



# LANDSCAPE CLASSIFICATION SYSTEM FOR VIRGINIA

A public resource presented by the Virginia Wind Energy Collaborative to facilitate the inclusion of environmental information into macro-siting decisions with regard to utility-scale wind power

May 2005

The *Landscape Classification System for Virginia* (LCS) comprises two main components. The foundation of the resource is a collection of geographical information system (GIS) data that describes the Virginia wind resource, and layers upon it multiple data sets that identify areas of environmental sensitivity. The document provided here is intended to describe the significance of the data layers, it relies extensively upon definition of land use categories presented to members of the Virginia Wind Energy Collaborative (VWEC) by an environmental working group.<sup>†</sup> In some instances, VWEC and the working group differ in opinion regarding the inclusion of certain land use types in specific landscape classification categories.<sup>‡</sup> The Virginia Wind Energy Collaborative presents this document and associated materials reflecting its recommendations to the community at large to better inform responsible wind power development in Virginia.

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<sup>†</sup> The members of the VWEC Environmental Working Group and their affiliations are listed in Appendix 2 of this document.

<sup>‡</sup> Some members of the working group re-organized and have recommended another version of the LCS embedded within a supplementary document that contains materials inconsistent with the charter of the working group set forth in July 2003. The Virginia Wind Energy Collaborative is not associated with this newly-formed working group, nor does it endorse the materials it presents, notwithstanding any suggested affiliation.

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## **OBJECTIVES AND SCOPE**

The purpose of this report and associated databases is to support efforts on the part of the wind energy community to recognize, avoid, and minimize adverse environmental impacts arising from utility-scale wind energy development in Virginia. This report and the resources it presents and describes are designed to achieve the following objectives:

- provide a readily accessible environmental database to facilitate macro-siting decisions for utility-scale wind energy developments so that impacts on sites with significant natural resource values are minimized, and
- provide contact information for agencies and organizations with environmental conservation and protection mandates affected by the development of potential wind energy sites.

The goal of this project is to provide a decision-support tool to facilitate siting of utility-scale wind energy facilities. This project is focused solely on consideration of impacts potentially associated with utility-scale wind systems. This document is not intended for direct application to small wind energy systems. Although some opinions differ between members of the working group and members of the Virginia Wind Energy Collaborative who reviewed the document, broad consensus was reached on the fact that the identification of areas of environmental sensitivity would be beneficial to environmental groups as well as wind developers, state and local agencies, and citizens of the Commonwealth of Virginia.

## **BACKGROUND**

Renewable energy offers the promise that our society's growing needs for energy might be met, at least in part, in a clean and sustainable manner. Of the many sources of renewable energy, wind is now the least expensive to produce and the most abundant, with the potential to supply a significant portion of the electricity demand in the United States. Although no utility-scale wind energy facilities are now operating in the Commonwealth, several sites are being considered in the coastal and mountain regions. Among the factors likely to accelerate the pace and increase the extent of wind energy development in Virginia are the Renewable Portfolio Standards (RPSs) adopted by neighboring states.

While conservation groups laud the advent of renewable, emission-free energy, there also is concern regarding the potential adverse impacts to habitats and species that could result from utility-scale wind energy development. This document seeks to facilitate efforts to identify, evaluate and avoid potential adverse impacts on wildlife and wildlife habitats that could accompany utility-scale wind energy development. Through this project, the Virginia Wind Energy Collaborative and its environmental working group sought to assist the emerging wind energy industry by offering an environmental screening tool to be used during the initial macro-siting process.

## **INTRODUCTION TO THE LANDSCAPE CLASSIFICATION SYSTEM FOR VIRGINIA**

The Landscape Classification System for Virginia was developed to facilitate the inclusion of environmental factors into the macro-site selection process. In conjunction with the Virginia Wind Resource Map<sup>1</sup>, the Landscape Classification System for Virginia is intended to be of use to wind developers, state and federal agencies, landowners, and environmental organizations involved in siting of utility-scale wind development in Virginia and to increase awareness of real and potential adverse environmental impacts for areas with Class 3<sup>2</sup> and above wind resources.

The Landscape Classification System is comprised of three categories overlaid on a base layer of Class 3 and above wind resources derived from the AWS TrueWind Solutions "Wind Resource Map of Virginia." Analyses consider sites with Class 3 or better wind resources, given that current or imminent technologies can exploit wind energy resources economically at, but not below, this level. Figure 1 depicts the distribution of the Class 3 and higher wind energy resources in Virginia.

The three landscape categories are characterized by the potential for conflict in a given area between utility-scale wind powered energy generation facilities and other existing or potential uses. The categories are:

- Unsuitable: Mapped
- Flagged for Potential Use Conflict
- Unclassified

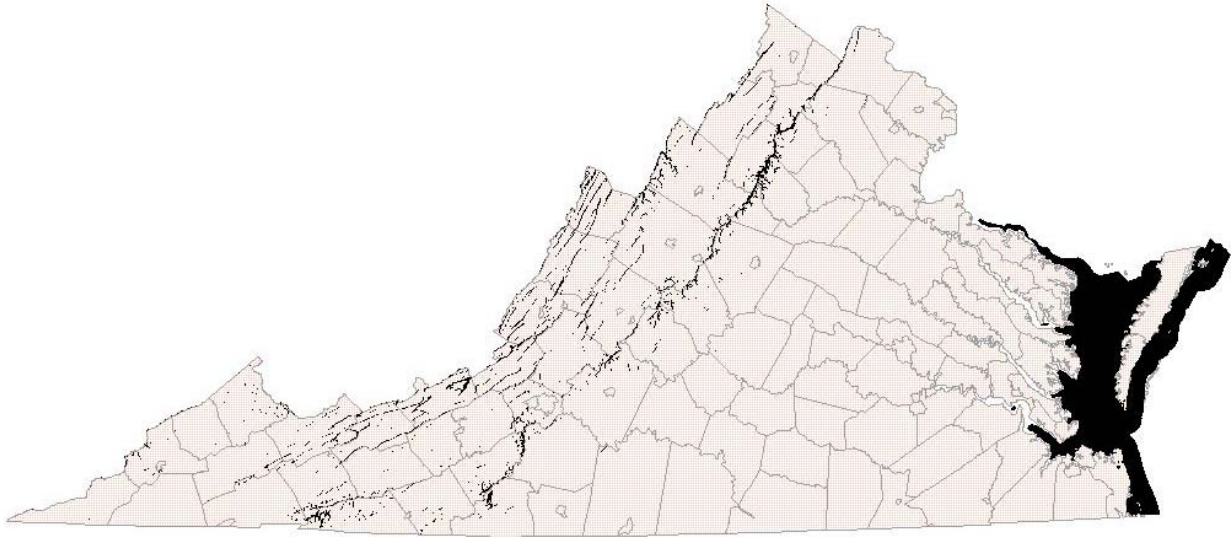
There was broad consensus reached between members of the Virginia Wind Energy Collaborative and members of the working group with the respect to the definition of these landscape categories and the assignment of data layers to them.

