious limitation to urban development because of low position, high water table, and possible ponding.

Soils at NAS Glenview consists of 14 separate soils map units (Figure 2.4). The majority of these soils are poorly drained silty and/or clayey loams, some with underlying clay or till. These soils typically represent lake bed deposits overlying

glacial deposits, but they have been altered by grading and filling to suit development at the site (NORTHNAVFACENGCOM 1989).

The soil types which fall into Great Lakes Annex at Glenview have been greatly altered by man and contain more than 50 percent man-made materials. Included in this group are the following: Urban land; Urban land-Udorthents, clayey and complex; Dumps; Dump-Udorthents, clayey and complex; and Dumps-Aquic Udorthents, clayey and complex.

Soils at Fort Sheridan are very similar to those found at NTC Great Lakes, refer to first two paragraphs for description.

#### Grounds Management

Most soils on the installation will require some basic management practices to maintain suitable grass to provide a pleasant, low maintenance cover, complimented by compatible landscape material. Soil samples can be used to determine the needed fertilizer formulas, and application rates, to maintain a healthy grass cover. Soils information will also play an important part in recommending and designing erosion control corrective actions. Soils information is also important when selecting inland materials for landscaping projects.

#### Wildlife Habitat

Soils directly affect the kind and amount of vegetation available to wildlife as food and cover. Construction of water impoundments also rely heavily on soils information. Therefore, the kind and abundance of wildlife that populate an area depend largely on the amount and distribution of food, cover and water. If soils have the potential, wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by helping natural establishment of desirable plants.

#### 4. IMPLEMENTATION

In accordance with OPNAVINST 5090.1B, Naval Training Center, Great Lakes is responsible for funding, preparation, task delegation, implementation and monitoring of all portions of the natural resources plan.

The Commander, Naval Training Center (CNTC), Great Lakes is responsible for management of all natural resources. Technical assistance is available from natural resources managers at SOUTHNAVFACENGCOM (Code 063) in developing and maintaining an effective conservation program to protect, conserve, manage and utilize the natural and historical resources. Periodic technical reviews of the individual programs will be conducted by

SOUTHNAVFACENGCOM (Code 063) and written findings and recommendations provided to assist the installation in its implementation efforts.

#### NATURAL RESOURCES ORGANIZATION STRUCTURE

The chain of command in the Natural Resources Program is as follows:

The Commander, Naval Training Center (CNTC), Great Lakes has delegated implementation of natural resources management activities to the NTC Staff Civil Engineer. The NTC Natural Resources Manager is assigned from the NTC Staff Civil Engineer's office. NTC Component and Tenant commands are responsible for natural resources management for areas under their cognizance. PWC Environmental Program Manager is the Natural Resources Manager in charge of Great Lakes Housing at NAS Glenview and Great Lakes Housing at Fort Sheridan.

The Natural Resources Managers should seek training in Natural Resources by attending seminars, conferences, and other means of professional training. The Natural Resources Managers are responsible for training subordinate commands such as Security, and MWR.

The NTC Staff Civil Engineer and Natural Resources Manager will quarterly brief the Commander regarding natural resources program issues and program progress as required by 32 CFR 190.

#### TECHNICAL ASSISTANCE

Other than SOUTHNAVFACENGCOM (Code 063), technical assistance is available from a variety of state and federal agencies, colleges, universities, conservation organizations, private industries and professional organizations. The assistance provided is varied, depending on specific needs of the individual management plan programs.

#### 5. FUNDING

The Commander, Naval Training Center (CNTC) and Commanding Officer, Navy Public Works Center (PWC) will make provisions for the Operation and Maintenance, Navy (O&MN) programming and budgeting to effectively support natural resources programs.

#### 6. REFERENCES

- a. Public Law 86-797, Sikes Act as amended (16 USC 670a -o)

- b. DOD Directive 4700.4, Natural Resources Management Program
- c. SECNAVINST 6240.6E, Department of the Navy Environmental and Natural Resources Management Program
- d. OPNAVINST 5090.1B, Environmental and Natural Resources Protection Manual
- e. NAVFAC MO-100.1 Natural Resources Land Management
- f. NAVFAC P-73 VOL II, Real Estate Operations and Natural Resources Management Procedural Manual
- g. Executive Order 11990, Protection of Wetlands
- h. Executive Order 11988, Floodplains Management
- i. Environmental Impact Statement for the Realignment of NTC Great Lakes, Illinois
- j. Naval Training Center Great Lakes, IL Master Plan
- k. Soil Survey of Lake County (USDA Soil Conservation Service)
- l. 32 CFR 190, Natural Resources Management Program

# **LONG RANGE LAND MANAGEMENT PLAN**

## SUMMARY OF SECTION

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This section provides a management plan which contains the information by which the Staff Civil Engineer can carry out an effective and economical erosion control and grounds maintenance program in accordance with the requirements of OPNAVINST 5090.1B Chapter 22 of November 1994. This section also contains important information pertaining to the vegetation found on base.

Suggestions from other commands have indicated that effective implementation can only be obtained if one or more individuals in the Naval Training Center (NTC) Staff Civil Engineer's Office are assigned the specific responsibility of carrying out the contents of this Section. Cooperation between the Natural Resources Managers and the Navy Public Works Center (PWC) Quality Assurance Evaluator for grounds maintenance is essential.

LAND MANAGEMENT SECTION

NAVAL TRAINING CENTER

GREAT LAKES, ILLINOIS

GREAT LAKES HOUSING AT NAVAL AIR STATION (NAS) GLENVIEW, AND  
GREAT LAKES HOUSING AT FORT SHERIDAN

1995

LAND MANAGEMENT SECTION  
NATURAL RESOURCES MANAGEMENT PLAN FOR  
NAVAL TRAINING CENTER (NTC), GREAT LAKES,  
GREAT LAKES HOUSING AT NAVAL AIR STATION (NAS) GLENVIEW, AND  
GREAT LAKES HOUSING AT FORT SHERIDAN

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## 1. INTRODUCTION

### PURPOSE

The purpose of the Land Management Section is to provide technical guidance and information for personnel engaged in land management and grounds maintenance on Department of Defense installations. Personnel following the principles and practices described in this Plan will supplement ongoing management efforts, conserve the natural resources on Department of Defense lands, maintain and improve the appearance of grounds and promote operational safety and efficiency.

This Land Management Section for 1,939 acres managed by Naval Training Center, Great Lakes, Illinois, establishes a long term program for balanced management and beneficial use of natural resources in accordance with their capability, potential and land use requirements. This plan provides:

- \* Methods for providing an acceptable level of appearance at minimum expense.
- \* Methods of attaining minimum maintenance cost while protecting investment in grounds improvements.
- \* Corrective action on erosion, drainage, sedimentation and nonpoint source pollution problems.
- \* Inventory of present and future areas requiring maintenance.
- \* Treatment necessary for plant disease and insect problems in order to maintain good vegetation growth.

This section shall be progressively applied by the installations. Navy instructions which pertain to grounds maintenance, land use, and the development of natural resources are listed in the Appendix. Technical assistance is available from Southern Division (Code 063), Naval Facilities Engineering Command, Charleston, South Carolina.

### PERTINENT PROBLEMS AND PROJECTS

One of the most significant problems at the Base is maintaining an acceptable level of grounds maintenance. An acceptable level of fertilization must be reached and the use of proper shrub pruning techniques should be utilized. Protection of trees from weedeater damage must be considered. The overall appearance of the installations can be improved by additional landscaping around certain buildings. With the increased construction projects on base, it is important to take corrective measures to control sediment runoff and erosion of exposed soils. A

description of the special problems and recommended solutions are addressed in Part 3., Special Problems and Projects of this section.

#### LAND CLASSIFICATION CRITERIA

All installation grounds are grouped in four categories based on operational needs and the intensity of maintenance required. The four categories are described in more detail in the Basic Section. For greater detail on maintenance requirements of each category, see the Installation's Grounds Maintenance Plan of Operation held by the Navy Public Works Center (PWC) in Building 1A at NTC Great Lakes.

The following table is a breakdown of the different categories by acreage:

LOCATION	AREAS IN ACRES				TOTAL ACRES
	I	SI	U	O	
NTC Great Lakes	467	51	489	641	1,648
NTC Great Lakes Annex-NAS Glenview	25	9	32	19	85
Great Lakes Housing on Fort Sheridan	51	21	62	72	206
TOTAL	543	81	583	732	1,939

#### NOTE

I = Improved                      U = Unimproved  
 SI = Semi-Improved              O = Other

## 2. LAND AND GROUND MAINTENANCE

### LAND USE

#### Agricultural Outleasing

The installation currently does not control any land areas which are suitable for, or have potential for agricultural use.

## Forest Management

The installation currently does not control any land areas which are suitable for, or have potential for forest management.

## Fish and Wildlife Management

The installation has a wide variety of fish and wildlife species, both consumptive and non-consumptive. These species will be discussed in detail in the Fish & Wildlife Section of this plan.

## Outdoor Recreation Management

The installation has an active recreation program coordinated through the NTC Moral, Welfare and Recreation Department to provide on station recreation to military personnel and family members. Facilities include golf course, ball parks, playgrounds, archery range, boating areas, and picnic areas.

## GROUND MAINTENANCE PLAN OF OPERATIONS

Good advanced planning is the key to an economical grounds maintenance program. An Annual Grounds Maintenance Plan of Operations is a requirement if scheduling, budgeting and implementing an economical program is to be accomplished. A plan will be prepared and updated to identify all of the maintenance work to be done during the year. Its contents should follow the guidelines of SOUTHNAVFACENGCOM Instruction 11015.8C.

An annual inspection of all installation lands should be made and the Grounds Maintenance Plan of Operations updated to reflect changes in conditions and land use requirements. Preparation, revision and implementation of the annual plan shall be the responsibility of the NTC Staff Civil Engineer's Environmental Office, and coordinated with the Facilities Managers of the other major landholders which include PWC, NAVHOSP, and NAVRESREDCEN. Technical assistance can be provided by Southern Division, Naval Facilities Engineering Command (Code 063).

## REDUCTION OF GROUNDS MAINTENANCE EXPENDITURES

It is paramount that grounds maintenance personnel be on constant alert to seek out and develop ways and methods of reducing grounds maintenance expenses. The following are some of the best ways to reduce expense:

- \* Conduct an annual review of installation lands.
- \* Promote a vigorous Self-Help program to ensure a clean and pleasant environment. Because of the effort required for grounds maintenance and cleanup, each division or department having custody of a building or area can be assigned

responsibility for daily cleanup, grounds maintenance in their area, minor erosion problems and landscape maintenance.

\* Develop instruction to implement OPNAVINST 11000.8H for the Self-Help Program.

\* Implement the following standards relative to maintenance of grounds:

- Grass areas should be kept mowed, trimmed and have debris removed (paper, cans, etc.). Grass around signs, poles, fences and buildings should be trimmed regularly. Caution in use of string trimmers will be exercised to avoid girdling trees or shrubs.

- Sidewalks, driveways, and all concrete and asphalt areas should be swept and kept clean of excess dirt, gravel and debris.

- Reduce the number of mowings on I and SI areas. Although this section provides for some reduction of mowing, further reduction can be achieved and still provide adequate appearance. Grass mowing should be scheduled on the basis of height; never by arbitrarily specified time intervals.

\* Conduct preventive maintenance. Grounds maintenance problems become worse if not corrected and require greater expense to remedy. Therefore, it is critical to maintain and repair areas before this occurs. This includes proper fertilization of critical areas subject to erosion such as steep slopes, road banks, drainage ditches, and worn areas subject to foot or vehicle traffic.

\* Use mowing equipment best suited to grass, terrain and other conditions. Hand mowing of any areas should be avoided because there are usually better, less expensive ways to do the job. All equipment should be properly matched (tractor with adequate horsepower to pull mower). Unmatched equipment costs more to maintain and will do the job less effectively.

\* Control weeds with herbicides. In most cases, the practice of controlling weeds by hand cutting is obsolete.

#### POLLUTION CONTROL PROGRAM

There is no water pollution problem.

Sediment control will be accomplished by timely correction of erosion problems. If sediment is carried into drainage systems, it is considered nonpoint source pollution and violates the Clean Water Act. All bare areas should be grassed to establish ground cover.

## GROUNDS MAINTENANCE

Grounds maintenance contracts are being used to accomplish most of the grounds maintenance work on the installation. Guidance provided in this section should be incorporated into contract specifications and adherence to this section's guidance monitored by contract inspections.

### BASIC MAINTENANCE CRITERIA

The following basic criteria has been established as the best and most economical and should be reflected in the installation Grounds Maintenance Plan of Operation. This criteria will be used as a guide in preparing any ground maintenance contract and this section listed as a reference for the contractor.

#### Mowing

Present cover in the improved (I) areas is Red Fescue, Kentucky Bluegrass, and Winter Rye. Cutting too low to the ground results in deterioration of many lawns. Mowing too close encourages thinning of turf and shallow rooting. This results in lower resistance to drought, disease, and invasion by weeds.

#### Improved (I) Areas

##### Lawns

When grass reaches 4 inches, mow grass using "flail" or "rotary" type mower to a height of 2 inches. Average mowing frequency is once every 8 days during the summer; and 14 - 21 days during the spring and fall, respectively. Mow only when actually needed.

#### Semi-improved (SI) Areas

##### Road Shoulders and Ditch Slopes

Maintain road shoulders in administrative and housing areas under approximately the same criteria as the adjacent areas. When grass in other road shoulders reaches 10 - 12 inches, mow to a 4 inch height. Do not mow vegetation on back slopes above the normal flow line of water in road ditches. On ditch banks too steep to mow, selective herbicides approved for aquatic vegetation can be used, but only if enough vegetation will remain to control erosion. To minimize cost selected areas may be converted from semi-improved to unimproved.

##### Drainage Canals, Ditches and Swales

Mow once annually (July) or spray with herbicides to control brush and reduce fire hazards. Use selective herbicides approved for aquatic purposes that will not damage grass.

## Fertilizer Application

The best method to determine fertilizer needs of grass cover is to take representative soil samples from the areas to be fertilized. Once a representative sample has been collected, it will be sent to a soil testing laboratory to determine the nutrients needed. Some Universities may do soil sampling. The test will also indicate the amount of each nutrient needed to provide optimum requirements. Soils samples will be collected by installation personnel who have been instructed in the correct sampling procedure.

### Improved (I) Areas

#### Lawns

Fertilizer is required to provide adequate sod density for erosion control and to reduce weed encroachment for appearance.

Weeds in lawns are generally an indication of low fertility. If soil tests are not taken, apply 16-4-8 (or equivalent) fertilizer per acre in March and June. Spread evenly on ground surface without preparation. Do not apply fertilizer when ground is wet. Apply extra fertilizer where pedestrian or vehicular traffic has damaged grass. Protect until vegetation is re-established.

#### Trees

Mature trees will normally obtain adequate fertilizer from lawn application. Small, young trees having reached full size should receive some fertilizer spread evenly beneath the dripline.

#### Shrubs

To small growing shrubs (2' - 4') apply 1/2 cup each of 13-13-13. To large shrubs apply one cup each. Apply just after flowering for spring flower varieties and just prior to spring growth for others. Application may be repeated at one to two month intervals through August if shrubs have not reached the desired size.

### Semi-Improved (SI) Areas

#### Road Shoulders

Some areas may require fertilization in the early spring.

#### Areas Mowed Just to Control Weeds

No Fertilizer.

## Unimproved (U) Areas

These areas require no fertilizer.

## Weed Control

In accordance with DOD, OPNAV and NAVFACENGCOM Directives, pest control chemicals shall be dispensed and other pest control operations shall be performed only by or under direct supervision of trained and certified personnel. Herbicides must be applied correctly so that adjacent vegetation is not adversely affected and which could result in erosion problems or loss of landscape plantings. Specific recommendations are available from SOUTHNAVFACENGCOM, Code 063 or Code 16A.

## Improved (I) Areas

Weeds are not likely to be a problem if the grass is well fertilized and not closely mowed. Weeds which persist should be identified and treated with herbicides.

