4 Taking Action! Voluntary Wetland Activities

Never doubt that a small group of dedicated people can change the world, indeed, it's the only thing that ever has." ~ Margaret Mead

Top and Bottom: Volunteers participating in Growing Native Acorn collection project. Middle photos: 2001 Earth Day participants learning about watersheds and wetlands (All Photos by Moulds, Alliance)

Take Action! Basic Ways to help

We must remember that we have the ability to implement change within our communities. Citizens can play a vital role in protecting one of Virginia's most important natural assets- its wetlands. Do not forget to think "outside the box" and identify a role that you can play in the process of preserving wetlands. Here are a few suggestions for getting started:

Be gentle with your environment – The way we live on the land affects the wetlands and rivers in Virginia. Many things you do at home, such as beneficial landscaping using native plants to filter runoff, reduce erosion and using native plants to conserve water and create wildlife habitat can positively affect our wetlands. Other beneficial actions such as and disposing of oil properly, driving less, using sulfide-free detergents, composting, recycling and conserving water few have positive impacts on the health of the environment, including wetlands.

Join a group that is working to protect wetlands – When we work together, we can accomplish much more. Support a local group working to protect wetlands by contributing your time, energy and talents. Oftentimes, these local conservation groups have hand-on restoration projects involving wetland restoration, creation and maintenance projects. Share your knowledge and concerns with friends and neighbors and encourage them to become involved in the process. If you belong to a civic group, garden club, or outdoor recreation group, help get them involved in wetlands protection in your community. Find a local watershed group in your community or find out other ways to contribute to the conservation of Virginia's wetlands. The Southeast Watershed Forum has an online listing of watershed-based community groups at http://www.southeastwaterforum.org/directory/virginia_sum.asp. If you live in the Chesapeake Bay region, you can also visit the Chesapeake Bay Program web site at http://www.chesapeakebay.net/involved.htm.

Get involved in your local government process – Comment on public notices and attend public hearings concerning wetland permits and regulations. Schedules of public hearings can be found in your local newspaper or by calling your local Corps office. Keep abreast of the environmental issues in your community. Encourage your local government representatives to adopt and support innovative land use planning and low impact development initiatives that would conserve and protect wetlands. Let your voice be heard!

Become knowledgeable about Virginia's wetlands – The more informed you are, the more effective you can be. Local conservation groups, nature centers, state parks and museums offer wetlands trips and courses. Visit and explore wetlands highlighted in Section 2, *Wetlands to See, Wildlife to Visit*, and continue to use this ToolKit to learn about their value and ecology. Find out where wetlands exist in your local community and support their protection and continued educational efforts.

Identify and learn about wetlands on your property – Identify wetlands on your property and avoid these areas if undergoing any construction projects. Continue to learn about the valuable habitat and

functions of your wetland and become familiar with the plants and animals that are found in the area. Take an opportunity to treat it as a unique respite and opportunity to observe and enjoy a unique ecosystem. Your wetland can serve as a lasting educational tool to familiarize your friends and neighbors with the majesty and value of this habitat. See the next chapter within this section of the *ToolKit, Informational Tools*, as well as *Volunteer-Based Wetland Monitoring* (Section 5) to learn how to study and monitor your wetland.

Enhance and restore wetlands on your property where former wetlands have been destroyed or degraded. In addition, maintain vegetative buffer areas around wetlands to conserve habitat values for fish and wildlife. Read the following section, *Hands On Voluntary Wetland Activities*, for more in-depth information about these types of activities you can undertake. Subsequent chapters will teach you about tools for identifying potential sites on which to perform your activities as well as where you can obtain financial as well as technical assistance.

Hands on Voluntary Wetland Activities: Introducing Protection, Enhancement, Creation and Restoration

"In the long run it is the cumulative effect that matters. One can do much. And one and one and one and one can move mountains." ~Joan Ward-Harris

Defining Basic Types of Voluntary Wetland Activities

Voluntary wetland activities are often generally referred to as "restoration" and are often used interchangeably. However, there are actually four main types of voluntary wetland activities: Preservation, Enhancement, Restoration and Creation, defined below (Virginia Wetlands Restoration Coordinating Committee, 2001).

- **Preservation** – The protection of existing wetlands (or other aquatic resources) in perpetuity through the implementation of appropriate legal and physical mechanisms, such as acquisition by purchase or donation, negotiated conservation easement or conservation tax incentive. These protection measures prevent the conversion of a wetland to another use.
- **Enhancement** – The increase of one or more functions or values of an existing wetland or other aquatic resource. Enhancement can include increasing the productivity, habitat, or water quality value of the wetland by modifying environmental parameters (vegetative plantings, for example, to increase wildlife habitat).
- **Restoration** – The re-establishment of a wetland in an area where it historically existed. A common example of restoration includes the re-establishment of wetland hydrology in a wetland that has been drained for cropland.

Top: Young volunteer at SAV restoration project; remaining photos: Alliance volunteers planting wetland plants at the Friends of Bandy Field enhancement project (Photos by Alliance)"

- **Creation** – The establishment of a wetland in an area where one did not formerly exist. Examples include establishing a wetland on an upland site and the filling a pond to produce a wetland.

To avoid confusion for the purposes of this ToolKit, we will refer to all four of these as "*voluntary wetland activities*" when discussing them generally as a group.

Before You Begin – Planning

The type of voluntary wetland activity you decide to undertake depends on who you are, your goals and objectives, resources and limiting characteristics. As with other pursuits, when performing voluntary wetland activities you generally aim for the most "bang for your buck." To do so requires careful planning and often compromises between your goals and limitations.

Step 1 – Determining Goals and Objectives

Oftentimes your organizational identify and jurisdiction alone determine to a large part, the extent of your interest and activities. Examples of each of the four voluntary wetland activities undertaken by different entities are included below:

- **Preservation of an existing wetland**
  Examples include: a private landowner wishing to preserve a family wetland tract through a conservation easement; The Nature Conservancy's Virginia Coast Reserve, a 60-mile stretch of barrier islands that are now a nature preserve, located on Virginia's Eastern Shore;
- **Enhancement of an existing wetland**
  Examples include a Boy Scout troop that builds and installs wood duck boxes in a bottomland wetland that lacks sufficient nesting sites; A National Wildlife Refuge that undertakes an invasive species control project in a wetland
- **Restoration of a former wetland that has been altered**
  Examples include: a local watershed organization that restores a tidal wetland by restoring the tidal connection; a regional nonprofit organization that restores the hydrology and vegetation to a former wetland drained for agricultural purposes (See the Case Study highlights for the Oscar Landing and the Chesapeake Bay Foundation projects)
- **Creation of a wetland where one has never existed**
  Examples include the creation of a vernal pool at a high school to be used as a teaching site

Beyond this, goals need to be further defined in more detail. Although projects should be designed to fulfill multiple goals, at least one major objective, followed by several secondary objectives should be identified (Mitsch & Gosselink, 2000). The enhancement, replacement or creation of functions and values should be an important consideration (Mitsch & Gosselink, 2000). Possible goals include: flood control, stormwater management, water quality improvements, wildlife or fisheries enhancement, and research and education (Mitsch &Gosselink, 2000).

Step 2 – Narrowing the Possibilities

Know your limits: Usually the ultimate goal of wetland voluntary wetland activities is to reverse historical impacts and return the site to its original features. Oftentimes, however, full historic restoration is not feasible due to limits such as financial constraints, timelines and people-power.

Take Advantage of assistance: There are many opportunities for assistance on your project, both technical and financial. Technical and financial assistance is discussed in greater detail in the *Getting Help* portion of this section.

Preservation

Preservation options for Virginia landowners include donation, sale, **conservation easements**, natural area dedications, and registration as a natural area. The first two options are discussed below. More information concerning natural area dedications and registrations may be obtained by contacting the DCR's Office of Land Conservation.

- **Donation** – Landowners can donate property rights to a state agency, local government, and land trust or conservation organization. Donation can also be performed for the future as part of a will. Donations qualify for tax deductions and potentially reduced real estate taxes.
- **Sale** – Landowners can also sell their property at a price below fair market value. The price difference is considered a charitable donation that may be eligible for income tax deductions, reduced estate taxes and minimizing long term capital gain taxes associated with the sale of a large estate
- **Permanent conservation easement** – Conservation easements differ from the donation or sale of land in that ownership is still retained. Under a conservation easement, most development rights are relinquished, but some traditional uses are still retained. A conservation easement is a legally binding and permanent deed to the property. Easements are tailored so that the land's unique characteristics – in this case, wetlands – are protected. Life estates are another option within conservation easements. In this situation, a landowner donates or sells their property to a land conservation organization but continues to live on it until his or her death.

More information about conservation easements:

- DCR's Office of Land Conservation: http://www.dcr.virginia.gov/olc/
- Virginia Open-Space Land Act: http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+10.1-1700
- Virginia Conservation Easement Act: http://leg1.state.va.us/cgi-bin/legp504.exe?000+cod+10.1-1009
- Sample Conservation Easement template: www.virginiaoutdoorsfoundation.org/easement.html
- Publications available about land conservation: www.lta.org/publications/easement_lib.htm
- For details on tax advantages for all of these Preservation measures: http://www.dcr.virginia.gov/olc/tools03.htm.

- To download a brochure that details state agencies' programs suited to help you conserve your land: http://www.state.va.us/dcr/olc/landcon.pdf

The *Getting Help* section of this chapter includes contacts for technical and financial assistance with land preservation. To find a Land Trust organization in your area, visit the Land Trust Alliance's webpage for Virginia organizations at http://www.lta.org/findlandtrust/VA.htm.

Narrowing Down the Search for Enhancement, Restoration and Creation Activities

- **Location, location, location!** When considering undertaking a voluntary wetland activity, oftentimes the exact location of the activity may not have been identified. There may be a large area that is under consideration, such as an entire county if the stakeholder is a local government, or an entire watershed if the stakeholder is a watershed organization. If this is the case, you will need to prioritize your search.
- **Restoration and enhancement projects are generally more feasible than creation projects.** When choosing sites, the aim should be to select those with the highest chances of success versus the least amount of cost and difficulty. For restoration and creation activities, sites with the highest chances of success are those where wetland hydrology and vegetation can most easily be achieved. Likewise proper soil conditions are necessary for the successful health of enhancement projects. Restoration and enhancement projects will likely have proper wetland soils as well as seed sources for native plants onsite or nearby. Additionally, it may be easier to achieve wetland hydrology in an enhancement or restoration site than in a location where a wetland never existed previously.
- **Wetland creation can be costly and difficult** and therefore smaller sites are recommended for stakeholders with smaller budgets.

Sites to prioritize in your search:

- Existing wetlands (for enhancement and restoration projects) and areas adjacent to wetland areas that could easily be modified to become a wetland (for creation projects)
- Former wetlands where the hydrology has been removed through the use of drains or ditches for cropland, pastureland, or other purposes (for restoration projects)
- Former tidal wetlands (including those that are still wetlands but are now freshwater) where the tidal connection has been disconnected through the placement of a road, berm or other development (tidal restoration projects)
- Sites where natural inundation or saturation is frequent. The tidal cycle and stage are important in tidal areas
- Former or existing wetlands where the vegetation and soils have been altered through actions such as plowing and tilling on cropland or through grazing on pastureland (for enhancement and restoration projects)

(Adapted from Mitsch & Gosselink, 2000).

