

## CHAPTER 7.7 WETLANDS ASSESSMENT and PROGRAM INITIATIVES

Wetlands are lands transitioning between terrestrial and deep-water habitats where the water table is usually at or near the land surface or where the land is covered by shallow water (Cowardin *et al.*, 1979). Virginia has many different types of wetlands ranging from salt marshes to freshwater swamps. Salt marshes include the extensive tidally influenced estuarine wetlands along the Chesapeake Bay that are characterized by predominantly herbaceous vegetation tolerant of brackish to salty water. Virginia's other tidal marshes are estuarine wetlands located along freshwater parts of tidal rivers. Interdunal swales occur in topographic depressions among sand dunes on the Atlantic coast that contain palustrine emergent or scrub-shrub wetlands. Virginia's Atlantic white cedar swamps, red maple swamps, cypress-tupelo swamps, and nontidal flood-plain forests are freshwater, non-tidal (also called "palustrine") forested wetlands that have seasonally occurring standing water and flood-tolerant trees. Pocosins, which occur in coastal Virginia, are freshwater, non-tidal scrub-shrub wetlands that are slightly elevated above the surrounding landscape and have flat topography and poor natural drainage. Virginia's bogs, fens, and wet meadows are freshwater, non-tidal emergent wetlands that are often underlain by organic soils.

Wetlands occupy approximately four percent of Virginia's land mass (Dahl, 1990). Based on the United States Fish and Wildlife Service National Wetlands Inventory mapping completed to date, vegetated palustrine wetlands cover approximately 1,075,443 acres of Virginia, and are by far the most abundant type of wetland in Virginia. Estuarine wetlands cover 190,996 acres, lacustrine wetlands 193 acres and riverine wetlands 380 acres (Hershner *et al.*, 2000). In addition, isolated wetlands (i.e. those wetlands occurring in depressions or fed by groundwater, with no surface water connection to other state waters) account for anywhere from 179,849 to 411,246 acres depending on the method used to estimate these areas (Hershner *et al.*, 2000). Virginia has completed geographic information system based (GIS) estimates of acreage of wetlands by watershed and wetland type which can be used in cumulative wetland impact assessment by hydrologic unit code (see Wetland Monitoring and Assessment section).

Virginia includes five physiographic provinces: the Coastal Plain, Piedmont, Blue Ridge, Valley and Ridge, and Appalachian Plateaus. Geologic features, landforms, and soils that directly affect the hydrology of wetlands characterize each province. Approximately 72 percent of the wetland areas in Virginia, including all the estuarine wetlands and most of the large nontidal palustrine wetlands, are in the Coastal Plain (Tiner and Finn, 1986). Extensive estuarine wetlands have developed in low-lying areas along the shores of the Chesapeake Bay and its tributaries and behind the barrier beaches of the Atlantic coast. Approximately 22 percent of the wetlands in Virginia are in the Piedmont, and the remaining 6 percent are in the Appalachian Plateau (Tiner and Finn, 1986; Harlow and LeCain, 1991). Palustrine wetlands are distributed throughout the State and are located primarily in bottomlands and in flood plains along stream channels, especially in headwater areas.

Virginia has experienced great losses of wetlands as a result of human-related development. In the 1780's, wetlands covered about 1,849,000 acres (more than 7 percent) of Virginia (Dahl, 1990). By the mid-1980's, when permits began to be required for most impacts to wetlands, about 1,075,000 wetland acres remained in Virginia – a loss of about 42 percent in 200 years (Dahl, 1990). Agriculture and forestry, industrial and urban development, and recreation have led to the draining, dredging and ditching, filling, diking and damming of wetlands in Virginia. According to a Chesapeake Bay Foundation fact sheet (2001), Virginia lost more than 770,000 acres of wetlands, for an average annual loss of 3,870 acres, during the 200-year period from the 1780s to the 1980s. From 1982 to 1989, Virginia lost more than 17,800 acres of its Chesapeake Bay watershed wetlands at an average annual loss of 2,500 acres. While the most recent data have not been finalized, most experts agree that significant annual wetland losses continued during the 1990s. Further, during 1998 and 1999, more than 2,500 additional acres of non-tidal wetlands in Virginia were ditched for development and unknown additional acreage of isolated wetlands were destroyed. From mid-1980 to the late 1990's, 80% of estimated losses of freshwater vegetated wetlands (mostly forested systems) occurred in the Coastal Plain. Wetland trends for the Norfolk/Hampton region of Virginia indicated a loss of about 4,800 acres of vegetated wetlands between 1982 and 1989-90 (Tiner and Foulis, 1994). The net loss of wetland areas has slowed since 2000 due to

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stricter laws, greater enforcement, and new mitigation strategies.

Table 7.7-1 depicts **permitted** wetland impacts with associated compensation by wetland type for 2008 through 2010 through the Virginia Water Protection Permit (VWPP) program.

**Table 7.7-1 VWP Permitted Wetland Impacts & Associated Compensation**

Wetland Type	Permitted Acreage			Totals	Compensated Acreage			Totals
	2008	2009	2010		2008	2009	2010	
Tidal Open Water	0.240	3.69	1.07	5.000	0.000	0	0.89	0.890
Tidal Emergent	1.470	0.01	0.34	1.820	1.230	0.01	0.34	1.580
Tidal Nonvegetated	0.030	0.19	0.22	0.440	0.010	0.04	0.22	0.270
<b>Subtotal</b>	<b>1.740</b>	<b>3.890</b>	<b>1.630</b>	<b>7.260</b>	<b>1.240</b>	<b>0.050</b>	<b>1.450</b>	<b>2.740</b>
Isolated, Non-tidal Emergent	0.247	1.09	0.42	1.757	0.300	0.72	2.32	3.340
Isolated, Non-tidal Scrub-Shrub	0.210	0.71	1.26	2.180	0.890	0.89	0.44	2.220
Isolated, Non-tidal Forested	5.108	4.56	0.17	9.838	9.535	4.01	0.18	13.725
<b>Subtotal</b>	<b>5.565</b>	<b>6.360</b>	<b>1.850</b>	<b>13.775</b>	<b>10.725</b>	<b>5.620</b>	<b>2.940</b>	<b>19.285</b>
Non-tidal Open Water	47.938	30.39	22.04	100.368	6.516	2.5	14.98	23.996
Non-tidal Emergent	39.813	24.14	19.26	83.213	46.272	23.18	22.51	91.962
Non-tidal Scrub-shrub	5.526	3.33	3.28	12.136	10.385	4.93	5.22	20.535
Non-tidal Forested	84.564	48.49	48.2	181.254	314.737	155.75	85.4	555.887
<b>Subtotal</b>	<b>177.841</b>	<b>106.350</b>	<b>92.780</b>	<b>376.971</b>	<b>377.910</b>	<b>186.360</b>	<b>128.110</b>	<b>692.380</b>
<b>Total</b>	<b>185.146</b>	<b>116.600</b>	<b>96.260</b>	<b>398.006</b>	<b>389.875</b>	<b>192.030</b>	<b>132.500</b>	<b>714.405</b>

## *Wetlands Definitions and Standards*

Wetlands may be defined in different ways with regard to jurisdictional issues, but all wetlands have in common a seasonal pattern of hydrology or continuous inundation, characteristic hydric soils, and vegetation adapted to growing under saturated condition. The Wetlands Act of 1972 (Title 62.1 of the Code of Virginia) defines tidal wetlands for the purposes of protecting the resource and regulating development. Under this definition, tidal wetlands are found in the 29 counties and 17 cities that comprise Tidewater, Virginia. Specifically, vegetated tidal wetlands are defined in the Act as "all land lying between and contiguous to mean low water and an elevation above mean low water equal to the factor 1.5 times the mean tide range at the site of the proposed project in the county, city or town in question," and on which are growing one or more of 37 specified species of wetlands vegetation. Non-vegetated wetlands are defined as all other lands between mean low water and mean high water. The Act does not include a definition for non-tidal wetlands. Further, it does not include all lands that are considered to be wetlands under the federal definition, seasonally tidal areas included. Although the Wetlands Act was initially limited to vegetated tidal wetlands, subsequent amendments included two discrete areas subject to wind tides along the North Landing River and Back Bay in southeastern Virginia.

The definition of wetlands contained in the DEQ's Virginia Water Protection Permit (VWPP) regulation (9 VAC 25-210-10 *et seq.*) in 2001 is as follows (and parallels the federal definition of wetlands contained in Section 404 of the Clean Water Act): "Wetlands mean those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support and, under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas." Wetlands are part of State Waters per Section 62.1-44.3 of the Code of Virginia. State Waters means "all water, on the surface and under the ground, wholly or partially within or bordering the Commonwealth or within its jurisdiction, including wetlands." Water quality standards for wetlands are the same as those water quality standards for other surface waters, per 9 VAC 25-260-10.A (*Designation of uses*) which states "all state waters, including wetlands, are designated for the following uses: recreational uses, e.g., swimming and boating; the propagation and growth of a balanced, indigenous population of aquatic life, including game fish, which might reasonably be expected to inhabit them; wildlife; and the production of edible and marketable natural resources, e.g., fish and shellfish. In particular, Virginia has "free from" narrative wetland criteria, numeric criteria based on EPA 304(a) criteria, fishable/swimmable designated use, and an antidegradation policy that is the same for all surface waters.

Virginia continues to develop a baseline data set, documenting current conditions and the general quality of wetlands throughout the state to determine whether existing wetland conditions are affecting wetland functions and values. Using a Geographic Information System (GIS), a baseline map has been developed by overlaying wetlands, as depicted on National Wetland Inventory (NWI) maps and other data sources listed previously, and a wetland quality indicator developed from the use of a stressor checklist tool and wetland landscape position. This information can be reported in the context of wetland types, land use, landscape position, or by watersheds, depending upon the information needed. Preliminary data and mapping has been uploaded to a web-access server, hosted by the Virginia Institute of Marine Science (VIMS). The format of these data will allow anyone to search the data base by several parameters. The preliminary data can be viewed at <http://ccrm.vims.edu/>. Refer to page 9 of this report in the Wetland Monitoring and Assessment section for further information.

