

**Environmental Assessment for
Tree Clearing Activities at the
National Aeronautics and Space Administration
Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, Virginia 23337**



January 1, 2000

Final

PREFACE

This *Environmental Assessment for Tree Clearing Activities at NASA's Wallops Flight Facility* has been developed by Occu-Health, Incorporated (OHI) for the NASA Goddard Space Flight Center's (GSFC) Wallops Flight Facility Environmental Office, Code 205.W, under Contract Number NAS5-98158.

This report was prepared by OHI for the exclusive use of the Wallops Flight Facility. This report was performed in general accordance with NASA document NHB 8800.11, *Implementing the Provisions of the National Environmental Policy Act* and *NASA Procedures and Guidelines for Implementing the National Environmental Policy Act and Executive Order 12114*.

**ENVIRONMENTAL ASSESSMENT
FOR TREE CLEARING ACTIVITIES
NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND,
ACCOMACK COUNTY, VIRGINIA**

Lead Agency: NASA Goddard Space Flight Center's Wallops Flight Facility

Proposed Action: Clearing trees obstructing program activities at the Goddard Space Flight Center's Wallops Flight Facility.

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EXECUTIVE SUMMARY

NASA Goddard Space Flight Center's Wallops Flight Facility (WFF) and its tenants conduct many programs that need unobstructed airspace. However, in certain areas, there are trees that intrude into this air space. These intrusions pose operational and/or safety concerns.

This Environmental Assessment (EA) addresses situations that meet the following conditions:

- Wallops' existing programs or activities that require unobstructed air space.
- New programs or activities not requiring their own National Environmental Policy Act (NEPA) considerations (EA or Environmental Impact Statement [EIS]).
- Re-growth of trees that interfere with existing or new programs or activities at WFF.

NASA proposes to cut and remove the trees in accordance with the Vegetative Management Plan (Resource Management Associates, 1997) and through a process including assessment, planning and cutting. Limitations to the cutting activities will be determined during the assessment and planning stages. Several factors may pose limitations to the cutting activities. Those factors include tree removal budget, erosion and sedimentation laws, wetlands regulations, equipment, size of the project, and ownership of the trees and/or land.

Alternatives to the proposed action include limitations or modifications to avoid intruding trees, program relocation, and no action. All the alternatives reduce the effectiveness of the programs to unacceptable levels.

The environmental consequences of the proposed action are discussed along with mitigating efforts. Various environmental factors were identified that may be affected. They include soil, surface water, wetlands, noise, electromagnetic radiation, plants, wildlife, and threatened and endangered species. The community may also be affected.

Tree cutting or removal may erode soils. Eroding soil may pollute surface water. Wetlands may be significantly altered. Tree removal may destroy endangered species' nesting areas. The community may object to tree removal. Various practices can reduce or eliminate each of these adverse effects. Noise, electromagnetic radiation, plants, and wildlife may also be affected, but the effects are minimal.

NASA intends to notify its tenants prior to any tree clearing in, or surrounding, the land permitted to that tenant. Moreover, if it is determined through application of this Environmental Assessment for Tree Clearing Activities that additional assessment is required prior to tree clearing activities, the affected tenants will be forwarded a copy of the additional assessment.

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1.0 PURPOSE AND NEED

1.1 Need

NASA Goddard Space Flight Center's Wallops Flight Facility (WFF) and its tenants conduct many programs that need unobstructed airspace. However, in certain areas, there are trees that intrude into this air space. These intrusions pose operational and/or safety concerns.

This Environmental Assessment (EA) addresses situations that meet the following conditions:

- Wallops' existing programs or activities that require unobstructed air space.
- New programs or activities not requiring their own National Environmental Policy Act (NEPA) considerations (EA or Environmental Impact Statement [EIS]).
- Re-growth of trees that interfere with existing or new programs or activities at WFF.

This environmental assessment applies to any program that meets these conditions and is not large enough to require its own NEPA (EA or EIS) considerations. If a program is large enough to require its own NEPA considerations, the need for unobstructed air space will be addressed in those documents.

NASA intends to notify its tenants prior to any tree clearing in, or surrounding, the land permitted to that tenant. Moreover, if it is determined through application of this Environmental Assessment for Tree Clearing Activities that additional assessment is required prior to tree clearing activities, the affected tenants will be forwarded a copy of the additional assessment.

The need for clear air space varies according to the program. Some examples include activities that require a clear line of sight to allow an unobstructed view, antennae that require a clear path for radar and radio waves, or airport operations and runways that require a clear space for aircraft departing or landing safely.

1.2 Background

Wallops provides resources and expertise to the air and space-based scientific and technology communities. WFF uses its research airport, fixed and mobile launch range, and orbital tracking facilities to provide frequent, cost-effective, and quick response to flight opportunities and data. The project management, design, fabrication, testing, and operations expertise of the Wallops workforce, and its tenants, enable NASA, other government agencies, and industry to meet prescribed objectives. These objectives include supporting the development of new technologies to increase the capabilities of launch platforms.

WFF consists of three separate sections of real property: the Main Base, the Wallops Mainland and Wallops Island. The Main Base includes the airport, most administrative buildings and some research facilities. The Main Base is located in northeastern Accomack County, Virginia, approximately 2 miles east of US Route 13. The Mainland includes radar antennae, and control buildings. The entrance gate for the Mainland and Wallops Island is approximately 6 miles

south of the Main Base. Wallops Island includes the rocket launch range and its tenants. Section 3.0 gives additional information about Wallops pertinent to this environmental assessment.

1.3 Specific Needs

Many activities at Wallops meet the conditions stated in Section 1.1. The four areas discussed are (1) airport runway clearances, (2) the view from the Range Control Center, (3) directional antennae, and (4) camera stands. This environmental assessment also applies to future situations that meet the conditions.

1.3.1 Airport Runways

The Federal Aviation Administration regulations require clear airspace above imaginary surfaces for precision runways (14 CFR 77.25) such as those at WFF. The regulations designate a runway as precision based upon the level of instrumentation at the airport. In the Approach Zones, the air space at the ends of the run ways, must slope up at a rate of 50:1, 50 horizontal units to 1 vertical unit. The Transition Zones, the air space at the sides of the runways, must slope up at a rate of 7:1, 7 horizontal units to 1 vertical unit. A 30-meter (approximately 98 feet) tree 1,450 meters (4,760 feet) from the end of a runway will intrude 1 meter (3.3 feet) into the Approach Zone of that runway.

Figure 1-1 shows an aerial view of the runways. Figure 1-2 illustrates various imaginary surfaces around an airport including approach zones and transition zones around precision runways.

Trees break into the air space above these imaginary surfaces. Figure 1-3 shows where this may occur for a 120-foot-tall tree.



Figure 1-1 Aerial view of Wallops' Runways

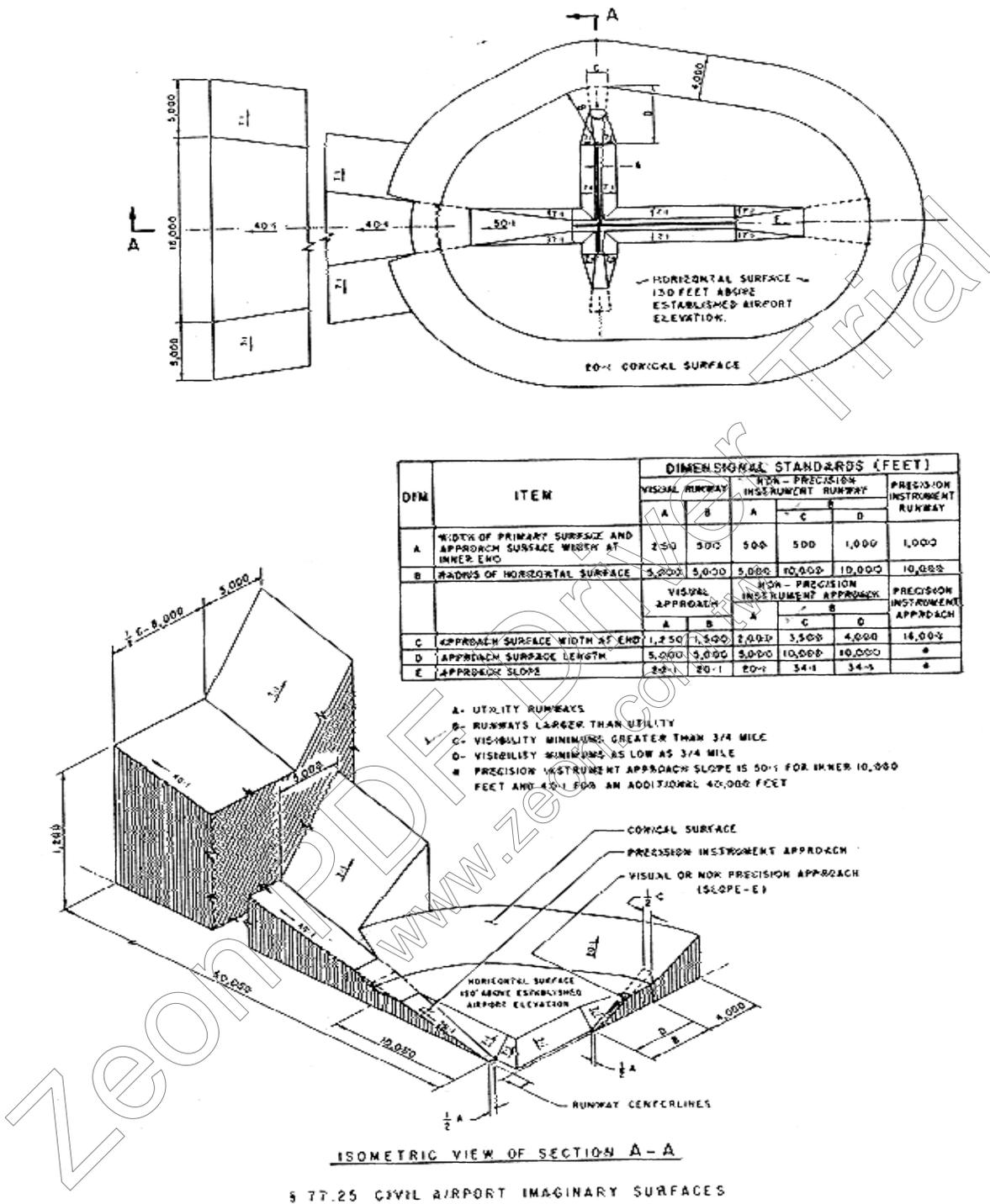


Figure 1-2	Slopes of Imaginary Surfaces for Runway Clearance
June 22, 1999	From Federal Aviation Agency Regulations, 14 CFR 77.25

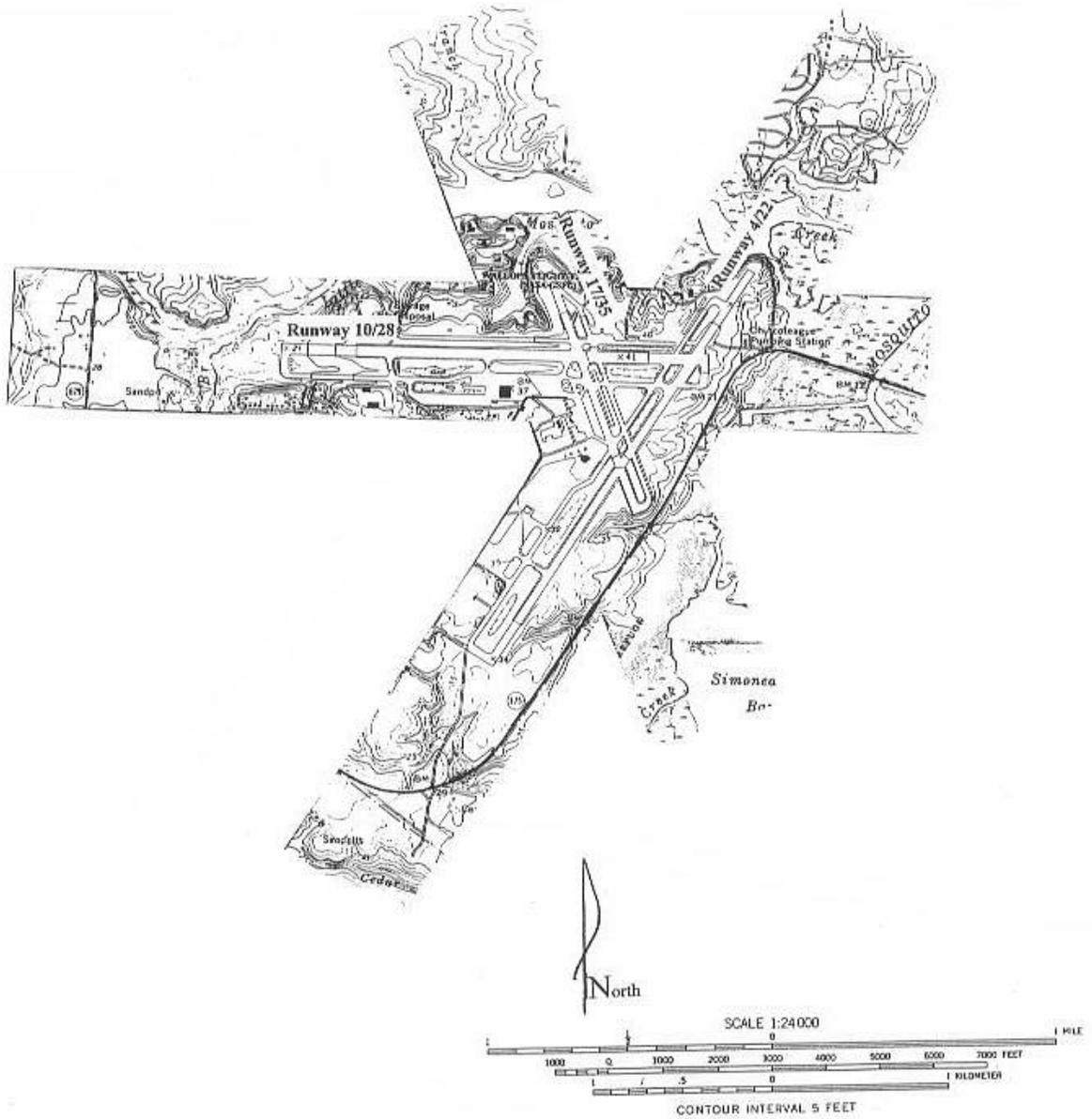


Figure 1-3	Areas around runways where trees may intrude into airspace.
June 23, 1999	Compiled from Chincoteague West and Hallwood USGS 7½' Series



Figure 1-4 Range Control Center between Buildings E-106 and E-107.