Less than ideal locations:

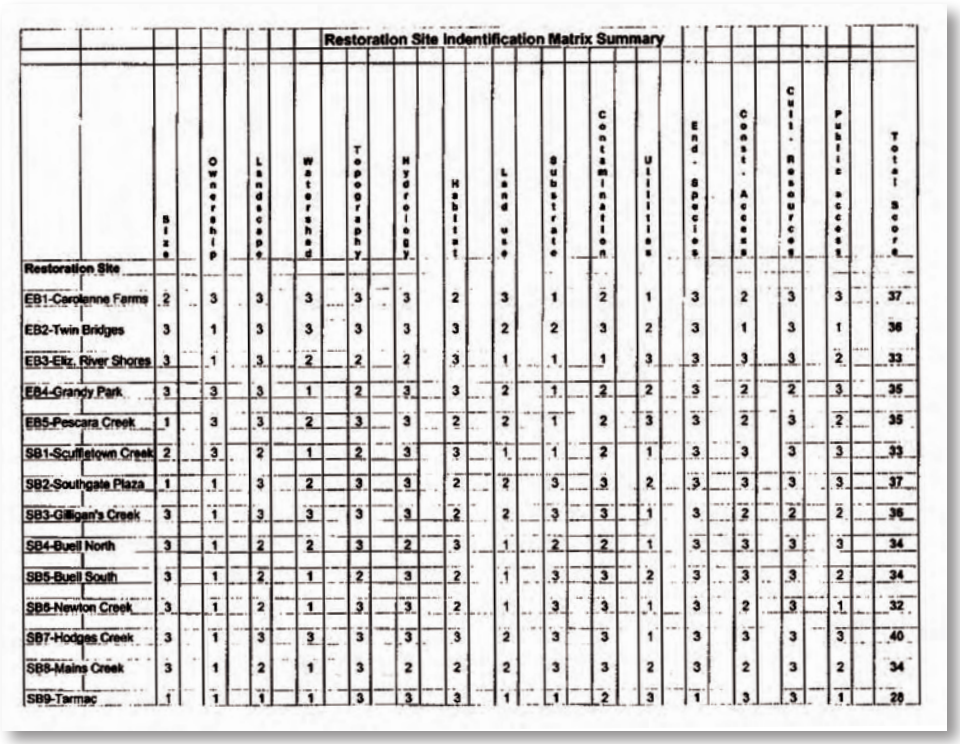
- Areas with highly drainable soils (upland or non-hydric soils) are not likely to have sufficient wetland hydrology
- Areas with moderate to steep topography generally do not have sufficient hydrology to support a wetland
- Areas where the site and adjacent lands are incompatible with a wetland project that will meet desired goals – If the is already developed as a commercial, industrial or residential site (or if such uses are planned and zoned accordingly for the near future) and there is insufficient room remaining on the property for voluntary activities, it is unlikely that it is a worthwhile site to consider.
- For areas where wildlife and fisheries habitat is a goal, if the size of the site is not large enough or is not connected to an ecological corridor such as migratory flyway or spawning runs, the project may be unsuccessful
- Sites with existing valuable habitat, including that which can or does support rare, threatened or endangered species – For example, an upland site that supports a rare plant or animal species is still very valuable even through it is not a wetland. Additionally, the removal of forest habitat to create an emergent wetland is not ideal.

Other considerations:

- Ownership of land – project may be more difficult when you don't own the land
- Size – in general, the larger the better, in terms of return on investment for values and functions
- Maintenance – aiming for sites that require minimal maintenance
- Utilities present or absent? – both above or belowground
- Site contamination – present or absent? Could pose health risk and be expensive to remediate
- Cultural resources – potential for project impacts?
- Public/Construction Access – desirable or undesirable? Available or not?
- Permitting considerations

Develop Screening Criteria For Prioritization

Different stakeholders will have different prioritization methods. For example, the Chesapeake Bay Foundation (CBF), Ducks Unlimited (DU), DGIF and the FWS's Partners for Fish and Wildlife program all focus site prioritization for restoration projects on former wetlands that have been drained or ditched for agricultural purposes. DU additionally prioritizes its activities on establishing waterfowl habitat, whereas the ultimate goal for the CBF is improved water quality for the Chesapeake Bay watershed. Alternatively, an organization that focuses efforts in urban or highly degraded areas may have no other choice than to choose what may seem as "less than ideal" situations to other stakeholder groups.



Restoration Site Indentification Matrix Summary

Restoration Site	Bias	Ownership	Landscape	Watershed	Topography	Hydrology	Habitat	Landuse	Substrate	Contamination	Utilities	End-Species	Coast-Access	Civil-Resource	Public Acceptance	Total Score
EB1-Carolanne Farms	2	3	3	3	3	3	2	3	1	2	1	3	2	3	3	37
EB2-Twin Bridges	3	1	3	3	3	3	3	2	2	3	2	3	1	3	1	36
EB3-Eliz. River Shores	3	1	3	2	2	2	3	1	1	1	3	3	3	3	2	33
EB4-Grandy Park	3	3	3	1	2	3	3	2	1	2	2	3	2	2	3	35
EB5-Pescara Creek	1	3	3	2	3	3	2	2	1	2	3	3	2	3	2	35
SB1-Scuffletown Creek	2	3	2	1	2	3	3	1	1	2	1	3	3	3	3	33
SB2-Southgate Plaza	1	1	3	2	3	3	2	2	3	3	2	3	3	3	3	37
SB3-Gilligan's Creek	3	1	3	3	3	3	2	2	3	3	1	3	2	2	2	36
SB4-Buell North	3	1	2	2	3	2	3	1	2	2	1	3	3	3	3	34
SB5-Buell South	3	1	2	1	2	3	2	1	3	3	2	3	3	3	2	34
SB6-Newton Creek	3	1	2	1	3	3	2	1	3	3	1	3	2	3	1	32
SB7-Hodges Creek	3	1	3	3	3	3	3	2	3	3	1	3	3	3	3	40
SB8-Mains Creek	3	1	2	1	3	2	2	2	3	3	2	3	2	3	2	34
SB9-Tarmac	1	1	1	1	3	3	3	1	1	2	3	1	3	3	1	28

Priest/ERP

Example spreadsheet demonstrating how the Elizabeth River Project prioritized its search for restoration sites using a simple spreadsheet

Oftentimes, it all comes down to Ownership of land as main determinant

What to do if you don't own the land? As the majority of wetlands across the nation are privately owned, chances are high that the wetland you are interested in helping is also located on private property (Firehock et al., 1998).

Don't despair – remember to think "outside of the box!" First, contact your local government to research land ownership through tax records. Once you have determined who owns the land (ownership may include multiple entities), there are two main routes that may be taken:

- **Land Acquisition** – Purchasing the land is one option for land preservation and other voluntary wetland activities.
- **Work cooperatively with the landowner(s) to encourage voluntary wetland activities** – This can be especially effective if citizen groups or other stakeholders interested in wetland restoration activities establish a positive dialogue and approach the situation and landowner(s) in a non confrontational manner.

Enhancement

Enhancement activities may include:

- **Native vegetation plantings** – to increase plant diversity as well as to increase habitat for food, shelter and cover for wildlife of interest.
- **Removal of invasive plants** – to aid in native plant establishment. For certain invasive plant species, eradication may not be possible and control may be a better goal.
- **Creation of buffer zones around wetland areas** – planting trees or native grasses in upland areas to protect against disturbance and soil erosion in the wetland area
- **Excluding or limiting domesticated animals** – horses, cattle and even dogs and cats, all of which can be detrimental in some way to wetlands
- **Wildlife control** – may be necessary for unchecked populations of invasive wildlife species that can be detrimental to wetlands such as large populations of resident Canada geese or nutria
- **Restricting off road vehicles** – off-road vehicles can cause soil erosion and damage plant roots
- **Wildlife habitat additions** – strategic placement of birdhouses, nesting boxes and platforms, feeding stations, tree stumps and small brush piles
- **Construction of trails, boardwalks and blinds** – encourages human enjoyment while limiting damage to wetlands by reducing traffic to specific areas. During breeding and nesting seasons, access may need to be restricted or closed

(Adapted from Kellselheim & Slattery, 1995)

A word of caution about enhancement – In pristine situations, wetlands manage just fine without any help from us. There are few wetlands or other natural resources, though, that still qualify as pristine. Nonetheless, more intrusive enhancement actions such as fish stocking, introducing a plant species, or altering water flow can have seriously detrimental effects, such as the introduction of an invasive species (as in the case with fish or plant introductions) or flooding of a neighbor's property for altering flow conditions (adapted from Kellselheim & Slattery, 1995).

Additionally, enhancement actions that may appeal to us may not be the best thing for the wetland. Study a wetland area first to determine enhancement needs. A lack of plant and wildlife diversity when studied in greater detail can help to clue us in as to what enhancement activities would be best for a wetland. (Adapted from Kellselheim & Slattery, 1995). Technical assistance from a wetland professional as to the best types and methods for enhancement measures is highly recommended.

Resources for Creation Projects

A Guide to Creating Vernal Ponds: All the Information you Need to Build and Maintain an Ephemeral Wetland. Bieghauser, T.R. (n.d.). Morehead, KY: USDA Forest Service. Small, handbook aimed for citizen groups with helpful photographs and diagrams. Available for download: http://herpcenter.ipfw.edu/outreach/VernalPonds/VernalPondGuide.pdf

POW! The Planning of Wetlands: An Educator's Guide. Ripple, K.L. & Garbisch, E.W. (2000). St. Michaels, MD: Environmental Concern Inc. Aimed for K-12 educators interested in creating, restoring or enhancing followed by monitoring of a wetland in their schoolyard. Although geared for educators, much of the information is useful for volunteers of all kinds. For more information, contact Environmental Concern Inc., http://www.wetland.org/ P.O. Box P, St. Michaels, MD 21663-0480, Tel. (410) 745-9620.

Resources for Invasive Plant Species Identification and Control

Citizen's Guide to the Control of Invasive Plants in Wetland and Riparian Areas. Alliance for the Chesapeake Bay. (2003) This booklet offers a survey of the efforts of a variety of groups that have mobilized volunteers in order to control invasive plants in natural areas. Available for download: http://www.acb-online.org/pubs/projects/deliverables-251-1-2005.pdf

The Natural Heritage Program has many fact sheets on Invasive Plant Species of concern in Virginia, available for download: http://www.state.va.us/dcr/dnh/bookeduc.htm#invasive

Resources for Restoration and Enhancement Projects

Propagation of Wetland Plants: Herbaceous Plants, Shrubs and Trees. McIninch , S. H. & Garbisch, E.W. (2003). St. Michaels, MD: Environmental Concern Inc. For more information, contact Environmental Concern Inc., http://www.wetland.org/ P.O. Box P, St. Michaels, MD 21663-0480, Tel. (410) 745-9620. Contains information on how to propagate wetland plants, from seed and perennnial plant parts, to be used in wetland projects.

Wetland Habitat Management: a guide for landowners. Ducks Unlimited (DU). (n.d.). Stevensville, MD: Ducks Unlimited, Mid-Atlantic Field Office. A handbook aimed as a reference manual for citizens on wetland enhancement, restoration and management techniques. Contains helpful diagrams explaining common enhancement and restoration practices. Available for downloading: http://www.ducks.org/conservation/Projects/GreatLakesAtlantic/documents/LandownerGuide.pdf

Restoration

- **Restoring tidal connections** to a site that was formerly a tidal wetland by removing berms, roads or other features that disconnected tidal flow
- **Restoring hydrology** to former wetlands that have been drained or ditched for agriculture or development. This can be accomplished by using the following techniques:

  Ditch plugging: Many former wetlands sites have a ditch or several ditches. The Great Dismal Swamp, one of the most studied wetlands in the nation, was severely impacted by human activities including ditching and draining activities (Mitsch & Gosselink, 2000). The least expensive and easiest restoration procedure for reversing ditching is to simply plug the ditch at its lowest point. Plugging may require periodic extensive maintenance. Ditches can also be backfilled. Ditches often are rimmed with an earthen berm that can be pushed back into the ditch and re-contoured (Thompson & Luthin, 2004).

  Disabling of drain tiles: Drain tiles are hollow tubes buried underground, usually in parallel lines. Water collects in the drains and is carried offiste via the tiles. Early tiles were made of wood, followed by clay, concrete and plastic. Drain tiles can be located and then disabled by excavation. Drain tiles can be identified by examining historic aerial photographs or by searching for tile lines with probes. When disabling drain tiles, it is important to remove them and to additionally disable the space created by the compacted soil surrounding the tile lines. Clay tiles can be crushed and reburied (Thompson and Luthin, 2004).

CBF

Old clay drainage tiles

CBF

Photo showing trench where drain tiles have recently been excavated. It is important to fill this area back in with soil to avoid a drainage conduit.

Some final "words of wisdom" for all enhancement, restoration and creation projects

Give the project time – As natural wetlands take time to develop, so will enhanced, restored or created wetlands. Several to many years may be required prior to plant establishment, wildlife habitat or other desired functions to come to fruition (Mitsch & Gosselink, 2000).

You are not alone – Technical assistance from a wetland professional as to the best types and methods for enhancement measures is highly recommended. The Getting Help portion of this section contains information about financial as well as technical assistance for voluntary wetland activities.