## Semi-Improved (SI) Areas

On critical areas, subject to erosion, apply same procedure as for lawns. On all areas where weeds or brush cannot be controlled by mowing or bush hogging, use a selective herbicide to remove undesirable vegetation competing with the grass and possibly eliminate a portion of the mowing requirement.

## Parking Lots

Use Glyphosate (or the equivalent) to eliminate unwanted grass and other vegetation. Do not apply a soil residual, non-selective herbicide within 75 feet of the dripline of trees or shrubs. Keep runoff from grass and tree areas.

## Fences, Power Poles, Fireplugs, etc. Within Grassed Areas

Spray a 6 inch band of Glyphosate (Roundup) around base of poles and signs, along walks and buildings, or any area requiring restriction of vegetation growth. Completely cover vegetative growth. Apply early in growth period and repeat if needed.

## Pruning

### Trees

Identify and remove hazardous, dead, or diseased branches or entire trees, as needed, annually. In removing entire trees, pull back soil and cut off just below ground surface. A stump grinder can also be used to accomplish the same results. Stump

grinders will remove stump to 6 - 12 inches below ground level. Fill hole with top soil and seed or sod the area.

## Shrubs

Major pruning to remove damaged or diseased branches and to preserve shape should be done once annually. Prune spring flowering varieties after flowering; all others in winter or early spring. Additional maintenance pruning may be required for particular species during growing season to produce desired shape and dense foliage. Eliminate high maintenance shrubs entirely.

## GRASS, TREES AND SHRUBS

### Grass

#### Treatment of Bare Areas

Bare spots should be treated until grass is re-established. Disk lightly to 2 - 3 inches depth and fertilize. Seed with Red Fescue at 1/2 pound per 1,000 square feet. Protect all areas from foot or vehicular traffic by suitable barricades, during period when cover is being re-established.

#### Lawn Establishment

New lawn, under normal conditions, should be established by seeding to the desired species. However, under certain conditions such as limited time, poor soil conditions or high cost of establishment by seeding, successful planting of lawn grasses can be accomplished by using live and growing plant materials. Three common methods of vegetative planting are:

##### Sodding

The placing of sod strips to completely cover the area. Sometimes the most economical or only practical way to establish turf on steep slopes, high visibility areas, or on areas with poor soil and moisture conditions.

##### Sprigging

The planting of separate plant parts such as sprigs, runners, cutting or stolons at spaced intervals.

##### Plugging

The transplanting of sod plugs 2 - 3 inches in diameter at intervals such as 1 foot apart. This method is often used to introduce new species without destroying existing turf.

## Selection of Seed/Sod

Grass seed selection is important for successful establishment of lawns. A number of grasses can be grown successfully at this location, but Kentucky Blue Grass or Red Fescue is recommended. It is preferable and desirable to plant single species rather than mixtures. The seed should be plump, well developed, uniformly colored, free of weed seeds and having a high germination percentage.

## Disease and Insects

Disease and insect control is an important phase of lawn management. Healthy and properly managed lawns are less likely to be attacked. They are more likely to recover than are those that are poorly managed. When treating insects or disease attacks, apply pesticides as recommended by the manufacturer.

## Trees and Shrubs

### Selection

Selection of varieties of trees and shrubs must be based on land conditions and climate. A list of adopted trees and shrubs can be found in NAVFACMO-100.1. Trees and shrubs should also be selected based on the mature size of the plant.

### Planting

Planting will be done during late fall, or early spring. Pits should be two feet greater in diameter and one foot deeper than the root spread or ball.

Backfill material should be 25% by volume peat and 75% topsoil. Fertilizer should be applied in small amounts or be applied a month or two after planting. Trees should be supported by stakes for at least for first year. Berms should be formed around planting pits to hold 3 - 4 inches of water. Protection from string trimmer damage should be provided by placing mulch around base of trees or installation of hard surface guards around the base of trees.

### Fertilization

#### Trees

Fertilization of established trees is not recommended as a general practice but may be necessary in selected areas where a definite need is observed. Some indicators of low fertility are:

- \* Slow growth
- \* Uniform yellowing of leaves
- \* Brown patches on leaves
- \* Noticeable lack of vigor

In areas where appearance is a prime consideration, such as administration buildings, Navy Exchange, etc., fertilization on a regular basis is desirable to maintain high vigor and full tree beauty. Also, a healthy tree is more resistant to diseases and insects.

#### Shrubs

Shrub fertilization is not recommended except where a definite need is indicated.

#### Pruning and Trimming

#### Trees

Pruning of selected trees is recommended to: (1) remove older limbs and encourage new growth; (2) remove injured, diseased and/or dead growth; and (3) cut out branches that interfere with other branches. In removing a dead or broken limb, make the cut through live wood, close to the junction with the larger stem but leaving the collar. Generally speaking, older trees need very little pruning.

#### Shrubs

Shrub pruning and trimming is recommended for all ornamental shrubs to produce attractive well-formed plants. For all practical purposes, pruning can be confined to two periods: when shrubs are dormant or immediately after blooming.

#### Protection of Natural Vegetation

All construction projects should contain built-in conservation measures to avoid subsequent erosion damages and expenditures for correction of deficiencies. Soil, water and vegetative conservation requirements shall be incorporated into the preliminary engineering, design and construction of new facilities and alterations. In keeping with Executive Order 50737, Environmentally and Economically Beneficial Practices on Federal Landscaped Grounds, as much as possible of the existing natural vegetation should be left on construction sites for landscaping.

Trees to be left for landscaping must be selected and marked in advance. Protect selected trees from construction damage by excluding heavy machinery from the area and eliminating fill dirt under dripline of trees. Heavy machines will damage feeder roots

and trees will die in subsequent years. Fill will also smother tree root systems and progressively kill the tree.

During the construction period, barricades and temporary "fences" are mandatory around the entire dripline to protect desirable trees. Erection of fences and barricades shall be completed prior to site clearing. Take precautions in burning debris since heat and smoke will severely damage or kill adjacent trees. Stockpile and store construction materials in areas not containing vegetation. Do not permit parking of equipment under trees since this tends to pack the soil and injure the surface roots. If trenches have to be placed close to trees, the roots should be cut off clean and covered immediately with moist soil. This treatment will also apply to above ground injuries. These recommendations must be rigidly administered by the Project Manager if positive results are to be obtained.

## Landscaping

### Planting New Trees and Shrubs

There are several guidelines that should be observed in planning new tree plantings. Consideration should be given to the future height of trees planted under telephone and power lines. Trees should be planted 20 feet or more from buildings to allow for limb spread and 10 feet or more from sidewalks and other paved areas. Tree rows should not be extended to street intersections where they may present a traffic hazard. Trees should be set back far enough from steep ditch banks to allow for future bank sloping. All plantings should be made when soils are at optimum moisture conditions. The holes should be dug to a diameter and depth sufficient in size to allow the proper placement of plants and to allow for proper compacting around the plant ball or roots. Dish-shaped water pockets should be formed around plants and surplus soil placed on lower side of plant to increase water holding capacity.

A list of adapted trees and shrubs for the region can be found in NAVFACMO-100.1.

Consider tree and shrub characteristics in selecting plant materials. The following are factors to consider in selecting trees and shrubs for landscape plantings.

- \* Size and shape at maturity.
- \* Deciduous or evergreen (wind resistance).
- \* Growth rate (pruning requirements).
- \* Adaptability to soil and climate conditions.

\* Habits (flowering, fruiting, type of root system, shedding, etc.).

\* Density of shade cast (intensity of shade affects growth of grass etc.).

\* Benefits to urban wildlife

### 3. SPECIAL PLANS AND PROJECTS

Pettibone Creek is eroding the stream bank in some critical areas. Immediate attention should be given to areas where bridge foundations are being eroded and undermined. Rip rap and back-filling can be used to stabilize erosion in these trouble areas.

Trees are growing under and into power lines along Pettibone Creek's foot path. Trees should be removed, replanted, or replaced with shrubbery.

The recently installed grease disposer, located above the sewage treatment plant, needs to be graded and seeded to eliminate erosion on the bluff. Waste from the grease disposer needs to be disposed of completely into the tank and not spilled around the area.

Bluff areas and ravines are eroding in several areas. Part of this erosion problem is blocked or inadequately sized storm drains on the uplands, which overflow and cause concentrated flows to be directed down the steeply sloping bluff and ravine areas.

### 4. PROJECT FUNDING

The installation is responsible for funding erosion control projects. Funds should be requested from the major claimant as a part of the budget submission as soon as a need is identified. Delays in arresting active erosion will result in accelerated erosion as time passes. Delaying corrective action can result in disruption of the use of operational and training facilities. Soil Conservationists from SOUTHNAVFACENGCOCOM (Code 063) are available to assist in developing projects and cost estimates.

### 5. NONPOINT SOURCE POLLUTION

Grounds maintenance activities and construction projects have the potential for creating nonpoint source pollution problems. The Clean Water Act, as amended (Public Laws 92-500), sets forth guidelines for controlling nonpoint source pollution in Section 319 of the Act. Section 319(b)(2)(F) and 319(K) enable States to review Federal activities for consistency with the State's approved Nonpoint Source Management Program. There is a copy of the Illinois Nonpoint Source Management Program in PWC's

Environmental Office located in Building 1A, and NTC's  
Environmental Office located in Building 5.

The Department of the Defense nonpoint source management strategy was issued on 14 March 1985. It includes the following:

- \* Technical information exchange;
- \* Increased attention to nonpoint source pollution in planning, operations, and construction activities;
- \* Inclusion of nonpoint source pollution abatement in training and education;
- \* Coordination with local water quality planning authorities;
- \* Compliance review at all DOD management levels.

## 6. RECOMMENDATIONS

Use the Comprehensive Slope Stability and Erosion Study at the Naval Training Center, Great Lakes, Illinois prepared by STS Consultants Ltd. of Northbrook for identification, prioritization and remedial action of problem areas within the bluff and ravine areas.

Great Lakes Housing at Fort Sheridan includes a bluff and ravine system, with potential for wildlife habitat. The remaining bluff and ravine system on Fort Sheridan will be given to the Cook County Park District by the Army for restoration and preservation. It would be beneficial for NTC Great Lakes to jointly manage their bluff and ravine system with the Cook County Park District.

With the BRAC requirements, construction projects are still being determined for base housing on both Fort Sheridan and NAS Glenview. Correct acreage of Improved (I) and Semi-improved (SI) grounds need to be further evaluated as construction and demolition continues.

In this Plan the installation grounds that are grouped in four categories based on operational needs are only broken down by base. For improved analysis, NTC Great Lakes should be categorized at a minimum by the four major Class 1 (Land) plant property holders: Naval Training Center, Navy Public Works Center, Naval Hospital and Naval Reserve Readiness Center and preferably include the eight component commands; Recruit Training Command, Service School Command, Construction Battalion Unit 401, Navy Public Works Center, Naval Hospital, Naval Dental Center, Transient Personnel Unit and Navy Brig.

Natural Resources Managers need to research the Illinois Nonpoint Source Pollution Manual, work on budgets, and familiarize themselves with this plan. Natural Resources Managers from the Naval Training Center and Navy Public Works Center should assist each other in implementing and coordinating this plan, keep each other aware of training courses, and support each other in implementing the Natural Resources Management Plan.

The checklist of holders requires each subordinate command to have a copy of the Natural Resources Management Plan. Natural Resources Managers should ask each subordinate command for a Natural Resources Coordinator. These personnel would be able to evaluate their areas more frequently, follow construction projects, analyze erosion and any other problems that may occur. Coordinators would then report any problem areas to the Natural Resources Managers. Natural Resources Managers should hold quarterly/semi-annually meetings with the coordinators for training and instruction.

To keep this Land Management Section a usable, working document, an annual review should be made to determine if the Plan has been effectively implemented. Work schedules and special problems should be annotated to show if work is on schedule or if it needs to be rescheduled. If rescheduling is required, or new problems are identified that need corrective action, work schedules will be revised accordingly.

## APPENDIX

- EXHIBIT "A" PUBLIC LAWS AND EXECUTIVE ORDERS PROVIDING NATURAL RESOURCES GUIDANCE
- EXHIBIT "B" GROUNDS MAINTENANCE PLAN OF OPERATIONS
- EXHIBIT "C" GROUNDS MAINTENANCE FIVE YEAR SCHEDULE
- EXHIBIT "D" COOL-SEASON TURFGRASS MAINTENANCE CALENDAR FOR ILLINOIS
- EXHIBIT "E" STRESS TOLERANT PLANTS
- EXHIBIT "F" TREE SELECTION GUIDE
- EXHIBIT "G" PRUNING ORNAMENTAL SHRUBS
- EXHIBIT "H" HOW TO PRUNE YOUNG SHADE TREES
- EXHIBIT "I" NAVY HOUSING YARD MAINTENANCE GUIDE FOR OCCUPANT USE

## PUBLIC LAWS, EXECUTIVE ORDERS & INSTRUCTIONS

NUMBER	TITLE	DESCRIPTION
<b>Public Law 65-186</b>	Migratory Bird Treaty Act, as amended (16 USC 703)	Prohibits taking or harming a migratory bird, its eggs, nest, or young without the appropriate permit.
<b>Public Law 85-337</b>	Military Reservation & . Facilities - Hunting, Fishing, and Trapping (10 USC 2671)	Provides that hunting, fishing, and trapping on military lands will be in accordance with state laws.
<b>Public Law 86-624 &amp; 96-366</b>	Fish & Wildlife Coordination Act, as amended (16 USC 661 et. seq.)	Provides for effective integration of the fish and wildlife conservation programs with federal water resource development and construction projects having impact on water resources.
<b>Public Law 86-797</b>	Conservation Programs on Military Installations, as amended (16 USC 670a et. seq.) (Often referred to as the "Sikes Act")	Requires that each military department manage their natural resources to ensure that professional services are provided to all fish and wildlife species, in accordance with a tripartite cooperative plan agreed to by the U.S. Fish & Wildlife Service and the state wildlife agency; to provide personnel with professional training in fish and wildlife management, and to give priority to contracting work with federal and state agencies having responsibility for conservation or management of fish and wildlife.
<b>Public Law 88-29</b>	Outdoor Recreation Program/ Organic Act(16 USC 4601 et.seq.)	Requires consultations with the National Park Service (NPS) regarding management for outdoor recreation.
<b>Public Law 89-669</b>	Fish & Wildlife Conservation Act (16 USC 2901 et.seq.)	Provides for conservation, protection, restoration, and propagation of native species of fish and wildlife, including migratory birds threatened with extinction; and for other purposes.
<b>Public Law 90-542</b>	Wild and Scenic Rivers Act	Required identification and protection of any river or stream that qualifies under the Act.
<b>Public Law 90-543</b>	National Trails Systems Act of 1986	Promotes development of recreational, scenic, and historic trails for persons for diverse interest and abilities.
<b>Public Law 90-583</b>	Noxious Plant Control	Provides for the control of noxious plants on land under control or jurisdiction of the federal government.
<b>Public Law 91-190</b>	National Environmental Policy Act (NEPA), as amended(42 USC 4321 et.seq.)	Establishes a national policy to preserve important natural aspects of our national heritage and enhance the quality of renewable resources.
<b>Public Law 92-500</b>	Federal Water Pollution Control Act (Clean Water Act), as amended (33 USC 1251)	Prohibits point source discharge of pollutants into navigable waters, unless an appropriate permit is first obtained under Section 401. Section 404 prohibits discharge of dredged or fill material into navigable waters of the United States, including wetlands, without first obtaining a permit from the U.S. Army Corps of Engineers. Section 319 requires federal agencies to comply with State nonpoint source pollution abatement guidelines.
<b>Public Law 92-522</b>	Marine Mammal Protection Act of 1972 (16 USC 1361 - 1407 et. seq.)	Prohibits taking or harming of marine mammals without the appropriate permit.