1.3.2 Range Control Center

The Range Control Center uses a windowed cab to view project activities along the runways and launch range. The cab sits between buildings E-106 and E-107 at the Main Base, as shown in Figure 1-4. Range personnel use the cab to view and direct research activities that use the runways. Figure 1-5 depicts trees obstructing that view. These trees compromise the effectiveness of the projects that use this cab. Figure 1-6 shows the approximate location of the Range Control Center and other sites.



Figure 1-5 Range Control Center and obstructing trees.

1.3.3 Various Antennae

Twenty-seven directional antennae broadcast and receive signals at Wallops. Three antennae, discussed here, illustrate how trees interfere with broadcast and reception. Currently, trees obstruct the views only from these antennae, but trees may obstruct the view from other antennae in the future. This Environmental Assessment also addresses future needs.

Mainland Radar

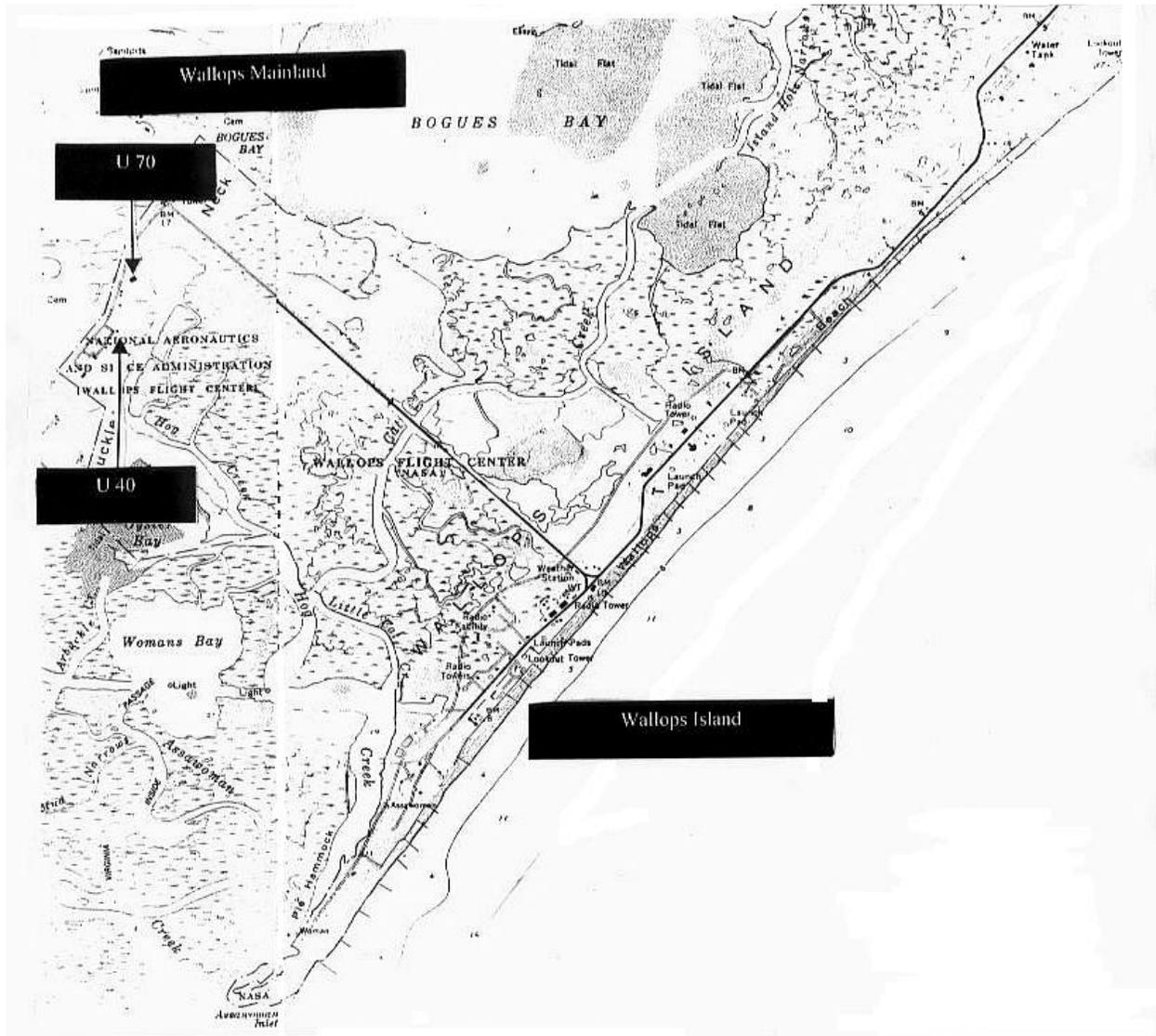


Figure 1-7 Building U-40 and obstructing trees

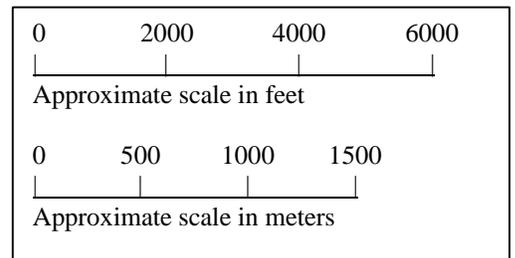
The radar antennae at buildings U-40 and U-70 on the Wallops' Mainland currently cannot effectively track the space shuttle and other spacecraft near the horizon. These radar normally acquire targets at a point 5° above the horizon or higher. The trees block the view of the radar up to $6\frac{1}{2}^{\circ}$ above the horizon and reduce its effectiveness. Figure 1-7 shows Building U-40, radar antenna, and obstructing trees. Figure 1-8 shows the approximate locations of antennae at buildings U-40 and U-70.

These radar track spacecraft launches from Wallops Island and other locations and aircraft take-offs from the Wallops Main Base. Normally, the radar acquires the signal from the space shuttle approximately 3 minutes after launch. Trees obstruct the view of the radar so that the signal from the space shuttle is acquired later than the normal 3 minutes. Personnel operating the radar consider this a significant reduction in performance.

NASA has also tracked the orbits of other spacecraft such as the International Space Station and the Russian MIR Space Station. The orbital trajectory of such spacecraft is often close to the horizon where trees may obstruct the view, reducing data transmission and reception.



<p>Figure 1-8</p>	<p>Approximate locations of antennae at Buildings U-40 and U-70, Wallops Mainland</p>
<p>June 22, 1999</p>	<p>Compiled from Hallwood and Bloxom USGS Topo Quad Maps</p>



NOAA Antennae

Figure 1-9 Antennae and woods at NOAA.

The National Oceanic and Atmospheric Administration (NOAA) has an ongoing antenna installation program. A row of trees standing approximately 300 feet from one of the antennae may interfere with reception. Figure 1-6 shows the approximate location of the NOAA antennae.

Leo-T Antenna

*Figure 1-10 Leo-T antenna and
obstructing trees*

Trees prevent the low earth orbit tracking (Leo-T) antenna from functioning as designed. The Leo-T antenna is designed to track satellites and spacecraft at any pitch greater than 5° above the horizon. Trees currently intruding into that area limit the tracking capability to a pitch greater than 7° above the horizon. The reduction in capability of the antenna from 5° to 7° above the horizon reduces its range of tracking and correspondingly reduces control and data gathering. Figure 1-6 shows the approximate location of the Leo-T antenna. Figure 1-10 depicts the Leo-T antenna with the tree stand located west of the site.

Camera Stands



Figure 1-11 Camera Stand V-100

NASA uses cameras mounted on stands to view and record mission-related activities. Stationary camera stands are located on the Mainland and on Wallops Island. Figure 1-11 depicts a typical camera stand. Trees do not currently obstruct the view. Trees that affect the operation of these facilities are covered by this EA.

2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 Proposed Action

NASA and its tenants propose to cut and remove the trees that violate the need for unobstructed space so they no longer pose operational or safety concerns.

Section 2.1.1 describes the tree clearing activities. Section 2.1.2 describes several factors that could modify or limit the methods used.

2.1.1 Description of the Proposed Action

NASA will utilize the Vegetative Management Plan created by Resource Management Associates to manage the trees and vegetation at Wallops Flight Facility. A three-step process is described below for the tree clearing activities.

2.1.1.1 First Step: Assessment

Wallops personnel must first assess the current need and decide how to conduct the operation. This assessment includes the following determinations:

- The action is covered under the current Vegetative Management Plan.
- The approximate size in square measurement of the area to be cleared.
- The number and size of trees.
- The land form (wetlands, slopes, surface water, and other considerations).
- The ownership (government or private).

These factors will determine needed equipment and labor. The assessment will also indicate possible limitations.

2.1.1.2 Second Step: Plan

The findings of the assessment will result in a plan of action and suggest the appropriate equipment. The work will be performed in-house or by outside contractors. Permits will be obtained as required. The project point of contact will notify the Wallops Public Affairs Office of the proposed plan. At the discretion of the Public Affairs Officer, a notice will be issued to inform the public.

2.1.1.3 Third Step: Cut and Plant

After the requirements of the assessment have been addressed and proper permits obtained, tree removal may begin. Recommendations in the Vegetative Management Plan would be followed as closely as possible. In the least restricted situations, workers would:

- Cut the trees.
- Use heavy equipment to pull the trees clear of the site.
- Dispose of the trees.
- Remove the stumps.
- Restore the ground level to previous existing grade elevation.
- Plant trees or other vegetation to protect exposed soils.

2.1.1.4 Potential Environmental Consequences

These actions could negatively impact the environment in the following ways:

- Equipment could expose mineral soils, creating an erosion hazard.
- Eroding soil could pollute nearby surface water, if shallow storm flowed from the project site to surface water.
- Wetlands may be affected by tree clearing activities.
- Removal of the trees may affect electromagnetic radiation and generation.
- Nesting areas of threatened or endangered bird species and other wildlife may be disturbed, if activities are conducted close to these habitats.
- Equipment produces noise.
- People in the community may find the action undesirable.

Section 4.0 discusses each of these considerations more thoroughly.

2.1.2 Limitations to the Proposed Action

Section 2.1.1 described the action when few factors limit it. This section describes the limitations that may affect the proposed action:

- Tree removal budget

Some fiscal year budgets may only allow for the most urgent need for tree cutting. Budget restrictions may limit methods of tree removal by using a chainsaw and leaving the trees lying where they were cut. Conversely, some fiscal year budgets may allow complete clearing, stump removal, surface restoration, and vegetation replacement.

- Erosion and sedimentation laws

Erosion and sedimentation laws apply to projects over 10,000 square feet. These laws require practices that limit soil erosion from construction sites and sedimentation in streams and other waterways. In compliance, NASA shall prepare a soil erosion and sedimentation plan. This plan must specify the means to reduce or eliminate soil erosion. The *Virginia Erosion and Sediment Control Handbook* produced by the Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation, includes an extensive list of methods and minimum standards to reduce erosion.

- Wetlands

During assessment, the presence of wetlands must be determined and plans modified if necessary. The plans may include using equipment that cuts trees with minimal soil disturbance, leaving the stumps. Alternatively, if stumps must be removed, NASA is required to file a permit with the Army Corps of Engineers. The Corps of Engineers may deny the permit, modify the permit, require mitigation, require wetland banking, or require other actions.

- Coastal Zone Management

Activities that occur within the Coastal Zone will require a Joint Permit Application (JPA) filed with the Virginia Marine Resources Commission (VMRC). VMRC will distribute the permit application to the U.S. Army Corps of Engineers (USACE) and to the Accomack County Wetlands Board. The results of a permit application may vary. The VMRC may deny the permit, modify the permit, require mitigation, or require other actions.