As additional data are collected, Virginia will use this sequential survey information to look at changes in wetland quantity and quality over time. This temporal analysis will be accomplished by continuing to refine the wetland database with information on wetland losses and gains in each watershed using the permit tracking database, as well as periodically conducting wetland quality assessments in select watersheds to make inferences on wetland condition. This in turn will allow for management decisions to be made that could provide additional protections for watersheds experiencing significant declines in

wetland quantity and/or quality. For instance, monitoring information could be used to identify exceptional value wetlands that should have greater protection within the context of permitting programs. Conversely, degraded wetlands could be identified that would be good candidates for targeting wetland restoration projects.

State Water Control Law (SWCL) and VWPP Regulations require compensation for unavoidable, permanent impacts to surface waters, sufficient to achieve no net loss of existing wetland acreage and function and no net loss of function in all surface waters (See, § [62.1-44.15:21](#) and 9VAC25-210-116 (A)). Wetland monitoring data will be used in conjunction with other water monitoring data to evaluate the effectiveness of wetland protection programs in terms of meeting the goal of no net loss of wetland acreage and functions. This will be accomplished through Section 305(b) reporting, and will include a determination of whether the wetland regulatory program is attaining this goal. In addition, wetland monitoring information can be used within the context of the following programs to address additional management measures: Section 319 (nonpoint source control), Section 314 (Clean Lakes), Section 303(d) Total Maximum Daily Loads (TMDLs), Section 402 (NPDES permits), and water quality standards modifications.

### *Wetland Laws and Regulations*

Development activities in wetlands in Virginia are regulated by the U.S. Army Corps of Engineers (the Corps) through Section 404 of the Clean Water Act, the Department of Environmental Quality, through the VWPP program and Section 401 of the Clean Water Act; and the Virginia Marine Resources Commission (VMRC) and local Wetland Boards through the Virginia Tidal Wetlands Act of 1972.

- Tidal Wetlands Act

The Virginia Tidal Wetlands Act of 1972 is codified in Title 28.2, Chapter 13, Code of Virginia, and is administered by the VMRC. The Act authorizes local governments to establish local wetland boards that exercise jurisdiction and issue permits for wetlands development, subject to adoption of a model wetlands zoning ordinance. While most Tidewater localities have wetland boards, in those areas without boards permits for wetland development must be obtained from VMRC. The Commission reviews all decisions made by the local boards and has the authority to modify, remand, or reverse those decisions. The Act also requires that the Virginia Institute of Marine Science (VIMS) maintain an inventory of vegetated wetlands and provide advice and assistance to the VMRC on projects and on the development of wetland guidelines. The guidelines describe the values of each wetland community type and provide ranking according to the values.

- Chesapeake Bay Preservation Act

The Chesapeake Bay Preservation Act created the Chesapeake Bay Local Assistance Department (CBLAD), whose function is to protect water quality and the integrity of the Chesapeake Bay through the creation of Chesapeake Bay Preservation Areas (CBPAs). The Chesapeake Bay Preservation Act authority is administered by CBLAD through the Department of Conservation and Recreation (DCR). The CBPAs restrict development in tidal wetlands and nontidal wetlands contiguous to tidal wetlands or free-flowing permanent streams through the establishment of buffer zones. Each local government within Tidewater, Virginia has developed regulations and ordinances regarding development within CBPAs, and is responsible for program implementation under the oversight of DCR-CBLA. The implementation of the regulations of this Act relies on local governments.

- Virginia Water Protection Permit Program

The Virginia Water Protection Permit (VWPP) constitutes the state Water Quality Certification required under Section 401 of the Clean Water Act, as well as serving as an independent state wetland

program since 2000. Activities for which a water quality certificate are required include impacts to wetlands under Sections 402 and 404 of the Clean Water Act, Section 10 of the Rivers and Harbors Act of 1899, Federal Energy Regulatory Commission licensing, and other appropriate federal permits or licenses. The State Water Control Board may issue blanket Section 401 Certifications for classes of Corps of Engineers Nationwide and Regional Permits that have minimal environmental impact and meet the requirements of state law.

The VWPP Regulations (9 VAC 25-210 *et seq.*) define "surface waters", which are part of the definition of state waters, to include wetlands. This definition has closely followed the federal definition of "waters of the United States".

In 1996 and again in 1999, the Virginia General Assembly enacted legislation to encourage the use of Wetland Mitigation Banks. These "banks" were to be developed in accordance with federal guidance for the creation of wetland mitigation banks. Furthermore, the Virginia General Assembly enacted service area requirements for these banks that required any impacts compensated through the purchase of credits from the bank to be in the same or adjacent hydrologic unit within the same river watershed as the bank. The Great Dismal Swamp Wetland Mitigation Bank was the first bank in Virginia to be created subsequent to the issuance of Federal Guidance for the Establishment, Use, and Operation of Mitigation Banks (60 CFR 58605 *et seq.*). Refer to additional information regarding mitigation banking in the *2010 Status and Trends Report* section further down in this document.

In 2000, the Virginia General Assembly amended Section 62.1-44 of the Code of Virginia, relating to non-tidal wetlands, to establish and implement policies and programs to achieve no net loss of existing wetland acreage and functions. Additionally, the Section was amended to develop voluntary and incentive-based programs that achieve a net resource gain in acreage and functions of wetlands. The General Assembly actions removed the dependence of the VWPP program on the issuance of a Corps permit, thus enabling DEQ to regulate activities such as excavation in wetlands and fill in isolated wetlands, which are not currently under federal jurisdiction. The VWPP regulation (9 VAC 25-210-10 *et seq.*) was significantly revised to reflect these statutory changes, some of which became effective on July 2000, with complete implementation on October 1, 2001. A federal/state court case decided by the U.S. Fourth Circuit Court of Appeals in 2003 (*Treacy v. Newdunn Associates*, 4<sup>th</sup> Cir. Ct. 02-1480) upheld the Commonwealth's authority to regulate wetlands as "State Waters" independent of any federal wetland permitting action.

To date, DEQ has four Virginia Water Protection General Permits. Each General Permit has specific thresholds for use (1 acre for utility projects and 2 acres for transportation, development, and mining projects, plus a non-activity specific permit for impacts less than 1/2 acre) and compensatory mitigation requirements, with a 45 day review and issuance time frame upon receipt of a complete application.

Since first becoming a signatory state to the Chesapeake Bay Wetlands Policy in 1989, the Commonwealth of Virginia has remained committed to attaining a net gain in wetland acreage and functions within the Chesapeake Bay drainage. The General Assembly's actions in 2000 further confirm the Commonwealth's commitment to these goals, through establishing a statutory commitment to a net resource gain of non-tidal wetlands through voluntary programs. DEQ completed a grant from EPA in 2005 to educate the public on opportunities for voluntary wetland restoration projects and to coordinate reporting of voluntary wetland restoration projects being conducted by state and federal agencies and nonprofit groups in each Virginia watershed. The end product of the grant, an informational manual called *Restoring Virginia's Wetlands, A Citizen's Toolkit*, and can be found on DEQ's wetlands web page <http://www.deq.virginia.gov/Portals/0/DEQ/Water/WetlandsStreams/restoringvawetlandstoolkit.pdf>.

In addition to the regulatory agencies, several state resource agencies are involved in reviewing activities for which VWP permits are required. Among these agencies are the Department of Game and Inland Fisheries (DGIF), the Department of Conservation and Recreation (DCR), Department of Health (VDH), and the Department of Agriculture and Consumer Services (VDACS). Input is sought from these

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agencies through the permit application clearinghouse administered by the Virginia Marine Resources Commission (VMRC). Permitting activities are also coordinated with these agencies during cooperative site visits and periodic Joint Permit Application meetings sponsored by the Corps.

The Corps issued the State Programmatic General Permit (SPGP) in August 2002 and implementation began on November 1, 2002. The SPGP eliminates much of the duplication between the DEQ and the Corps permitting programs by allowing DEQ to issue the Corps-SPGP permit for certain smaller impacts. The modified SPGP became effective in 2007, and gave DEQ responsibility for initial screening of potential impacts to Federal threatened and endangered species. The Corps' 07-SPGP-01 authorizes the discharge of dredged or fill material impacting up to one acre of nontidal wetlands and 2,000 linear feet of nontidal waters of the United States associated with certain residential, commercial, and institutional developments and up to 1/3 acre nontidal waters of the United States for linear transportation projects within the geographical limits of the Commonwealth of Virginia under the regulatory jurisdiction of the Norfolk District Corps. In 2008, DEQ became responsible for screening for potential impacts to historic resources to address Section 106 of the National Historic Preservation Act. The 07-SPGP-01 requires compensatory mitigation to offset losses of aquatic functions and values. On April 10, 2008, the Federal Mitigation Rule (Rule) was issued by the Environmental Protection Agency (EPA) and U.S. Army Corps of Engineers (USACE) giving preference first to mitigation banks, second to in-lieu funds, and third to permittee responsible mitigation as compensatory mitigation for minor impacts to aquatic resources. As a result of the Rule, DEQ staff was directed under Guidance Memorandum 09-2004, to recognize the preference hierarchy presented in the Rule. The Corps is revising the 07-SPGP-01 to incorporate several business process efficiencies. The revised SPGP is expected to be implemented in Spring 2012.