A fourth category labeled *Unsuitable: Unmapped* was defined by the working group to include areas of unknown geographic extent that are unsuitable for wind energy development due to adverse biological impacts. These are areas that host avian and bat activity. This category carries significance, as defined, only with respect to the notion that there are potential impacts that would be better understood were the relevant GIS data available. In addition, the spirit of this document resides within the categories for which such data do exist. The *Unsuitable: Unmapped* category is therefore not included within the Landscape Classification System for Virginia since mapping information, by definition, is not available. However, it is the recommendation of VWEC that developers should seek to avoid and mitigate any potential adverse impacts on the groups designated for assignment to this land classification.

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<sup>1</sup> Michael Brower. 2002. Wind Resource Maps of Virginia. Prepared for Commonwealth of Virginia, Department of Mines, Minerals, and Energy, Division of Energy (Contract #C026047) and US Department of Energy, Philadelphia Regional Office (Order #DE-AP43-01R3-25005-00) by TrueWind Solutions, LLC.

<sup>2</sup> The potential for an area to generate electricity from the wind is categorized according to Wind Power Class. Each class represents a range of mean wind power density (in units of W/m<sup>2</sup>) or equivalent mean wind speed at the specified height(s) above ground. A Class 1 wind resource area has very light winds; higher Class numbers indicate stronger winds - Class 7 is the highest wind power class. Areas designated Class 3 or greater are suitable for most wind turbine applications. See: <http://rredc.nrel.gov/wind/pubs/atlas/chp1.html>.



**Figure 1: Distribution of Class 3 and Higher Wind Energy Resources in Virginia.**

Each Landscape category includes a number of land use types compiled from various sources. These types include public lands; private nature reserves; known occurrences of rare, threatened, and endangered species; significant natural features and important scenic and recreation areas. Table 1 provides an overview of land use/management types included in each Landscape Class, as well as a brief description of the potential use conflict that could result from utility-scale wind energy development in each land use type. Definitions of land use types and descriptions of potential environmental impacts are detailed below.

Three general categories of potential use conflict were identified, these are:

- **Legal/Regulatory Use Conflict:** Utility-scale wind development is inconsistent with the permitted use of a site as established in law, regulation, management prescription, or deed.
- **Environmental Use Conflict:** Utility-scale wind development is likely to change the physical structure and chemical properties of a site such that a permanent shift in desired biological composition will result.
- **Aesthetic Use Conflict:** Utility-scale wind development may effect a change in the physical appearance and user experience of a site beyond stated management objectives.

The examination of potential adverse impacts is not intended to be exhaustive or authoritative. Impacts examined for this project were limited to those that have been linked to utility-scale wind energy development in the Mid-Atlantic or other regions. The working group acknowledged that all parties may not agree on the significance of some of the impacts addressed here. At the same time, well-informed decision making can best be assured by acknowledging impacts attributed to wind energy development that have proven controversial in the past.

The data sets incorporated in this project are the best available at time of distribution, and represent the state of knowledge at the time that this project was completed. Users

of this product should consult with relevant agencies during their site-scoping process to ensure that decisions are made on the basis of the most current information. Contact information for updated data may be found in Appendix 1.

**Table 1: Summary of Landscape Classification System for Virginia.**

<b>Conflict Significance Class</b>	<b>Land use/Management Type</b>	<b>Potential Use Conflict</b>
<b>Unsuitable: Mapped</b>	National Park Service – Appalachian National Scenic Trail and 5-mile buffer zone	Legal/Regulatory
	National Park Service – Blue Ridge Parkway	Legal/Regulatory
	National Park Service – All of Shenandoah National Park (SNP), including: Skyline Drive, the Skyline Drive Historic District, the Appalachian National Scenic Trail within SNP and the Shenandoah Wilderness Areas within SNP	Legal/Regulatory
	U.S. Forest Service – Wilderness Areas	Legal/Regulatory
	U.S. Forest Service – National Scenic Areas	Legal/Regulatory
	U.S. Forest Service – Special Biologic Areas & SIA – Shenandoah Mountain Crest	Legal/Regulatory
	U.S. Forest Service – Inventoried Roadless Areas	Legal/Regulatory
	U.S. Forest Service – Research Natural Areas	Legal/Regulatory
	U.S. Forest Service – Wilderness Study Areas	Legal/Regulatory
	U.S. Forest Service – Inventoried Old-Growth Forest (Jefferson National Forest)	Environmental
	Virginia Department of Conservation and Recreation, Division of Natural Heritage – State Parks and Natural Area Preserves	Legal/Regulatory
	Virginia Outdoor Foundation (VOF) Easements	Legal/Regulatory
	U.S. Fish and Wildlife Service National Wildlife Refuges	Legal/Regulatory
	The Nature Conservancy Preserves	Environmental
Submerged Aquatic Vegetation	Environmental	
<b>Flagged for Potential Use Conflict</b>	National Park Service – Appalachian National Scenic Trail and 5 to 10-mile buffer zone	Aesthetic
	The Nature Conservancy Ecoregional Portfolio Sites	Environmental

	Virginia Department of Conservation and Recreation, Division of Natural Heritage – Heritage Sites	Environmental
	U.S. Forest Service – Candidate Wilderness Areas	Environmental
	U.S. Forest Service – Uninventoried Roadless Areas	Environmental
	U.S. Forest Service – Remaining National Forest Lands	Legal/Regulatory
	Virginia Department of Game and Inland Fisheries Wildlife Management Areas	Environmental, Aesthetic
	Virginia Department of Forestry State Forests	Environmental
	Cold Water Streams	Environmental
<b>Unknown Significance</b>	Areas of Unknown Suitability	
	Wind Energy Potential Class 2 or Less	

## **LANDSCAPE CLASSIFICATION SYSTEM FOR VIRGINIA**

### **UNSUITABLE: MAPPED**

The category “Unsuitable Mapped” is defined for areas of known geographic extent that are unsuitable for utility-scale wind development due to a direct conflict with legal or administrative mandates regarding the management of the site, and adverse impacts to irreplaceable biological resources. The following land use/management types are included in this class.

### **National Park Service – Appalachian National Scenic Trail and 5-mile buffer zone**

The Constitution of the Appalachian Trail Conference (ATC) states that one of the purposes of the ATC is “to preserve and restore the natural environment of the Trail and its adjacent lands.” In order to provide trail users with a wilderness experience, the ATC uses buffer zone on each side of the Appalachian Trail to assess potential interference with the Trail’s viewshed from powerplant, commercial, wind farm, transportation and other forms of development. The ATC advocates for no construction of utility-scale wind energy development within 0 to 5 miles on either side of the Trail, and requests that developers considering a development in this zone contact the ATC as early as possible in the site scoping process.

*GIS Users Note:* In order for the path of the Appalachian Trail (AT) to be visible on printed maps, the thickness of the line representing the AT has been enlarged well beyond the 5 or 10 mile buffer. An accurate calculation of the buffer is easily achieved when using the digital data included in this project.

