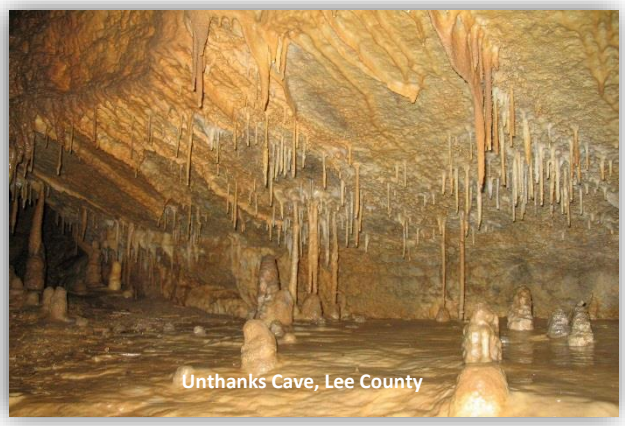
Virginia Natural Heritage Data Explorer (NHDE)

User Guide, version 2.22


Brown Pelican Breeding Colony *(Pelecanus occidentalis)*


Unthanks Cave, Lee County


Southern Appalachian Shrub Bald


Sensitive joint-vetch *(Aeschynomene virginica)*

The NHDE provides interactive access to maps and data representing Natural Heritage resources and other conservation values in Virginia.

www.vanhde.org

Welcome to the Virginia Natural Heritage Data Explorer (NHDE) Help. Navigate through this PDF document by clicking on any link in the menu above, or by enabling bookmarks in Adobe Reader by clicking the bookmark icon in the left panel. Any blue underline text in the document is hyperlinked and may be clicked to access the item. Download a PDF version of the NHDE user guide using this link: NHDE User Guide**.** For additional information about NHDE, visit the Virginia Natural Heritage Program's NHDE webpage. For further assistance not found in this document, please contact a DCR Natural Heritage staff member at: nhdesupport@dcr.virginia.gov

For best results, NHDE should be viewed in the *most current versions* of the following browsers: Firefox, Google Chrome, Safari, and Internet Explorer. While the website and map viewer may function in some tablets and smartphones, NHDE was not specifically developed to be fully functional on these devices.

Document created and last updated 2023-10 by Natural Heritage Staff. Cover photos courtesy of Gary Fleming and Irvine Wilson.

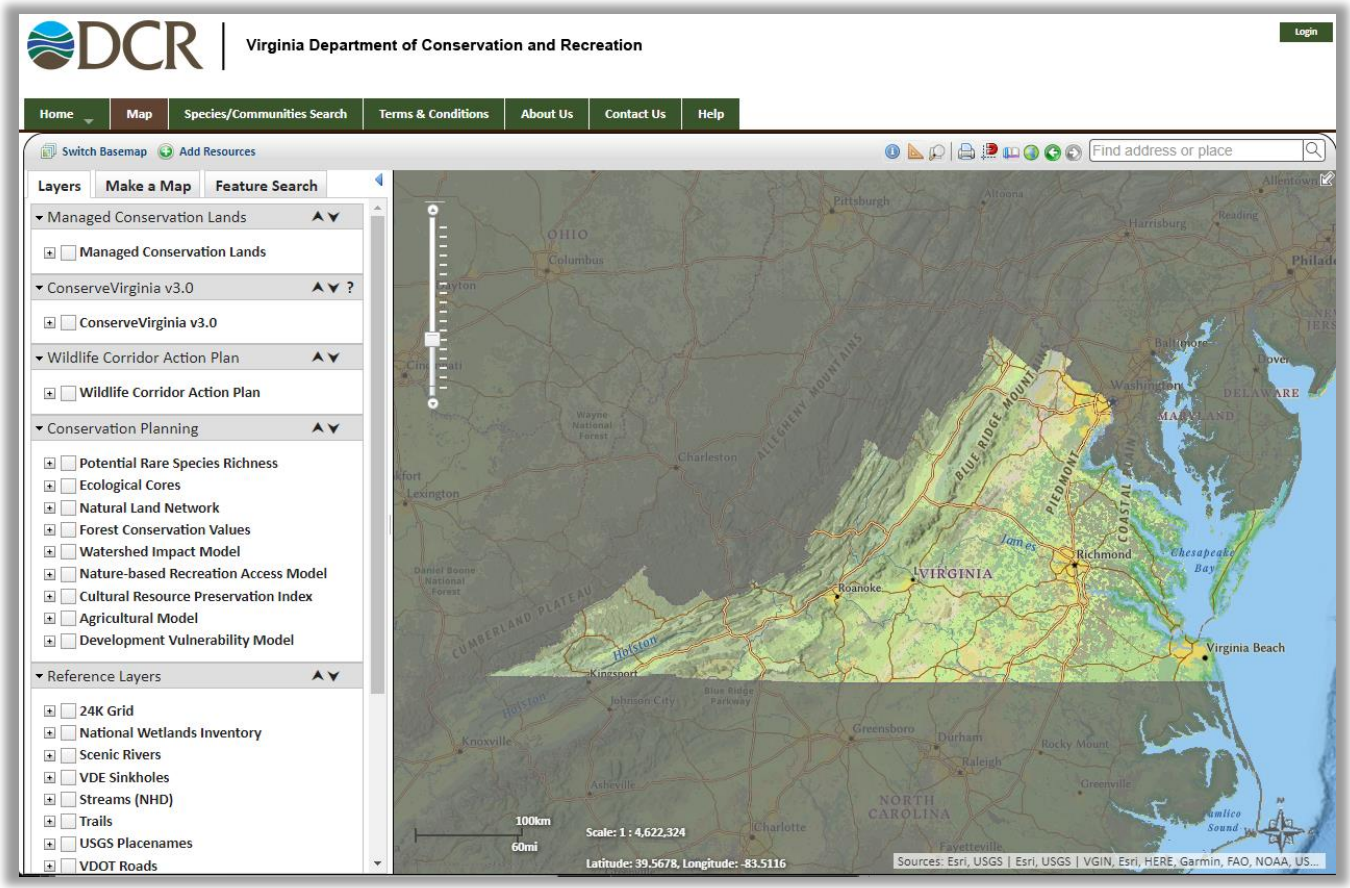
CONTENTS

Click an item in the table to jump to the corresponding section in this user guide.

*Asterisks denote sensitive layers

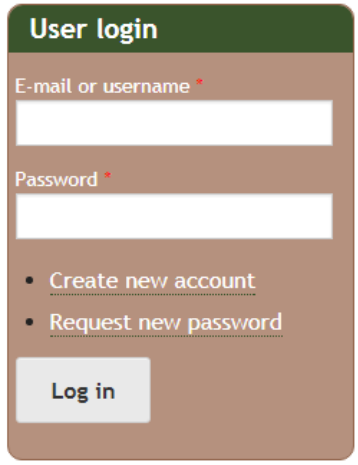
MAP NAVIGATION AND USE

Hover over an area of the screenshot below until the hand becomes a pointer; click to learn more about that specific component of the map viewer.



Map Viewer Basics

DCR Logo: Click this logo to go to the homepage for the Virginia Natural Heritage Data Explorer, https://vanhde.org



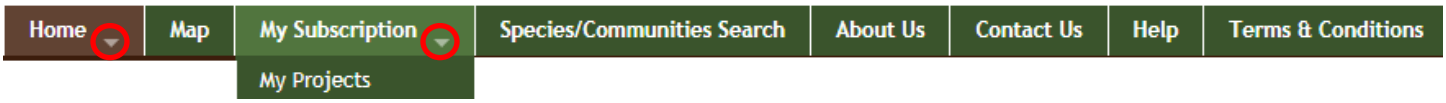
Site Access Information on Home Page

Open Access: The user does not need to register, or have an account to use the NHDE. All publicly available map layers, including ConserveVirginia v3.0, as well as analysis and mapmaking tools are available. Click the Map tab and agree to the Terms of Use to view publicly available map layers, or the Species/Communities Search tab to search our database and create summaries of Natural Heritage Resources. Note that in order to access sensitive data or to have the ability to submit projects for review, an account and subscription are required. To learn more, contact nhderegister@dcr.virginia.gov.

Non-subscribing NHDE users who would like to create an account and create or join a subscription to access sensitive Natural Heritage data, should send an email to nhderegister@dcr.virginia.gov, indicating interest in setting up an account. Natural Heritage Program staff will respond with a follow up email or phone call within 5 business days regarding account and subscription information, to facilitate account creation.
Subscription Access: Required for access to sensitive Natural Heritage data, registered NHDE users with active accounts should enter credentials and click 'Log in.' Entering the required email address and password will provide access the site based on the user's assigned tier level. After logging into the site, the user may click 'My Account' in the upper right corner of the screen to view and edit account information, as well as view profile, history, and group subscriptions.

Navigation Bar

The green navigation bar at the top of the screen provides easy access to various components of the NHDE. Note that the active tab is brown (for example, the Map tab shown below indicates that the user is accessing the Map Viewer). Make sure to right click and open as section in a new tab to avoid navigating away from the active page (thus refreshing the map, in the example below) as appropriate.



Home: The Virginia Natural Heritage Data Explorer home page, consisting of basic information about access to the NHDE, as well as a login/account registration window. Using the pointer finger (shown right), hover over the arrow on the Home tab (circled, red) and click 'VA DCR Home' to visit the Virginia Natural Heritage Program's website (http://www.dcr.virginia.gov/natural-heritage/).

Map: The NHDE Map Viewer is where the user can view and analyze map layers that summarize conservation status and values of lands, as well as reference and boundary map layers. Subscribed users can access additional Natural Heritage data and submit projects for review (see the following pages for more information about the using the Map Viewer.)

My Subscription: This tab is only available to users with an NHDE account and subscription who are logged into the website. Click the tab to view and edit subscription membership, and to view information about other members within a subscription administrated by the user. Using the pointer finger, hover over the arrow on the 'My Subscription' tab (circled, red) and click 'My Projects' to see a list of projects submitted for review. See the Access and Permissions section of this user guide for more information related to creating subscriptions. If unsure whether an organization has a current subscription, the NHDE user should contact nhdesupport@dcr.virginia.gov to determine whether they have a subscription, or locate the appropriate administrator for their group.

Species/Communities Search: The species/communities search enables the user to search the Natural Heritage Program's database to generate tabular reports summarizing rare species and natural communities by a variety of attributes. See the Species/Communities Search section of this user guide for more information about this tool and guidance on its use.

About Us: Information about the Virginia Department of Conservation and Recreation's Division of Natural Heritage and its mission.

Contact Us: Contact information for the Virginia Natural Heritage Program and NHDE support.

Help: Help documentation for effective use and understanding of the Natural Heritage Data Explorer.

Terms and Conditions: Disclaimers related to the use of the NHDE as a conservation planning and environmental review tool, as well as terms and conditions for accessing sensitive Natural Heritage data. All users of this website are required to adhere to these Terms and Conditions.

Basic Map Navigation

Scale Bar: Click at a point along the scale bar (shown right) to zoom to a specific extent. Or, slide the scale block up and down to zoom in and out, respectively. The map scale and coordinates are visible in the bottom left corner of the map viewer (shown below) and change accordingly when the scale bar or any other navigation tools are used.

Overview Map: located in the upper right corner of the map viewer

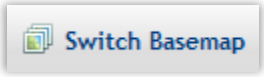
- Show/hide the Overview Map by toggling the arrow icons in the upper right corner of the main map view, circled in red, at right (the default view does not show the overview map).
- Drag the gray box in the Overview Map to alter the map extent; the main map will adjust accordingly.

Panning: To shift the viewable area, click and hold anywhere on the map and slide the cursor/mouse.

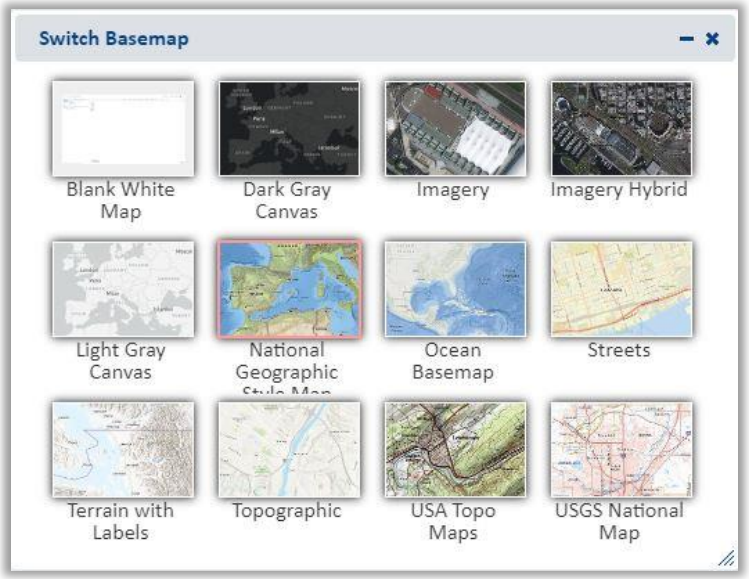
Zoom in: Double click anywhere on the map to zoom in and re-center the Map window on that location. If using a mouse with a scroll wheel, scroll up to zoom in. Alternatively, hold the SHIFT key while dragging a box on the map.

Zoom out: If using a mouse with a scroll wheel, scroll down to zoom out (if not, use the vertical scale bar). Alternatively, hold SHIFT and CTRL keys simultaneously while dragging a box on the map.

Map Tools



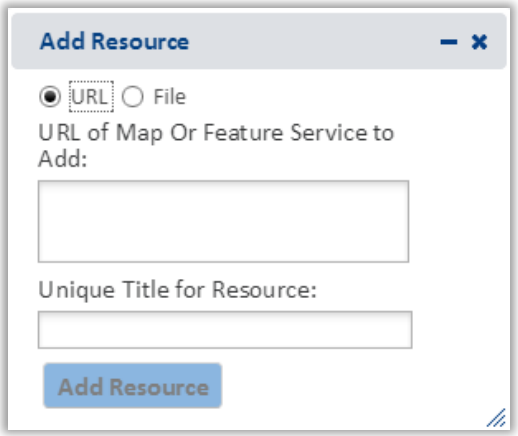
Switch Basemap: The default basemap is "Switch Basemap" at the National Geographic; click contents to select from top of the table of options. The basemap several other basemap off in the table of cannot be toggled on and *Blank White Map* option contents, however, a Basemap menu to serve is provided in the Switch this purpose.

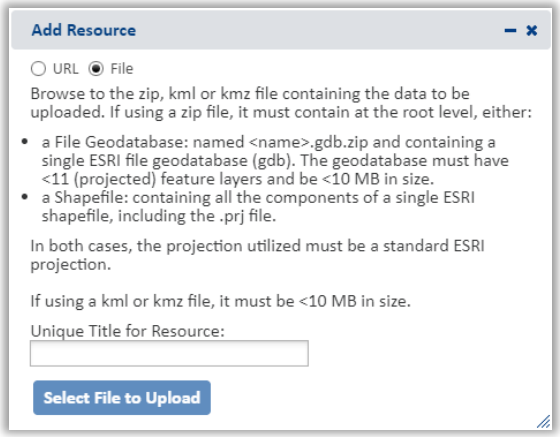


Add Resources: Click the 'Add Resources' button at the top of the table of contents to import and use additional layers via map services, feature services, or zipped shapefiles, in the map viewer.

- *From URL: Map services (below, left):* enter a URL and title for the layer in the respective fields of the dialog box. Note that the map service URL must have the correct format. For more information on this feature, see the Access an external Map Service for use in the map viewer topic in the How Do I section.

- *From File: Zipped shapefiles/geodatabases, kml or kmz file (below, right):* Browse to the file by clicking 'Select File to Upload.' For more information, see the Import a shapefile or file geodatabase to the map viewer topic.





Note that while the zipped shapefile or geodatabase may contain more than one shape, only one shape may be submitted at a time during the Create Project process.

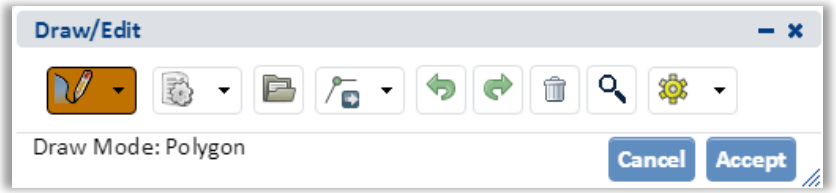
The components of an ESRI shapefile should contain, at a minimum:

- .shp – The main file that stores the feature geometry; required.
- .shx – The index file that stores the index of the feature geometry; required.
- .dbf – The dBASE table that stores the attribute information of features; required.
- .prj – The file that stores the coordinate system information used by ArcGIS*

See http://desktop.arcgis.com/en/arcmap/10.3/manage-data/shapefiles/shapefile-file-extensions.htm for more information on shapefile file extensions.

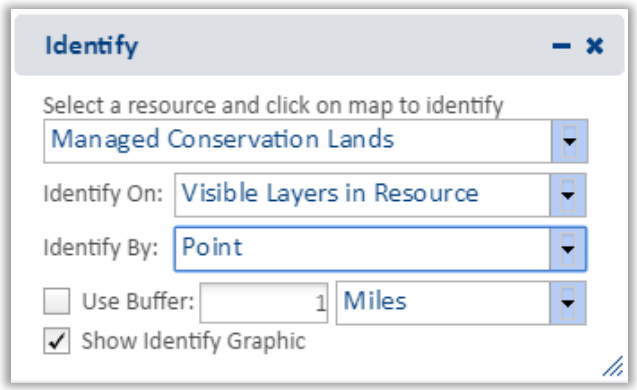
*A projected coordinate system is defined on a flat, two-dimensional surface. Unlike a geographic coordinate system, a projected coordinate system has constant lengths, angles, and areas across two dimensions. A projected coordinate system is always based on a geographic coordinate system that is based on a sphere or spheroid. To learn more about projected coordinate systems, visit http://desktop.arcgis.com/en/arcmap/10.3/guide-books/map-projections/about-projected-coordinate-systems.htm. See http://desktop.arcgis.com/en/arcmap/10.3/guide-books/map-projections/pdf/projected_coordinate_systems.pdf for a comprehensive list of projected coordinate systems that are supported by ESRI.

Create Project: Clicking 'Create Project' (formerly 'Submit Project') opens a draw/edit toolbar, which allows subscribers to submit projects for site-specific project review. For more information about this tool, see the Submit a Project for Review topic in the How Do I section.

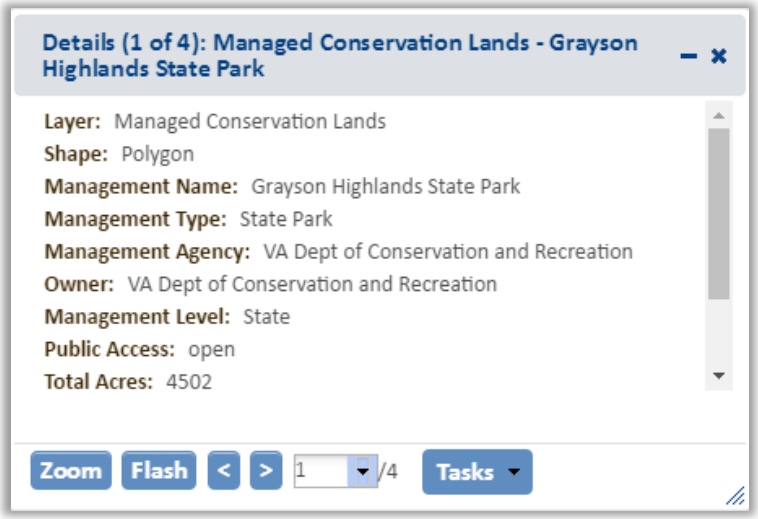


Tool buttons are used to navigate around the map, and to view and query datasets. From left to right, explained below:

Identify tool: Identify a feature from a data layer by selecting the layer from the pull-down menu and clicking on the type of resource to be identified. Change the search criteria by selecting 'Identify On,' 'Identify By' and 'Buffer' criteria, if applicable. Related information will appear in the details window. *Note that the buffer function is disabled for sensitive Natural Heritage data, in the Identify tool.*



The details window returns the identify results:



Within the details window, the following tools can be used:

Zoom Zooms to the feature Flash Flashes feature < > If more than one feature is identified, navigate between them by using the arrows to step back and forth through the set of features, or selecting the desired feature dialog from the dropdown list (right)

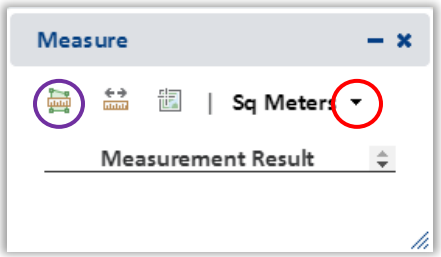
Tasks The tasks button presents the option to show the Identify results in a table, which can be exported to PDF or CSV file formats.

See the Retrieve information about a particular feature topic in the How Do I section for more information on how to use the Identify tool.

Measure Tool: Measure to determine the size of an area, distance of a digitized line, and the coordinates of a specific location. Click the measure icon (right) and choose the correct unit of measurement from the dropdown list when measuring area or distance, and the format for coordinate results (see examples, below).

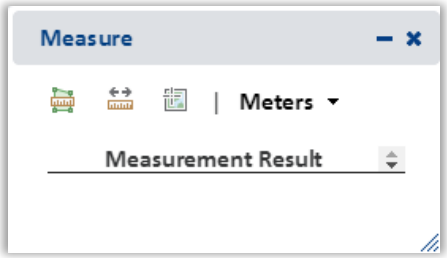
To create the feature to be measured, select the desired type of measurement (polygon area, line distance, or location coordinates- circled in purple in the images below). Specify the desired units in the measure window by clicking the down arrow (red circles, below).

Area



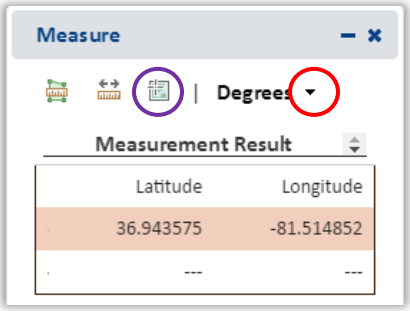
Draw a polygon with the mouse to delineate the desired area and double click to finish the feature.

Distance



Draw a line with the mouse to delineate desired length and double click to finish the feature. Cumulative lengths are displayed after each segment is added.

Location

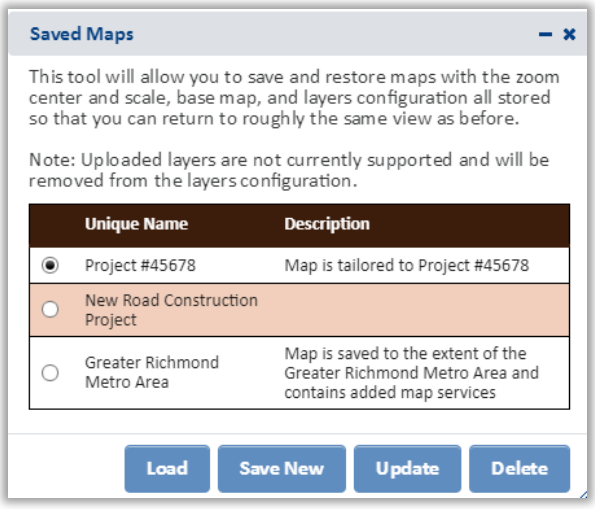


Coordinates are displayed at the current location; double click to create a marker on the map with set coordinates.

The resulting measurement is shown in the *Measurement Result* section. Select a different unit from the dropdown for the results to be displayed in the new unit.

Saved Maps: This tool saves the current state and scale of the map for later use by the logged in user. The user may save multiple different maps, as well as update existing saved maps. *Note that subscribers only have access to this feature.* The saved settings apply to:

- Zoom
- Basemap
- Overview map
- Configuration of map layers (turned on or off, transparency, expansion)
- Map services uploaded to the map via the Add Resources from URL function
- Spatial bookmarks



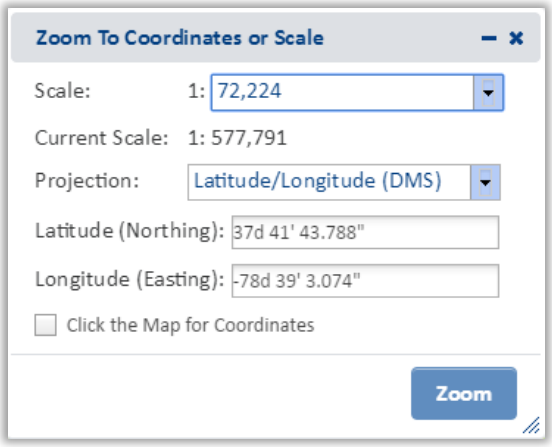
The following functions are maintained on the server during the logged in session only; they DO NOT persist in saved maps:

- Files (shapefiles or geodatabase) uploaded to the map via Add Resources from file button

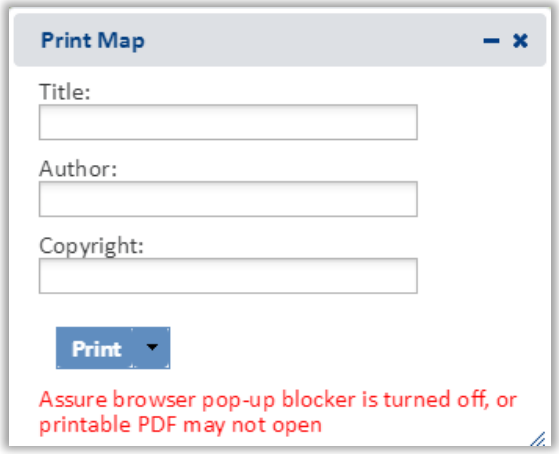
- Map annotations created in the 'Make a Map' tab

See the Save a Map for Later Use topic in the How Do I section for more details on saving, loading, updating, and deleting saved maps.

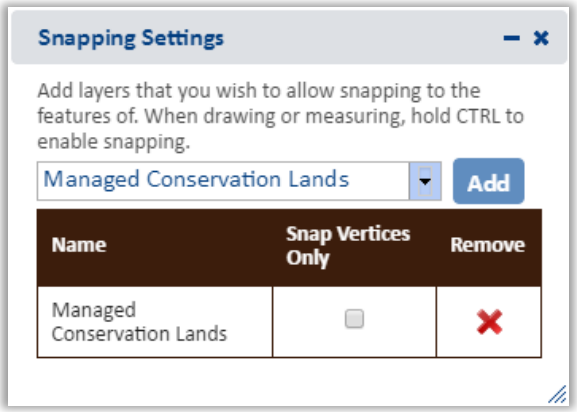
Zoom to Coordinates or Scale: Zoom to a specific location by selecting one of the predefined scale options or entering latitude and longitude coordinates, making sure to specify the appropriate projection. See the Zoom to map coordinates topic in the How Do I section for more information on this tool.



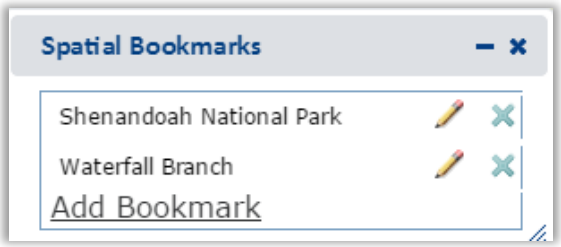
Print: Create a printable version of the map view. Click the 'Print' button and when the Print Map window opens, enter a title for the map, its author, any copyright information, and toggle the 'Print' pull-down to select the paper setting. Maps can be generated showing Landscape Layout (PDF format) or Map Only (in PDF, PNG, or JPG formats). See the Print a Map topic in the How Do I section for more information on the Print tool.



Snapping Settings: Add map layers to snapping settings to allow snapping to the layers' features when drawing or measuring. To enable snapping, hold CTRL when drawing or measuring. For example, to measure the distance of one conserved land to another conserved land, add the Managed Conservation Lands layer to the snapping settings. When clicking near a managed conserved land with the measure tool, the tool will snap to the boundary for a more accurate measurement. *Note that sensitive Natural Heritage Resources Data, including the Element Occurrences and Predicted Suitable Habitats Summaries, are not available for snapping.*



Spatial Bookmarks: Bookmark the map at a particular extent and location to return to for later use. Click the spatial bookmarks icon once the map is at the desired location and extent and type in a name for the bookmark. The bookmark will appear in the spatial bookmarks window. *Note: Bookmarks will not persist if the user is not logged in and closes the NHDE map viewer, or if the browser experiences thirty minutes of inactivity. Spatial bookmarks are only retained during the current open browser session, unless the signed in user saves the map.*

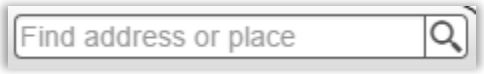


Default Extent: Zoom to the full extent of the Commonwealth of Virginia.

Previous Extent: Moves the map window back to the previous view. *Note: the button will appear grey if there are no previous views available.*

Next Extent: Moves the display to the next view. *Note: the button will appear grey if there are no next views available.*

Find address or place: Search for a place by typing a desired location in the text box. If searching for an address, include city, state and/or zip code, as this is a global search. Once the search criteria is typed into the box, hit 'Enter' on the keyboard, or click the magnifying glass icon to zoom to the location on the map.

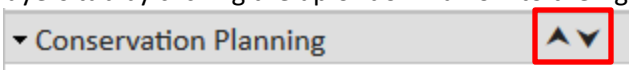


Map Tabs

Note that the menu can be minimized by clicking the blue arrow, shown left. The active tab, currently in use, is white (e.g., Layers).

Layers Tab: Displays the available map layers for view and query in the map window.

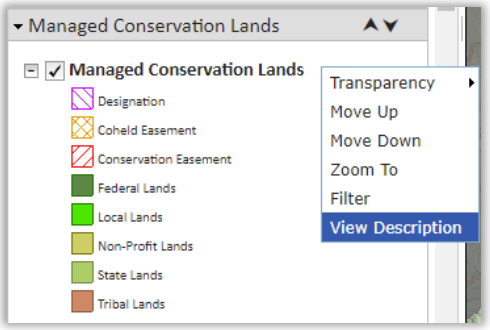
- Map layers are grouped by type, denoted by the grey heading (e.g. "Conservation Planning"). These layer groups can be expanded or collapsed by clicking the heading title in the gray bar. They may be reordered among other layer groups in the Layers tab by clicking the up or down arrow to the right of the layer group name:



- A layer can be displayed by clicking the check box. *Note that some layers are scale dependent, meaning that they are only visible at certain map scales based on the most appropriate scale for that layer. If a map layer's features are grayed out, then it can't be viewed at that scale. See Table 1 for viewable scale thresholds.*

- The symbology for each map layer can be hidden or expanded by clicking the + or -, to the left of the check box.

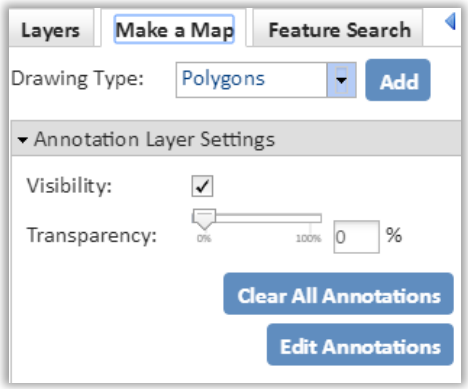
- When the mouse is hovered over a layer name, an arrow appears to the right of it. Clicking this arrow displays a menu with the option to adjust the layer's transparency, zoom to the full extent of that layer, filter to display by specific criteria (non-sensitive layers only), and view layer descriptions. If the user added a layer, additional options include the ability to remove the layer, and view its map service details in another web browser tab.



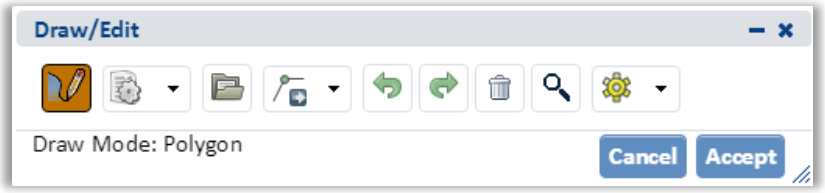
- See Map Layers section for detailed descriptions of each layer. See the Filter a map layer page for filtering help.

Make a Map tab: Create printable maps by digitizing an annotation layer on the map viewer. The Make a Map tab is formerly known as the 'Map Making' tab in NHDE 1.0.

- Points, lines, polygons, and text are available in many styles, sizes, and colors to satisfy a variety of mapping purposes.
- To begin annotating, choose a drawing type by clicking a selection on the pull-down menu. Once created, annotations may be edited by clicking on 'Edit Annotations.' To delete all annotations, click 'Clear All Annotations.'