- Equipment

Equipment available at Wallops includes chainsaws, bulldozers, a rubber-tired crane, and dump trucks. These may not be adequate for all projects. NASA may contract with companies that are fully equipped for the project.

- Size

The size of a project may affect the number or type of permits required, the equipment needed, or the visibility of a site.

- Ownership

Occasionally, trees located off NASA property intrude into the required air space. To clear the intruding trees and eliminate the obstructions, NASA must execute a legal instrument with the owner of the property, or the owner of the trees, if different than the owner of the property. The legal instrument might consist of title to the property, title to the trees, permission to cut the trees, an agreement that the owner will cut the trees, or other acceptable legal instrument.

2.2 Alternatives

Alternatives to the proposed action are considered in this section: limiting, modifying or relocating the current Wallops programs; strategic location of future Wallops programs. Other alternatives have been eliminated because of existing conditions, limitations, and site characteristics.

2.2.1 Program Limitation or Modifications

NASA may limit or modify programs to avoid the intrusion of trees. These limitations or modifications may be acceptable for a period of time. However, the changes are no longer acceptable when they jeopardize a program.

2.2.2 Program Relocation

It may be possible to relocate a program to avoid the intrusion of trees into required clear airspace. However, based upon current operational requirements and restrictions, program relocation is not a practical solution. Planning for future programs' locations will consider the presence of trees.

2.2.3 Other Alternatives

Other alternatives were considered to the proposed action. Trees could be topped along the slopes of the imaginary surfaces necessary for runway clearances or antennae and camera views. Or, only the trees that invade these surfaces could be cut. Instead of clearing the area, cut trees may be left on the site. Stumps may be left inground versus removal and grading of the area. However, if only topping or selective removal is instituted, the topped or remaining trees will quickly grow into the clear airspace resulting in a perpetual maintenance problem. In certain areas where the use of heavy equipment is inhibited (i.e. steep slopes), cut trees and stumps may be left on site. The purpose of the proposed action, however, is to facilitate maintenance of areas requiring clear airspace. Fallen trees and stumps would prevent grounds maintenance and promote regrowth of the trees. Therefore, wherever feasible, dead trees and stumps will be cleared so that the area may be graded and seeded with vegetation that is more readily maintainable.

2.3 No Action Alternative

Leaving trees undisturbed would reduce the effectiveness of various current programs. In some cases, the intrusion of the trees into needed clear air space would destroy the program. The Wallops management considers this an unacceptable alternative.

3.0 AFFECTED ENVIRONMENT

Environmental consequences of the proposed action are addressed in Section 4.0 Environmental Consequences. This section summarizes existing parts of the environmental elements so the consequences of the proposed action may be determined.

3.1 Physical Environment

3.1.1 Soils

Cutting and removing trees will disturb soils and likely cause soil erosion. Uprooting the trees or their stumps and using heavy equipment, particularly tracked vehicles, will disturb the soils, leaving mineral soils exposed and vulnerable to wind and rain. The amount of soil exposed, the slope of the surface, the force of the wind or rain, and the erodibility of the soil type will influence the extent of erosion.

The soil types vary in erodibility across the three sections of Wallops. The *Soil Survey of Accomack County, Virginia*, published by the United States Department of Agriculture Soil Conservation Service, maps the soils found at Wallops and shows characteristics of the soils including erodibility. It is included by reference.

3.1.2 Surface Water

Storm water can erode mineral soils and other materials into surface waters. The proposed action may make soil erodible by exposing mineral soil. Operations conducted near surface water may result in sedimentation and deposition into surface water. Extensive areas of surface water lie within and near the boundaries of Wallops and may be vulnerable. Figures 3-1A and B show the locations of surface water near Wallops.

Little Mosquito Creek forms most of the northern boundary of the Main Base. The Wattsville Branch forms part of the western boundary of the Main Base and feeds into Little Mosquito Creek near the northwestern corner of the Main Base. The eastern and southeastern boundaries of the Main Base lie along or near extensive salt marsh and associated guts, creeks and bays. These guts, creeks and bays include Jenneys Gut, Simoneaston Creek, and Simoneaston Bay.

An extensive salt marsh separates Wallops Island from the Mainland with numerous creeks, guts and bays. The salt marsh lies east of the Mainland and west of Wallops Island. The Atlantic Ocean forms the eastern boundary of Wallops Island. Water quality standards are listed in the Commonwealth of Virginia DEQ (formerly SWCB) Regulations 9 VAC 25-31-110. These standards, including dissolved oxygen, pH, and maximum temperature, are used by the Commonwealth of Virginia to protect and maintain surface water quality. Background surface water concentrations for WFF were recently analyzed by Versar, Inc. and are reported in *Remedial Investigation/Feasibility Study Report Sites 14 and 15* dated, June 14, 1999.

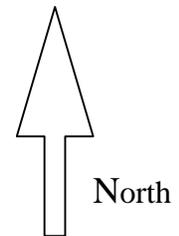
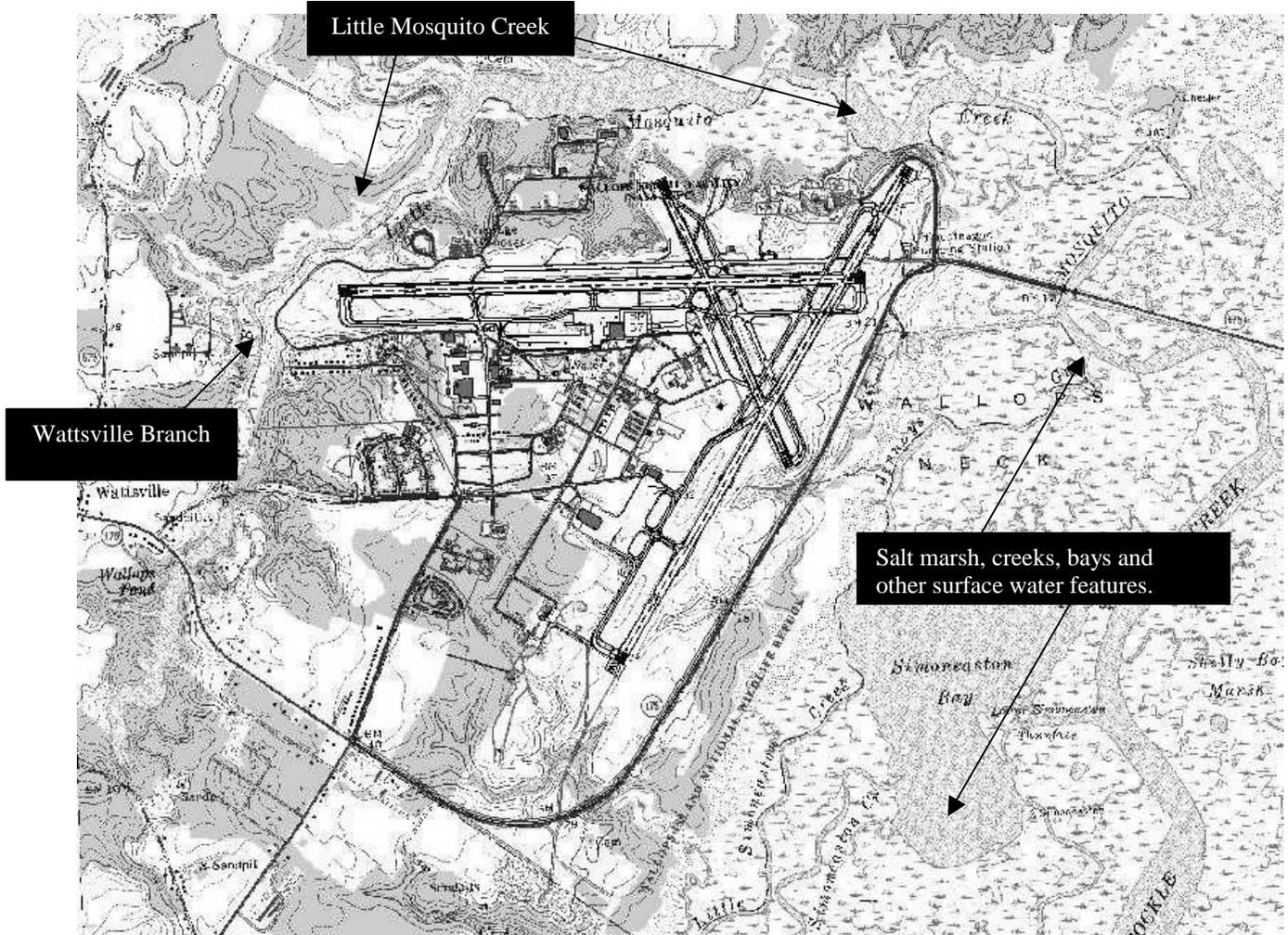
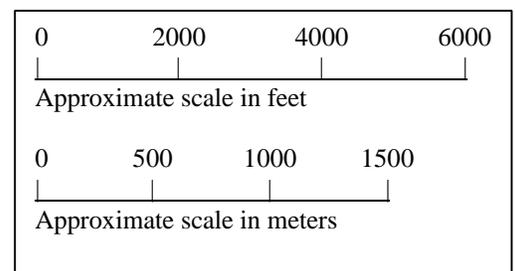


Figure 3-1A	Surface Water near Wallops Main Base
June 22, 1999	Compiled from Chincoteague West USGS Topo Quad Map



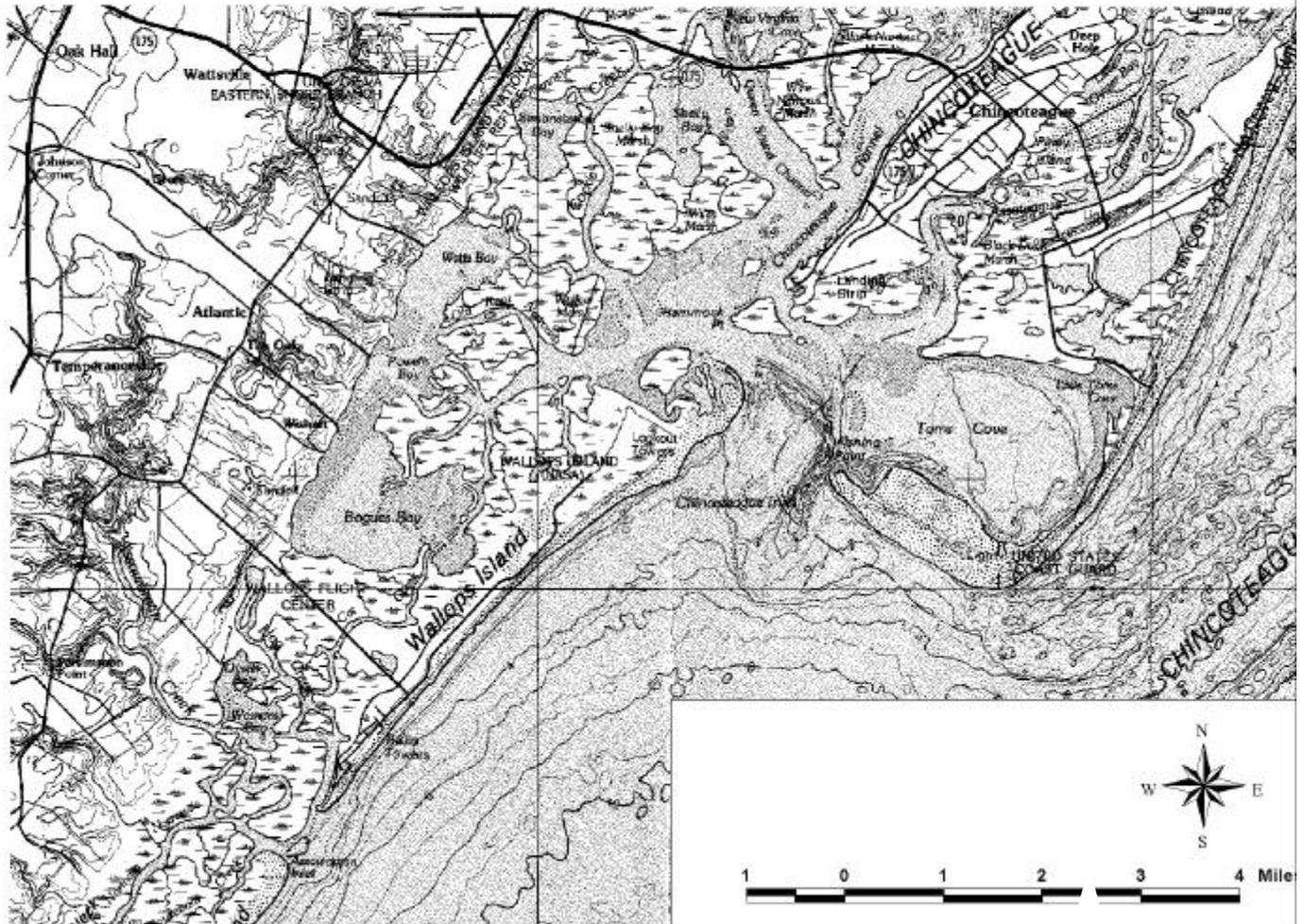


Figure 3-1B	Surface Water near Wallops Mainland and Wallops Island
June 22, 1999	Compiled from Hallwood and Bloxom USGS Topo Quad Maps

3.1.3 Wetlands

Trees that intrude into clear air spaces may grow from wetlands. Extensive care must be taken during removal to prevent wetlands destruction. Moving soil, removing all vegetation or draining water could degrade the wetland environment or destroy it. Activities conducted on wetlands are heavily controlled by regulations, case law, nationwide permits and enforcement practices.

