



SECRETARY OF DEFENSE 2005 ENVIRONMENTAL AWARD NATURAL RESOURCES CONSERVATION, SMALL INSTALLATION Navy Information Operations Command Sugar Grove

INTRODUCTION

Navy Information Operations Command Sugar Grove is a communications research installation in Pendleton County, West Virginia and the largest active duty Department of Defense activity in West Virginia. The unique mountainous topography of western Virginia and eastern West Virginia directly affects radio signals by inhibiting their transmission. This topographic ability to screen out most incoming radio signals resulted in the Naval Research Laboratory's request to conduct advanced electronic communications research in that area. In 1955, the Navy, through a Cooperative Agreement with the U.S. Forest Service (USFS), acquired the Sugar Grove lands for this purpose. Following the Navy's lead, in 1958 the Federal Communications Commission set aside approximately 13,000 square miles of surrounding West Virginia and Virginia lands to become the United States National Radio Quiet Zone that protects Sugar Grove and the National Radio Astronomy Observatory at Green Bank, West Virginia from radio encroachment. The "Mountaineer Navy" consists of approximately 220 military and 90 civilian workers with 204 dependents living on Sugar Grove.



An aerial view of the "Home of the Mountaineer Navy"

Sugar Grove lies in mountainous terrain with elevations ranging from 1,250 to 4,000 feet above mean sea level. Sugar Grove is made up of two facilities, the Main Base and the Operations Site. The Main Base encompasses 117 acres, 94 improved and 23 unimproved. It lies in South Fork Valley between Hoover Mountain and the western foothills of Shenandoah Mountain, and is bordered by the headwaters of the South Fork of the South Branch of the Potomac River. The Operations Site consists of 477 acres, 20 improved, 36 semi-improved, and 421 unimproved. It lies six miles to the south of the Main Base, is located on several foothill ridge tops of Shenandoah Mountain and is completely surrounded by the George Washington National Forest. It is drained by three watersheds: Lick Run on the west, and Wolf Run and the Little Fork River on the east. Overall Sugar Grove is bordered by four and one-half miles of in-stream, wetland and riparian habitat and contains 454 acres of managed forest. All of Sugar Grove's 594 acres is covered by an Integrated Natural Resources Management Plan (INRMP).

Sugar Grove is home to a rare geologic and biotic community called a shale barren. These are sparsely vegetated, steep slopes with characteristic and endemic species. There are two shale barrens at Sugar Grove – the Little Fork Shale Barren and the Lick Run Shale Barren. These steep southeast-facing slopes have very thin soils that consist primarily of shale fragments. Their vegetative cover consist of a poor quality, stunted Virginia pine/oak/hickory forest. This sparse cover helps contribute to soil temperatures that can reach 150 degrees Fahrenheit in summer. These rare communities total approximately 35 acres in size and are located on the Shenandoah Mountain. The Little Fork shale barrens are also home to the largest known population of the shale barren rockcress (*Arabis serotina*), a Federally listed threatened plant.

In addition to the shale barren rockcress, the West Virginia Department of Natural Resources (WVDNR) has identified five rare plant species and two rare butterfly species on the Operations Site. A pair of bald eagles nest just outside the Sugar Grove boundary line and have fledged eaglets every year since 1997. The eagles forage regularly

at the beaver pond in the Operations Site and on the South Branch of the Potomac River adjacent to the Main Base western boundary. The U.S. Fish and Wildlife Service (USFWS) has also determined that Sugar Grove has foraging and nesting habitat for the federally listed Indiana and Virginia Big-eared bats. During the summer of 2005, Sugar Grove conducted a combination auditory and capture survey on both the Main Base and Operations Area, however, neither bat species was caught or recorded. The diverse ecosystem at Sugar Grove is home to 40 tree species and over 2000 species of shrubs and herbaceous plants. The landscape includes beaver pond wetlands, grassy meadows, dense riparian forest areas, and cascading streams - including the headwaters of the Potomac River - a portion of the Chesapeake Bay watershed. All this provides excellent habitat for over 107 bird species from the bald eagle to the ruby-throated hummingbird. The oak-hickory forest of the Operations Area is also home to deer, bear, fox, turkey, opossum, raccoon and squirrel.