Informational Tools for Targeting Potential Sites for Voluntary Wetland Activities

"Maps are a way of organizing wonder. " ~ Peter Steinhart, 1986

This chapter discusses tools such as maps and aerial photographs that are useful for targeting sites for voluntary wetland activities. Information on how to obtain these tools is also provided. These tools will also prove useful for learning more about your site(s) once you have narrowed down your search.

This chapter is divided into six sections: *Topographic Maps; National Wetland Inventory (NWI) Maps; Soil Surveys; Aerial Photographs; Geographical Informational Systems (GIS) Resources;* and *Other Tools*.

Important Points to Make Concerning Informational Tools

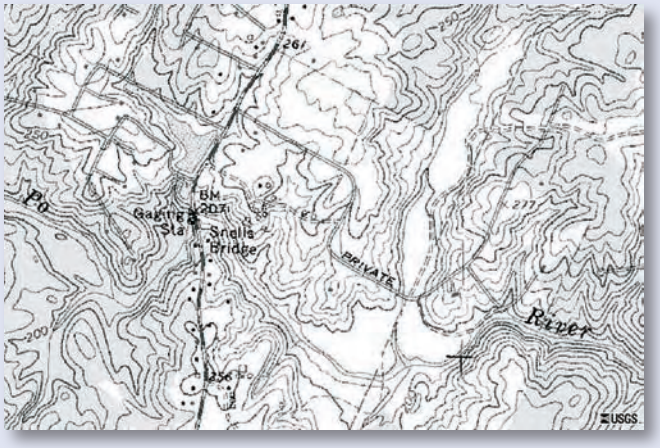
- **None of the tools should be used as "stand-alone" documents** when performing your targeting. In other words, to best narrow down your search, the more tools you have the better in order to obtain a more complete estimate of conditions.
- **Pay attention to the date that each tool was prepared**, remembering that changes in land use could have occurred since that time. Although it may be difficult to find historic copies of the various tools, previous editions of each tool, when used in combination of current editions, can be useful to indicate changes that have occurred to your sites of interest.
- **Remember these are *tools* only, each one its own limitations**. There are always fundamental limitations in mapping scale
- Once you have narrowed your search to one or a few sites, **on-site verification** of your findings should always be performed.
- **Partnering with agencies and organizations** for the use of certain tools and other resources is recommended. An entity that is interested in your area of interest may already have many of the tools you are interested in using and may already know plenty about the conditions and history of your site.

Topographic Maps

Topographic maps are 2-dimentional maps that use contour lines to render the three-dimensional elevation and shape of the land. In addition to showing natural features such as mountains, valleys, plains, lakes, rivers, and vegetation, they also show manmade features such as roads, boundaries, transmission lines, and major buildings (http://erg.usgs.gov/isb/pubs/booklets/topo/topo.html).

The best-known topographic maps are 1:24,000-scale maps produced by the U.S. Geological Survey (USGS), also known as 7.5-minute quadrangles. More than 54,000 7.5-minute maps were made to cover the 48 conterminous States. (http://erg.usgs.gov/isb/pubs/booklets/topo/topo.html). The 7.5-minute map series was officially completed in 1992. The program has recently been replaced by *The National Map*, an online, interactive map service (http://nationalmap.usgs.gov/). All topographic maps from the 7.5-minute program, as well as various derived products, remain available for sale from the USGS.

How to read and use Topographic Maps:



Understanding Features:

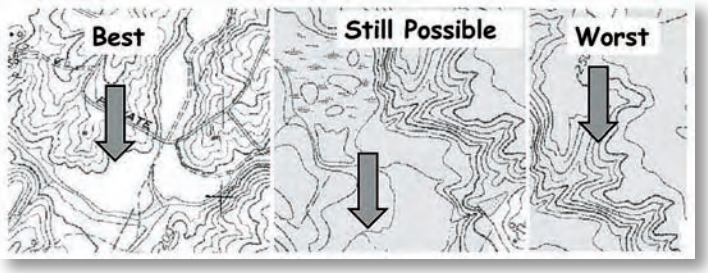
- **Area features**: forested vegetation (indicated as green); water (blue); densely built-up areas (gray or red); information added with update (purple)
- **Line features**: topographic contours (brown); roads, boundaries, railroads, etc.
- **Point symbols**: depict features such as buildings, wells, campgrounds, etc.

Reading Topographic Contours: Topographic contour lines are imaginary lines that join points of equal land elevation. Topographic contours are lines of equal elevation and therefore never cross. Topographic lines are brown. Contours that are very close together indicate steep slopes while lines that are wide apart indicates gradual slope or near level terrain.

More information about how to read topo maps and symbol explanations may be found at: http://erg.usgs.gov/isb/pubs/booklets/symbols/

Tips for using Topographic Maps for identifying potential sites for voluntary wetland activities

- Look for areas adjacent to streams or water bodies, especially areas with wide floodplains
- Look for low-lying areas, depressions, and headwaters
- For creation projects: look for unforested areas



The site indicated as "worst" is an unlikely candidate for creation due to the steep topography. The sites labeled "Best" and "still possible" are both located adjacent to a stream with nearly level to flat topography, indicated by the lack of contours. The site labeled as "best" is a more likely candidate for creation projects because it is unforested while the "still possible" site is indicated as forested (color version of map is shaded green). For protection, restoration and enhancement projects this is not critical, unless you are specifically looking for unforested areas such as emergent wetlands.

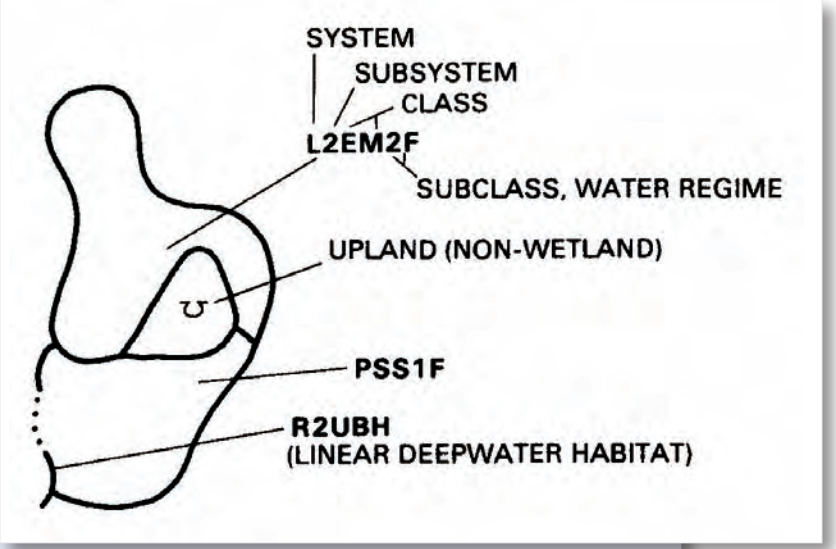
- **Understanding Digital Cartographic Data**: Several types of digital data is available from the USGS, including from Business Partners. For more information go to http://geography.usgs.gov/esic/to_order.html
- **Explanation of digital data types:**
  - Digital Line Graphs (DLG) – small files of data derived from USGS topographic quadrangle maps, arranged in layers, generally for use in geographic information systems (GIS)
  - Digital Elevation Models (DEM) – elevation data (similar data also available in seamless set known as National Elevation Data, or NED)
  - Digital Raster Graphics (DRG) – scanned topographic maps
  - Digital Orthophoto Quadrangles (DOQ) – digitized and ortho-rectified renderings of National Aerial Photography Program products

Obtaining Topographic Maps

- **Topographic maps with a smaller scales (zoomed in or close up) than 7.5 minute quadrangle:**
  - Local government planning/zoning offices
  - Also check to see if a site survey has been performed
- **USGS Topographic Maps (online, hardcopy, and/or digital):**
  - **USGS:**
    http://geography.usgs.gov/esic/to_order.html
    1-888-ASK-USGS (1-888-275-8747):
    P.O. Box 25286
    Denver, CO 80225
    USGS Business Partners:
    http://rockyweb.cr.usgs.gov/acis-bin/querypartner.cgi
  - **Virginia Department of Mines, Minerals and Energy (DMME), Division of Mineral Resources (DMR):**
    http://www.mme.state.va.us/DMR/PUB/maplist2.html#topo
    434-951-6341
    P.O. Box 3667
    Charlottesville, VA 22903
  - **TerraSever** – on online service that contains high-resolution USGS aerial imagery and USGS topographic maps that can be viewed and downloaded *for free*. http://terraserver-usa.com/
  - **Topozone** – on online service that contains USGS topographic maps that can be viewed *for free*. http://www.topozone.com. Purchasing requires subscription to Topozone Pro.
  - **National Geographic** – CD-ROM contains all topographic maps set for the Mid-Atlantic region: http://www.trailsillustrated.com/acb/showdetl.cfm?&DID=15&Product_ID=943&CATID=35
    - Digital format for ArcGIS also available: http://maps.nationalgeographic.com/topo/extension.cfm

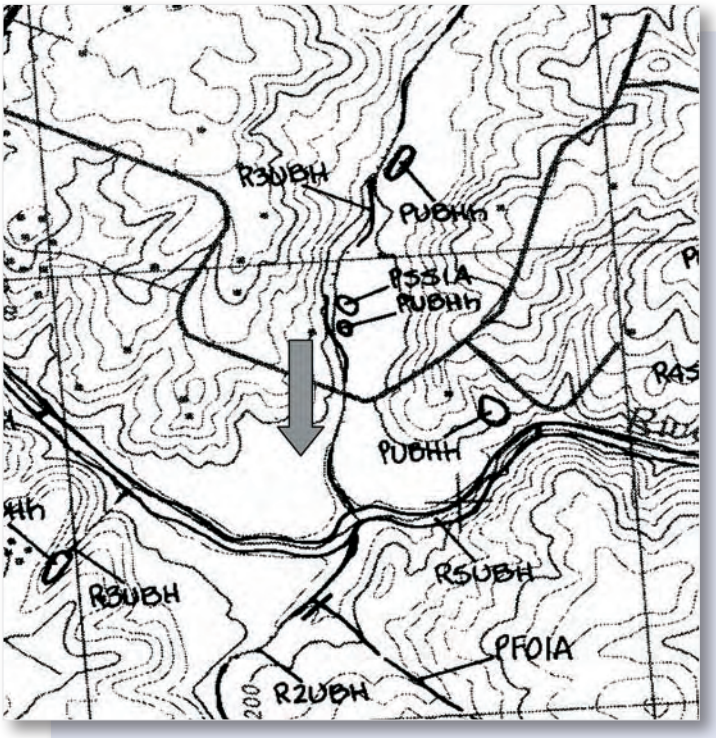
National Wetland Inventory (NWI) maps

The National Wetland Inventory (NWI) maps are based on the NWI classification system developed by the FWS and provide information on the status and extent of wetlands and deepwater habitats. Hardcopy NWI maps are printed on a blueprint and are overlain on top of USGS 7.5 minute quadrangles. The FWS recently completed or revised the over 800 NWI maps necessary to cover all of Virginia (Hershner et al., 2003). Efforts are currently underway by the FWS to produce a seamless digital data set for the entire Nation. Digital data sets contain additional information as part of The National Map effort.



How to Read and Use NWI Maps:

Wetland and deepwater habitats are displayed as polygons using the alphanumeric codes corresponding to the classification nomenclature that best describes the habitat. A wetland key to the alphanumeric system is located at the bottom of each hardcopy map. The diagram above shows two different polygon shaped wetland features: L2EM2F (Lacustrine [L], littoral [2, meaning along the shoreline], emergent [EM], nonpersistent vegetation [2], semi permanent water regime [F]); and PSS1F (Palustrine [P], scrub-shrub vegetation [SS], broad leaved deciduous vegetation [1], semi permanent water regime [F]) surrounding an upland feature (polygon labeled with "u", indicating an upland area. A solid and dashed line indicates a linear Riverine feature. For online maps, an online codes link is available from the NWI website.



Tips for using NWI Maps for identifying potential sites for voluntary wetland activities:

- For protection, enhancement and restoration projects- look for areas indicated as wetlands.
- For creation projects, look for areas adjacent to wetlands
- Fore restoration projects, compare historic NWI maps to recent NWI maps to identify sites that previously wetlands but that are no longer.

Precautions with using NWI maps:

As the NWI maps are created from aerial photos, some types of wetlands, particularly smaller forested wetlands, may not appear on the NWI maps.