**PUBLIC LAWS, EXECUTIVE ORDERS & INSTRUCTIONS (Cont'd)**

NUMBER	TITLE	DESCRIPTION
Public Law 92-583	Coastal Zone Management Act, as amended (16 USC 1451 et.seq.)	Provides for the development of state coastal zone management plans and for federal activities in the coastal zone to be consistent with the purposes of the Act.
Public Law 92-532	Marine Protection, Research & Sanctuaries Act of 1972	Prohibits transportation for dumping material into ocean waters.
Public Law 92-205	Endangered Species Act of 1973, as amended (16 USC 1531 et.seq.)	Provides for the identification and protection of threatened and endangered species of fish, wildlife, and plants and their critical habitats. Requires federal agencies to ensure that no agency action is likely to jeopardize the continued existence of an endangered or threatened species. Requires biological assessments of any agency action when an endangered or threatened species may be present in the area(s) affected by the action.
Public Law 93-639	Federal Noxious Weed Act of 1974 (7 USC 2801 et.seq.)	Provides for the control and eradication of noxious weeds and their regulation in interstate and foreign commerce.
Public Law 96-366	The Non-Game Species Act	Encourages management for non-game species.
10 USC 2665	Military Construction Authorization Act - Sale of Certain Interest in Lands; Logs	The sale of forest products is authorized to finance the cost of managing forest resources for commercial production.
10 USC 2667	Leases; Non-Excess Property	Provides for the outleasing of public lands for agricultural purposes and retention of cash receipts for administration of the program; improvement of existing leased areas; preparing new areas for outleasing; and for other natural resources projects.
16 USC 590A	Soil Conservation Act	Provides for application of soil conservation practices on federal lands.
16 USC 668 et.seq.	Bald & Golden Eagle Protection Act (16 USC 688 et.seq.)	Prohibits the taking (harassment, sale, or transportation of bald or golden eagles, alive or dead, whole or in part and their nest and/or eggs.
42 USC 1962d	Water Resources Planning Act of 1965, as amended	Provides for the optimum development of the Nation's natural resources through the planning of water and related resources.
Executive Orders 11514 & 11991	Protection & Enhancement of Environmental Quality	Directs issuance of instructions and guidelines relative to preparation of Environmental Impact Statement.
Executive Order 11988	Floodplain Management	Requires federal agencies to evaluate effects of action they have taken on floodplains.
Executive Orders 11989 & 12608	Off-Road Vehicles on Public Lands	Provides for closing areas to off-road vehicle use where soil, wildlife, or other natural resources are adversely affected.
Executive Order 11990	Protection of Wetlands	Requires agencies to take action to minimize destruction, loss, or degradation of wetlands.
Executive Order 50737	Environmentally & Economically Beneficial Practices on Federal Landscaped Grounds	Provides policy for landscaping on federal facilities concerning the use of native plants for reduced maintenance; reduced water consumption, reduced insect and disease problems; and a compatible appearance in relationship to the surrounding natural environment.

**PUBLIC LAWS, EXECUTIVE ORDERS & INSTRUCTIONS (Cont'd)**

<b>NUMBER</b>	<b>TITLE</b>	<b>DESCRIPTION</b>
<b>32 CFR 190</b>	<b>Natural Resources Management Program</b>	<b>Provides DOD policy on natural resources management.</b>
<b>DODINST 4700.2</b>	<b>The Secretary of Defense Natural Resources Conservation Award</b>	
<b>DODINST 7310.5</b>	<b>Accounting for Production &amp; Sale of Forest Products</b>	
<b>SECNAVINST 6240.6E</b>	<b>Environmental Protection &amp; Natural Resources</b>	
<b>OPNAVINST 5090.1B</b>	<b>Environmental &amp; Natural Resources Program Manual</b>	
<b>NAVFACINST 6250.3F</b>	<b>Performance &amp; Reporting of Pest Control Operations in the Naval Shore Establishment</b>	
<b>NAVFACINST 7110</b>	<b>Fish &amp; Wildlife &amp; Game Conservation &amp; Rehabilitation; Funds Management for</b>	
<b>NAVFACINST MO-110.1</b>	<b>Natural Resources Land Management</b>	
<b>NAVFACINST MO-110.2</b>	<b>Forest Management</b>	
<b>NAVFACINST MO-110.3</b>	<b>Fish &amp; Wildlife Management</b>	
<b>NAVFACINST MO-110.4</b>	<b>Outdoor Recreation &amp; Cultural Values</b>	
<b>NAVFAC P-73</b>	<b>Real Estate Operations &amp; Natural Resources Management Procedural Manual - Volumes I &amp; II</b>	

**GROUNDS MAINTENANCE PLAN  
OF OPERATIONS  
(MOWING FREQUENCY)**

TYPE OF AREA	J	F	M	A	M	J	J	A	S	O	N	D
LEVEL I				2	4	4	4	4	4	3		
LEVEL II				2	4	4	4	4	4	3		
LEVEL III				2	4	4	4	4	4	3		
LEVEL IV					1		1		1		1	
LEVEL V				2	4	4	4	4	4	4		

NUMBER OF MOWINGS  
PER MONTH

**GROUNDS MAINTENANCE  
(FIVE YEAR SCHEDULE)**

TYPE OF AREA	J	F	M	A	M	J	J	A	S	O	N	D
TRIMMING (LEV 1-3,5)				2	4	4	4	4	4	3		
EDGING (LEV 1,2,3)				1	1	1	1	1	1	1		
FERTILIZE				1								
WEEDING				1	1							
DEBRIS REMOVAL	1	1	1	2	4	4	4	4	4	3	1	1
SPRING CLEANUP				1								
FALL CLEANUP											1	
LEAF REMOVAL											1	
TREE PRUNING											1	
SHRUB PRUNING					1		1		1			
PLANT BED WEEDING				1	1	1	1	1	1	1		
HERBICIDE (FENCELINE)					1							
WEED CONTROL PAVED AREAS				1	1	1	1	1	1	1		

NUMBER OF OCCURRENCES  
PER MONTH

COOL-SEASON TURFGRASS MAINTENANCE CALENDAR FOR ILLINOIS

	Cultural Practices and Establishment	Pests
March and April	<p><i>Mow and Water</i>—As necessary.</p> <p><i>Cultivation</i>—Core aerify, slice, spike, verticut, or dethatch when turf is actively growing.</p> <p><i>Establishment</i>—Establish or renovate turf by seed or sod.</p> <p><i>Other</i>—General cleanup; remove debris, rake leaves, pick up fallen twigs and branches from turf. Roll only to flatten small surface irregularities due to frost heaving.</p>	<p><i>Weeds</i>—Preemergence annual grass controls should be applied when soil temperatures are 50°F for three consecutive days. Actively growing broadleaf weeds can be treated with postemergence herbicides. Use care when applying these herbicides to avoid damage to desirable plants.</p> <p><i>Possible Diseases</i>—“Helminthosporium” diseases, powdery mildew, pythium blight, seed rot, damping off</p>
May	<p><i>Mow and Water</i>—As necessary.</p> <p><i>Fertilization</i>—Fertilize in early May if making two, three, or four annual applications.</p> <p><i>Cultivation</i>—Core aerify, slice, spike, verticut, or dethatch when turf is actively growing.</p> <p><i>Establishment</i>—Seed only if adequate water is available during first half of month. Lay sod through entire month.</p>	<p><i>Weeds</i>—Actively growing broadleaf weeds can be treated with postemergence herbicides. Use care when applying these herbicides to avoid damage to desirable broadleaf plants.</p> <p><i>Possible Diseases</i>—“Helminthosporium” diseases, necrotic ring spot, powdery mildew, pythium blight, slime molds, fairy rings, seed rot/damping off, leaf smuts</p>
June through mid-August	<p><i>Mow and Water</i>—As necessary. Raise mowing height as temperatures warm.</p> <p><i>Fertilization</i>—Fertilize in late June if making four annual applications (summer irrigation is usually necessary if this application is made).</p> <p><i>Establishment</i>—Sod only.</p>	<p><i>Weeds</i>—Actively growing broadleaf weeds can be treated with postemergence herbicides.</p> <p><i>Insects</i>—Treat for grubs, sod webworm, chinchbug, and greenbugs as necessary.</p> <p><i>Possible Diseases</i>—“Helminthosporium” diseases, summer patch/necrotic ring spot, dollar spot, red thread/pink patch, rusts, brown patch, powdery mildew, pythium blight, anthracnose, fairy rings, nematodes</p>
Mid-August through September	<p><i>Mow and Water</i>—As necessary. Mowing heights may be reduced when temperatures cool and turf growth increases.</p> <p><i>Fertilization</i>—Fertilize all cool-season turfs in early September; this is the most important application of the year.</p> <p><i>Cultivation</i>—Core aerify, spike, slice, or dethatch when active growth resumes.</p> <p><i>Establishment</i>—Establish or renovate turf by seed or sod.</p>	<p><i>Weeds</i>—Actively growing broadleaf weeds can be treated with postemergence herbicides beginning late August.</p> <p><i>Insects</i>—Treat for grubs, sod webworm, chinchbug, and greenbugs as necessary.</p> <p><i>Possible Diseases</i>—“Helminthosporium” diseases, summer patch/necrotic ring spot, dollar spot, red thread/pink patch, rusts, brown patch, powdery mildew, pythium blight, anthracnose, fairy rings, nematodes, leaf smuts</p>
October	<p><i>Mow and Water</i>—As necessary.</p> <p><i>Establishment</i>—Sod only.</p>	<p><i>Weeds</i>—Actively growing broadleaf weeds can be treated with postemergence herbicides.</p> <p><i>Possible Diseases</i>—“Helminthosporium” diseases, rusts, yellow patch, leaf smuts, powdery mildew, snow molds, pythium blight, fairy rings</p>
November	<p><i>Mow and Water</i>—Stop mowing after growth has ceased. Make final mowing at normal autumn height. Turf should go into winter dormancy well-hydrated; irrigate in fall to reduce winter desiccation problems, but do not flood.</p> <p><i>Fertilization</i>—Fertilize turfs receiving three or four annual applications after growth and mowing has ceased.</p> <p><i>Establishment</i>—Lay sod during first half of month.</p> <p><i>Other</i>—Fall clean-up.</p>	<p><i>Possible Diseases</i>—snow molds, pythium blight, yellow patch</p>

## STRESS TOLERANT PLANTS

### EVERGREEN TREES

BOTANICAL NAME COMMON NAME	HEIGHT	ADAPTATION AND REMARKS
<i>Abies concolor</i> WHITE or CONCOLOR FIR	60'	Provide adequate drainage; good drought tolerance
<i>Juniperus chinensis</i> (several cultivars) w/ selection	varies	Provide adequate drainage; various forms; pistillate plants bear attractive bloom-covered "berries"
<i>Picea glauca</i> var. <i>densata</i> BALCK HILL'S SPRUCE	20'	Provide adequate drainage; good drought tolerance
<i>Picea omorika</i> SERBIAN SPRUCE	40'	Provide adequate drainage; naturally occurs on alkaline soils
<i>Pinus bungeana</i> LACEBARK PINE	40'	Tolerates heavy soils better than most pines; needles in threes; limited availability
<i>Pinus flexilis</i> LIMBER PINE	40'	Tolerates heavy soils; flexible branches and limbs
<i>Pinus peuce</i> BALKAN or MACEDONIAN PINE	50'	Tolerates air-born deicing salts; retains dark green needle color in winter; slow growing; limited availability

#### REFERENCES:

- Dirr, Michael A. 1983. Manual of Woody Landscape Plants: Their Identification, Characteristics, Culture, Propagation, and Uses. 3rd ed., Stipes Publishing Co., Champaign, IL.
- Flint, Harrison L. 1983. Landscape Plants for Eastern North America. John Wiley & Sons, New York, NY.
- Harris, Richard W. 1983. Arboriculture: Care of Trees, Shrubs, and Vines in the Landscape. Prentice-Hall, Inc., Englewood Cliffs, NJ.

STRESS TOLERANT PLANTS  
SMALL DECIDUOUS TREES

PAGE 2

"Bob White"	Horizontal form; pink to white flowers; tiny persistent yellow fruit
Malus floribunda JAPANESE FLOWERING CRAB	Spreading form; pink to white flowers; small, amber colored fruit
"Mary Potter"	Horizontal form; pink to white flowers; small red fruits
"Profusion"	Round form; magenta flowers; medium, maroon fruit. Persistent
"Red Jewel"	Pyramidal form; white flowers; very red fruit
Malus sargentii SARGENT FLOWERING CRAB	Spreading form; dwarf, shrub-like; white flowers borne in alternate years; persistent red fruit
"Selkirk"	Round form; magenta flowers; bronze foliage; attractive, large red fruit
"Snowdrift"	Round form; pink to white flowers; small orange-red fruit.
Malus zumi var. calocarpa REDBUD FLOWERING CRAB	Horizontal form; pink to white flowers born in alternate years; tiny, bright red fruit
Pyrus calleryana CALLERY PEAR	Narrow crown; red-maroon fall color
"Rancho"	
"Select"	Narrow crown; red-maroon fall color; late
"Autumn Blaze"	Hardier than other selections; earlier fall color

STRESS TOLERANT PLANTS

MEDIUM-SIZED DECIDUOUS TREES 30' - 40'

BOTANICAL NAME COMMON NAME	ADAPTATION AND REMARKS
Acer campestre HEDGE MAPLE	Use only locally grown plants
Corylus colurna TURKISH FILBERT	Good form for street tree use; rarely fruits
Phellodendron amurense AMUR CORKTREE	Often slow to establish in heavy soils; plant male trees; seedlings weedy
"Macho"	Male selection; darker colored, thicker leaves; limited availability
Pyrus ussuriensis USSURIAN PEAR	Hardest of all pears; commonly used as a rootstock; limited availability
Tilia cordata LITTLELEAF LINDEN (several cultivars)	Cultivar selections based on improved form; not particularly drought tolerant; canker diseases becoming more prevalent
Tilia X euchlora REDMOND LINDEN "Redmond"	Very pyramidal form; more drought tolerant than previous <u>T. cordata</u>

## STRESS TOLERANT PLANTS

### SMALL DECIDUOUS TREES 15' - 30'

BOTANICAL NAME COMMON NAME	ADAPTATION AND REMARKS
<i>Acer ginnala</i> AMUR MAPLE	Showy fall color; <u>seedlings can become weedy</u>
<i>Acer tataricum</i> TATARIAN MAPLE	Similar to <u>A. ginnala</u> ; limited availability
<i>Cotinus obovatus</i> AMERICAN SMOKETREE	Natively grows on alkaline soil; brilliant fall color; limited availability
<i>Crataegus crus-galli</i> COCKSUPR HAWTHORN	Large thorns; dangerous in high traffic areas
<i>Crataegus crus-galli</i> v. <i>inermis</i> THORNLESS COCKSPUR HAWTHORN	Thornless; more ascending branches
<i>Crataegus phaenopyrum</i> WASHINGTON HAWTHORN	Large thorns; remove in high traffic areas; fruit attractive and persistent till spring; older plants prone to ice-breakage
<i>Crataegus viridis</i> WINTER KING HAWTHORN "Winter King"	Fewer thorns than previous species; attractive fruit and bark
<i>Malus</i> FLOWERING CRABAPPLES "Cultivars"	All require full sun and adequate drainage
"Adams"	Spreading form; single, magenta flowers; medium sized, red fruit
"Beverly"	Horizontal form; pink to white flowers borne in alternate years; small persistent fruit

## STRESS TOLERANT PLANTS

NOTE: When selecting plant materials, think of your selection at its mature height in your selected location: "Mighty oaks from little acorns grow."