To determine the effectiveness of the 07-SPGP-01 and to evaluate the extent of its cumulative impacts, DEQ committed to continuing the process of conducting an annual review, which was first initiated by the Corps. Generally, the resulting annual reports are for the period of September 1<sup>st</sup> through August 31<sup>st</sup> of every year. Previous annual reports for the SPGP-01 may be viewed on the Corps' web page at [http://www.nao.usace.army.mil/technical%20services/Regulatory%20branch/SPGP/SPGP\\_annual\\_report\\_s.asp](http://www.nao.usace.army.mil/technical%20services/Regulatory%20branch/SPGP/SPGP_annual_report_s.asp) The annual reports for 07-SPGP-01 may be viewed on the DEQ web page at <http://www.deq.virginia.gov/Programs/Water/WetlandsStreams/PermitsFeesRegulations.aspx>. The annual reports provide data on the type, number, and acreage of wetlands and linear footage of stream impacts requested and authorized, the mitigation required, and the geographic distribution of the authorized impacts. DEQ also provides the average number of calendar days between initial receipt of application and receipt of complete application, the approximate number of residential, commercial, or institutional activities; and the approximate number of linear transportation activities.

### *2010 Status and Trends Report*

This report summarizes trends in permitting, compensation, and compliance activities carried out by the DEQ Water Division's Office of Wetlands and Water Protection. This report includes data on total wetland, open water, and stream impacts from July 1, 2001 to December 31, 2010. During this period, 2,142 acres of wetland and open water impacts were authorized through VWP permits. These impacts were compensated through a combination of restoration, creation, enhancement or preservation of 7,602 acres of wetlands. In the same time frame, we reported 1,447,469 linear feet of permitted impacts to streams, and 2,713,529 linear feet of compensation through a combination of restoration, enhancement, or preservation. This report also provides maps of permitted surface water impacts and approved and proposed mitigation banks in the Commonwealth of Virginia. Figure 7.7-1 presents the annual number of permit applications received and permits issued by DEQ from 2001 to 2010.

**Figure 7.7-1 Number of Joint Permit Applications Received and Number of Permits Issued (Per Year 2001-2010).**

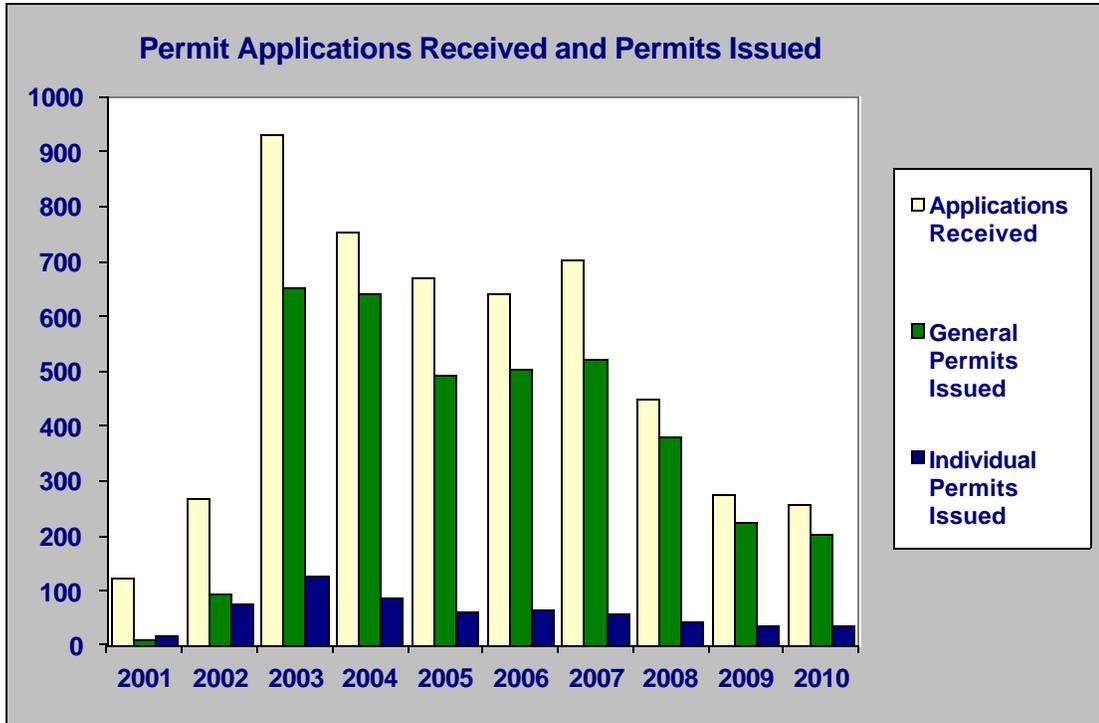
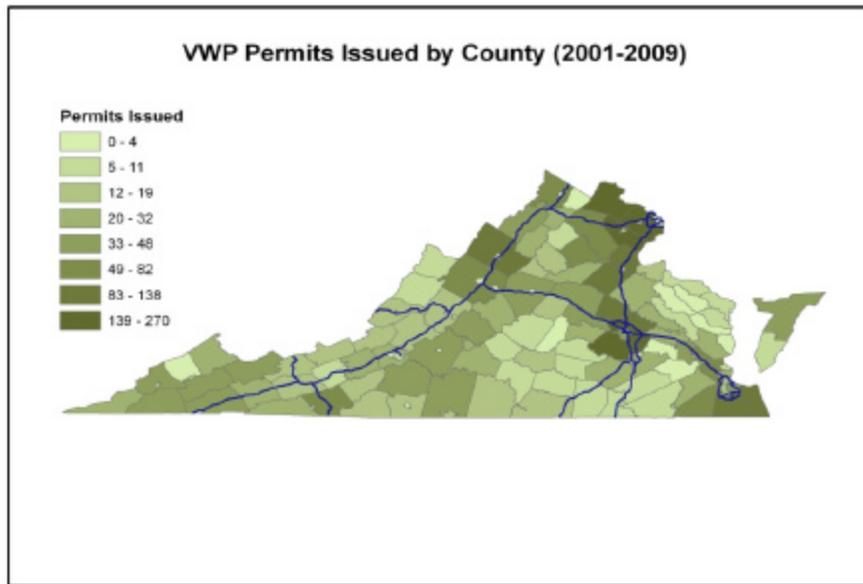


Figure 7.7- 2 shows the variation in number of VWPP permits issuances by county since 2001.

**Figure 7.7-2 Cumulative number of VWPP permits Issued from 2001 to 2009 for each county in Virginia.**



Surface water impacts and demand for permits vary from county to county. Demand for permits reflect proximity to Virginia’s population centers, as well as concentrations of surface waters. Additional factors influence VWPP permitting activity for specific locations. These include overall development pressure, amount of suitable uplands available for build out, and local demand for water-related recreation access.

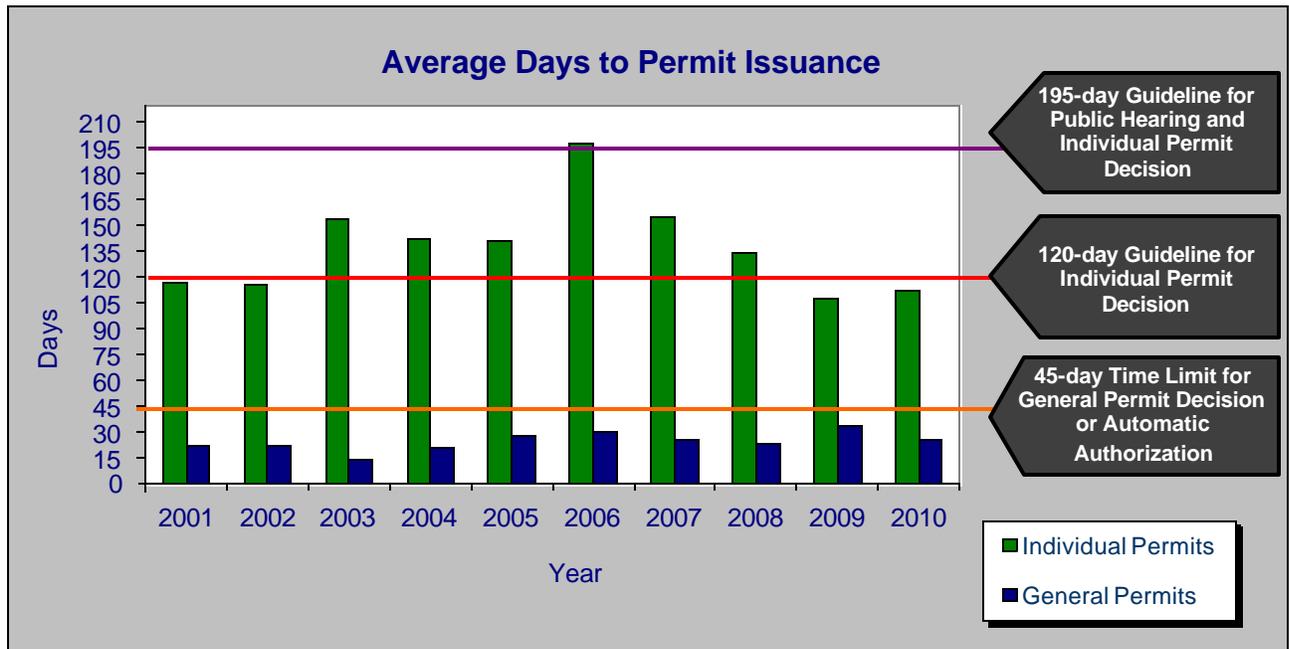
**Permit Efficiency** DEQ works to process needed permits as quickly and efficiently as possible. State law sets time limits for permit decisions, especially when impacts are considered to have minimal effect on human health and the environment. Table 7.7-2 presents the number of days of staff time allowed for certain permit actions.