## **National Park Service – Blue Ridge Parkway**

The Blue Ridge Parkway follows the high crests of the central and southern Appalachians for 469 miles from Shenandoah National Park in Virginia to the Great Smoky Mountains National Park in North Carolina, traversing an unsurpassed diversity of climate zones, vegetation zones, physiographic zones, and geological features. The more than 92,000 acres of Parkway lands pass through a highland area of five degrees longitude and approximately 3 degrees latitude, making it the third largest unit of the National Park Service in terms of area covered. Park resources include 400 streams (150 headwaters), and 47 Natural Heritage Areas (areas set aside as national, regional or state examples of exemplary natural communities).<sup>3</sup> The fundamental purpose of the national parks "... is to conserve the scenery and the natural and historic objects and wildlife therein and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations."<sup>4</sup> The NPS does have authority to grant Rights-of-Way across BRP lands, subject to NEPA, NPS Management Policies and Guidelines, and other legislative protections.<sup>5</sup>

## **National Park Service – Shenandoah National Park (SNP)**

This land use type encompasses the entire Park, which can not allow commercial development except for the provision of visitor services. The Park includes many special features incompatible with utility-scale wind energy development, including Skyline Drive, the Skyline Drive Historic District, the Appalachian National Scenic Trail within SNP and the Shenandoah Wilderness Areas within SNP. The Congressionally-designated *Shenandoah Wilderness* within SNP is the largest such area in the mid-Atlantic states.

## **U.S. Forest Service – Wilderness Areas**

A Wilderness Area is a tract of "undeveloped Federal land retaining its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions."<sup>6</sup> Wilderness Areas are established only by an Act of Congress and are managed by the Federal agency on whose lands they are located (National Park Service, Forest Service, Bureau of Land Management, or Fish and Wildlife Service). Management directions are established by the agency, but resource extraction, permanent structures, roads, and mechanical transport are explicitly prohibited by the Wilderness Act of 1964. Wilderness Areas together form the National Wilderness Preservation System.

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<sup>3</sup> National Park Service, Blue Ridge Parkway Home Page. <http://www.nps.gov/blri/>. Accessed August 22, 2004.

<sup>4</sup> National Park Service Organic Act 16 U.S.C. 1, 1916.

<sup>5</sup> Molling, Suzette, D. Anderson, A. Hess. August 1, 2003. "Blue Ridge Parkway Environmental Assessment Guide for Right-of-Ways." Division of Resource Planning and Professional Services, Blue Ridge Parkway. Viewed August 22, 2004, at: <http://data2.itc.nps.gov/parks/blri/ppdocuments/EA%20Info%20Guide%20for%20ROWS-08-03.pdf>.

<sup>6</sup> Wilderness Act of 1964.



## U.S. Forest Service – National Scenic Areas

Located in Amherst County, Virginia, the 7,580 acre Mount Pleasant National Scenic Area was created by an Act of Congress in 1994. The National Scenic Area designation is for the protection of the watershed and scenic values, recreation use, protection of wildlife and their habitat, and for other purposes. As stated in the Mount Pleasant National Scenic Area Act, the purpose of conveying this status onto the Mount Pleasant area was to:

- ensure appropriate protection and preservation of the scenic quality, water quality, natural characteristics, and water resources;
- protect and manage vegetation to provide wildlife and fish habitat, consistent with protection and preservation of resources identified above;
- provide areas that may develop characteristics of old-growth forests; and
- provide a variety of recreation opportunities that are not inconsistent with the purposes set forth above.<sup>7</sup>

## U.S. Forest Service – Special Biologic Areas (SBAs)

SBAs are one of four categories of Special Interest Areas (SIA's) identified on National Forest Lands. The other categories are SIA - Geologic, SIA - Historic, and SIA - Shenandoah Mountain Crest. Only SBA's (also known as SIA-Biologic) & the SIA – Shenandoah Mountain Crest are included in this screening tool.

The Forest Service designates these SIA's during Forest Plan revisions. SBAs, include lands that support key components and concentrations of the Forest's biological diversity. These areas typically include high quality natural communities such as high elevation mountain tops, shale barrens, caves and karst features, wetlands, and habitat for threatened, endangered, and sensitive species. Thirty-eight SIA's - Biologic are designated on the GWNF.<sup>8</sup>

The Special Interest Area for *Shenandoah Mountain Crest* extends from Cow Knob south to Little Bald Knob. This 43,000 acre area extends special protections under the George Washington National Forest Plan for the variety of threatened, endangered, and sensitive species and unique natural communities, including at least 15 species of plants and 13 species of animals plus their associated habitats.

The Revised Land & Resource Management Plan for the *Jefferson National Forest* utilizes different management terminology from the George Washington Plan, referring to management prescriptions rather than areas. Several of these prescriptions are similar to SBAs, including Botanical-Zoological Areas (4,700 acres), Rare Communities (7,400 acres) and Habitat Conservation Areas for the Peaks of Otter salamander (varying acreages). In addition, the Jefferson Plan designates protected areas surrounding hibernacula of the federally-endangered

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<sup>7</sup> U.S. Senate Bill 2142." Mount Pleasant National Scenic Area Act" 1994 viewed at: <http://thomas.loc.gov/cgi-bin/query/z?c103:S.2142.IS>:

<sup>8</sup> USDA Forest Service. 1993. *Final Revised Land and Resource Management Plan, George Washington National Forest*. pp. 3-107 through 3-114. Available at: [http://www.southernregion.fs.fed.us/gwj/forestplan/gwplandocs/gw\\_forestplan.pdf](http://www.southernregion.fs.fed.us/gwj/forestplan/gwplandocs/gw_forestplan.pdf).

Indiana Bat Primary Cave Protection Areas (900 acres), and Secondary Cave Protection Areas (8,800 acres). The Jefferson Plan also designates a variety of additional Special Areas. "The Forest Service is committed to protect... areas with scenic, historical, geological, botanical, zoological, paleontological or other special characteristics, and classify areas that possess unusual recreation and scientific values..." The following are designated Special Areas – Hoop Hole (4,400 acres), Whitetop Mountain (5,100 acres), Mt. Rogers Crest Zone (5,100 acres), North Creek (5,200 acre), Whitetop Laurel (4,200 acres), North Fork of Pound (5,500 acres).<sup>9,12</sup>

*GIS Users Note:* These areas are not reflected in the Unsuitable coverage due to capacity limitations at this stage of the project, but are included in the National Forest Lands layer in the Flagged Category.<sup>10</sup>

### **U.S. Forest Service – Inventoried Roadless Areas (IRAs)**

Inventoried Roadless Areas are undeveloped tracts of National Forest land "that met the minimum criteria for wilderness designation under the Wilderness Act and that [were] inventoried during the Forest Service's Roadless Area Review and Evaluation (RARE II) process, subsequent assessments, or forest planning. These areas were granted special protections under a formal rule making process initiated at the request of the Clinton Administration.<sup>11</sup> The Final "Roadless Area Conservation Rule" published in the Federal Register Jan. 12, 2001<sup>12</sup> prohibits - with certain limited exceptions - new road construction and reconstruction in inventoried roadless areas on National Forest System lands, and prohibits cutting, sale, and removal of timber in inventoried roadless areas.<sup>13</sup> These areas are published as a set of inventoried roadless area maps included in the *Forest Service Roadless Area Conservation, Final Environmental Impact Statement*, Volume 2, dated November 2000.<sup>14</sup> These areas are also described in Appendix C to both the 1993 George Washington and 2004 Jefferson management plans.<sup>15</sup> At time of press, the Bush administration had proposed a modification to the 2001 Roadless Area Conservation Rule that would require governors to petition the Forest Service to have roadless areas in their states protected from logging, road-building and other industrial activities. IRA's will remain in the unsuitable category, regardless of whether the Bush Administration modifies the rule.