### TALL DECIDUOUS TREES 40' - 100'

BOTANICAL NAME COMMON NAME	ADAPTATION AND REMARKS
Acer platanoides NORWAY MAPLE	
"Cleveland"	Improved form; dense foliage
"Emerald Lustre"	Improved form; less susceptible to frost cracking
"Emerald Queen"	Improved form; vigorous: prone to bark splitting
"Deborah"	Red foliage in spring: less susceptible to frost cracking
Acer saccharinum SILVER MAPLE	
"Silver Queen"	Improved form; seedless; roots may disrupt pavement
"Skinneri"	Improved form; central leader; strong branch development; laciniate foliage; roots may disrupt pavement
Acer nigrum BLACK MAPLE	
"Green Column"	Western type of <u>A. saccharum</u> ; thicker leaves; drought tolerant
Acer saccharum SUGAR MAPLE	
"Green Mountain"	Thicker leaves: more drought tolerant
"Legacy"	Thicker leaves: more drought tolerant

STRESS TOLERANT PLANTS  
TALL DECIDUOUS TREES

PAGE 2

<i>Alnus glutinosa</i> BLACK ALDER	Tolerant of heavy, wet soils; intolerant of drought
"Pyramidalis"	Good fastigate tree: limited availability
<i>Catalpa speciosa</i> NORTHERN CATALPA	Flowers and large leaves too messy for high traffic areas
<i>Celtis occidentalis</i> COMMON HACKBERRY	Often slow to establish: pest or disease problem may limit use
<i>Fraxinus pennsylvanica</i> GREEN ASH (Several cultivars)	Cultivars usually fruitless and possess improved form; borers can be a problem
<i>Fraxinus quadrangulata</i> BLUE ASH	Four-sided, stout twigs
<i>Ginkgo biloba</i> GINKGO	Plant only male trees; slow to establish
<i>Gleditsia triacanthos</i> var. <i>inermis</i> THORNLESS HONEYLOCUST	Cultivars, fruitless and possess improved form; cankers becoming more prevalent
<i>Quercus macrocarpa</i> BUR OAK	Difficult to transplant; limited availability
<i>Quercus muehlenbergii</i> CHINKAPIN OAK	Natively grows on alkaline soil; difficult to transplant, very limited availability

# TREE SELECTION GUIDE

## USING THIS GUIDE

This guide is not a comprehensive look at trees. It should be used as a tool to help in the selection of the proper tree for a particular site. Look through the guide to find trees that match the needs of the site where they will be planted and which also have the ornamental features desired. Once you have selected a number of trees that seem appropriate, use other references to find out more about each tree. There is much more to be known about each tree than is represented in this guide.

## KEY TO READING THE GUIDE

The following key explains the purpose of each column in the guide and the symbols used in each column.

### HARDINESS:

Hardiness is the ability of a plant to thrive in a particular environment. Although hardiness is affected by many factors, minimum winter temperature is the factor usually considered most crucial. The hardiness numbers on the table refer to the zones on the USDA hardiness zone map. According to this map, Northeastern Illinois is in zone 5 (the smaller the zone number, the colder the zone). This means that plants hardy in zones 1-5 can be grown in our area. **Be aware that the USDA hardiness zone map is not the only map available. When using any horticultural reference book, check to see which map is being used in that particular reference.**

### FORM:

This refers to the average, overall shape of the mature tree. Young trees may have a different appearance. Also, these forms refer to trees growing in a landscape situation with ample room to grow. Trees growing in the wild often grow closely together

and the characteristic form may not be seen. Two letters in the column indicates that the form may vary quite a bit from specimen to specimen or may be intermediate between the two forms.

R = rounded	W = weeping
B = broad rounded, spreading	S = shrubby
O = oval	C = columnar
P = pyramidal (or conical)	I = irregular
V = vase-shaped	# = variable

### HEIGHT AND SPREAD:

The average height and spread (in feet) is given for mature specimens in a landscape site. The height and spread are usually given as a range because the dimensions of any given specimen will be influenced by the planting site and the care provided. Keep in mind that the figures given are sizes usually attained in a landscape situation; trees in the wild often attain greater heights. V indicates that size varies greatly from cultivar to cultivar.

### TRANSPLANT:

This column refers to the relative ease with which young trees can be transplanted.

E = easy

I = intermediate (or needs special preparation)

D = difficult

### MOISTURE:

The majority of trees prefer a soil that is evenly moist and well drained. Some trees can tolerate dry sites or poorly drained sites. This does not mean that the tree prefers these conditions, but simply that it can live in them. Under such conditions, the tree may show slowed or reduced growth. It is also important to remember that tolerance of poor conditions is found

only in established trees. All newly planted trees need a consistent supply of water.

**M** = moist, well drained

**D** = tolerates drought or dry sites

**P** = tolerates poorly drained sites or sites that remain wet for extended periods

#### **PROBLEMS:**

No tree is perfect; each one has some characteristic that is potentially undesirable. This category lists potential problems common to each tree. Some problems may be minor, others more serious. The more problems a tree has, the higher the level of maintenance required to keep the tree healthy and/or attractive. Again, use of other references is suggested to obtain a more complete picture of these problems.

**a** = may produce sucker growth at base of tree and/or from the roots

**b** = susceptible to damage from late spring frosts and/or early fall freezes

**c** = susceptible to scorch and/or winter damage

**d** = tree may exhibit shrubby growth; pruning may be needed to obtain a tree form

**e** = tree produces numerous seedlings

**f** = insect and/or disease problems common or frequent

**g** = weak-wooded species and/or susceptible to wind/ice/storm damage

**h** = does not tolerate alkaline (high pH) soils; may become chlorotic (yellow)

**i** = shallow root system (may be sensitive to soil compaction and/or may make it difficult to establish turf under the tree)

**k** = tree has thorns

**l** = female trees are undesirable

**m** = witches brooms and/or galls a common occurrence (but not necessarily detrimental to the tree)

**n** = tree produces litter (may be twigs, fruit, flowers)

**!!** = this species has many problems; use with caution

**\*** = this species may not be widely available

#### **BARK, FLOWERS AND FRUIT:**

An X in these columns indicates the features of the tree that are considered to be ornamental. A \ indicates a feature that is ornamental, but may be more subtle. Beauty is a subjective quality. Whenever possible, before buying a tree, try to see one in a landscape or at least look at pictures to help you decide if you really like those features described as ornamental.

#### **FALL COLOR:**

**R** = red

**Y** = yellow

**O** = orange

**B** = brown

**G** = little or no change

**P** = purplish or maroon

**Z** = russet

**X** = golden bronze

If two letters appear in the column it indicates that the color may vary from specimen to specimen (or from cultivar to cultivar) or a mix of both colors is present.

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NEW 2/95

COMMON NAME	SCIENTIFIC NAME	HARDI- NESS	FORM	HEIGHT	SPREAD	TRANS PLANT	MOISTURE	PROBLEM	BARK	FLOWER	FRUIT	FALL COLOR
Alder, black ( <i>Alnus glutinosa</i> )		4	O,P	35-80	30-40	E	M,P	e,*				B,G
Ash, black ( <i>Fraxinus nigra</i> )		3	O,I	40-70	35-50	E	M,P	e,*				B,G
Ash, blue ( <i>Fraxinus quadrangulata</i> )		4	O,I	50-75	35-50	E	M,D,P	e				Y
Ash, European ( <i>Fraxinus excelsior</i> )		4	R	70-100	50-70	E	M	e,f				G
Ash, green ( <i>Fraxinus pennsylvanica</i> )		3	O,I	50-75	35-50	E	M,D	e,f				Y
Ash, white ( <i>Fraxinus americana</i> )		4	O,I	50-100	40-60	E	M	e,g				Y,P
Aspen, quaking ( <i>Populus tremuloides</i> )		2	O,C	35-70	20-40	E	M,D	ll				Y
Bald cypress ( <i>Taxodium distichum</i> )		5	P	50-100	30-40	E	M,P	h				Z
Beech, American ( <i>Fagus grandifolia</i> )		4	R	50-90	40-60	E	M	l,*				X
Beech, European ( <i>Fagus sylvatica</i> )		5	R	50-90	40-60	E	M	l				X
Birch, Asian white ( <i>Betula platyphylla</i> var. <i>japonica</i> )		5	P	40-50	30-40	I	M	f				G,Y
Birch, cherry ( <i>Betula lenta</i> )		4	R	50-60	35-50	D	M	f				Y
Birch, European white ( <i>Betula pendula</i> )		3	O,W	40-80	30-40	I	M,P	f,g				G,Y
Birch, gray ( <i>Betula populifolia</i> )		4	P,I	20-40	10-20	E	M,D,P	f,g				Y
Birch, paper ( <i>Betula papyrifera</i> )		2	O,P	50-70	30-40	I	M	f				Y
Birch, river ( <i>Betula nivalis</i> )		4	O,P	50-70	30-40	E	M,D,P	g,h				Y
Birch, yellow ( <i>Betula alleghaniensis</i> )		3	O,R	60-75	30-40	D	M	f				Y
Box-elder ( <i>Acer negundo</i> )		2	R,I	35-50	35-50	E	M,D,P	ll				G
Buckeye, Ohio ( <i>Aesculus glabra</i> )		3	O,I	20-40	20-40	I	M	f,n				Y,O
Buckeye, red ( <i>Aesculus parviflora</i> )		5	R	10-20	10-20	I	M	f,n				G
Buckeye, yellow ( <i>Aesculus octandra</i> )		5	O,I	50-75	30-50	I	M	f,n				O
Burternut ( <i>Juglans cinerea</i> )		3	I	40-60	30-50	D	M	g,n,*				Y
Catalpa, Northern ( <i>Catalpa speciosa</i> )		4	O,I	50-90	35-50	I	M,D,P	n				G,B
Catalpa, Southern ( <i>Catalpa bignonioides</i> )		5	B,I	30-40	30-40	I	M,D,P	n				G,B
Cherry, black ( <i>Prunus serotina</i> )		3	O	50-60	30-40	I	M,D	f,n				Y,O
Cherry, European bird ( <i>Prunus padus</i> )		3	R	30-40	30-40	I	M,D	f,n				Y
Cherry, Sargent ( <i>Prunus sargentii</i> )		5	R	40-50	40-50	E	M	f,n				R,X

COMMON NAME SCIENTIFIC NAME	HARD- NESS	FORM	HEIGHT	SPREAD	TRANS PLANT	MOISTURE	PROBLEM	BARK	FLOWER	FRUIT	FALL COLOR
Chestnut, Chinese ( <i>Castanea mollissima</i> )	5	R,B	35-60	35-60	E	M,D	n	X	X		G
Chokecherry, amur ( <i>Prunus maackii</i> )	3	R	36-45	35-45	I	M	f	X	X		G,Y
Chokecherry, common ( <i>Prunus melanocarpa</i> )	3	S	20-30	18-25	I	M,D	ll		X		G,Y
( <i>Prunus vitifolia</i> ) Coffeeberry, Kentucky ( <i>Gymnocladia dioica</i> ) Corticee	4	O,I	60-90	30-50	I	M	n				G,Y
( <i>Prunella dioica</i> ) Corticee	4	B	30-40	40-50	E	M,D					G,Y
( <i>Prunella dioica</i> ) Corticee	3	R,B	75-100	50-75	E	M,D,P	ll		X		G,Y
Cottonwood ( <i>Populus deltoides</i> ) Crabapple, flowering ( <i>Malus spp.</i> )	3/4/5	#	V	V	E	M	a,f				B,Z
Dawn redwood ( <i>Metasequoia glyptostroboides</i> ) Dogwood, corneliancherry ( <i>Cornus mas</i> )	5	P	75-100	25-50	E	M	b,*		X		G,P
Dogwood, yellow ( <i>Cornus florida</i> ) Dogwood, pagoda ( <i>Cornus alternifolia</i> ) Elm, Chinese ( <i>Ulmus parvifolius</i> ) Elm, Siberian ( <i>Ulmus pumila</i> ) Fibbert, Turkish ( <i>Corylus colurna</i> ) Ginkgo ( <i>Ginkgo biloba</i> )	5	O,S	20-25	15-20	I	M	a,d				P
Hackberry, common ( <i>Celtis occidentalis</i> ) Hawthorn, cockspur ( <i>Crataegus crusgalli</i> ) Hawthorn, downy ( <i>Crataegus mollis</i> ) Hawthorn, English ( <i>Crataegus laevigata</i> ) Hawthorn, green ( <i>Crataegus viridis</i> 'Winter King')	4	B,R	15-25	20-30	I	M		X			Y,P
Hawthorn, lanceolate ( <i>Crataegus punctata</i> ) Hawthorn, Washington ( <i>Crataegus phaenopynum</i> ) Hedge-apple ( <i>Machaera douglasii</i> ) Hickory, shagbark ( <i>Carya ovata</i> ) Hickory, shellbark ( <i>Carya laciniosa</i> ) Honeylocust ( <i>Gleditsia triacanthos</i> var. <i>inermis</i> ) Hophornbeam, American ( <i>Ostrya virginiana</i> ) Hornbeam, American ( <i>Carpinus caroliniana</i> )	4	R	40-50	35-40	E	M	f	X			Y
	2	R	50-75	30-40	E	M,D	ll				G,Y
	5	R,P	40-50	30-40	I	M,D	*				Y
	4	B	50-75	30-40	E	M,D	I				G,Y
	3	R,V	50-100	50-100	E	M,D	m				G,Y
	4	B,R	20-30	20-35	I	M,D	f,k		X		P,R
	3	R	20-30	20-30	I	M,D	f,k		X		Y,X
	3	R	20-30	20-30	I	M,D	f,k		X		G
	5	O	15-20	12-20	I	M	f,k		X		G,P
	5	O	20-35	20-30	I	M,D	f		X		X,R
	4	R,O	15-30	15-30	I	M,D	f		X		X,R
	5	O	25-30	20-25	I	M,D	f,k		X		O,R
	5	O	25-30	20-25	I	M,D	f,k		X		G,Y
	5	R,I	35-60	35-60	E	M,D	k,n				G,Y
	4	I,O	70-100	35-50	D	M,D	f,n	X			Y,X
	4	I,O	70-100	35-60	D	M,P	f,n				Y,X
	5	I,O	70-100	35-60	D	M,P	f,n				Y
	4	R	50-75	50-75	E	M,D,P	f,n				Y
	4	P,R	25-50	20-35	D	M,D	*				Y
	3	R,B	20-30	20-30	D	M	*				Y,O,R

COMMON NAME SCIENTIFIC NAME	HARD- NESS	FORM	HEIGHT	SPREAD	TRANS PLANT	MOISTURE	PROBLEM	BARK	FLOWER	FRUIT	FALL COLOR
Hornbeam, European ( <i>Carpinus betulus</i> )	5	R,O	40-60	30-40	I	M		I			G,Y
Horsechestnut, common ( <i>Aesculus hippocastanum</i> )	4	R,O	50-75	40-50	I,D	M	f,n		X		Y,B
Horsechestnut, red ( <i>Aesculus x sativa</i> )	5	P,R	40-60	30-40	I,D	M	f,n		X		Y,B
Katsura tree ( <i>Caracalathium japonicum</i> )	5	O	40-60	20-30	D	M	c				Y,R
Larch, Eastern ( <i>Larix laricina</i> )	2	P	50-75	20-35	E	M	f		I		Y
Larch, European ( <i>Larix decidua</i> )	3	P	60-100	30-50	E	M	f,*		I		Y
Larch, Japanese ( <i>Larix kaempferi</i> )	5	P	70-90	25-40	E,I	M	.		I		Y
Ume, Japanese tree ( <i>Prunus reticulata</i> )	4	O,R	20-30	15-25	E	M	b,f	X	X		G
( <i>Prunus reticulata</i> )	3	P,O	60-100	25-50	E	M,D	f		X		G,Y
( <i>Tilia americana</i> )	3	P,O	80-90	40-50	E	M	a,*	X	X		G,Y
( <i>Tilia obcordata</i> )	4	P,O	40-60	20-30	E	M	a,f	X	I		G,Y
( <i>Tilia x euclora</i> )	3	P,O	60-90	40-50	E	M,D	f	X	I		G,Y
( <i>Tilia cordata</i> )	4	R,P	20-30	20-30	E	M	f,g,*	X	I		G,Y
( <i>Tilia monticola</i> )	5	W	50-90	30-60	E	M	f,*	X	I		G,Y
( <i>Tilia petiolaris</i> )	5	O,R	50-90	30-60	E	M,D	f	X	I		G,Y
( <i>Tilia tomentosa</i> )	4	I,O	40-80	25-40	E	M,D	f,g	X			G,Y
Locust, black ( <i>Robinia pseudoacacia</i> )	4	R	20-30	20-30	I	M	.	X			G
Masackia, amur ( <i>Masackia amurensis</i> )	5	O,R	50-90	35-50	D	M	b	.	I		G,B
Magnolia, cucumber tree ( <i>Magnolia acuminata</i> )	5	P,R	20-30	20-30	D	M	b	X	I		G
( <i>Magnolia acuminata</i> )	5	R,P,S	15-20	10-15	D	M	b,d	I			Y
( <i>Magnolia stellata</i> )	3	R,S	18-20	20-25	E	M,D	d	I			Y,R
Magnolia, star ( <i>Magnolia stellata</i> )	3	R,O	60-75	50-75	E	M,D	f,i				Y
Maple, black ( <i>Acer glabrum</i> )	5	R,B	20-30	25-35	E	M,D					G,Y
( <i>Acer saccharum</i> subsp. <i>diatum</i> )	5	R,O	30-40	30-40	I	M	.				G,Y
( <i>Acer canadense</i> )	4	R	40-50	40-50	E	M,D	I		I		G,Y
( <i>Acer rubrum</i> )	5	R,O	20-30	20-30	I	M		X			G
( <i>Acer glabrum</i> )	4	R	20-25	20-25	I	M	.				Y,R