**Table 7.7-2 Calendar days allowed for certain permitting activities.**

<b>Calendar Days</b>	<b>Permit Processing Activity</b>
15	Completeness Review of Applications
45	Permit Decision for General Permits or Automatic Issuance
120	Guideline for Time to Permit Decision for Individual Permits
195	Guideline for Public Hearing and Individual Permit Decision

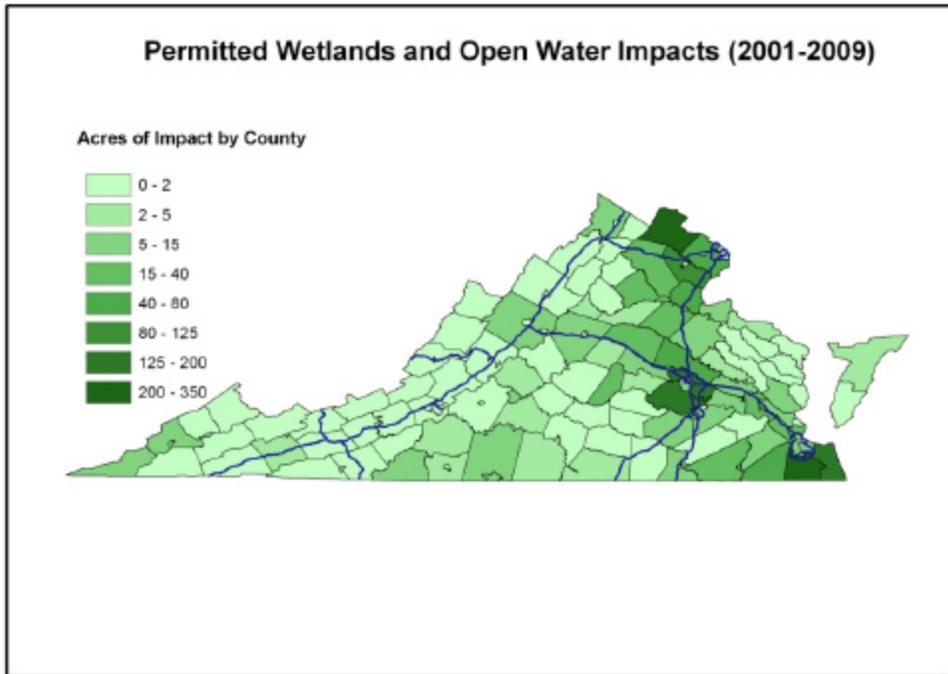
Figure 7.7-3 presents the average number of days taken to issue permits for the years 2001 through 2010. The 45-day line in orange and 120-day line in red show the time allowed to process general permits and individual permits. The 195-day line in purple shows additional time allowed for public hearings on individual permits, demonstrating that DEQ consistently meets these stringent permitting deadlines.

**Figure 7.7-3 Average number of days to issue Virginia Water Protection Permits. Lines indicate time allowances for permit actions.**



**Distribution of Impacts** DEQ authorized impacts to 2,142 acres of wetlands and open water, and 1,447,469 linear feet of streams from July 1, 2001 to December 31, 2010. Figure 7.7-4 presents the distribution of impacts by county and quantifies wetland and open water impacts in progressively darker shades of green. The development pressure in Northern Virginia, greater Richmond, and Tidewater is reflected in the larger amount of surface water impacts in these regions.

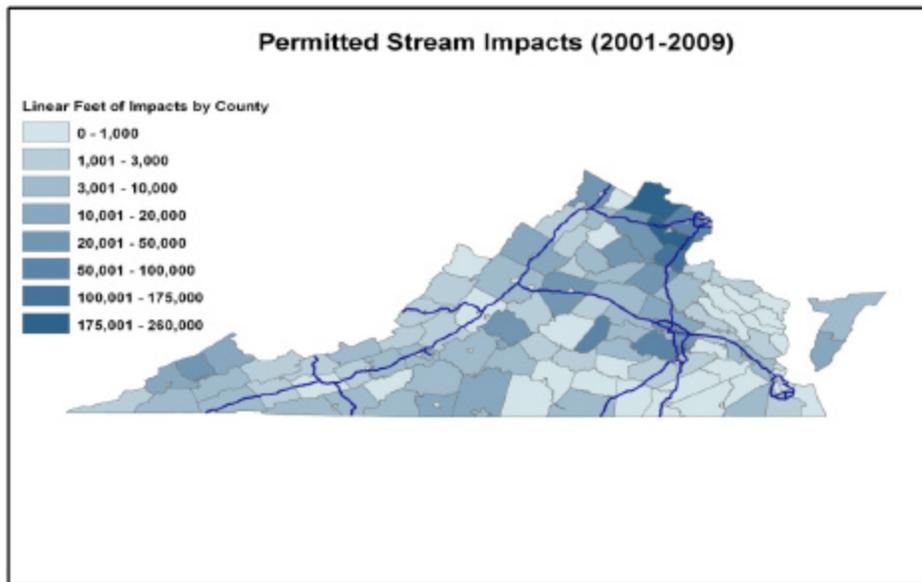
**Figure 7.7-4 Cumulative total wetland and open water impacts for counties in Virginia (2001-2009).**



Wetland impacts are particularly difficult to avoid in Tidewater as this area of the commonwealth has the highest proportion of wetlands to uplands. In general, wetlands become increasingly more common east of Interstate 95. Stream systems are the most common surface waters in Western and Northern Virginia.

Figure 7.7-5 presents the distribution of impacts by county and quantifies stream impacts in progressively darker shades of blue. The dark blue lines represent interstate highways. The stream impacts shown in Figure 7.7-5 again reflect the development pressure in Northern Virginia, and the greater Richmond area.

**Figure 7.7-5 Cumulative total stream impacts for counties in Virginia (2001-2009).**



The stream impacts shown in Figure 7.7-5 again reflect the development pressure in Northern Virginia, and the greater Richmond area.

### *No Net Loss of Surface Waters*

**Achieving “No Net Loss” of Wetlands, Streams and Open Water** State law requires wetlands, streams, and open water that are impacted through permits to be replaced such that the overall benefits to people, aquatic wildlife, and water quality remain unchanged. In other words, DEQ must require compensation for wetland, stream and open water impacts sufficient to ensure no-net-loss of wetland acreage and function as well as no-net-loss of function in all surface waters.

**Avoidance and Minimization** Many applicants avoid and minimize impacts to surface waters through careful project planning. In addition, DEQ staff frequently recommend building alternatives and request protection of avoided, or non-impacted, wetlands. For the period from 2001 to 2010, impacts to 76 acres of wetland and 79,254 feet of stream were avoided or minimized through permit review and subsequent changes to the originally proposed project design. For the same period, 3,129 acres of wetlands and 1,232,451 feet of stream were preserved as compensation on the project sites. By requiring preservation of wetlands and streams, DEQ is ensuring impacts to these surface waters will be avoided in the future.

**Compensation** Purchasing wetland mitigation bank credits, contributing to an in-lieu fee fund, or engaging in wetland creation or restoration, and/or stream restoration are methods commonly used to compensate for the loss of surface waters and aquatic resources. All compensation resources are required to be protected in perpetuity. On some sites, preservation of existing aquatic resources or upland buffers is acceptable to satisfy a portion of the compensation requirement. From July 1, 2001 to December 31, 2010 DEQ has required enhancement, restoration, creation, or preservation of over 2.71 million (2,713,529) linear feet of streambed, and 7,602 acres of wetlands and open water as compensation for surface water impacts. Figures 7.7-6 and 7.7-7 present total surface water impacts compensated through DEQ permitting.

Figure 7.7-6 Surface Water Impacts and Compensation (Per Year 2001-2010).