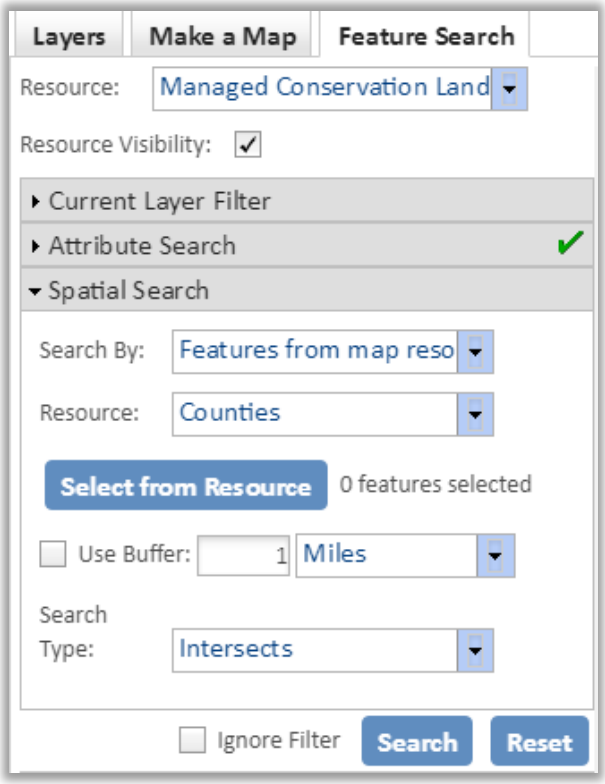


- Selecting Polygons or Lines opens a Draw/Edit window, where users can upload zipped shapefiles to use as annotation geometries as well as use various editing tools to refine map-making.



- See the How Do I help section topic Add and edit point, line, or polygon annotation to my map for some examples on how to use this tool. Note that shapefiles uploaded by the user are only visible during the current NHDE session; once logged out, the custom annotations will no longer be visible to the user.

Feature Search tab: Search database (or back-end) data associated with map layers under this tab.

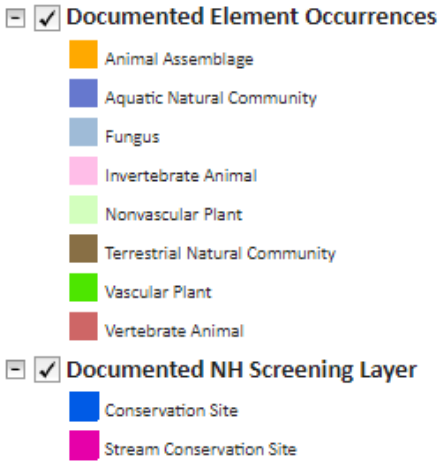


- Select the map layer to search within in the drop down menu for 'Resource.'
- Searches can be conducted by using the Attributes Search, by selecting text strings or choosing from the drop down list for each attribute.
- Searches can be conducted by using the Spatial Search by selecting a spatial area in which to conduct the search.
- Attribute Search and Spatial Search can also be used together. For example (at right), Managed Conservation Lands can be searched by various attributes (e.g., Managed Area Name, Management Agency), as well as search based on other map layers via the Spatial Search (e.g., county boundaries).
- The Feature Search can either respect or ignore the filter for a layer. The filter may be viewed (and cleared) under the Current Layer Filter section, or it may be kept but ignored in the Feature Search by checking the 'Ignore Filter' button next to 'Search.'
- Search results can be instantly viewed in a list at the bottom of the Feature Search window, within a table, and within the map window by selecting 'Details.' If viewed within a table, results may be exported to CSV or PDF.
- Results may be used as a filter expression, to display only the Feature Search results for that map layer, but clicking 'Filter By' in the results section. This action only applies to attribute searches criteria.
- For more information on this tool please see the Feature Search help page.

MAP LAYERS

**Asterisked sensitive data is only available to users with NHDE accounts and the properly assigned Tier access level.*

Natural Heritage Resources*



Documented Element Occurrences: This dataset is only visible and available to Tier 3 level users and available as a tabular list as part of the project review report received by Tier 2 users. This layer identifies occurrences of rare plants and animals, exemplary or unique natural communities, and important animal assemblages (e.g. colonial waterbird nesting sites) that are tracked by the Virginia Natural Heritage Program (VNHP). Collectively, these plants, animals, animal assemblages, and natural communities are referred to as 'elements of natural biodiversity,' or e*lements*. Specific occurrences of elements are known as 'Element Occurrences' (EOs). Each EO is represented by a polygon indicating its known location. The polygons are intended to indicate the full known areal extent of the occurrence, modified to account for any known locational uncertainty of the source data. Each EO is attributed with ranks that indicate their rarity at global and state levels, as well as a rank that is an assessment of the viability of the occurrence.

Generally, any extant and viable EO in the VNHP database is worthy of protection. While rarity and viability ranks provide important information about the protection needs of an EO, use of this information alone might not lead to conservation of all native biodiversity in Virginia. Therefore, the VNHP uses a prioritization tool to define a portfolio of Essential Element Occurrences (EEO) and their associated Conservation Sites. Currently, only EOs which are associated with Terrestrial and Stream Conservation Sites are prioritized. EOs which have not been recently observed or with poor estimated viability are ineligible for prioritization. EEOs are assigned one of four tiers, defined as:

- Irreplaceable: the only eligible EO of the element in the state
- Critical: one of only 2 eligible EOs of the element in the state
- Vital: the highest-ranked eligible EO of the element in the state, for elements having 3 or more eligible EOs
- High Priority: one of the remaining highest-ranked *N* eligible EOs, where *N* is the number of portfolio slots allotted for the element, depending on Global Rank (for G1 elements, *N* = 10; for G2 elements, *N* = 5; for others, *N* = 2).

All remaining eligible EOs are assigned to the "General" tier.

The "Essential Element Occurrence?" field denotes EEO status with a "YES" or "NO" value followed by the tier name, or "NA" (not applicable) for EOs not eligible for prioritization.

Data source: VA DCR, Division of Natural Heritage

Documented NH Screening Layer: This layer can be seen and queried at all Tier levels. There are two separate components to the NH Screening Layer, described below.

- **Conservation Sites** identify planning boundaries that delineate the Virginia Natural Heritage Program's best determination of the land and water area occupied by natural heritage resources (exemplary natural communities and rare species) and necessary to maintain ecological processes that will facilitate their long-term survival. There are several different types of Conservation Sites. Terrestrial Conservation Sites are the most common and encompass areas surrounding above-ground natural heritage resources associated with uplands, as well as wetlands. Other types of Conservation Sites are delineated for natural heritage resources associated with significant karst resources, habitat in human-built environments, and migratory animal stopover habitat. The size and dimensions of a Conservation Site are based on the habitat requirements of the natural heritage resources present and the physical features of the surrounding landscape. Features taken into consideration include hydrology, slope,

aspect, vegetation structure, current land uses, and potential threats from invasive species. Conservation Sites do not necessarily preclude human activities, but a site's viability may be greatly influenced by human activities. Conservation Sites may require ecological management in order to maintain or enhance their viability. Each Conservation Site is given a biodiversity significance ranking (B-rank) based on the rarity, quality, and number of natural heritage resources it contains. Conservation Sites encompass all extant and viable terrestrial EOs documented in the VNHP database.

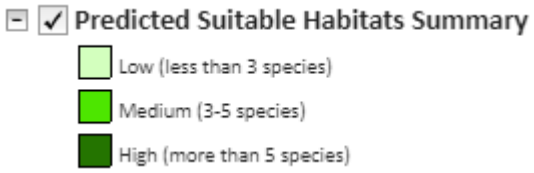
- **Stream Conservation Sites** (SCS) encompass stream/river reaches, waterbodies, and terrestrial contributing areas containing or associated with aquatic or semi-aquatic EOs, including upstream and downstream reaches and tributaries up to 3-km stream distance from EOs. The size and dimensions of a Stream Conservation Site are based on the hydrology of the waterway and surrounding landscape, taking into consideration dam locations and whether the waterway is tidal. SCS encompass all extant and viable aquatic EOs documented in the VNHP database, and are given B-ranks based on the rarity, quality, and number of natural heritage resources they contain. SCS can be used to identify land management needs and protection priorities. They can also be used as a screening tool, to identify potential conflicts with development activities, and they can be used for proactive planning to ensure that development projects successfully avoid or enhance natural heritage resources.

Generally, all Conservation Sites designated by the VNHP are worthy of protection. However, as there are limited resources and opportunities to achieve conservation, additional prioritization helps to conserve Virginia's biodiversity efficiently and effectively. While B-ranks provide the relative biodiversity significance of Conservation Sites across the Commonwealth, use of these ranks alone might not lead to conservation of all native biodiversity in Virginia. Therefore, Essential Conservation Sites (ECS) are also used. ECS are the subset of Terrestrial and Stream Conservation Sites that are associated with one or more Essential Element Occurrences, which includes those in the Irreplaceable, Critical, Vital, and High Priority tiers (see the "Documented Element Occurrences" layer description in the map or NHDE User Guide for more information). Conservation Sites are assigned to tiers based on the highest tier of associated EOs. The ECS process is currently applied only to Terrestrial and Stream Conservation Sites and associated EOs, but may be expanded to other Conservation Site types in the future.

The "Essential Conservation Site?" field denotes ECS status with a "YES" or "NO" value followed by the tier name, or "NA" (not applicable) for Conservation Sites which do not currently contain any EOs eligible for prioritization.

Data source: VA DCR, Division of Natural Heritage

Predicted Habitats*



Predicted Suitable Habitats Summary: This layer summarizes multiple individual species' Predicted Suitable Habitat (PSH) layers into one layer. An individual species' PSH layer is a raster layer, which identifies areas most likely to have suitable habitat for that species. PSH were developed using known occurrences, a Species Habitat Model, and expert opinion. Access the layer description in the map viewer for more details pertaining to Predicted Suitable Habitats Summary layer. For information pertaining the use of this layer, see the How Do I Interpret the Predicted Suitable Habitats Summary Layer section of this document. Visit http://www.dcr.virginia.gov/natural-heritage/sdm or contact the Virginia Natural Heritage Program to learn more. *Note that these layers are not able to be queried; they are display only and can be analyzed with the Identify tool. Data source: VA DCR, Division of Natural Heritage, 2023*

Diabase Screening Layer: A digital representation of diabase soils with potential for some rare, threatened and endangered plant species. Diabase glades are characterized by historically fire-dominated grassland vegetation on

relatively nutrient-rich soils underlain by Triassic bedrock. Diabase flatrock, a hard, dark-colored volcanic rock, is found primarily in northern Virginia counties and is located within the geologic formation known as the Triassic Basin. Diabase soils were isolated from NRCS Soil Survey Geographic (SSURGO) datasets and further analyzed using the National Land Cover Dataset (NLCD 2011), U.S Geological Survey Gap Analysis Program - Land Cover Data (GAP Version 2), and digital orthophotography from the Virginia Base Map Imagery (VBMP) and National Agriculture Imagery Program (NAIP 2012). Areas were removed where the landscape appeared to be disturbed or currently under heavy cultivation. In Northern Virginia, diabase supports occurrences of several global and state rare plant species: Earleaf False Foxglove (*Agalinis auriculata*, G3/S1), White Heath Aster (*Symphyotrichum ericoides*, G5/S3), American Bluehearts (*Buchnera americana*, G5?/S1S2), Hairy Beardtongue (*Penstemon hirsutus*, G4/S3), Downy Phlox (*Phlox pilosa*, G5/S1), Stiff Goldenrod (*Oligoneuron rigidum* var. *rigidum*, G5T5/S2), and Marsh Hedgenettle (*Stachys pilosa* var. *arenicola*, G5T4/S1). *Note that this layer is not able to be queried; it is display only and can be analyzed with the Identify tool. Data source: VA DCR, Division of Natural Heritage, 2014.*

Karst Spelaea Screening Layer: Spelaea Screen is produced by buffering cave entrances in the Virginia Speleological Survey database for caves not covered under Biotics sites. Entrance locations were buffered randomly from 50 to 500 meters to produce cave entrance offsets. Such offsets were done for two reasons. First, the VSS-DCR data sharing agreement specifies that DCR cannot share cave entrance locations. Secondly, many locations within the database are approximate, but generally prove to be within 500 meters of the reported location. The cave entrance offsets were then buffered by 500m plus the surveyed length of the cave to create individual circular shapes. These shapes were then merged into a single, statewide coverage. Intersection with this coverage means that the area of interest is either over or within 500m of documented, underlying cave passage. Intersection of a project with Spelaea Screen requires coordination with VDCR Natural Heritage Program to obtain further information to avoid or mitigate impacts to karst resources. *Data source: VA DCR, Division of Natural Heritage, 2021.*

Karst Bedrock: This layer was derived from Virginia Department of Energy (formerly Department of Mines, Minerals, and Energy), Division of Mineral Resources, (VDMR), 2003. CD ROM (ISO-9660), Publication 174: Digital Representation of the 1993 Geologic Map of Virginia. Bedrock units containing significant karstic strata were selected and converted to a statewide layer consisting of these units only. Projects taking place within or immediately adjacent to these units have the potential to encounter karst hazards as well as rare, threatened, or endangered fauna and natural communities associated with karst landscapes. *Note that this layer is not able to be queried; it is display only and can be analyzed with the Identify tool. Data source: VA DCR, Division of Natural Heritage, 2003.*

Predicted Suitable Habitats by Taxa: These are individual species' Predicted Suitable Habitat (PSH) layers. Areas covered by the features in the layer are considered Predicted Suitable Habitat for the species. PSH were developed using known occurrences, a Species Habitat Model, and expert opinion. This feature version of the PSH is was converted from the original raster. Access the layer description in the map viewer for more details pertaining to Predicted Suitable Habitats by Taxa layers. Visit http://www.dcr.virginia.gov/natural-heritage/sdm or contact the Virginia Natural Heritage Program for more information. *Note that these layers are not able to be queried; they are display only and can be analyzed with the Identify tool. Data source: VA DCR, Division of Natural Heritage, 2023.*

Managed Conservation Lands

Managed Conservation Lands: Public and private conservation and recreation lands in Virginia. The Managed Conservation Lands layer includes:

- Lands managed by state and federal natural resource agencies.
- Open space university lands that are protected from development.
- Permanently protected private conservation organization lands.
- Properties protected in perpetuity by conservation easements under the Virginia Outdoors Foundation and other public and private qualified easement holders.
- Local government lands owned and managed for open space values excluding ball fields or other heavily developed areas.

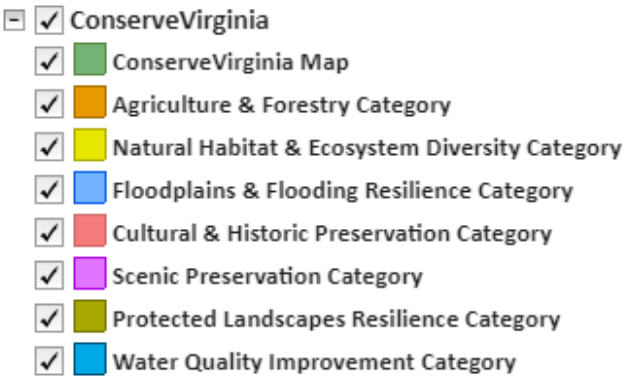
Management Type Definitions

- Designation: specific management designations on certain protected lands, including wilderness areas, special biological areas, NERR sites, and others.
- Coheld Easement: easements that are jointly held by more than one entity.
- Conservation Easement: conservation easements and open space easements held by the Virginia Outdoors Foundation, conservation organizations, land trusts and federal, state and local governments.
- Federal Lands: lands owned and managed by federal natural resource agencies. Department of Defense lands with protective management plans are also included.
- Local Lands: lands owned and managed by local governments as parks and natural areas.
- Non-Profit Lands: lands owned and managed by land trusts and conservation organizations.
- State Lands: lands owned and managed by state natural resource agencies.
- Tribal: lands owned and managed by Native American Tribes

Attribute	Description
Management Name	Name of the managed area
Management Type	Land category or group; see Management Type Definitions for more information
Management Agency	Entity responsible for managing the conservation interest of the property
Owner	Property owner
Management Level	Federal, State, Private, Local, Tribal, or Virginia Outdoors Foundation
Public Access	Public access available for the property
Total Acres	Total acreage for a complete land unit, possibly including several smaller tracts
GIS Acres	Acreage calculated by the GIS mapping software. Varies based on mapping accuracy
Web Link	Web link to additional information or information about the land manager

Note that acreage values are not split by county or watershed boundaries. Any watershed or county-based query reflects the total acreage values for all intersecting lands and some acreage totals may appear inflated. Acreage does not include water bodies. (Data source: VA DCR, Division of Natural Heritage http://www.dcr.virginia.gov/natural-heritage/clinfo)

ConserveVirginia v3.0



ConserveVirginia Map: ConserveVirginia is Governor Ralph Northam's land conservation strategy and is based on a data-driven process for identifying Virginia's highest priority lands for protection. Research and spatial analysis of many conservation values are summarized into seven categories and mapped as:
Agriculture & Forestry
Natural Habitat & Ecosystem Diversity
Floodplains & Flooding Resilience
Cultural & Historic Preservation
Scenic Preservation
Protected Landscapes Resilience
Water Quality Improvement

The "ConserveVirginia Map" is a summary of all seven category inputs and can be used as an initial screening to determine if a potential land protection project qualifies as a ConserveVirginia priority. Click the location of a potential conservation project in the ConserveVirginia Map to display which of the seven priority conservation values the project could protect. For a land protection project to be considered a ConserveVirginia success in any one of the categories, deed language will restrict certain land uses and assure management actions for protection of conservation values identified in the category map(s). Click the location of a project area in the category maps to view information on required deed language. See the How Do I Interpret the ConserveVirginia v3.0 data layers section for more information. *Note that these layers are not able to be queried; they are display only and can be analyzed with the Identify tool. Data source: VA DCR, Division of Natural Heritage, 2021. ConserveVirginia was codified into law in 2021 (§ 10.1-104.6:1).*

Attribute	Description
Agriculture and Forestry	YES/NO - includes inputs from the Agriculture and Forestry category
Cultural and Historic Preservation	YES/NO - includes inputs from the Cultural and Historic Preservation category
Natural Habitat and Ecosystem Diversity	YES/NO - includes inputs from the Natural Habitat and Ecosystem Diversity category
Protected Landscapes Resilience	YES/NO - includes inputs from the Protected Landscapes Resilience category
Scenic Preservation	YES/NO - includes inputs from the Scenic Preservation category
Floodplains and Flooding Resilience	YES/NO - includes inputs from the Floodplains and Flooding Resilience category
Water Quality Improvement	YES/NO - includes inputs from the Water Quality Improvement category
Map Date	Date the data was created

Agriculture and Forestry: The Agriculture & Forestry Category identifies priority agricultural and forest lands across Virginia. It is comprised of two datasets. The *Farms Under Threat State of the States* spatial data includes a detailed assessment of the extent, diversity, location, and quality of agricultural land in the United States, as well as the threats to this land from expanding commercial, industrial, and residential development. The results of this effort include: An agricultural land cover dataset with rangeland, pastureland, cropland and woodland land cover classes, an index of

agricultural land Productivity, Versatility, and Resiliency (PVR), and a valuation of the impact of low density residential development and urban high density development on agricultural land.

The Department of Forestry's *Forest Conservation Value (FCV) Model* strategically identifies priority forestland in Virginia for conservation by identifying those of the highest quality, most productive, and most vulnerable statewide. The model classifies forestlands based on watershed integrity; size of forested blocks; management potential; connectivity and proximity to other conserved lands; threat of conversion, and diminished tree species and significant forest community attributes. The model assigns a relative FCV rank to all forestland in Virginia from 1 (lowest) to 5 (highest); the highest class was used for the Strategy. The *ConserveVirginia* mapped lands include large blocks, and clusters incorporating smaller patches, of high quality forest with overall high FCV.

Attribute	Description
Agriculture	YES/NO - high priority agricultural areas are included
Forestry	YES/NO - high priority VDOF identified forested areas are included
Map Date	Date the data was created
Deed Requirement	Required protections to meet ConserveVirginia standards

Natural Habitat & Ecosystem Diversity: The Natural Habitat & Ecosystem Diversity category has been developed by working with five key data resource areas. The *Virginia Natural Landscape Assessment* identifies large patches commonly referred to as Cores of forests, marshes, dunes and beaches with at least 100 acres of continuous interior natural habitat. The cores are ranked based upon many variables including environmental diversity, species diversity, water quality benefits and habitats. The Outstanding category (C1) was used in the strategy, excluding the four lower ranked categories. *Landscape Corridors* of natural land cover were included connecting C1 Cores to maintain connectivity to allow species movement between larger natural land patches, elevations, latitudes and from ocean to inland.

Resilient and Connected Landscapes represent a map developed by The Nature Conservancy and its partners highlighting areas that represent climate resilient sites and species movement areas (corridors) across Virginia that include key habitats and the space for nature to adapt and change in the face of a changing climate. *Natural Heritage Conservation Sites* are areas of the landscape that contain Virginia's and the planet's rarest aquatic and terrestrial natural communities and plant and animal species. This set includes cave and karst habitats, terrestrial sites and aquatic systems, and only the top ranked sites have been included. *Brook Trout Streams* identified by Department of Wildlife Resources are streams supporting native brook trout that are in a natural state representing high ecological integrity.

Attribute	Description
TNC Resilient Landscapes	YES/NO - high priority TNC Resilient and Connected Landscapes are included
VaNLA Corridors	YES/NO - high priority ConservationVision Landscape Corridors are included
VaNLA Cores	YES/NO - high priority ConservationVision Ecological Core are included
NH Conservation Sites	YES/NO - high priority Natural Heritage Conservation Sites are included
Native Brook Trout	YES/NO - high priority native brook trout streams are included
Map Date	Date the data was created
Deed Requirement	Required protections to meet ConserveVirginia standards

Floodplains & Flooding Resilience: The Floodplains & Flooding Resilience Category is comprised of four data-models.

Riverine flooding is addressed by mapping the undeveloped forest and agricultural lands upstream of the 10 worst flooding disasters across Virginia based upon jurisdictional risk, dollar losses and federal disaster declarations based on data from the Commonwealth of Virginia Hazard Mitigation Plan.

Statewide flooding is also addressed by wetlands maps. *Wetlands* are included directly via the ConservationVision Virginia Wetlands Catalog map project. Wetlands include mapped and predicted wetlands, streams and floodplains. They are prioritized based on variables including water quality, natural land networks and buffers, ecosystem services and biodiversity. The two highest-class priorities are included.

Coastal Flooding is addressed by the wetlands maps and coastal ecological resiliency map models developed by the Virginia Institute of Marine Science and by The Nature Conservancy. Coastal wetlands are critical to the productivity and diversity of marine ecosystems and to the human economies they support. Mapped priorities include those wetlands identified as above average and far above average resilience indicating the greatest long-term potential for adaptive response, based on a projected rise in sea level of six feet. Coastal resilience is also addressed via wetlands identified by the VIMS model that represent the highest class in estuarine and freshwater areas that provide the highest ecological services and provide for the highest marsh migration potential to adjacent natural lands.

Attribute	**Description**
Ecological Coastal Resilience	YES/NO - TNC's high priority ecological coastal resilience areas included
Va Wetlands Catalog	YES/NO - DCR's high priority Virginia Wetland Catalog features included
VIMS Marsh Migration & Building	YES/NO - VIMS high priority marsh building and migration areas included
Flood Resilience	YES/NO - areas historically known to be most flood prone are included
Map Date	Date the data was created
Deed Requirement	Required protections to meet ConserveVirginia standards

Cultural & Historic Preservation: The Cultural and Historic Preservation category includes lands designated as National Historic Landmarks, listed in the National Register of Historic Places or the Virginia Landmarks Register, and sites or properties with Federal or DHR Board determinations of Eligibility for the National Register of Historic Places. These designations indicate properties of high national or state historic significance.

Lands in this category also include battlefield Core and Study areas classified by the National Park Service American Battlefield Protection Program (ABPP) as Priority 1 or 2 and Class A or B or unprioritized Class A or B, where “Priority” captures integrity and threat and “Class” represents historic significance. Class A and B battlefields represent principal strategic operations, and therefore capture historic significance.

Also included in the Cultural and Historic Preservation category are sites and properties that have been found to be eligible for listing in the National Register of Historic Places within the past nine years by the Department of Historic Resources. This allows for places that are historically significant, yet have not undergone the full listing process (which may require time and expense), to be included.

Finally, sites and properties may be individually designated as having High Preservation Potential by the Department of Historic Resources. This allows for properties that may not yet have been thoroughly documented or evaluated to be added as preservation priorities based on historical research, community values, or other factors.

Attribute	**Description**
Cultural & Historic	YES/NO - DHR identified high priority cultural and historic resources included
Map Date	Date the data was created
Deed Requirement	Required protections to meet ConserveVirginia standards

Scenic Preservation: The Scenic Preservation Category identifies lands by mapping national and state designated scenic byways, state designated scenic rivers, All-American roads, national scenic trails, national historic trails, national millennium trails, national recreational trails, national scenic areas, and the Mount Rogers National Recreation Area scenic zone. A statewide map for these resources did not exist. The majority of these resources were mapped and boundaries created using river banks, shorelines and jurisdictional boundaries where necessary and then expanded by

200 feet on either side of the resource to capture adjacent lands. Large patches of forested land in the immediate views from the USFS national scenic areas and the Mount Rogers National Recreation Area scenic zone were also included.

Attribute	Description
Scenic Resources	YES/NO - high priority scenic resources included
Map Date	Date the data was created
Deed Requirement	Required protections to meet ConserveVirginia standards

Protected Landscapes Resilience: Protected Landscapes Resilience represents priority areas identified by six public resource agencies as lands and waters around existing protected lands that are important habitats, connections to the landscape, critical to enhance climate resilience, and protect key scenic and recreational values. The Protected Landscapes Resilience category was developed and provided by the U.S. Fish and Wildlife Service, National Park Service, Department of Wildlife Resources, Department of Conservation and Recreation, Department of Forestry, and U.S. Forest Service.

Attribute	Description
USFWS Resilience	YES/NO - USFWS identified resilience lands included
State Parks Resilience	YES/NO - State Park identified resilience lands included
Natural Heritage Resilience	YES/NO - Natural Heritage identified resilience lands included
NPS Resilience	YES/NO - NPS identified resilience lands included
DOF Resilience	YES/NO - DOF identified resilience lands included
DWR Resilience	YES/NO - DWR identified resilience lands included
USFS Resilience	YES/NO - USFS identified resilience lands included
Map Date	Date the data was created
Deed Requirement	Required protections to meet ConserveVirginia standards

Water Quality Improvement Category: Once conserved permanently, water quality benefits of the lands in any of the inputs to this category will be further increased by establishing and maintaining natural vegetation in buffers. Conservation easements including deed requirements for such vegetated buffers will qualify as a ConserveVirginia success.

The *Water Quality Improvement Opportunity Areas* input identifies 788,974 acres of the highest priority lands for conservation in the interest of water quality improvement in general. It was developed via collaboration between the Department of Conservation and Recreation and the Department of Environmental Quality using estimates of nitrogen, phosphorus, and sediment loadings from agricultural sources from the Chesapeake Bay Program Phase 6 Watershed Model (CAST-2017d) and the Virginia Water Quality Assessment, and with consideration of the goals of the Chesapeake Bay Watershed Implementation Plan (WIP III). The basic approach was to identify watersheds (12-digit hydrologic units) with the highest (i.e., those in the 90th percentile) loadings of nitrogen, phosphorous, or sediment from any of the assessments used. Riparian areas along streams, creeks, and rivers in those watersheds are the focus of this *ConserveVirginia* input. Buffers were mapped for these waterways, where buffers ranged from 100 to 400 ft., depending on steepness of slope of adjacent lands. Generally, wider buffers were mapped for steeper slopes and for headwater streams. These buffer lands are where land conservation would be most effective to maintain and improve water quality.

The *Aquatic Life Conservation Opportunity Areas* input identifies 340,938 acres of the highest priority lands for conservation in the interest of protecting waters of high integrity. In order to identify waters with outstanding ecological conditions for consideration as high-priority conservation areas, DEQ conducted a thorough review of its biological monitoring data to identify least disturbed sites throughout the Commonwealth. Associated watersheds and

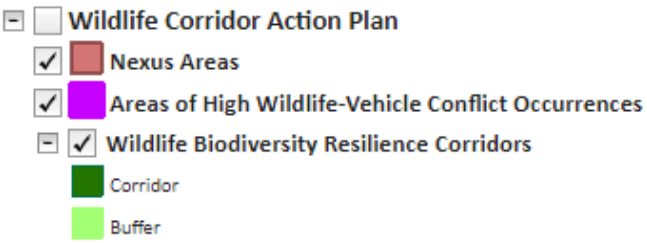
riparian buffers were used to identify land areas where conservation efforts may be most beneficial to protect high quality waters. DEQ identified 173 unique, high-quality watersheds with 845 km2 of riparian area. These land areas and freshwater systems support living aquatic communities that indicate least-disturbed water quality and habitat conditions. The overall water quality ratings based on these communities are among the top 5% expected in Virginia's streams and rivers, as indicated by the biomonitoring indices used by DEQ for conducting water quality assessments.

The *Healthy Waters Conservation Opportunity Areas* input identifies 186,653 acres of the highest priority lands for conservation in the interest of protecting confirmed healthy waters. Healthy waters are streams that are ranked as "outstanding" or "healthy" based on fish and macroinvertebrate communities, and instream and riparian habitat data, through a stream ecological integrity assessment known as Interactive Stream Assessment Resource (INSTAR). This input to ConserveVirginia was developed with funding from a Chesapeake Bay Implementation Grant in collaboration between the Department of Conservation and Recreation and the Center for Environmental Studies at Virginia Commonwealth University using estimates of nitrogen, phosphorus, and sediment loadings from agricultural sources from the 2020 NPS Pollution Assessment and Prioritization (DCR Soil and Water Conservation, 2020). The basic approach was to rank 10-km truncated drainages for each pollutant and retain those which had a relative yield in the top 50th-percentile for any of the three pollutants. For those drainages that remained, riparian buffers were delineated using overland flow length while accounting for soil sensitivity.

The *Restoration Candidate Best Management Practices Opportunity Areas* input identifies 156,089 acres of the highest priority lands for targeting agricultural best management practices (BMP) in the interest improving water quality for restoration candidate waters. This input targets waters that don't qualify as healthy based on fish and macroinvertebrate communities, and instream and riparian habitat data, from the stream ecological integrity assessment known as Interactive Stream Assessment Resource (INSTAR), but which may become healthy with restoration. This input to ConserveVirginia was developed with funding from a Chesapeake Bay Implementation Grant in collaboration between the Department of Conservation and Recreation and the Center for Environmental Studies at Virginia Commonwealth University. The first step in this analysis involved removing form consideration those 10-km truncated drainages that had greater than 5% impervious cover because BMP and land conservation would not be effective in improving the quality of waters degraded by residential and industrial development. The basic method was to delineated riparian buffers using overland flow length for the retained drainages and then extract and categorize non-impervious land covers within the riparian buffers. The classification allows for targeting non-agricultural covers for conservation and agricultural land covers for BMP and conservation.

Attribute	**Description**
Water Quality Improvement Opportunity Areas	YES/NO - high priority water quality improvement opportunity areas included
Restoration Candidate BMP Opportunity Areas	YES/NO - high priority restoration candidate BMP opportunity areas included
Aquatic Life Conservation Opportunity Areas	YES/NO - high priority aquatic life conservation opportunity areas included
Healthy Waters Conservation Opportunity Areas	YES/NO - high priority healthy waters conservation opportunity areas included
Map Date	Date the data was created
Deed Requirement	Required protections to meet ConserveVirginia standards

Wildlife Corridor Action Plan



Virginia is one of the first states in the eastern U.S. to create a *Wildlife Corridor Action Plan* (Plan) with a clear emphasis on protecting vital wildlife habitat corridors and reducing wildlife-vehicle conflicts, such as collisions, to promote driver safety. Wildlife corridors connect fragmented habitats separated by human activities or infrastructure; this habitat connectivity is vital to the long-term sustainability of wildlife biodiversity. When road infrastructure fragments wildlife habitats, some species of wildlife may need to move across roads to reach suitable habitats for fulfilling their food, water, shelter, and mating requirements. Wildlife-vehicle conflicts can occur, resulting in driver safety risks due to direct collisions with the animals or crashes from avoidance maneuvers, as well as wildlife population impacts such as significant mortality and barriers to dispersal. More than 60,000 known deer-vehicle collisions have occurred annually in Virginia since 2015, costing the Commonwealth and its citizens approximately $533 million each year.

To make roads safer for drivers and wildlife, wildlife crash countermeasures are more frequently being integrated into road transportation projects across the nation. For example, one measure is called a wildlife crossing, which is typically a road underpass or overpass specifically designed so wildlife can cross under or over a road. Benefits of integrating wildlife crash countermeasures into roads include safe wildlife passage, wildlife biodiversity resilience, improved driver safety, and reduced costs.

To create this *Wildlife Corridor Action* Plan for the Commonwealth, the Virginia General Assembly enacted § 29.1-578 and § 29.1-579 to establish a collaborative leadership team comprised of the Virginia Department of Wildlife Resources, the Virginia Department of Transportation, the Virginia Department of Conservation and Recreation, and the Virginia Department of Forestry.

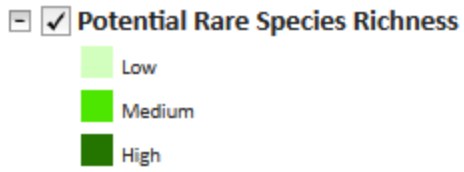
For more information about the Wildlife Corridor Action Plan, see the official website hosted by the Virginia Department of Wildlife Resources, from which the final Plan and data resources can be downloaded.

Nexus Areas: These areas include coarse-scale (25 square-mile) hexagons that represent opportunities where wildlife crash countermeasures could provide the mutual benefits of driver safety and wildlife corridor conservation. This layer resulted from a spatial overlay of the Areas of High Wildlife-Vehicle Conflicts and the Wildlife Biodiversity Resilience Corridors layers.