COMMON NAME SCIENTIFIC NAME	HARD- NESS	FORM	HEIGHT	SPREAD	TRANS PLANT	MOISTURE	PROBLEM	BARK	FLOWER	FRUIT	FALL COLOR
Maple, red ( <i>Acer rubrum</i> )	3	O	40-60	30-45	E	M,P	h		✓	✓	R,G
Maple, silver ( <i>Acer saccharinum</i> )	3	I,O	50-75	50-75	E	M,D,P	ll	X			Y
Maple, striped ( <i>Acer dasycarpum</i> )	3	I,R	20-30	20-30	I	M	g,l				Y,R,O
Maple, sugar ( <i>Acer saccharum</i> )	3	R,O	60-75	50-75	E	M	l				B,Y
Maple, sycamore ( <i>Acer pseudoplatanus</i> )	5	R,O	40-60	40-60	I	M	9,*		✓		Y,R
Maple, tetarian ( <i>Acer pseudoplatanus</i> )	3	R,O	15-20	15-20	I	M,D	d,*			X	Y,R
Maple, European Mountain Ash, European ( <i>Sorbus aucuparia</i> )	4	O	20-40	15-25	I	M	ll		X	X	Y,O
Mountain Ash, Korean ( <i>Sorbus altilfolia</i> )	4	P,O	40-60	20-30	I	M	f,*		X	X	G,Y
Mulberry, common ( <i>Morus alba</i> )	5	R	25-80	25-80	E	M,D	ll				R,Y
Oak, black ( <i>Quercus velutina</i> )	4	R,O	50-80	50-80	D	M,D	f,n				G,Y
Oak, bur ( <i>Quercus macrocarpa</i> )	3	R,B	70-100	70-100	D	M,D,P	n				Y,B
Oak, chestnut ( <i>Quercus prinus</i> )	5	R,B	50-75	50-75	D	M,D	n,*				Y
Oak, chinquapin ( <i>Quercus muhlenbergii</i> )	5	R	40-60	40-60	D	M,D	f,n				G,B
Oak, Engelm ( <i>Quercus lobur</i> )	5	R,B	50-75	50-75	I	M	f,n				R
Oak, Northern pin ( <i>Quercus ellipsoidalis</i> )	3	P,O	50-75	50-75	D	M,D	n				R,Z
Oak, pin ( <i>Quercus palustris</i> )	5	P	50-75	40-50	E	M,P	h,n				R,Z
Oak, red ( <i>Quercus rubra</i> )	3	R	60-80	40-50	E	M	h,n				Y,B
Oak, sawtooth ( <i>Quercus acutissima</i> )	5	R,B	35-45	50-60	I	M,D	h,n				R,Z
Oak, scarlet ( <i>Quercus coccinea</i> )	5	P,R	60-80	40-50	D	M,D	f,n,*				Z
Oak, shingle ( <i>Quercus imbricaria</i> )	5	P,R	50-60	50-60	I	M,D	n				Y,B
Oak, swamp white ( <i>Quercus bicolor</i> )	4	R,B	60-70	60-70	I	M,P	h,n				Y,B
Oak, white ( <i>Quercus alba</i> )	4	R,B	50-80	50-80	D	M,D	f,n		X	✓	G
Pagodatree, Japanese ( <i>Sophora japonica</i> )	5	R,B	50-75	40-60	I	M,D	n,*		✓	✓	Y,G
Pawpaw ( <i>Asimina triloba</i> )	5	I	15-20	15-20	D	M	g,*		✓	✓	R,P
Par, callery ( <i>Pyrus calleryana</i> )	5	P,O	30-50	30-50	I	M,D	b		X	✓	P,Y
Parishman, common ( <i>Dioscorea virginiana</i> )	5	O	35-75	30-40	D	M,D	a,n		✓	✓	G,Y
Poplar, Lombardy ( <i>Populus nigra</i> 'italica')	3	C	30-60	10-15	E	M	ll				G,Y

COMMON NAME  
SCIENTIFIC NAME

Poplar, silver  
(*Populus alba*)  
Redbud, Eastern  
(*Cercis canadensis*)  
Russet-olive  
(*Eleagnus angustifolia*)  
Sassafras  
(*Sassafras albidum*)  
Serviceberry, downy  
(*Amelanchier arborea*)  
Sourgum  
(*Nyssa sylvatica*)  
Sycamore  
(*Platanus occidentalis*)  
Tree of Heaven  
(*Ailanthus altissima*)  
Tulip tree  
(*Liriodendron tulipifera*)  
Walnut, black  
(*Juglans nigra*)  
Willow, corkcraw  
(*Salix matsudana* 'Tortuosa')  
Willow, weeping  
(*Salix alba* 'Triste')  
Willow, laurel  
(*Salix pendula*)  
Yellowwood, American  
(*Cladonia kentuckea*)  
formerly *C. lutea*

HARDI- NESS	FORM	HEIGHT	SPREAD	TRANS PLANT	MOISTURE	PROBLEM	BARK	FLOWER	FRUIT	FALL COLOR
4	I/B	40-70	40-70	E	M,D	II	X			G
5	B	20-30	20-35	I	M,D	f,g		X		G,Y
3	R,S	12-20	12-20	E	M,D	II			I	G
5	O,I	30-60	25-40	D	M,D	a,h		I	I	O,P,R
4	O,R,S	15-25	15-25	I	M	d		X	I	Y,O
5	O,P	35-50	20-30	D	M,D,P	h				R,O
5	R,B	75-100	75-100	E	M,P	f,n	X			B,Y
5	O,I	40-60	40-50	E	M,D,P	II		I	I	G,Y
5	O	75-100	35-50	I	M	f,g		I		Y
4	I,R	50-75	50-75	D	M,D	n				G,Y
5	O	20-30	10-15	E	M	II				Y
4	W	50-75	50-75	E	M,P	II				G,Y
3	O,R	40-60	30-40	E	M,P	II				G
4	R	40-50	40-50	I	M	g	I	X		Y

# Pruning

## Ornamental Shrubs

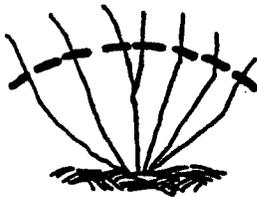
Gerald Smith, Extension Horticulturist

Almost all shrubs in your yard require pruning. Pruning helps produce attractive, well-formed, compact plants. Unsightly shrubs are often the result of not pruning, or pruning incorrectly.

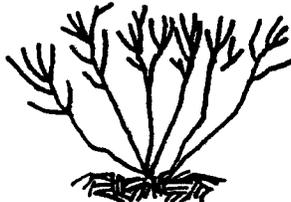
To get the best results from pruning, you need to know how it affects plants.

### What Pruning Does

1. Pruning stimulates new plant growth and the development of a more compact plant.
2. New growth as a result of pruning usually develops only near the points where cuts are made.



BEFORE



AFTER

3. Pruning limbs increases the development of short side branches.

Grateful appreciation is expressed to the research scientists in the Experiment Stations of the College of Agriculture and elsewhere for the development of research data on which this publication is based.

4. Pruned plants tend to grow from topmost buds.



BEFORE



AFTER

### *When to prune . . .*

Some gardeners believe that shrubs may be pruned only during the winter. This is not true. Many shrubs need light, periodic pruning throughout the growing season. Do not hesitate to cut out tall, unsightly limbs while they are growing.

By pinching out the tips of tender new growth you may stimulate growth of side limbs and lessen long, upward growth.

Heavy pruning should not be done in late summer or early fall. New growth as a result of pruning at this time often is killed.

Prune spring flowering shrubs soon after they bloom so as not to affect next year's flowering.

If severe pruning must be done, do it just before growth begins in the spring. Plants are better able to withstand the shock of heavy pruning at this time of year.

### *Prune shrubs when they are young . . .*

Begin pruning plants when they are very young. Early pruning causes the plant to develop a compact limb system near ground level. Obtaining a compact branching system is difficult if pruning is delayed several years.



Prune when young.

Pruning begun later.

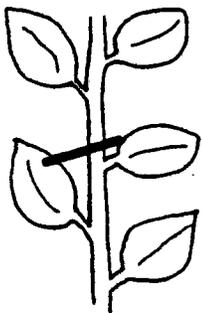
On small plants, prune back limbs to stimulate growth of side branches. Do this before growth in the spring, and again during the summer months.

### *Do not shear most shrubs . . .*

Shearing destroys the natural shape of many shrubs. To reduce size and to produce more compact growth, cut out the undesirable longer limbs from inside the plant. Do not cut all limbs at same height.

### *Cut properly . . .*

When removing limbs over one inch in diameter cut back flush to a larger limb or to a side limb. These precautions are not necessary for small limbs.



Cut just above leaf node.



Cut flush with larger limb.

### *Protect wounds . . .*

Protect wounds over an inch in diameter. Commercial tree wound compounds and asphalt paints are good for this purpose. Do not use paints containing creosote.

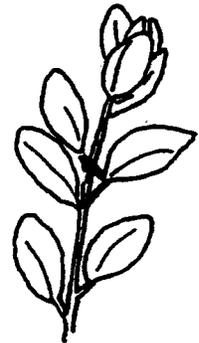
## Specific Pruning Suggestions for Various Shrubs

### *Azaleas . . .*

Contrary to popular opinion, most azaleas need pruning. The practice is especially desirable to produce more compact growth for the tall growing varieties.



Remove long azalea limbs back inside the plant.

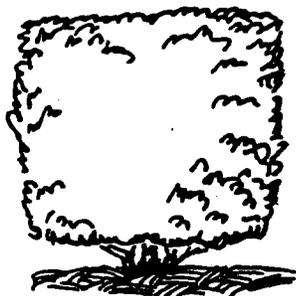


Pinch out tips of new azalea growth to induce branching.

Any heavy pruning should be done immediately after the flowering period. To induce branching, pinch out tips of new growth anytime after flowering until the first of July. Pruning after July 1 may reduce next year's flower production.

### *Boxwood . . .*

Cut out unsightly limbs before growth begins in the spring. Shear new growth once or twice during the summer months. When pruning, shear the entire surface area. Do not cut only across the top.



Pruning boxwood straight across top will produce unnatural shape



Prune entire boxwood to produce rounded effect.

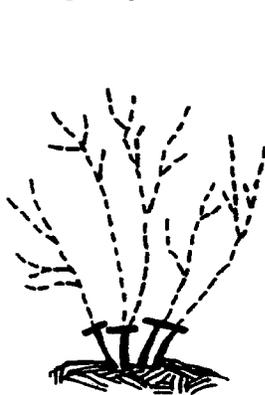
### *Camellias . . .*

*Camellia japonica* varieties require little pruning. If the plant is misshapen or too large, remove undesirable limbs at a point inside the plant.

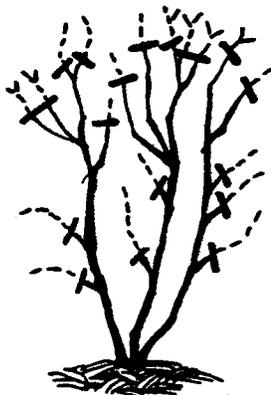
*Camellia sasanqua* varieties, however, may require considerable pruning. For a more natural effect, cut out individual limbs. Prune immediately after the flowering period to avoid affecting next year's flowering.

### *Crape myrtle . . .*

Heavy pruning in the spring before growth begins, plus proper fertilization, is the secret of abundant crape myrtle flowering.



Prune back to foot of ground level for compact, heavy growth.



For taller plants of crape myrtle, cut out only small branches.

To obtain heavy flowers on compact plants, prune stems back to within one foot of the ground level every year or every other year.

If you do not want a low type plant, prune limbs back to about thumb size. To produce small tree type plants, remove all except 3 or 4 main stems and cut off side branches up to the point where branches are desired.

### *Gardenias . . .*

Gardenias generally require little pruning. However, if a plant does become too large, prune it back just before growth begins in the spring. When the large plants are pruned heavily, frequent watering stimulates new growth.

### *Hollies . . .*

Many varieties of dwarf hollies are used in landscaping homes today. Begin pruning these plants during their first year. Pinch off tips of new growth during spring and summer months. This will keep the plants compact with little loss of growth.

Dwarf hollies lose their compact growth habit if pruning is neglected. If this should happen, cut out tall, undesirable limbs at a point inside the main body of the shrub.

Chinese hollies, such as *Burford* and *Cornuta*, also require frequent pruning. Too much pruning, however, will reduce berry production. If the plants get too large, they may be cut back to within a foot of the ground. Do this just before growth begins in the spring.

### *Vigorous, tall shrubs . . .*

*Ligustrum*, *Pittosporum*, *Cherry Laurel*, *Elaeagnus*, and other vigorous, tall growing shrubs produce compact growth only when pruning is heavy and frequent.

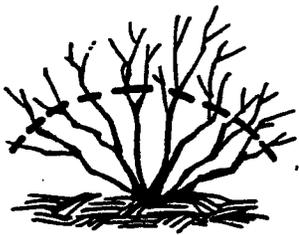
*Ligustrum*, if it becomes too large, may be cut back during winter months to within a foot of the ground level. Then to maintain compact growth, prune frequently.

## *Nandina . . .*

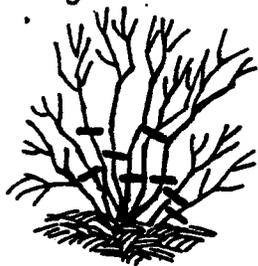
Nandinas should be pruned differently than most shrubs. If this shrub becomes unsightly or too tall, cut the entire plant back to near ground level anytime during the dormant period. Then each year during the winter cut out approximately  $\frac{1}{4}$  of the older canes. To stimulate new growth at the base of the plant, cut the canes near the ground level. Many gardeners do this during the Christmas season to obtain decoration material.

## *Spring flowering shrubs . . .*

Prune Spirea, Forsythia, Flowering Quince, and other spring flowering shrubs shortly after the flowering period. Remove individual limbs from inside the plant rather than shearing.



Do not shear spring flowering shrubs.



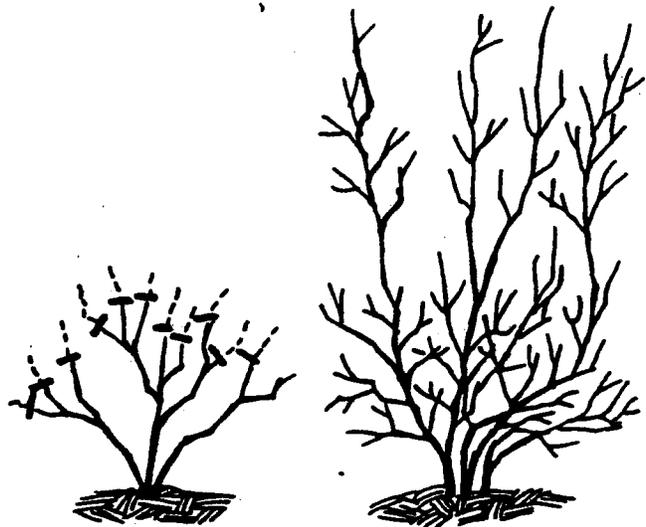
Reduce size of spring flowering shrubs by cutting inside plant.