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<sup>9</sup> USDA Forest Service. 2004. *Revised Land and Resource Management Plan, Jefferson National Forest*. Chapter 3. Available at: <http://www.southernregion.fs.fed.us/gwj/forestplan/plan.pdf>.

<sup>10</sup> USDA Forest Service. 2003. *Draft Proposed Revised Land and Resource Management Plan, Jefferson National Forest*. Chapter 3.

<sup>11</sup> Federal Register: October 19, 1999 "Action: Notice of intent to prepare an environmental impact statement". (Volume 64, Number 201), Notices. Page 56306-56307. From the Federal Register Online via GPO Access [wais.access.gpo.gov]. [DOCID:fr19oc99-27]. Available at: <http://www.roadless.fs.fed.us/documents/noi.htm>.

<sup>12</sup> Federal Register, January 12, 2001. Department of Agriculture Forest Service. Special Areas; Roadless Area Conservation; Final Rule 36 CFR Part 294. Page 3244.

<sup>13</sup> USDA Forest Service Webpage. Roadless Area Conservation. Final Rule. <http://www.roadless.fs.fed.us/documents/rule/index.shtml>. Modified January 16, 2001. viewed September 13, 2004.

<sup>14</sup> Forest Service Roadless Area Conservation, Final EIS, Volume 1.

<sup>15</sup> USDA Forest Service. 2004. *Revised Land and Resource Management Plan, Jefferson National Forest*.

## **U.S. Forest Service – Research Natural Areas (RNAs)**

RNA's are part of a national network of ecological resources designated for research, education and maintenance of biological diversity on National Forest System lands. The existence of unique examples of natural communities and the biological diversity they support are the main reasons for designating an RNA. Research Natural Areas (RNA's) are designated by the Chief of the Forest Service following a formal study and recommendation by the Regional Forester.<sup>16</sup> On the George Washington National Forest, Little Laurel Run (2,000 acres) was designated a Research Natural Area in the 1930s. Six additional areas on the George Washington National Forest are identified as candidates for possible RNA designation: Big Levels, Laurel Run, Maple Flats, Shale Barren-Complex, Skidmore, and Slabcamp/Bearwallow. There are currently no RNAs on the Jefferson National Forest, however the plan designates several areas that are similar to RNA's in their management prescription. These areas are included in the coverage of National Forest Lands listed in the Flagged category.

## **U.S. Forest Service – Wilderness Study Areas**

A Wilderness Study Area is a tract of undeveloped Federal land administered “so as to maintain [its] presently existing wilderness character and potential for inclusion in the National Wilderness Preservation System.”<sup>17</sup> Wilderness Study Areas may be designated by an Act of Congress by the Chief of the Forest Service, or by recommendation in the Land and Resource Management Plan for each national forest.<sup>18</sup>

## **U.S. Forest Service – Inventoried Old Growth Forest**

In 1997, the U.S. Forest Service published its “Guidance for Conserving and Restoring Old-Growth Forest Communities on National Forests in the Southern Region.”<sup>19</sup> The introduction to this guidance states:

*“The U.S. Department of Agriculture, Forest Service, Southern Region, recognizes old-growth forests as a valuable natural resource worthy of protection, restoration, and management. Old-growth forests provide a variety of values, such as biological diversity, wildlife habitat, recreation, esthetics, soil productivity, water quality, aquatic habitat, cultural values, and high-value timber products. Old-growth communities are rare or largely absent in the southeastern forests of the United States. ... For these reasons the national forests are making efforts to address the restoration of this missing portion of the southern forest ecosystems. ... current Federal laws and regulations associated with the management of national forests do not specifically mandate old-growth management.”*

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<sup>16</sup> Virginia's National Forests are part of the Southern Region (Region 8) headquartered in Atlanta.

<sup>17</sup> Final Environmental Impact Statement, Land and Resource Management Plan, Jefferson National Forest, 1985.

<sup>18</sup> USDA Forest Service. 2004. *Final Environmental Impact Statement for the Revised Land and Resource Management Plan, Jefferson National Forest.*

<sup>19</sup> USDA Forest Service. 1997. “Guidance for Conserving and Restoring Old-Growth Forest Communities on National Forests in the Southern Region”. Available at: <http://www.southernregion.fs.fed.us/resources/documents/R8-Old-Growth-Report.pdf>

*These various laws do, however, provide direction to the Forest Service in such areas as the management of multiple natural resources and values, the protection and recovery of federally listed threatened and endangered species and their habitats, providing habitats to sustain viable populations of vertebrate species, and maintaining and enhancing the diversity of plant and animal communities that would be expected in a natural forest.”*

The old growth forest layer included in the screening tool is from the Jefferson National Forest (JNF). The JNF began an inventory of old growth in 1989, later incorporating the guidelines for defining eastern old growth cited above. The Jefferson FEIS explains that additional old-growth areas are likely to be found during the implementation of the Forest Plan. Current mapping shows 49,993 acres of old growth on the Jefferson in small- (1-99 acres) and medium- (100-2,499) sized patches.<sup>20</sup> Inventory and mapping of old growth on the George Washington National Forest will occur when that Forest’s Land and Resource Management Plan is revised, within the next few years.

*GIS Users Note:* It is recommended for the purposes of environmental screening that in addition to protecting the area of defined old growth, some buffer zone also be retained around old-growth areas.

### **Virginia Department of Conservation and Recreation, Division of Natural Heritage – State Parks and Natural Area Preserves**

Virginia's State Park system was initiated on June 15, 1936, when the first six parks in the system opened. There are now 34 State Parks spread across the Commonwealth. Virginia's State Parks were recently judged the best in the nation by the National Sporting Goods Association's Sports Foundation Inc. Virginia voters in 2002 approved a bond referendum to improve and repair State Park facilities and acquire additional park land. The Natural Area Preserve System protects examples of some of the rarest natural communities and rare species habitats in Virginia. A site becomes a component of the preserve system once it is dedicated as a natural area preserve by the Director of the Department of Conservation & Recreation. Most of the preserves are owned by the Department of Conservation and Recreation, but some are owned by local governments, universities, private citizens, and private conservation organizations. These areas are managed for the conservation of biodiversity, and only activities compatible with that purpose are permitted on those lands.

### **Virginia Outdoor Foundation (VOF) Easements**

The Virginia Outdoors Foundation (VOF) is the state agency charged with preserving the scenic and natural resources of the Commonwealth. VOF holds conservation easements on nearly 250,000 acres of open space lands throughout the state. Some of these properties are located in areas with levels of wind energy appropriate for utility-scale wind power development. However, all of the easements currently held by VOF prohibit construction of commercial and utility-scale wind

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<sup>20</sup> Ibid. p 3-116.

turbines. VOF does not anticipate a policy change that would allow large-scale commercial windmills to be permitted on VOF-eased lands. VOF does hold several easements that permit small-scale windmills on specific properties. Examples of acceptable uses include windmills that may be used to generate electricity or water sources for agricultural activities or domestic consumption.

VWEC is in receipt of a letter from the VOF recommending that VOF-held easements be classified “Unsuitable.”