BACKGROUND

Sugar Grove's INRMP was developed around major Natural Resource management issues and includes management recommendations for surface drainage, soil erosion and sediment control, land management, forestry, fish and wildlife, protected species, and outdoor recreation. WVDNR concurred with the management recommendations in Sugar Grove's proposed INRMP in their letter dated February 7, 2003 and USFWS concurred in a letter dated March 31, 2003. The Sugar Grove INRMP was finalized in May 2003. To date, Sugar Grove has completed approximately 90% of the proposed recommendations for the five-year planning period of 2003-2008 and has requested funds to begin an INRMP revision in 2006, two years ahead of schedule.

To support the natural resources management program, Sugar Grove has established cooperative agreements with the USFS, Institute of Bird Populations (IBP), WVDNR, and West Virginia Department of Environmental Protection (WVDEP). Because of the Federally threatened shale barren rockcress, Sugar Grove consults regularly with the USFWS.

Sugar Grove has one full-time Environmental Specialist on site and supplements its staff through technical assistance from Naval Facilities Engineering Command Mid-Atlantic (NAVFAC MidLant) and Commander, Navy Region, Mid-Atlantic. In addition, Sugar Grove depends on volunteer Base Conservation Officers and other DoD military and civilian volunteers to provide valuable assistance in accomplishing natural resources management objectives. Management of Sugar Grove's natural resources is closely coordinated with the Commanding Officer's Executive Steering Committee. In addition, natural resources aspects and impacts are addressed in Sugar Grove's Environmental Management System that is currently under development.

PROGRAM SUMMARY

The goal of the Sugar Grove INRMP is to implement an ecosystem-based program that provides for conservation and rehabilitation of natural resources in a manner that is consistent with the military mission; integrates and coordinates management activities; provides for sustainable multipurpose use of natural resources; and provides public access for use of natural resources subject to safety and military security considerations. From 2003 to 2005, Sugar Grove accomplished over 90% of its INRMP objectives as quantified in the INRMP project implementation schedule. These objectives included: the first phase of reforestation and wildlife habitat restoration at the old Wullenwebber Antenna area on the Operations Site; environmentally beneficial landscaping on the Main Base; and erosion and sediment control projects on both the Main Base and Operations Site.

Using funds from the NAVFAC Agricultural Outlease program, Sugar Grove was able to establish a cooperative agreement with the WVDNR in 2005 to monitor the shale barren rockcress. Sugar Grove has partnered for ten consecutive years with the WVDNR to accomplish this work. Sugar Grove has been involved with the Department of Defense (DoD) "Partners in Flight" program for the last five years. The IBP and Sugar Grove cooperate in this program to monitor resident and breeding songbird populations on the base.

Environmental Education is a high priority at Sugar Grove. Over the last several years, Sugar Grove has hosted WVDEP programs addressing the Clean Water Act and has participated in the Potomac Basin Watershed Program in

cooperation with the Chesapeake Bay Program. In 2005, Sugar Grove received a DoD "National Public Lands Day" Legacy program grant for the control of invasive species. Sugar Grove used this grant to initiate its invasive species control program and to educate the surrounding community on the danger to native ecosystems posed by invasive species.