## *Pyracanthas . . .*

Most Pyracanthas when purchased consist of a tall main stem. To induce base branching, cut this stem back to one-half its height. After new growth is 8 to 10 inches long, cut out tips to cause further branching. This will establish a compact, base-branching plant.

Pyracanthas tend to produce long, tall stems. This type of growth can be checked easily by pinching or cutting out the tips of the new growth during growing season. This will cause compact growth without the loss of berries.

Over-sized plants can be rejuvenated by cutting back all stems to within one foot above ground level anytime before growth resumes in the spring. This results, however, in loss of berries for one year.



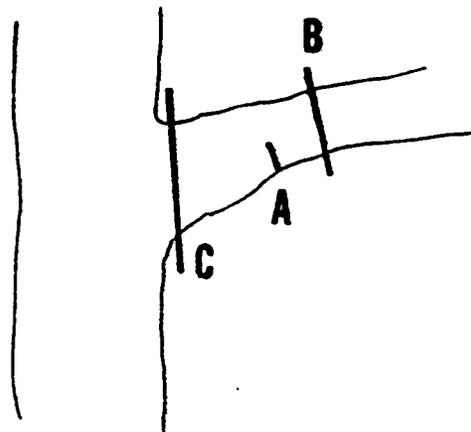
Prune Pyracanthas during growing season.

Pyracanthas not pruned during growing season easily get out of bounds.

## *Shade trees . . .*

Shade trees need little pruning. The practice of "topping" mature trees results in the death of thousands of shade trees annually.

When cutting off large limbs, never leave a stub. Such a wound heals slowly and permits fungus diseases to enter and weaken the tree, eventually leading to its death.



To remove a limb, make an undercut as shown at A. Saw limb as shown in B until it breaks. Make a third cut, C, as close to the main trunk as

possible. A cut flush with the main trunk or with a larger limb will heal over readily.

Apply a commercial tree wound compound to wounds over one inch in diameter.

### *Abelia . . .*

To keep the common varieties of Abelia within bounds, heavy pruning near ground level every 3 to 4 years is necessary. Cutting out tips of the new growth during the growing season also is beneficial.

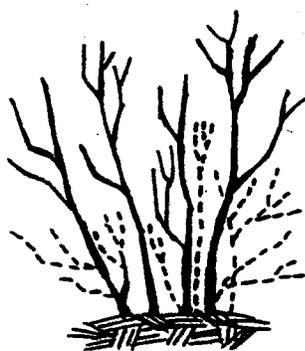
### *Narrow-leaved evergreens . . .*

Junipers, cedars, arborvitae, and other similar shrubs are difficult to keep pruned. Heavy pruning may cause them to die. Therefore, if these narrow-leaved evergreens become too large, they should be replaced.

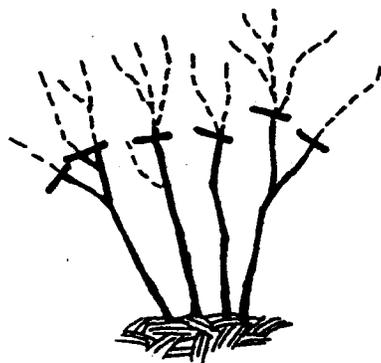
### *Roses . . .*

Bush roses should be pruned as soon as bud swelling occurs in the winter. This usually occurs from early February in South Georgia to mid-March in North Georgia.

Hybrid tea varieties (those usually used for cut flowers) may be pruned in two operations: (1) Remove all diseased or dead canes and spindling limbs; (2) reduce height of stronger remaining canes by removing one-half their length.



Step 1  
Remove all dead, diseased and spindling growth.



Step 2  
Cut strong canes back one-half.

Pruning roses back to approximately  $\frac{1}{4}$  inch above a bud is important. (There is a bud wherever a leaf is or was attached.) If this cannot be done, cut flush with a larger limb. This procedure causes more rapid healing of the wounds and thus reduces die-back disease troubles.

Climbing roses do not require as heavy pruning as bush varieties. It is best to delay pruning of climbing roses until after the first flush of flowers in the spring. Remove only the very old canes near ground level. Do not shear off new growth.



## TREE CITY USA BULLETIN

for the  
*Friends of Tree City USA*

Bulletin No. **1**  
James R. Fazio, Editor

# How to Prune Young Shade Trees

*"As the twig is bent, so grows the tree." This insightful old bromide about children might just as well serve as the cardinal principle for pruning young shade trees. What you do to your tree in its first few years of life will affect its*

*shape, strength, and even its life span. In importance, early pruning must rank just after selecting the right tree for the site, and careful planting.*

The sketch of the tree on the right represents what we like shade trees to look like 15 years or so after planting: a tall, straight trunk; and a full, healthy crown with strong, well-spaced branches... a tree that casts a broad expanse of sheltering shade, that resists damage by wind and ice, that is easy to maintain.

The sketch at the left also represents a 15-year-old tree. But it looks more like a big, rambling bush than a well-groomed shade tree. Its low-growing branches obscure streets, driveways, and walks, posing traffic hazards. Many branches have been damaged during storms, and weak, unsightly shoots sprout in abundance. Maintenance is badly needed and will now be expensive.

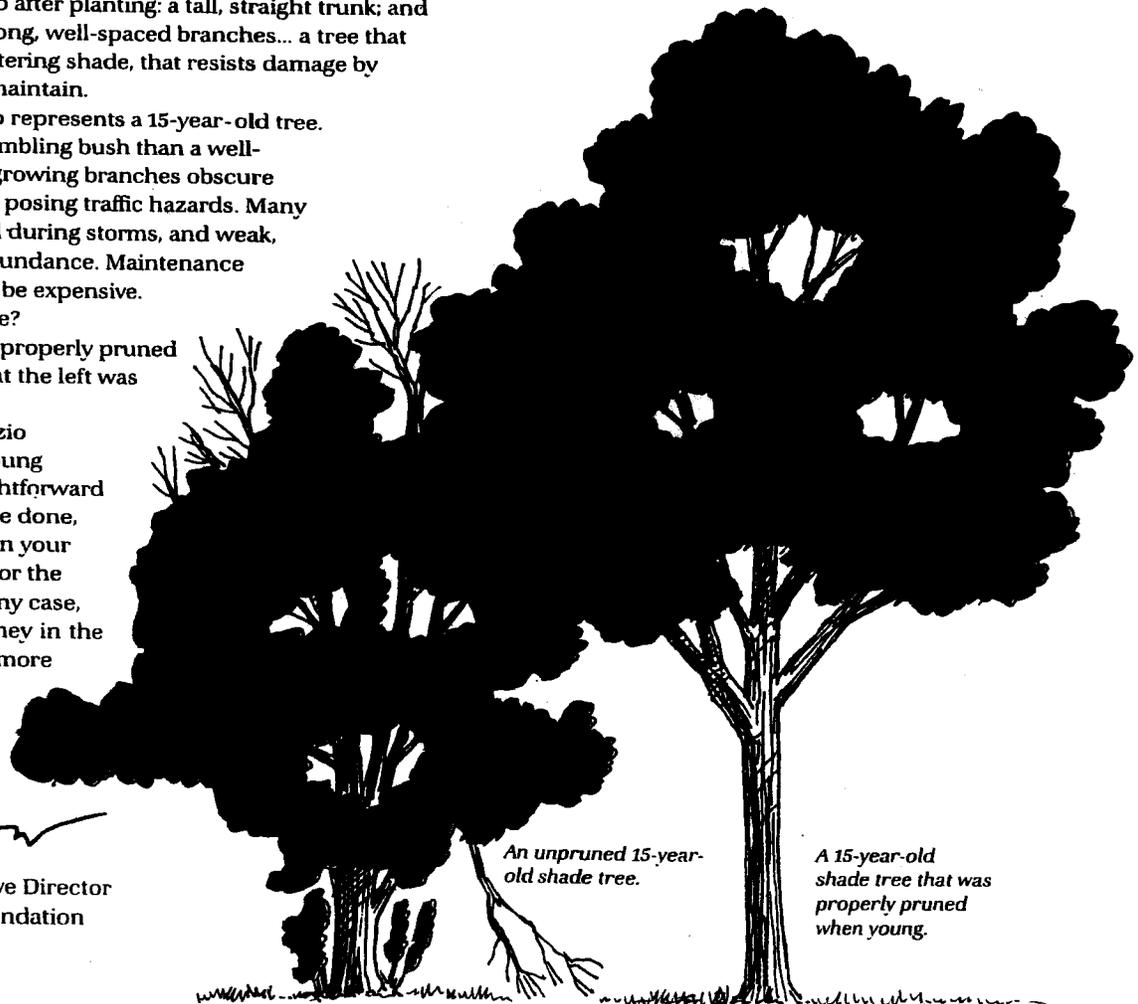
What made the difference?

The tree at the right was properly pruned when it was young. The tree at the left was neglected.

As Bulletin editor Jim Fazio skillfully explains, pruning young shade trees is a simple, straightforward task. It is a job that needs to be done, whether by you for the trees in your yard, or by your community for the trees on public property. In any case, proper pruning will save money in the long run, and give you safer, more beautiful, healthy, easy-to-maintain trees.

*John Rosenow*

John Rosenow, Executive Director  
National Arbor Day Foundation



An unpruned 15-year-old shade tree.

A 15-year-old shade tree that was properly pruned when young.

# A Tale of Two Trees

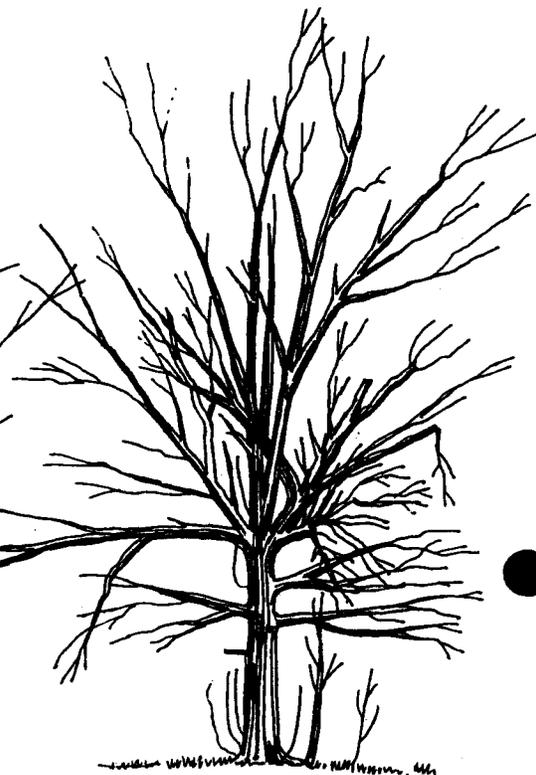
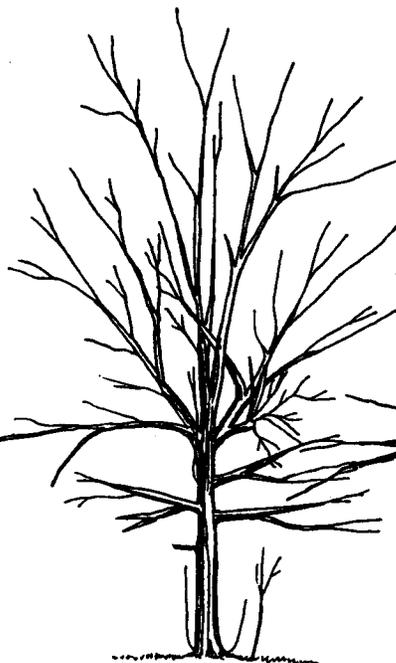
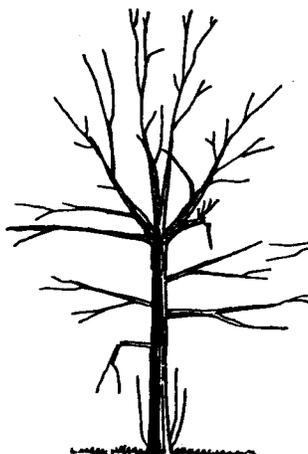
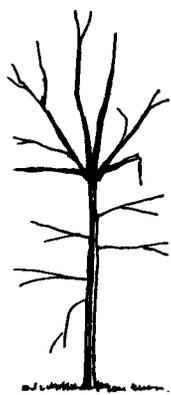
One happy day in May the all-American dream came true for two families. Brand new houses of their own in the suburbs. The good life for their kids. New friends and neighbors. More space and comfort. And good investments, too.

Now, it happened that both families loved trees, so they each promptly planted one to commemorate their new start

in life. Unknown to each other, both families planted trees that were the same species and the same age.

Looking ahead, we would expect the twin trees to eventually make a nice contribution to the neighborhood, each spreading its shade to grateful residents for generations to come. But, it was not to be. Unfortunately, Family A had the misguided belief that a tree should be left alone, just as it is in

## FAMILY A'S TREE — Not Pruned When Young



### At Planting

Family A didn't ask for planting instructions. They knew how to plant a tree. When that was done, they believed their work was done.

Actually, they were partly correct. You may receive instructions to the contrary, but little should be done to the tree at this stage. In most cases, it is best to leave all the leaf surface possible to manufacture food that will build a larger root system. It has been found that both roots and top will be larger after one year if left unpruned.

### After 3-4 Years

By the time many transplants are in their new home for 2 to 4 growing seasons, sprouts and suckers may appear. The root suckers protruding near the base sap strength from the tree. The sprouts are disproportionately vigorous and weakly attached to the tree. And look at the broken limb. By now, it has sprouted numerous branches just below the break — too many, in fact.

### After 5-7 Years

The baby is quickly becoming an adult. The results of not making corrections early in life are now quite visible, although some are still not obvious to the untrained eye. To the more careful observer, the form of the future crown is apparent.

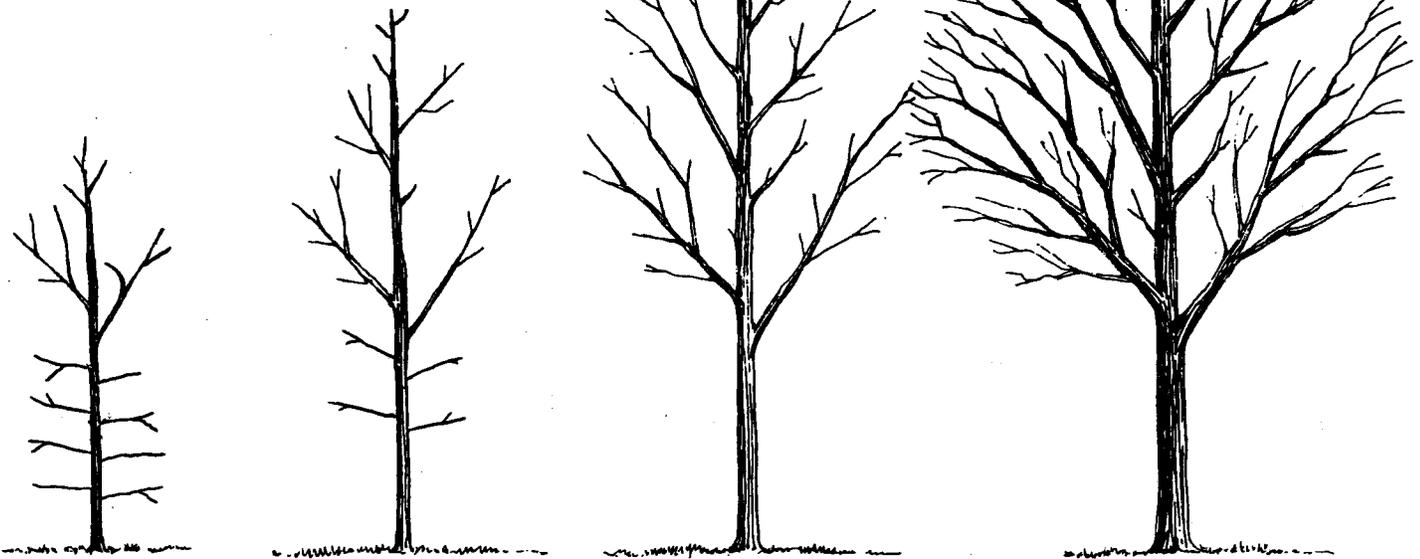
### 15 Years After Planting

Family A's tree is now not only unattractive, but dangerous, especially when the wind is blowing. Lopsided and dense, the tree in full leaf catches the wind like a sail. Also, the narrow branch angles and multiple leaders have resulted in a weak top. The broken branch not only attracted insects, but may soon break off under the weight of too many sprouts. Decay has entered the trunk where the little bent branch tore off many years ago and a jagged stub protrudes just above it. The tree is an accident waiting to happen. It is becoming more of a liability than an asset for the property.

the forest. Family B knew better. They realized that a tree in the yard or along a street is not growing there because ecological sorting matched its needs to the site. It is there because it was planted there; Nature's method was circumvented. The new transplant is probably on poor soil that is then subjected to the trampling of hundreds of

footsteps. It most likely is not enjoying the optimum conditions of sunlight or shade, and it certainly does not have the advantage of forest neighbors to shield it from wind, prune its lower branches, and form the outline of its crown. In short, it needs help.