## **U.S. Fish and Wildlife Service National Wildlife Refuges**

The National Wildlife Refuge (NWR) System is managed by the Fish and Wildlife Service within the U.S. Department of the Interior. The mission of the National Wildlife Refuge System is to work with others, to conserve, protect and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people. Virginia has 14 NWRs, located mostly along the coast or major rivers. Many of these NWRs were established to protect endangered species, including the bald eagle and other bird species and several sea turtle species. The National Wildlife Refuge System Improvement Act of 1997 gave refuges, formerly managed as isolated islands of habitat, an overarching mission and mandated the implementation of an ecosystem-based approach to wildlife conservation. As federal lands, any developments on USFWS holdings are subject to NEPA.

## **The Nature Conservancy Preserves**

The Mission of The Nature Conservancy is to preserve the plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive.<sup>21</sup> TNC owns and/or manages only those lands and waters that are critical to the success of its mission, and seeks to manage all of its conservation properties to promote the long-term survival of vulnerable native species and native community types. TNC will not knowingly engage in any practice or use that is inconsistent with this goal. TNC may engage in compatible human use at conservation sites when the use is designed to meet programmatic goals after development of a documented hypothesis establishing the programmatic benefit, and when the use will not generate collateral threats to conservation targets, and provided that the use is consistent with Conservancy values. Contemplation of a programmatic human or economic use must be approved by the Regional Director. TNC in Virginia has determined that utility-scale wind energy development is not a compatible use of its preserves or managed areas.<sup>22</sup>

## **Submerged Aquatic Vegetation**

The Virginia Institute of Marine Science identifies submerged aquatic vegetation (SAV) is a diverse assembly of rooted macrophytes found in shoal areas of

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<sup>21</sup> The Nature Conservancy Homepage, How We Work. 2003. Viewed on TNC Intranet Policy and Procedures WebPages Dec. 4, 2003. <http://nature.org/aboutus/howwework/>.

<sup>22</sup> The Nature Conservancy, Policy and Procedures Manual. 2003. p.p. 3, 7. Viewed on TNC Intranet Policy and Procedures webpage Dec. 4, 2003.

Chesapeake Bay<sup>23</sup>, including many high resource wind areas in Virginia. Historically SAV contributed to the high productivity of Chesapeake Bay<sup>24</sup>, but a dramatic decline of all SAV species was noted in the late 1960s and 1970s.<sup>25</sup> In response to the loss of a critical component of the Bay Ecosystem, the 1987 Chesapeake Bay Agreement, was signed by the governors of Pennsylvania, Maryland, and Virginia, the mayor of the District of Columbia, the chair of the Chesapeake Bay Commission, and the administrator of the U.S. Environmental Protection Agency. This Agreement set as a major commitment the "need to determine the essential elements of habitat quality and environmental quality necessary to support living resources and to see that these conditions are attained and maintained"<sup>26</sup> (Chesapeake Executive Council, 1987). The *Submerged Aquatic Vegetation Policy for the Chesapeake Bay and Tidal Tributaries*<sup>27</sup> (Chesapeake Executive Council, 1989) and the Implementation Plan for the Submerged Aquatic Vegetation Policy (Chesapeake Executive Council, 1990) were developed to guide managers and scientists in areas of SAV assessment, protection, education, and research.

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### FLAGGED FOR POTENTIAL USE CONFLICT

This category includes those areas known to support sensitive biological or recreational resources or those areas necessitating formal or legal Administrative Review by a managing agency.

#### **National Park Service – Appalachian National Scenic Trail and 5 to 10-mile buffer zone**

In order to provide trail users with a wilderness experience, the ATC uses five- and ten-mile buffer zones on each side of the Appalachian Trail to alleviate potential interference with the Trail's viewshed from powerplant, commercial, wind farm, transportation and other forms of development. The ATC requests that any developer interested in such areas consult with the ATC regarding viewshed interference in the earliest stages of potential wind farm siting.

*GIS Users Note:* In order for the path of the Appalachian Trail (AT) to be visible on printed maps, the thickness of the line representing the AT has been enlarged well beyond the 5 or 10 mile buffer. An accurate calculation of the buffer is easily achieved when using the digital data included in this project.

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<sup>23</sup> VIMS SAV Mapping Lab. VIMS SAV Web Page [Internet]. Updated Oct. 6, 2003. Viewed Dec. 9, 2003. Available at: <http://www.vims.edu/bio/sav/>.

<sup>24</sup> Kemp, et al., 1984 Cited on VIMS SAV Web Page [Internet] "Submerged Aquatic Vegetation (SAV) Species in Chesapeake Bay". Updated Oct. 17, 1996. Available at: <http://www.vims.edu/bio/sav/aboutsav.html>.

<sup>25</sup> Orth, R. J. and K. A. Moore. 1983. "Chesapeake Bay: An Unprecedented Decline in Submerged Aquatic Vegetation." *Science*. 222:51-53. Cited on VIMS SAV Web Page [Internet] "Submerged Aquatic Vegetation (SAV) Species in Chesapeake Bay". Updated Oct. 17, 1996. Available at: <http://www.vims.edu/bio/sav/aboutsav.html>.

<sup>26</sup> Chesapeake Executive Council. 1989. Cited on VIMS SAV Web Page [Internet] "Submerged Aquatic Vegetation (SAV) Species in Chesapeake Bay". Updated Oct. 17, 1996. Available at: <http://www.vims.edu/bio/sav/aboutsav.html>.

<sup>27</sup> Chesapeake Executive Council. 1989. "Submerged Aquatic Vegetation Policy for the Chesapeake Bay and Tidal Tributaries". Annapolis, MD. July. Cited on VIMS SAV Web Page [Internet] "Submerged Aquatic Vegetation (SAV) Species in Chesapeake Bay". Updated Oct. 17, 1996. Available at: <http://www.vims.edu/bio/sav/aboutsav.html>.

## **The Nature Conservancy Ecoregional Portfolio Sites**

Ecoregions are large areas of land or water defined by their distinct climate, geology and native species. Because ecoregions are defined by the same variables that govern the distribution of organisms, they provide an effective unit for regional conservation planning. An ecoregional portfolio is the minimum set of sites (on public or private land) that, if managed appropriately, will ensure the long-term survival of all native biodiversity within that ecoregion. Numeric goals are set for the minimum number of occurrences needed to sustain viable populations of each targeted native plant, animal and natural community, for the next 100 years. Finally, sites known to support the best remaining examples of targeted plants, animals, and natural communities are selected to form the portfolio. Since the selected sites represent only the minimum number needed to meet viability goals, the loss of any site undermines the integrity of the entire portfolio.

## **Virginia Department of Conservation and Recreation, Division of Natural Heritage – Heritage Sites<sup>†</sup>**

The DNH Screening Coverage includes those areas of the landscape that contribute to the conservation of Natural Heritage Resources. These resources are defined in the Virginia Natural Area Preserves Act of 1989 (Section 10.1-209 through 217, Code of Virginia), as "the habitat of rare, threatened, and endangered plant and animal species; exemplary natural communities, habitats, and ecosystems; and other natural features of the Commonwealth". DCR-DNH maintains lists of Natural Heritage Resources and revises them as new data become available. Taxa are added to the list when it is determined that their continued existence in Virginia is in jeopardy, and deleted when data indicate they are secure.<sup>28</sup> The DNH Screening Coverage can be used to identify conflicts with development activities, and for proactive planning to ensure that development projects successfully avoid or enhance Natural Heritage resources.<sup>29</sup>

## **U.S. Forest Service – Candidate Wilderness Areas**

The Working Group has classified these lands Flagged until such time as the U.S. Congress passes S. 2342, H.R. 4202, or successor legislation. Should either bill become law, these lands will be placed in the unsuitable category.