The site indicated by the arrow is the same as that labeled as " Best" in the topographic map section for a creation project. The general area is potentially a candidate for a creation project, because although it is not indicated as being a wetland, it located close to several riverine (R) and palustrine (P) wetlands. Any of the areas indicated as wetlands may be potential sites for protection, enhancement or restoration.

Obtaining NWI maps (online, hardcopy and digital):

NWI wetland information has been collected and disseminated over the past several decades. Therefore, the data exist in different formats:

- **Hardcopy** – (Standard-sized 7.5' paper composites) for purchase from USGS Cooperator-run Distribution Centers. For Virginia NWI maps
  http://www.umass.edu/tei/esio/wtlnd.html
  Earth Science Information Center
  at University of Massachusetts
  Blaisdell House
  Amherst, MA 01003
  (413) 545-0359

- **Online (Viewing and customized downloads)**: NWI Wetlands Mapper – Digital NWI data:
  http://wetlandsfws.er.usgs.gov/intro.html

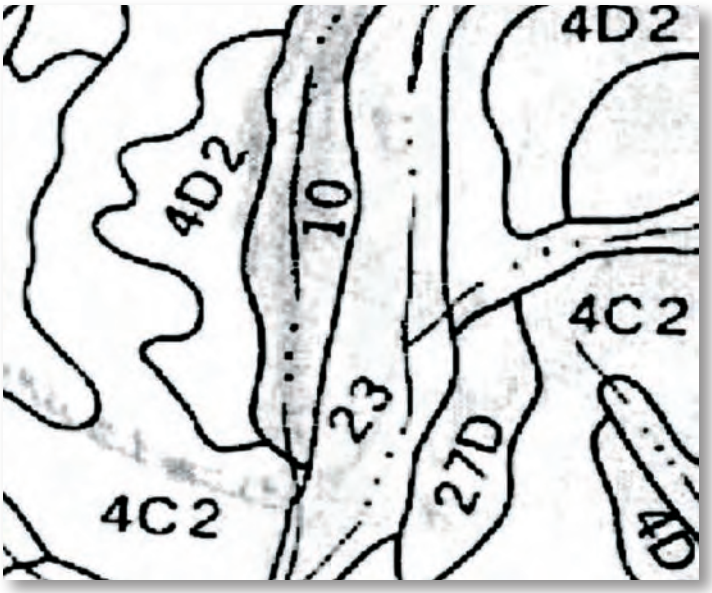
- **Custom digital NWI maps *for purchase* (to download)**:
  http://www.charttiff.com/WetLandMaps/index.html

- **VIMS Wetlands Data Viewer tool** – allows users to obtain NWI statistics for any hydrologic unit in Virginia. Localities are divided by county or municipality. http://ccrm.vims.edu//disclaimer_wetlandsdataviewer.html

For more information about obtaining NWI maps, go to http://wetlandsfws.er.usgs.gov/intro.html

Soil Surveys

The Natural Resources Conservation Service (NRCS) produces soil surveys. Soil surveys are produced for most counties and some cities and contain maps showing the locations and extent of soils as well as data about the physical and chemical properties of those soils. The maps are underlain by aerial photographs and show soil boundaries as well as linear features such as roads and drainage features and point features such as buildings.



How to Read and Use Soil Surveys

1. The lines on the map separate different soil types, referred to as map units. The alphanumeric labels, such as 10, 23, or 27D, designate the types of soil mapping units, which are described within the narrative portion of the soil survey.
2. Note the perennial streams indicated by the —— _ _ _ —— symbol.

(For more detailed instructions on reading soil surveys, go to http://soils.usda.gov/survey/how_to/)

Tips to using soil surveys for identifying potential sites for voluntary wetland activities:

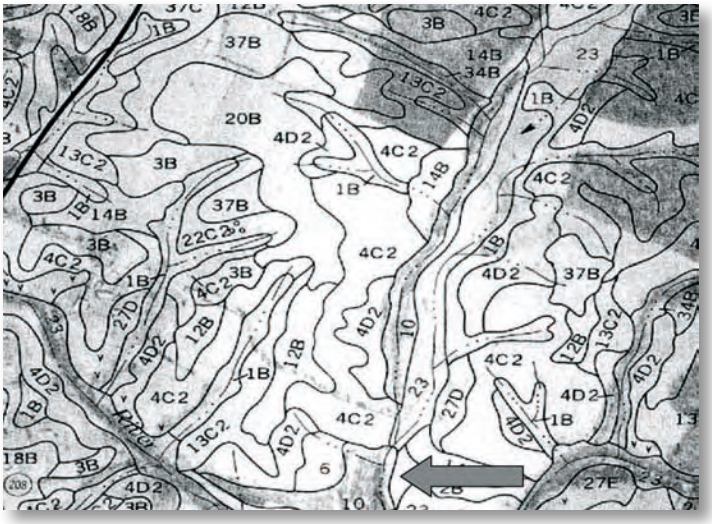
- **Obtain a Hydric soils list for your area of interest from the Local NRCS office** – This list contains hydric soils and oftentimes **fluvaquents** (soils formed from frequent flooding, often found in floodplains) and hydric **inclusions** (hydric soils located within larger non hydric soil complexes). These soils are on this list because they have been found to share characteristics due to their formation under conditions of saturation, ponding or flooding for a long enough time period to have developed anaerobic conditions. They generally share characteristics such as poor drainage, a high water table, are found on flat or nearly level slope, or are located in a floodplain.

- **Identify Hydric soils and fluvaquents on your soil survey map** – these indicate areas that have a high likelihood of either being a wetland at the time the soil survey was made or at some prior time.

- **Once you have narrowed down your search, look for soils with hydric inclusions**, which might indicate the presence of smaller wetlands at the time of the survey or at some prior time.

Precautions with using Soil Surveys

Precautions must be taken in using soil surveys for gathering hydric soil information because due to the scale of the surveys, map units will contain soils that are not all of the same type. Therefore a map unit that contains a soil type listed on the hydric soil list may contain inclusions of soils that are non hydric. Likewise, map units that are not on the hydric soils list may include inclusions of hydric soil. Once you have narrowed down your search to one or a handful of sites, you should confirm your findings by having someone such as a soils scientist visit the site(s).



The site to the left of the arrow is the same as that labeled as " Best" on the Topographic Map for a creation project. The general area is potentially a candidate for a creation project, because it is labeled as map unit "10." Based on the codes description included in the soil survey, this refers to a soil unit included on the hydric soils list for that particular county. Soil units 23 and 34B are also listed on the county's hydric soils list and therefore have a high likelihood of either being a wetland at the time the soil survey was made or at some prior time.

Aerial photographs

Aerial photographs are a useful tool for understanding more about recent site conditions as well as providing clues to the past.

Tips for using aerial photographs for identifying potential sites for voluntary wetland activities:

- Look for darkened areas, which may indicate the presence of water.
- Look for sites adjacent to streams or water bodies
- For creation projects: look for unforested areas

The site framed by the two arrows is the same as that labeled as " Best" on the Topographic Map for a creation project. The general area is potentially a candidate for a creation project, because it is unforested and is located close to several stream systems that appear to be forested or shrub-scrub. The area below the top arrow is lighter in color and is most likely a crop field.

Obtaining aerial photographs

- **Farm Service Agency (FSA)** – The Aerial Photography Field Office (APFO) of the FSA is the primary source of aerial imagery for the U.S. Department of Agriculture (USDA). Hard copies of aerial photographs are available for purchase for much of the country for years 1955 to present. Orders are all custom-made, as no stock of completed photography is on hand. Digital imagery is currently being archived and developed at the APFO to meet USDA Service Center requirements. More information on obtaining aerial photographs may be obtained by contacting the state FSA office or:http://www.apfo.usda.gov/
  Virginia State FSA Office
  1606 Santa Rosa Rd.
  Culpeper Building, Suite 138
  Richmond, VA 23229
  Phone: 804-287-1503
  Fax: 804-287-1723
- **USGS** – Aerial photographs may also be ordered from the USGS through their *Business Partner Program:* http://rockyweb.cr.usgs.gov/acis-bin/querypartner.cgi?results&sort=location.
- **TerraSever** – Online service that contains high-resolution USGS aerial imagery and USGS topographic maps that can be viewed and downloaded *for free*: http://terraserver-usa.com/
- **TopozonePro** – Full-resolution 1-meter USGS aerial photographs available *for purchase:* http://www.topozone.com/topozonepro.aspy
- **Virginia Department of Transportation (VDOT)** Current as well as historic aerial photographs, dating back to the 1930s for some areas, available *for purchase*: (804) 786-2575 for more details

Geographical Information Systems (GIS)

Geographical Information Systems (GIS) is a type of computer system that can capture, store, analyze and display information geographically, or according to location. GIS allows users to view multiple layers of geographical-based data such as roads, topography, and wetlands at one time. "The power of a GIS comes from the ability to relate different information in a spatial context and to reach a conclusion about this relationship" (U.S. Geological Survey [USGS], December 2005). GIS also allows the user to "point" at an area, location or object on the computer screen and retrieve recorded information about it from off screen files.

The way maps and other data have been stored or filed as layers of information in a GIS makes it possible to perform complex analyses. For example, GIS can be used to analyze NWI maps, USGS topographic maps, and soil maps to produce a new map layer or overlay that ranks the wetlands according to certain criteria. GIS can therefore be a valuable tool to research large amounts of geographical data for large areas.

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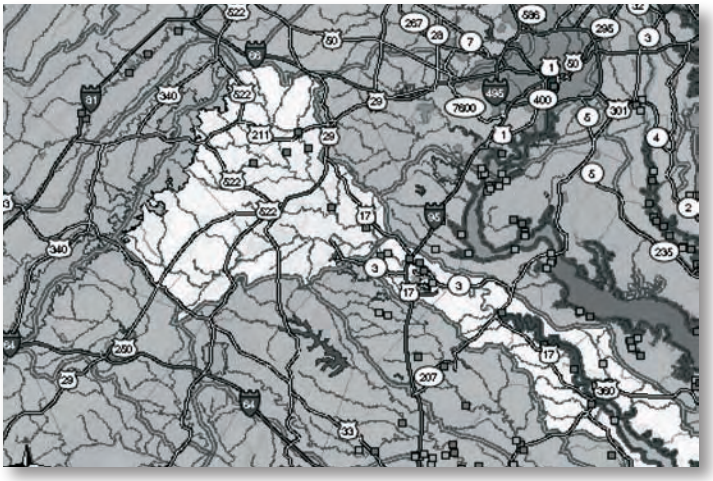
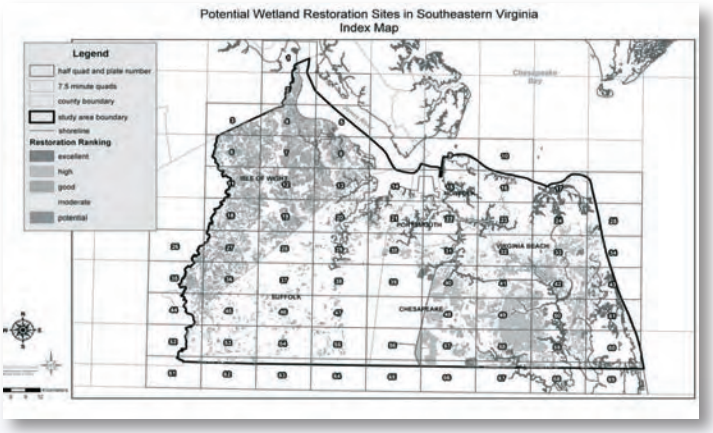
GIS requires viewing capabilities as well as digital data in GIS-based format. Until recently, this required expensive computer software and related computer skills. Recently however, online viewing of GIS-based data has become more available through web-based interactive programs on Federal, state, and private websites. To create your own GIS data, however, you will most likely need GIS-based still software and computer skills.

An active GIS market has resulted in lower costs and continual improvements in GIS hardware, software, and data. These developments will lead to a much wider application of the technology throughout government, business, and industry.

For more information on GIS, visit the USGS website at: http://erg.usgs.gov/isb/pubs/gis_poster/#what



Example of Towson CGIS' Watershed Mapper for the Rappahannock Watershed showing roads, water features and citizen-based water quality monitoring stations.



Wetlands mitigation/restoration targeting tool for Hampton Roads area.