3.1.4 Coastal Zone

As a federal facility, Wallops Flight Facility is exempt from the Coastal Zone Management Act (CZMA) regulations. However, NASA follows federal and state CZMA requirements. Wallops Island is a barrier island along Virginia's Atlantic coast. A rock seawall has been placed along the shoreline to retard damage from storm events. Out to 2.8 miles (4.5 km) offshore, the ocean east of Wallops Island is shallow, averaging 33 feet (10 m) deep. Shrubs and scrub trees exist on the dunes on the northern end of Wallops Island. A maritime forest extends inland beyond the dune line. Development on coastal primary sand dunes can destroy vegetation which stabilizes the dunes, alter the natural contour of these sand dunes, impede their natural formation and migration, and interrupt wind and water currents which replenish the sand supply of beaches. Such alterations to coastal primary sand dunes may lead to an increase in shoreline erosion, coastal flooding, damage to fixed structures near the shore, loss of open space, and loss of wildlife habitat. Therefore, permanent alteration of, or construction upon, any coastal primary sand dune is expressly prohibited. Moving soil or removing vegetation from the maritime forest could negatively impact the forest environment. Activities conducted in the Coastal Zone are heavily controlled by regulations, case law, nationwide permits and enforcement practices.

3.1.5 Air Quality

Wallops Island, Virginia, is located in Region IV of the Commonwealth of Virginia air quality district. Region IV does not exceed standards in any of the precursor air pollutants listed in the ambient air quality standards for either Virginia or the United States (Virginia Department of Air Pollution Control, 1991). Therefore, since Wallops Flight Facility is located in an Attainment Area for all air quality standards, a General Conformity Analysis under the Clean Air Act is not required.

Fugitive dust from land clearing activities may adversely impact local air quality.

3.1.6 Noise

Local commuter traffic, air traffic, and rocket launches create most of the noise at Wallops. To reduce the impact of noise, aircraft are generally required to fly over marshland or farmland.

3.1.7 Electromagnetic Radiation

The directional antennae at Wallops generate electromagnetic radiation. Trees attenuate or modify this radiation, especially near the source, if the trees intrude into the path of the radiation. The directional antennae are of safe design relative to electromagnetic radiation emission.

3.2 Biological Environment

3.2.1 Plants

Mainland and Main Base: The vegetative zones from east to west on the Mainland and Main Base are marsh, thicket, and forest. Inland communities such as fresh and brackish marsh, xeric and mesic shrub, patches of open and complete cover of pine, and pine deciduous-mixed woodlands are often separated from one another by a sharp topographic change, forming a mosaic. Small rich remnants of upland forest and swamp forest occur on the Mainland and Main Base.

Wallops Island: The barrier island contains various ecological succession stages that include beaches, dunes, swales, maritime forests, and marsh. The natural vegetative zones form a series of finger-like stands that merge or grow into each other. The northern and southern dune vegetation on Wallops Island directly borders the salt marshes.

The predominant forest types are as follows:

- Primarily loblolly pine (*Pinus taeda*) with a few bushes and little ground cover.
- A mix of oaks (*Quercus* spp.), wild black cherry (*Prunus serotina*) and other hardwoods with a few loblolly pines, primarily along the edges.
- Widely spaced, park-like stands, primarily consisting of oaks and other hardwoods with grasses as ground cover.

3.2.2 Wildlife

The forested areas at the Wallops Flight Facility serve as habitat to many species of wildlife. Bird species include: sparrows (various genera and species), red-winged blackbirds (*Agelaius phoeniceus*), boat-tailed grackles (*Quiscalus major*), fish crows (*Corvus ossifragus*), gray catbirds (*Dumetella carolinensis*), mourning doves (*Zenaida macroura*), mockingbirds (*Mimus spp.*), robins (*Turdus migratorius*), and starlings (*Sturnus vulgaris*). There are also many migratory species.

Mammal species include whitetail deer (*Odocoileus virginianus*), eastern cottontail rabbit (*Sylvilagus floridanus*), red fox (*Vulpes fulva*), Virginia opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), gray squirrel (*Sciurus carolinensis*), and eastern chipmunk (*Tamias striatus*).

3.2.3 Threatened and Endangered Species

The United States Fish and Wildlife Service has identified three bird species (the piping plover, the peregrine falcon, and the bald eagle) that nest at WFF and are classified as either threatened or endangered. The populations of these three birds meet criteria established in the Endangered Species Act. The piping plover (*Charadrius melodus*), an endangered species, and the peregrine falcon (*Falco peregrinus*), a threatened species, both nest on Wallops Island. The piping plover nesting areas are limited to the beaches. Peregrine falcon nests have been limited to a nesting platform off Wallops Island.

Bald eagles (*Haliaeetus leucocephalus*) have built three nests on the Wallops Main Base and nearby properties. Under the Endangered Species Act, the United States Fish and Wildlife Service has established zones around bald eagles' nests where little to no activity may occur. No activity may occur within 330 feet of active nests and no more than minimal activity within 660 feet of active nests. These zones do not apply to inactive nests; however, inactive nests and the trees that hold them may not be destroyed or significantly impacted.

The Virginia Department of Game and Inland Fisheries has designated the three bald eagles' nests found on or near Wallops as VAAC 93-02, VAAC 95-01, and VAAC 97-03. Only VAAC 93-02 is actually on NASA property. The United States Fish and Wildlife Service use the same designations as the Virginia Department of Game and Inland Fisheries, except that the "VA" prefix is deleted. The following table was taken from a letter to John Brinton of NASA from the United States Fish and Wildlife Service, dated May 1, 1997.

Bald Eagle Nests

Nest	1993	1994	1995	1996	1997
AC 93-02	Active 2 young	Active 0 young	Not active	Not active	Not active
AC 95-01	---	---	Active 2 young	Active 0 young	Not active
AC 97-03	---	---	---	---	Active

The nest on Wallops property was not active from 1995 through 1997. The active nest, AC 97-03, lies on the north side of Mosquito Creek, outside of any area of concern. The letter also indicated that, while nest AC 93-02 has not been active in three seasons, the nest itself may not be destroyed.

No tree clearing activities are permitted within 330 feet of active eagles' nests. Beyond that, minimal activities may be conducted within 660 feet of active eagles' nests. No trees are to be cut near the peregrine falcon nesting platform and the piping plover nesting area on the beach.

3.3 Social or Community Environment

The Wallops Flight Facility and many of its activities are visible to much of the local community. People living in or visiting the area drive by Wallops. Personnel who work at Wallops have contact with the wooded areas and may express concern about tree clearing projects.

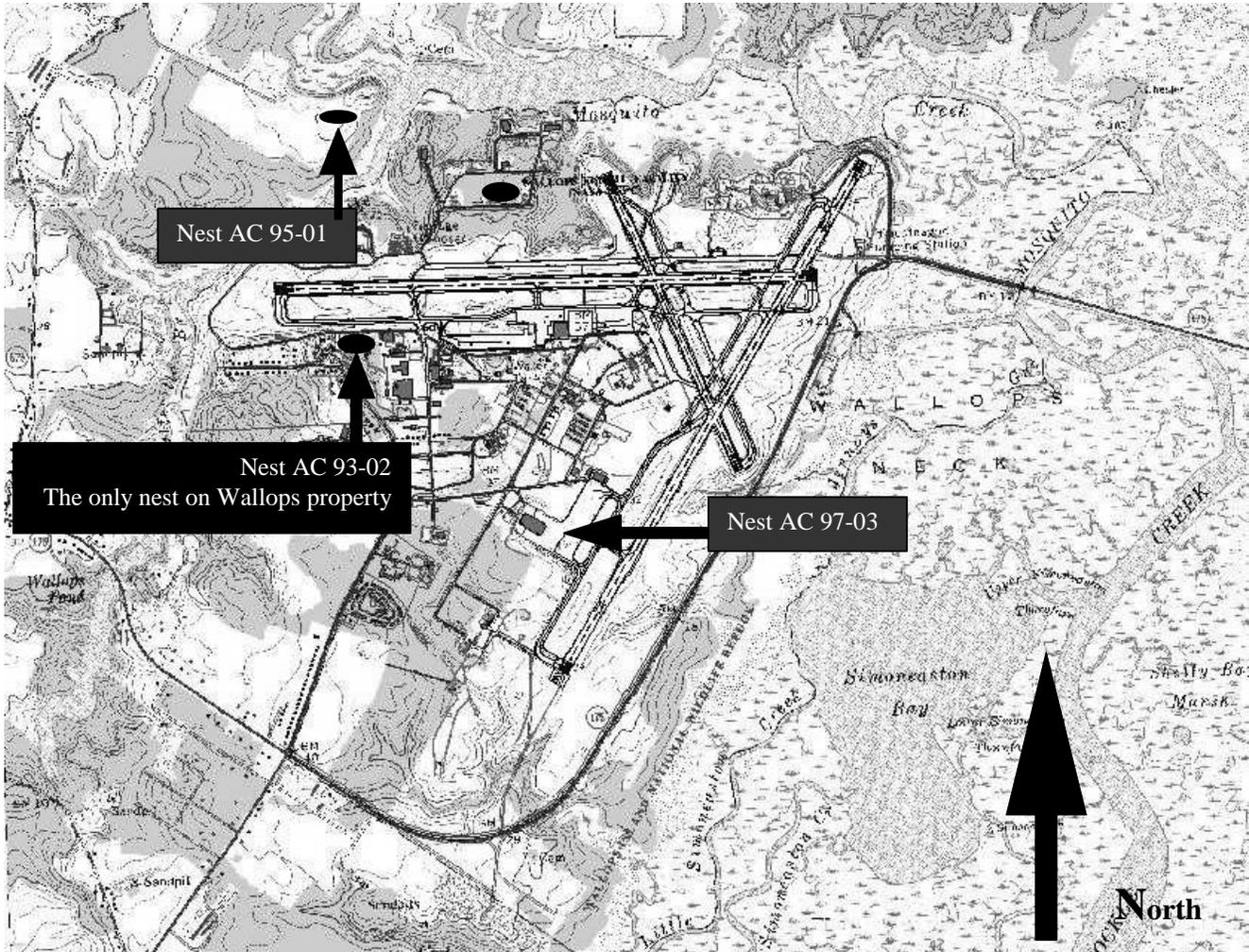
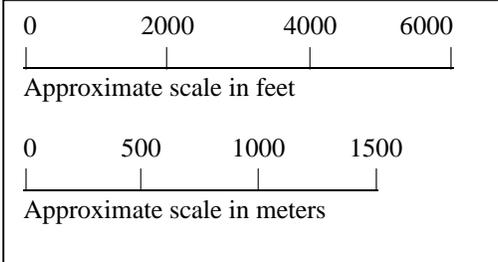


Figure 3-2	Approximate locations of bald eagles' nests
June 22, 1999	Compiled from Chincoteague West USGS Topo Quad Map



4.0 ENVIRONMENTAL CONSEQUENCES

4.1 Physical Environment

4.1.1 Soils

Tree cutting or removal may erode soils. Heavy equipment could expose mineral soil. Removing stumps will expose mineral soil and increase the risk of erosion. Exposed mineral soil may erode during rain storms or wind.

Compliance with erosion and sedimentation control standards and regulations prevents soil erosion. Ground cover will be left intact as much as possible. If the stumps are to be removed, the erosion and sedimentation control practices listed below will be used. Additional practices may be useful and necessary.

- Follow recommendations in the Vegetative Management Plan as closely as possible.
- Minimize the time mineral soil is exposed. Be prepared to complete the job before beginning operations. Once work begins, continue the operation until completion.
- Use equipment that will perform adequately but minimize soil disturbance. Using lighter equipment compacts the soil less.
- Replant ground cover as soon as possible after tree removal. This should include appropriate grasses, but may also include shrubs or low-growing trees that will not intrude into clear airspace.
- Monitor vegetation growth to ensure if it is well established; replant if necessary.
- Leave the soil surface uneven. The soil surface may be smooth enough for mowing, but uneven enough to interfere with storm water flowing over the surface.
- On slopes, establish control of soil-carrying storm water to reduce or eliminate soil erosion off the site of operations. Following is a list of practices, in order of preference:
 1. A grassy area down slope of the site to stop erosion.
 2. A brush barrier made up of brush from the trees removed. The brush barrier should be 5 feet across the base and 3 feet high.
 3. Straw bales. Brush barrier or straw bales if used, will be removed after vegetation is established.

These practices should be adequate for minor programs and evaluated for effectiveness on larger projects.

For tree removal projects over 10,000 square feet, an erosion and sedimentation plan must be submitted. The plan must be submitted to the Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation, Regional Erosion and Sedimentation Control Specialist, 1548 Holland Road, Suffolk, Virginia 23434.

4.1.2 Surface Water

Land disturbance activity of five acres or more may require a Virginia Pollutant Discharge Elimination System (VPDES) Stormwater General Permit from Virginia DEQ. Contact DEQ's Tidewater Regional office at (757) 518-2000.