Areas of High Wildlife-Vehicle Conflict Occurrences: This layer represents the areas of highest wildlife-vehicle conflict based on available data. This layer is particularly relevant for collisions with white-tailed deer and black bear, due to how these two species are associated with more costly and injurious collisions for drivers. This layer resulted from a geospatial analysis of subsets from two databases, Virginia Roads and Virginia Smart Roads.

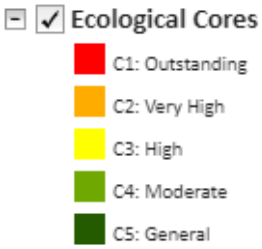
Wildlife Biodiversity Resilience Corridors: These corridors represent relatively intact, representative, and biologically diverse habitat connections that were designed to provide refugia and facilitate species distribution shifts as the climate changes and the landscape becomes more developed. They were developed using the Commonwealth's ConserveVirginia and top priorities of the Virginia Natural Landscape Assessment (VaNLA). The layer has classes for "Corridor" and "Buffer," with the former being connections between the highest priority Ecological Cores (see description for Ecological Cores layer) identified by the VaNLA and the latter being adjacent Ecological Cores that could buffer the central corridors to make them more resilient.

Conservation Planning



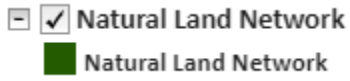
Potential Rare Species Richness: This layer categorizes 3-mile diameter hexagons into Low, Medium and High classes, based on the number of Predicted Suitable Habitat (PSH) layers that fall within the hexagon. An individual species' PSH layer is a raster layer, which identifies areas most likely to have suitable habitat for that species. PSH were developed using known occurrences, a Species Habitat Model, and expert opinion. For more information, see the How Do I Interpret the Potential Rare Species Richness Layer section. *Data source: VA DCR, Division of Natural Heritage, 2023*

Virginia ConservationVision: *The Virginia ConservationVision map layers are provided to assist in conservation planning efforts in Virginia. Developed originally as the Virginia Conservation Lands Needs Assessment (VCLNA) by Virginia DCR-Natural Heritage in 2008, ConservationVision maps and GIS layers are updated as needed, or as new data is obtained. Virginia ConservationVision helps users to make conservation decisions strategically, via accounting for the interests of different conservation stakeholders, and the public. The following provides a brief definition of each ConservationVision layer. More background on Virginia ConservationVision can be found on the DCR-Natural Heritage ConservationVision webpage. The rest of the layers outlined in this section are part of ConservationVision. Note that some of these layers are not able to be queried; they are display only and can be analyzed with the Identify tool; refer to Table 2.*

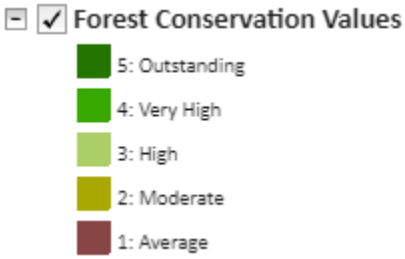


Ecological Cores: The Virginia Natural Landscape Assessment (VaNLA) is a landscape-scale GIS analysis that has identified, prioritized, and linked important lands to form natural land networks throughout Virginia. Using land cover data derived from satellite imagery, the VaNLA identified large, unfragmented cores, which are patches of natural land with at least 100 acres of interior cover. Cores provide habitat for a wide range of species, from interior-dependent forest species to habitat generalists, as well as for species that utilize marsh and maritime habitats. The cores layer represents cores as polygons that are symbolized by Ecological Integrity scores, calculated from an Ecological Composite Model (ECM). Maintaining vital natural landscapes is essential for basic ecosystem services such as cleaning our air and filtering our water. Natural lands also harbor thousands of species of animals and plants and contain libraries of genetic information from which we derive new foods, materials, and medicinal compounds. These parts of the landscape also provide us with recreational opportunities and open space resources. But these qualities are represented differently across the cores and habitat fragments that constitute the natural landscape. To assess their unique values, each core and habitat fragment has been assigned an Ecological Integrity score that rates the relative contribution of that area to ecosystem services such as wildlife and plant habitat, biodiversity conservation, open space, recreation, water resources protection, erosion control, sediment retention, protection from storm and flood damage, crop pollination, and carbon sequestration. In general, larger, more biologically diverse areas are given higher scores. Scores are enhanced if the core or habitat fragment is part of a larger complex of natural lands. Scores also are increased for those cores and habitat fragments that contribute to water quality enhancement. *Data Source: VA DCR, Division of Natural Heritage, 2017.* For more information, go to: http://www.dcr.virginia.gov/natural-heritage/vaconvisvnla.

Attribute	Description
Core ID	Unique ID representing each core feature
Core Rank	Ecological integrity score resulting from the Ecological Composite Model (ECM) for each core or habitat fragment
Total Acres	Total acreage of each core or habitat fragment



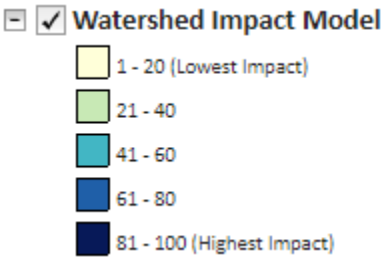
Natural Land Network: The VaNLA connects the highest priority Ecological Cores, i.e. those classified as having Outstanding Ecological Integrity (C1) or Very High Ecological Integrity (C2), to form the backbone of a statewide network known as the Natural Lands Network (NLN). This was done through creation of a model that represented impedances to wildlife movement and ecological flow through the landscape and then selection of routes with least resistance between Ecological Cores. These routes, known as least cost paths, were each expanded to a width of three hundred meters to enhance the integrity of natural corridors. This width maintains one hundred meters of interior cover along the entire length and one hundred meters of buffer on each side of corridors. The model guided corridors as much as possible through public and private natural lands with ecological value and protections from natural and anthropogenic disturbances. Where major roadways were intersected, and where possible, the model funneled corridors to existing bridge underpasses and large culverts associated with riparian habitats to improve viability by potentially providing safer passages for wildlife. The model also guided corridors through lower-ranked Ecological Cores, which were automatically integrated to complete the NLN, to provide additional habitats and increased suitability for sensitive species. By including lands of high ecological integrity and identifying lands that represent important natural connections, the NLN facilitates protection of biodiversity and resilience as the landscape changes. The NLN has the same Core ID and Core Rank attributes as in the table above, as well as a Corridor_ID attribute that gives the unique ID representing each corridor feature. *Data Source: VA DCR, Division of Natural Heritage, 2017.* For more information, go to website listed above for Cores.



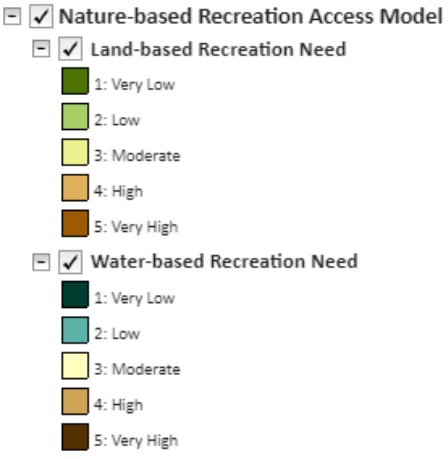
Forest Conservation Values: The Forest Conservation Value (FCV) model is a tool designed by the Virginia Department of Forestry (VDOF) to strategically identify the highest priority forestland for conservation in Virginia. The intent is to maximize the efficiency of limited resources by focusing conservation efforts on the highest quality, most productive, and most vulnerable forestland statewide. The original FCV model was developed in 2013 by the VDOF. Since that time, a number of factors necessitated an update to the 2013 model. The agency has sharpened its focus and priorities through a strategic planning effort completed in 2017. In 2017, VDOF's Forestland Conservation Program implemented a new conservation ranking and prioritization system designed to identify the highest priority projects on a quarterly basis; the FCV is a key component of this ranking system. The FCV is further intended to contribute to the Virginia ConservationVision, the suite of GIS models maintained by the Virginia Department of Conservation and Recreation (DCR) to inform a cohesive, statewide strategy for land conservation. As this multitude of needs were identified and as new data has become available, VDOF has taken the opportunity to create an up to date, improved FCV model to help inform both internal and statewide conservation efforts throughout the Commonwealth. The 2018 model applied a completely new approach, with different criteria, methodology, and datasets selected for the analysis than were used in 2013. In 2020 the model was updated again with more recent data for Conserved Lands and SSURGO soils, and with multi-year data from the National Land Cover Dataset (NLCD). The multi-year NLCD allowed development of a more accurate forest cover dataset based on a pattern of productive forest landuse over time rather than the landcover class from a single year. The 2020 model replaces the 2018 version and direct comparison among versions is not recommended. Model Components include: 1) Forested Blocks, 2) Forest Management Potential, 3) Connectivity, 4) Watershed Integrity, 5) Threat of Conversion, and 6) Significant Forest Communities and Diminished Tree Species

Six data input layers were created based on these components and were ultimately combined to create the final FCV model. The 2020 FCV model evaluates these criteria to prioritize the highest value forestlands for conservation. The model ranks all forestland in Virginia from 1 (lowest) to 5 (highest) FCV. More complete detail on the background for selection, methodology, and limitations of each component is available with the Data Download.

Data Source: Biasiolli, K., J. Pugh, and M. Santucci. 2020. Forest Conservation Value Model, 2020 Edition. Virginia Department of Forestry, Charlottesville, VA, USA. For more information, go to: https://dof.virginia.gov/forest-management-health/forestland-conservation/



Watershed Impact Model: This raster dataset (10-m resolution, TIF format) is the primary output of the Virginia ConservationVision Watershed Impact Model (2022 edition), a screening tool to assess where activities on the land are expected to have the greatest impact on water. A measure of the potential impact of terrestrial activity on water resources is derived from a soil sensitivity component and a landscape position component. Potential for impacts is based on precipitation, soil type, slope, and position in the landscape relative to surface waters and karst features. The Potential Impact Score values range from 1 to 100, with high scores indicating high potential for land cover change to impact aquatic resources downstream, either negatively (e.g., by converting forest to residential development) or positively (e.g., by restoring farmland to natural vegetation). Impact scores were derived by taking the mean value of the Landscape Position Score and the Soil Sensitivity Score. *Data Source: VA DCR, Division of Natural Heritage, 2022.* For more information, see https://www.dcr.virginia.gov/natural-heritage/vaconviswater.



Nature-based Recreation Access Model: The purpose of the Virginia ConservationVision Nature-based Recreation Access Model is to quantify the availability of opportunities for outdoor, nature-based recreation on Virginia's public lands and waters, and to identify areas where more opportunities are needed. We developed two layers to evaluate land- and water-based recreation needs.

Land-based Recreation Need

This layer is a representation of relative needs for land-based recreation across Virginia. Land-based recreation need is categorized into five levels from 1 (very low) to 5 (very high), and is calculated as a weighted average of four sub-scores with the following weights:

- Pressure Score - 70%
- Proximity Score - 5%
- Access Options Score - 20%
- Activities Options Score - 5%

Water-based Recreation Need

This layer is a representation of relative needs for water-based recreation across Virginia. Water-based recreation need is categorized into five levels from 1 (very low) to 5 (very high), and is calculated as a weighted average of four sub-scores with the following weights:

- Pressure Score - 70%
- Proximity Score - 5%

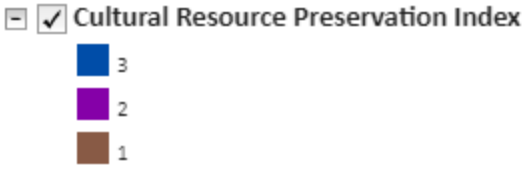
- Access Options Score - 20%
- Activities Options Score - 5%

The model is a contribution to the digital conservation planning atlas known as Virginia ConservationVision. It is intended to assist land planners prioritizing lands for conservation and recreation access, and is used by granting organizations such as the Virginia Land Conservation Foundation to help allocate funding for various conservation and recreation projects.

Data Source: VA DCR, Division of Natural Heritage, 2021. For more information, visit: http://www.dcr.virginia.gov/natural-heritage/vaconvisrec.

Cultural Resource Preservation Index

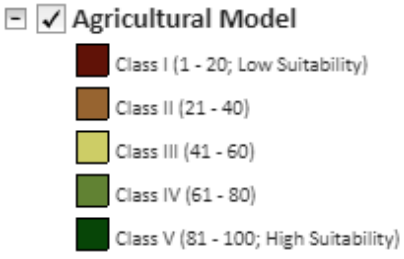
The Cultural Resource Preservation Index displays likelihood of a given location to have conservation value when considering known and evaluated cultural heritage resources. For the purposes of obscuring sensitive boundaries the Commonwealth of Virginia was divided into a hexagon grid (individual hexagons are ~250 acres in size). Resources that have been surveyed in the inventory of the Department of Historic Resources (DHR) were ranked by levels of cultural interest, defined in the attribute field MAX_Preservation_Index as:



3 = Listed as National Historic Landmarks (Highest)
2 = Listed on, contributing to, or eligible for listing on the National Register of Historic Places/Virginia Landmarks Register
1 = Sites/properties without formal evaluations of eligibility that are recommended to have potential for eligibility

Resources with rankings attached were joined to the hexagons and all attribute data was stripped away. The index value for each hex is equal to the highest value of cultural significance contain within it. For example if three resources overlap within a hexagon with values of 2, 1, and 3 the value of the hexagon will be 3. The index value is not cumulative.

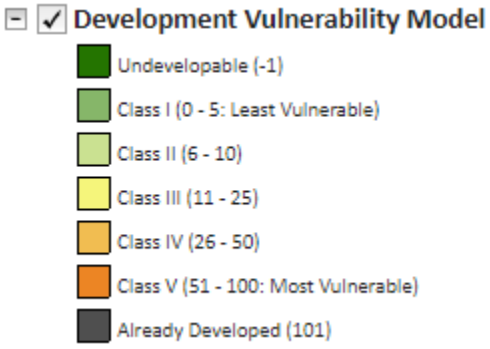
This dataset does not include sites or properties that remain unevaluated, nor does it include areas of the commonwealth that have not been surveyed for cultural resources. Data Source: Virginia Department of Historic Resources - March 15, 2018. For more information, go to: http://www.dcr.virginia.gov/natural-heritage/vaconviscultural



Agricultural Model: The Virginia Agricultural Model is a raster dataset that quantifies the relative suitability of lands for agricultural activity. Agricultural value is assessed primarily based on inherent soil suitability, but also accounts for current land cover as well as travel time between agricultural producers and consumers. Model values range from 0 (unsuitable for agriculture) to 100 (optimal).

Attribute	Description
Model Value	The agricultural suitability score, ranging from (unsuitable) to 100 (optimal).
Agricultural Suitability Class	The class in which the suitability score falls, ranging from 1 (low suitability) to 5 (high suitability)

NOTE: In this visualization, any area not in agricultural use is scored 0. Pixels with the value 0 are transparent and thus not visible in the map. *Data Source: VA DCR, Division of Natural Heritage, 2015.* For more information, go to: http://www.dcr.virginia.gov/natural-heritage/vaconvisagric.



Development Vulnerability Model: The Virginia ConservationVision Development Vulnerability Model quantifies the relative risk of conversion from natural, rural, or other open space lands to urbanized or other built-up land uses. Using land cover data from multiple time periods and a suite of predictor variables representing driving forces of development, a machine-learning approach was employed to estimate the relative risk of development in the future. The model output is a raster data set in which the relative vulnerability of lands ranges from 0 (least vulnerable) to 100 (most vulnerable). Conservation lands on which biodiversity preservation is believed to be the primary goal are considered undevelopable and are coded as -1, while areas in which development has already occurred are coded as 101. The model is based on ground conditions ca. 2019 and represents the relative likelihood of development by 2029. *Data Source: VA DCR, Division of Natural Heritage, 2022.* For more information, go to http://www.dcr.virginia.gov/natural-heritage/vaconvisvulnerable.

Attribute	Description
Vulnerability Value	The vulnerability score, ranging from 0 (least vulnerable) to 100 (most vulnerable). Areas considered undevelopable are coded as -1, and already-developed areas are coded 101.
Vulnerability Class	Classification of the vulnerability value into already developed, undevelopable, or a vulnerability category ranging from 1 (least vulnerable) to 5 (most vulnerable).

Karst Research*

Dye Inputs, Monitor Points, Dye Trace Vectors:
These layers represent the generalized dye trace vectors, injection points, and monitoring points associated with dye trace studies performed by a variety of authors in Virginia's karst region. Users requiring local details should consult the original, referenced publication, if available, or contact the DCR Natural Heritage Karst Protection Coordinator. In some cases, locations are generalized and/or offset to protect sensitive locations. Details on these locations are available on a case by case basis. The primary purpose of these coverages is to alert the user to the fact that information on hydrological studies for the area is available. Absence of karst research layer vectors or points in a specific area does not necessarily mean that no detailed studies have been performed. *Note that these layers are not able to be queried; they are display only and can be analyzed with the Identify tool. Data source: VA DCR, Division of Natural Heritage, 2006.*

Reference Layers

24K Grid: This dataset represents the outlines for the digital versions of the USGS 1:24,000 scale USGS topographic maps. *Data source: U.S. Geological Survey*

National Wetlands Inventory (NWI): This dataset represents the extent, approximate location, and type of wetlands and deepwater habitats in the coterminous United States. These data delineate the areal extent of wetlands and surface waters as defined by Cowardin et al. (1979). *Data Source: U.S. Fish and Wildlife Service, 2016.* http://www.fws.gov/wetlands/

Scenic Rivers: State Scenic Rivers in Virginia as designated by the General Assembly. *Data source: Virginia Department of Conservation and Recreation, 2020.* http://www.dcr.virginia.gov/recreational-planning/srmain

VDE Sinkholes: This dataset represents karst-related sinkholes as mapped by Dave Hubbard of the Virginia Department of Energy (formerly Department of Mines, Minerals and Energy). The dataset is intended to show, in a general sense, the distribution and relative intensity of karst development in western Virginia. Sinkholes were interpreted from 1:24,000-scale stereo air photo pairs. Extensive field checking indicates that the dataset depicts only a fraction of the sinkholes actually present. These data were originally published in printed form as Division of Mineral Resources Publications 44, 83, and 167 at 1:250,000-scale. Dataset is informally known as "Hubbard Sinkholes."

Streams (NHD): The National Hydrography Dataset (NHD) is a comprehensive set of digital spatial data that contains information about surface water features such as lakes, ponds, streams, rivers, springs and wells. Within the NHD, surface water features are combined to form "reaches," which provide the framework for linking water-related data to the NHD surface water drainage network. These linkages enable the analysis and display of these water-related data in upstream and downstream order. The NHD is based upon the content of USGS Digital Line Graph (DLG) hydrography data integrated with reach-related information from the EPA Reach File Version 3 (RF3). The NHD supersedes DLG and RF3 by incorporating them, not by replacing them. Users of DLG or RF3 will find the National Hydrography Dataset both familiar and greatly expanded and refined. *Data source: U.S. Geological Survey, 2018.* http://nhd.usgs.gov/

Trails: Currently includes the Appalachian Trail, trails located in many Virginia State Parks, National Forests and Shenandoah National Park, and some other major trails. State Trails include existing trails, on-road routes and proposed trails that connect to create a state or regionally significant network of trails. These data are updated as more information becomes available; visit http://www.dcr.virginia.gov/recreational_planning/tr-sbiib2 for additional details. *Data sources: VA DCR, NPS, USFS, Appalachian Trail Conference. Trailheads, Managed Trails, State Existing Trails: 2017. State Proposed Trails: 2016.*

USGS Placenames: Includes all features labeled on Virginia's USGS Topographic Quadrangles. *Data source: U.S. Geological Survey, 2017.* https://www.usgs.gov/core-science-systems/ngp/board-on-geographic-names

VDOT Roads: The Road Centerline Program (RCL) leverages the Commonwealth's investment in the VBMP digital orthophotography and is focused on creating a single statewide, consistent digital road file. The RCL data layer is a dynamic dataset supported and maintained by Virginia's Local Governments, VDOT, and VGIN. VBMP RCL is extracted and provided back to local governments and state agencies in many geographic data sets every quarter. When the service opens by default the "Ramps and Arterials" and "All Other Roads" are turned off. *Data source: Virginia Geographic Information Network, 2019.* https://vgin.maps.arcgis.com/home/index.html

Boundaries

Counties: Jurisdiction boundaries for all counties (95) and cities (39) in Virginia at a precision that is, at a minimum, from heads-up digitizing off of USGS Digital Raster Graphics (DRGs); 2004 edition. *Data source: VA-DCR Division of Soil and Water Conservation.*

Physiographic Provinces: A physiographic province is a landform region, an area delineated according to similar terrain that has been shaped by a common geologic history. Each province is characterized overall by its elevation, relief, lithology, and geologic structure. *Data source: VA DCR, Division of Natural Heritage.*

Planning Districts: There are 21 planning districts in Virginia, each exists under the jurisdiction of a separate Planning District Commission (PDC). *Data source: Virginia Geographic Information Network.*

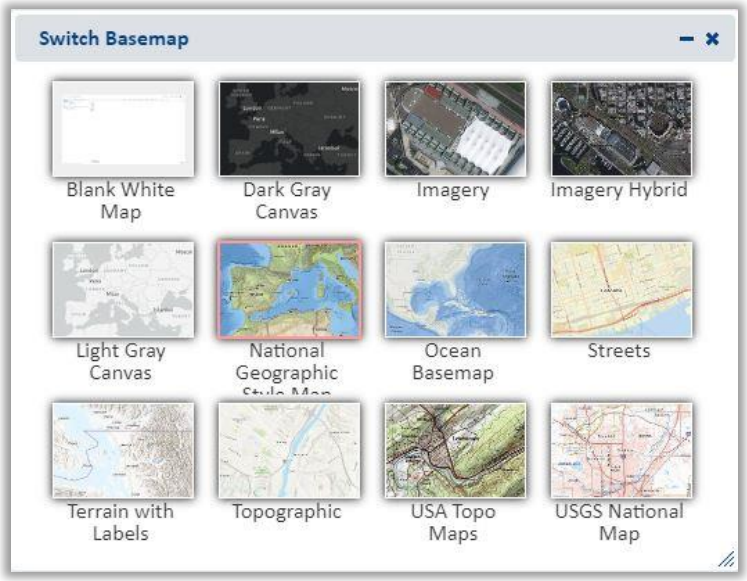
Subwatersheds (12 digit USGS): The boundaries of the 494 hydrologic units in Virginia at the 14 digit level of detail. This dataset covers the whole state and these units are the immediate subsets of the 11 digit level of hydrologic units in Virginia. Developed for finer watershed planning work in the state than the 11 or 8 digit level of hydrologic unit allows. This level is the basis for Virginia's non-point source pollution assessment and ranking. It is the official statewide

hydrologic unit delineation for water quality reporting. *Data sources: EPA/VA-DCR Division of Soil and Water Conservation.*

Watersheds (8 digit USGS, subbasin): The United States is divided and sub-divided into successively smaller hydrologic units, or watersheds, which are classified into four levels: regions, sub-regions, accounting units, and cataloging units. The hydrologic units are arranged within each other, from the smallest (cataloging units) to the largest (regions). Each hydrologic unit is identified by a unique hydrologic unit code (HUC) consisting of two to eight digits based on the four levels of classification in the hydrologic unit system. *Data source: VA-DCR Division of Soil and Water Conservation.*

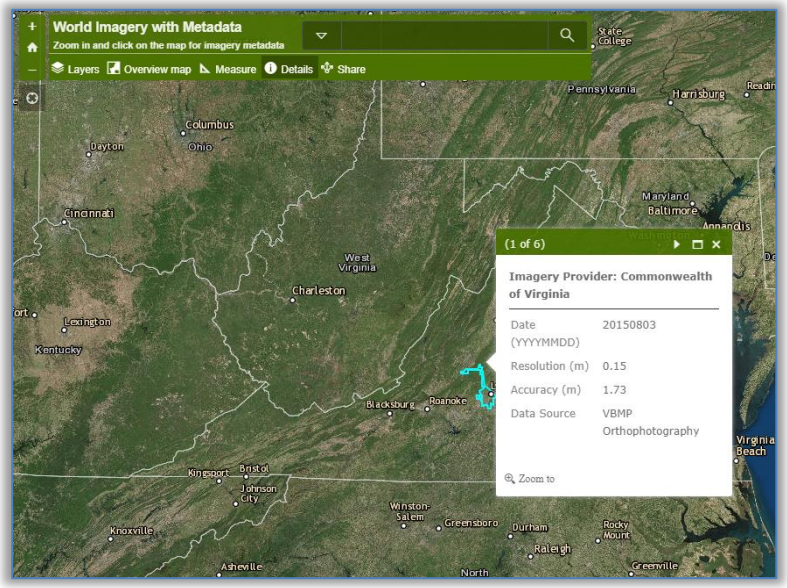
Virginia Boundary: Virginia state boundary *Data source: VA-DCR Division of Natural Heritage*

Basemaps



Basemaps are used to give geographical context for the layers displayed in the map viewer and can be changed based on the particular users' needs. The basemap gallery provided on NHDE contains the following basemaps: Imagery, Imagery Hybrid, Streets, Topographic, Terrain with Labels, Dark Gray Canvas, Light Gray Canvas, National Geographic Style Map, USA Topo Maps, USGS National Map, and Ocean Basemap. A Blank White Map is available in lieu of the ability to turn the basemap on and off in the Layer list.

Note that the default visible map scale differs for each basemap, so depending on the users' zoom level in the map viewer, the basemap may or may not appear. Refer to Table 1 for the minimum and maximum display thresholds for basemaps and other layers in the map viewer.



To view a web application that allows the user to identify the metadata for the Imagery basemaps provided in NHDE, visit this link: https://arcg.is/1LSn4W0.

This application features metadata information for the imagery that is published in ESRI's World Imagery map. Zoom in or search for an area and click on map for metadata information. Imagery metadata is available at the following resolutions: 30cm, 60 cm, and 1m. When the details window appears, scroll through the results by clicking on the arrow that appears at the top right corner of the pop up window.

Table 1. Viewing scale thresholds for all layers on the NHDE Map Viewer. Please see the above layer descriptions for further information regarding layer groups (blue, below) and the layers within them

Map Layer or Group	Display Threshold: Minimum Scale	Display Threshold: Maximum Scale
*Natural Heritage Resources**		
Documented Element Occurrences and NH Screening Layer	1:577,791	1:1,128
Predicted Habitats- all layers*	No threshold	1:1,128
Managed Conservation Lands layer	No threshold	1:1,128
Wildlife Corridor Action Plan	No threshold	1:1,128
ConserveVirginia v3.0- all layers	No threshold	1:1,128
Conservation Planning- all models except those listed below	No threshold	1:1,128
Potential Rare Species Richness	No threshold	1:2,311,162
Karst Research- all layers*	1:288,895	1:72,224
Reference Layers:		
24K Grid	No threshold	1:1,128
National Wetlands Inventory	No threshold	1:1,128
Scenic Rivers	No threshold	1:1,128
VDE Sinkholes	No threshold	1:1,128
Streams (NHD)	1:288,895	1:1,128
Trails		
Trailheads, Managed Trails, State Existing Trails	No threshold	1:1,128
State Proposed Trails	No threshold	1:288,895
USGS Placenames	1:72,224	1:1,128
VDOT Roads	1:288,895	1:1,128
Boundaries- all layers	No threshold	1:1,128
Basemap:		
Imagery	No threshold	1:1,128
Imagery Hybrid	No threshold	1:1,128
Streets	No threshold	1:1,128
Topographic	No threshold	1:1,128
Terrain with Labels	No threshold	1:4,514
Dark Gray Canvas	No threshold	1:1,128
Light Gray Canvas	No threshold	1:1,128
National Geographic Style Map	No threshold	1:1,128
USA Topo Maps	No threshold	1:18,056
USGS National Map	No threshold	1:9,028
Ocean Basemap	No threshold	1:36,112

Table 2. Layers that cannot be queried; they are display only and can be analyzed with the Identify tool

Map Layer Group	Layer Name
Natural Heritage Resources	Documented Element Occurrences and NH Screening Layer (no spatial search; attribute search available)
Predicted Habitats	All Predicted Suitable Habitat layers
ConserveVirginia v3.0	All ConserveVirginia layers
Conservation Planning	Watershed Model
	Nature-based Recreation Access Model
	Agricultural Model
	Development Vulnerability Model
Karst Research	Dye Inputs, Monitor Points, Dye Trace Vectors

ACCESS AND PERMISSIONS

The Natural Heritage Data Explorer has 4 levels of access based on the needs of constituents and partners.

Public Access (no login required) includes the ability to:

- Display and query map layers including county boundaries, streams, trails, wetlands, watersheds, managed conservation lands, and conservation planning layers including ConserveVirginia v3.0 and Predicted Suitable Habitats Summary.
- Use a suite of tools to explore Virginia data and perform basic analyses including feature queries, area measurements, etc.
- Search a map layer for a certain feature and zoom to it, or display more detailed information.
- Zoom into an area and view data layers with any map gallery basemaps.
- Make a map by adding point, line, or polygon annotations for an area of interest and creating text labels.

Tier 1 allows the logged in subscriber to:

- Perform all functions available to Public Access users.
- Display Natural Heritage Screening Layer features and Predicted Suitable Habitats Summary
- Delineate a proposed project boundary or upload a project boundary shapefile and submit a project for review
- Receive automatically, a PDF format report of Natural Heritage Screening Layer features intersecting with the project boundary 100ft buffer and a table listing the screening features that intersect the project boundary.

Tier 2 allows the logged in subscriber to:

- Perform all functions available to Public Access and Tier 1 users.
- Delineate a proposed project boundary or upload a project boundary shapefile and submit a project for review.
- Receive automatically, a PDF format report of Natural Heritage Screening Layer features that intersect the project boundary 100ft buffer. This report will also include a table listing those screening features and Natural Heritage resources (Element Occurrences) which intersect with the project area buffer.

Tier 2 Plus allows the logged in subscriber to:

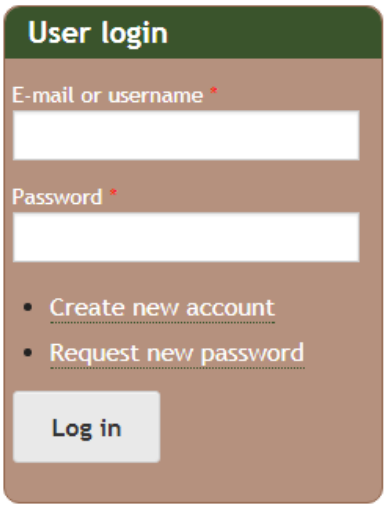
- Perform all functions available to Public Access, Tier 1 and Tier 2 users.
- View and query Predicted Suitable Habitat Models by Taxa within the map viewer.

Tier 3 allows the logged in subscriber to:

- Perform all functions available to Public Access, Tier 1 and Tier 2 users.
- View and query Natural Heritage Screening Layer features and Natural Heritage resource (Element Occurrences, including General Location Natural Heritage Resource) boundaries and Predicted Suitable Habitat Models by Taxa within the map viewer.
- Receive automatically, a PDF format report including a table and map of Natural Heritage Screening Layer features and Documented Element Occurrences that intersect the project boundary 100ft buffer.

Any NHDE user can use the site at the Public Access level after agreeing to Terms and Conditions, without registering, logging in, or joining a subscription. In order to access the sensitive natural heritage resource information and project review functionality at Tier I, II or III access levels, the user should send an email to nhderegister@dcr.virginia.gov, indicating interest in setting up an account and a subscription.

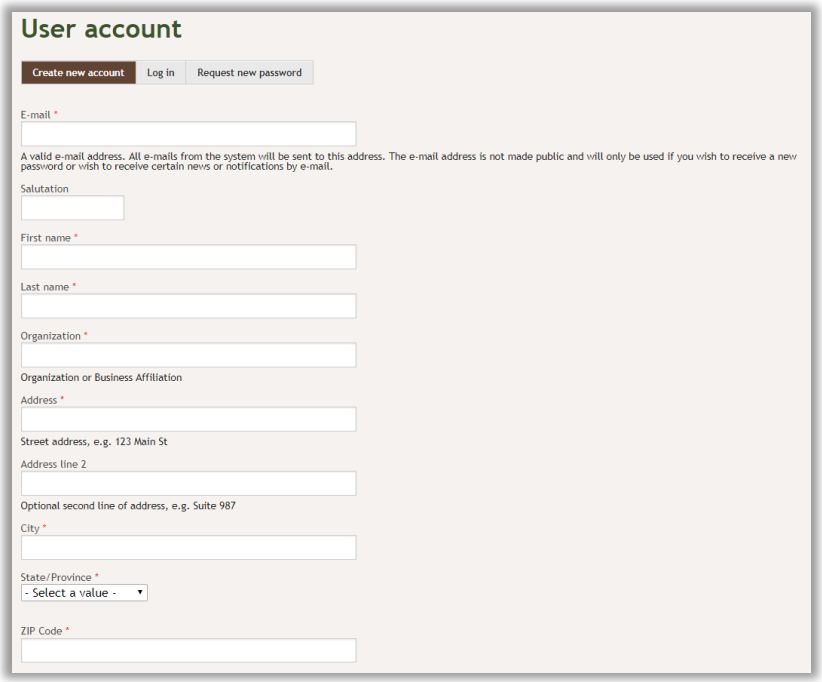
Creating an Account

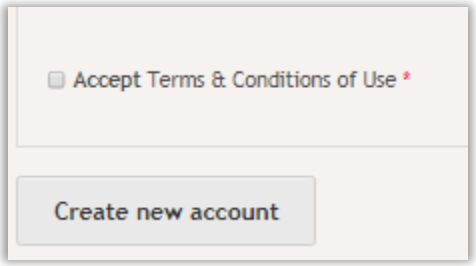


Send an email to nhderegister@dcr.virginia.gov, indicating interest in setting up an account and how NHDE will be utilized by the company or organization. Natural Heritage Program staff will respond with a follow up email or phone call within 5 business days to facilitate user account and subscription creation.