Sources for Geographical Information Systems Assistance, Data and Online Viewers:

- **Local planning/zoning offices** – Geographical data layers with local information is often available for purchase or download
- **The Virginia Economic Development Partnership** – Digital data coverage of the 7 1/2 Minute Quadrangles for Virginia as well as many other GIS data layers, *for free:* http://gis.vedp.org/VEDPdatasets.html
- **Chesapeake Bay Program** – Variety of Chesapeake Bay watershed geographical resources are available for downloading: http://www.chesapeakebay.net/maps.htm. Interactive Mapping is also available as well as links to other sites with GIS data
- **Academic Institutions** –May be able to offer technical assistance for your project. Additionally, several have websites with online viewers containing many useful data layers and data layers that can be downloaded for free or for purchase
  - **Virginia Institutive of Marine Science (VIMS) Comprehensive Coastal Inventory Program** Online GIS Databases:
    - **GIS data links** available to support programs and activities which research, enhance, or implement policy related to shoreline management in Virginia: http://ccrm.vims.edu/gis/gisdata.html
    - **Wetlands mitigation/restoration targeting tool:** GIS and landscape practices to determine sites suitable for wetlands creation and restoration. Tool contains two components: *static maps* and an *interactive query system*. Currently, the model has been run for the Hampton Roads Area. VIMS plans to run the model statewide in the future. http://ccrm.vims.edu/cci/wet_target/
  - **Towson University (TU) Center for Geographical Informational Sciences (CGIS)** – GIS technical services, free easy to use viewing software, and interactive mapping for analysis and display of geographic information: http://chesapeake.towson.edu/.
    - Basic Interactive-mapping Viewer: http://chesapeake.towson.edu/mapping/simpleims.asp
    - Watershed Mapper – Provides watershed associations the ability to disseminate geographic information about their watershed over the Internet. This is accomplished through features such as a list of available data to view, a map window, and a number of basic GIS tools: http://chesapeake.towson.edu/mapping/watershedmapper.asp
- **The GIS Center at Radford University** – Several spatial data sources covering Virginia and surrounding states: http://www.radford.edu/~geoserve/main_page.html

Other Tools:

Several other tools may be useful when identifying potential sites for voluntary wetland activities, especially once you have narrowed down your search and are considering site characteristics such as the presence or absence of threatened and endangered species, cultural resources, or the likelihood of environmental contamination.

- **DGIF's Virginia Fish and Wildlife Information Service (VAFWIS)** – Online database containing current and comprehensive information about Virginia's Wildlife resources, including wildlife species observations, threatened or endangered species locations, and cold water (trout) stream surveys. Also available as GIS data layers: http://vafwis.org/WIS/ASP/default.asp
- **Virginia Natural Heritage Program's (NHP's) Online information of Virginia's Natural Communities, Rare, Threatened and Endangered Animals and Plants** – On-line database allows for queries to find information on Virginia's 1600+ natural heritage resources. Queries can be run for categories such as species/natural areas, counties, physiographic regions, and others: http://www.dcr.virginia.gov/dnh/nhrinfo.htm
- **Virginia Department of Historic Resources (DHR)** – To determine historic, architectural, archaeological, and cultural resources that may exist on your site or on sites within the project vicinity. Organized by city and county, this collection of data is contained in files, reports and maps. For more information, contact DHR's Archivist at (804) 367-2323 ext. 124 or: http://www.dhr.virginia.gov/archives/archiv_info.htm
- **Environmental databases** –A number of environmental databases are available for identifying the potential risk of contamination at or in the vicinity of your site. Examples include:
  - **Toxic Release Inventory (TRI)** – database containing information of releases and transfers of toxic chemicals from facilities in certain industrial sectors, including manufacturing, waste handling, mining, and electricity generation.
  - **Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS)** – database containing information on hazardous waste sites, site inspections, preliminary assessments and remedial status.
  - **Obtaining Environmental Databases** – many are available online *for free*. Custom database searches can also be provided by a number of commercial businesses *for purchase*:
    - **EPA Envirofacts:** online access to select EPA environmental data *for free*: http://www.epa.gov/enviro/
    - **The Right-to-Know Network** – provides *free access* to numerous environmental databases: http://www.rtknet.org/
- **Tax Maps** – Available at County/City Tax Assessor's office

Getting Help – Resources for Financial and Technical Assistance

"Asking is the beginning of receiving." ~ Jim Robins

You are not alone when it comes to voluntary wetland activities. Help is out there!

In fact, unless you are a wetland professional, it is highly recommended to recruit technical assistance for your project in order for it to most likely be successful. This ToolKit chapter is intended to provide basic information in table format at-a-glance as well as contacts for further more detailed information. Four tables are included: Grants and Foundations; Cost Share Programs; Preservation Assistance; and Technical Assistance for Wetland Enhancement, Restoration or Creation.

Grants and Foundations

The Grants and Foundations table lists environmental **grant** and **foundation** funding programs. Many of these listings are not specific to Virginia or to voluntary wetland activities; however, all of these listings have funded such projects in the past. Eligible recipients vary but generally include nonprofit organizations and often local or state agencies. More information can be obtained by visiting the agency's website or by contacting them by phone or in person.

A special note about matching funds

Please be aware that some grants require **matching funds**, often referred to as *match* or **cost share**. Match is the amount of money that the applicant organization or partners are prepared to spend on the project. These contributions can be in the form of cash (cash outlay), **in-kind contributions**, or donated goods and services. Each **grantor** has different match requirements and different restrictions on allowable match.

Other helpful information about grants:

- **Catalog of Federal Funding Sources for Watershed Protection** – online database allows you to perform tailored queries for financial assistance sources (grants, loans, cost-sharing) based on entered information about type of assistance, eligible organization type, match requirements and keywords: http://cfpub.epa.gov/fedfund/
- **Environmental Foundation Funding** – Centralized, web-based clearinghouse of foundation funding and resources. For environmental foundation funding: http://fdncenter.org/pnd/rfp/cat_environment.jhtml;jsessionid=FSF5E2TG0RSOYP5QALRSGXD5AAAACI2F
  - **Online tools for grant writing:**
    - **Grant Terminology, Grant Research and Writing Tips:** http://www.howard.k12.md.us/grants/Terminology.html
    - **Grant-writing tools for non-profit organizations:** http://www.npguides.org/
    - **EPA Grant-Writing Tutorial:** http://www.epa.gov/seahome/grants/src/grant.htm

Cost Share and Payment Programs

The Cost Share Table lists incentive-based programs geared to landowners, particularly agricultural, for voluntary wetland activities. Funding specifics vary with program and should be closely examined. Typically, the landowner's portion of the project cost is required upfront, with reimbursement after project completion.

Scenario of how cost share programs typically work:

Landowners contact technical or financial assistance organization. The organization determines if a suitable site exists on the property. Consultation with the landowner determines likely activities and a survey and project design are completed for the landowner to review and approve. The landowner signs the contract, and the necessary permits and clearances are obtained. The project is then constructed with partner oversight and the landowner is reimbursed for project expenses. (Virginia Wetlands Restoration Coordinating Committee, 2001).

Preservation Assistance

Land Trust Alliance lists just a few of the many agencies, organizations and programs in Virginia to assist private landowners with land preservation. To find a Land Trust organization in your area, visit the Land Trust Alliance's webpage for a listing of Virginia organizations at http://www.lta.org/findlandtrust/VA.htm.

Technical Assistance for Voluntary Wetland Enhancement, Restoration and Creation Projects

This table lists contact information for technical assistance for voluntary wetland activities within Virginia. Although most of these entities are also listed in the *Cost Share and Payment Programs* table for specific programs offered by these entities. These organizations are additionally listed within this section to emphasize the fact that even if they cannot offer financial assistance under a particular program, they can still oftentimes provide technical assistance. Many of these entities and programs are closely networked, meaning that if one entity is unable to assist with your project, they can likely place you under the assistance of another.

GRANTS & FOUNDATIONS				
NAME	CONTACT ORGANIZATION	GOALS	ELIGIBILITY REQUIREMENTS	WEB ADDRESS
Chesapeake Bay Restoration Fund (CBRF)	Virginia Division of Legislative Services	Environmental education, restoration and conservation of the Chesapeake Bay	State and local governments, nonprofit organization and academic institutions. Grants will not be awarded to individuals. Preferences will be given to environmental education and action-oriented conservation and restoration projects within Virginia's Chesapeake Bay watershed	http://dls.state.va.us/cbrfac.htm
Chesapeake Bay Small Watershed Grants Program	National Fish and Wildlife Foundation (NFWF)	To protect and improve watersheds in the Chesapeake Bay while building citizen-based resource stewardship	Non-profit organizations or local governments within Chesapeake Bay watershed. Individuals, state and Federal government agencies, and private for-profit firms are not eligible	http://www.nfwf.org/programs/chesapeake
Community-Based Restoration Program (CRP)	National Oceanographic and Atmospheric Administration (NOAA)	Grass-roots habitat restoration benefiting living marine resources	Institutes of higher education, hospitals, nonprofit organizations, commercial and international organizations, state/local/tribal governments	http://www.nmfs.noaa.gov/habitat/restoration/projects_programs/crp/index.html
Fish America Foundation	Fish America Foundation	On-the-ground habitat restoration benefiting fishery resources	Public and private organizations, local/state/tribal governments	http://www.fishamerica.org/faf/

GRANTS & FOUNDATIONS				
NAME	CONTACT ORGANIZATION	GOALS	ELIGIBILITY REQUIREMENTS	WEB ADDRESS
Five-Star Restoration Challenge Grants	EPA and NFWF	Community-based wetland, riparian, and coastal habitat restoration that builds diverse partnerships and fosters local natural resource stewardship	Any public or private entity	http://www.nfwf.org/programs/5star-rfp.cfm
Migratory Bird Conservancy (MBC) Grant Program	NFWF	Conservation of bird habitats including acquisition, restoration, and management	Private individuals, organizations, government entities	http://www.conservebirds.org/
National Fish and Wildlife Foundation – General Matching Grant Program	NFWF	Actions promoting fish and wildlife conservation and habitat conservation while involving and working with other conservation and community interests	Federal, state, and local governments, educational institutions, and nonprofit organizations	http://www.nfwf.org/guidelines.cfm
North American Fund for Environmental Cooperation Grants	North American Commission for Environmental Cooperation (NAFEC)	Projects must strengthen the capacity of citizens and communities to monitor aspects of their Environments that affect their own health.	Non-profit, non-governmental organizations in North America	http://www.cec.org/
North American Wetlands Conservation Act (NAWCA) Grants	US Fish and Wildlife Service (FWS)	Wetlands conservation projects that promote long-term conservation of North American wetland ecosystems that provide habitat for waterfowl and other migratory birds, fish and wildlife	Public or private, profit or nonprofit entities or individuals establishing public-private sector partnerships, in US, Canada, Mexico	http://www.fws.gov/birdhabitat/NAWCA/act.htm
Private Stewardship Grants Program	FWS	To benefit federally listed, proposed, or candidate species, or other at-risk species by providing grants and assistance to individuals and groups.	Private (non government) landowners and their partners – includes private landowners, individually or as a group as well as individuals or groups (for example land conservancies, community organizations, or conservation organizations) working with private landowners on conservation efforts are eligible to apply. State agencies are not eligible to apply	http://www.fws.gov/endangered/GRANTS/PRIVATE_STEWARDSHIP/

GRANTS & FOUNDATIONS				
NAME	CONTACT ORGANIZATION	GOALS	ELIGIBILITY REQUIREMENTS	WEB ADDRESS
Project AWARE Grants	Project AWARE Foundation	To support worthwhile aquatic conservation projects such as: public education; grass roots conservation and enhancement projects; research leading to conservation; public awareness initiatives; environmental assessment and monitoring projects; and volunteer-supported community activism	Individuals, organizations, government entities	http://www.projectaware.org/americas/english/grants.asp
Urban and Community Forestry Assistance Grants	USDA-FS / VDOF	To encourage projects that promote tree planting, the care of trees, the protection and enhancement of urban and community forest ecosystems, and education on tree issues in cities, towns and communities across the nation	State, local and regional governments, nonprofit organizations, neighborhood associations and civic groups, public educational institutions (college level) or Community Tree Volunteers	http://www.dof.virginia.gov/info/grants.shtm
Virginia Environmental Endowment (VEE) – Virginia Program and Mini-Grant Program	VEE	To improve the quality of the environment by using its capital to encourage all sectors to work together to prevent pollution, conserve natural resources, and promote environmental literacy	Virginia Program: nonprofit, tax-exempt, charitable organizations and institutions and governmental agencies Mini-Grant Program: Public and private schools (K-12) and nongovernmental, nonprofit community organizations local, state, and Federal government agencies and programs are not eligible	http://www.vee.org
Wetland Program Development Grant	EPA	Main funding priorities: (1) Developing a comprehensive wetland monitoring and assessment program; (2) improving the effectiveness of compensatory wetland mitigation; and (3) refining the protection of vulnerable wetlands and aquatic resources	States, Tribes, local governments, interstate associations, intertribal consortia, and national nonprofit, non-governmental organizations	http://www.epa.gov/owow/wetlands/grantguidelines/