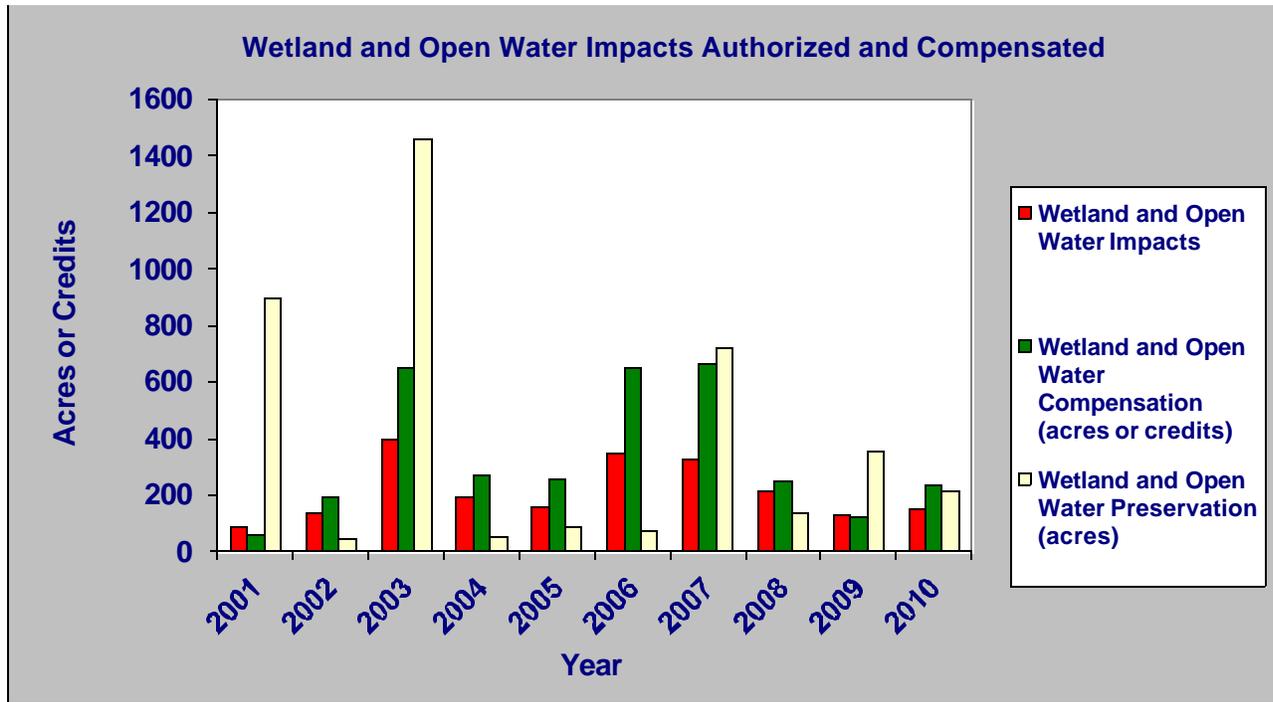
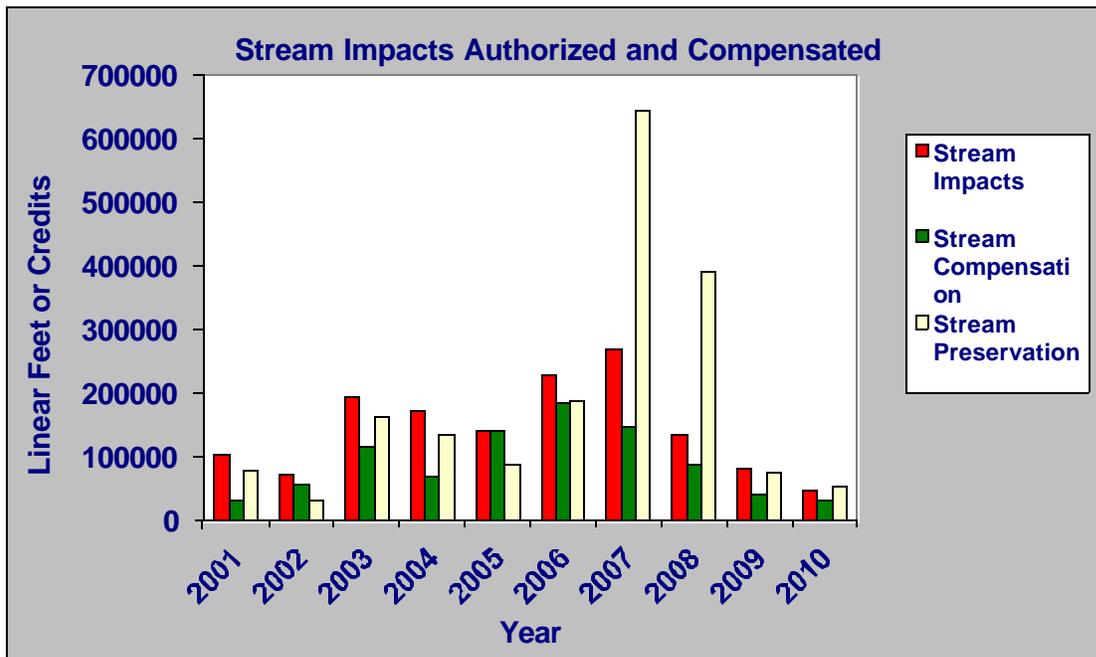
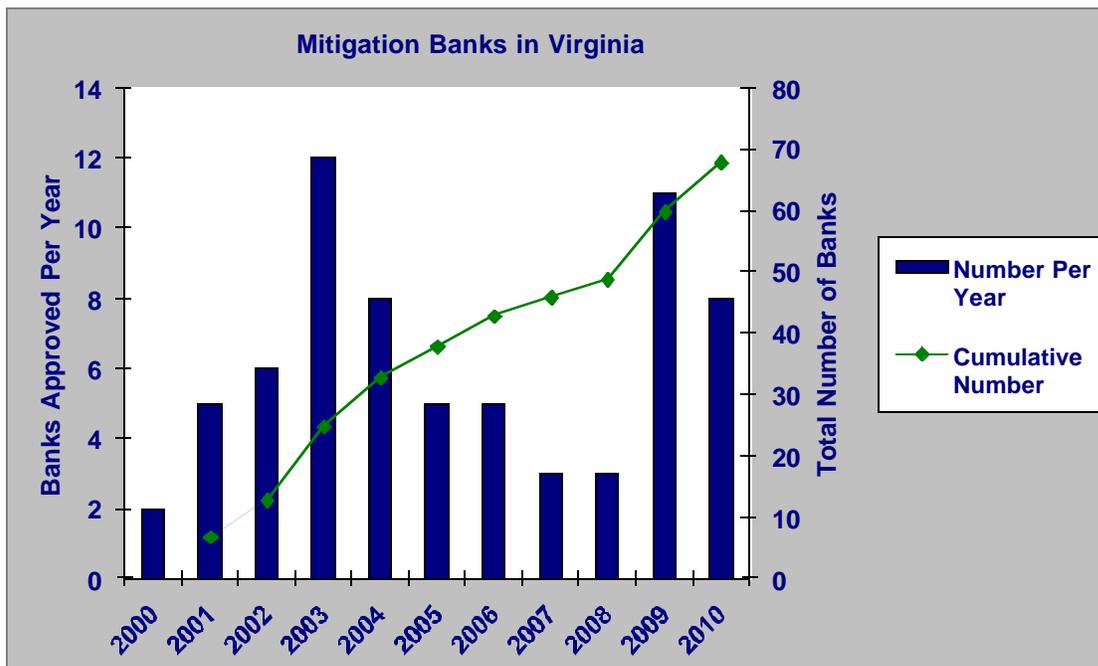


Figure 7.7-7 Surface Water Impacts and Compensation (Per Year 2001-2010).



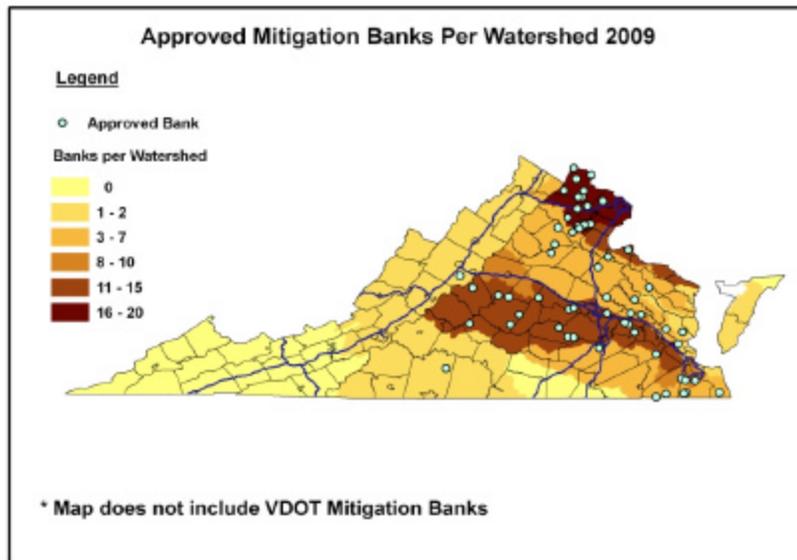
**Stream and Wetland Mitigation Banks** As of December 2010, Virginia has 68 operational mitigation banks. An additional 33 mitigation banks are proposed. Virginia accounts for approximately 10 percent of the mitigation banking activity nationwide. In Virginia and across the U.S. there is a trend toward a large scale, watershed approach for compensation. Mitigation banks provide such an ecologically preferable, watershed-based form of compensation. DEQ is the Co-Chair of the Interagency Review Team, which reviews and authorizes mitigation banks in Virginia. Figure 7.7-8 presents the number of mitigation banks approved per year and total number of banks in existence for each year from 2001 to 2010.

**Figure 7.7-8 Number of Mitigation Banks Approved per Year and Total Number of Mitigation Banks Approved.**



Mitigation banks tend to be more numerous in watersheds with the most permitted impacts. Figure 7.7-9 shows the location of active mitigation banks, and proposed banks nearing approval. The map does not depict mitigation banks operated by the Virginia Department of Transportation, nor proposed banks that are "inactive".

**Figure 7.7-9 USGS Hydrologic Units Color Coded to Represent Cumulative Number of Mitigation Banks Servicing the Watershed with Dots Showing Mitigation Bank Locations.**



**In-Lieu Fee Funds** An in-lieu fee fund is usually sponsored by a public natural resources agency or a non-governmental organization. The fund collects fees as compensatory mitigation for unavoidable impacts to wetland and stream resources. Next, the fund administrator uses the fees to find and restore sites in need of restoration and preservation. Virginia law states that DEQ has to approve these sites for use. There are currently two in-lieu fee funds operating in the Commonwealth of Virginia: the Living River Restoration Trust (LRRT) and the Virginia Aquatic Resources Trust Fund (VARTF).

The primary focus of the LRRT is compensation for impacts to tidal submerged lands and tidal wetlands within the Elizabeth River watershed.

The VARTF, Sponsored by The Nature Conservancy, has been used to mitigate for non-tidal wetland, tidal wetland, and stream impacts in the fourteen major river basins in Virginia since its inception in 1995. VARTF revised their Program Instrument, their contract with the government agencies, to comply with the 2008 Federal Mitigation Rule. The revisions were completed in July 2011. DEQ serves as Co-Chair of the VARTF Interagency Review Team.