4.1.3 Wetlands

Removing trees will minimally impact the functions of wetlands, providing other vegetation and hydrology remain intact. Whenever possible, NASA will cut the trees low without removing the stumps. Tree clearing without stump removal or soil disturbance is outside the jurisdiction of the wetlands legal authorities (regulations, case law, and enforcement practices). If stumps must be removed or if soil is to be moved from wetlands, a Virginia Water Protection Permit from DEQ, a tidal wetlands permit from Accomack County and/or a Section 404 permit from the USACE may be required. A Joint Permit Application (JPA) must be filed with the Virginia Marine Resources Commission (VMRC). VMRC will distribute the permit application to the U.S. Army Corps of Engineers (USACE) and to the Accomack County Wetlands Board. The results of the permit application may vary and may be costly. They are discussed in section 2.1.2 Limitations to the Proposed Action.

4.1.4 Coastal Zone Management

Currently, no programs exist or are anticipated for the northerly end of Wallops Island. Therefore, no tree clearing activities would occur that could impact the Coastal Zone. If a future program is initiated that would affect this area, a Joint Permit Application (see 4.1.3 above) would be filed. The results of the permit application may vary and may be costly. They are discussed in section 2.1.2 Limitations to the Proposed Action.

4.1.5 Air Quality

No adverse impacts to air quality are anticipated during execution of the project, however, fugitive dust will be kept to a minimum. Measures will be taken that include, but are not limited to, application of water to suppress dust, and washing down construction vehicles and paved roadways immediately adjacent to the project site.

4.1.6 Noise

The additional noise due to tree clearing will be minimal, compared to the other sources of noise at Wallops.

4.1.7 Electromagnetic Radiation

While the electromagnetic radiation could increase after the removal of trees, it will not increase to unsafe levels. This environmental assessment will not quantify the effect that the removal of trees will have upon electromagnetic radiation or upon radiation safety. It assumes that removal of the trees will reduce the dampening effect. However, based upon information provided by the Wallops Flight Facility Safety Office, removing the trees will not compromise safety. Electromagnetic radiation calculations for radar antenna do not consider the dampening effect of trees or other vegetation when determining safety levels.

4.2 Biological Environment

4.2.1 Plants

The impact of harvesting on forest communities at WFF will cause regression from late second succession growth to early old field succession stages of forest development. The late second succession forest community consists of loblolly pine (*Pinus taeda*), a mix of oaks (*Quercus* spp.), wild black cherry (*Prunus serotina*) and other hardwoods. The early old field succession forest community will then include pines, hawthorns, apple, briars, alder bushes, and various grasses.

4.2.2 Wildlife

The alternatives that include removing all trees in a given area will impact wildlife whose habitat is limited to the cut-over area. The impacted wildlife might include small mammals, small reptiles, and birds. After cutting, a profusion of vegetation may take root over the area, if not managed by NASA. This new growth may temporarily support larger populations of animals, such as deer.

4.2.3 Threatened and Endangered Species

Careless tree removal could destroy the bald eagle's nest on Wallops and would violate the Endangered Species Act. All tree removal must carefully avoid nesting trees. The United States Fish and Wildlife Service (USF&WS) will be consulted if tree clearing activity is proposed within 1,320 feet of an active bald eagle nest on Wallops Flight Facility. The tree removal will not impact the peregrine falcon nest or the piping plover beach nesting area.

4.3 Social Environment

Portions of the community may object to the tree removal on aesthetic, ecological, or other grounds. Their objections may be a concern to WFF's managers. This document is part of a response to those objections. Tenants affected by tree clearing activities will be notified and consulted during the planning stages of a tree removal project. When the removal includes more than a few trees, the Public Affairs Office should be contacted. At the discretion of the Public Affairs Officer, the public may be notified through various means. This notification should explain the necessity and rationale for the removal.

4.4 Cumulative Effects

Under current conditions, there is very little impact upon the regional environment by tree removal at WFF. Thirty-nine thousand, two hundred thirty hectares (96,630 acres) of Accomack County are wooded; 3,950 areas of Wallops are wooded. The present total area of the sites to be cleared accumulates to less than 10 hectares (25 acres) with the single largest area covering approximately 5 ½ acres. The acreage cleared to meet the current need for unobstructed space at Wallops will amount to no more than 0.026 percent of the present total wooded area in Accomack County and 0.633 percent of WFF. Large areas of WFF will remain wooded.

In the foreseeable future, the regional environment will likely retain much of its wooded area. Timber is harvested commercially over much of the area. Commercial forest land is routinely replanted and remains forest land.

Nearby state and federal parks, refuge areas and forested wildlife preserves guarantee that Accomack County will remain rural and forested for the foreseeable future.

5.0 AGENCIES AND INDIVIDUALS CONSULTED

Accomack County Administration
Attn: Mr. R. Keith Bull, County Administrator
P.O. Box 388
Accomack, VA 23301
(757) 824-5444

Chesapeake Bay Local Assistance Department
Attn: Mr. Michael D. Clower, Executive Director
James Monroe Building
101 North 14th Street,
17th Floor
Richmond, VA 23219
(804) 225-3440

Commonwealth of Virginia
Department of Agriculture and Consumer Services
Office of Policy Planning and Research
Attn: Roy E. Seward, Director
1100 Bank St. Suite 211
Richmond, VA 23218
(804) 786-2373

Commonwealth of Virginia
Department of Conservation and Recreation
Division of Planning and Recreation Resource
Attn: Mr. John R. Davy, Division Director
203 Govenor Street, Suite 326
Richmond, VA 23219
(804) 786-2556

Department of Environmental Quality
Tidewater Regional Office
Attn: Ms. Sheri Kattan
5636 Southern Boulevard
Virginia Beach, VA 23462
(757) 518-2156

Department of Environmental Quality
Division of Environmental Announcement
Office of Environmental Impact Reviews
Attn: Ms. Ellie Irons
629 East Main Street, Room 631
Richmond, VA 23219
(804) 698-4325

Commonwealth of Virginia
Department of Game and Inland Fisheries
Attn: Mr. Ray Fernald, Environmental Coordinator
4010 West Broad Street
Richmond, VA 23230
(804) 367-1000

Commonwealth of Virginia
Department of Historic Resources
Federal Review and Compliance Coordinator
Attn: Ms. Cara Metz, Project Review Director
2801 Kensington Avenue
Richmond, VA 23221
(804) 367-2323

Department of Mines, Minerals, and Energy
Division of Mineral Resources
Attn: Mr. Stanley S. Johnson, State Geologist and Director
P.O. Box 3667
Charlottesville, VA 22903
(804) 951-6310

U.S. Fish and Wildlife Service
Attn: Ms. Karen Mayne, Director
6669 Short Lane
Gloucester, VA 23061
(804) 693-6694

NASA Headquarters
Attn: Mr. Ken Kumor
Code: HQ/JE
Washington, DC 20546-0001
(202) 358-1112

Accomack-Northampton Planning District Commission
Attn: Mr. Paul F. Berge, Executive Director
P.O. Box 417
Accomack, VA 23301
(757) 787-2936

U.S. Army Corps of Engineers
Eastern Shore Field Office
Attn: Mr. Gerald Tracy
P.O. Box 68
Accomack, VA 23301
(757) 787-3133

Virginia Department of Health
Attn: Mr. Arthur Miles, Environmental Health Supervisor
P.O. Box 177
Accomack, VA 23301
(757) 824-6211

Virginia Department of Transportation
Environmental Quality Division
Attn: Mr. Earl T. Robb, State Environmental Administrator
1401 East Broad Street
Richmond, VA 23219
(804) 786-2801

Virginia Institute of Marine Science
Attn: Dr. L. Donaldson Wright, Dean and Director
P.O. Box 1346
Gloucester Point, VA 23062
(804) 684-7000

Virginia Marine Resources Commission
Attn: Mr. William Pruitt, Commissioner
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Newport News, VA 23607
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William B. Bott	NASA Goddard Space Flight Center's Wallops Flight Facility, Code 205.W	Proposed Action and Graphics review

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15. National Aeronautics and Space Administration, 1991. *Floodplain and Wetlands Management*. 14 CFR 1216.2.
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8.0 RESPONSES TO COMMENTS

The preceding Environmental Assessment (EA) and the accompanying Finding of No Significant Impact (FONSI) were sent to the Government Agencies in Section 5.0 as well as announced for public comment in the local newspapers, on October 13, 1999. Final responses were received on November 20, 1999. All responses have been considered and appropriate changes were made to this EA. The following responses were received.

1.0 PURPOSE AND NEED

1.1 Need

NASA Goddard Space Flight Center's Wallops Flight Facility (WFF) and its tenants conduct many programs that need unobstructed airspace. However, in certain areas, there are trees that intrude into this air space. These intrusions pose operational and/or safety concerns.

This Environmental Assessment (EA) addresses situations that meet the following conditions:

- Wallops' existing programs or activities that require unobstructed air space.
- New programs or activities not requiring their own National Environmental Policy Act (NEPA) considerations (EA or Environmental Impact Statement [EIS]).
- Re-growth of trees that interfere with existing or new programs or activities at WFF.

This environmental assessment applies to any program that meets these conditions and is not large enough to require its own NEPA (EA or EIS) considerations. If a program is large enough to require its own NEPA considerations, the need for unobstructed air space will be addressed in those documents.

NASA intends to notify its tenants prior to any tree clearing in, or surrounding, the land permitted to that tenant. Moreover, if it is determined through application of this Environmental Assessment for Tree Clearing Activities that additional assessment is required prior to tree clearing activities, the affected tenants will be forwarded a copy of the additional assessment.

The need for clear air space varies according to the program. Some examples include activities that require a clear line of sight to allow an unobstructed view, antennae that require a clear path for radar and radio waves, or airport operations and runways that require a clear space for aircraft departing or landing safely.

1.2 Background

Wallops provides resources and expertise to the air and space-based scientific and technology communities. WFF uses its research airport, fixed and mobile launch range, and orbital tracking facilities to provide frequent, cost-effective, and quick response to flight opportunities and data. The project management, design, fabrication, testing, and operations expertise of the Wallops workforce, and its tenants, enable NASA, other government agencies, and industry to meet prescribed objectives. These objectives include supporting the development of new technologies to increase the capabilities of launch platforms.

WFF consists of three separate sections of real property: the Main Base, the Wallops Mainland and Wallops Island. The Main Base includes the airport, most administrative buildings and some research facilities. The Main Base is located in northeastern Accomack County, Virginia, approximately 2 miles east of US Route 13. The Mainland includes radar antennae, and control buildings. The entrance gate for the Mainland and Wallops Island is approximately 6 miles

south of the Main Base. Wallops Island includes the rocket launch range and its tenants. Section 3.0 gives additional information about Wallops pertinent to this environmental assessment.

1.3 Specific Needs

Many activities at Wallops meet the conditions stated in Section 1.1. The four areas discussed are (1) airport runway clearances, (2) the view from the Range Control Center, (3) directional antennae, and (4) camera stands. This environmental assessment also applies to future situations that meet the conditions.

1.3.1 Airport Runways

The Federal Aviation Administration regulations require clear airspace above imaginary surfaces for precision runways (14 CFR 77.25) such as those at WFF. The regulations designate a runway as precision based upon the level of instrumentation at the airport. In the Approach Zones, the air space at the ends of the run ways, must slope up at a rate of 50:1, 50 horizontal units to 1 vertical unit. The Transition Zones, the air space at the sides of the runways, must slope up at a rate of 7:1, 7 horizontal units to 1 vertical unit. A 30-meter (approximately 98 feet) tree 1,450 meters (4,760 feet) from the end of a runway will intrude 1 meter (3.3 feet) into the Approach Zone of that runway.

Figure 1-1 shows an aerial view of the runways. Figure 1-2 illustrates various imaginary surfaces around an airport including approach zones and transition zones around precision runways.

Trees break into the air space above these imaginary surfaces. Figure 1-3 shows where this may occur for a 120-foot-tall tree.



Figure 1-1 Aerial view of Wallops' Runways



Figure 1-4 Range Control Center between Buildings E-106 and E-107.

1.3.2 Range Control Center

The Range Control Center uses a windowed cab to view project activities along the runways and launch range. The cab sits between buildings E-106 and E-107 at the Main Base, as shown in Figure 1-4. Range personnel use the cab to view and direct research activities that use the runways. Figure 1-5 depicts trees obstructing that view. These trees compromise the effectiveness of the projects that use this cab. Figure 1-6 shows the approximate location of the Range Control Center and other sites.



Figure 1-5 Range Control Center and obstructing trees.