COST SHARE PROGRAMS				
NAME	CONTACT ORGANIZATION	GOALS	ELIGIBILITY REQUIREMENTS	WEB ADDRESS
Conservation Enhancement Program (CREP) – Virginia	US Department of Agriculture – Farm Service Agency/ Natural Resources Conservation Service (USDA-FSA/ NRCS)	To encourage farmers and ranchers to remove lands from agricultural production in order to improve water quality and to treat environmentally sensitive areas through the establishment of forested streamside buffers, filter strips and the restoration of wetlands	Private agricultural landowners in Virginia's Chesapeake Bay watershed and eligible portions of Southern Rivers watersheds	http://www.dcr.virginia.gov/sw/crep.htm
Conservation Reserve Program (CRP) – Virginia	USDA-FSA/ NRCS	Water quality and habitat enhancement and Conversion of highly erodible land (HEL)	Private agricultural landowners; Privately owned, highly erodible cropland or environmentally sensitive acreage	http://www.fsa.usda.gov/pas/publications/facts/html/nonfloodwet04.htm
Cost-Share and Tax Credit for Virginia Agricultural Best Management Practices (BMPs)	Virginia Department of Conservation and Recreation (DCR) and Virginia Soil and Water Conservation Districts (SWCD)	To assist with the installation of conservation practices that protect water and make farms more productive	Farmers in designated priority watersheds within Virginia	www.dcr.virginia.gov/sw/costshar.htm
Ducks Unlimited (DU) Chesapeake Bay Wetland Restoration Program	DU	To provide funding and technical assistance for wetland restoration projects within the Chesapeake Bay watershed	Private landowners within Virginia's James, Rappahannock and Potomac (including Shenandoah) watersheds	http://www.ducks.org/
Forest Land Enhancement Program (FLEP)	USDA-Forestry Service (FS)	To keep private forestlands and natural resources productive and healthy	Non-industrial private forest owners, group associations, corporations, Indian tribes, or other legal, private entities	http://www.dof.virginia.gov/

COST SHARE PROGRAMS				
NAME	CONTACT ORGANIZATION	GOALS	ELIGIBILITY REQUIREMENTS	WEB ADDRESS
Partners for Fish and Wildlife – Virginia	FWS	To promote voluntary restoration of wetlands and streamside habitats through offering of technical and financial assistance	Private (non-Federal) and corporate landowners. Cost Share is currently available for only specific areas of VA and changes with internal funding levels. Contact FWS for more information.	http://www.fws.gov/partners/index.htm
Virginia Department of Game and Inland Fisheries Technical Landowner Assistance Program	Virginia Department of Game and Inland Fisheries (DGIF)	To provide assistance to undertake wetland restoration or habitat improvement and management projects	Private and public landowners	http://www.dgif.virginia.gov/index.asp
Wetland Reserve Program (WRP)	USDA - NRCS	Provides technical and financial assistance to eligible landowners to restore, enhance and protect wetlands. The goal is to restore degraded wetlands to “natural” conditions. In eastern VA, focus is on groundwater dependent hardwood forested wetlands. In mountain region, focus is on spring seep and herbaceous/shrub wetlands	Private agricultural land (including Tribal)	http://www.nrcs.usda.gov/programs/wrp
Wildlife Habitat Incentive Program (WHIP)	USDA-NRCS	To encourage the creation or restoration of high quality fish and wildlife habitats primarily on private land. Allows for the development and protection of upland, wetland, riparian, and aquatic habitat areas. Offering of technical and financial assistance	Private landowners (including Tribal); State and local government on a limited basis	http://www.nrcs.usda.gov/programs/whip/

LAND CONSERVATION PROGRAMS				
NAME	CONTACT ORGANIZATION	GOALS	ELIGIBILITY REQUIREMENTS	WEB ADDRESS
Land Conservation Program	Piedmont Environmental Council (PEC)	Provides assistance to landowners to undertake land conservation measures and to encourage the placement of conservation easements	Private landowners in certain counties of the Piedmont Region in Virginia	www.pecva.org
Land Trust Alliance	Land Trust Alliance (LTA)	Provides resources to promote voluntary land conservation and strengthen the land trust movement by providing the leadership, information, skills and resources land trusts need to conserve land for the benefit of communities and natural systems	National organization-provides technical assistance through resources	www.lta.org
Land Trust of Virginia	Land Trust of Virginia	Provides assistance to landowners with conservation easements	Statewide	http://www.landtrustva.org/
Office of Land Conservation	Virginia Department of Conservation and Recreation		State agency	http://www.dcr.virginia.gov/olc/
Open Space Lands Preservation Trust Fund	Virginia Outdoors Foundation (VOF)	Preserve farmland, forestland, and natural and recreational areas by restricting intensive uses	Individual landowners in VA	http://www.virginiaoutdoorsfoundation.org/
Orange County Conservation Fund	Piedmont Environmental Council (PEC)	Protect lands threatened by sprawl development	Private landowners in certain parts of Orange County	www.pecva.org

TECHNICAL ASSISTANCE FOR WETLAND ENHANCEMENT, RESTORATION OR CREATION				
NAME	CONTACT ORGANIZATION	CONTACT ORGANIZATION	ELIGIBILITY REQUIREMENTS	WEB ADDRESS
	Chesapeake Bay Foundation (CBF)	Libby Norris Virginia Watershed Restoration Specialist Virginia State Office 1108 East Main Street, Suite 1600 Richmond, VA 23219 (804) 780-1392 lnorris@cbf.org	Private or public landowners within Virginia's Chesapeake Bay watershed	http://www.cbf.org
	Chesapeake Wildlife Heritage (CWH)	Austin Jamison Old Three Notch Road Charlottesville, VA 22901 (804) 825-7587 ajamison@cheswildlife.org	Private or public landowners within Virginia's Chesapeake Bay watershed	http://www.cheswildlife.org
Chesapeake Care Program	Ducks Unlimited, Inc.	Grace Bottitta Great Lakes Atlantic Region Mid Atlantic Field Office 34 Defense Street, Suite 200 Annapolis, MD 21401 (410) 224-6620 gbottitta@ducks.org	Private landowners within Virginia's James, Rappahannock and Potomac (including Shenandoah) watersheds	www.ducks.org
Partners for Wildlife	U.S. Fish and Wildlife Service (FWS) Partners for Fish and Wildlife	6669 Short Lane Gloucester, VA 23061 (804) 693-6694 David Byrd – ext 133, or Willard Smith – ext 124	Private (non-Federal) landowners. Technical assistance is currently available for wetlands in Rappahannock, Roanoke, and Back Bay Watersheds, and on the Eastern Shore of Virginia. Technical assistance is currently available for streams in the Rappahannock, Shenandoah Valley, and Upper Tennessee Watersheds, and on the Eastern Shore of Virginia	http://www.fws.gov/partners/index.htm
Private Landowner Technical Assistance	Virginia Department of Game and Inland Fisheries (DGIF)	David Norris Williamsburg Regional Office 5806 Moore Town Road Williamsburg, VA 23188 (757) 253-7072 dnorris@dgif.state.va.us	Private and public landowners. Will provide technical assistance, including project design, even if landowner does not enroll in program with DGIF	http://www.dgif.virginia.gov/index.asp

TECHNICAL ASSISTANCE FOR WETLAND ENHANCEMENT, RESTORATION OR CREATION				
NAME	CONTACT ORGANIZATION	CONTACT ORGANIZATION	ELIGIBILITY REQUIREMENTS	WEB ADDRESS
Rivers, Trails and Conservation Assistance Program	National Park System (NPS)	Wink Hastings Chesapeake Bay Program Field Office (410) 267-5747 Hastings.Wink@epamail.epa.gov, or Ursula Lemanski Potomac Field Office (304) 535-4018 Ursula_lemanski@nps.gov	Community groups, State and local governments working to conserve rivers, preserve open space, and develop trails and greenways	http://www.nps.gov/rtca/
Wetland Reserve Program and cost share programs	Natural Resources Conservation Service	John Meyers WRP Program Manager 1606 Santa Rosa Road, Suite 209 Richmond, VA 23229-5014 John.myers@va.usda.gov 804-287-1668	Provides technical assistance for private and public landowners who want to undertake riparian, wetland or grassland activities	http://www.nrcs.usda.gov/programs/wrp

Wetland Permitting and Delineations – Information for Voluntary Wetland Activities

"Better to ask for permission first than to ask for forgiveness later" ~unknown

Introduction to Permitting

Why do I need a permit? Even though your voluntary wetland activity – be it preservation, enhancement restoration, or creation – is for the purpose of benefiting the environment, it is quite possible that your activity may have some impacts that will require a permit from government agencies. Many projects may require permits for activities associated with the project, such as disturbance of the land surface, crossing existing waterways, and melding with the existing habitat and land uses in the project area.

Examples of activities requiring permits include:

- Dredging (removing or relocating sediment from surface waters)
- Filling (adding material to the bottom of surface waters)
- Discharging any pollutant into or adjacent to surface waters
- Altering physical, chemical or biological properties of surface waters
- Activities causing significant damage to existing wetland acreage
- Land disturbance
- Vegetation disturbance in the Chesapeake Bay Preservation Area

Priest

Land Disturbance as part of excavation for tidal wetland restoration project

Begin Researching Permit Requirements Early!

As you plan a wetland project, an important step is to research and evaluate the types of permits you might need from local, state, and Federal agencies. This step should be conducted early in the planning process, as each agency has different requirements and time frames for issuing permits.

Two of the main resources to consider when planning a restoration project are the project's impacts to water and soil.

Impacts to water bodies, such as streams, wetlands, ponds, and lakes, may require permits from more than one local, state, or Federal agency. Impacts to the ground surface and soils, also referred to as **land disturbance**, may require permits from local and state agencies. The below sections discuss permits for these two types of impacts.

Partners may Provide Technical Assistance for Permitting Process

If a partnering organization, such as the CBF, DU, NRCS, DGIF or FWS, is taking the lead with your project, they most likely will take care of obtaining any necessary permits. It's always a good idea to confirm this is being taken care of by them and to find out the expiration dates of any permits that are required as well as steps to renew permits for the future.

