# NVIRONMENTAL SCIENCE



Second Edition

Underwood

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## Preface

nvironmental science often finds itself embroiled in controversy. The science itself is not controversial. Among scientists there is general agreement as to its findings and principles. But when environmental science brushes against economics and politics, controversies arise. Inevitably, environmental science becomes embroiled in environmental issues.

These are some of the most contentious issues society faces. Often they involve economic interests, preservationists, one or more user groups, politicians, regulatory agencies (local, state, and/or federal), and the press in a process that comes to resemble a barroom brawl. What starts out as a minor disagreement escalates into an all-consuming issue that divides communities and defies reason. Environmental science is often caught in the middle.

In the pages that follow, we examine 12 such issues. Each one is an example of how a specific group of people in a specific region faced a specific issue. These may or may not be the most important issues facing society. What is important is that they illustrate how a community has dealt or is dealing with an environmental controversy. In every case progress has been made, but no case sees complete resolution. Indeed, a characteristic of these issues is that they tend never to go away completely. Intensities ebb and flow as decisions are made and events take their course, but the issues are always there, waiting somewhere in the background. The price for involvement in environmental issues is constant vigilance.

Must this always be so? What would it mean to satisfactorily resolve an environmental issue?

If resolution is the goal, keep these points in mind when dealing with these and similar issues:

- There are no good guys and no bad guys, just differing points of view. In fact, even differing viewpoints are often not that far off from each other. Most developers see the value of a clean environment and most preservationists admit the importance of a strong economy. They differ mainly in the order they value economic versus environmental factors. How can we get combatants in these issues to be sensitive to the opinions of others?
- 2. The role of environmental science is somewhat limited, and as scientists, we cannot solve all problems or answer all questions. For example, what would be the environmental impacts if large numbers of species become extinct in a given area? Environmental science can answer this one. How much money should we spend to save endangered species? This is a question that environmental science cannot answer by itself. The answer is political, economic, perhaps moral, but not

- scientific. In general, what kinds of questions should scientists answer and which ones should we avoid?
- 3. Our goal should be "win/win" solutions. Too often issues become "win/lose." If the environment wins, the economy loses. If the economy wins, the environment loses. How often do we hear, "A particular environmental policy will cost too much; thousands of jobs will be lost." Must it always be this way? What are the economic benefits of clean, healthy environments or healthy populations of endangered plants? Often, it's a matter of attitude.
- 4. These issues showcase real people dealing with real-life issues. Related issues are being dealt with by other people in other regions. What are the related issues in your community? How will you contribute? Do you wish to enflame, inform, ignore, or resolve?

The 12 issues that constitute Case Studies in Environmental Science are organized regionally—at least one issue is included from each of the major regions of North America. Each starts with a commentary that introduces the issue, including its importance, relevance, and seriousness. The introductory text is followed by a series of readings that provide additional background and address the specific issue and region. At the end of each unit, a series of questions guides the reader through the intricacies and complexities of the issue.

Case Studies in Environmental Science is more than a textbook. An integral part of the learning system is an extensive Web site authored and maintained by Kevin R. Henke, University of Kentucky, Lexington. The site can be found at <www.harcourtcollege.com/lifesci/envicases2>. This Web site and its links are powerful additions to the text, allowing exploration of issues in greater detail with access to the most up-to-date information on any environmental topic. Using the same organization as this book, the site supplements each unit with coverage of the case study issue in all regions of the United States and Canada. Resources for each unit enable instructors and students to go beyond the readings via links to other Web sites and critical thinking questions. The links contain a diverse wealth of environmental information on national as well as local issues. This information includes both archived, historical materials (such as the Dust Bowl of the 1930s) and detailed discussions on today's headlines. Furthermore, the Web site contains practical suggestions for becoming more environmentally proactive, including how to save energy and more effectively recycle wastes at home. Links will be periodically reviewed to ensure that they are still active. Inactive links will be replaced with new links on related topics.

Environmental science and involvement in environmental issues are exciting and necessary aspects of modern life. For many of you, it will be your life's passion. Enjoy!

LARRY UNDERWOOD

Woodbridge, Virginia

April 2000

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**Questions for Discussion** 

### Future Use of the Woodbridge Research Facility

#### Introduction

In urban and suburban communities, it is often difficult to establish and retain natural areas. Open land is at a premium. Often, as soon as a tract becomes available, competing, incompatible uses vie for its control. Citizens get caught up in what soon becomes local controversy. Their needs and wants frequently conflict. Citizens want open land for passive or active recreation and to provide habitat for wildlife, but they need jobs, services, and sources of revenue to support local governments. Land-use decisions are often long, tedious, and contentious.