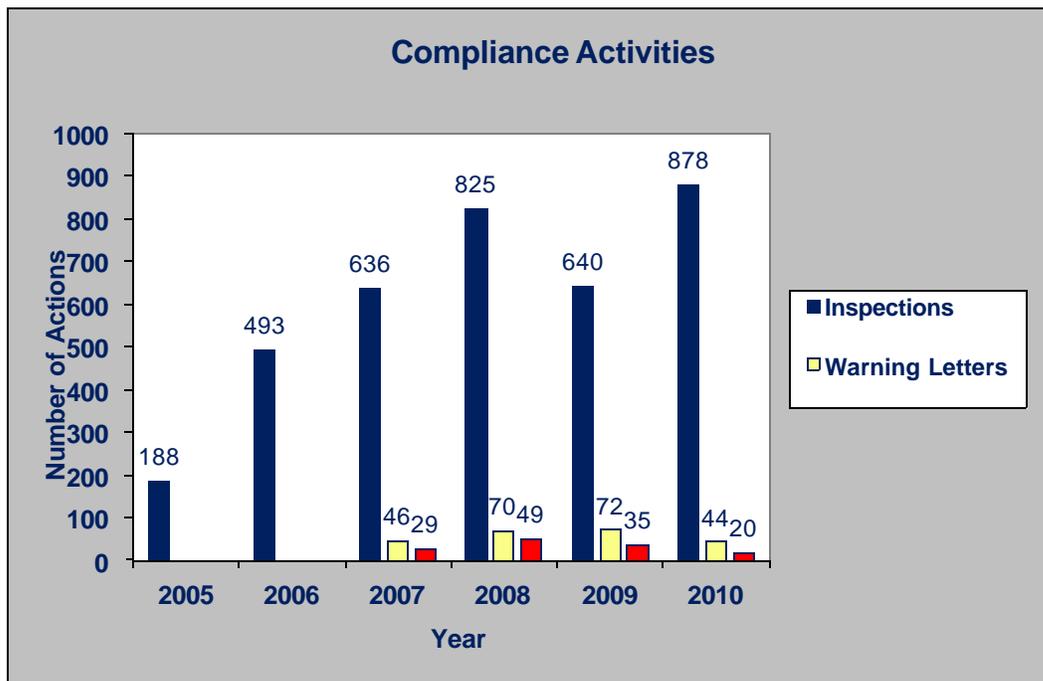
Annual reports from the in-lieu fee funds are available on the Office of Wetland and Water Protection website at <http://www.deq.virginia.gov/Programs/Water/WetlandsStreams/Mitigation.aspx>.

**Compliance** Compliance activities include inspections of permitted and unpermitted sites, and warning letters to notify persons when they are not in compliance with the State Water Control Law (SWCL) or the VWPP Regulation. Significant or on-going non-compliance can result in a notice of violation (NOV). The NOV also serves as a referral to the DEQ Division of Enforcement. In 2005, DEQ received a grant from the U.S. Environmental Protection Agency (EPA) to increase compliance inspections of surface water impacts and to explore use of a remote sensing program. Remote sensing uses satellite imagery to detect changes in surface waters and document unpermitted impacts. DEQ is in the process of

expanding the remote sensing effort to cover the entire state under an EPA grant received in October 2009.

Figure 7.7-10 presents the number of compliance inspections since initiation of the compliance grant and number of warning letters and NOV letters sent since 2007. While DEQ has performed site inspections and issued warning letters and NOV letters since inception of the program, prior to receiving the grant in 2005, DEQ did not track inspections in a database. DEQ started tracking warning letters and NOV letters in the database in 2007.

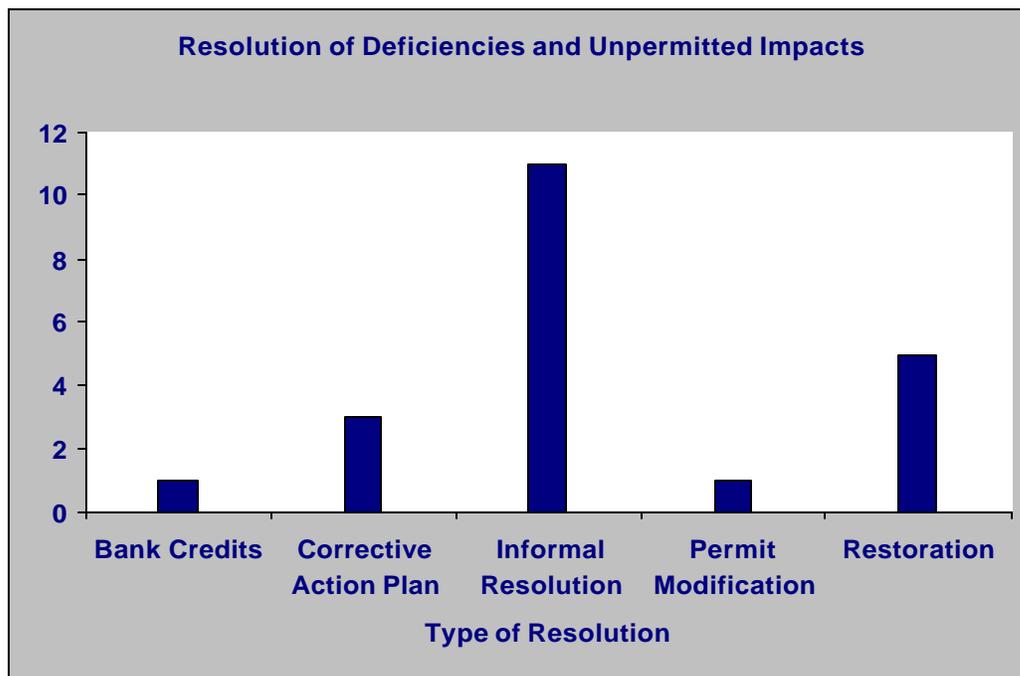
**Figure 7.7-10 Compliance Activity Tracked since the initiation of the EPA Compliance Grant.**



As depicted in Figure 7.7-10, most inspections do not result in issuance of a warning letter or notice of violation. The majority of inspections confirm that a project is in compliance with the permit or identify minor deficiencies that can be immediately corrected, known as informal resolution. Other outcomes include: corrective action plan, permit modification, restoration, or compensation for unauthorized impacts. A corrective action plan is a course of action to meet the permit requirements that may take months or years. A permit modification is used to address deficiencies that arise from unexpected site conditions or minor changes in a project plan. Restoration is required for unauthorized impacts that could be avoided. Compensation is required for deficiencies causing a permanent loss of surface waters.

Figure 7.7-11 shows the possible outcomes of inspections that identify deficiencies entailing unpermitted impacts.

**Figure 7.7-11 Resolutions for deficiencies identified from 22 inspections conducted December 1, 2007 to December 31, 2009.**



In a random sample of 22 inspections finding deficiencies, the resolutions included the following: one case where impacts were compensated using bank credits, three corrective action plans, 11 informal resolutions, one permit modification, and five resolutions resulting in restoration of unauthorized impacts. The one inspection that required the use of bank credits compensated for 30 feet of stream impact with 63 stream credits and 0.02 wetland credits. The five unauthorized impacts requiring restoration of 0.90 acres of wetland impact and 1000 linear feet of stream impact in total.

### *Synopsis of the 2010 Status and Trends Report*

The VWPP Program is meeting its statutory requirements to provide prompt permit decisions that protect water quality. General permits are consistently issued before the 45-day deadline and individual permits are issued before 270-day allowance for processing and public involvement. DEQ is meeting no-net-loss and continuing to facilitate compensation opportunities. From July 1, 2001 to December 31, 2010 impacts to an estimated 2305 acres of wetland and 1,311,705 feet of stream were avoided or minimized through permit review or approval of on-site preservation. Also from July 1, 2001 to December 31, 2010, unavoidable impacts to 2,142 acres of wetlands and open water were compensated with 7,602 acres of similar resources. In the same time frame, 1,447,469 linear feet of unavoidable stream impacts were compensated with 2,713,529 linear feet of stream. DEQ has thorough permitting procedures, compliance initiatives, established compensatory mitigation standards and methods, and significant efforts to monitor and assess Virginia's wetlands.

## *Wetland Monitoring and Assessment*

A key aspect of the Commonwealth of Virginia's nontidal wetlands program is ensuring that there is no net loss of wetland acreage and function through permitted impacts and a net gain in wetland resource through voluntary programs. To accomplish these goals, the VWPP program received grants from EPA in August 2003, October 2004, October 2006, October 2007 and October 2008 to determine the status of wetland resources in Virginia, in terms of location, extent, and overall quality of wetlands in each watershed. Using this information, the VWPP program can then track changes in wetland acreage and function, target certain watersheds and help determine the effectiveness of compensatory mitigation replacing lost wetland acreage and function. As a first step, Virginia has developed a long-term strategy for wetland monitoring and assessment, including the goals and objectives of a monitoring and assessment program and a time frame for implementation. This strategy will provide the ultimate framework for an ongoing assessment of the status of the Commonwealth's wetland resources and the success of both our wetland regulatory and voluntary programs. The end result of the 10 Year Wetland Monitoring and Assessment Strategy will be the incorporation of wetland monitoring and assessment data into the Commonwealth's water monitoring programs.

Virginia has narrative water quality standards for all surface waters, including wetlands. The overall water quality for state waters is assessed based on whether or not the condition of the waterbody being assessed permits citizens to safely enjoy the six designated uses of the water (aquatic life use, fish consumption use, swimming use, public water supply use, shellfish consumption use, and wildlife use), as described in the Virginia Water Quality Standards. Part of this wetland monitoring and assessment strategy will include the evaluation of these designated uses for their applicability to wetland condition as well as consider other designated uses of wetlands, with the possible goal of further developing specific wetland quality standards as narrative use criteria.