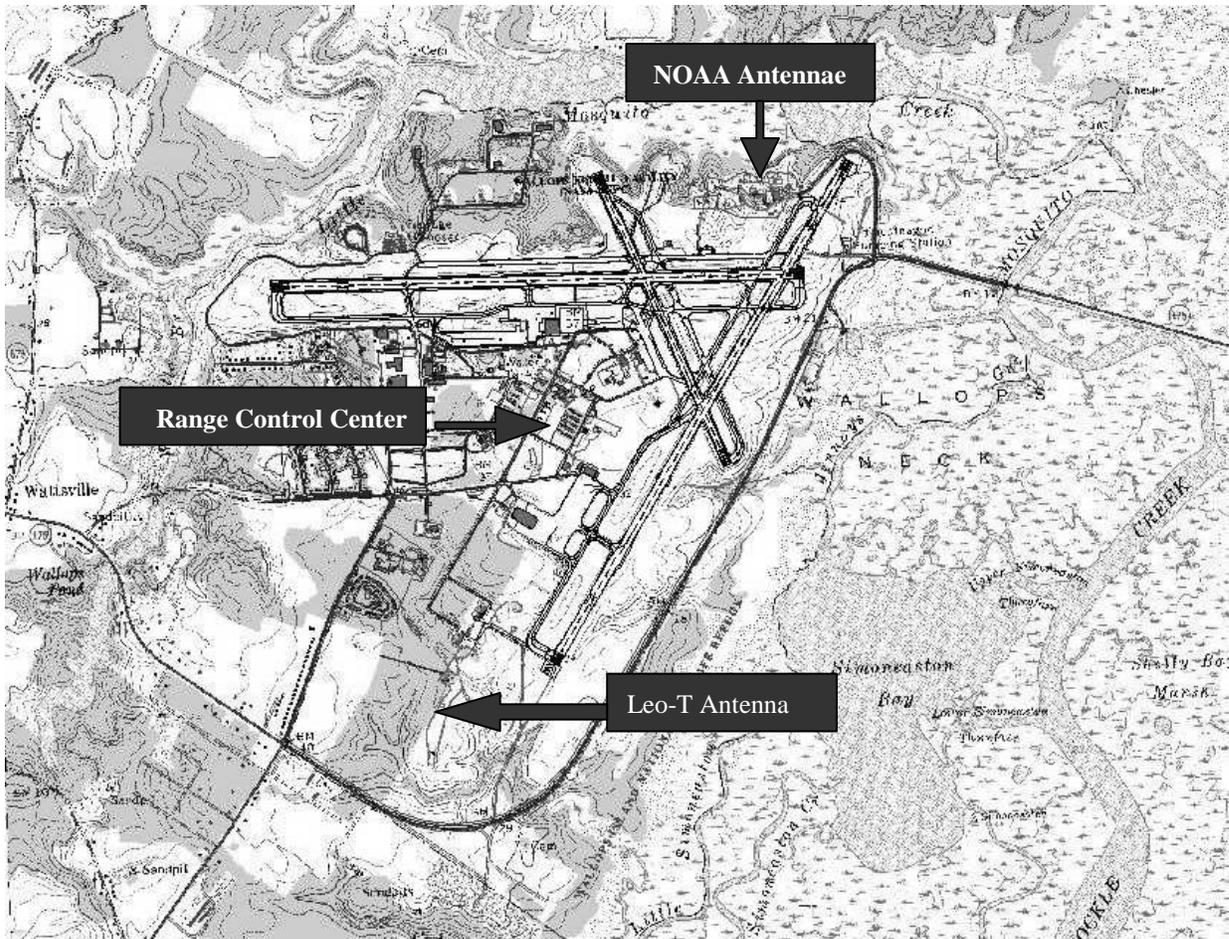


Figure 1-6	Range Control Center and Other Sites
June 22, 1999	Compiled from Chincoteague West USGS Topo Quad Map

1.3.3 Various Antennae

Twenty-seven directional antennae broadcast and receive signals at Wallops. Three antennae, discussed here, illustrate how trees interfere with broadcast and reception. Currently, trees obstruct the views only from these antennae, but trees may obstruct the view from other antennae in the future. This Environmental Assessment also addresses future needs.

Mainland Radar

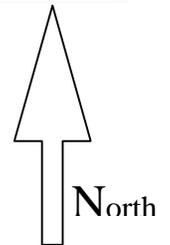


Figure 1-7 Building U-40 and obstructing trees

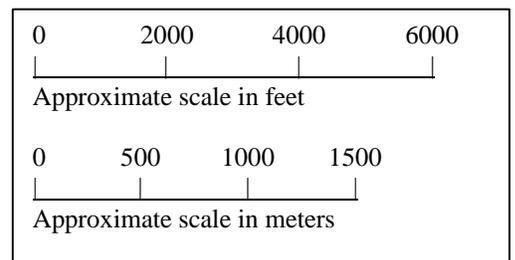
The radar antennae at buildings U-40 and U-70 on the Wallops' Mainland currently cannot effectively track the space shuttle and other spacecraft near the horizon. These radar normally acquire targets at a point 5° above the horizon or higher. The trees block the view of the radar up to $6\frac{1}{2}^{\circ}$ above the horizon and reduce its effectiveness. Figure 1-7 shows Building U-40, radar antenna, and obstructing trees. Figure 1-8 shows the approximate locations of antennae at buildings U-40 and U-70.

These radar track spacecraft launches from Wallops Island and other locations and aircraft take-offs from the Wallops Main Base. Normally, the radar acquires the signal from the space shuttle approximately 3 minutes after launch. Trees obstruct the view of the radar so that the signal from the space shuttle is acquired later than the normal 3 minutes. Personnel operating the radar consider this a significant reduction in performance.

NASA has also tracked the orbits of other spacecraft such as the International Space Station and the Russian MIR Space Station. The orbital trajectory of such spacecraft is often close to the horizon where trees may obstruct the view, reducing data transmission and reception.



<p>Figure 1-8</p>	<p>Approximate locations of antennae at Buildings U-40 and U-70, Wallops Mainland</p>
<p>June 22, 1999</p>	<p>Compiled from Hallwood and Bloxom USGS Topo Quad Maps</p>



NOAA Antennae

Figure 1-9 Antennae and woods at NOAA.

The National Oceanic and Atmospheric Administration (NOAA) has an ongoing antenna installation program. A row of trees standing approximately 300 feet from one of the antennae may interfere with reception. Figure 1-6 shows the approximate location of the NOAA antennae.

Leo-T Antenna

*Figure 1-10 Leo-T antenna and
obstructing trees*

Trees prevent the low earth orbit tracking (Leo-T) antenna from functioning as designed. The Leo-T antenna is designed to track satellites and spacecraft at any pitch greater than 5° above the horizon. Trees currently intruding into that area limit the tracking capability to a pitch greater than 7° above the horizon. The reduction in capability of the antenna from 5° to 7° above the horizon reduces its range of tracking and correspondingly reduces control and data gathering. Figure 1-6 shows the approximate location of the Leo-T antenna. Figure 1-10 depicts the Leo-T antenna with the tree stand located west of the site.

Camera Stands



Figure 1-11 Camera Stand V-100

NASA uses cameras mounted on stands to view and record mission-related activities. Stationary camera stands are located on the Mainland and on Wallops Island. Figure 1-11 depicts a typical camera stand. Trees do not currently obstruct the view. Trees that affect the operation of these facilities are covered by this EA.

2.0 DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

2.1 Proposed Action

NASA and its tenants propose to cut and remove the trees that violate the need for unobstructed space so they no longer pose operational or safety concerns.

Section 2.1.1 describes the tree clearing activities. Section 2.1.2 describes several factors that could modify or limit the methods used.

2.1.1 Description of the Proposed Action

NASA will utilize the Vegetative Management Plan created by Resource Management Associates to manage the trees and vegetation at Wallops Flight Facility. A three-step process is described below for the tree clearing activities.

2.1.1.1 First Step: Assessment

Wallops personnel must first assess the current need and decide how to conduct the operation. This assessment includes the following determinations:

- The action is covered under the current Vegetative Management Plan.
- The approximate size in square measurement of the area to be cleared.
- The number and size of trees.
- The land form (wetlands, slopes, surface water, and other considerations).
- The ownership (government or private).

These factors will determine needed equipment and labor. The assessment will also indicate possible limitations.

2.1.1.2 Second Step: Plan

The findings of the assessment will result in a plan of action and suggest the appropriate equipment. The work will be performed in-house or by outside contractors. Permits will be obtained as required. The project point of contact will notify the Wallops Public Affairs Office of the proposed plan. At the discretion of the Public Affairs Officer, a notice will be issued to inform the public.

2.1.1.3 Third Step: Cut and Plant

After the requirements of the assessment have been addressed and proper permits obtained, tree removal may begin. Recommendations in the Vegetative Management Plan would be followed as closely as possible. In the least restricted situations, workers would:

- Cut the trees.
- Use heavy equipment to pull the trees clear of the site.
- Dispose of the trees.
- Remove the stumps.
- Restore the ground level to previous existing grade elevation.
- Plant trees or other vegetation to protect exposed soils.

2.1.1.4 Potential Environmental Consequences

These actions could negatively impact the environment in the following ways:

- Equipment could expose mineral soils, creating an erosion hazard.
- Eroding soil could pollute nearby surface water, if shallow storm flowed from the project site to surface water.
- Wetlands may be affected by tree clearing activities.
- Removal of the trees may affect electromagnetic radiation and generation.
- Nesting areas of threatened or endangered bird species and other wildlife may be disturbed, if activities are conducted close to these habitats.
- Equipment produces noise.
- People in the community may find the action undesirable.

Section 4.0 discusses each of these considerations more thoroughly.

2.1.2 Limitations to the Proposed Action

Section 2.1.1 described the action when few factors limit it. This section describes the limitations that may affect the proposed action:

- Tree removal budget

Some fiscal year budgets may only allow for the most urgent need for tree cutting. Budget restrictions may limit methods of tree removal by using a chainsaw and leaving the trees lying where they were cut. Conversely, some fiscal year budgets may allow complete clearing, stump removal, surface restoration, and vegetation replacement.

- Erosion and sedimentation laws

Erosion and sedimentation laws apply to projects over 10,000 square feet. These laws require practices that limit soil erosion from construction sites and sedimentation in streams and other waterways. In compliance, NASA shall prepare a soil erosion and sedimentation plan. This plan must specify the means to reduce or eliminate soil erosion. The *Virginia Erosion and Sediment Control Handbook* produced by the Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation, includes an extensive list of methods and minimum standards to reduce erosion.

- Wetlands

During assessment, the presence of wetlands must be determined and plans modified if necessary. The plans may include using equipment that cuts trees with minimal soil disturbance, leaving the stumps. Alternatively, if stumps must be removed, NASA is required to file a permit with the Army Corps of Engineers. The Corps of Engineers may deny the permit, modify the permit, require mitigation, require wetland banking, or require other actions.

- Coastal Zone Management

Activities that occur within the Coastal Zone will require a Joint Permit Application (JPA) filed with the Virginia Marine Resources Commission (VMRC). VMRC will distribute the permit application to the U.S. Army Corps of Engineers (USACE) and to the Accomack County Wetlands Board. The results of a permit application may vary. The VMRC may deny the permit, modify the permit, require mitigation, or require other actions.

- Equipment

Equipment available at Wallops includes chainsaws, bulldozers, a rubber-tired crane, and dump trucks. These may not be adequate for all projects. NASA may contract with companies that are fully equipped for the project.

- Size

The size of a project may affect the number or type of permits required, the equipment needed, or the visibility of a site.

- Ownership

Occasionally, trees located off NASA property intrude into the required air space. To clear the intruding trees and eliminate the obstructions, NASA must execute a legal instrument with the owner of the property, or the owner of the trees, if different than the owner of the property. The legal instrument might consist of title to the property, title to the trees, permission to cut the trees, an agreement that the owner will cut the trees, or other acceptable legal instrument.

2.2 Alternatives

Alternatives to the proposed action are considered in this section: limiting, modifying or relocating the current Wallops programs; strategic location of future Wallops programs. Other alternatives have been eliminated because of existing conditions, limitations, and site characteristics.

2.2.1 Program Limitation or Modifications

NASA may limit or modify programs to avoid the intrusion of trees. These limitations or modifications may be acceptable for a period of time. However, the changes are no longer acceptable when they jeopardize a program.

2.2.2 Program Relocation

It may be possible to relocate a program to avoid the intrusion of trees into required clear airspace. However, based upon current operational requirements and restrictions, program relocation is not a practical solution. Planning for future programs' locations will consider the presence of trees.

2.2.3 Other Alternatives

Other alternatives were considered to the proposed action. Trees could be topped along the slopes of the imaginary surfaces necessary for runway clearances or antennae and camera views. Or, only the trees that invade these surfaces could be cut. Instead of clearing the area, cut trees may be left on the site. Stumps may be left inground versus removal and grading of the area. However, if only topping or selective removal is instituted, the topped or remaining trees will quickly grow into the clear airspace resulting in a perpetual maintenance problem. In certain areas where the use of heavy equipment is inhibited (i.e. steep slopes), cut trees and stumps may be left on site. The purpose of the proposed action, however, is to facilitate maintenance of areas requiring clear airspace. Fallen trees and stumps would prevent grounds maintenance and promote regrowth of the trees. Therefore, wherever feasible, dead trees and stumps will be cleared so that the area may be graded and seeded with vegetation that is more readily maintainable.

2.3 No Action Alternative

Leaving trees undisturbed would reduce the effectiveness of various current programs. In some cases, the intrusion of the trees into needed clear air space would destroy the program. The Wallops management considers this an unacceptable alternative.

3.0 AFFECTED ENVIRONMENT

Environmental consequences of the proposed action are addressed in Section 4.0 Environmental Consequences. This section summarizes existing parts of the environmental elements so the consequences of the proposed action may be determined.