After this initial contact, follow these instructions to create an account:

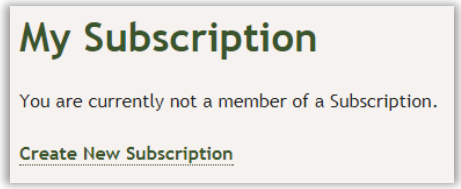
1. On the NHDE home page, click 'Create new account' under the Login menu. *Note that a valid email address is needed; all reports from the NHDE system will be sent to this address. The email address is not made public and will only be used to send the results of project reviews, password resets, or other notifications.*
2. Supply the required information on the account registration page, denoted by red asterisks (*). *Note that the information supplied will be used in all correspondence generated from the NHDE, including letter responses contained in site-specific project reviews. Enter information as it should appear in correspondence from the NHDE; avoiding acronyms and abbreviations is recommended.*





3. Read and accept the Terms and Conditions of Use. *Note that if the Terms and Conditions are updated in the future by Natural Heritage, they will need to be re-read and accepted before the user can access NHDE again.*
4. Click 'Create new account' at the bottom of the page.
5. A message will appear on the NHDE home page, indicating that further instructions have been sent to the email address entered during account creation.
6. Open the email and click on the link provided to activate the new account.
7. Click the 'Log in' button on the Reset Password page. Create and confirm the password for the account; a strong password should have at least 6 characters containing both lowercase and uppercase letters, numbers, and punctuation. Scroll to the bottom of the page, select the appropriate time zone, and click 'Save.'
8. A message will appear at the top of the page, indicating that the changes have been saved. *Note that once an account is created, the user will need to create or join an existing subscription- see the next section.*

Creating or Joining a Subscription



Once an account is created, the user may either:

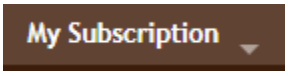
- Create a subscription, and become the **Subscription Admin**, or primary managing owner of that subscription.
- Join an existing subscription, or group, to become a **Subscription Member**. To join a subscription, the user must be invited, via email, by that subscription's admin. Joining the subscription allow the same Tiered access level as that admin, and all others in that group.

Differing Roles and Who Does What?

There are two main roles with differing permissions and responsibilities regarding subscriptions. The subscription links together multiple members who work together within an organization or agency.

- **Subscription Admin:** The member that creates a subscription for a particular organization or agency, and is the subscription owner, or primary manager. This admin can invite other members to join the subscription group and can cancel any other members' access to the subscription. The Subscription Admin is Virginia Natural Heritage's point of contact for anything involving the subscription for their particular organization.

- **Subscription Member:** One of many possible members within an organization that has joined a NHDE subscription. The Subscription Admin invites members to join a subscription group and approves all members.

Once an account is created, a 'My Subscription' link is available in the navigation bar: 

The 'My Subscription' link will go to a page that allows the user to create a subscription or, if already subscribed, states the subscription group name and lists the group admin. The user can also view group members and edit their profile information through this page. *Note that the user may be a member of only one subscription at a time.*

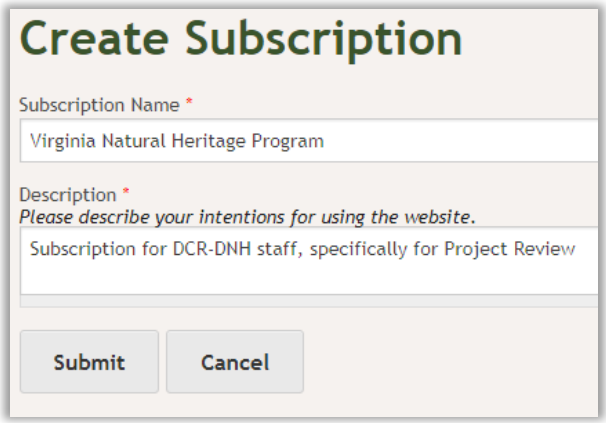
Subscription Admin: Create and Add Users to a Subscription

The creator of the subscription is identified as the managing Subscription Administrator, or Admin. The Admin manages who can access the subscription and is the Natural Heritage Program's point of contact for any inquiries or updates to the subscription. The Admin may identify additional Admins for the same subscription on their 'Edit Membership' page.

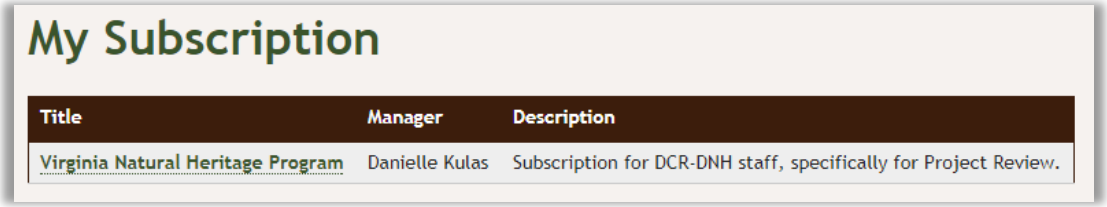
Important: It is the responsibility of the Admin to appropriately safeguard and protect any information related to this subscription and user registration. This includes, but is not limited to:

- Verifying all members of the subscription are aware of terms and conditions related to the use of the NHDE website.
- Not sharing passwords or other registration information with anyone.
- Not publicizing or openly documenting the URL or user registration information.
- Providing accurate user registration information.
- Deactivating members who have retired or left their organization.
- Helping ensure all members have received adequate training on using the NHDE website and interpreting Natural Heritage data.

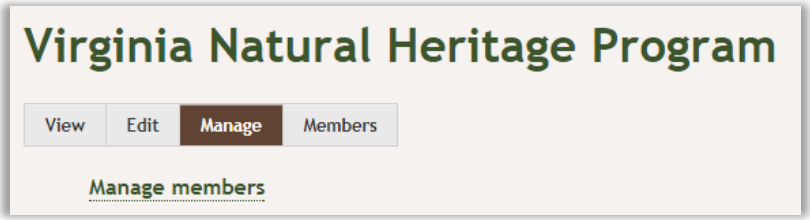
To create a subscription, follow these steps:



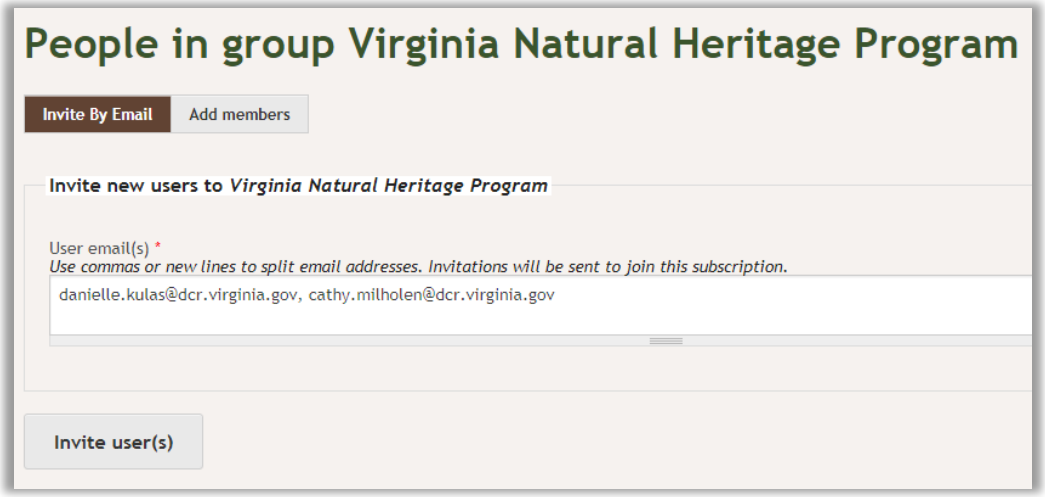
1. After the account is created and the Admin is logged in, click on the 'Create New Subscription' link under the 'My Subscription' menu tab on the navigation bar.
2. Fill out a unique subscription name and description on the Create Subscription page and click 'Submit.' *Note that the name of the subscription will appear as the title for the subscription's pages, so it should be descriptive based on how the subscription is to be used and avoid acronyms/abbreviations.*
3. An email will be sent to Virginia Natural Heritage informing them that a subscription has been created. **At this point, the new subscription provides site use at a public access level, which does not include sensitive Natural Heritage resource information or the ability to submit projects for review.**
4. Natural Heritage staff review the subscription and, upon receipt of a signed license agreement and completion of training, gives Tiered access to sensitive Natural Heritage data. The Natural Heritage Program will send an email stating the Tiered access level for the subscription, with a link to the subscription page.
5. The subscription creator is now the Subscription Admin and can invite users to join the subscription. On the 'My Subscription' page, click on the subscription's name.



6. Click the 'Manage' tab, then click 'Manage members.'



7. To invite members, click the 'Invite by Email' tab, then enter email addresses for the desired members to join the subscription. Use commas or new lines to separate the email addresses. Once all email addresses have been entered, click 'Invite users(s).' A pop-up window will then appear stating that invitation(s) have been sent via email. The Subscription Admin may add additional email addresses to the subscription at any time on this page.

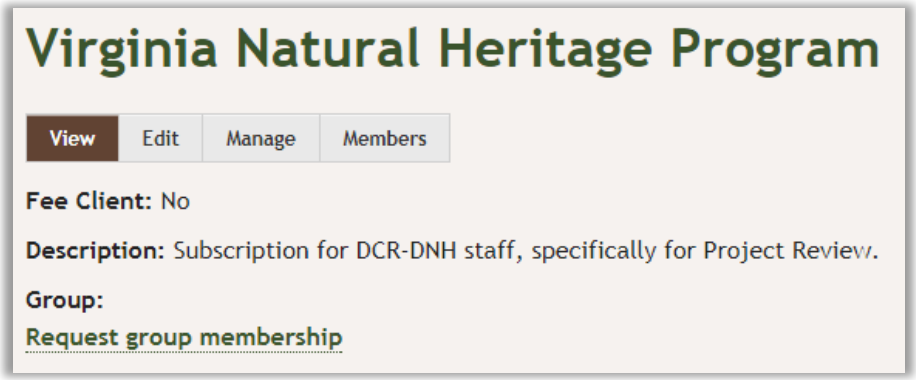


8. Once invited, members will receive the invitation via email. They will either create an account, or if they already have an account, will log in to NHDE and request to join the group.
9. **The request must be approved by the Subscription Admin in order for the user to join a subscription**; the Admin will receive an email from NHDE that includes a link to the Edit Subscription page. To approve the request, the Admin will click on 'Manage,' then 'Manage Members,' then scroll to the bottom of the page. Click on 'Edit,' to the right of the member's name who made the request (their status will say 'Pending'). On the 'Edit Membership' page, choose 'Active' as the Status, and click 'Update Membership.' The member will then receive an email notifying that the subscription has been successfully approved.

Subscription member: Join a Subscription

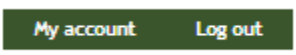
A Subscription Admin will send an email via the NHDE asking you to join the subscription. *Note that you cannot join a subscription without being invited by the Admin.*

1. Users that DO NOT already have an account on NHDE, follow these steps to join a subscription:
   a) Register for an account on the NHDE Home Page (see Creating an Account, page 27). After submitting the account registration form, an email will be sent containing instructions on account activation.
   b) Click on the activation link in the email to create a password an enable the account.
   c) Return to the subscription invitation email and click on the link for the subscription.
   d) Request to join the subscription.
2. Users that DO already have an NHDE account, follow these steps to join a subscription:
   a) Click on the link provided in the email from the Subscription Admin.
   b) Log in and the page will redirect to the Subscription page.
   c) Click the 'Request Group Membership' link to join the subscription. Add a request message if appropriate, and click 'Join.'
3. Once the Subscription Admin approves the request, an email will be sent confirming subscription membership.
4. The subscription member can now view their Tier level on the main subscription page, and can also view other members associated with the subscription.

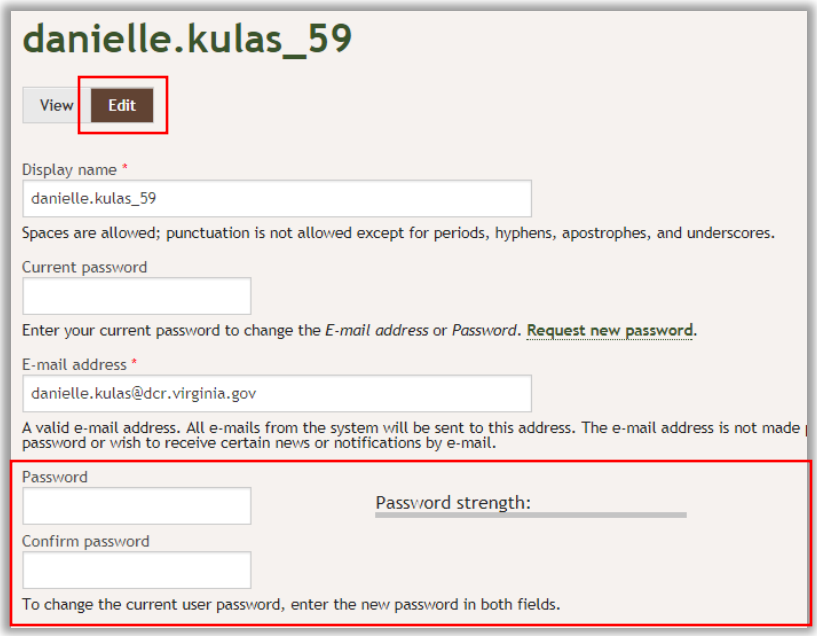


Resetting User Password

The NHDE user is responsible for resetting passwords; Virginia Natural Heritage staff are not able reset NHDE user passwords. To change the user password, while logged in to NHDE, click on the 'My Account' button on the top right corner of the screen (if the password has been forgotten and needs to be reset, go to the next page):

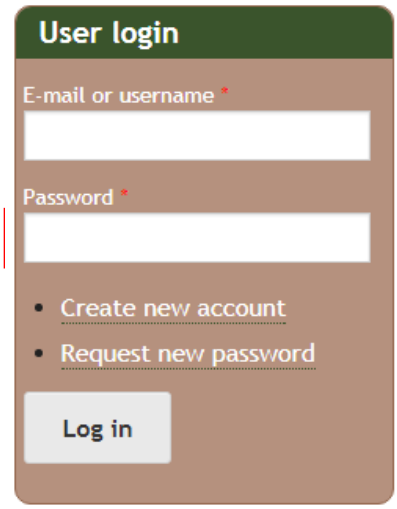


Click on the “Edit” tab, enter the new password in both ‘Password’ and ‘Confirm password’ fields. Click ‘Save’ at the bottom of the page to reset the user password. A message will appear indicating that the changes have been saved.

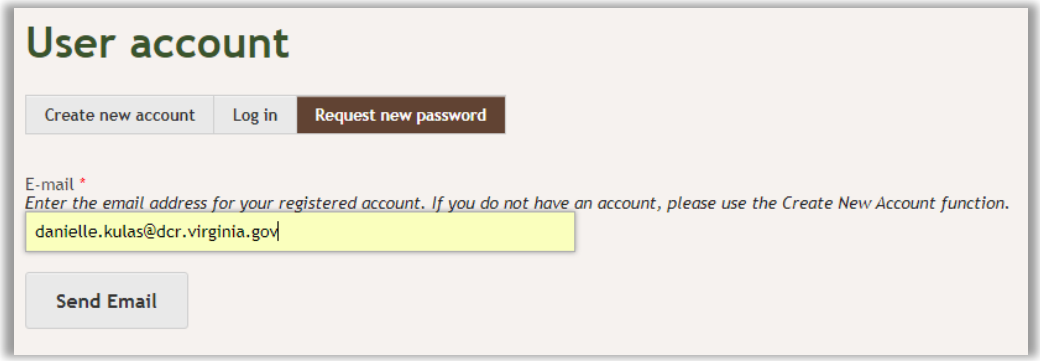


Requesting New Password

If the password has been forgotten and the user cannot log in to NHDE, click on the ‘Request new password’ button on the user login menu on the NHDE home page:



Enter the email address associated with the account in the user account menu and click ‘Send Email.’ A message will appear indicating that further instructions have been sent to the e-mail address supplied.



Click on the link provided in the email; it will go to **a one-time log in that will expire after one day**. Click ‘Log in’ and follow the steps to change the user password, provided in the Resetting User Password section (previous page).

PROJECT REVIEW

The NHDE allows subscribers to submit site-specific project areas for review by either drawing a project boundary, or by uploading a zipped shapefile of the project boundary and/or any applicable attachments. The project boundary 100ft buffer is intersected with Natural Heritage Program data to provide an automatically generated report of natural heritage resources documented within the project boundary buffer. The report includes a letter that summarizes the results and tables that provide information on documented natural heritage resources relative to the project boundary buffer and if predicted suitable habitat models or Ecological Cores intersect the project area. The report also includes a map that shows the estimated extent of natural heritage resources within the project area, depending on user Tier level.

Note that the map included in the report only shows resources that intersect the project boundary 100ft buffer; natural heritage resources beyond the project boundary buffer are not shown on the map, but can be viewed in the Map Viewer if the user has the appropriate Tiered access.

Please refer to the Terms and Conditions on the NHDE website for important information regarding the use of Natural Heritage Program data. The absence of records for natural heritage elements within a project area does not necessarily mean that they are not present. It may mean that the area has not been surveyed, for instance. The use of Natural Heritage Program data is not intended to substitute for actual field surveys.

For instructions on how to create a project for review, see the Submit a project for review topic in the How Do I section.

For more information on the attributes included in the report tables, please see the Definitions section.

For assistance in interpreting the results received in the report, contact NHDE Support: nhdesupport@dcr.virginia.gov.

FEATURE SEARCH

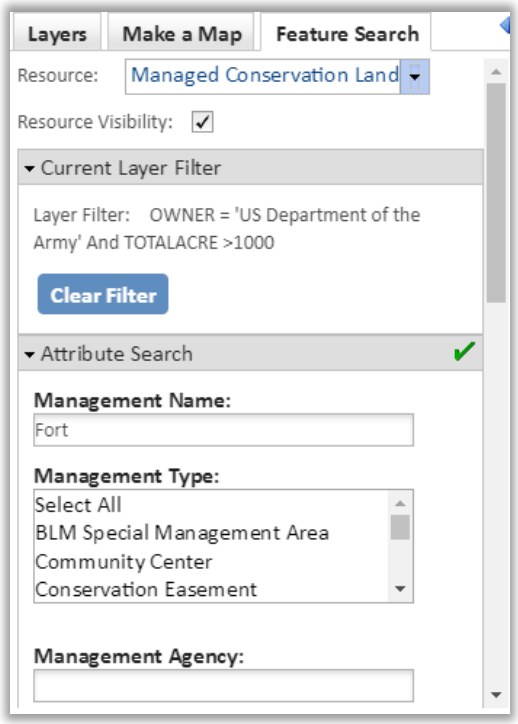
The Feature Search (formerly Find/Results) tab allows users to search data associated with map layers by selecting features via an attribute search or a spatial search. Features are the components of a layer consisting of the same spatial representation, such as points, lines, or polygons. Search results can be instantly viewed in a list and within the map window. The spatial search and attribute search can be used separately or together; see examples below. Note that some layers are not queryable; they are display only and can be analyzed with the Identify tool; refer to Table 2.

Resource is the layer on which the attribute or spatial search is to be performed. Select the Resource layer from the pull-down menu.

Resource visibility is checked by default so that the search is visible in the map viewer; click on the check box to turn the resource layer off, removing it from map display.

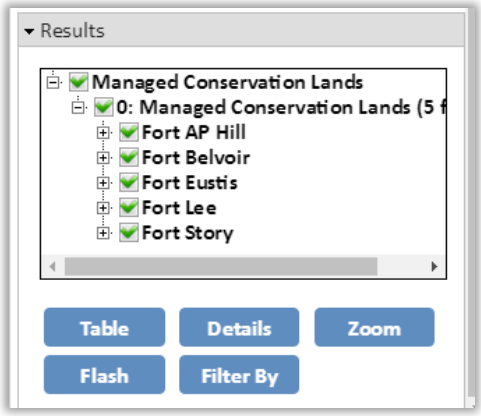
Attribute Search

Allows the user to search the layer of interest by its attributes. More than one attribute may be used as search criteria at once.



In this example (left), the Managed Conservation Lands layer can be searched on by its Name, Type, Agency, Level, Public Access status, and Acreage fields.

For instance, if the user wanted to find all Federally Managed Conservation Lands with the word 'Fort' in the name, they would type 'Fort' in the 'Management Name' field, and select 'Federal' from the 'Management Level' field.



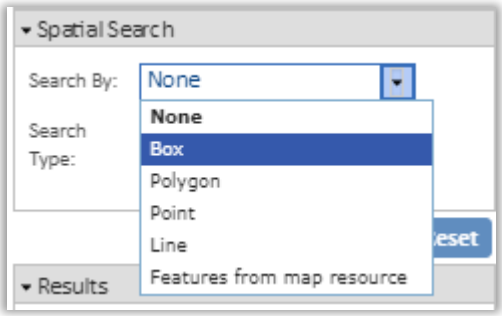
If a filter is applied to the layer, it will be shown (and may be cleared) in the 'Current Layer Filter' section. Alternatively, the user may also check 'Ignore Filter' next to the search button.

Once the user scrolls down and selects 'Search,' the results (right) appear in a list at the bottom of the Feature Search panel. The results may be viewed in a table (and can be exported to CSV or PDF), or individually by selecting 'Details.' Filter the layer to show only the Feature Search results by clicking 'Filter By.'

Note that searchable fields change based on the layer on which the search is being performed. That is, the fields in the Attribute Search section will alter based on the layer specified in the resource pull-down list. Also note that layers that cannot be used in the Feature Search have dashes surrounding the layer name, for example: --ConserveVirginia v3.0--

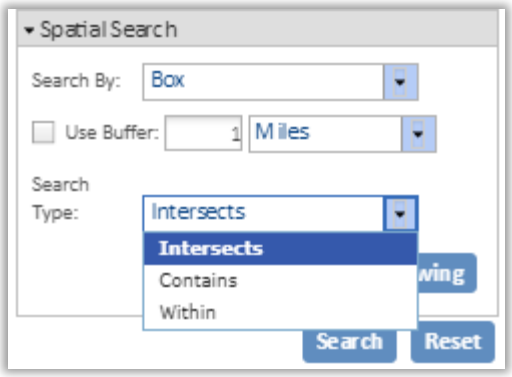
Spatial Search

Spatial search allows the user to spatially search the layer of interest. *Note that Spatial Search is not available for Natural Heritage Resources, Predicted Habitats, Potential Rare Species Richness, or Karst Research Layers.*



Search By: a subset of features can be selected by a spatial search; either an area delineated by the user (box, polygon, point, or line), or selected by its relation to another layer in the map viewer (Features from map resource).

Search Type: This field determines how the search is performed in regards to how the layer of interest relates to its spatial search criteria. So, if searching by a box, the user can determine what features intersect the box, are contained by the box, or what features lie completely within the box. *Note that depending on the 'Search By' input, additional options (such as the ability to apply a buffer to the search input or the ability to draw the search input freehand) will become available.*



The different types of spatial searches are outlined as follows (this example uses a polygon as the 'Search By' criteria on the Managed Conservation Lands layer):

Use the pull-down options on the Spatial Search menu to select the desired search input for *Search By* and *Search Type*. Click on the map in the area of interest to begin drawing, clicking at each vertex. Double click to complete the drawing. Once the spatial graphic is drawn, click 'Stop Select by Drawing.' Click 'Search' and the results will become highlighted on the map viewer, with their details displayed in the Results menu. In the examples below, the spatial graphic is a polygon (blue shaded polygons), and the layer of interest is Managed Conservation Lands. Selections appear outlined in green.

Intersects

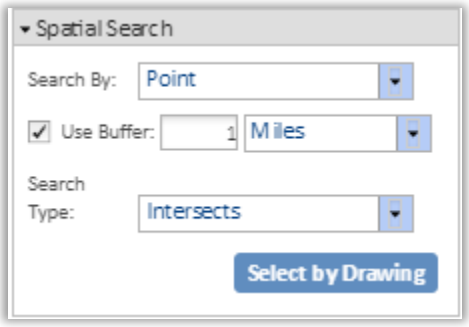
Contains

Within

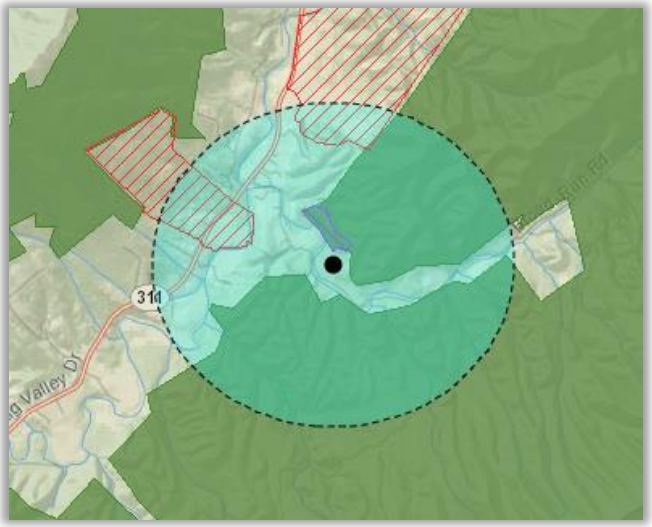
- Search type **Intersects** selects all features in the layer of interest that touch the spatial graphic
- Search type **Contains** selects the features of the layer of interest that are contained by the spatial graphic
- Search type **Within** selects the feature that the spatial graphic lies entirely within

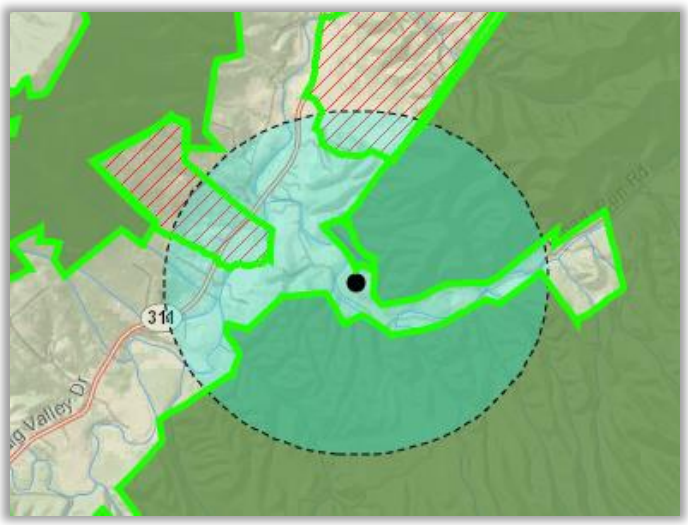
Note that in addition to the search by polygon option, all of the above examples also apply to the search by box option. Point and line 'Search By' criteria do not have the Search Type 'contains,' as these features are not appropriate for that search type.

Box, point, line, and polygon search types provide the capability to search using a **buffer**, by clicking on the box next to 'Use Buffer' and selecting a distance with the appropriate units. The buffer will be applied to the spatial search area. In the example below, a point is buffered by 1 mile with search type 'Intersects' selected. Thus, all Managed Conservation Lands intersecting the mile buffer around the point are selected. See the graphics on the following page.

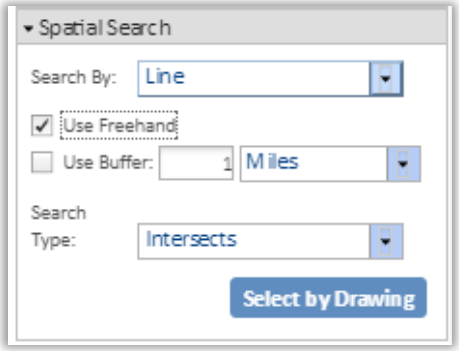


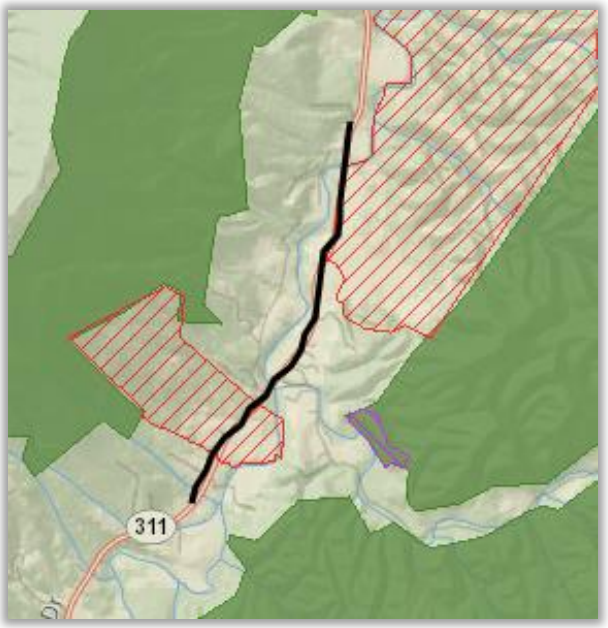
Below, a point is placed as the search graphic by clicking on the map, with a 1 mile buffer (left picture). At right, after clicking 'Search,' the Managed Conservation Lands intersecting the point's mile buffer are selected (outlined in green).

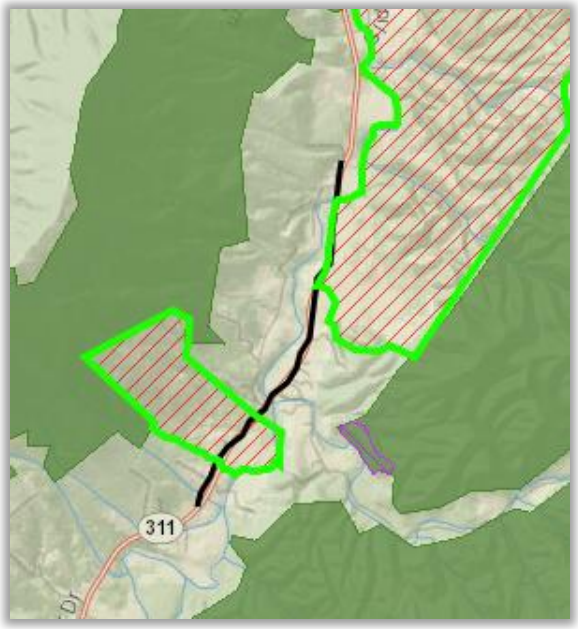




Line and polygon search types can be drawn **freehand,** where the user can draw freeform lines or polygons with the mouse. In the example below, the user traces a creek using a line search graphic (below left) to select all of the features that intersect their freehand search graphic of the creek (below right, green outline).







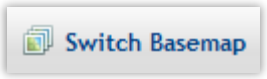
For more examples on how to use Feature Search, visit Search for a certain feature in a layer and Search a layer by attributes and by spatial location topics in the How Do I section.

HOW DO I…?

Turn map layers on and off ☑.

There is a check box next to each map layer in the Layers menu. Click this box to toggle the layer on and off. Since some layers take a long time to display and refresh at zoomed-out scales, some of the layers are scale dependent to maximize performance of the site. This means that they are only available at certain map scales (Table 1). Layer symbology is grayed out in the legend if a layer is unavailable at the current scale.

View topographic maps and aerial photography

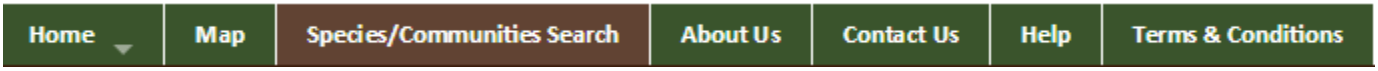


Topographic maps and aerial photography are available as basemaps in the map viewer. All basemap layers can be viewed when Switch Basemap is clicked at the top left corner of the map viewer; several different basemaps featuring topography and aerial imagery are available. Select the thumbnail of the desired basemap and the map viewer will refresh accordingly. The current basemap being used is visible as the last layer listed on the Layers menu.