## FAMILY B's TREE — Pruned When Young



### At Planting

Family B also planted their tree correctly, but they also noticed a broken branch and a branch that was competing with the leader. Both were pruned close to the trunk. Another, swollen from the sting of an insect laying eggs (a gall), was snipped off. Otherwise, all branches were left intact to provide maximum leaf surface to manufacture food during the first year of life in its new home.

### After 3-4 Years

By now root growth should be well on its way to anchoring the transplant and expanding to the size necessary to nourish the growing branches. Family B decides to cut off the root suckers and sprouts in the crown. Other excessive branches are thinned to reduce competition for light, water and nutrients, and a co-dominant leader is removed. A few of the lowest limbs are also removed, but others are temporarily left to help the trunk develop more taper and strength.

Growth is far enough along to reveal problems developing such as branches that rub or are growing in an undesirable direction. Narrow angles are also eliminated for reasons explained on page 4.

### After 5-7 Years

Now is the time to make a good tree even better: Lower limbs are pruned off to "raise" the bottom of the crown well out of the way of human heads. The lowest limbs are now the permanent lowest limbs. *An important fact is recognized here. Branches do not move upward as a tree grows taller. The center of a branch at 5 feet will always be at 5 feet.*

Higher up, a few overzealous branches are cut back so they do not protrude beyond the graceful outline of the crown. A branch here and there is removed for more even spacing — but basically the job of sculpturing the tree is now complete.

### 15 Years After Planting

Family B was amazed to see their tree survive a major wind storm one summer day. While many other trees in the neighborhood suffered split tops and broken limbs, their's stood strong and firm. Proper pruning gave strength to the branches and allowed the wind to pass harmlessly through the thinned crown. Early each spring, the tree gets scrutinized and dead or damaged limbs are cut off using proper pruning methods. Otherwise, Family B has only to enjoy the beauty and shade of their tree. And what do you know? Just before they moved recently, the real estate agent told them it was the trees in their yard that helped sell the property so quickly.

# Pruning for Strength

The first guide to pruning a young shade tree is to have a clear understanding about what pruning can do for the tree — and you.

For example, we know to prune modestly — if at all — when transplanting a new tree. An immediate objective must be to strengthen and expand the root system which is usually reduced by 80-90 percent during transplanting. To meet this objective, as much as possible of the leaf surface (the tree's

food factories) is left intact. Only damaged or dead limbs should be removed.

After the first year, pruning should begin in earnest. Pruning with strength as the objective is the best way to avoid weak branches later on, and to prevent expensive corrections that will otherwise become necessary.

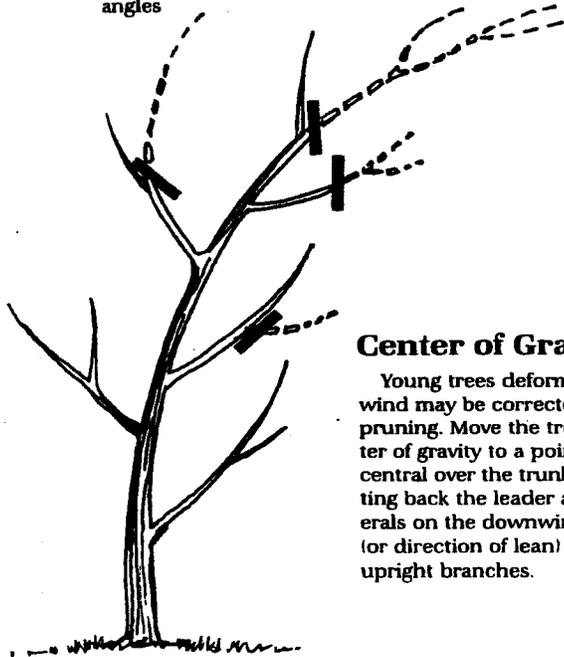
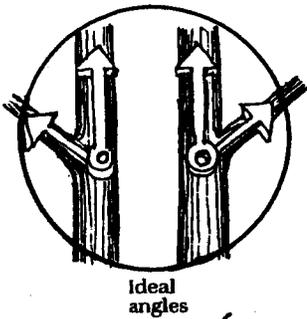
What to look for:



## Branch Angles and Size

Narrow angles signal a point of future weakness, whether in the trunk or crown. The reason is that as the two branches grow, neither has sufficient space to add the wood needed for strength. Instead, they grow against each other. The effect is similar to hammering in a wedge. To prevent this and the expensive problems that are sure to follow, simply remove one of the two branches. For strength, the ideal branching angle approximates 10 or 2 o'clock.

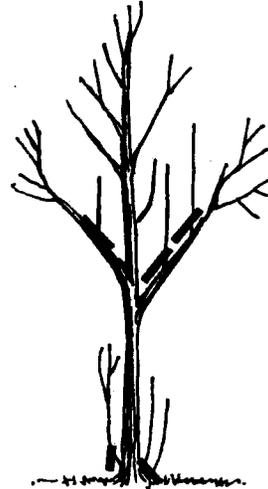
Lateral branches should be no more than  $\frac{1}{2}$  to  $\frac{3}{4}$  the diameter of the trunk. As the trunk grows it will strengthen the joint by adding wood around the branch — like a dowel in a chair leg.



## Center of Gravity

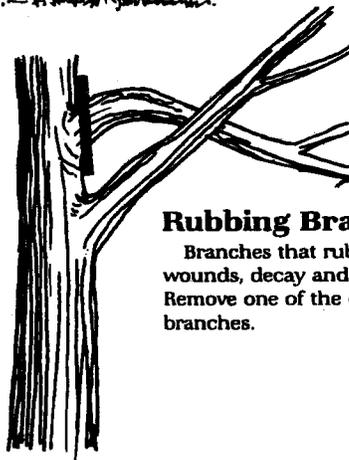
Young trees deformed by wind may be corrected by pruning. Move the tree's center of gravity to a point more central over the trunk by cutting back the leader and laterals on the downwind side (or direction of lean) to more upright branches.

**Caution:** When pruning diseased trees, dip your shears in household bleach before storing or moving to the next tree. Be sure to rinse and wipe dry before storage.



## Watersprouts and Suckers

These "parasite" sprouts can occur at the base or inside the crown. They are rapidly growing, weakly attached, and upright. Usually they use more energy than they return to the tree. It is best to remove them as soon as possible when it is obvious they are vigorous sprouts.

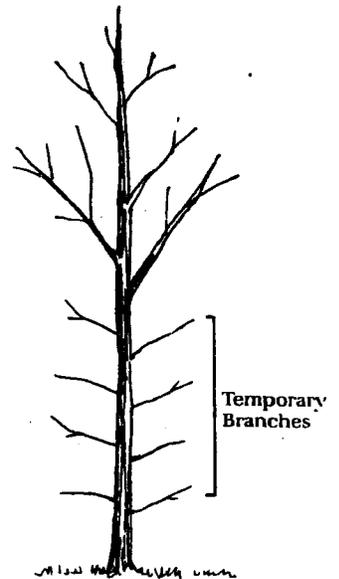


## Rubbing Branches

Branches that rub result in wounds, decay and notches. Remove one of the offending branches.

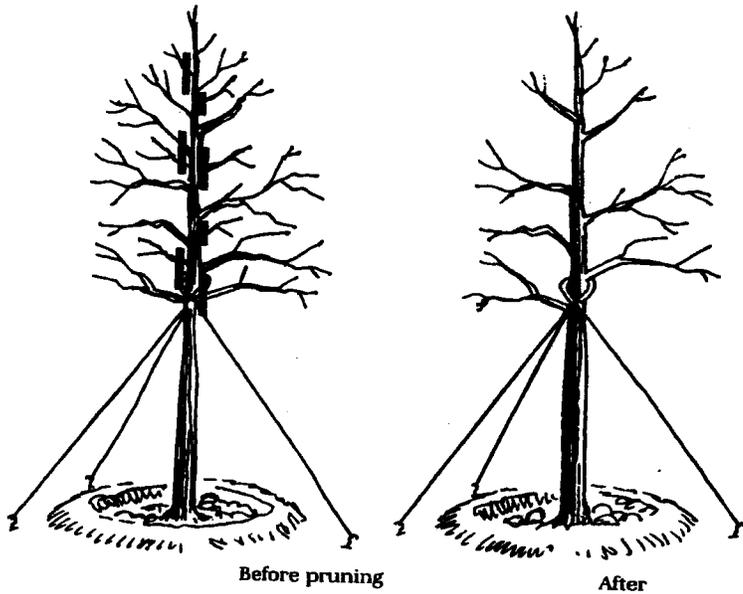
## Temporary Branches

Branches below the lowest permanent branch can protect young trees from injury from the sun and add taper and strength to the trunk. Particularly in lawn plantings where lower limbs do not block passage or tempt vandals, the limbs may be left for 3-4 years after planting. Then remove over the next 2-3 years, beginning with the larger temporaries. Don't let the temporary branches become large and vigorous. Shorten the larger temporary branches, or remove vigorous temporaries if less vigorous ones can be selected.



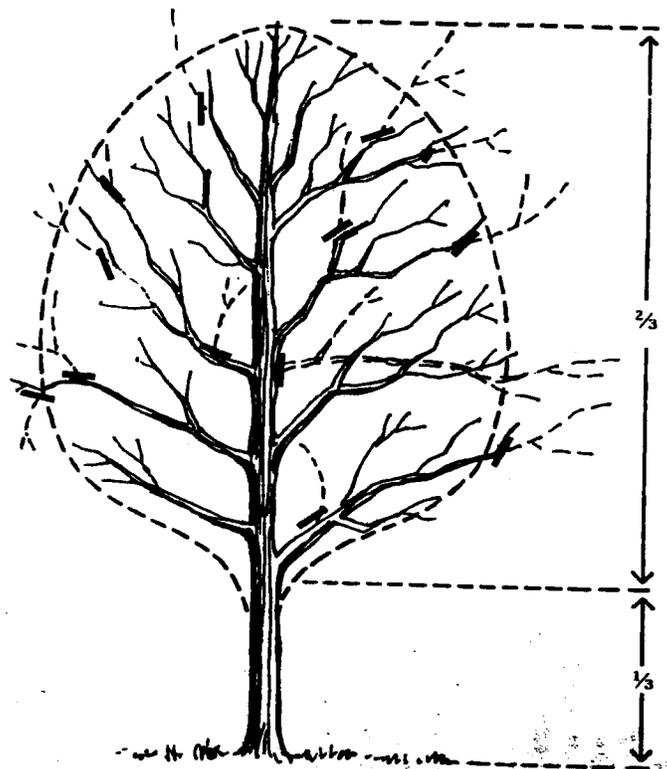
# Pruning for Form

The objective in pruning for form is to help shape a tree that is aesthetically pleasing and serves well in the space it is to occupy. After pruning with strength in mind, look for ways to help shape the most desirable tree.



## Thinning and Spacing

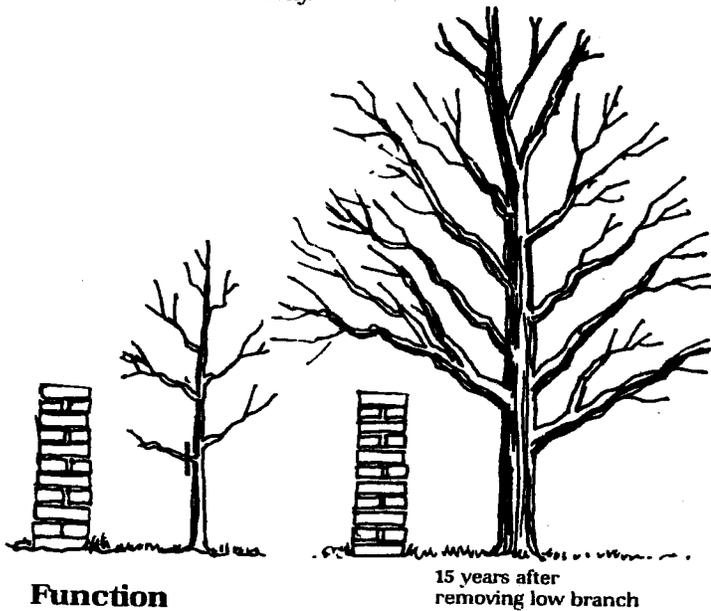
Most trees benefit from thinning — removing a portion of the limbs that compete for space and light. Evenly spaced laterals, 8-12 inches apart in the young tree, is a good rule of thumb to help assure an ideal "ladder" at maturity.



## Ingrowers

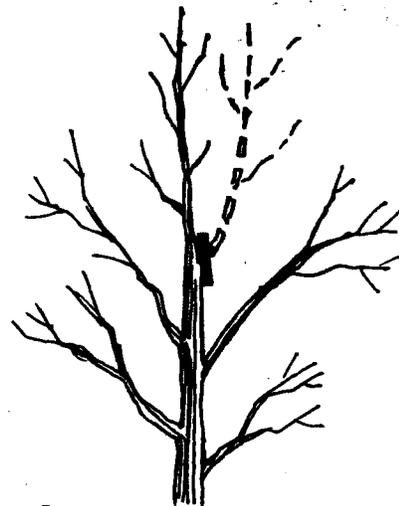
### Protruders and Crown Ratio

When a crown is dense, look for limbs that turn inward and those that extend beyond the "natural" outline of the crown. Prune at the trunk or down to an appropriate lateral branch. Over-pruning can damage or even kill your tree. Always maintain at least 1/3 of the tree as the live crown.



## Function

Try to imagine what the tree will look like when it is larger. If a limb is headed toward trouble (the house, walkway, sign, etc.), remove as early as possible in the life of the tree. Closure of the wound will be more complete when the limb is small, and it is less trouble and expense. Remember, limbs do not move upward as a tree grows in height.