Prince William County (PWC) in Northern Virginia is caught up in just such an activity. In recent years, PWC has been a bedroom community for Washington, D. C., located just 20 miles (32 km) away. Without an industrial base, PWC is finding it difficult to squeeze enough tax revenues from citizens to provide for their needs. To broaden its commercial tax base and to provide citizens with local jobs, the county is doing what it can to lure businesses and other economic interests to the area.

In 1991, PWC saw an opportunity to obtain a sizable tract of land from the federal government. To save federal tax dollars, the U.S. government asked the Base Realignment and Closure Commission to identify bases no longer essential to military needs. Bases so designated were to be closed and the land they occupied either transferred to other federal agencies, given to state or local gov-

ernments, or sold on the open market. To minimize the economic impact on local communities, local governments were asked to establish Reuse Committees, made up of local citizens and interested parties, to study alternatives and make recommendations to the Army.

The Woodbridge Research Facility (WRF) was determined to be such a site. Located in PWC's southwest corner, this top-secret U.S. Army laboratory was designated for closure. Nearly 600 acres (240 hectares) of potentially prime real estate fronting the Potomac River was suddenly up for grabs.

#### Background

In many respects, the WRF is a unique and important site. Its potential economic value is unquestioned. It lies less than one mile (1.6 km) south of the "Route 1 Corridor" (Figure 1), a strip development running through the county made up of numerous small- to medium-sized businesses serving the region. Immediately adjacent, to the northwest of the facility, is an industrial complex. Perhaps more important, immediately northeast of the facility a major commercial development (Belmont Development) is planned, consisting of new homes, a hotel and conference center, a marina, an aquarium, and a golf course. To county land planners, the additional acreage would create jobs and expand the commercial tax base.

The area also had surprising environmental values. First settled in the 1700s, the facility had been farmed until 1950, when approximately 600 acres (240 hectares) were transferred to the U.S. Army. In 1970, the facility became part of the Harry Diamond Laboratory. For the next 24 years, research at the WRF was top secret. The exact nature of much of this research. the site's value as a wildlife habitat. Part of this research involved generating huge electromotive forces, similar to those generated in atomic bomb blasts, and studying their effects on military equipment. This involved arrays of huge antennas that could focus energy on equipment.

Perhaps surprisingly, the army's research was not incompatible with wildlife. The top-secret nature of the research kept the general public at bay for 40 years. Four main buildings, where human activities were concentrated, were situated in a central compound of approximately 11 acres (4.5 hectares). A system of roads radiated from the central compound linking areas outside the compound. Habitat diversity is high. At least 20 different vegetative communities have been identified. A variety of wetland communities cover approximately 300

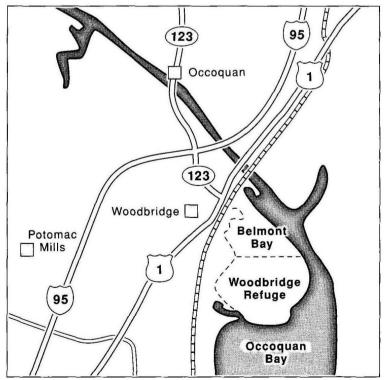


Figure 1

acres (120 hectares). These include tidal marshes, freshwater swamps, seasonal wetlands, and a pond. Open woodland habitat comprises another approximately 170 acres (70 hectares) of upland meadows. For more than 40 years, the Army mowed these areas annually for security and related reasons, but otherwise they were preserved. As a result, surprisingly diverse communities arose within the grassland ecosystem.

Understandably, the Army's interest lay in areas other than analysis of habitat and wildlife. Ecologically, the area was virtually unstudied. Starting in 1993, an ad hoc community of interested citizens documented some of the facility's diversity. More than 620 species of plants have been identified and catalogued. Many are found nowhere else in the county or region. The area is also attractive to birds; 220 species have been identified. Additionally, the grasslands support large populations of mice and voles, which are important to over-wintering raptors. Ospreys nest on the facility each summer, and bald eagles feed and rest there daily. More studies are needed.

#### The Problem

No sooner was base closure announced than various interests began to vie for control of part or all of the land. Base Realignment and Closure regulations gave the Army three options: (1) transfer the base to another federal agency, (2) transfer it to a state or local government agency, or (3) sell the land on the open market. The Army was instructed to both close the base and minimize local economic impact.

The Fish and Wildlife Service (FWS) voiced an early interest in the land. The WRF land would join two units of the Mason Neck Wildlife Refuge, which the FWS manages. Some local environmentalists sided with the FWS. They reasoned that any region growing as fast as PWC needs to preserve as much of its natural heritage as it can.

Local educators and scientists saw an opportunity to develop the facility into a regional environmental education center. Particularly appealing was the facility's combination of buildings, roads, and outstanding habitat values. Here was an area uniquely suited for visits and study by school children, older students, and adults.

Citizens interested in economic development stressed WRF's possible contribution to local tourism.