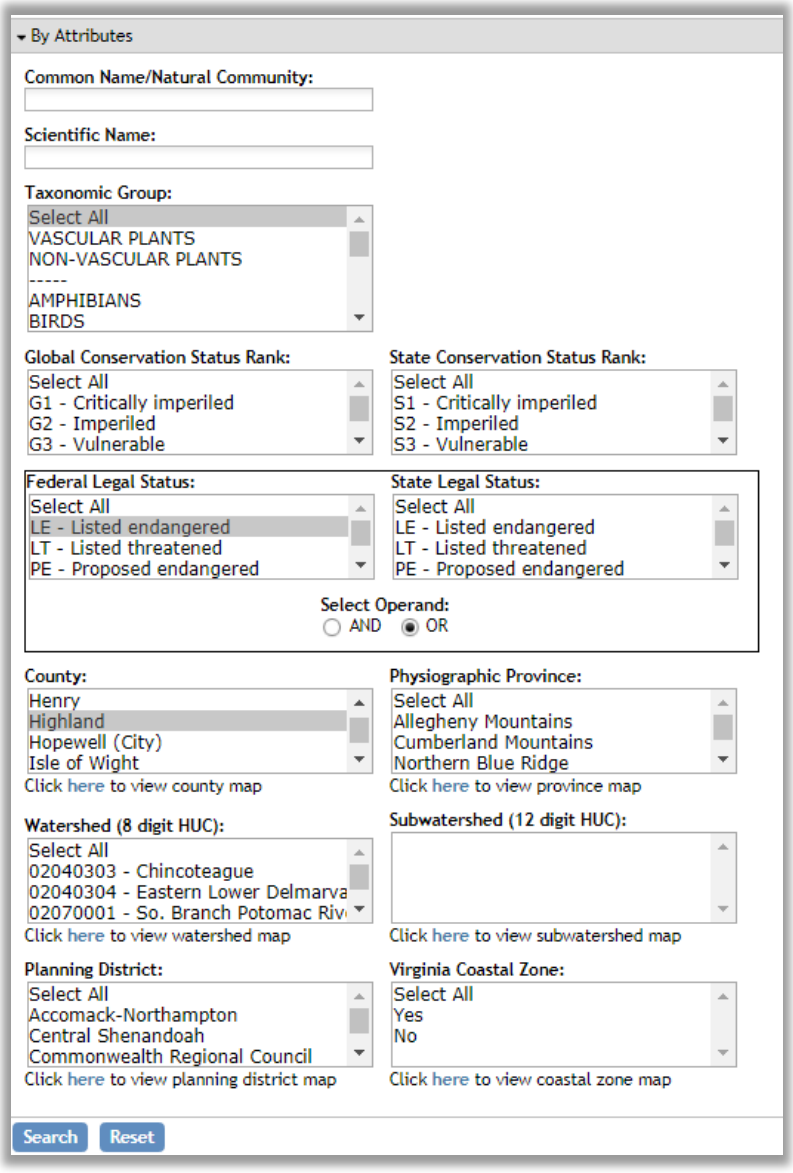
Use the Species/Communities Search

Click on the Species/Communities Search tab in NHDE (brown selection, below), agree to the Terms of Use if a non-subscribing user, and read through the tips at the top of the page. The following examples outline searches that are commonly performed. For more detailed information on this tool and how to find more in-depth help in using it, see the Species/Communities Search section of this document.

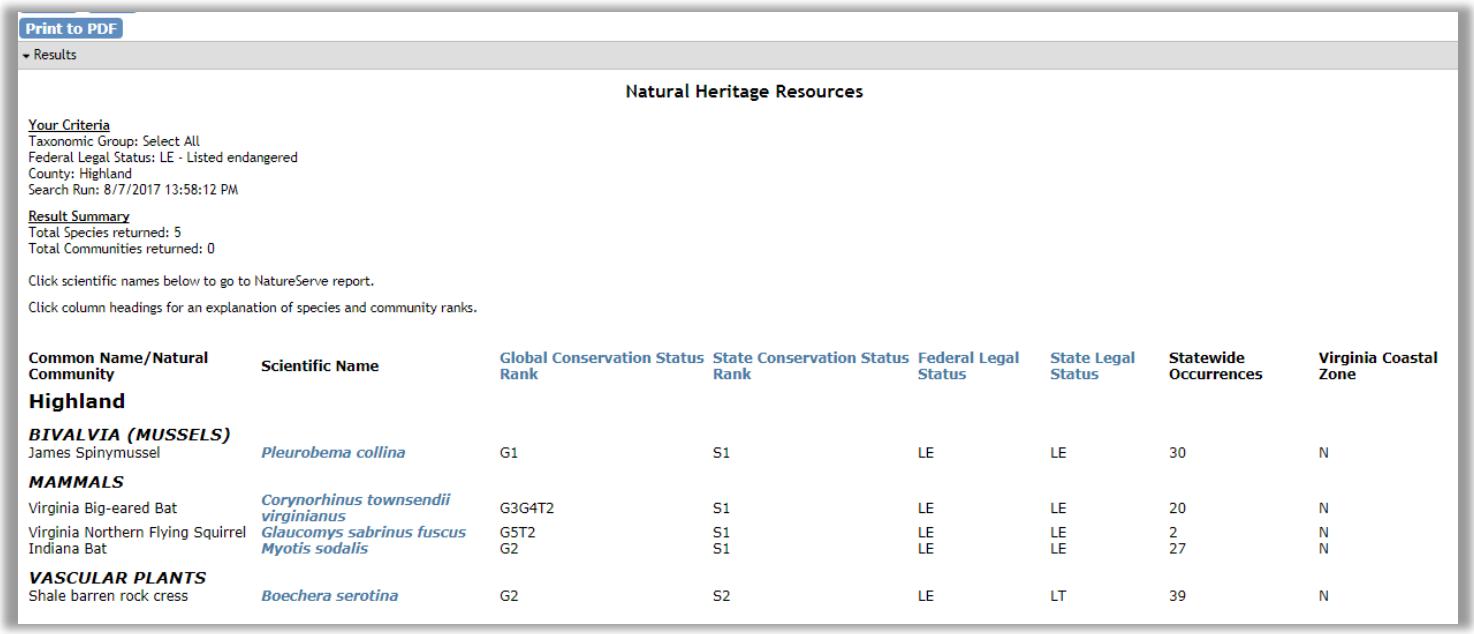
Note that the Species/Communities Search reports are not site specific and are not to be substituted for a project review or for on-site surveys required for environmental assessments of specific project areas.



To search for federally endangered species in Highland County, select terms as displayed in gray highlighting below:



Click ‘Search’ to view the results, or ‘Reset’ to enter different search criteria. The results appear in the ‘Results’ section:



Print to PDF

Results

Natural Heritage Resources

Your Criteria
Taxonomic Group: Select All
Federal Legal Status: LE - Listed endangered
County: Highland
Search Run: 8/7/2017 13:58:12 PM

Result Summary
Total Species returned: 5
Total Communities returned: 0

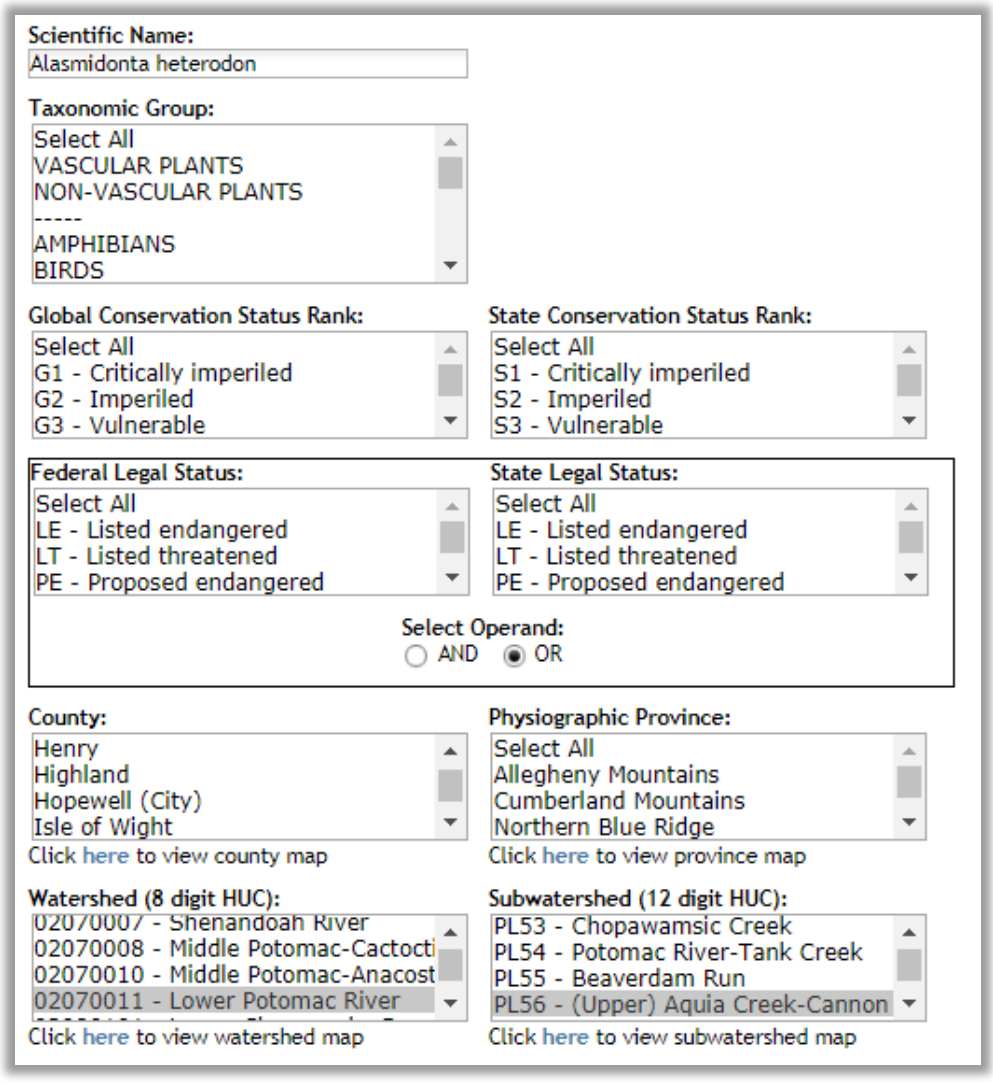
Click scientific names below to go to NatureServe report.

Click column headings for an explanation of species and community ranks.

Common Name/Natural Community	Scientific Name	Global Conservation Status Rank	State Conservation Status Rank	Federal Legal Status	State Legal Status	Statewide Occurrences	Virginia Coastal Zone
Highland							
BIVALVIA (MUSSELS)							
James Spinymussel	*Pleurobema collina*	G1	S1	LE	LE	30	N
MAMMALS							
Virginia Big-eared Bat	*Corynorhinus townsendii virginianus*	G3G4T2	S1	LE	LE	20	N
Virginia Northern Flying Squirrel	*Glaucomys sabrinus fuscus*	G5T2	S1	LE	LE	2	N
Indiana Bat	*Myotis sodalis*	G2	S1	LE	LE	27	N
VASCULAR PLANTS							
Shale barren rock cress	*Boechera serotina*	G2	S2	LE	LT	39	N

The user has the option to click Print to PDF to open a PDF of the results for saving or printing.

To search for *Alasmidonta heterodon* in the Upper Aquia Creek-Cannon Creek subwatershed of the Lower Potomac River watershed, enter the scientific or common name and select search terms as displayed in gray highlighting below:



Scientific Name:
Alasmidonta heterodon

Taxonomic Group:
Select All
VASCULAR PLANTS
NON-VASCULAR PLANTS

AMPHIBIANS
BIRDS

Global Conservation Status Rank:
Select All
G1 - Critically imperiled
G2 - Imperiled
G3 - Vulnerable

State Conservation Status Rank:
Select All
S1 - Critically imperiled
S2 - Imperiled
S3 - Vulnerable

Federal Legal Status:
Select All
LE - Listed endangered
LT - Listed threatened
PE - Proposed endangered

State Legal Status:
Select All
LE - Listed endangered
LT - Listed threatened
PE - Proposed endangered

Select Operand:
AND OR

County:
Henry
Highland
Hopewell (City)
Isle of Wight
Click here to view county map

Physiographic Province:
Select All
Allegheny Mountains
Cumberland Mountains
Northern Blue Ridge
Click here to view province map

Watershed (8 digit HUC):
02070007 - Shenandoah River
02070008 - Middle Potomac-Catoctin
02070010 - Middle Potomac-Anacost
02070011 - Lower Potomac River
Click here to view watershed map

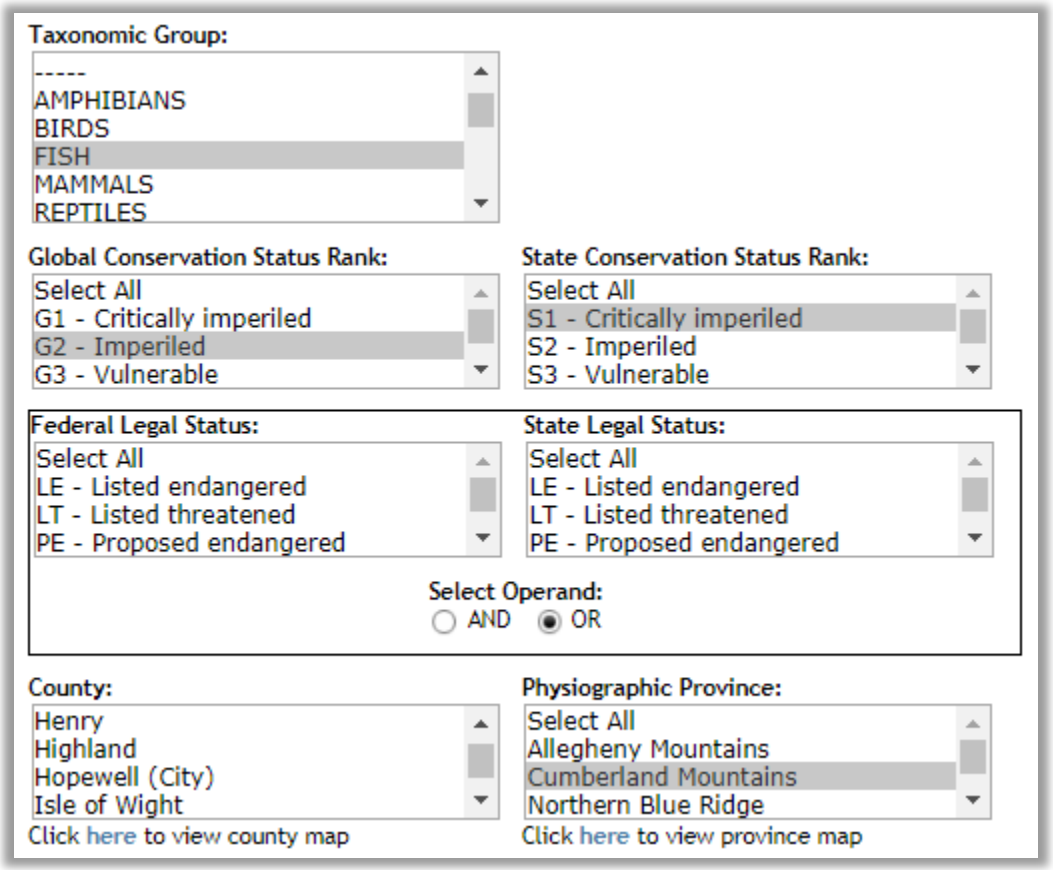
Subwatershed (12 digit HUC):
PL53 - Chopawamsic Creek
PL54 - Potomac River-Tank Creek
PL55 - Beaverdam Run
PL56 - (Upper) Aquia Creek-Cannon
Click here to view subwatershed map

Click ‘Reset’ to enter different search criteria, or click ‘Search’ to view the results:

The user has the option to click 

to open a PDF of the results for saving or printing.

To search for Globally imperiled and State critically imperiled fish in the Cumberland Mountains Physiographic Province, select search terms as displayed in gray highlighting below:



Click ‘Reset’ to enter different search criteria, or click ‘Search’ to view the results:

Print to PDF
Results

Natural Heritage Resources

Your Criteria
Taxonomic Group: FISH
Global Conservation Status Rank: G2 - Imperiled
State Conservation Status Rank: S1 - Critically imperiled
Physiographic Province: Cumberland Mountains
Search Run: 8/7/2017 14:22:05 PM

Result Summary
Total Species returned: 2
Total Communities returned: 0

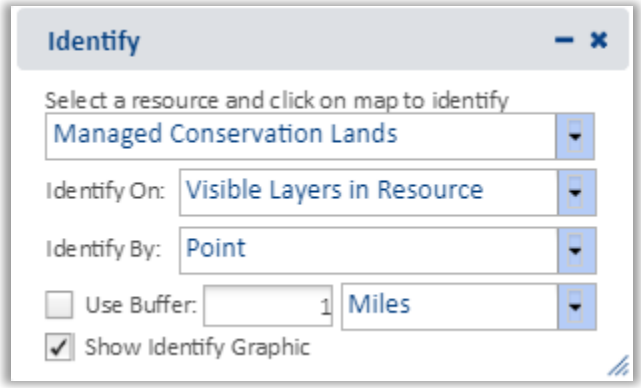
Click scientific names below to go to NatureServe report.

Click column headings for an explanation of species and community ranks.

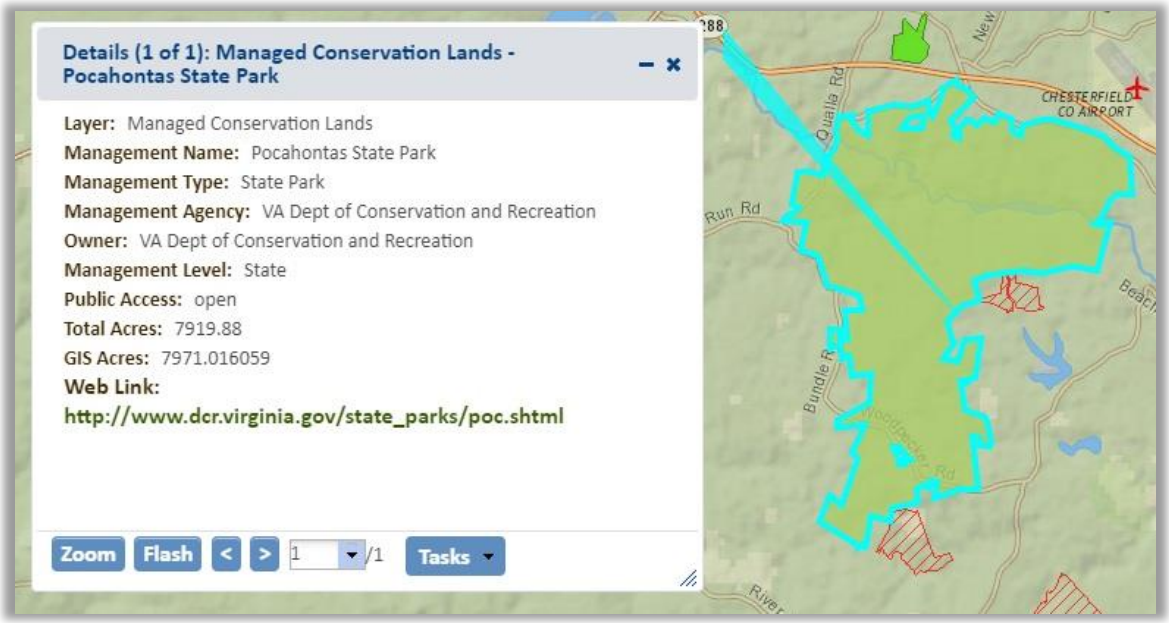
Common Name/Natural Community	Scientific Name	Global Conservation Status Rank	State Conservation Status Rank	Federal Legal Status	State Legal Status	Statewide Occurrences	Virginia Coastal Zone
Cumberland Mountains							
FISH							
Blackside Dace	*Chrosomus cumberlandensis*	G2	S1	LT	LT	5	N
Ashy Darter	*Etheostoma cinereum*	G2G3	S1	SOC	None	4	N

The user has the option to click Print to PDF to open a PDF of the results for saving or printing.

Retrieve information about a particular feature (Identify)



1. To retrieve a snapshot of information about a particular feature on the map, click the Identify tool (i.e. the blue circle with the "i" in the toolbar, shown above in the red box) and the identify window will appear.
2. Use the blue arrow to open the pull-down menu and click on the map resource of interest (at right, Managed Conservation Lands). The user may use a point, box, polygon, or line as 'Identify By' criteria to select the desired map resource features. The user may also buffer their 'Identify By' graphic to capture features within a specified distance of the Identify By graphic.
3. Once the search parameters are set, click on a feature in the map with the mouse pointer (dot, below). The selected feature will have a blue outline, and a details window containing attribute information related to the selected feature will appear.

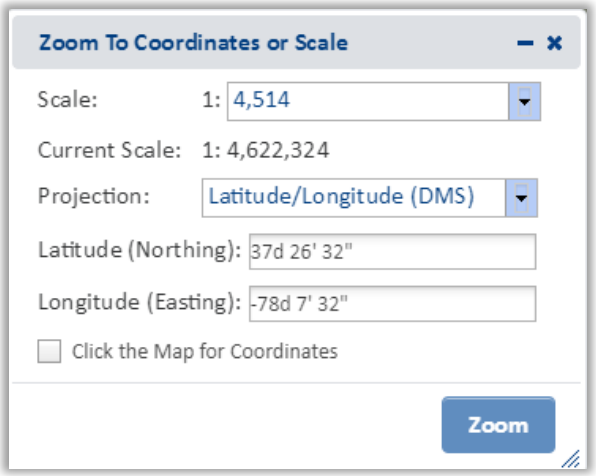


4. Click the 'Zoom' button at the bottom of the Details window to zoom to and center the map on the selected feature.
5. Click the 'Flash' button in the identify window will illuminate the selected feature for a few seconds.
6. If more than one feature is present within the area identified:
   a) The user may click the left or right arrows to scroll between results.
   b) The user may select the number from the pulldown to the right of the arrows to jump to the desired record.
7. The 'Tasks' pulldown menu offers the option to view the results in a table.

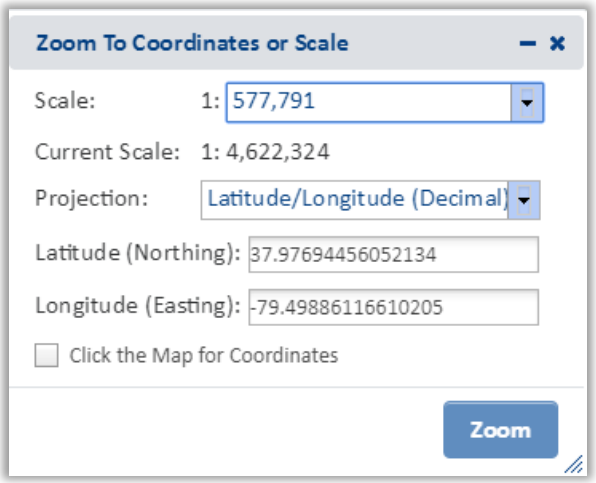
Zoom to map coordinates

1. Click on the magnifying glass icon (shown with red box at right, above) on the toolbar. A Zoom to Coordinates or Scale window will open, where the user specifies the desired map zoom scale and enters a projection and accompanying coordinates. The user may enter latitude/longitude coordinates in either degrees minutes seconds (DMS) or decimal degrees, UTM coordinates for both zones 17N and 18N, or defined a projection. To use the zoom to coordinates tool:
2. Use the Scale dropdown menu to select the scale at which the map should be zoomed.
3. Click the arrow to open the projection pull-down, and click on the appropriate projection.
4. Once the projection is selected, click on the map to automatically populate the zoom criteria with coordinates (the 'Click the Map for Coordinates' item must be checked, or enter coordinates in the following format:

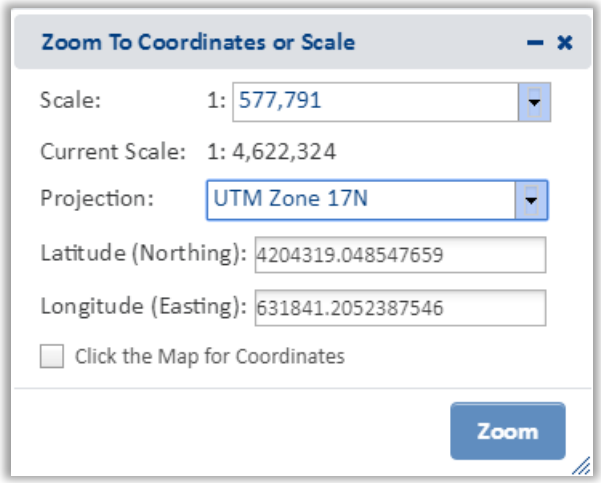
   a) Latitude/Longitude (DMS) can either be in _d _' _" format or simply the numbers with spaces in between them. The Longitude value must be negative (indicating that Virginia is west of the Prime Meridian).

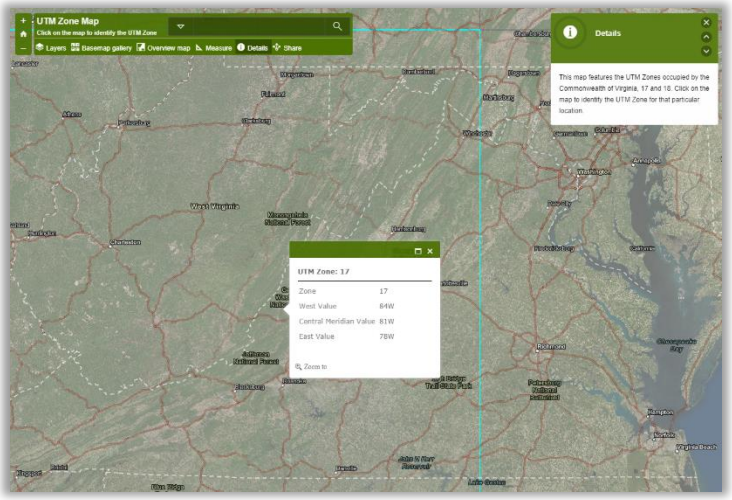


   b) Latitude/Longitude (Decimal) should be entered as two digit numbers with decimals. The Longitude value must be negative (indicating that Virginia is west of the Prime Meridian).

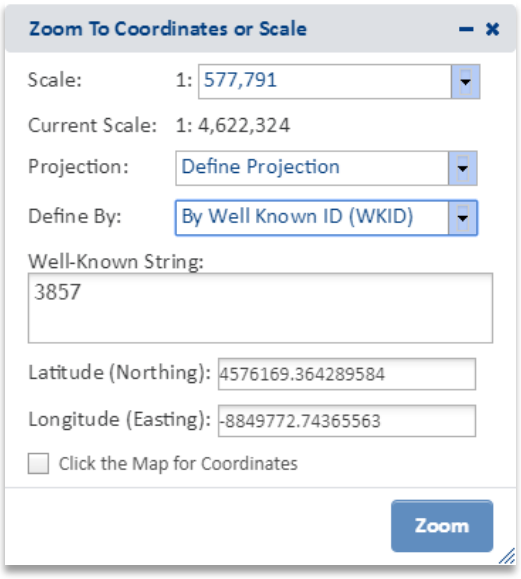


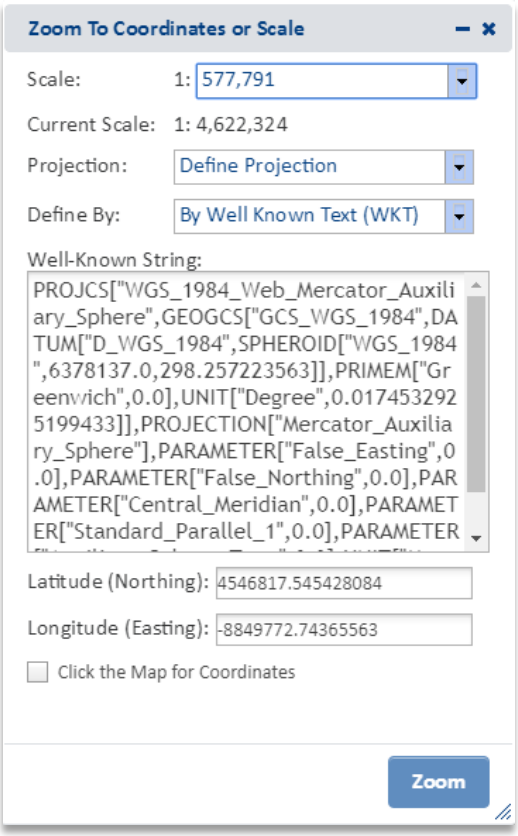
c) UTM is entered as a 7 digit number with decimals for the Northing, and a 6 digit number with decimals for the Easting. Specify either zone 17N or zone 18N; refer to this web mapping application for UTM Zones in Virginia: https://arcg.is/1i4GGS (pictured, below right)





d) Define Projection: enter Well Known ID (WKID) or Well Known Text (WKT). *Note: WKID and WKT values can be searched here: http://www.spatialreference.org/. Also, the WKT can be copied from a projection (.prj) file.*



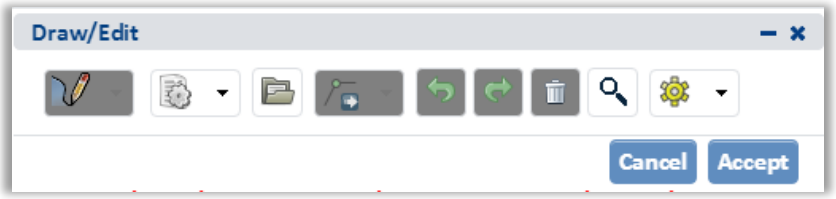


5. Check that the desired scale is set (the smaller the number, the more closely the map will zoom).
6. When the scale, projection, and coordinates are entered, click 'Zoom'.
7. The map will center on the specified coordinates and a red diamond icon will appear around the entered coordinates.
8. If the 'Click the Map for Coordinates' option is checked, the diamond marker will move around the map based on the users' clicks while the Zoom To tool is open. When the Zoom To window is closed, the marker will disappear.

Submit a project for review

Please note that this option is only available for members of a subscription.

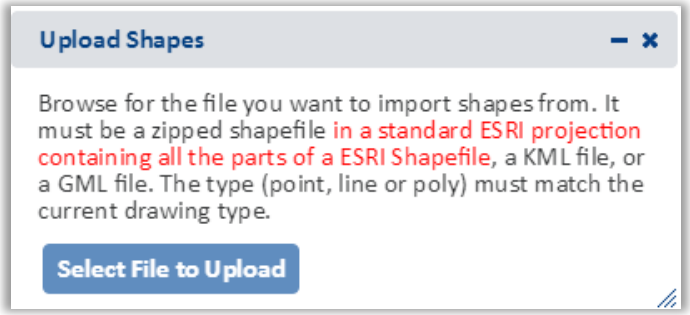
1. Click on the 'Map' tab to access the Map Viewer.
2. Click on the 'Create Project' button in the gray bar just above the map window, and a draw/edit toolbar will appear:



Note that the following message may appear if the map is zoomed out: "Zoom in closer than 1:72,224 to draw your project. Alternately, you may upload a zipped ESRI shapefile or use additional mapping options at any scale."

To upload a shapefile of the project boundary:

3. Upload a shapefile at any scale by clicking on the 'Upload Shapes' button on the Draw/Edit menu
4. In the upload shapefile window, click on the 'Select File to Upload' button and browse to select a **zipped** shapefile in a standard ESRI projection with all the parts of an ESRI **shapefile**, a **KML** file or a **GML** file (see Add Resources section for more information regarding shapefile components).
5. The map view will automatically zoom to the extent of the project boundary from the shapefile. *If the uploaded shape is a point or line, the application will automatically buffer the shape by 10 meters, or the user can select a different buffer size to capture the project limits of disturbance. Please note that NHDE only accepts polygons for project submittal.*



6. If the uploaded shapefile contains one shape, the uploaded shape will become automatically selected and may be further modified with the Edit Shape toolset available on the Draw/Edit menu.
7. If the uploaded shapefile contains more than one shape, the user must select the appropriate shape for the project by clicking and dragging a box around it in the map viewer. Click 'Accept' to advance to the Draw/Edit menu. ***Note that multipart geometry is not an option for project submittal. The uploaded shapefile may contain more than one feature, but only one mapped feature per project may be submitted at a time.***

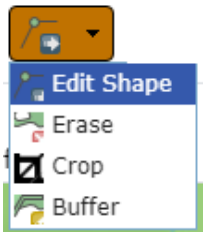
To draw a project boundary:

8. Locate the area of interest on the map. The map must be zoomed to a scale of 1:72,224 or closer. *Note that if tool icons in the Draw/Edit toolbar are dark gray, the map is not zoomed in close enough to draw a project boundary.*
9. To start drawing, click on the 'Draw Shape' button (right) on the Draw/Edit menu and select the geometry type, which will display at the bottom of the Draw/Edit toolbar with the heading 'Draw Mode.'

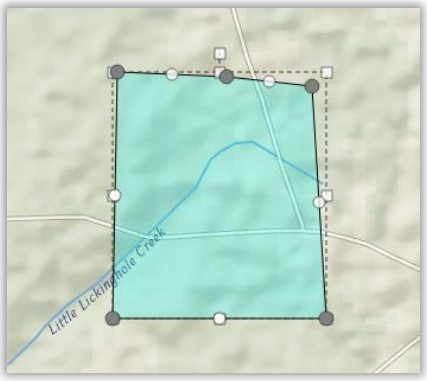
Note that if a point or line is drawn, the user will be prompted to buffer the shape, as NHDE only accepts polygons. 10 meters is the default buffer distance; the user may alter this value to capture the project limits of disturbance.