ACCOMPLISHMENTS

Overall Conservation Management

During 2004, Sugar Grove began integrating the use of a geographic information system (GIS) in its natural resource management program, introducing its use into program areas such as land management, threatened and endangered species management, wildlife management, and forestry. As an example, using GIS has given the environmental and engineering staff the capability to create integrated maps of storm water hydrology, surface drainage, and underground collection systems. These maps have enhanced land management. By pinpointing areas susceptible to erosion, Sugar Grove has modified its storm water collection system to intercept run off before it causes erosion and sedimentation. This has prevented violations of the Clean Water Act. GIS also provides detailed information on the extent and location of rare, threatened and endangered species and of wetlands. A GIS inventory of the urban forest resources at Sugar Grove has helped to determine the species, age, health and suitability of landscape vegetation. The information gathered from this inventory helped in the selection of the most practical and beneficial trees for landscape renovation, soil stabilization and reforestation projects conducted during the last two years. In addition to modernizing base operations, these GIS capabilities have allowed the environmental staff to anticipate real and potential land management issues and to facilitate coordination with the USFWS on compliance issues.

Ecosystem Management

Over the last several years and through cooperative agreements with state and non-profit agencies, detailed surveys and studies were conducted at Sugar Grove on amphibians, bats, aquatic vertebrates and invertebrates, plants and insects. Information gained from these studies and from coordination with federal and state wildlife agencies supports the management of natural resources based on ecological boundaries and cooperative management. Current management goals at Sugar Grove include maintaining and enhancing habitat for wildlife species that favor early and mature forest environments. Temporary and permanent clearings, encouraging residents to create backyard wildlife habitat in housing areas, and preventing wildlife disturbance during nesting and brood-rearing seasons accomplish this goal. During 2004, Sugar Grove established the first phase of a wildlife hedge planting at the old Wullenwebber site in the Operations site. Fruit producing species were planted for wildlife cover and nesting. In 2005, Sugar Grove awarded a contract for the second phase of this project.

Land Use Management

During 2004 and 2005, Sugar Grove implemented many of the hydrological recommendations contained in the INRMP. These recommendations addressed areas on the Main Base and the Operations Site where construction had altered the natural hydrology of surface runoff. This was leading to sheet and rill erosion and also to erosion of grassy drainage swales. This erosion and the resulting sedimentation were directly affecting wildlife habitat and the water quality of the South Fork of the South Branch of the Potomac River.

To deal with the erosion issues, Sugar Grove implemented the following best management practices to restore the riparian buffers: using Bio-logs made from coconut fiber to slow down high velocity runoff, grading and seeding, using fiber matting, adding erosion control fences, planting tree seedlings and establishing no-mow areas.



Installation of Bio-logs at the Operations Site

To improve soil fertility at the old Wullenwebber antenna site, Sugar Grove, treated sewage sludge (biosolids) is applied to approximately 36 acres. This is done under the guidelines of a West Virginia's National Pollution Discharge Elimination System Permit. Since June of 1997, the base has had applied about 90,000 gallons (15 dry tons) of biosolids. The nutrients contained in this sludge have a fertilizer value equal to 5,300 lbs. of 10-10-10 (10% Nitrogen, 10% Phosphorous, 10% Potassium) fertilizer. This application improves the site conditions for vegetation restoration and is essential to rehabilitation of this previously excavated land.

The goal of these projects was primarily to bring Sugar Grove into compliance with Section 319D of the federal Clean Water Act, the West Virginia Non-Point Source Storm Water Pollution requirements and regional Chesapeake Bay Program water quality goals. These projects also promoted wildlife conservation and environmental awareness.

Forest Management

The goals of the forest management program at Sugar Grove includes: soil and water conservation; preservation of habitat for wildlife; conservation of biodiversity; protection of rare, threatened and endangered species; coordination with the military mission; and limited timber production for maintenance of the forest ecosystem. A good example of the success of Sugar Grove's forest management program is the planned reforestation and wildlife habitat improvement of the old Wullenwebber Antenna site. One of the goals at this site is to find a source of blight-resistant American chestnut (*Castanea dentate*) seedlings, and to reintroduce a stand of these trees. The enhancement of biodiversity in the forested ecosystem is an important aspect Sugar Grove's forest management program. The American chestnut was once an important component of the forest ecosystem, before disease wiped it out. In addition to increasing biodiversity, the reintroduction of the American chestnut will have a positive effect on wildlife populations by providing a large and predictable mast crop. In many forest ecosystems, various oaks replaced the American chestnut as the primary hard mast producer. However, oaks typically produce sporadic mast crops. Before the blight, chestnuts produced large mast crops almost annually. Squirrels and other rodents stored away this large and predictable mast crop, and it was consumed in large quantities by deer, bear, turkey and many other wildlife species to build fat for the winter. Reintroducing this primary producer into the ecosystem will enhance wildlife habitat and biodiversity. West Virginia nurseries have indicated that blight-resistant seedlings will be available for planting in 2007.