The VWPP program, in coordination with the overall DEQ water monitoring program, has developed a ten-year plan for wetland monitoring and assessment in Virginia (October 2005). EPA grants received since 2005 have been used to collect data in accordance with the 2005 Strategy. Based on the amount of data that has been collected since 2005, the Wetland Monitoring and Assessment Strategy is currently out of date. DEQ has recently been awarded a new EPA grant to update, in addition to continue development of, the Strategy. The development of this strategy followed the EPA March 2003 "Elements of a Wetland Monitoring and Assessment Program Checklist" and includes a discussion of the following elements:

- I. Monitoring Program Strategy
- II. Monitoring Objectives
- III. Monitoring Design
- IV. Core and Supplemental Water Quality Indicators
- V. Quality Assurance
- VI. Data Management
- VII. Data Analysis/Assessment
- VIII. Reporting
- IX. Programmatic Evaluation
- X. General Support and Infrastructure Planning

Additionally, the wetland monitoring and assessment strategy incorporates the EPA May 2006 "Application of Elements of a State Water Monitoring and Assessment Program for Wetlands" (a supplement to the 2003 EPA document).

The first step in developing such a plan was to clearly articulate the goals and objectives of the assessment and monitoring of wetlands in Virginia. Virginia's focus is to use data generated under this grant to conduct reporting on status and trends of wetlands as part of Virginia's 305(b) report and evaluating the effectiveness of regulatory and voluntary programs in meeting Virginia's mandate of no net

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loss of wetland resources through regulatory programs and a net resource gain through voluntary programs. Rather than focusing on intensive monitoring of the quality of wetlands for the purposes of setting numeric wetland quality standards, our strategy is to use a three-tiered census approach to wetlands assessment, using a suite of core and supplemental indicators, to assess whether or not a particular wetland is performing at a similar condition as an identified reference wetland. Since 2003, the overall wetland monitoring and assessment strategy has been to establish baseline conditions in various broad contexts, such as land use, watershed, and wetland type.

DEQ's monitoring objectives are designed to support regulatory decision-making, allow reporting of wetland condition, and provide information for policy development. In particular, information derived from monitoring will be used to:

1. Report ambient wetland conditions in Virginia's Clean Water Act (CWA) Integrated 305(b)/303(d) report;
2. Assist in the evaluation of environmental impacts to wetlands of proposed projects during permit review as part of Virginia's regulatory program, including an assessment of cumulative impacts to wetlands and water quality within a given watershed;
3. Evaluate the performance of wetland restoration and other compensatory wetland mitigation in replacing wetland acreage and function, including changes in wetland condition over time based upon surrounding landscape changes and maturity of the mitigation site; and
4. Evaluate the cumulative impacts of wetland loss and restoration in watersheds relative to ambient ecological conditions.

The elements of the wetland monitoring and assessment program are listed in Table 7.7-3 below.

<b>Table 7.7-3 Wetland Monitoring and Assessment Program Elements</b>	
Monitoring Strategy	<ol style="list-style-type: none"> <li>1. Establish baseline condition of nontidal wetlands by broad category scaleable from individual wetland to small watershed to physiographic province to entire State.</li> <li>2. Guide management decisions regarding restoration, compensation, and regulation of wetlands.</li> </ol>
Monitoring Objectives	<ol style="list-style-type: none"> <li>1. Support regulatory decision-making.</li> <li>2. Report wetland condition.</li> <li>3. Guide policy development.</li> <li>4. Evaluate cumulative impacts of wetland loss.</li> <li>5. Evaluate wetland restoration and compensatory mitigation effectiveness.</li> </ol>
Survey Design	<p>Three-Tiered: Sample Frame = all NWI wetlands</p> <ol style="list-style-type: none"> <li>1. Enhanced GIS analysis (census) – Level I (Model Development).</li> <li>2. Probability-based sampling for field assessment of anthropogenic stressors – Level II (Model Calibration).</li> <li>3. Intensive study of biological endpoints (birds, amphibians, water quality) along stressor gradient – Level III+ (Model Validation).</li> </ol>
Assessment Indicators and Methods	<ol style="list-style-type: none"> <li>1. Level I (Model Development): land use adjacent, within 200m, and within 1000m of wetland, wetland size, type, hydroperiod, proximity to other wetlands, road type, road density, and road alignment.</li> <li>2. Level II (Model Calibration): field assessment of anthropogenic stressors within 30m of wetland assessment point and within 100m of wetland assessment point.</li> <li>3. Level III (Model Validation): population and community structure metrics for birds and amphibians. Water quality modification metrics.</li> </ol>
Quality Assurance	An EPA-approved Quality Management Plan coupled with the VIMS' Quality Assurance Plan used to prevent random and systematic errors. Techniques

	include direct electronic field data assimilation to prevent transcription error as well as random return site visits and redundant QA assessment loops.
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The strategy continues to develop a complete wetland monitoring and quality assessment in Virginia's Coastal Plain, Piedmont, and Ridge and Valley physiographic provinces in Virginia. The long-term field assessment strategy is outlined in Table 7.7-4 below. Products from this strategy directly support Goal 4 of EPA's Strategic Plan to provide "...additional focus on assessment of wetland condition" and the National Priority of "wetlands monitoring and assessment".

Phase	Start/End	Assessment Activity	Status
Phase 1	Oct. 2003	Begin Level I assessment for Virginia.	Complete
	Dec. 2004	Begin Level II site assessment of Coastal Plain wetlands.	Complete
	Dec. 2005	Complete Level I assessment of Virginia, Complete Level II site assessment of Coastal Plain, Develop protocol for Level III assessment for Coastal Plain physiographic province.	Complete
Phase 2	Dec. 2005	Begin Level II site assessment of Piedmont physiographic province.	Complete
	Sept. 2007	Complete Level II site assessment of Piedmont. Begin Level III sampling for coastal plain sites.	Complete
Phase 3	Oct. 2007 – Sept. 2008	Complete enhanced wetland site selection for Ridge and Valley Level II site assessment using a protocol for probable wetlands location. Complete Level II site assessment for Ridge and Valley physiographic provinces. Continue Level III sampling for Coastal Plain.	Complete
Phase 4	Oct. 2008 – Sept 2010	Begin Level III (model validation) sampling for Piedmont, and Ridge and Valley. Begin Level II re-sample coastal plain subset for calibration.	Complete
Phase 5	Oct. 2010	Begin Level I re-sample of Virginia for trends analysis.	In progress
Phase 6	Oct 2010	Development of a Wetland Program Comprehensive Plan, refinement of our environmental database, and continued development of the wetlands monitoring and assessment program.	In progress
Phase 7	Oct 2011	Collaborate with VDOT to incorporate linear transportation projects into the wetland data viewer, potentially review and update the monitoring and assessment strategy to incorporate completed tasks and re-evaluate the direction of the strategy.	Future request

Virginia has begun application of a hierarchical suite of assessments that constitute a three level approach to wetlands sampling and analysis. Comprehensive coverage of all mapped wetlands is achieved with a GIS-based analysis of remotely sensed information (Level 1 analysis). These data are summarized on the basis of small watersheds or hydrologic units. It provides a first order evaluation of the condition and functional capacity of wetlands based on their landscape position.

The second level assessment (Level 2) is intended for use in a statistically selected sub-sample of the watershed wetland population (stressors within 30 and 30-100 meter radius) and involves a more sophisticated analysis of remotely sensed information and a site visit for verification and additional data collection. The third level assessment (Level 3) are designed to specifically evaluate performance of

functions in wetlands under varying degrees of stress, as indicated by the Levels I and II protocols. This field sampling will provide a direct measurement of each selected site's performance of habitat (avian and amphibian) and water quality functions and allow testing for correlations between ecological service and stressor levels. Avian and amphibian community structure and water quality function will be analyzed using the same methods of previous work (CCRM 2006; CCRM 2007).

The model validation (Level 3) for the Piedmont and Ridge & Valley physiographic provinces of Virginia has been sampled. The re-calibration of the Coastal Plain for wetland status and trends analysis has also been completed. Relative stressor frequency has remained similar in the coastal plain between 2004 and 2010 with some slight increases in eroding banks/slopes and sediment deposits/plumes but with a decrease in 2010 of potential non-point discharge toxics/nutrients.

Re-calibration of surrounding landcover and stressors shows that the landcover classes remain valid for condition assessment scoring. All landcover types identified in the earlier assessment as having significant relationship to the ecosystem endpoints of habitat and water quality continue to have significant relationships with the identified onsite stressors.

DEQ and VIMS staff have designed and implemented procedures to facilitate the routine application of inventory and monitoring data in permitting decisions. A web-based delivery of monitoring data and a prototype tool for assessment of wetlands that are not part of the NWI database has been developed. Both of these tools were designed to assist DEQ wetland project managers by providing desktop access to information on wetland resources throughout the Commonwealth. Additional work was needed to improve the user interface such that no further data processing is needed in order to develop evaluations of impact mitigation options, cumulative impacts, and compensation opportunities.

In order to generate the type of site specific guidance and recommendations that DEQ wetland project managers indicate would be most useful, we will develop and test some new analytical protocols modeled on procedures developed by VIMS under previous EPA grants. The goal was to deliver a project specific, web-based assessment of proposed impacts, their relevance in the local landscape, recommendations for mitigation goals, and opportunities for compensation. All of this information will be formatted to be directly applicable to the permit decision DEQ staff prepares. DEQ staff is currently testing the new protocols and modifications to refine the tool.

DEQ will continue to transfer data to the VIMS website for public use as the data are finalized. Information gathered from this project will be disseminated through the VIMS website, as well as newsletters and scientific meetings and forums. A pilot study that included input from state and federal personnel on the use of the wetland data viewer was conducted in 2011. We anticipate that these data may be used by local governments (for comprehensive planning process and zoning), regulatory agencies (for cumulative impact analysis), researchers (for developing new studies and research questions), and the general public (for wetland and watershed awareness). We also plan to investigate linkages to the recently launched USACE ORMS II GIS database.