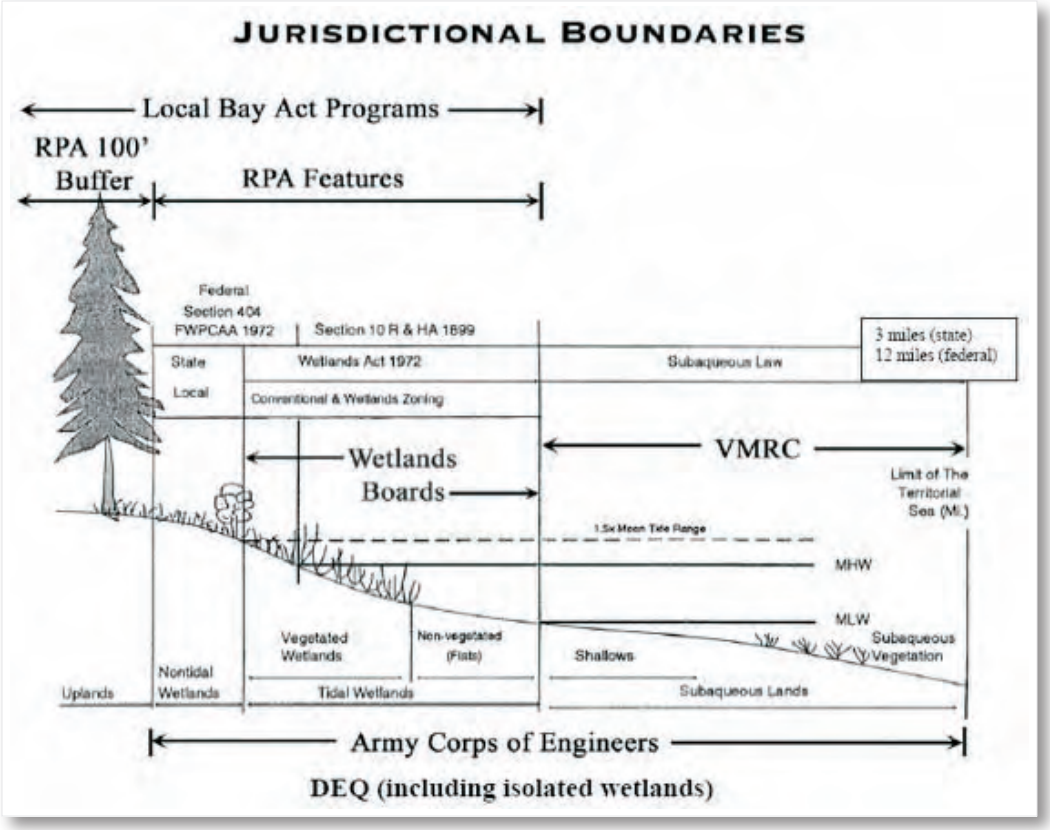


Diagram showing jurisdictional boundaries within Virginia for uplands, nontidal and tidal wetlands, and subaqueous lands. Source: Tidewater Joint Permit Application (JPA), available online at: http://www.nao.usace.army.mil/regulatory/webTidewaterJPA2004.pdf

Water Impacts – Typical Permits needed:

Joint Permit Process

The permit process for impacting tidal wetlands, nontidal wetlands and other water bodies including subaqueous lands begins with a Joint Permit Application (JPA). The JPA process was established to minimize duplication of permitting and to improve coordination and tracking of permits among the various state and Federal agencies. A JPA is submitted to the VMRC.

VMRC assigns a permit number and distributes the JPA to local wetlands boards, DEQ, and the Corps, which decide separately whether they need to issue a permit for the project. Each agency responds separately to the applicant (Association of State Wetland Mangers, 2005).

Several state resource agencies additionally provide specific information to the regulatory agencies on natural resources that may be impacted by the proposed project. Among these agencies are DGIF, DCR, CBLAD, Department of Health (VDH), and the Department of Agriculture and Consumer Services (DACS). Input is sought from these agencies through the each agency's internal permitting process. Permitting activities are also coordinated with these agencies during preliminary site visits (DEQ, August 2005).

Nation Wide Permit (NWP) 27

NWP 27 is the most likely permit required for voluntary wetland projects Typically issued by the Corps for enhancement, restoration and creation activities associated with streams and wetlands. NWP 27 is conditionally certified by the DEQ, meaning that if certain conditions are met by the applicant/permittee, then a separate permit is not required from DEQ. However, local permit requirements may still apply. A JPA is required to apply for coverage under the Corps' NWP 27. More information concerning NWPs, DEQ permits, and the permit process in general for wetlands and other waters is included in the following information.

Tidal Surface Waters and Wetlands, Subaqueous Lands and Coastal Primary Sand Dunes

- **VMRC, Division of Habitat Management** – has main regulatory authority. VMRC is the regulatory agency for impacts to subaqueous or bottom lands, tidal wetlands, and coastal primary sand dunes. More information about VMRC permit requirements can be found at http://www.mrc.state.va.us/regulations/hm-permits.shtm
    - **Local Wetlands Boards (LWB)** – LWBs are the main entity in the Tidewater region responsible for reviewing impacts to tidal wetlands, both vegetated and unvegetated. VMRC reviews decisions made by LWBs. In area within Tidewater where no LWB exists, VMRC is the main regulatory authority. Contact the planning and zoning office in the area of your project to find out if such a board has jurisdiction, or visit http://www.nao.usace.army.mil/Regulatory/wetlandsboard.htm for more information
- **Corps Nationwide or Regional Permits** – may also be required for impacts to subaqueous or bottom lands, tidal wetlands, and coastal primary sand dunes. More information about permits issued by the Corps – Norfolk District Office can be found at http://www.nao.usace.army.mil/
- **DEQ's Virginia Water Protection Permit (VWP) Program** – VWP permits required for tidal wetland projects only if 401 Certification is required. When a Corps nationwide or regional permit is issued in addition to a permit issued by VMRC, it is automatically conditionally certified by DEQ, meaning that if certain conditions are met by the applicant/permittee, a separate permit is not required from DEQ. If the conditions cannot be met, a separate permit may be required from DEQ.

TIDEWATER JPA – Tidewater JPA is an abbreviated version of the JPA for certain activities within the tidewater region. Activities eligible for a Tidewater JPA include:

- **Access-related activities**: piers, boathouses, boat ramps (without associated dredging or excavation), moorings, marinas, aquaculture facilities, etc.
- **Shoreline stabilization projects**: riprap revetments, marsh toe stabilization, bulkheads, breakwaters, beach nourishment, groins, jetties, etc.
- **Crossings over/ under tidal waters and wetlands**: bridges and utility lines (water, sewer, electric, etc.)

Nontidal surface waters and wetlands

If your project is nontidal, depending on the nature and size of the impacts, DEQ, the Corps, or both agencies will issue a permit. Impacts to nontidal subaqueous lands (i.e., impacts to stream bottoms) are still regulated by the VMRC. Depending on the details of the projects, most projects will qualify for either a Nationwide or Regional Permit from the Corps, and/or a General Permit from DEQ. When a proposed activity does not qualify for any of these more general permits, an individual permit from one or both agencies may be required.

- **DEQ VWP – General Permits** – Projects with less than 2 acres of surface water impacts will likely qualify for one or more of the four existing VWP General Permits. For more information on the types of VWP general permits, please visit http://www.deq.virginia.gov/wetlands/permitfees.html
- **Corps Nationwide or Regional Permit** – May be required for projects having minimal surface water impacts. DEQ has conditionally certified most NWPs and regional permits, meaning that if certain conditions are met by the applicant/permittee, a separate permit is not required from DEQ. If the conditions cannot be met, a separate permit may be required from DEQ. For more information on the types of Corps' Nationwide and Regional permits: http://www.nao.usace.army.mil/Regulatory/Regulatory.html

Compensatory Mitigation

If impacts to wetlands are unavoidable as a result of your voluntary creation, enhancement or restoration project, keep in mind that compensatory mitigation may be required for impacts to wetlands and surface waters. Compensatory mitigation may be as simple as restoring a stream crossing that was temporarily disturbed during the construction process area, or as complicated and costly as replacing a wetland impacted by your project.

Soil Impacts – Typical Permits needed:

In addition to water impacts, voluntary wetland projects may result in land disturbance and may require the following permits from local and state agencies.

- V**irginia Stormwater Management Program –DCR** is responsible for the issuance of Virginia Pollutant Discharge Elimination System (VPDES) permits, which apply to the control of stormwater discharges from land disturbing activities under the Virginia Stormwater Management Program. Projects requiring permits include land disturbance activities impacting an area of 1 acre or more in nontidal locations, or between 2,500 square feet and 1 acre in locations designated as Chesapeake Bay Preservation Areas. More information can be found at http://www.dcr.virginia.gov/sw/stormwat.htm
- **Erosion and Sediment Control Programs** – Any time land is disturbed above a certain area (square footage or acreage), permits are generally required from the local government to ensure that controls are in place to minimize sedimentation and erosion. Voluntary Wetland projects are not *typically exempt* from these programs. For more information about local requirements, contact the planning and zoning office for the area in which the project will occur.

Don't forget about the Bay Act in Tidewater Region

Projects involving land disturbance or removal of vegetation that are located in Chesapeake Bay Preservation Areas (Tidewater, VA) will require approval from local governments. For some localities, the LWB is the same entity that regulates the Bay Act, but don't assume this without checking with your local government.

A Note about Wetland Delineations

Step 1 – Confirming your site is a wetland

Section One (*What Makes it a Wetland?*) discusses simple ways to tell if your site is most likely a wetland. If you are pretty sure you have a wetland, it is still a good idea to have it confirmed by someone experienced in wetland identification. Section four (Getting More Help) lists several places to go for technical assistance, including the Corps, NRCS, and the DGIF, to name a few. If someone from one of these agencies is unable to visit your site (especially if you are under a tight timeline), they can point you in the right direction for further assistance.

Step 2 – Have wetland delineation performed

The process of determining the boundaries of a wetland area is termed a **wetland delineation** (Kellselheim & Slattery, 1995). Wetland delineations are used to determine "jurisdictional" wetlands based on the regulatory definition of a wetland used by the Corps, EPA and the DEQ (discussed in *Section One, What is a wetland?*).

Why is wetland delineation useful?

- Knowing the boundaries of your wetland area is useful, for simply the ease in studying and observing it
- If you want to put your wetland into some type of conservation easement or other protection, identifying your wetland boundary will be critical for legal purposes
- For any type of on-the-ground project, permits required for water impacts additionally require a Corps-approved wetland delineation

Who can perform wetland delineation and how does the Corps approve it?

The Norfolk District Corps office maintains a list of individuals and companies that offer professional delineation services. This list may be accessed by going to: http://www.nao.usace.army.mil/Regulatory/Agents/Wetland-Consultants.pdf

- As a word of caution, the consultant you select should be familiar with and utilize the current 1987 Corps Wetlands Delineation Manual and subsequent guidance, to perform wetlands delineations
- You may also want to ask the consultant if he or she is certified through the Virginia Board for Professional Soil Scientists and Wetland Professionals. This is a voluntary certification program and is not presently required to perform wetland delineations in Virginia

The consultant's findings should then be provided to the Corps in the form of a report. Once delineation has been performed, Corps staff will review the validity of the report and make a determination on the presence and extent of wetlands and other waters of the United States on the property.

Resources and Assistance to Learn More about Permitting:

DEQ regional offices – A map including the counties included in region: http://www.deq.virginia.gov/regions/homepage.html

Corps – The Norfolk District may be contacted at (757) 201-7652. To contact a local office: http://www.nao.usace.army.mil/map.htm

VMRC – A Map showing Habitat Division Territory Assignments: http://www.mrc.state.va.us/territory_assignments.shtm

A Guide to the Virginia Water Protection Permit Process, DEQ, June 2003: http://www.deq.virginia.gov/wetlands/pdf/guidevwpprocess.pdf. Note: this document should be used only as a general guideline, as the DEQ wetland/streams regulatory program has changed since the document's publication date.

Information pertaining to the VWP Program can be found at: http://www.deq.virginia.gov/wetlands/

A copy of the JPA can be found at: http://www.nao.usace.army.mil/Regulatory/JPA.html

In summary, remember to plan ahead! Include time in your project schedule to research permit needs, and include space in your budget for permit fees and compensatory mitigation, if required. Contact local, state, and Federal government agencies for direction on permit and compensation requirements for your project. Research agency web pages for further information. And, if your project design changes over the course of planning or construction, take time to re-evaluate the need for permits, additional permits, or modifications to the permits you already have.

Case Studies

Every day is Earth Day." ~Author Unknown

This chapter highlights voluntary wetland projects that have been funded through some of the financial resources or that have received technical assistance highlighted in the *Getting Help* chapter of this section. These projects vary in their size, scope and partnerships to provide some varied "blueprints" of how other efforts to preserve, enhance and restore wetlands in Virginia have evolved.

Environmental Law Institute: National Wetland Awards

The Environmental Law Institute (ELI) located in Washington D.C. has advanced dialogue on wetland law, science and policy since 1978. Annually, in partnership with the EPA, National Marine Fisheries Service, NRCS, FWS and the USDA Forest Service, they recognize individuals who have demonstrated innovation, effort, and excellence in wetland conservation, research and education through the National Wetlands Awards. Each year, ELI produces a summary of the National Wetlands Award winners including a brief bio and a description of the work they were nominated for. This is a great resource to glean inspiring ideas and to locate innovative people and projects in your area. To find out more about the National Wetlands Awards, visit the ELI web site at www.eli.org.

Bandy Field: The Little Engine That Could

Bandy Field Nature Park – This once threatened 18-acre green space, nestled within a suburban neighborhood in Richmond, is a grass roots success story. This is a story of citizens coming together and marching forward towards a common vision to saving an urban oasis from encroaching development and transforming it into a nature park for the pleasure and environmental education of all.