The Library of Congress asked for a portion of the facility on which to build warehouses to store excess books and documents. Public opposition to this request grew swiftly. At the urging of the Virginia Congressional Delegation, the library found an alternate, less environmentally sensitive area and withdrew its proposal.

Into this milieu of simmering and conflicting interests stepped the Reuse Committee. For more than two years, meetings and hearings were held to determine the will of the community and to sort through various possibilities. There was general agreement on the need for and value of a regional environmental education center. The wetland and woodland areas along with the existing buildings and roads could well serve this purpose, they reasoned. That left more than 100 acres (40 hectares) of upland meadows, along the northern border of the facility, immediately adjacent to the proposed Belmont Development. This land, among other uses, would allow for the expansion of the proposed golf course.

Unfortunately for the process, this was the very habitat that was most important to overwintering raptors and that supported many of the rarest plants. Here were the seeds for protracted controversy.

On May 16, 1994, the Committee submitted its recommendations. Eight days later, four members of the committee issued a minority report, disagreeing with the majority view and recommending alternative actions. For several months after the release of the two sets of conflicting recommendations, no significant action was taken officially by the county, the army, the FWS, or private citizens. But behind the scenes, there was considerable activity. Most significant, several local and national environment groups urged Congress to take action and settle the issue. In August 1994, at the urging of Congresswoman Byrne (D-VA) and Senator Robb (D-VA), with the concurrence of Senator Warner (R-VA), the following section was added to the pending Military Appropriations Bill:

- Sec. 128. Land Transfer, Woodbridge Research Facility, Virginia
- (a) Requirement of transfer.—Not withstanding any other provision of law, the Secretary
  of the Army shall transfer, without reimbursement, to the Department of the Interior,
  a parcel of real estate consisting of approximately 580 acres [230 hectares], comprising
  the Army Research Laboratory Woodbridge Facility, Virginia, together with any
  improvements thereon.
- (b) Use of Transfer Property.—The Secretary of the Interior shall use appropriate parts of
  this real property for (1) incorporation into the Mason Neck Wildlife Refuge and (2)
  work with the local governmental and the Woodbridge Reuse Committee to plan any
  additional usage of the property, including an environmental education center:
  Provided, that the secretary of the Interior provided appropriate public access to the
  property.

In September 1994, President Clinton signed legislation that transferred the entire facility to the U.S. Fish and Wildlife facility. They renamed the facility Occaquan Bay National Wildlife Refuge (OBNWR).

Taking over and managing such a facility is neither easy nor straightforward. The first task or the FWS was to develop a facility management plan that would recognize the needs and desires of a highly politicized general public, the habitat needs of species the refuge is intended to preserve, and the federally mandated mission statement of the agency. The following readings provide additional background.

## reading

#### "Mason Neck Addition"

Spencer S. Hsu

Prince William Weekly, August 15, 1994, p.D05. © 1994 The Washington Post. Reprinted by permission.

A proposal to incorporate a surplus Army post into the Mason Neck Wildlife Refuge got the approval of Congress this month, making it likely that birdwatchers and hikers will soon tread on land once used for secret testing associated with nuclear weapons.

Transfer of the 580-acre Woodbridge Research Facility, formerly known as the Harry Diamond Laboratories, in Eastern Prince William County was included in a military appropriations bill that now will go to President Clinton, who is expected to sign it.

The bill calls for the Army to turn over the land, which borders the Potomac River, to the U.S. Fish and Wildlife Service on Sept. 30.

Over the years, the site had a variety of Defense Department roles. Once it was a secret radio listening post; later it was an electronic testing ground, where certain effects of nuclear blasts were simulated. The tests did not involve explosions or radioactivity and did not harm the environment, according to Army officials.

The land is on a peninsula at the confluence of the Potomac and Occoquan rivers, less than 15 minutes south of the Capital Beltway, and it harbors 200 animal species and 300 kinds of plants. It is one of the most

lush habitats and bird marshes in the Washington area, said Dennis Shiflett, spokesman for the Virginia Wildlife Federation.

J. Frederick Milton, manager of the Mason Neck refuge, said the land will be added to the 2,200 acres the Fish and Wildlife Service already manages on the Fairfax County side of the Occoquan.

It would be opened to the public before the end of the year, allowing dawn-to-dusk access for boating, fishing, hiking and other recreation, he said.

Sens. Charles S. Robb (D-Va.) and John W. Warner (R-Va.) led the legislative move, ending a struggle that began in 1991 when the post was slated for closing. Last year, Congress killed an attempt by the Library of Congress to use the land for warehousing books and records.

This spring, Prince William County tried to save some of the land for development, and a consultant's study foresaw creation of 1,000 jobs and more than \$500,000 in annual tax revenue if development were permitted.