The hierarchical nature of Virginia's wetland monitoring and assessment strategy allows for both general reporting on status and trends, as well as providing for more intense analysis of select watersheds for assessment of cumulative impacts to wetland condition and water quality. This assessment approach will generate data that will be used to conduct biannual reporting on status and trends of wetlands as part of Virginia's Integrated 305(b)/303(d) report, and to evaluate the effectiveness of regulatory and voluntary programs in meeting Virginia's mandate of no net loss of wetland resources through regulatory programs, and a net resource gain through voluntary programs. Further, our interactive database and Wetland Quality Status and Trends Report will provide the general public, resource agencies, land use planning entities, and conservation groups general information on the health and condition of the Commonwealth's wetland resources.

The following questions will be used to guide the performance measures for the wetland monitoring  
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program objectives:

1. What is the overall quality of wetlands in Virginia?
2. To what extent is wetland quality changing over time?
3. What are the wetland problem areas and areas needing protection?
4. What level of wetland protection is needed?
5. How effective are wetland programs in protecting the resource?

The additions of data sets and GIS layers will allow Virginia to continue to develop a GIS-based wetland data viewer for use by regulatory agencies and the general public (see Figures 7.7-12 and 7.7-13). Our success will be measured by an increasing trend in the statistically-reliable Level I protocol that is used by wetland managers to assess cumulative wetland impacts and wetland and watershed restoration opportunities. By having a statistically-validated tool that measures wetland quality as a function of habitat and water quality parameters, our permit staff will be able to make better permit decisions relative to potential cumulative impacts. Further, we will also be able to measure how well we are protecting the function of our more vulnerable wetlands (i.e. isolated wetlands, vernal pools, white cedar swamps), by comparing the condition of wetland habitat and water quality parameters, as a function of the assessment scoring over time. The overall outcome of this continued focus on wetland monitoring and assessment will be better protection of wetlands and more definitive and defensible information on wetland condition over time, and documentation of how we are achieving no net loss of wetland acreage and function in Virginia.

Figure 7.7-12. GIS-based Wetland data viewer.

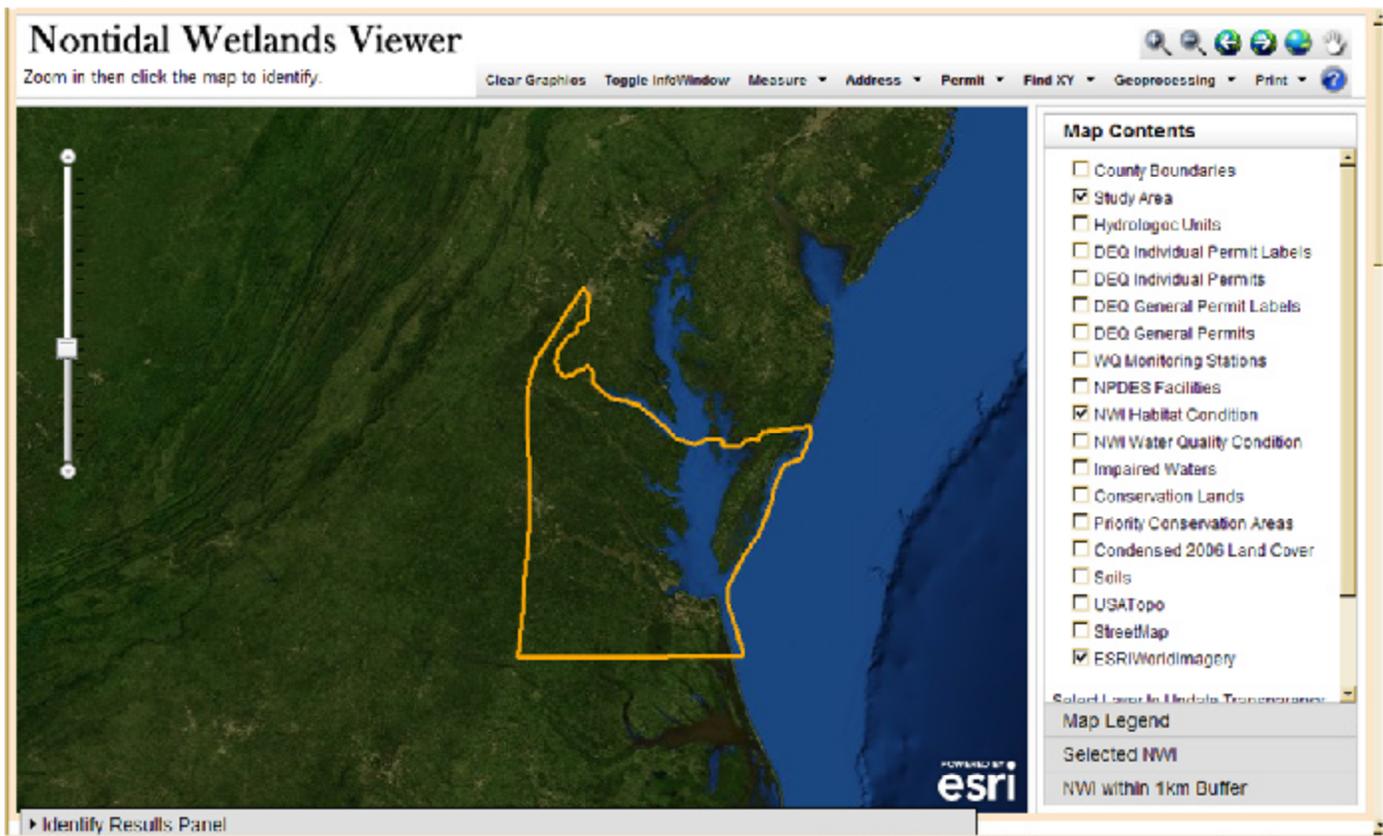
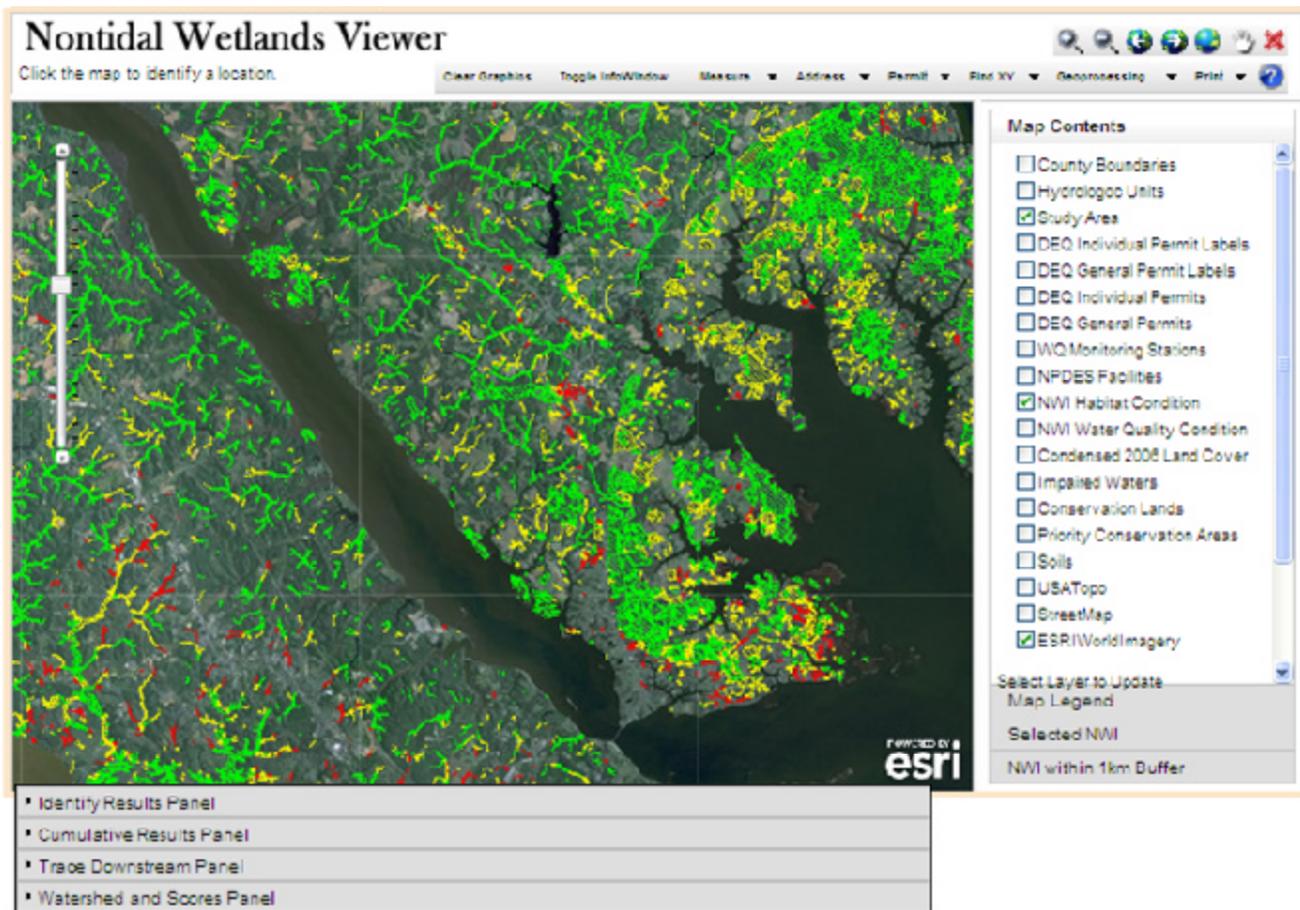


Figure 7.7-13 GIS-based Wetland data viewer



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