A group of local residents long recognized the conservation value of this open field and wanted to protect the area from ensuing development. In 1998, area residents began lobbying Richmond City Council to prevent the City from selling the area or developing the site. The slogan "Save Bandy Field" was spread throughout the neighborhood and Friends of Bandy Field (FOBF) was born. FOBF, led by Dr. Charles Price, a 9-member board, and many additional members and volunteers began their preservation efforts. Dedicated to the preservation and maintenance of Bandy Field, FOBF petitioned city officials and eventually succeeded in having the property designated as a public park. FOBF, working with an advisory board, started a trust to fund continue park maintenance.

In 2003, a project was undertaken in the park to enhance a mowed drainage swale in order to create a wetland. The objective was three fold: 1): improve water quality of Little Westham Creek, a tributary of the James River, 2): create wildlife habitat for amphibians, birds and other invertebrates, and 3): create an educational tool for the community. Under the guidance of environmental planner and FOBF volunteer Robert Wright, a project was developed to regrade the swale area, excavated a small vegetated catchment basin, and plant both areas with native plants to naturally filter surface runoff from a

Bandy Field before restoration

Bandy Field 5 months after restoration

portion of the field, woods, and adjacent parking area. The 800 sq feet habitat was designed to featuring four primary components: 1): an interior marsh like habitat established with emergent herbaceous plants, 2): a perimeter of shrub plants, 3): a reserved un-manicured planting area for future use as a wildflower meadow, and 4): a denser planting of shrubs toward the interior marsh.

FOBF partnered with the Alliance to coordinate a hands-on, volunteer day to plant the wetland habitat and to educate, empower, train and engage volunteers. City of Richmond staff performed the site excavation a few days prior to the volunteer day. Volunteers included FOBF members, area residents, Tuckahoe Garden Club, Boxwood Garden Club, Virginia Native Plant Society, local Boy Scouts, Sierra Club volunteers, and high school science club members. The project was funded through funds raised by FOCB and through the Alliance's RestoreCorps program, through a grant from the Chesapeake Bay Restoration Fund.

Other projects include the continued removal of invasive plants within other areas of the park and the replacement with native plants. Other planned projects include developing a butterfly habitat and creating woodland paths complete with native plant interpretive signage

Future environmental education plans for Bandy Field Nature Park include continuing to provide environmental education opportunities to local students and the larger community regarding wetlands and natural habitats. Plans include the installation of interpretive signage and maps to allow self guided tours, the development of educational printed materials, and offering the site for field trips for teachers and students. Volunteers will be trained to develop and conduct environmental programs for all ages. FOBF will partner with the City of Richmond's After School Program and the Henricopolis Soil and Water Conservation District.

In the words of Margaret Mead, "Never doubt that a small group of dedicated people can change the world, indeed, it's the only thing that ever has." Undoubtedly, FOBF has heard her cry for grass roots action and dedicated citizenship to enact environmental preservation and Bandy Field Nature Park is their living tapestry for all to enjoy.

For more information about Bandy Field Nature Park: www.bandyfield.com (available in Fall 2006) or call Dr. Charles Price at (804) 358-0256

Bandy Field Action Day

Bandy Field volunteers

Wetlands Estonoa Learning Center Project: Lasting Education for A Community

Team Estonoa – The town of St. Paul is located within the sparsely populated (population 1,000) County of Wise, in the southwest corner of the state. The community is nestled within the Clinch River valley, relying on the Clinch as its primary drinking water source. The karst geology of the valley means that it is particularly susceptible to ground-water contamination from overlying surface water area, making area wetlands critical for filtering and ground-water recharge functions.

In the spring of 1999, students enrolled in an ecology class from Saint Paul High School were assigned various projects. One student, Stevie Sabo, chose to do his project on a local, neglected waterbody known as Lake Estonoa. His project covered the lake's history, present condition, and his desire to see the lake restored. Another student, Nikki Buffalow, became interested in the project the following school year, and through her research, discovered the "lake" should actually be classified instead as a wetland. With the hope of better preserving "Lake" Estonoa, she began a quest to have it officially classified as a wetland. After successfully achieving this endeavor, interest began to grow within the school and surrounding community to restore the wetland.

Students from St. Paul's Appalachian Ecology and Physics classes led the restoration effort.. The students became known as "Team Estonoa" with a mission to protect and conserve the "Wetland Estonoa" in order to create a lasting educational venue for the community. Semester after semester with excitement and curiosity, the team continues to work on the Wetlands Estonoa Learning Center Project. Seeing the students' enthusiasm and dedication over the years, the Town of St. Paul has become an active partner in continuing to preserve and protect the wetlands.

During the past five years, Team Estonoa has developed various partnerships, pursued grant opportunities, and performed many hours of public outreach and maintenance. To date, the team has removed multiple truckloads of trash from the wetland, constructed an environmentally friendly walking path, footbridges, picnic tables, benches and a floating dock. The team has conducted wetlands workshops for area teachers, students and college groups. Over 100 groups have received presentations or have been hosted in some way by Team Estonoa.

Through the efforts of Team Estonoa, a beautiful learning center has recently been constructed adjacent to the wetland. Team Estonoa has already hosted over twenty groups in the newly completed center for environmental workshops and watershed meetings. The grounds around the center have been landscaped with native Appalachian flora, interpretive signs, and an observation area with seating. A rain garden has been installed to control stormwater runoff and to serve as a teaching tool, illustrating its value as a low impact method of storm water management.

The Team Estonoa project demonstrates how students and community members can be actively engaged to conserve and protect important resources like the Estonoa Wetlands. All it takes is that initial spark of enthusiasm and dedication to conserve our natural resources for generations to come — the stewardship and community involvement that results is infectious!

To learn more about Wetlands Estonoa : www.estonoa.org. To schedule a visit to Wetlands Estonoa contact Terry Vencil at (276) 762 0221.

Planning meeting

The dock at Wetlands Estonoa

Arial photo of Wetlands Estonoa

Wetlands Estonoa up close

The Oscar's Landing Wetland Project: An Urban Oasis

Oscar's Landing – Through the efforts of many partners, a neglected and degraded piece of land has been resorted into a functioning tidal wetland within the heart of an urban area. The Oscar's Landing Wetland was restored to enhance Jones Creek, a tributary of the Elizabeth River and the Southgate area of Chesapeake.

Since World War II, the Elizabeth River watershed has lost 50% of its crucial tidal wetlands. Oscar's Landing is part of "reversing the loss" and will naturally treat stormwater runoff from 250 acres of neighboring property. Additionally, the wetland improves the aesthetics of the neighborhood by providing a more natural habitat for native plants and animals, attracting migrating shorebirds, butterflies, and other aquatic species.

The Oscar's Landing Wetland project is a combined effort of the Elizabeth River Project (ERP) and the City of Chesapeake. The four-acre site has two sections: a conservation easement donated by Mr. Si-Jun Lee of Southgate Plaza Corporation to the ERP, and a wetland creation site owned by the City of Chesapeake. Placing this land under a "conservation easement" legally protects Oscar's Landing from future development and preserves this important natural resource. The property, once a borrow pit and landfill, was most recently the site of a go-kart track. Since the closure of the track, the site was littered with trash and other debris and had become infested with the invasive plant, Phragmites (Reed grass).

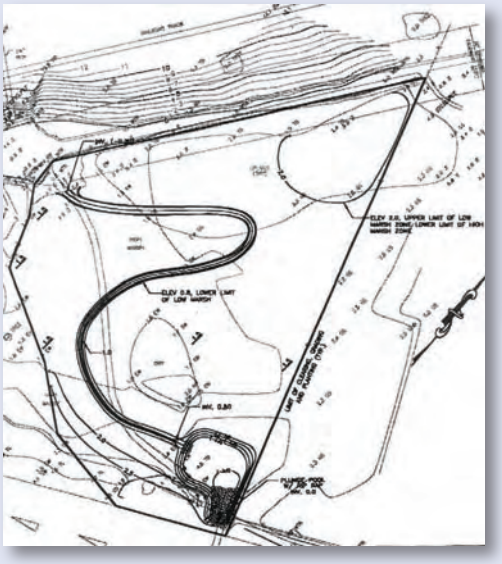
Many partners, including the ERP, the City of Chesapeake, Southgate Plaza Corporation, Oscar Smith Middle School, and the community of South Norfolk worked together to restore the "donated" portion of the site into a functioning tidal wetland. Restoration of the site required excavation of sediment in order to restore the tidal connection as well as to eradicate the Phragmites. VIMS was brought in to lead the project design. Excavation and grading of Oscar's Landing, performed by Whit Williams Inc., began in April 2002 and was completed in July 2002.

Following the excavation, ERP coordinated a volunteer event to plant native tidal wetland vegetation. Volunteers included the Women's Club of South Norfolk, local scouts, and many neighborhood citizens. The students of Oscar Smith Middle School have been ongoing stewards of this wetland restoration project. The children participated in a contest to name the wetland. In addition, students researched information on native plants and animals found in the wetland habitats displayed on educational markers places on the observation platform overlooking the site.

Funding for the donated portion of the wetland project was provided through a grant from the Virginia Department of Conservation and Recreation. The FWS and American Management Systems provided additional funding. Whit Williams Inc. provided assistance with construction costs. VIMS, Landmark Design Group, Old Dominion University, East Coast Hydrographic, Emerald Forest Consulting, Naturescapes Inc., as well as the Chesapeake Department of Public Works provided additional surveying and design support.

The Oscar's Landing Wetland Project will continue to serve as a lasting educational and environmental benefit to the community of South Norfolk and provides a beautiful oasis in the midst of the urban fabric.

For more information about Oscar's Landing Wetland Project contact the Elizabeth River Project at (757) 399- 7487 or www.elizabethriver.org



Restoration plan for Oscars Landing

Oscars Landing after planting

Oscars Landing after Spring 2003

Walter Priest ERP and donor

Chesapeake Bay Foundation and the U.S. Fish and Wildlife Service: Restoring Agricultural Wetlands

The Laurel Grove Tract Project – The Laurel Grove Tract is a 465-acre parcel located in Richmond County, in the Northern Neck region of Virginia. The project site is located along the banks of Farnham Creek and within one-half mile of the Rappahannock River and is part of the FWS's Eastern Virginia Rivers National Wildlife Refuge. The site consisted of 250-acres of mature, hardwood forest, 205-acres of open cropland, and an 11-acre, freshwater lake. The tract was purchased, restored and protected through the "Chesapeake Conservation Challenge," a unique partnership comprised of private business, Federal government, and nonprofit organizations. The partners included CBF, the Conservation Fund (TCF), a non-profit conservation organization based in DC, Bass Pro Shops, National Fish and Wildlife Foundation (NFWF), and the FWS. TCF negotiated with the landowner and purchased the property. When the farm became available, each of the five conservation partners, each assumed a role in the project that spanned from 2001 until 2004.

CBF, with major funding from The Bass Pro Shops and NFWF led the wetland restoration efforts. CBF worked closely with the FWS to provide the habitat and water quality benefits the refuge desired. After several options were discussed and evaluated, it was decided that restoring both the wetlands and reforesting the open fields would provide important habitat for interior forest birds.

Prior to any restoration work, the existing agricultural fields were planted in clover, to serve as a cover crop throughout the year. CBF worked with the current farmer to plant the clover and serve as a consultant on the project. His knowledge of the property and its history served a critical role in the project. To restore wetland hydrology, over 1500-feet of agricultural drainage tile was broken and ditches were plugged to restore approximately 50-acres of wetlands. The open fields were reforested using a mix of sixteen different native hardwood tree species. Volunteers planted the final acre of trees during a Public Field Day event in 2004, celebrating the project and its partnerships.

Since the completion of the Chesapeake Conservation Challenge project at Laurel Grove, the FWS and CBF have partnered on another innovative habitat tool. The "Acorns to Acres" project retrofitted a no-till planter to plant acorns, instead of corn. In 2005, with funding from NFWF, the pilot project planted four species of acorns across a 10-acre field located in the center of the Laurel Grove Tract. The resulting seedlings will be monitored for the next several years, and their growth and survivability will be compared with the tree seedlings planted as part of the Chesapeake Conservation Challenge project. This new conservation tool may offer landowners and agencies new options for planting hardwood trees in riparian buffers or reforestation projects.

For more information about the Laurel Grove Tract Project, contact Libby Norris with the Chesapeake Bay Foundation at Lnorris@cbf.org or 804.780.1392

Kids planting trees as part of CBF's Public Field Day

Standing water and emergent wetland at Laurel Grove