On April 22, 2004, Sen. John Warner (R-VA) and Congressman Rick Boucher (D-VA) introduced the *Virginia Ridge and Valley Wilderness and National Scenic Area Act of 2004 (S. 2342/H.R. 4202)*. The legislation would create four new Wilderness Areas, expand five existing Wilderness areas and designate two National Scenic Areas in Virginia's Jefferson National Forest. In total, the measure will provide lasting protection for some 40,000 acres in portions of Craig, Grayson, Giles, Lee, Montgomery and Smyth counties. Each of the new Wilderness and National Scenic

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<sup>†</sup> The GIS data pertaining to this category are temporarily withheld while license agreements are negotiated.

<sup>28</sup> Virginia Department of Conservation and Recreation, Division of Natural Heritage. An Overview of the Natural Heritage Program <http://www.dcr.state.va.us/dnh/mission.htm> viewed 12/4/03.

<sup>29</sup> VDCR-DNH. 2003. Metadata accompanying DNH Screening Layer.

Area designations has been endorsed by either the U.S. Forest Service or the Board of Supervisors of the county in which the area is located.

The proposed new Wilderness Areas are:

- 1) Stone Mountain- Lee County.
- 2) Raccoon Branch- Smyth County.
- 3) Brush Mountain- Montgomery County.
- 4) Brush Mountain East- Craig County.

The proposed new National Scenic Areas are:

- 1) Crawfish Valley- Smyth County.
- 2) Seng Mountain- Smyth County.

### **U.S. Forest Service – Uninventoried Roadless Areas**

A Geographic Information Systems based analysis was conducted by Bruce and Giecek (2003)<sup>30</sup> to determine the location of large roadless parcels in both the Jefferson and George Washington National Forests. The most recent Forest Service data representing roads and Forest Service land ownership was evaluated to locate parcels that are: 1) Greater than 1000 acres and adjacent to existing Wilderness or Inventoried Roadless Areas (IRA), or 2) Greater than 5000 acres and not adjacent to existing Wilderness and Inventoried Roadless Areas. The 1000 and 5000 acre criteria were also used to guide the Forest Service's more recent mapping of Uninventoried Roadless Areas for the Clinton administration's Roadless Area Conservation Rule.<sup>31</sup> However, this GIS based analysis yields significant acreage that was not included in the IRA-RARE II analysis. Considered together, Wilderness areas, Wilderness study areas, IRAs, and URAs represent a significant portion of the roadless lands in Virginia's National Forests.

### **U.S. Forest Service – Remaining National Forest Lands**

National Forest lands are managed by the U.S. Forest Service within the Department of Agriculture. As set forth in law, the mission of the USDA Forest Service is to sustain the health, diversity, and productivity of the Nation's forests and grasslands to meet the needs of present and future generations.<sup>32</sup>

The two National Forests in Virginia are the George Washington (GWNF) and Jefferson (JNF), established in 1917 and 1936 respectively. Together, these Forests total about 1.7 million acres including some lands in Kentucky and West Virginia,<sup>33</sup> and are the primary provider of dispersed recreation opportunities in Virginia.<sup>34</sup> The

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<sup>30</sup> Bruce, Chris. GIS Analyst, The Nature Conservancy. Charlottesville, VA and Don Giecek. Virginia Wilderness Committee.

<sup>31</sup> Federal Register: October 19, 1999 (Volume 64, Number 201). Page 56306-56307. DEPARTMENT OF AGRICULTURE Forest Service - National Forest System Roadless Areas, ACTION: Notice of intent to prepare an environmental impact statement.

<sup>32</sup> USDA Forest Service <http://www.fs.fed.us/aboutus/mission.shtml> Last Modified: Wednesday, Jun 05, 2002 at 04:04 PM EDT. Viewed 12/4/03.

<sup>33</sup> USDA Forest Service - George Washington and Jefferson National Forests. <http://www.southernregion.fs.fed.us/gwi/nfhistory.htm> Viewed 12/5/03.

<sup>34</sup> DCR's Virginia Outdoors Plan 2002, p. 108.



George Washington and Jefferson National Forests are each governed by their own Land and Resource Management Plan (LRMP), which defines a variety of management "prescriptions" (Jefferson) or "areas" (GW), with guidelines for what management activities are allowed. The current Forest Plans for Virginia's two National Forest differ greatly in their format, and the current plan for the Jefferson was published in early 2004 spring. Because of this, users are advised that a detailed analysis of the Jefferson prescriptions was not possible, and many areas that may be classified as unsuitable have yet to be delineated.

At time of distribution, potential wind energy development on National Forests is guided by BLM Instruction Memorandum No. 2003-020, Interim Wind Energy Development Policy<sup>35</sup>.

### **Virginia Department of Game and Inland Fisheries Wildlife Management Areas**

There are currently 29 Wildlife Management Areas (WMAs) managed by Virginia Department of Game and Inland Fisheries, totaling about 180,000 acres. WMAs are managed for public hunting of game animals, the provision of non-game wildlife habitat, and passive recreation such as hiking and birdwatching.<sup>36</sup>

### **Virginia Department of Forestry State Forests**

The Virginia Department of Forestry (VDOP) manages 16 State Forests and other state lands totaling about 50,000 acres. Since its inception, the State Forests have been charged with managing the forestland to ensure a sustained yield of timber for the operation and maintenance of the resource and stability of the local economy while at the same time fulfilling multiple benefits, such as timber management, recreation, aesthetics, wildlife, natural reserves and water quality. Special Management Areas provide demonstration and research areas for the promotion of good forestry practices and observation of applied research.<sup>37</sup> At time of distribution, the intersection between VA State Forests and developable wind energy resources was minimal; however, additions to the State Forest System expected to occur in the next few years are likely to increase potential for use conflict.

### **Cold Water Streams<sup>†</sup>**

Virginia's cold water streams provide habitat for the indigenous brook trout (*Salvelinus fontinalis*), as well as introduced rainbow trout (*Oncorhynchus mykiss*) and brown trout (*Salmo trutta*). These streams are primarily associated with forested mountain ridges, which also represent the inland areas of greatest wind energy development potential. The trout species and other aquatic life found in these streams require relatively cool and clean water. Potential effects of wind energy development are primarily associated with forest clearing and road construction.

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<sup>35</sup> United States Department Of The Interior Bureau Of Land Management. Instruction Memorandum No. 2003-020. October 16, 2002. Available at <http://www.blm.gov/nhp/efoia/wo/fy03/im2003-020.htm>.

<sup>36</sup> Virginia Department of Game and Inland Fisheries, Homepage. Viewed Dec. 3, 2003. <http://www.dgif.state.va.us/hunting/wma/index.html>.

<sup>37</sup> Virginia Department of Forestry. "Virginia's State Forests". <http://www.dof.virginia.gov/stforest/index.shtml>. 2004. Viewed September 13, 2004.

<sup>†</sup> The GIS data pertaining to this category are temporarily withheld while license agreements are negotiated.