Fish and Wildlife Management

Sugar Grove operates a recreational hunting program in the Operations site and participates in the WVDNR's Deer Management Assistance Program. There are 20 designated hunting zones and game such as whitetail deer, wild turkey, black bear, bobcat, squirrel, and ruffed grouse are plentiful. To hunt on Sugar Grove, all hunters must successfully complete a 12-hour West Virginia Hunter Education Program and purchase a West Virginia hunting license before obtaining an on-base hunting license. Only DoD active duty, retired, civilian employees and their dependents can hunt aboard Sugar Grove.

In early 2004, Sugar Grove implemented an INRMP recommendation for moist soil management at the storm water detention pond located on the old Wullenwebber site. This involved establishing a water management regime to benefit wildlife, incorporating clay soil into basins to help retain water, and initiating annual monitoring of conditions in the basin. In addition to the habitat improvements, an enclosed wildlife viewing platform was constructed overlooking the pond. To enhance the non-consumptive enjoyment of wildlife, a one-mile circular nature trail with interpretive signage was also developed in the area.



Turkeys feeding on the old Wullenwebber site

The South Fork of the South Branch of the Potomac River and the Little Fork River provide Sugar Grove with approximately two miles of natural in-stream habitat. The INRMP objectives for this prime riverine fishery emphasize maintaining wild fish stocks and preserving the biotic integrity of the ecosystem. The South Fork of the South Branch

of the Potomac is one of the Mid-Atlantic's premier small-mouth bass waterways. The South Branch rises in Virginia, where it is a Category B trout water. The Commonwealth of Virginia stocks the South Branch with trout in early winter, again in late winter, once in March, and twice between April and May 15. WVDNR also stocks the West Virginia side during the same period. This stocking, along with wild fish populations, creates prime recreational fishing on Sugar Grove.

The South Fork River bounding the Main Base has many natural stream features such as riffles, in-stream boulders, pools and rocky substrate. In 2003, tropical storms had a devastating effect on these features and streamside vegetation in the riparian buffer. After a flood in the fall of that year, Sugar Grove's Commanding Officer requested assistance of a Seabee detachment from Naval Amphibious Base Little Creek to clear debris and repair flood damage to the riparian buffer. The command's Environmental Department, in cooperation with federal and state agencies, used about 20 volunteers to plant native species along a half-mile section of the river to enhance wildlife habitat and shoreline protection. The volunteers provided over 500 hour of labor for this project. Funding for the restoration and enhancement projects needed to repair severe erosion caused by the storms and associated flooding came from a special DoD emergency hurricane appropriation, which totaled over \$100,000. These projects were completed during 2004 and 2005. The need for these projects was identified in the INRMP, although the severity of the storms magnified the damage that had been noted prior to the 2003 storms. One project entailed diverting storm water into a natural detention basin, where it percolates into the ground water system vice running directly into the river.

Invasive Species Control and Pest Management

While preparing its INRMP in 2003, Sugar Grove also updated its Pest Management Plan. Both documents highlight the necessity of controlling invasive species. The Natural Resources Management Program has oversight of the invasive species control program. The invasive species program emphasizes mechanical control as the main method of controlling all invasive species, with follow up of chemical control if required.