The legislation provides for keeping the land in its natural state, although it allows for environmental education programs that would create some jobs.

## reading

# "Recommended Reuse for the Woodbridge Research Facility, Prince William County, Virginia"

Woodbridge Reuse Committee, May 16, 1997, selected pages.

#### 1. Executive Summary

Pollowing announcement of the Army's decision to abandon and dispose of the Woodbridge Research Facility (formerly the Harry Diamond Lab), the Prince William County Board of Supervisors indicated their interest in the reuse of this important resource. To pursue this, the Board created the Woodbridge Reuse Committee, which was charged with exploring and recommending the most appropriate reuse for the site.

The WRC in Phase I of the reuse planning effort, after extensive analysis and discussion, recommends the Woodbridge Research Facility site be used for a combination of:

- Environmental protection and enhancement;
- Educational, institutional, and cultural uses; and,
- Commercial (tax paying, job supporting) development...

. . . provided criteria and procedures are established in Phase II to assure the uses and activities are made compatible.

This WRC recommendation has evolved from a process that involved the insight of the members and the organizations they represent, the input from two citizens meetings, and analysis of the applicable local and regional plans. This process resulted in the formulation of goals, development and evaluation of alternatives, and the recommended conceptual reuse plan and implementation strategy.

The basic goals supporting the recommended reuse are:

- Protect and enhance the natural environment located on the WRF, including:
  - shoreline
  - wetlands
  - uplands
  - flora/fauna
- Encourage public access and enjoyment of the natural features, with appropriate management to prevent damage or degradation
- Create programs to allow the natural environment to be used for environmental education, research and other related activities (arts, education, etc.)
- Allow and encourage the use of the remainder of the site for commercial use (tax paying and employment generating)

Based on these general concepts, more specific reuse proposals have been developed for the sites four subareas—the compound, the wetlands, the shoreline, and the uplands. These are described as follows:

6 Unit One: Northeast: Land-Use Issues

The Compound-The buildings and land can be used or redeveloped to accommodate the resource management activities, the educational, institutional and cultural activities, and private commercial uses. This includes accommodations for overnight visitors.

The Wetlands-The wetlands should be protected as a natural resource, and be used for environmentalresearch and education. Maximum public access, consistent with the objective of preserving and enhancing the natural eco-system, is recommended for walking paths or trails for observing wildlife and other passive activity. Provision will also be made to continue the regional Potomac Trail.

The Shoreline–The shoreline should be made available for fishing, canoeing, public boat launch, and mooring for research vessels related to the educational and institutional activity.

The Uplands-Up to 50% of the 100 acre uplands, excluding the compound (that is, less than 10% of the total acreage at the WRF), can be used for commercial (tax paying, employment generating) uses, particularly for environmentally oriented businesses and institutions. The remainder of the uplands will remain undeveloped nad programs will be initiated to sue these areas to enhance the natural systems. The uplands areas adjoining the golf course and hotel/marina proposed by the adjoining Belmont Center may be the location for private development to benefit from the values of these amenities.

All of the recommended uses will be able to take advantage of the nearby VRE/AMTRAK station, reducing dependency on private auto access.

These recommended uses are designed to accommodate the views of the major constituencies interested in the site—those interested in protecting the environment, those interested in use for educational, institutional and cultural activities, and those interested in economic development. Accommodating increased activity and additional development, without threatening the eco-system, will require:

- the establishment of carefully crafted performance criteria for the design, use, and management of all activities to be accommodated; and,
- procedures for enforcing the performance criteria, both for inclusion in any transfer agreement and after transfer have taken place.

Assuming the Army will accept the reuse recommendations, the next steps will be negotiating the performance criteria, evaluating the institutional capabilities of available organizations and/or creating a Local Redevelopment Authority, and securing the necessary funding. Because no institution or organization has been identified that has the charter, or existing resources to accommodate or support all of recommended uses, the evaluation of institutional capabilities will be an important element of the next phase of the process.

Inclusion of commercial tax paying and employment generating uses will give this portion of the site considerable market value, which, according to the BRAC policy, can provide the Army and the County significant proceeds (in a 60-40 split). A portion of these funds can possibly be used to support the environmental management, educational, institutional and cultural activities. The economic analysis of the recommended reuse estimates the market value of the land, at the .30 FAR, to be almost \$4 million. This analysis also estimates the economic benefits to Prince William County to be an annual real estate tax of over \$750,000 and 2400 jobs. This will also generate an estimated \$3.9 million in real estate value.

These recommendations are the result of extensive effort, analysis and negotiations by the Woodbridge Reuse Committee, in their effort to respond to the responsibility given them by the County, and their responsibility to the citizens of the adjoining community, the County, and the region. The Woodbridge Reuse Committee is now prepared to initiate Phase II to assure the optimum use of this valuable asset-The Woodbridge Research Facility.