10. Click on the map to draw the project boundary; click at each change of direction to place a vertex. If drawing a line or polygon, double click to finish creating the shape. *Note that multipart geometry is not an option for project submittal; one drawn boundary may be submitted at a time.*

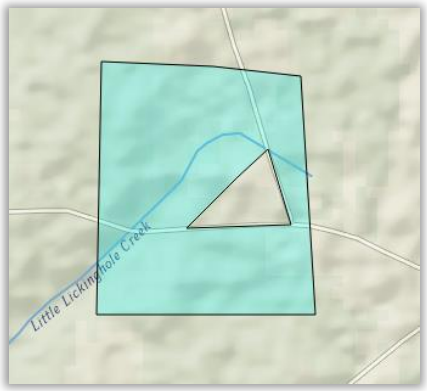
11. The shape may be further edited, using the Edit Shape tools (pictured at left, below). Choose from various edit options, which are outlined on this page (examples show Draw Mode: Polygon)



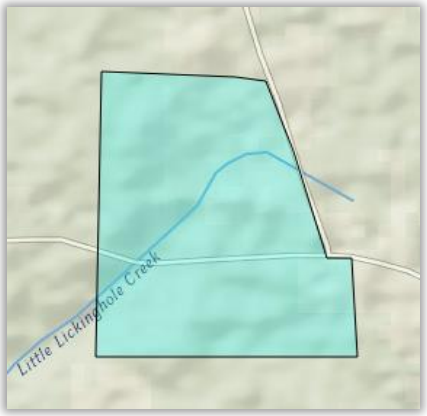
Edit shape by dragging a vertex or vertices. Right click on a gray vertex to delete it. Click and drag a white dot to add another vertex. The shape may be resized using the bounding box corners, rotated using the square above the bounding box, or moved by dragging the whole shape.



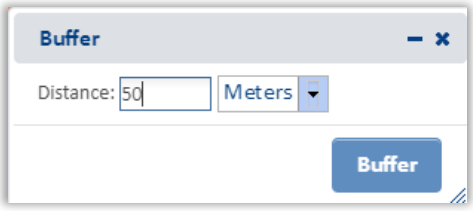
Erase (Inside drawn area) to remove an area that is fully contained by the project boundary (like an inholding, or hole). Simply draw the area to be removed from the original feature.

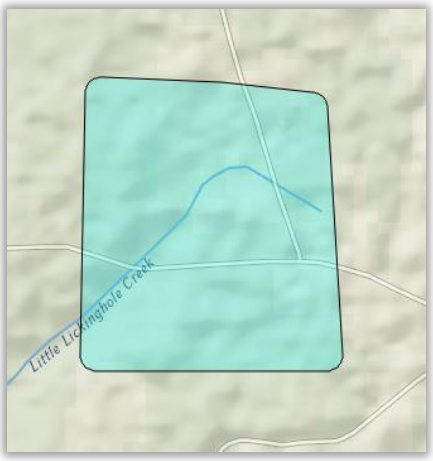


Crop (outside drawn area) to remove sections of the project boundary that include part of the outer boundary. The area within the polygon drawn in Crop mode will be retained, and the portion outside the drawn polygon will be removed from the original feature.



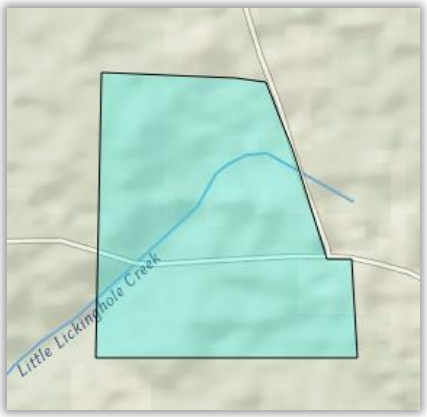
Buffer to specify a distance and units that will buffer the shape. A positive distance will buffer outside of the feature, whereas a negative distance will buffer within the feature. Negative distances cannot exceed the size of the shape, nor can they be used with Point or Line features. Buffers are additive; if one distance is used to buffer, and then another distance is entered, the second buffer will be added to the first buffer rather than to the original drawn feature.

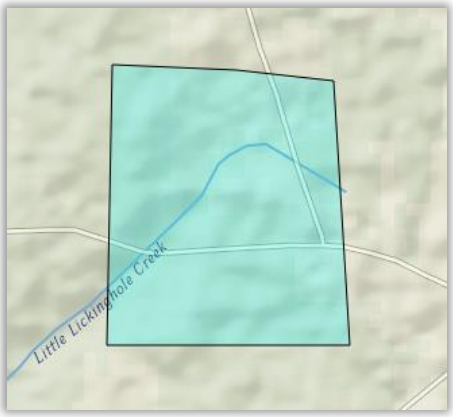




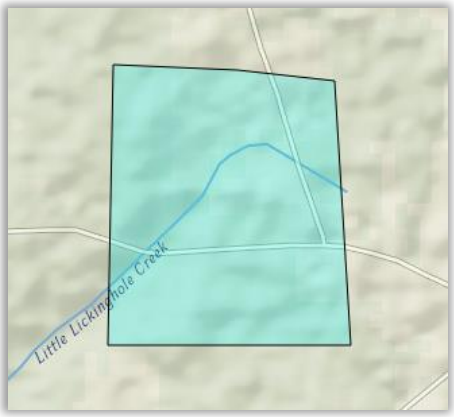
Other helpful editing tools on the Draw/Edit menu include:

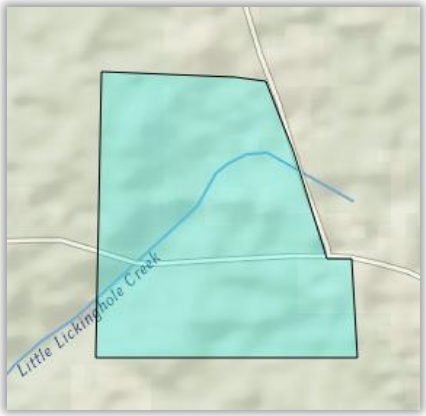
Undo last drawing action 





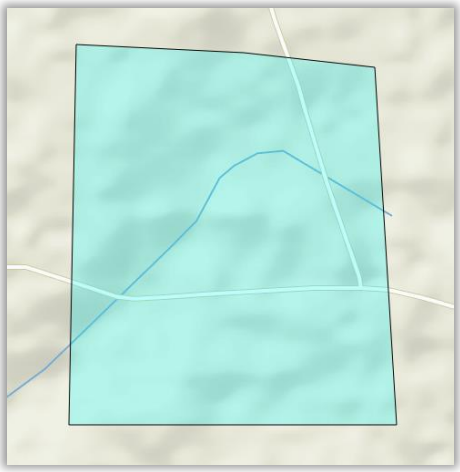
Redo last drawing action 

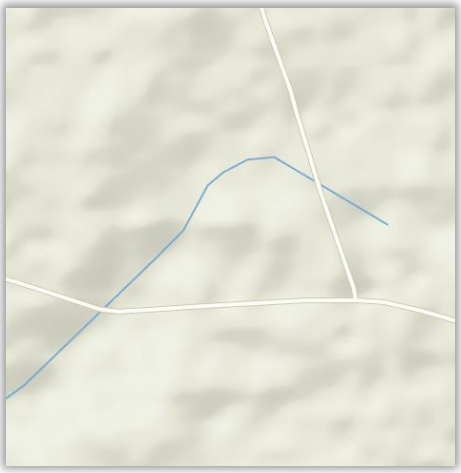




Zoom to Current Shape 

Clear Shape 





To create a project boundary using Additional Mapping Options:

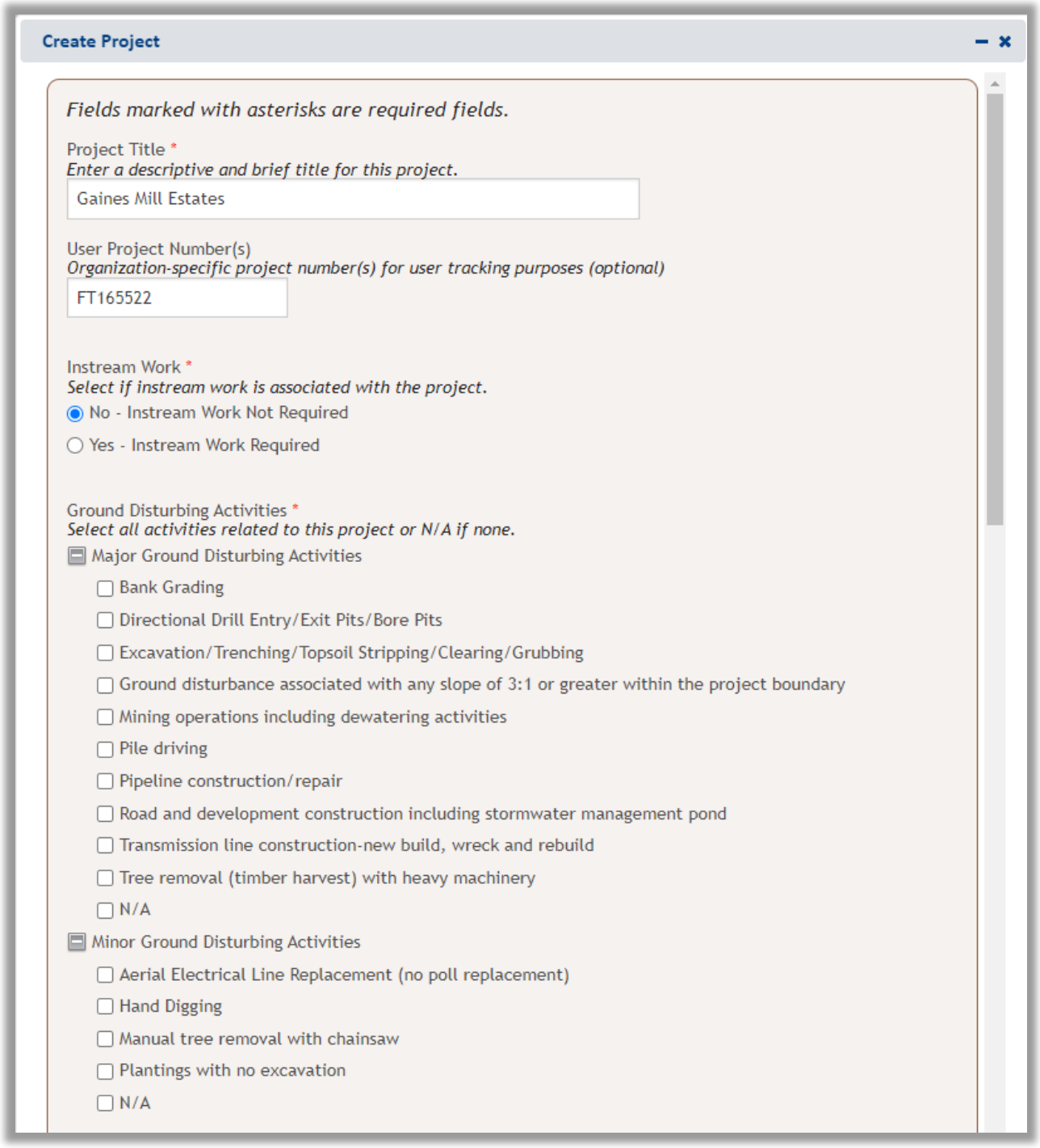
12. The Additional Mapping Options button (above right) on the Draw/Edit menu allows the user to create a project boundary from a map annotation, or by entering coordinates. *Note that multipart geometry is not an option for project submittal; only one annotation boundary or pair of coordinates may be submitted at a time.*
    a. From Make a Map: Click 'Select from Resource' and click and hold on the map to drag a box and select the desired Map Annotation. Close the details window for the annotation. Click 'Modify' to further edit the shape, or click 'Next' to continue with project submittal. See Add and edit point, line or polygon annotations to my map topic for more information on editing the Map Annotation layer.
    b. Coordinates: Enter coordinates for the project location. See the Zoom to Map Coordinates section of this document for guidance on use of this tool. Click 'Zoom and Preview' to ensure the coordinates are in the proper location. The user may further modify the selected coordinates by selecting 'Modify' and utilizing the available edit tools. When finished, click 'Next.' If the user did not buffer the point in the 'Modify' step, a window will appear to buffer the point (project boundaries must ultimately be submitted as polygons).

Draw Settings dropdown menu includes options for drawing, editing, and measuring while in Draw/Edit mode. Options are enabled or disabled by clicking the corresponding checkbox. Of note:

13. Drawing Options include 'Disable Navigation While Drawing' to lock the map so that panning and zooming does not interfere with boundary drawing, and 'Use Freehand' enables continuous freehand delineation, rather than clicking to create individual vertices.
14. Editing options yield several options for moving, adding and removing vertices, as well as moving, rotating, and scaling geometry. Scaling uniformly to maintain aspect is another editing option.
15. Measure options allow the user to select the desired Area and Length Units in which to display the measurements that are at the bottom of the Draw/Edit Window when digitizing shapes.

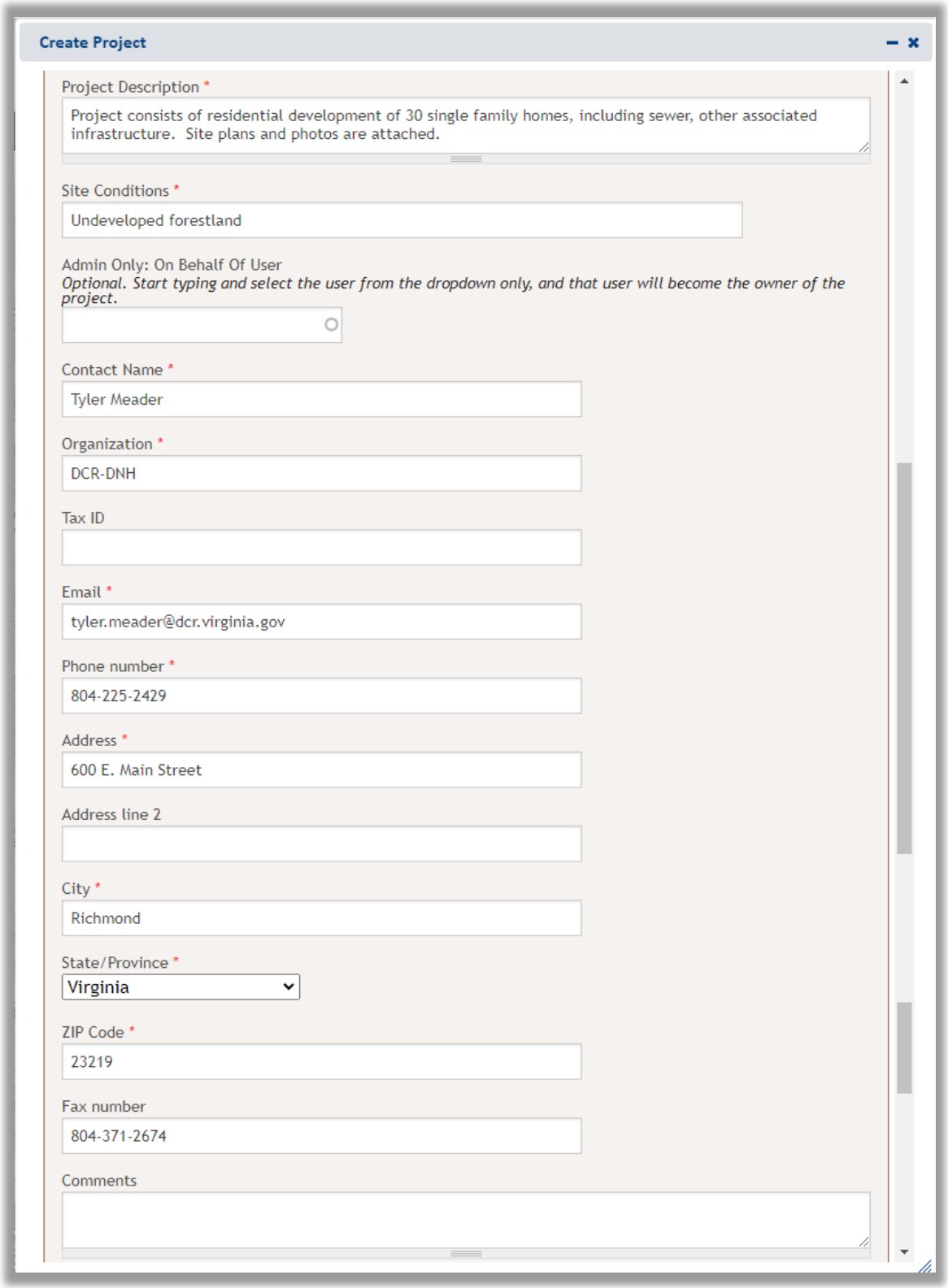
Project submittal:

16. Once uploading or drawing/editing of the project boundary is complete, click 'Accept' in the Draw/Edit toolbar.
17. A 'Create Project' window will open to allow for entry of information about the project.
18. Enter all available project information into the fields provided in the Create Project window. Fields marked with a red asterisk (*) must be filled in to submit a project. See graphic on the next page for an example.
19. Pertinent Fields include:
    - **Project Title:** Give the project a title. This title will be displayed in the letter contained in the review response and can be used to sort your projects in 'My Projects.'
    - **User Project number:** Give the project a unique, identifiable number that will be convenient for your reference if one is available. The User Project Number will be displayed in the letter contained in the review response and can be used to sort your projects in 'My Projects.'
    - **Instream work**: Use the check boxes provided to note if your project requires instream work or not.
    - **Ground Disturbing Activities:** Select which "major" and/or "minor" ground disturbing activities will be required using the choices provided or select N/A (not applicable).

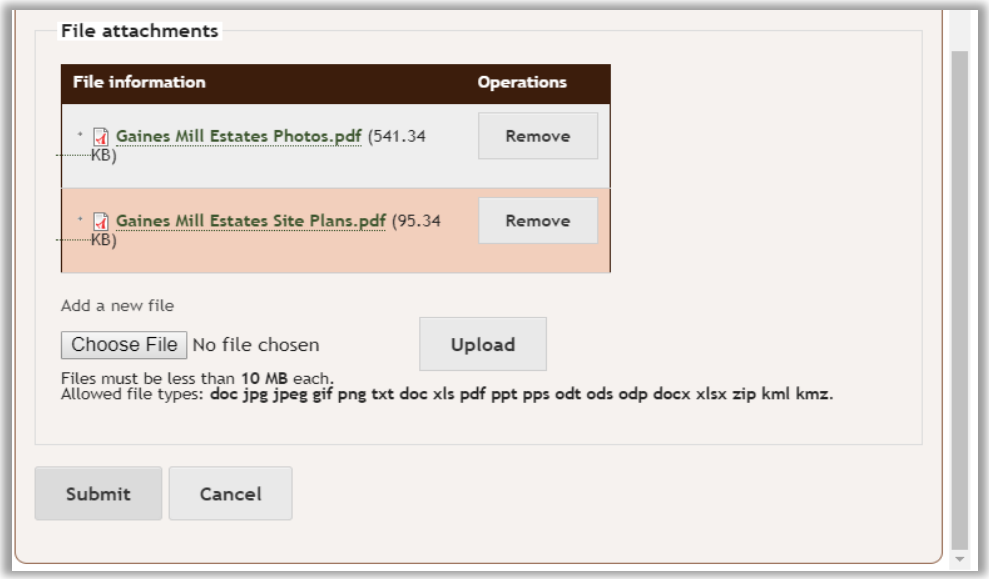


- **Project Description:** Describe in detail what work is proposed at the project site, (e.g. residential subdivision)
- **Site Conditions:** what are present conditions at the project site (e.g. rolling, intermittent drainage ways that form headwaters, forested)
- **Contact information:** this information is automatically populated by the application from the user's account, but is able to be edited. *Contact information should be entered in the format in which it should be displayed in the generated response letter, and the email address should be the address at which the confirmation of project submittal and project review report is to be received.*

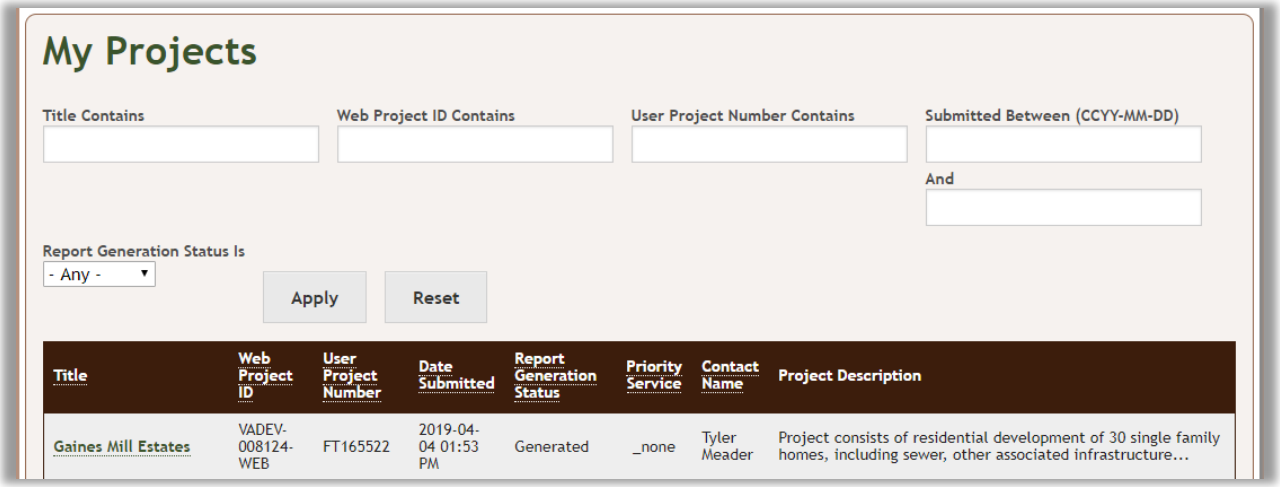
- **Comments:** enter any other important information that the Virginia Natural Heritage Program would need for proper review (e.g. this is a wetland compensation project, re-review, etc.)



20. File attachments such as photographs, survey documents, site plans, etc., can be uploaded and attached to the project form. Attachments are encouraged, as comprehensive information is helpful in a timely review of the project. **Files must be less than 10 MB each.** Click 'Choose File' to navigate to the file(s), and when the correct file(s) is/are listed, click 'Upload.'



21. Click 'Submit' at the bottom of the Create Project window to submit the project (or 'Cancel' to cancel the project).
22. Once the project is submitted, a pop-up window will be displayed in the browser indicating that a notification email will be sent once the automated review is complete.
23. Click on the link in the received project review notification email to access project review results, or access through the 'My Subscription' tab by clicking the down arrow and then clicking 'My Projects.' Open the project through the 'My Projects' page (see graphic below) by clicking on the Project Title, in bold green. Projects can be sorted by clicking on any of the column headings, or by using the criteria boxes at the top of the page to filter results. *Note: to view the project review report, the user must be logged in to their account on the NHDE.*



24. On the Project Review Results page (see graphic, next page), the user may use the tabs underneath the project title. Click 'View' to view information about the project. 'View Shape' opens the NHDE map, zoomed to extent of the

submitted project boundary. ‘Notes’ allows the user to view or add notes to the project, and ‘Email’ opens an email submission form to contact the subscription owner/manager.

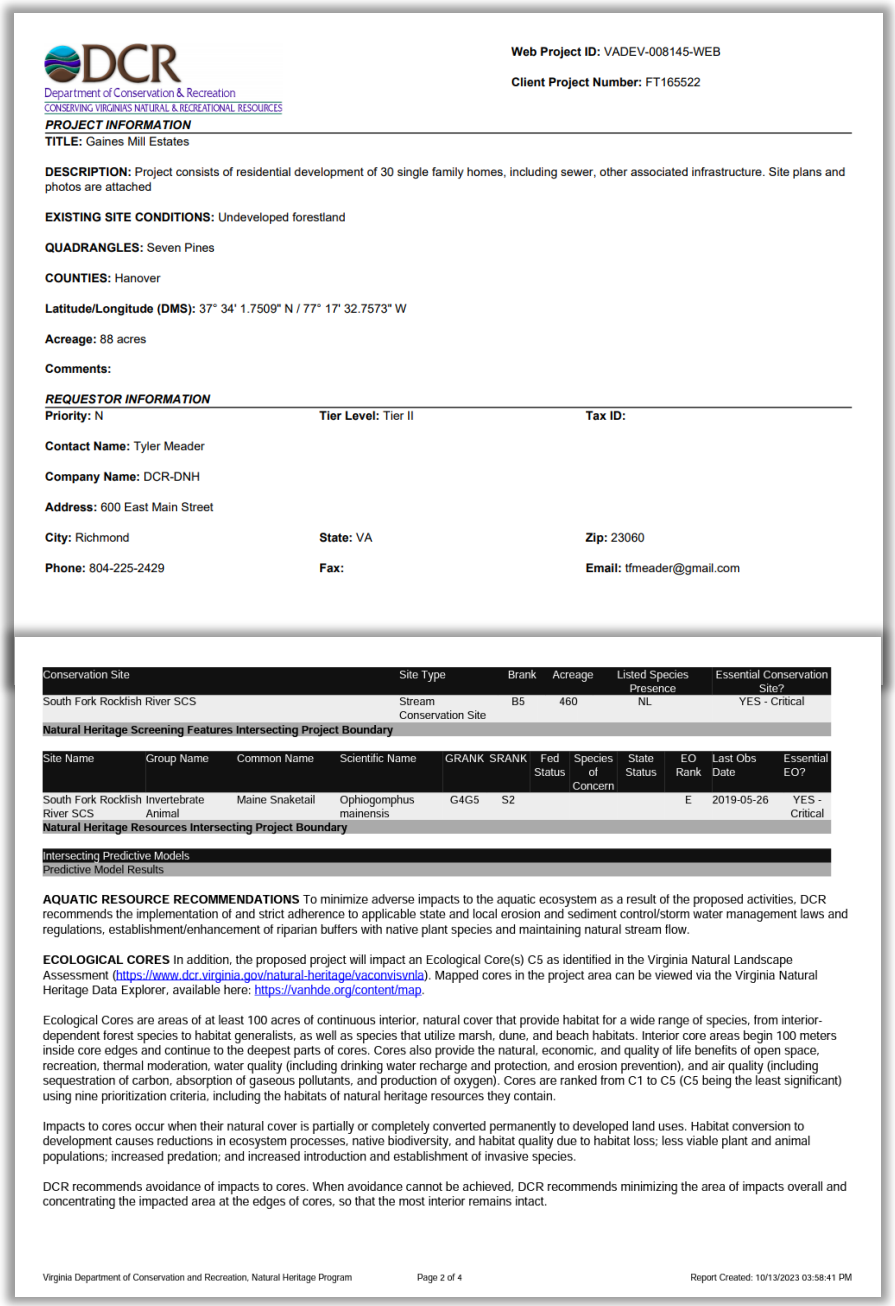
Gaines Mill Estates

View | View Shape

Project Review Results

Revision date	Report Status	Report File	Boundary Shapefile	Latitude	Longitude
4/4/2019 01:54:00 PM	Generated	project_review_16357.pdf	project_shape_16357.zip	373358.00	-771726.00

25. To view the project report, click on the PDF Report File title, which contains a response letter and tables of natural heritage resources (if any) within the project area and within 100ft of the project area. The report also includes a map showing the project area, and natural heritage resources intersecting with a 100ft buffer around the project area. An example of the project report is as follows:



DCR
Department of Conservation & Recreation
CONSERVING VIRGINIA'S NATURAL & RECREATIONAL RESOURCES

Web Project ID: VADEV-008145-WEB

Client Project Number: FT165522

PROJECT INFORMATION

TITLE: Gaines Mill Estates

DESCRIPTION: Project consists of residential development of 30 single family homes, including sewer, other associated infrastructure. Site plans and photos are attached

EXISTING SITE CONDITIONS: Undeveloped forestland

QUADRANGLES: Seven Pines

COUNTIES: Hanover

Latitude/Longitude (DMS): 37° 34' 1.7509" N / 77° 17' 32.7573" W

Acreage: 88 acres

Comments:

REQUESTOR INFORMATION

Priority: N | **Tier Level:** Tier II | **Tax ID:**

Contact Name: Tyler Meader

Company Name: DCR-DNH

Address: 600 East Main Street

City: Richmond | **State:** VA | **Zip:** 23060

Phone: 804-225-2429 | **Fax:** | **Email:** tfmeader@gmail.com

Conservation Site	Site Type	Brank	Acreage	Listed Species Presence	Essential Conservation Site?
South Fork Rocklish River SCS	Stream Conservation Site	B5	460	NL	YES - Critical

Natural Heritage Screening Features Intersecting Project Boundary

Site Name	Group Name	Common Name	Scientific Name	GRANK	SRANK	Fed Status	Species of Concern	State Status	EO Rank	Last Obs Date	Essential EO?
South Fork Rocklish River SCS	Invertebrate Animal	Maine Snaketail	Ophiogomphus mainensis	G4G5	S2				E	2019-05-26	YES - Critical

Natural Heritage Resources Intersecting Project Boundary

Intersecting Predictive Models
Predictive Model Results

AQUATIC RESOURCE RECOMMENDATIONS To minimize adverse impacts to the aquatic ecosystem as a result of the proposed activities, DCR recommends the implementation of and strict adherence to applicable state and local erosion and sediment control/storm water management laws and regulations, establishment/enhancement of riparian buffers with native plant species and maintaining natural stream flow.

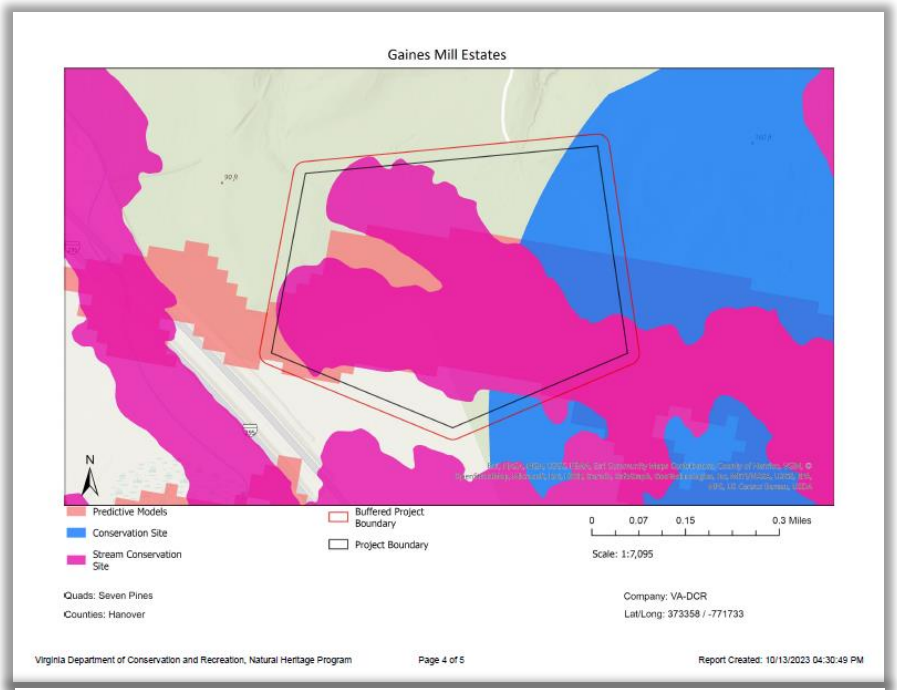
ECOLOGICAL CORES In addition, the proposed project will impact an Ecological Core(s) C5 as identified in the Virginia Natural Landscape Assessment (https://www.dcr.virginia.gov/natural-heritage/vaconvisvnla). Mapped cores in the project area can be viewed via the Virginia Natural Heritage Data Explorer, available here: https://vanhde.org/content/map.

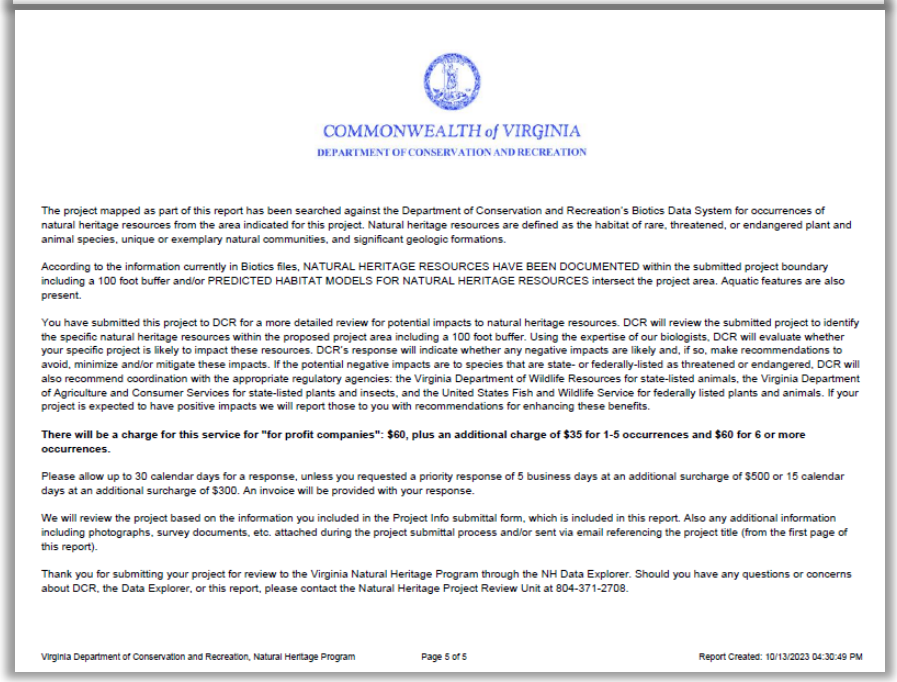
Ecological Cores are areas of at least 100 acres of continuous interior, natural cover that provide habitat for a wide range of species, from interior-dependent forest species to habitat generalists, as well as species that utilize marsh, dune, and beach habitats. Interior core areas begin 100 meters inside core edges and continue to the deepest parts of cores. Cores also provide the natural, economic, and quality of life benefits of open space, recreation, thermal moderation, water quality (including drinking water recharge and protection, and erosion prevention), and air quality (including sequestration of carbon, absorption of gaseous pollutants, and production of oxygen). Cores are ranked from C1 to C5 (C5 being the least significant) using nine prioritization criteria, including the habitats of natural heritage resources they contain.