3.1 Physical Environment

3.1.1 Soils

Cutting and removing trees will disturb soils and likely cause soil erosion. Uprooting the trees or their stumps and using heavy equipment, particularly tracked vehicles, will disturb the soils, leaving mineral soils exposed and vulnerable to wind and rain. The amount of soil exposed, the slope of the surface, the force of the wind or rain, and the erodibility of the soil type will influence the extent of erosion.

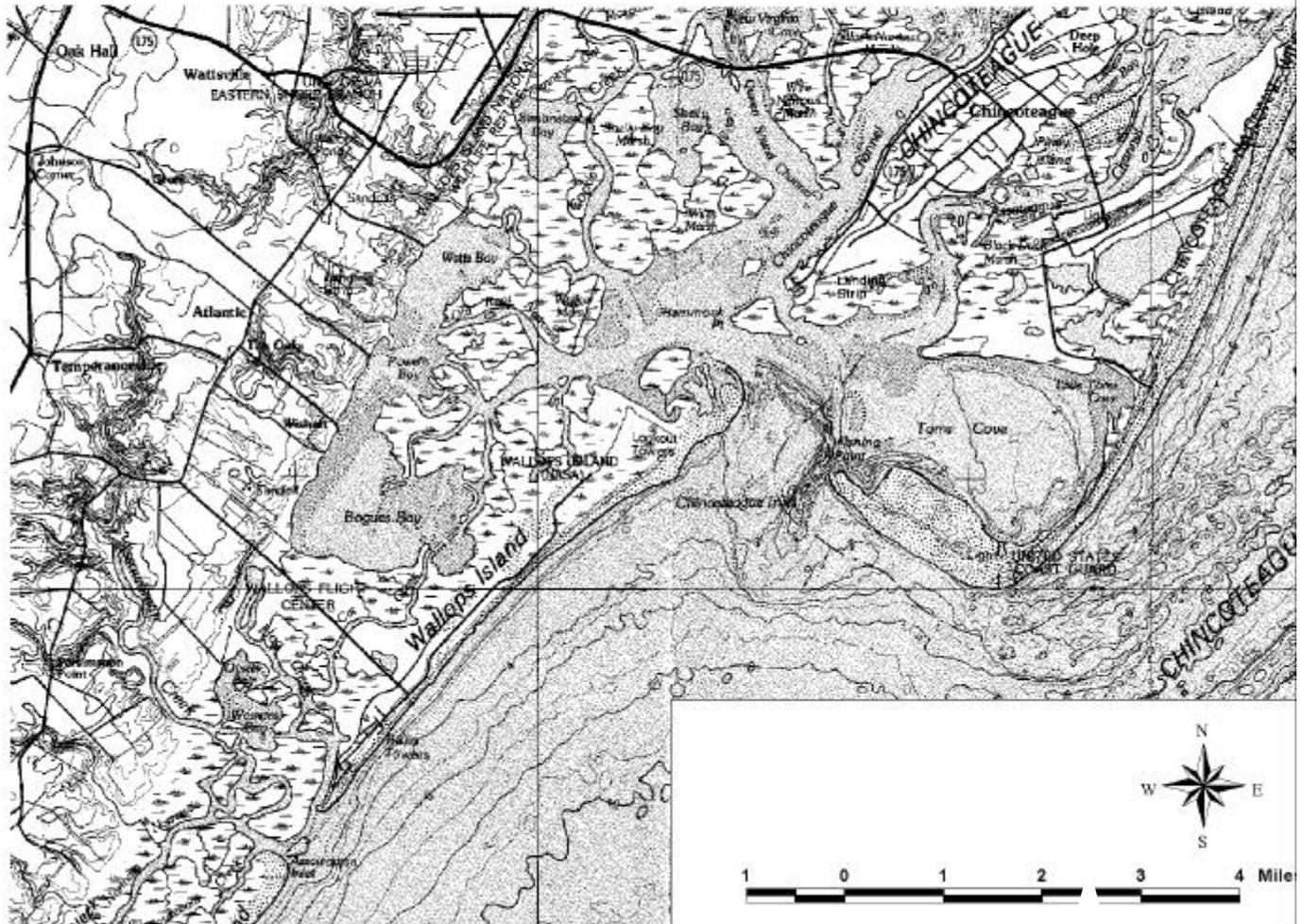
The soil types vary in erodibility across the three sections of Wallops. The *Soil Survey of Accomack County, Virginia*, published by the United States Department of Agriculture Soil Conservation Service, maps the soils found at Wallops and shows characteristics of the soils including erodibility. It is included by reference.

3.1.2 Surface Water

Storm water can erode mineral soils and other materials into surface waters. The proposed action may make soil erodible by exposing mineral soil. Operations conducted near surface water may result in sedimentation and deposition into surface water. Extensive areas of surface water lie within and near the boundaries of Wallops and may be vulnerable. Figures 3-1A and B show the locations of surface water near Wallops.

Little Mosquito Creek forms most of the northern boundary of the Main Base. The Wattsville Branch forms part of the western boundary of the Main Base and feeds into Little Mosquito Creek near the northwestern corner of the Main Base. The eastern and southeastern boundaries of the Main Base lie along or near extensive salt marsh and associated guts, creeks and bays. These guts, creeks and bays include Jenneys Gut, Simoneaston Creek, and Simoneaston Bay.

An extensive salt marsh separates Wallops Island from the Mainland with numerous creeks, guts and bays. The salt marsh lies east of the Mainland and west of Wallops Island. The Atlantic Ocean forms the eastern boundary of Wallops Island. Water quality standards are listed in the Commonwealth of Virginia DEQ (formerly SWCB) Regulations 9 VAC 25-31-110. These standards, including dissolved oxygen, pH, and maximum temperature, are used by the Commonwealth of Virginia to protect and maintain surface water quality. Background surface water concentrations for WFF were recently analyzed by Versar, Inc. and are reported in *Remedial Investigation/Feasibility Study Report Sites 14 and 15* dated, June 14, 1999.



<p>Figure 3-1B</p>	<p>Surface Water near Wallops Mainland and Wallops Island</p>
<p>June 22, 1999</p>	<p>Compiled from Hallwood and Bloxom USGS Topo Quad Maps</p>

3.1.3 Wetlands

Trees that intrude into clear air spaces may grow from wetlands. Extensive care must be taken during removal to prevent wetlands destruction. Moving soil, removing all vegetation or draining water could degrade the wetland environment or destroy it. Activities conducted on wetlands are heavily controlled by regulations, case law, nationwide permits and enforcement practices.

3.1.4 Coastal Zone

As a federal facility, Wallops Flight Facility is exempt from the Coastal Zone Management Act (CZMA) regulations. However, NASA follows federal and state CZMA requirements. Wallops Island is a barrier island along Virginia's Atlantic coast. A rock seawall has been placed along the shoreline to retard damage from storm events. Out to 2.8 miles (4.5 km) offshore, the ocean east of Wallops Island is shallow, averaging 33 feet (10 m) deep. Shrubs and scrub trees exist on the dunes on the northern end of Wallops Island. A maritime forest extends inland beyond the dune line. Development on coastal primary sand dunes can destroy vegetation which stabilizes the dunes, alter the natural contour of these sand dunes, impede their natural formation and migration, and interrupt wind and water currents which replenish the sand supply of beaches. Such alterations to coastal primary sand dunes may lead to an increase in shoreline erosion, coastal flooding, damage to fixed structures near the shore, loss of open space, and loss of wildlife habitat. Therefore, permanent alteration of, or construction upon, any coastal primary sand dune is expressly prohibited. Moving soil or removing vegetation from the maritime forest could negatively impact the forest environment. Activities conducted in the Coastal Zone are heavily controlled by regulations, case law, nationwide permits and enforcement practices.

3.1.5 Air Quality

Wallops Island, Virginia, is located in Region IV of the Commonwealth of Virginia air quality district. Region IV does not exceed standards in any of the precursor air pollutants listed in the ambient air quality standards for either Virginia or the United States (Virginia Department of Air Pollution Control, 1991). Therefore, since Wallops Flight Facility is located in an Attainment Area for all air quality standards, a General Conformity Analysis under the Clean Air Act is not required.

Fugitive dust from land clearing activities may adversely impact local air quality.

3.1.6 Noise

Local commuter traffic, air traffic, and rocket launches create most of the noise at Wallops. To reduce the impact of noise, aircraft are generally required to fly over marshland or farmland.

3.1.7 Electromagnetic Radiation

The directional antennae at Wallops generate electromagnetic radiation. Trees attenuate or modify this radiation, especially near the source, if the trees intrude into the path of the radiation. The directional antennae are of safe design relative to electromagnetic radiation emission.

3.2 Biological Environment

3.2.1 Plants

Mainland and Main Base: The vegetative zones from east to west on the Mainland and Main Base are marsh, thicket, and forest. Inland communities such as fresh and brackish marsh, xeric and mesic shrub, patches of open and complete cover of pine, and pine deciduous-mixed woodlands are often separated from one another by a sharp topographic change, forming a mosaic. Small rich remnants of upland forest and swamp forest occur on the Mainland and Main Base.

Wallops Island: The barrier island contains various ecological succession stages that include beaches, dunes, swales, maritime forests, and marsh. The natural vegetative zones form a series of finger-like stands that merge or grow into each other. The northern and southern dune vegetation on Wallops Island directly borders the salt marshes.

The predominant forest types are as follows:

- Primarily loblolly pine (*Pinus taeda*) with a few bushes and little ground cover.
- A mix of oaks (*Quercus* spp.), wild black cherry (*Prunus serotina*) and other hardwoods with a few loblolly pines, primarily along the edges.
- Widely spaced, park-like stands, primarily consisting of oaks and other hardwoods with grasses as ground cover.

3.2.2 Wildlife

The forested areas at the Wallops Flight Facility serve as habitat to many species of wildlife. Bird species include: sparrows (various genera and species), red-winged blackbirds (*Agelaius phoeniceus*), boat-tailed grackles (*Quiscalus major*), fish crows (*Corvus ossifragus*), gray catbirds (*Dumetella carolinensis*), mourning doves (*Zenaida macroura*), mockingbirds (*Mimus spp.*), robins (*Turdus migratorius*), and starlings (*Sturnus vulgaris*). There are also many migratory species.

Mammal species include whitetail deer (*Odocoileus virginianus*), eastern cottontail rabbit (*Sylvilagus floridanus*), red fox (*Vulpes fulva*), Virginia opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), gray squirrel (*Sciurus carolinensis*), and eastern chipmunk (*Tamias striatus*).

3.2.3 Threatened and Endangered Species

The United States Fish and Wildlife Service has identified three bird species (the piping plover, the peregrine falcon, and the bald eagle) that nest at WFF and are classified as either threatened or endangered. The populations of these three birds meet criteria established in the Endangered Species Act. The piping plover (*Charadrius melodus*), an endangered species, and the peregrine falcon (*Falco peregrinus*), a threatened species, both nest on Wallops Island. The piping plover nesting areas are limited to the beaches. Peregrine falcon nests have been limited to a nesting platform off Wallops Island.

Bald eagles (*Haliaeetus leucocephalus*) have built three nests on the Wallops Main Base and nearby properties. Under the Endangered Species Act, the United States Fish and Wildlife Service has established zones around bald eagles' nests where little to no activity may occur. No activity may occur within 330 feet of active nests and no more than minimal activity within 660 feet of active nests. These zones do not apply to inactive nests; however, inactive nests and the trees that hold them may not be destroyed or significantly impacted.

The Virginia Department of Game and Inland Fisheries has designated the three bald eagles' nests found on or near Wallops as VAAC 93-02, VAAC 95-01, and VAAC 97-03. Only VAAC 93-02 is actually on NASA property. The United States Fish and Wildlife Service use the same designations as the Virginia Department of Game and Inland Fisheries, except that the "VA" prefix is deleted. The following table was taken from a letter to John Brinton of NASA from the United States Fish and Wildlife Service, dated May 1, 1997.

Bald Eagle Nests

Nest	1993	1994	1995	1996	1997
AC 93-02	Active 2 young	Active 0 young	Not active	Not active	Not active
AC 95-01	---	---	Active 2 young	Active 0 young	Not active
AC 97-03	---	---	---	---	Active

The nest on Wallops property was not active from 1995 through 1997. The active nest, AC 97-03, lies on the north side of Mosquito Creek, outside of any area of concern. The letter also indicated that, while nest AC 93-02 has not been active in three seasons, the nest itself may not be destroyed.

No tree clearing activities are permitted within 330 feet of active eagles' nests. Beyond that, minimal activities may be conducted within 660 feet of active eagles' nests. No trees are to be cut near the peregrine falcon nesting platform and the piping plover nesting area on the beach.

3.3 Social or Community Environment

The Wallops Flight Facility and many of its activities are visible to much of the local community. People living in or visiting the area drive by Wallops. Personnel who work at Wallops have contact with the wooded areas and may express concern about tree clearing projects.