Forest clearing required for turbine siting, access road construction, and development of power transmission corridors may contribute to alteration of the critical thermal regime of these streams. Road building, use, and maintenance may also contribute to stream siltation and alteration of hydrologic conditions. Construction and use of low-grade roads on steep terrain or where streams crossings are required may be particularly problematic.

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#### **UNCLASSIFIED**

The category “Unclassified” includes those areas that have Class 2 or lower wind resource, or for which insufficient data exist to assess site suitability for utility-scale wind development. It is possible that some portion of this area would be classified as unsuitable if adequate geographic data on areas of concentrated avian use were available.

## **APPENDIX 1: DATA DICTIONARY**

GIS DATA DICTIONARY  
GIS DATA FOR LANDSCAPE CLASSIFICATION  
ALL SHAPEFILES IN UTM 17N NAD 27

Originally compiled 9/14/04 by:

Don Giecek  
19484 Running Cedar Lane  
Maidens, VA 23102  
804-749-1992

This document should be used as a reference guide to the geographic data on the CD. It is not meant to replace the metadata. Please see the metadata directory for more specific details regarding the geographic data.

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The following coverages were provided by U.S. Department of Agriculture Forest Service: George Washington and Jefferson National Forest:

FILE NAME ON CD: IRA\_VA\_UTM17  
REPRESENTING: USFS INVENTORIED ROADLESS AREAS  
METADATA ON CD: IRA  
VWEC OBTAINED: NOV 2003  
OBTAINED BY: DMG

FILE NAME ON CD: MTPLEASANT  
REPRESENTING: USFS NATIONAL SCENIC AREA  
METADATA ON CD: NSA  
VWEC OBTAINED: MAY 2004  
OBTAINED BY: DMG- CLIPPED FROM USFS'S IRA\_VA\_UTM17

FILE NAME ON CD: NFOWN  
REPRESENTING: USFS SURFACE OWNERSHIP  
METADATA ON CD: NFOWN  
VWEC OBTAINED: MAY 2004  
OBTAINED BY: DMG

FILE NAME ON CD: RNAUSFS  
REPRESENTING: USFS RESEARCH NATURAL AREA  
METADATA ON CD: RNA  
VWEC OBTAINED: MAY 2004  
OBTAINED BY: DMG- CLIPPED FROM USFS ALTPRE\_RX\_GW  
COVERAGE (MANAGEMENT PRESCRIPTIONS FROM  
1993 GWNF LAND MANAGEMENT PLAN)

FILE NAME ON CD: SBA03  
 REPRESENTING: USFS SPECIAL BIOLOGICAL AREAS  
 METADATA ON CD: SBA  
 VWEC OBTAINED: NOV 2003  
 OBTAINED BY: DMG

FILE NAME ON CD: USFSOLDGROWTH  
 REPRESENTING: USFS (JEFFERSON NF ONLY) OLD GROWTH FOREST  
 METADATA ON CD: OLDGROW  
 VWEC OBTAINED: NOV 2003  
 OBTAINED BY: DMG

FILE NAME ON CD: WILDERNESSJUNE04  
 REPRESENTING: USFS WILDERNESS AREAS  
 METADATA ON CD: WILD  
 VWEC OBTAINED: JUNE 2004  
 OBTAINED BY: DMG- PRIEST & THREE RIDGES CLIPPED FROM USFS'S  
 IRA\_VA\_UTM17 COVERAGE; REMAINDER CLIPPED  
 FROM USFS WILDERNESS COVERAGE

FILE NAME ON CD: GWJEFFWILDSTUDY  
 REPRESENTING: USFS RECOMMENDED WILDERNESS STUDY AREAS  
 METADATA ON CD: WILDSTUDY  
 VWEC OBTAINED: SEPTEMBER 2004  
 OBTAINED BY: DMG- CLIPPED FROM USFS COVERAGES  
 REPRESENTING MANAGEMENT PRESCRIPTIONS IN  
 THE JEFFERSON AND GW NATIONAL FORESTS.

Contact:  
 James O'Hear  
 George Washington and Jefferson National Forests  
 112 North River Road  
 Bridgewater, VA 22812  
 Phone: 540-828-1566  
 Email: johear@fs.fed.us  
 Web: <http://www.fs.fed.us/gwjnf/gisdatadictionary.html>

**Coverage Limitations:** Coverages may or may not be complete within National Forest ownership boundaries. Coverages are considered incomplete outside National Forest ownership boundaries. Updates may be applied without notice. Users are advised to fully and carefully read the Liability Disclaimer before downloading or using this data.

**User Responsibilities:** It is the responsibility of the data user to use the data appropriately and in accordance with the limitations of geospatial data in general and these data in particular. These data are not recommended to be used with data of scales larger than 1:24,000.

Liability Disclaimer: The Forest Service cannot assure the accuracy, completeness, reliability, or suitability of this information for any particular purpose. Using GIS data for purposes other than those for which they were created may yield inaccurate or misleading results. The recipient may neither assert any proprietary rights to this information nor represent it to anyone as other than U.S. Government-produced information. The Forest Service shall not be liable for any activity involving this information with respect to lost profits, lost savings or any other consequential damages.

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The following coverages were provided by the Department of Conservation and Recreation, Conservation Lands Database:

FILE NAME ON CD: BLUERP  
REPRESENTING: BLUE RIDGE PARKWAY  
METADATA ON CD: NPS  
VWEC OBTAINED: NOV 2003  
OBTAINED BY: DMG- CLIPPED FROM VA DCR'S NPS COVERAGE

FILE NAME ON CD: DCR  
REPRESENTING: DCR STATE PARKS AND STATE DEDICATED NATURAL  
AREA PRESERVE BOUNDARIES  
METADATA ON CD: DCR  
VWEC OBTAINED: NOV 2003  
OBTAINED BY: DMG

FILE NAME ON CD: DGIF  
REPRESENTING: STATE WILDLIFE MANAGEMENT AREA BOUNDARIES  
METADATA ON CD: DGIF  
VWEC OBTAINED: NOV 2003  
OBTAINED BY: DMG

FILE NAME ON CD: DOF  
REPRESENTING: VA DEPARTMENT OF FORESTRY STATE FOREST  
OWNERSHIP BOUNDARIES  
METADATA ON CD: DOF  
VWEC OBTAINED: NOV 2003  
OBTAINED BY: DMG

FILE NAME ON CD: SNP\_UTM17  
REPRESENTING: SHENADOAH NATIONAL PARK OWNERSHIP  
METADATA ON CD: NPS  
VWEC OBTAINED: NOV 2003  
OBTAINED BY: DMG- CLIPPED FROM VA DCR'S NPS COVERAGE

FILE NAME ON CD: USFWS  
REPRESENTING: U.S. FISH AND WILDLIFE SERVICE'S NATIONAL  
WILDLIFE REFUGE BOUNDARIES

METADATA ON CD: USFWS  
VWEC OBTAINED: NOV 2003  
OBTAINED BY: DMG

FILE NAME ON CD: VOF  
REPRESENTING: VIRGINIA OUTDOORS FOUNDATION EASEMENTS AND  
LAND HOLDINGS.