Impacts to cores occur when their natural cover is partially or completely converted permanently to developed land uses. Habitat conversion to development causes reductions in ecosystem processes, native biodiversity, and habitat quality due to habitat loss; less viable plant and animal populations; increased predation; and increased introduction and establishment of invasive species.

DCR recommends avoidance of impacts to cores. When avoidance cannot be achieved, DCR recommends minimizing the area of impacts overall and concentrating the impacted area at the edges of cores, so that the most interior remains intact.

Virginia Department of Conservation and Recreation, Natural Heritage Program | Page 2 of 4 | Report Created: 10/13/2023 03:58:41 PM





COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

The project mapped as part of this report has been searched against the Department of Conservation and Recreation's Biotics Data System for occurrences of natural heritage resources from the area indicated for this project. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in Biotics files, NATURAL HERITAGE RESOURCES HAVE BEEN DOCUMENTED within the submitted project boundary including a 100 foot buffer and/or PREDICTED HABITAT MODELS FOR NATURAL HERITAGE RESOURCES intersect the project area. Aquatic features are also present.

You have submitted this project to DCR for a more detailed review for potential impacts to natural heritage resources. DCR will review the submitted project to identify the specific natural heritage resources within the proposed project area including a 100 foot buffer. Using the expertise of our biologists, DCR will evaluate whether your specific project is likely to impact these resources. DCR's response will indicate whether any negative impacts are likely and, if so, make recommendations to avoid, minimize and/or mitigate these impacts. If the potential negative impacts are to species that are state- or federally-listed as threatened or endangered, DCR will also recommend coordination with the appropriate regulatory agencies: the Virginia Department of Wildlife Resources for state-listed animals, the Virginia Department of Agriculture and Consumer Services for state-listed plants and insects, and the United States Fish and Wildlife Service for federally listed plants and animals. If your project is expected to have positive impacts we will report those to you with recommendations for enhancing these benefits.

There will be a charge for this service for "for profit companies": $60, plus an additional charge of $35 for 1-5 occurrences and $60 for 6 or more occurrences.

Please allow up to 30 calendar days for a response, unless you requested a priority response of 5 business days at an additional surcharge of $500 or 15 calendar days at an additional surcharge of $300. An invoice will be provided with your response.

We will review the project based on the information you included in the Project Info submittal form, which is included in this report. Also any additional information including photographs, survey documents, etc. attached during the project submittal process and/or sent via email referencing the project title (from the first page of this report).

Thank you for submitting your project for review to the Virginia Natural Heritage Program through the NH Data Explorer. Should you have any questions or concerns about DCR, the Data Explorer, or this report, please contact the Natural Heritage Project Review Unit at 804-371-2708.

Virginia Department of Conservation and Recreation, Natural Heritage Program Page 5 of 5 Report Created: 10/13/2023 04:30:49 PM

Note that Natural Heritage Resources documented beyond the 100ft buffer will not appear on the report map, unless the resources overlap the boundary or are part of the same resource that does intersect the buffer (i.e. multipart EO)

26. The PDF may be printed or saved, and will remain on the 'My Projects' page for later reference. A boundary shapefile is also created for each project submitted, which includes the project boundary drawn as part of project submission. The zipped boundary shapefile may be downloaded by clicking on the green shapefile title on the Project Review Results page for that particular project.
27. If there are no resources present within the search area, the project report will contain a blank list, a map showing that no resources are present, and a 'no find' letter. **No further correspondence regarding that project will be received by the user from VA Natural Heritage Program.** Please see the next pages for an example of a 'no find' report:

Department of Conservation & Recreation
CONSERVING VIRGINIA'S NATURAL & RECREATIONAL RESOURCES

Web Project ID: VADEV-008146-WEB

Client Project Number: 794124-5241

PROJECT INFORMATION

TITLE: Bell South Facility

DESCRIPTION: Planned development of a telecommunications relay station

EXISTING SITE CONDITIONS: Wooded

QUADRANGLES: Concord

COUNTIES: Appomattox

Latitude/Longitude (DMS): 37° 19' 55.2505" N / 78° 57' 45.5852" W

Acreage: 41 acres

Comments:

REQUESTOR INFORMATION

Priority: N | **Tier Level:** Tier II | **Tax ID:**

Contact Name: Tyler Meader

Company Name: DCR-DNH

Address: 600 East Main Street

City: Richmond | **State:** VA | **Zip:** 23060

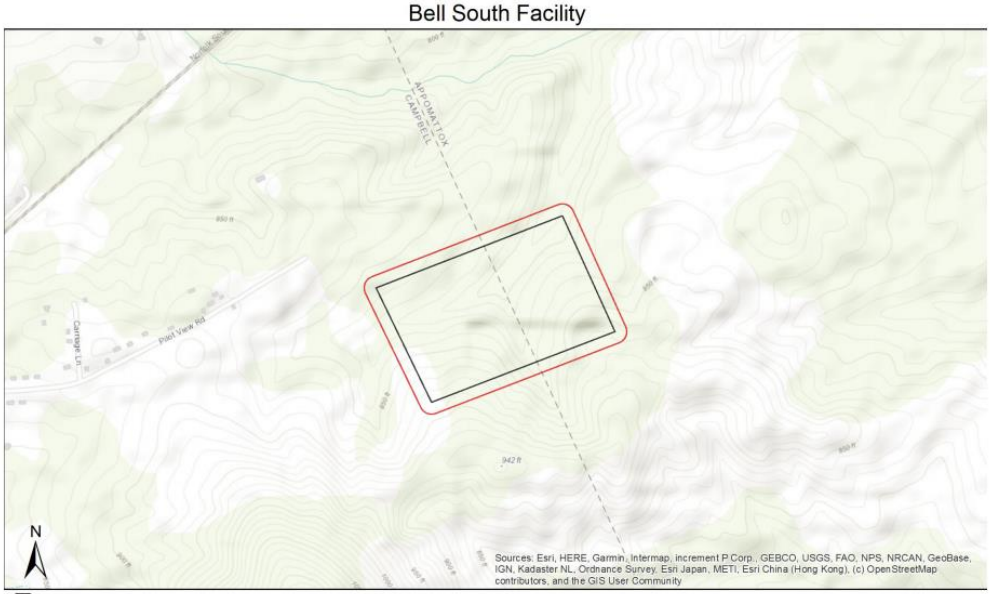
Phone: 804-225-2429 | **Fax:** | **Email:** tfmeader@gmail.com

Conservation Site	Site Type	Brank	Acreage	Listed Species Presence
Natural Heritage Screening Features Intersecting Project Boundary				

Site Name	Group Name	Common Name	Scientific Name	GRANK	SRANK	Fed Status	Species of Concern	State Status	EO Rank	Last Obs Date	Precision
Natural Heritage Resources Intersecting Project Boundary											

Intersecting Predictive Models
Predictive Model Results

Bell South Facility



Project Boundary

Buffered Project Boundary

1:9,028

0 0.075 0.15 0.3 mi

0 0.1 0.2 0.4 km

Quads: Concord

Counties: Appomattox

Company: DCR-DNH

Lat/Long: 371955 / -785745

COMMONWEALTH of VIRGINIA

DEPARTMENT OF CONSERVATION AND RECREATION

The project mapped as part of this report has been searched against the Department of Conservation and Recreation's Biotics Data System for occurrences of natural heritage resources in the vicinity of the area indicated for this project. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in Biotics, natural heritage resources have not been documented within the submitted project boundary including a 100 foot buffer. In addition, the project area does not intersect any of the predictive models identifying potential habitat for natural heritage resources.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the Virginia Department of Conservation and Recreation (DCR), DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

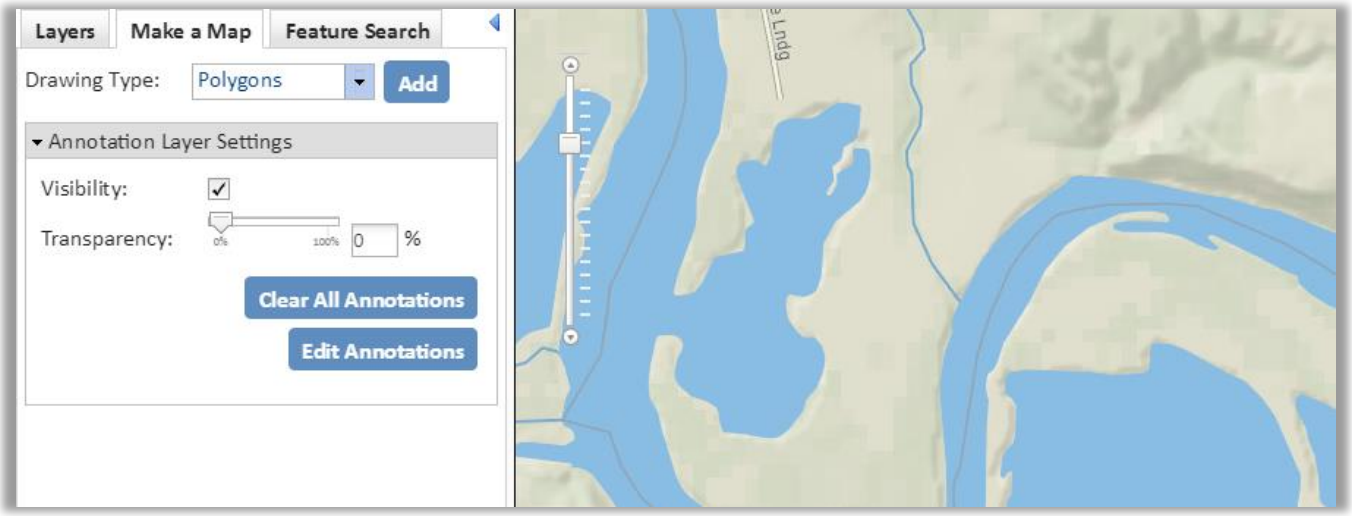
Any absence of data may indicate that the project area has not been surveyed, rather than confirm that the area lacks additional natural heritage resources. New and updated information is continually added to Biotics. Please revisit this website or contact DCR for an update on this natural heritage information if a significant amount of time passes (DCR recommends no more than six months) before it is utilized.

The Virginia Department of Wildlife Resources maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters, that may contain information not documented in the Natural Heritage Data Explorer. Their database may be accessed from http://vafwis.org/fwis/ or contact Amy Martin (804-367-2211 or amy.martin@dwr.virginia.gov).

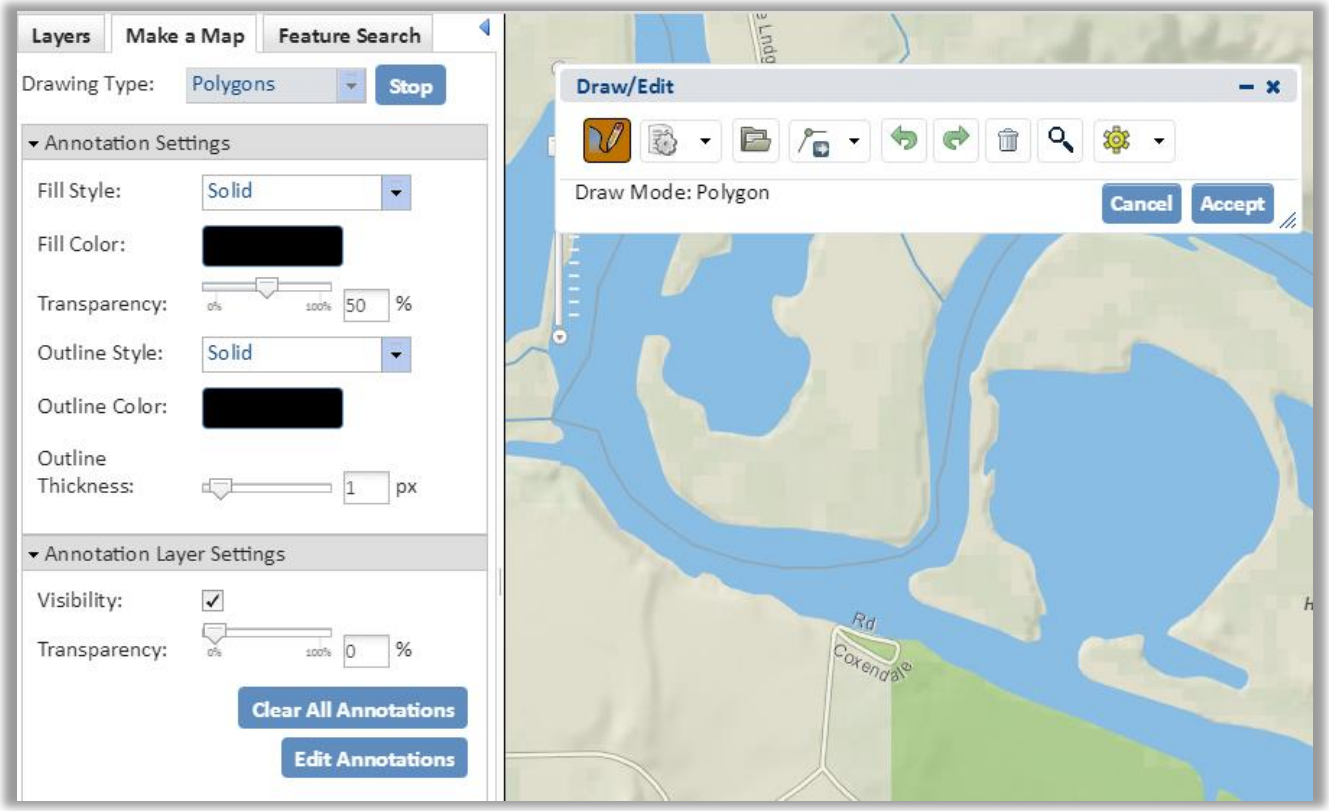
Thank you for submitting your project to the Virginia Department of Conservation and Recreation's Natural Heritage Data Explorer Web Service. Based on the preliminary screening results for this project, no further correspondence will be sent from this office. Should you have any questions or concerns about this report, the Data Explorer, or other Virginia Natural Heritage Program services, please contact the Natural Heritage Project Review Unit at 804-371-2708.

Add and edit point, line, or polygon annotation to my map

1. Zoom to the area of interest and click on the 'Make a Map' tab (formerly 'Map Making' tab).

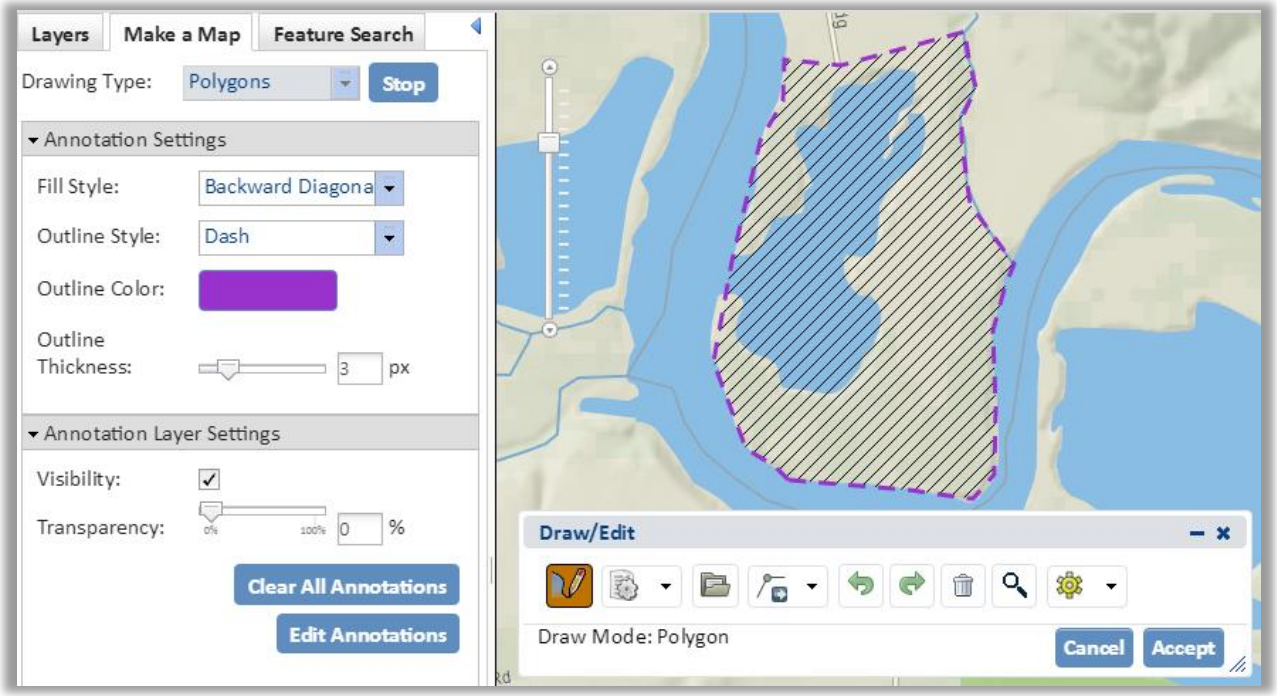


2. Select a Drawing Type of Polygons, Lines, or Points, and click 'Add.' A Draw/Edit toolbar will appear with annotation settings specific to the Drawing Type.



3. Select the desired fill style and color, transparency, and outline style, color, and thickness. *Note that if the chosen drawing type is polygon and the fill style is not solid, then the option to choose fill color and transparency will not be available*. Once the settings have been selected; use the tools in the Draw/Edit toolbar to draw the shape. The example below uses Drawing Type of polygon.

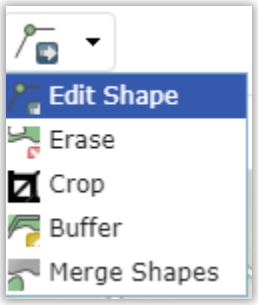
4. **To add annotations by drawing directly on the map**, choose the 'Draw Shape' button (shown right) and draw the shape by single-clicking on the map, making sure to click (or put a vertex) at each direction change for lines and polygons. Double click to finish line and polygon shapes. *Note that annotation settings may be changed at any point while drawing. To move the Draw/Edit toolbar out of the way, click and drag the title bar.*



5. **To add annotations using a shapefile**, click the 'upload shapes' button (shown right). When the Upload Shapes window opens, click 'Select File to Upload' and navigate to the zipped shapefile, KML, or GML file. Click 'Open' and the shape will automatically add to the map as an annotation. *Note that the geometry type (point, line, polygon) must match the current Drawing Type in the Draw/Edit menu.* If a file with multiple shapes is uploaded, click 'Select from Resource' and drag a box to select the desired shapes for creating the annotation.

6. **To add annotations from coordinates or existing annotations**, use the 'Additional Mapping Options' button (shown right) from the Draw/Edit menu. Click the down arrow to specify whether the new shape should come from existing annotations ('From Make a Map') or coordinates ('Coordinates'). For either option, the user may further modify features once they have been created.

7. To edit the active, or newly created shape, click the 'Edit Shapes' button (shown right) in the toolbar and choose one of the four tools, described below:



Edit Shape allows the user to move, resize, or rotate the shape, as well as alter its appearance by moving individual vertices.

Erase removes areas that are INSIDE the shape delineated with the tool.

Crop removes areas that lie OUTSIDE the shape delineated with the tool.

Buffer adds a buffer to the shape by the distance specified in the dialog box (distance can be positive or negative).

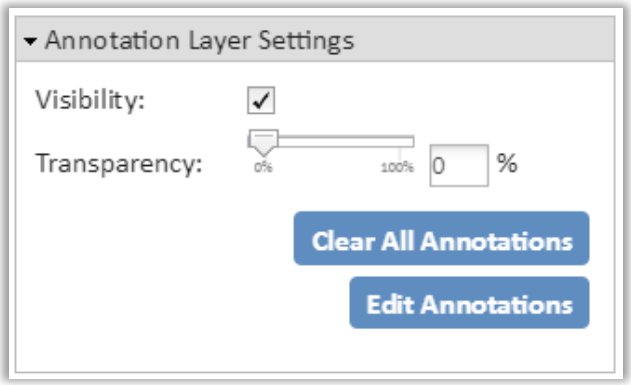
Merge Shapes combines multiple shapes into one annotation feature, for the active annotation adding session.

Other tools on the Draw/Edit menu include:

Undo last drawing action **Redo** last undo **Clear** shape **Zoom** current shape

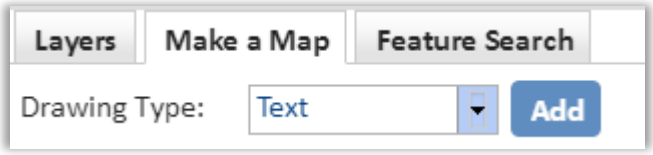
The **Draw Settings** button contains many options for the user to optimize drawing experience. See the draw settings section in the Submit a Project for Review help topic for more information.

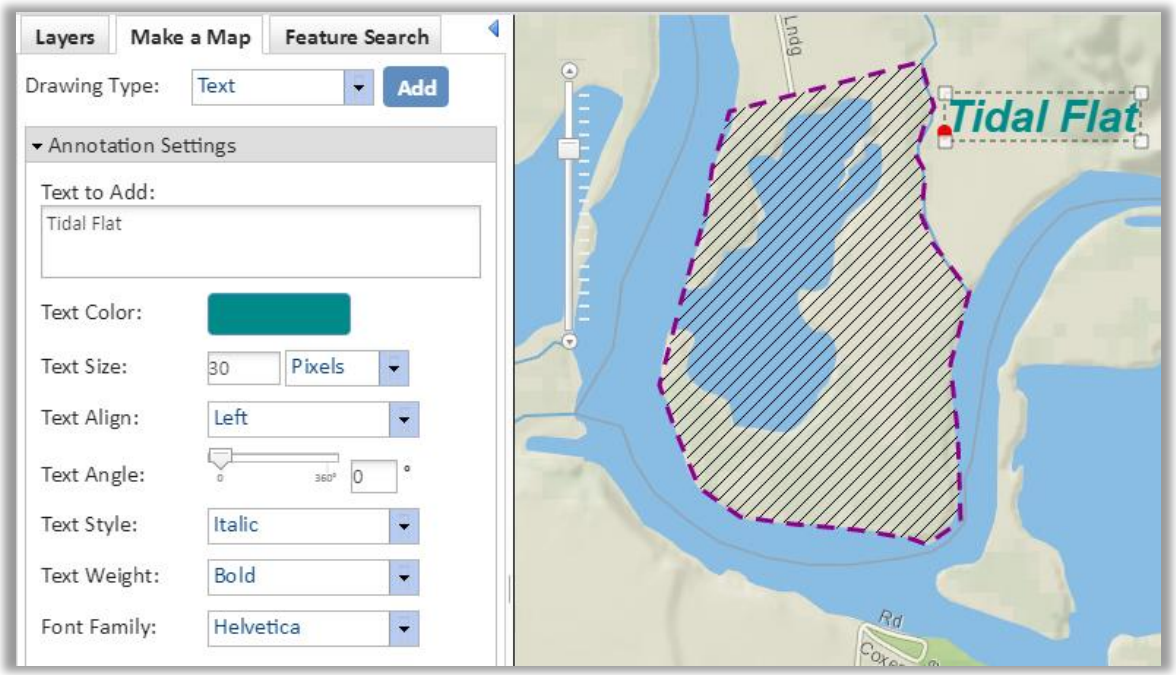
8. When drawing and editing of the annotation feature(s) are complete, click 'Accept' on the Draw/Edit toolbar.
9. To edit existing annotations, click on 'Edit Annotations' under the Annotation Layer Settings heading in the Make a Map tab. Click on the annotation to be edited; vertices may be added, deleted, or moved. The shape may also be resized or rotated. Click 'Stop Editing' when the shape is complete.
10. To delete annotations, select an annotation while in editing mode and click 'Delete Annotation.' Or, the user may click 'Clear All Annotations' to delete all annotations at once.



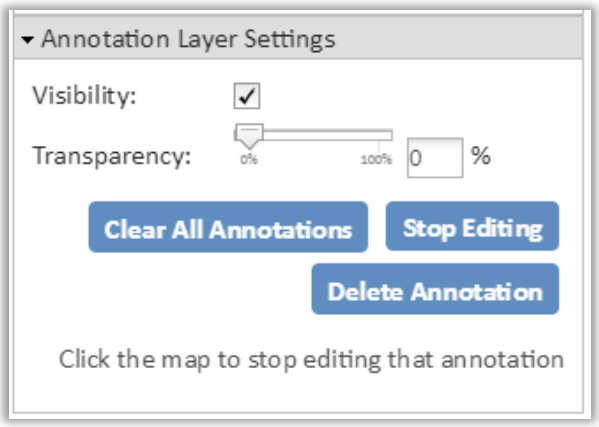
Add text to my map

1. Zoom to the area of interest and click on the 'Make a Map' tab.
2. Select a Drawing Type of Text from the dropdown menu, click the 'Add' button, and click on the map where the text should be placed.
3. The placeholder text <Please Add Text> label will be added to the map as well as a red dot, which indicates the location on the map that was clicked (shown at right).
4. In the Annotation Settings section of the Make a Map tab, enter the desired text into the 'Text to Add' box. Adjust text color, size, alignment, angle, style, weight, and font if appropriate.



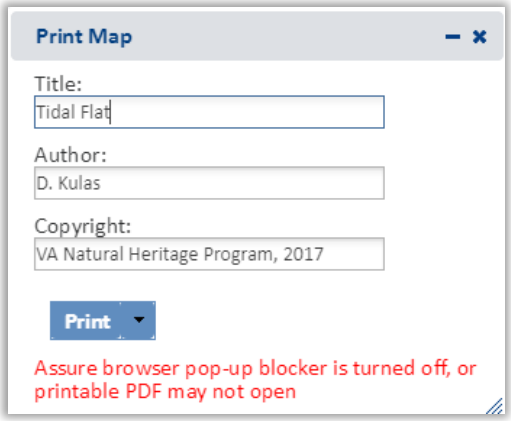


5. Use Annotation Layer Settings, under the Make a Map tab, to toggle annotation layer visibility on/off, adjust transparency, and clear or edit existing labels.
6. Once all text is added and complete, click the 'Stop Editing' button.
7. Any of the settings may be adjusted once the text has been placed. Click 'Clear All Annotations' to remove all text labels. Click 'Edit Annotations' to edit existing text. Click on the label to be edited, make adjustments, and select 'Stop Editing' when finished.

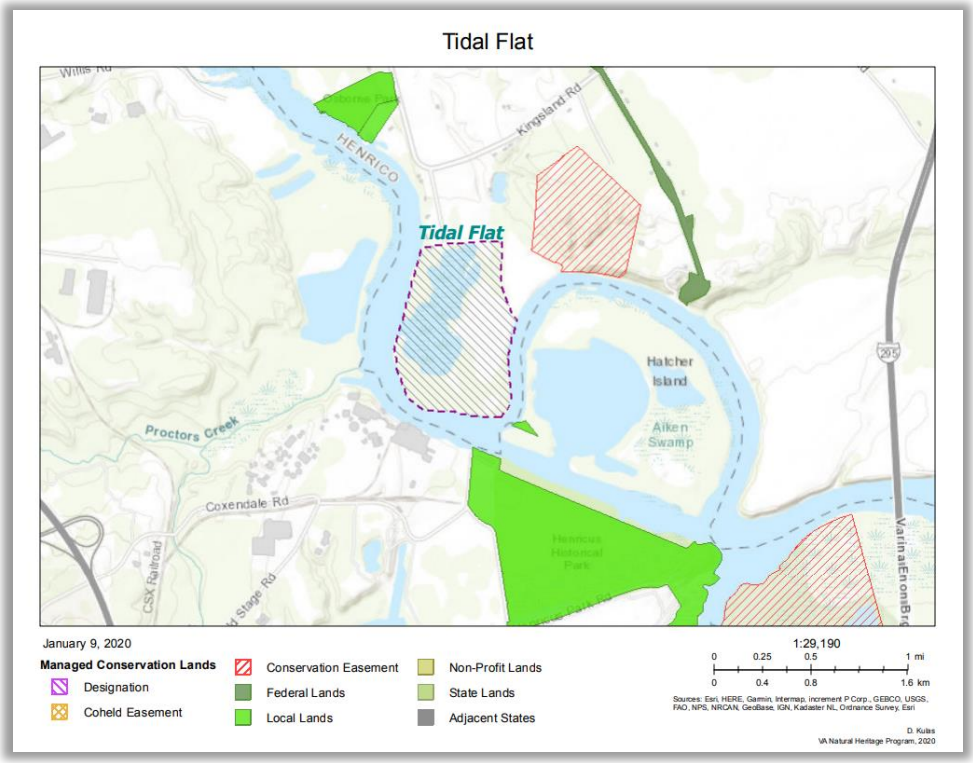


Print a map

1. Ensure that the map viewer has the desired layers, scale, and/or annotations set.
2. Click the print button on the map toolbar (pictured at right). The Print Map window will open.
3. Optionally enter a Title, Author, and Copyright information into each field
4. Click the blue arrow to the right of the blue 'Print' button and choose a print setting.
5. When the map is ready, a **Printout** hyperlink will appear in green on the 'Print Map' window in place of the Print button. Click the link and the printable map will open in a new browser tab. *Note that the browser needs to allow pop-ups for NHDE, or the new tab will not open.*
6. Use the browser's print function to print the map. If the map needs changes; exit the preview and return to the map viewer to make edits.

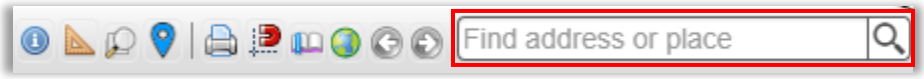


When printing a hard copy map with 'Map Only' selected, please allow a one inch margin around the entire page.



Find a location of interest

1. Locate the **Find address or place** tool on the map toolbar:



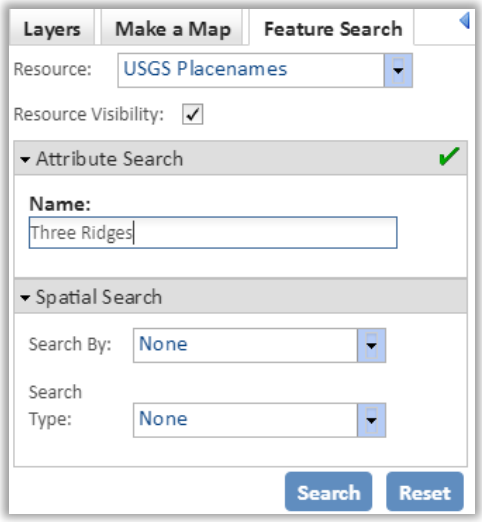
2. Type the address or geographic place name, preferably including state and/or zip code, in the text box. Hit the 'Enter' key on the keyboard or click the magnifying glass icon to zoom to the location on the map.
3. The search results box shows the option to zoom closer to the area, or to show more search results.

Note: If searching for a commonly used name, be specific. The tool uses a global place name search. For example, when searching for Grafton, the user should specify Grafton, Virginia to avoid being taken to, e.g., Grafton, Massachusetts. The tool zooms to different scales depending on the viewable threshold for the basemap being used; see Table 1 for details.

Search for a certain feature in a layer

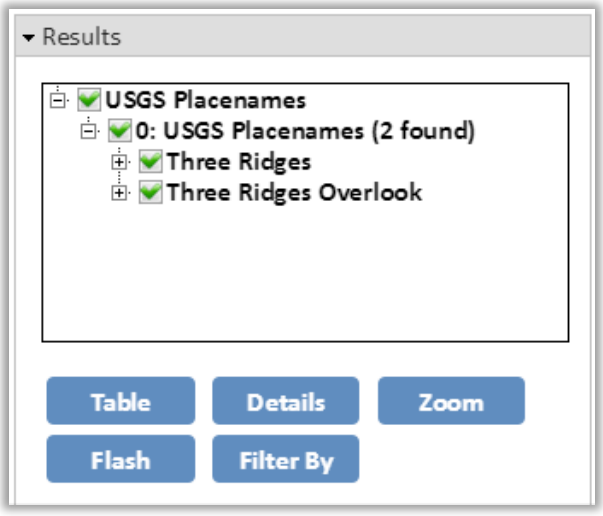
Use the Feature Search (formerly Find/Results) tab to search data layers for features of interest. The following examples demonstrate attribute and spatial search methods separately; see the next section for an example that uses a combination of the two search methods. Check 'Resource Visibility' to turn the Resource (search) layer on in the map. For layers that have defined filters set, see the Feature Search section for instructions on clearing or ignoring the filter.