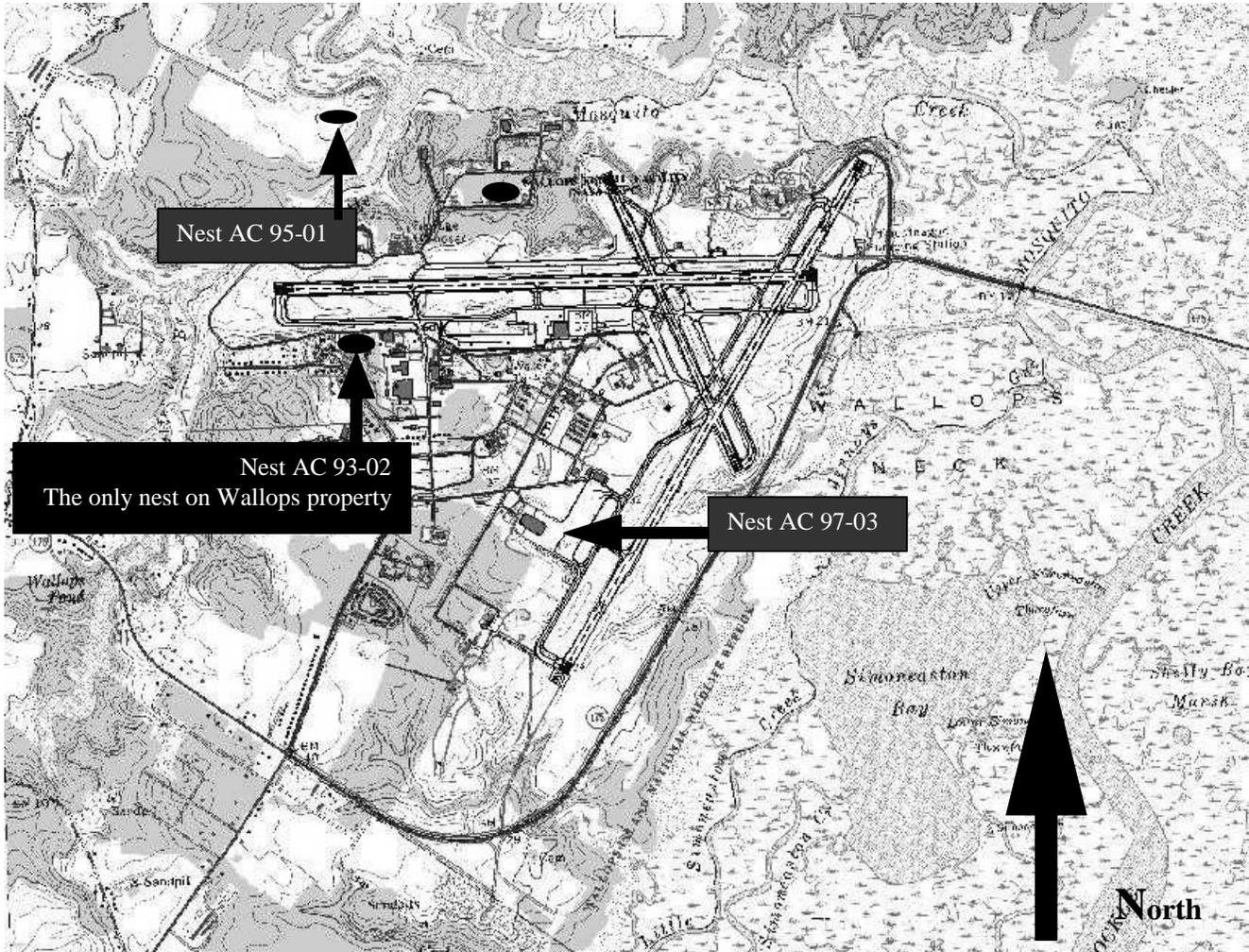
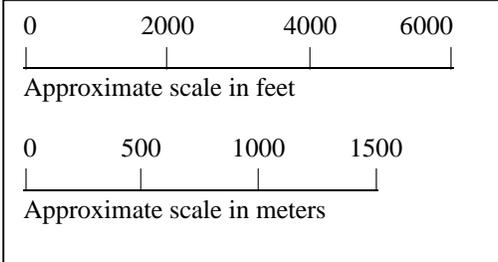


Figure 3-2	Approximate locations of bald eagles' nests
June 22, 1999	Compiled from Chincoteague West USGS Topo Quad Map



4.0 ENVIRONMENTAL CONSEQUENCES

4.1 Physical Environment

4.1.1 Soils

Tree cutting or removal may erode soils. Heavy equipment could expose mineral soil. Removing stumps will expose mineral soil and increase the risk of erosion. Exposed mineral soil may erode during rain storms or wind.

Compliance with erosion and sedimentation control standards and regulations prevents soil erosion. Ground cover will be left intact as much as possible. If the stumps are to be removed, the erosion and sedimentation control practices listed below will be used. Additional practices may be useful and necessary.

- Follow recommendations in the Vegetative Management Plan as closely as possible.
- Minimize the time mineral soil is exposed. Be prepared to complete the job before beginning operations. Once work begins, continue the operation until completion.
- Use equipment that will perform adequately but minimize soil disturbance. Using lighter equipment compacts the soil less.
- Replant ground cover as soon as possible after tree removal. This should include appropriate grasses, but may also include shrubs or low-growing trees that will not intrude into clear airspace.
- Monitor vegetation growth to ensure if it is well established; replant if necessary.
- Leave the soil surface uneven. The soil surface may be smooth enough for mowing, but uneven enough to interfere with storm water flowing over the surface.
- On slopes, establish control of soil-carrying storm water to reduce or eliminate soil erosion off the site of operations. Following is a list of practices, in order of preference:
 1. A grassy area down slope of the site to stop erosion.
 2. A brush barrier made up of brush from the trees removed. The brush barrier should be 5 feet across the base and 3 feet high.
 3. Straw bales. Brush barrier or straw bales if used, will be removed after vegetation is established.

These practices should be adequate for minor programs and evaluated for effectiveness on larger projects.

For tree removal projects over 10,000 square feet, an erosion and sedimentation plan must be submitted. The plan must be submitted to the Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation, Regional Erosion and Sedimentation Control Specialist, 1548 Holland Road, Suffolk, Virginia 23434.

4.1.2 Surface Water

Land disturbance activity of five acres or more may require a Virginia Pollutant Discharge Elimination System (VPDES) Stormwater General Permit from Virginia DEQ. Contact DEQ's Tidewater Regional office at (757) 518-2000.

4.1.3 Wetlands

Removing trees will minimally impact the functions of wetlands, providing other vegetation and hydrology remain intact. Whenever possible, NASA will cut the trees low without removing the stumps. Tree clearing without stump removal or soil disturbance is outside the jurisdiction of the wetlands legal authorities (regulations, case law, and enforcement practices). If stumps must be removed or if soil is to be moved from wetlands, a Virginia Water Protection Permit from DEQ, a tidal wetlands permit from Accomack County and/or a Section 404 permit from the USACE may be required. A Joint Permit Application (JPA) must be filed with the Virginia Marine Resources Commission (VMRC). VMRC will distribute the permit application to the U.S. Army Corps of Engineers (USACE) and to the Accomack County Wetlands Board. The results of the permit application may vary and may be costly. They are discussed in section 2.1.2 Limitations to the Proposed Action.

4.1.4 Coastal Zone Management

Currently, no programs exist or are anticipated for the northerly end of Wallops Island. Therefore, no tree clearing activities would occur that could impact the Coastal Zone. If a future program is initiated that would affect this area, a Joint Permit Application (see 4.1.3 above) would be filed. The results of the permit application may vary and may be costly. They are discussed in section 2.1.2 Limitations to the Proposed Action.

4.1.5 Air Quality

No adverse impacts to air quality are anticipated during execution of the project, however, fugitive dust will be kept to a minimum. Measures will be taken that include, but are not limited to, application of water to suppress dust, and washing down construction vehicles and paved roadways immediately adjacent to the project site.

4.1.6 Noise

The additional noise due to tree clearing will be minimal, compared to the other sources of noise at Wallops.

4.1.7 Electromagnetic Radiation

While the electromagnetic radiation could increase after the removal of trees, it will not increase to unsafe levels. This environmental assessment will not quantify the effect that the removal of trees will have upon electromagnetic radiation or upon radiation safety. It assumes that removal of the trees will reduce the dampening effect. However, based upon information provided by the Wallops Flight Facility Safety Office, removing the trees will not compromise safety. Electromagnetic radiation calculations for radar antenna do not consider the dampening effect of trees or other vegetation when determining safety levels.

4.2 Biological Environment

4.2.1 Plants

The impact of harvesting on forest communities at WFF will cause regression from late second succession growth to early old field succession stages of forest development. The late second succession forest community consists of loblolly pine (*Pinus taeda*), a mix of oaks (*Quercus* spp.), wild black cherry (*Prunus serotina*) and other hardwoods. The early old field succession forest community will then include pines, hawthorns, apple, briars, alder bushes, and various grasses.

4.2.2 Wildlife

The alternatives that include removing all trees in a given area will impact wildlife whose habitat is limited to the cut-over area. The impacted wildlife might include small mammals, small reptiles, and birds. After cutting, a profusion of vegetation may take root over the area, if not managed by NASA. This new growth may temporarily support larger populations of animals, such as deer.

4.2.3 Threatened and Endangered Species

Careless tree removal could destroy the bald eagle's nest on Wallops and would violate the Endangered Species Act. All tree removal must carefully avoid nesting trees. The United States Fish and Wildlife Service (USF&WS) will be consulted if tree clearing activity is proposed within 1,320 feet of an active bald eagle nest on Wallops Flight Facility. The tree removal will not impact the peregrine falcon nest or the piping plover beach nesting area.

4.3 Social Environment

Portions of the community may object to the tree removal on aesthetic, ecological, or other grounds. Their objections may be a concern to WFF's managers. This document is part of a response to those objections. Tenants affected by tree clearing activities will be notified and consulted during the planning stages of a tree removal project. When the removal includes more than a few trees, the Public Affairs Office should be contacted. At the discretion of the Public Affairs Officer, the public may be notified through various means. This notification should explain the necessity and rationale for the removal.

4.4 Cumulative Effects

Under current conditions, there is very little impact upon the regional environment by tree removal at WFF. Thirty-nine thousand, two hundred thirty hectares (96,630 acres) of Accomack County are wooded; 3,950 areas of Wallops are wooded. The present total area of the sites to be cleared accumulates to less than 10 hectares (25 acres) with the single largest area covering approximately 5 ½ acres. The acreage cleared to meet the current need for unobstructed space at Wallops will amount to no more than 0.026 percent of the present total wooded area in Accomack County and 0.633 percent of WFF. Large areas of WFF will remain wooded.

In the foreseeable future, the regional environment will likely retain much of its wooded area. Timber is harvested commercially over much of the area. Commercial forest land is routinely replanted and remains forest land.

Nearby state and federal parks, refuge areas and forested wildlife preserves guarantee that Accomack County will remain rural and forested for the foreseeable future.

5.0 AGENCIES AND INDIVIDUALS CONSULTED

Accomack County Administration
Attn: Mr. R. Keith Bull, County Administrator
P.O. Box 388
Accomack, VA 23301
(757) 824-5444

Chesapeake Bay Local Assistance Department
Attn: Mr. Michael D. Clower, Executive Director
James Monroe Building
101 North 14th Street,
17th Floor
Richmond, VA 23219
(804) 225-3440

Commonwealth of Virginia
Department of Agriculture and Consumer Services
Office of Policy Planning and Research
Attn: Roy E. Seward, Director
1100 Bank St. Suite 211
Richmond, VA 23218
(804) 786-2373

Commonwealth of Virginia
Department of Conservation and Recreation
Division of Planning and Recreation Resource
Attn: Mr. John R. Davy, Division Director
203 Govenor Street, Suite 326
Richmond, VA 23219
(804) 786-2556

Department of Environmental Quality
Tidewater Regional Office
Attn: Ms. Sheri Kattan
5636 Southern Boulevard
Virginia Beach, VA 23462
(757) 518-2156

Department of Environmental Quality
Division of Environmental Announcement
Office of Environmental Impact Reviews
Attn: Ms. Ellie Irons
629 East Main Street, Room 631
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(804) 698-4325

Commonwealth of Virginia
Department of Game and Inland Fisheries
Attn: Mr. Ray Fernald, Environmental Coordinator
4010 West Broad Street
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Commonwealth of Virginia
Department of Historic Resources
Federal Review and Compliance Coordinator
Attn: Ms. Cara Metz, Project Review Director
2801 Kensington Avenue
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Department of Mines, Minerals, and Energy
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Attn: Mr. Stanley S. Johnson, State Geologist and Director
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U.S. Fish and Wildlife Service
Attn: Ms. Karen Mayne, Director
6669 Short Lane
Gloucester, VA 23061
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Virginia Institute of Marine Science
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William B. Bott	NASA Goddard Space Flight Center's Wallops Flight Facility, Code 205.W	Proposed Action and Graphics review

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8.0 RESPONSES TO COMMENTS

The preceding Environmental Assessment (EA) and the accompanying Finding of No Significant Impact (FONSI) were sent to the Government Agencies in Section 5.0 as well as announced for public comment in the local newspapers, on October 13, 1999. Final responses were received on November 20, 1999. All responses have been considered and appropriate changes were made to this EA. The following responses were received.