METADATA ON CD: VOF  
VWEC OBTAINED: NOV 2003  
OBTAINED BY: DMG

FILE NAME ON CD: NHR\_SCREEN  
REPRESENTING: DCR NATURAL HERITAGE RESOURCES  
METADATA ON CD: NHR\_SCREEN  
VWEC OBTAINED: SEPTEMBER 2004  
OBTAINED BY: DMG

Contact:  
David Boyd  
Conservation Lands GIS Planner  
DCR - Natural Heritage Division  
217 Governor Street  
Richmond, VA 23219  
Phone: 804-371-4801  
Email: [dboyd@dcr.state.va.us](mailto:dboyd@dcr.state.va.us)  
Web: <http://www.dcr.state.va.us>

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The following coverages were provided by The Nature Conservancy of Virginia.

FILE NAME ON CD: SELECTED\_PRESERVES.SHP  
REPRESENTING: BOUNDARIES OF SELECTED PRESERVES OWNED OR  
MANAGED BY THE NATURE CONSERVANCY OF  
VIRGINIA  
METADATA ON CD: TNC\_PRESERVES  
VWEC OBTAINED: MAY 2005  
OBTAINED BY: JONATHAN MILES

FILE NAME ON CD: SELECTED\_PORTFOLIO\_CLS3  
REPRESENTING: THE NATURE CONSERVANCY ECOREGIONAL  
PORTFOLIO CLIPPED TO INTERSECT CLASS 3 AND  
ABOVE WINDS (WITH 1KM BUFFER).  
METADATA ON CD: SELECTED\_PORTFOLIO\_CLS3  
VWEC OBTAINED: AUGUST 2004  
OBTAINED BY: DMG

FILE NAME ON CD: UNROADED\_TNC\_NAD27  
REPRESENTING: USFS UNINVENTORIED ROADLESS AREAS- BRUCE &  
GIECEK  
METADATA ON CD: UNROAD  
VWEC OBTAINED: NOV 2003  
OBTAINED BY: DMG

Note:

A Geographic Information Systems based analysis was conducted by Chris Bruce (TNC) and Don Giecek (VWC) in fall 2003 to determine the location of large roadless parcels in both the Jefferson and George Washington National Forests. The most recent Forest Service data representing roads and Forest Service land ownership was evaluated to locate parcels that are: 1) Greater than 1000 acres and adjacent to existing Wilderness or Inventoried Roadless Areas (IRA), or 2) Greater than 5000 acres and not adjacent to existing Wilderness and Inventoried Roadless Areas. The 1000 and 5000 acre criteria used in this analysis are similar to the criteria used by the Forest Service in the IRA-RARE II analysis.

However, this GIS based analysis yields significant acreage that was not included in the IRA-RARE II analysis conducted by the forest service (as represented by USFS coverage IRA\_VA\_UTM17.)

Contact:

Chris Bruce  
GIS Specialist  
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490 Westfield Rd  
Charlottesville, VA 22901  
Phone: 434-951-0565

OR    Regarding Uninventoried  
         Roadless Areas Analysis  
         Don Giecek  
         Virginia Wilderness Committee  
         19484 Running Cedar Lane  
         Maidens, VA 23102

Email: [cbruce@tnc.org](mailto:cbruce@tnc.org)  
Web: <http://nature.org/Virginia>

804-749-1992  
[giecek@aol.com](mailto:giecek@aol.com)

The following coverages were provided by the Virginia Institute of Marine Science:

FILE NAME ON CD: SAV17\_NAD27  
REPRESENTING: SUBMERGED ACQUATIC VEGETATION  
METADATA ON CD: SAV17  
VWEC OBTAINED: NOV 2003  
OBTAINED BY: DMG

FILE NAME ON CD: SAV02  
REPRESENTING: SUBMERGED ACQUATIC VEGETATION UPDATE  
METADATA ON CD: IRA  
VWEC OBTAINED: MAY 2004  
OBTAINED BY: DMG

Contact:  
Marcia Berman  
Virginia Institute of Marine Science  
Gloucester Point, VA 23062  
804-684-7088  
marcia@sweethall.wetlan.vims.edu

---

The following coverage was clipped from data originally provided by TrueWind Solutions:

FILE NAME ON CD: CLASS\_GE3\_27  
REPRESENTING: WIND RESOURCE CLASS 3 AND ABOVE (WIND POWER @ 50 METERS; WIND >300W/m<sup>2</sup>)  
METADATA ON CD: TRUEWIND  
VWEC OBTAINED: AUGUST 2004  
OBTAINED BY: CLIPPED FROM WIND POWER @50 M; CHRIS BRUCE, DMG

FILE NAME ON CD: PWR50.BMP  
REPRESENTING: WIND POWER @ 50 METERS; WIND >300W/m<sup>2</sup>  
METADATA ON CD: BITMAP  
VWEC OBTAINED: MAY 2003  
OBTAINED BY: DMG

Contact:  
Brent Kinal  
GIS Specialist  
AWS Scientific  
255 Fuller Road  
Albany, NY 12203-3656  
Phone: 518-437-8790



Email: [bkinal@awsscscientific.com](mailto:bkinal@awsscscientific.com)  
Web: <http://www.awsscscientific>

---

The following coverage was provided by the Appalachian Trail Conference:

FILE NAME ON CD: ATCENTER\_VA  
REPRESENTING: APPALCAHIAN NATIONAL SCENIC TRAIL CENTERLINE  
METADATA ON CD: ATC  
VWEC OBTAINED: JULY 2004  
OBTAINED BY: MARK LOTTS, DMG

Contact:

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Email: [mrobinson@appalachiantrail.org](mailto:mrobinson@appalachiantrail.org)  
Web: <http://www.appalachiantrail>.  
HYPERLINK "<http://www.appalachiantrail.org/>" \t "\_blank"

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The following coverage was provided by the Southern Appalachian Forest Coalition:

FILE NAME ON CD: VIRGINIABILL\_UTM17\_NAD27  
REPRESENTING: VIRGINIA RIDGE AND VALLEY WILDERNESS AND  
NATIONAL SCENIC ACT OF 2004 (S. 2342 AND HB. 4202)  
METADATA ON CD: VIRGINIABILL\_UTM17\_NAD27  
VWEC OBTAINED: JULY 2004  
OBTAINED BY: DMG- PROVIDED BY HUGH IRWIN/SAFC

Contact:

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GIS Analyst  
Southern Appalachian Forest Coalition  
Asheville, NC  
Phone: 828-252-9223  
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Notes:

1) Most coverages have been assigned new names. Therefore, file names appearing here don't necessarily correspond to original names assigned by the agency or organization that developed the data. 2) DMG= DONALD M. GIECEK.

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**APPENDIX 2: MEMBERS OF THE VIRGINIA WIND ENERGY COLLABORATIVE ENVIRONMENTAL WORKING GROUP**

**D. DANIEL BOONE**  
**JUDY K. DUNSCOMB**  
**DON GIECEK**  
**RICK WEBB**  
**CHRISTINA WULF**

*Representing:*

The Virginia Society of Ornithology  
The Nature Conservancy  
The Virginia Wilderness Committee  
Virginia Forest Watch

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The Virginia Wind Energy Collaborative offers special thanks to Mr. Giecek and to Mr. Mark Lotts of VWEC for their significant contributions toward the completion of the GIS-based component of this resource. Mr. Giecek served as the principal architect of the GIS data resource and was a significant contributor toward development of the LCS. Mr. Lotts provided considerable technical assistance and guidance during development of the GIS database.