During the spring of 2005, Sugar Grove applied for and received a special DoD Legacy funded National Public Lands Day 2005 grant. Only military installations that permit public use of their facilities for recreation are eligible for this program. The Commanding Officer of Sugar Grove proclaimed Friday September 23 as Public Lands Day. Through this proclamation, he asked for volunteer assistance in initiating the invasive species control program. The first phase of the INRMP project called for removing invasive species from eight acres of riparian buffer along the South Fork River. The Commanding Officer, his Executive Officer and 20 volunteers, began the mechanical removal of the invasive tartarian honeysuckle (*Lonicera tatarica*) and multiflora rose (*Rose multiflora*). Workers sprayed cut stems with an approved herbicide to prevent resprouting. The removal of these dense and thorny invasive species immediately enhanced fishing access and also opened up the river view from the riparian nature trail. During the fall of 2006, the upper riparian buffer will be planted with native species to prevent the invasive species from becoming re-established.

Conservation Education / Community Relations

The Commanding Officer at Sugar Grove has made Community Outreach a priority for all Departments. To this end, the Environmental Department frequently speaks at Pendleton County High School and Brandywine and Franklin Elementary Schools, discussing natural resources subjects such as ecosystem management and protection. Sugar Grove also sponsors an annual Environmental, Health, and Safety Fair, which is open to the public. In 2005, over 120 children from local area schools attended and participated in numerous activities, including meetings with Smoky the Bear and the Safety Squirrel. In addition, during 2005, Sugar Grove sponsored a visit from the coordinator of the West Virginia "Save Our Streams" Program to the Pendleton County Homeschoolers' Association. This daylong workshop focused on stream health. Mrs. Nancy Parode, the parent /teacher who



Homeschoolers learning about stream health

coordinated the Homeschoolers' Association participation, stated, " The children and parents will never look at the river the same way again, now that they know that the river is teeming with life. They learned that what we do affects life in the river, and that we must take care of this precious resource so we can enjoy it in future years."

Environmental Enhancement

Sugar Grove participates in informal consultation on the shale barren rockcress with the USFWS. This consultation process, enhanced by USFWS staff visits in 2003 and 2005, has resulted in the development of an outstanding working relationship. This helps to ensure the survival of the shale barren rockcress, since the largest known population exist at Sugar Grove. Continuing relationships and cooperative agreements with the State of West Virginia and non-profit agencies have also produced positive outcomes. These working relationships result in timely responses and expert advice regarding problems that might arise in Sugar Grove's natural environment.

Mission Enhancement

The success of Sugar Grove's mission, "to conduct advanced electronic communications research", is dependent on the conservation of natural resources and the management of its threatened and endangered species. All mission activities that deal with modernization through construction require consultation with the USFWS. The open communication between Sugar Grove's Environmental Department, NAVFAC MidLant and the USFWS, through the informal consultation process, has resulted in a superb relationship. The local USFWS office, although burdened with a heavy workload and under staffed, has tried to make the Navy's mission success one of their main priorities.

Natural Resources Compliance Program

To sustain Sugar Grove's mission, to conduct communications research and development, Sugar Grove is committed to the conservation of its natural resources and the conscientious management of threatened and endangered species. The leadership at Sugar Grove believes in preserving and enhancing the natural environment through a coordinated ecosystem approach. Accordingly, they committed to funding all INRMP Conservation Compliance projects regardless of the Navy assessment level. This commitment resulted in completion of 90 percent of the INRMP projects three years ahead of schedule. Sugar Grove has a strong compliance program and maintains a close working relationship with all the Federal and State Agencies concerned with natural resources. Regulators are welcomed and frequently visit Sugar Grove. Full compliance with all pertinent laws, executive orders, regulations and directives plus the positive relationship with the regulators has fostered Sugar Grove's outstanding Natural Resources Management Program. This program will ensure the future viability of a unique facility that is a testament to the Secretary of Defense's commitment to the wise use of American land and worthy of the trust of the American people.