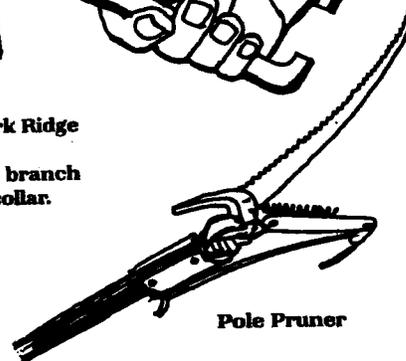
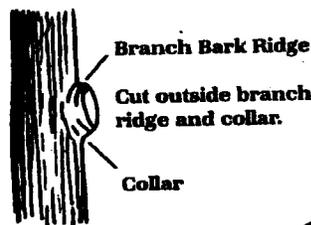
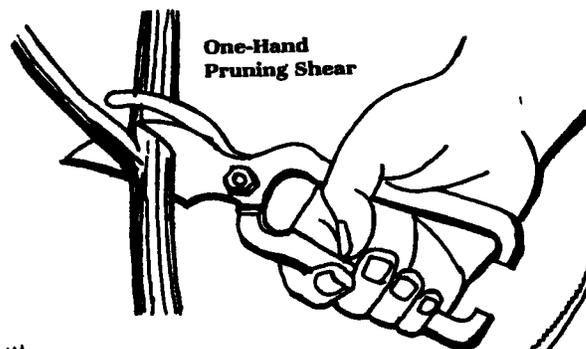
## Double Leaders

Protect the leader from competition. In trees with co-dominant leaders, remove the one with a crook or other defects, or that creates a lop-sided appearance.

**Caution:** Do not prune too high too quickly. To "lift" (raise) the crown, remove lower limbs over several years. No more than 1/3 of the live crown should ever be removed in a single cutting.

# Keys To Good Pruning

1. Prune early in life of the tree so pruning wounds are small and so growth goes where you want it.
2. Begin your visual inspection at the top of the tree and work downward.
3. Identify the best leader and lateral branches (scaffold limbs) before you begin pruning and remove defective parts before pruning for form.
4. Don't worry about protecting pruning cuts. For aesthetics, you may feel better painting larger wounds with a neutral-color tree paint, but the evidence is that it does not prevent or reduce decay.
5. Keep your tools sharp. One-hand pruning shears with curved blades (secateurs) work best on young trees.
6. Make safety a number one priority. For high branches use a pole pruner. Some, like the one pictured, have both a saw and shears on the same tool. A major job on a big tree should be done by a professional arborist.
7. When you prune back to the trunk or a larger limb, branches too small to have formed a collar (swollen area at base) should be cut close. (Notice in the drawing of the pruning shears that the cutting blade is cutting upward for less effort and a close cut.) Otherwise, follow the rules of good pruning of larger limbs by cutting just outside the branch ridge and collar and at a slight down-and-outward angle (so as not to injure the collar). Do not leave a protruding stub.
8. When simply shortening a small branch, make the cut at a lateral bud or another lateral branch (referred to as "head" or "headback pruning"). Favor a bud that will produce a branch that will grow in a desired direction (usually outward). The cut should be sharp and clean, and made at a slight angle about ¼ inch beyond the bud.



Correct Pruning Cut



Too Close



Too Long



Too Slanted

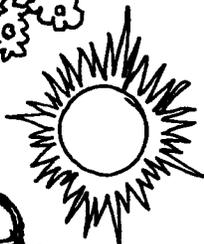


## When To Prune

depends to a large extent on why you prune. Light pruning and the removal of dead wood can be done anytime. Otherwise, here are some guidelines, but recognizing that individual species may differ:



**Winter** Pruning during dormancy is the most common practice. It results in a vigorous burst of new growth in the spring and should be used if that is the desired effect. It is usually best to wait until the coldest part of winter has passed. Some species, such as maples, walnuts and birches, may "bleed" when the sap begins to flow. This is not harmful and will cease when the tree leafs out.



**Summer** To direct the growth by slowing the branches you don't want; or to slow or "dwarf" the development of a tree or branch, pruning should be done soon after seasonal growth is complete. The reason for the slowing effect is that you reduce the total leaf surface, thereby reducing the amount of food manufactured and sent to the roots for their development and next year's growth of the crown.

Another reason to prune in the summer is for corrective purposes. Defective limbs can be seen more easily, or limbs that hang down too far under the weight of leaves.



**Fall** Because decay fungi spread their spores profusely in the fall and healing of wounds seems to be slower on fall cuts, this is a good time to leave your pruning tools in storage.



**Flowering Trees** If your purpose for pruning is to enhance flowering; 1. For trees or shrubs that bloom in summer or fall on *current* year's growth (e.g., crape myrtle), prune in winter. 2. For trees that bloom in spring from buds on one-year-old wood (e.g., dogwood and flowering fruit trees), prune when their flowers fade.

**Caution:** In some areas of the country, diseases or insect occurrence may be affected by the time of pruning. Check with your county extension agent or city forester; or an arborist or nursery operator to see if there are any local problems.



TREE CITY USA

# Pruning Is A Vital Part Of Any Urban Forestry Program

A survey conducted by the American Forestry Association (AFA) showed that many of the nation's urban forests are in serious trouble. To stem the decline of shade trees, more and more communities are engaging in vigorous planting programs. The magnitude of this effort may vary from a few dozen park trees in small towns to the annual planting of thousands of trees in large cities. In all cases, the investment is significant. AFA's Gary Moll suggested that 20 percent of an urban forestry budget should be allocated to planting and early care.

It follows that the early care of new trees is one of a community's best ways to maximize its investment in planting. Systematic pruning of trees during the first several years of growth should be an integral part of the program.

A basic message of the Tree City USA program is to encourage proper shade tree care. Early pruning is part of the care necessary for strong, healthy beautiful trees. Of the four standards listed on the back page of this bulletin, time spent pruning young trees would contribute to Standard 2 as a part of the comprehensive community

forestry program. In every way, your community will gain from making early pruning a part of the urban forestry program.

Within a tree maintenance program, urban foresters and arborists have suggested that the following steps be included:

1. Minimum pruning immediately after transplanting; within 3 years, pruning for strength and form; and every 3 years thereafter to remove the canopy of dead, broken, or diseased limbs over sidewalks and 14 feet above the ground.
2. Pruning to remove dead, broken, or diseased limbs; to correct trunk defects; to correct form; to remove Crowns that are overhanging or overtopping; to correct pruning wounds.
3. Street trees should be pruned to clear sidewalks.
4. Dead limbs should be removed within 24 hours of their appearance.
5. More...

## For The Best Start, Start in the Nursery

A good tree management program begins with selecting good trees. When choosing trees for city plantings, plazas, streets and in parks and other public

places, you should look for trees that are healthy, even if they are not the best look for:

### Bare root trees

Abundant, deep green foliage and numerous small roots, good color, moist.

### Balled & Burlapped trees

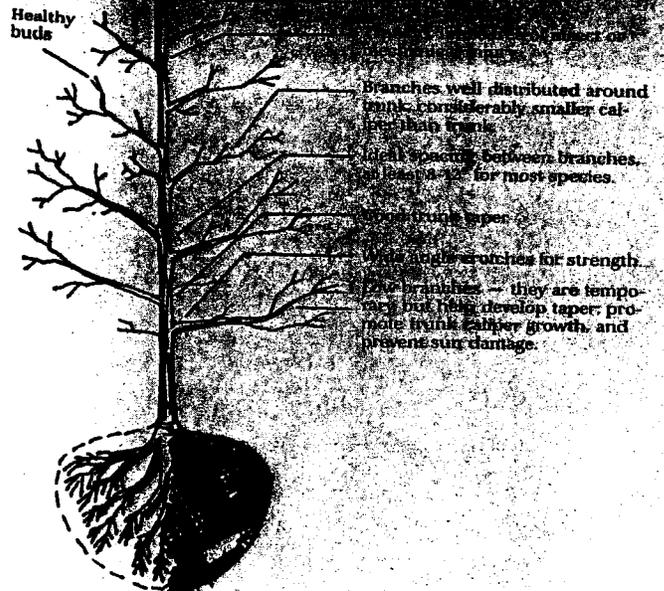
Firm soil ball with tight mesh burlap. Do not accept a plant with a broken "ball". Do not accept plants with a circling root at the base of the trunk. Always carry B&B plants by the soil ball, not by the trunk, stems or branches.

### Container grown trees

Avoid trees that are "root-bound" in the can. Roots that circle around the edge of the container may become circling roots. Because of this, B&B trees are generally preferred. Always remove can, basket or pot when planting. (Cut any circling roots when planting.)

For some street plantings, such as next to narrow sidewalks, it may be necessary to plant trees that immediately have high crowns. In this case, the height of the lowest limbs should be specified when ordering from the nursery. However, whether raising the crown during the years after planting, or as the trees are grown in the nursery, it is generally important to maintain a ratio of 2/3 green top to 1/3 pruned trunk.

Tree boards should be wary buyers. Carefully write specifications and be sure an expert inspects the trees before accepting delivery on behalf of the city. After a good start with good nursery stock, remember — a program of pruning young trees is a wise, long-term investment.



# NAVY HOUSING YARD MAINTENANCE GUIDE FOR OCCUPANT USE

## D. MOSQUITO CONTROL

The Preventive Medicine Unit (PMU) and the Public Works Center cooperate in combating mosquitoes throughout the Naval Base. PMU conducts mosquito surveys and inspections to locate and identify breeding sources, and to determine the kinds and relative abundance of mosquitoes present. The Public Works Center conducts actual control operations by eliminating breeding sites or treating them with a larvicide, and by fogging periodically to kill any adults already present.

## E. CLOTHESLINES

Swings and other items may not be attached to clothesline poles. When necessary, repair of clothesline poles will be done by Maintenance. Replacement of the clothesline is your responsibility. This item is available at Self Help. Do not use makeshift lines which are in any way attached to the building.

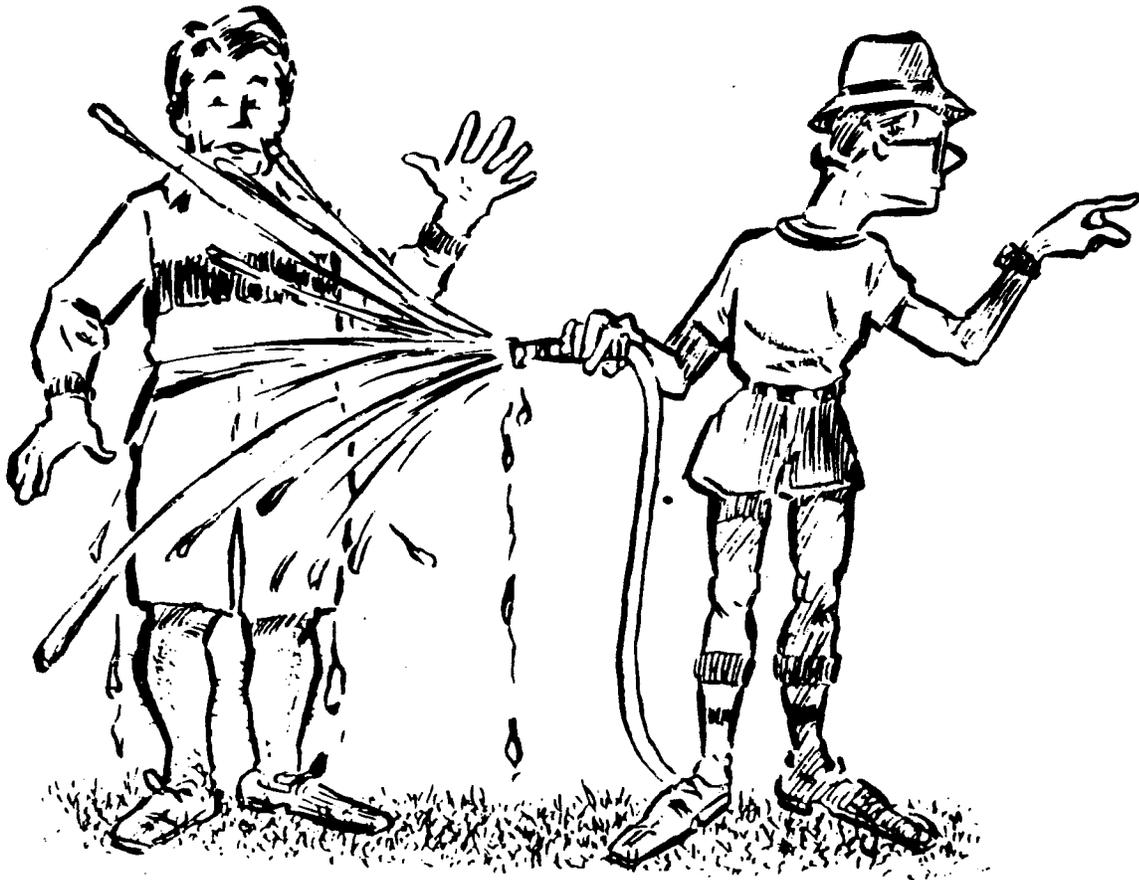
## F. GROUNDS MAINTENANCE

You are expected to maintain the grounds around your unit to fifty feet out (except brick row residents), or to the nearest sidewalk, street, security fence, vacant lot, or to the halfway line between buildings. The Project Manager will identify the area of responsibility for grounds maintenance during the check-in inspection. Any questions regarding boundaries should be referred to the Housing Department. Exhibit D, in the rear of this Handbook, identifies lawn areas of responsibility for the 14-family buildings.

You are required to adhere to certain grounds maintenance standards. Your grounds will be inspected regularly by the Housing Department. You will be requested to correct any discrepancies. Repeated violations may result in eviction.

**SNOW REMOVAL.** You are required during and after winter snow and ice storms to clear the front and rear sidewalks to quarters, including walks leading to and from the street, garage, or dumpster area. Also clear driveways and off street parking spaces. Any vehicles left snowbound after two days will be removed from the housing area at the your expense. Everyone's cooperation is needed during the snow season. Rock salt can be picked up at Self Help.





WATERING. When required you should water grounds in the early morning or late afternoon since evaporation is greatest during midday. Continued sprinkling after the ground is saturated must be avoided to prevent run-off, erosion, and general waste of water. The saturation point is normally reached after 15 minutes of water in any one spot.

FERTILIZER. You are responsible for the application of fertilizer to feed lawns, shrubs, and hedge plantings on an as needed basis. Grass seed and fertilizer can be obtained at Self Help. Top soil for flower bed and lawn patching can only be picked up in the storage area between California and Delaware Avenues, in Forrestal Village.

MOWING. Lawns will be kept neat and orderly by mowing as often as required to maintain the grass at a height within the range of a 1-1/2 inch minimum to a 4 inch maximum. Frequent mowing encourages grass to spread laterally into tight sods. If lawns are mowed on a once-a-week schedule, the grass would normally be about 1/2 to 3/4 inch higher than the established cutting height. The clippings would be short enough to sift back into the lawn, thereby eliminating the job of raking or sweeping. Push lawn mowers are available at Self Help.

RAKING. Grounds will be raked as often as necessary to keep the area free of fallen leaves and litter. Rakes are available at Self Help. Rakings should be collected in trash cans or boxes and placed at the curb on collection days for curb side garbage pickup, or in the dumpsters for those who have dumpster pickup. You are responsible for picking up waste paper and other litter on the lawn adjacent to your housing unit. The source of most of this litter is careless placement of garbage and refuse in garbage cans, containers, or dumpsters. You can help reduce the excessive amount of litter in housing areas by placing lids tightly on garbage cans, and by not entrusting the job of placing trash in garbage cans or dumpsters to small children.

EDGING. A neat clean edging along walks and flower beds must be maintained. Scalloped effects and unsightly gullies between lawns and walks should be avoided. Edging cuts should be vertical and should run parallel to the edge of the walk. Grass shears are available at Self Help.

PRUNING AND TRIMMING OF SHRUBS AND HEDGES. You must trim and prune shrubs and hedges around your quarters as often as required to maintain a neat and attractive appearance, and to prevent encroachment upon structures and utilities. Existing shrubs or hedges located at intersections or adjacent to streets should not exceed three feet in height. Other hedges should not exceed six feet in height. Hedge clippers are available at Self Help. Tree trimming throughout the housing area will be performed by PWC. Additionally, hedges which parallel the road and are accessible to tractor clipping will be trimmed by PWC.

CULTIVATING OF BEDS. The width of flower and shrub beds generally are not to exceed four feet and are to be confined to spaces adjacent to government quarters. Appropriate vines or other ground cover plants may be planted in beds beneath shrubs to avoid unnecessary tillage. The practice of cultivating areas around trees is undesirable. Grass should be grown instead. Garden tools are available at Self Help.