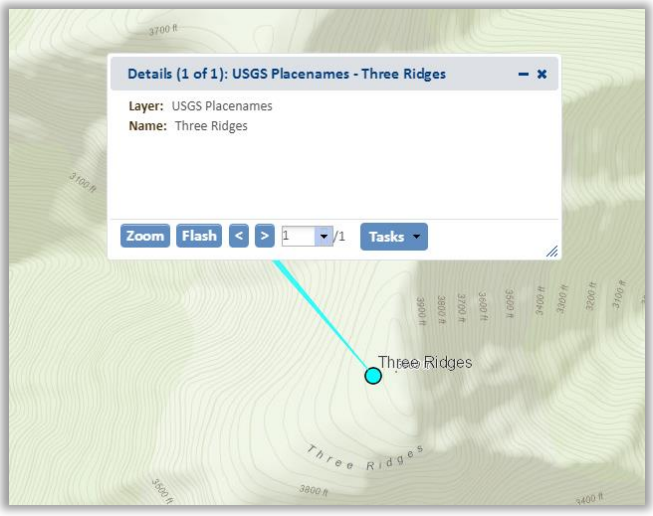
ATTRIBUTE SEARCH identifies features in a layer via specific search criteria



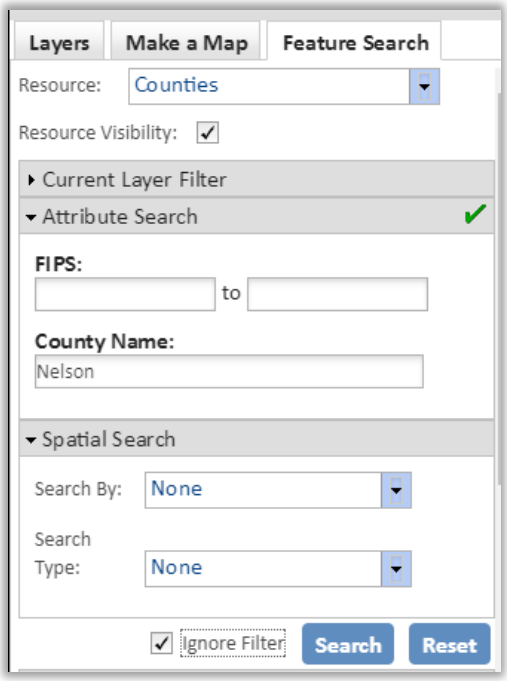
Example: Feature Search on geographic place names

1. Click on the Feature Search tab and click on the blue arrow in the Resource field to open the drop-down menu of layers. Click on the USGS Placenames layer name to specify the layer to search.
2. Type the location of interest in the Name field of the 'Attribute Search' section (refer to graphic, at right). Click 'Search.'
3. The search results will appear in the 'Results' section of the Feature Search window (below, left). Check or uncheck the appropriate boxes to select the location(s) of interest. Click 'Zoom' to view to the selected location(s) in the map. Clicking 'Details' will open the details window for the selected feature(s) in the map viewer (below, right). The 'Table' button allows the user to view all results in a table, and the flash button will flash the selected features in the map. 'Filter By' will filter the layer to show only the search results.

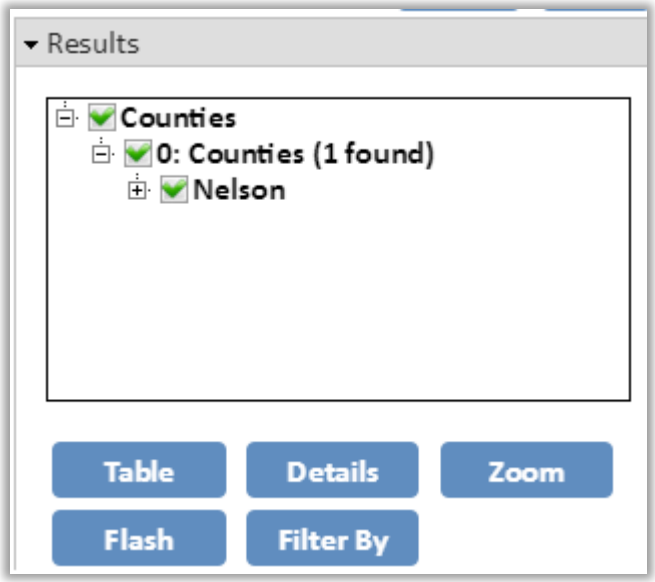


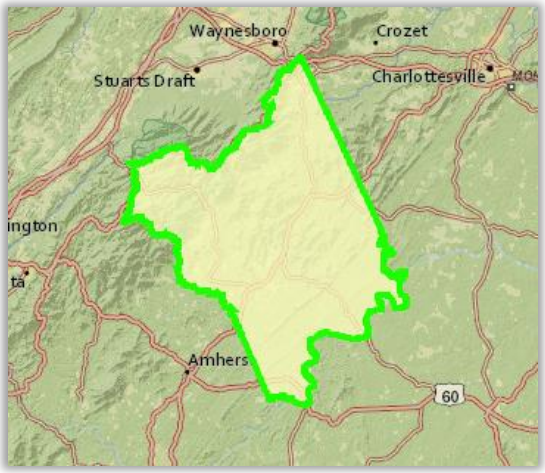


Example: Feature Search on the Virginia Counties layer

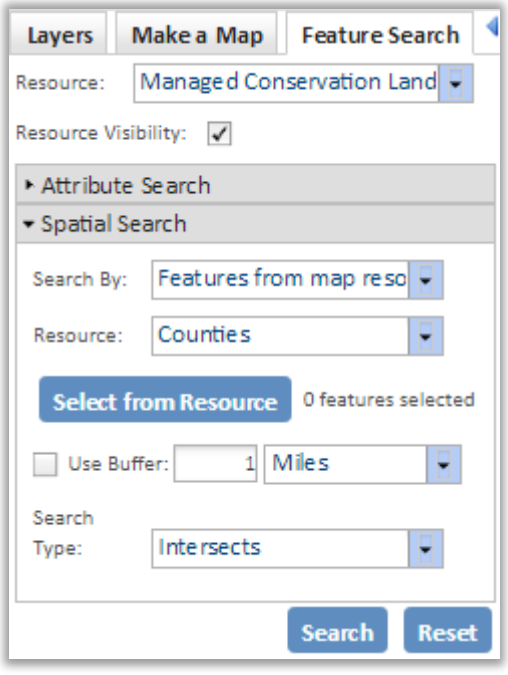


1. Click on the Feature Search tab from the Map view and select the Counties layer from the Resource dropdown list.
2. Type the name of the county in the County Name box and Click Search. *Note: if the layer is filtered, the Current Layer Filter section will show. If searching for a feature not specified in the filter, select 'Ignore Filter.'*
3. The results will reveal the particular county, and clicking 'Zoom' will zoom to the extent of the selected county in the map viewer. Clicking 'Flash' will flash the selected county on the viewer. 'Table' opens the results in a table and 'Details' opens the Details window in the map viewer. Clicking 'Filter By' will update the layer's filter to show only the selected county (below, right).





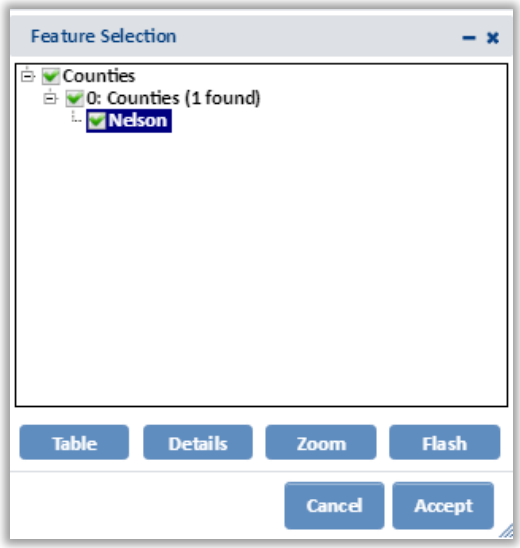
SPATIAL SEARCH identifies features in a layer via a shape delineated by the user, and explores relationships between data layers. See the Feature Search section for an example of searching by drawing a box, and for further information regarding using filtered layers in the feature search. *Note: the Filter By option is only available for attribute search.*



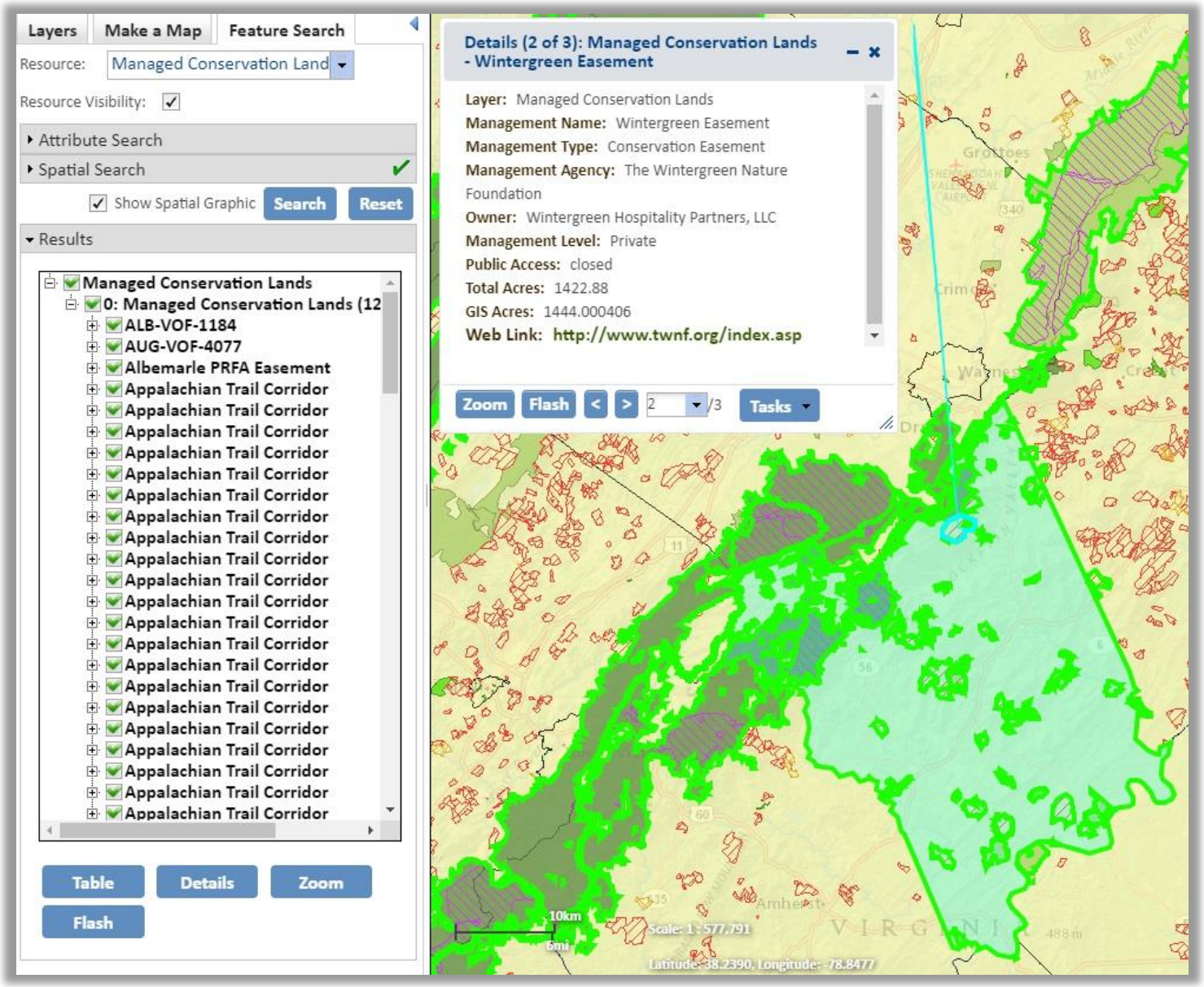
Example: Search for Conserved Lands that intersect a given County

1. Click the Feature Search tab in the Map View.
2. Use the Resource pull-down arrow to select the Managed Conservation Lands layer. *The 'Attribute Search' section may be clicked to hide that section and save space in the menu.*
3. In the 'Spatial Search' section, use the pull-down menus to select:
   Search By: Features from Map Resources (uses another layer)
   Resource: Counties
   Search Type: Intersects

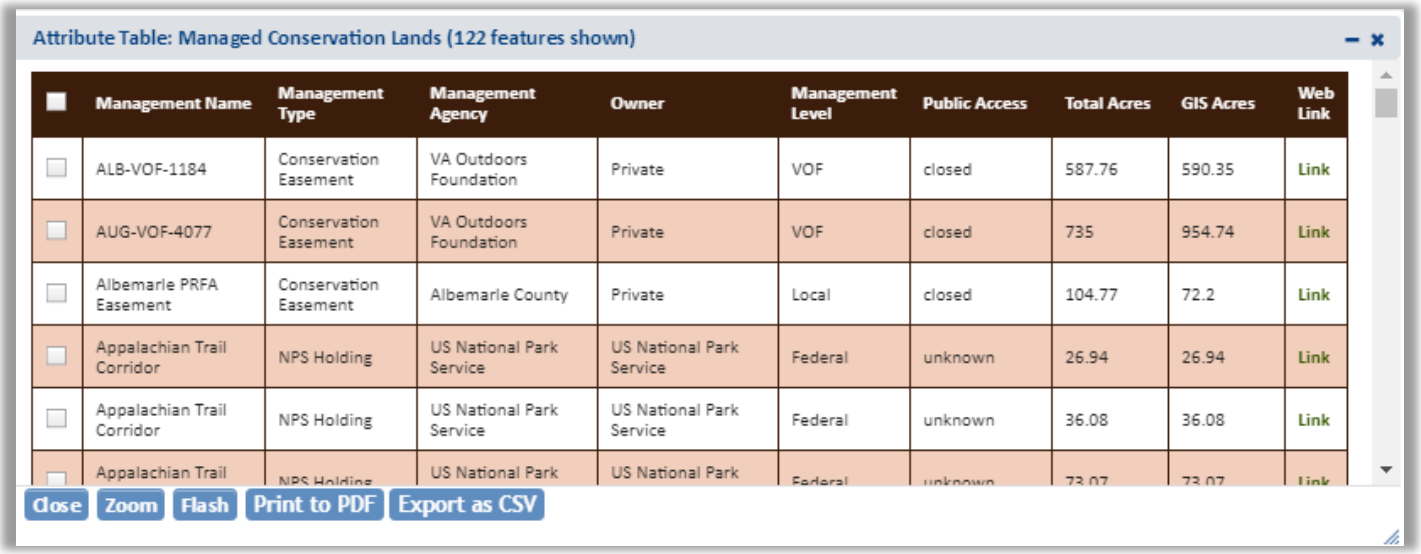
4. Once the search parameters are set, click ‘Select from Resource.’
5. Click on the map to add a county, or press the ctrl key on the keyboard and drag a box on the map with the mouse to select multiple counties. The selections will be outlined in blue in the map and may be selected or unselected by clicking the checkbox in the ‘Feature Selection’ window, shown at right. Once the selection is made, click ‘Accept.’



6. The search feature (selected county or counties) will be outlined entirely in blue and the Spatial Search menu will indicate the number of features selected next to the ‘Select from Resource’ button. Click ‘Search.’
7. The Results section will populate with all Managed Conservation Lands that intersect the selected county (Nelson, in this example), and the mapped features will appear in the map with green higlighting. There are 122 Managed Conserved Lands that intersect with the Nelson County boundary. The Results window may need to be expanded by clicking and dragging on the right side of the window, or using the bar at the bottom of the results window to scroll.
8. Select/unselect individual results by clicking the check box next to the result. Expand result details by clicking on the plus sign next to a record.



9. Clicking ‘Details’ will open a details window in which the user can step between, Flash, and Zoom to the individual results on the map viewer. Clicking Tasks allows the user to open results in a tabular format.
10. The Results panel also has a ‘Table’ button. The user can zoom to and flash selected results. A PDF of the results can be generated for printing and saving by clicking the ‘Print to PDF’ button. Results may also be exported as CSV.

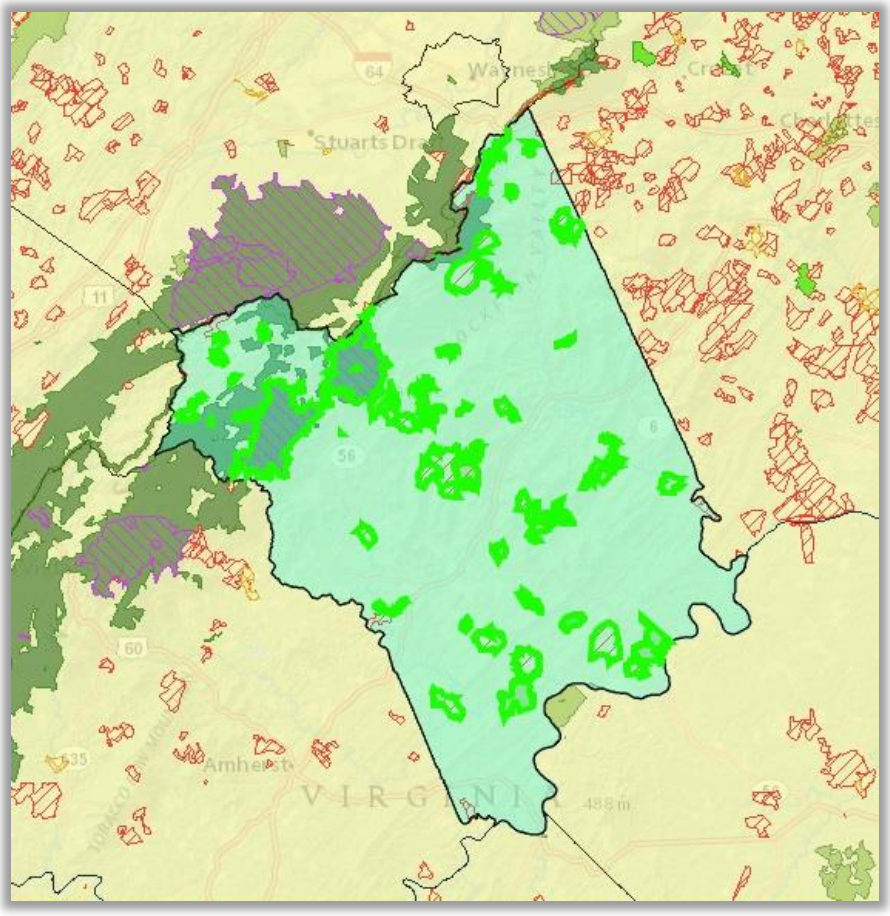


Attribute Table: Managed Conservation Lands (122 features shown)

Management Name	Management Type	Management Agency	Owner	Management Level	Public Access	Total Acres	GIS Acres	Web Link
ALB-VOF-1184	Conservation Easement	VA Outdoors Foundation	Private	VOF	closed	587.76	590.35	Link
AUG-VOF-4077	Conservation Easement	VA Outdoors Foundation	Private	VOF	closed	735	954.74	Link
Albemarle PRFA Easement	Conservation Easement	Albemarle County	Private	Local	closed	104.77	72.2	Link
Appalachian Trail Corridor	NPS Holding	US National Park Service	US National Park Service	Federal	unknown	26.94	26.94	Link
Appalachian Trail Corridor	NPS Holding	US National Park Service	US National Park Service	Federal	unknown	36.08	36.08	Link
Appalachian Trail	NPS Holding	US National Park	US National Park	Federal	unknown	73.07	73.07	Link

Close Zoom Flash Print to PDF Export as CSV

Note that many highlighted Managed Conservation Lands fall outside the search county of Nelson. This is because either they are part of the same conserved entity (for example, the Appalachian Trail Corridor), they are a part of a larger group of statewide managed areas (for example, conservation easements held by The Nature Conservancy), or they are adjacent to the county and got selected because the managed area crosses the Nelson County boundary. Another search type, Contains, will return Managed Conservation Lands that fall completely within the selected county, excluding conserved lands that overlap into more than one county (any features that lie outside the selected area WILL NOT be included). Compare the below Contains results with the Intersects results, shown on the previous page.

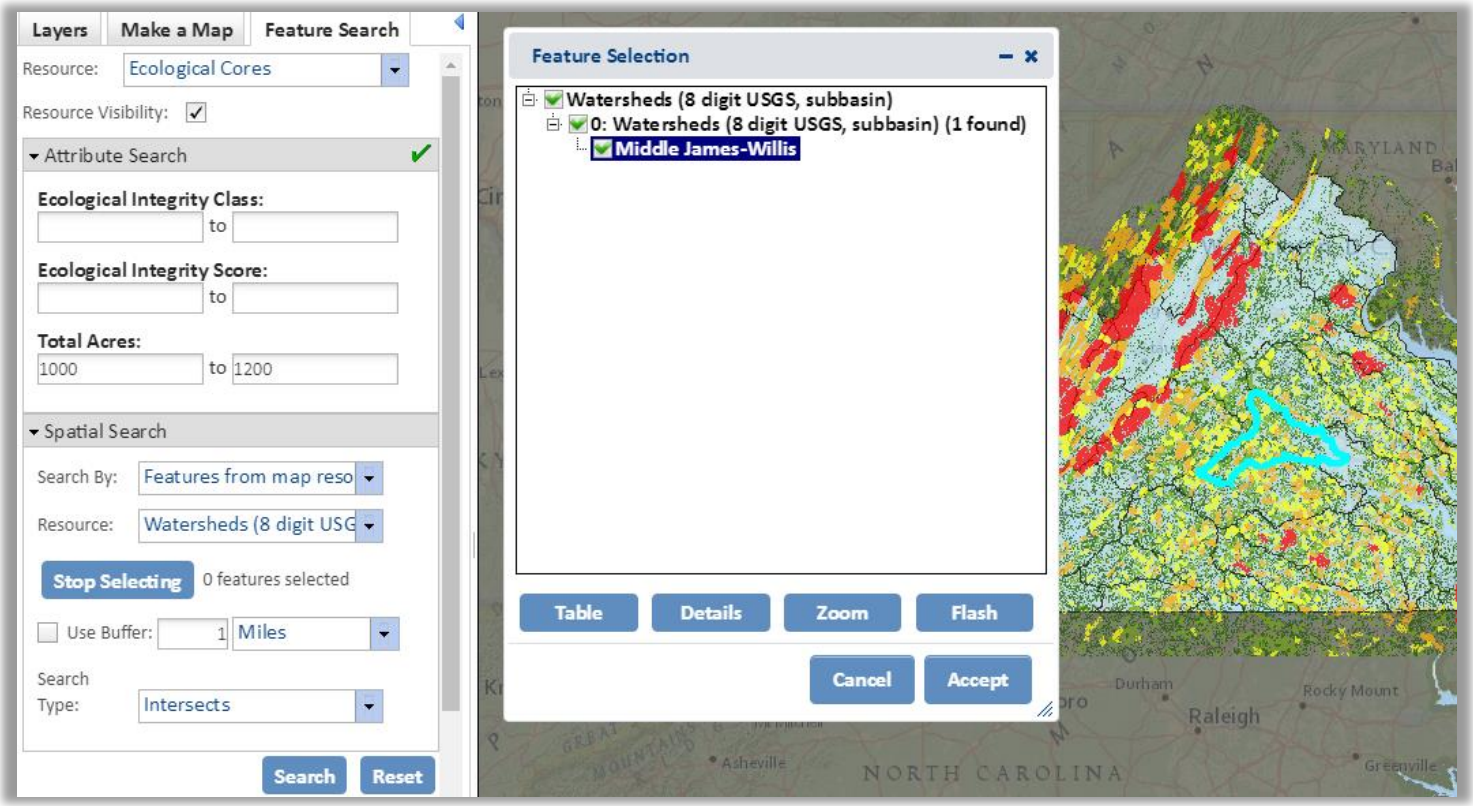


Search a layer by attributes and by spatial location

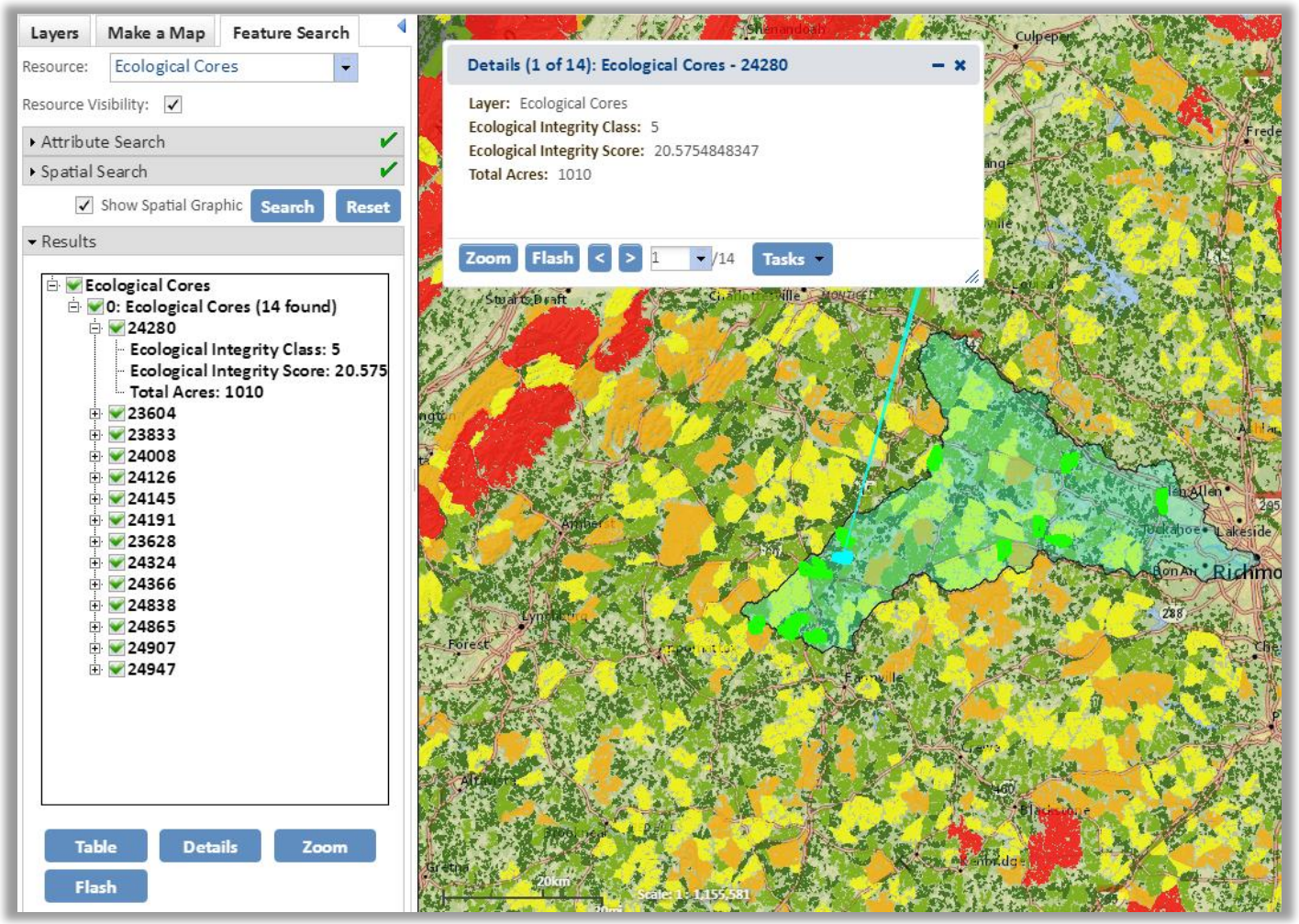
This search uses both the 'Attribute Search' AND 'Spatial Search' sections of the Feature Search tab.
For layers that have defined filters set, see the Feature Search section for instructions on clearing or ignoring the filter

Example: Find out how many 1000-1200 acre Ecological Cores are within a specific watershed

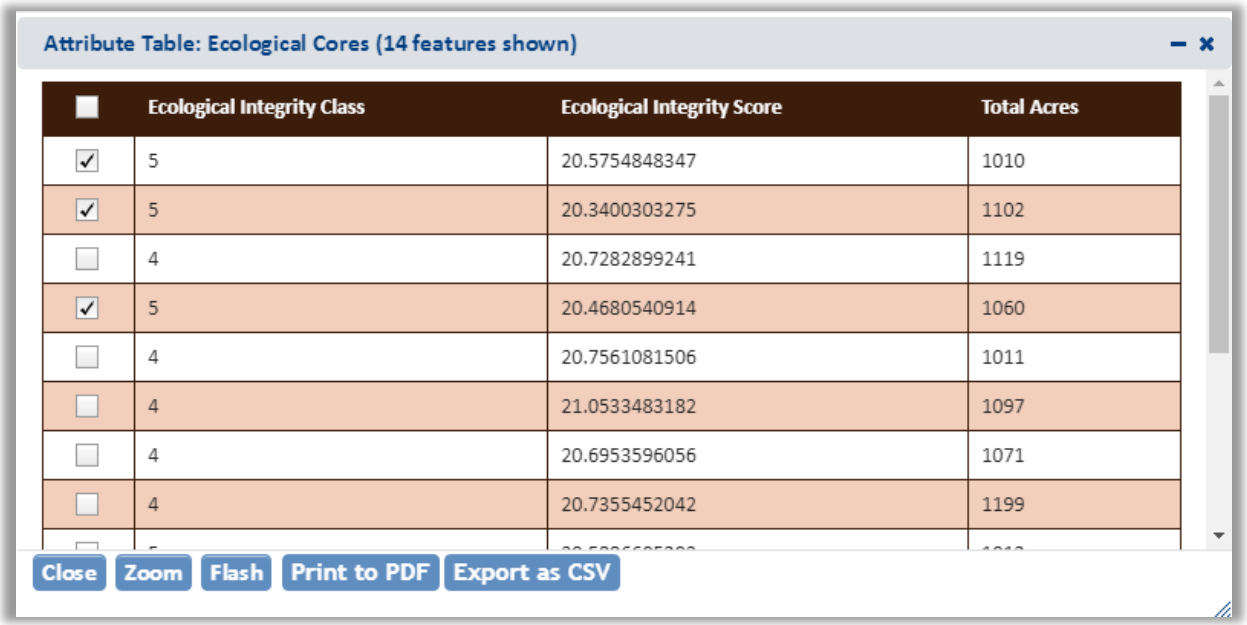
1. In the Map view, click the 'Feature Search' tab.
2. Select 'Ecological Cores' as a resource layer from the dropdown menu.
3. In the 'Attribute Search' section, enter the desired acreage range.
4. In the 'Spatial Search' section, select 'Features from map resource' in the Search By pull-down menu. *The features from map resource option allows the user to search the Ecological Cores layer's relationship to other layers (in this case, watersheds).*
5. In the 'Resource' pull-down menu, click on 'Watersheds (8 digit USGS, subbasin),' and in the 'Search Type' pull-down, choose 'Intersects.'
6. Click the 'Select from Resource' button and the watersheds layer will turn on, if not already displayed.
7. Single click on the desired watershed, or hold the Ctrl key down on the keyboard and with the mouse, drag a box over the desired watershed on the map. The selected watershed will be highlighted in blue and its information will appear in the 'Feature Selection' window. If multiple selections were made, they can be selected and unselected by toggling the check boxes next to the name (see graphic, next page).
8. Click 'Accept' in the feature selection window. There should now be a message saying "1 features selected" next to the 'Select from Resource' button. This selection feature can be viewed any time by clicking 'View.'



9. Click ‘Search’ and the results will appear in a list in the Results section, and will be highlighted in green on the map.
10. Results details can be easily viewed by checking the plus sign next to each entry in the results section, or by clicking on the Details button to open a details window. The ‘Flash’ button will illuminate the selected results for a few seconds on the map viewer. Click ‘Filter By’ to filter the Cores layer (based on attribute search criteria only).

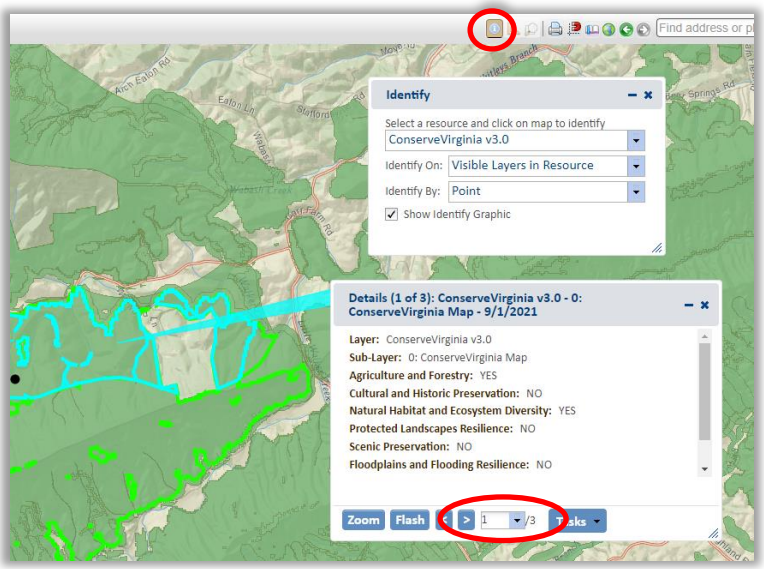


11. Click the ‘Table’ button to open the results in tabular format. Clicking Print to PDF opens a PDF version of the table in a new web browser tab. The user may also export the results to CSV format. Selections may be toggled on and off by clicking the checkboxes in the first column of the table.



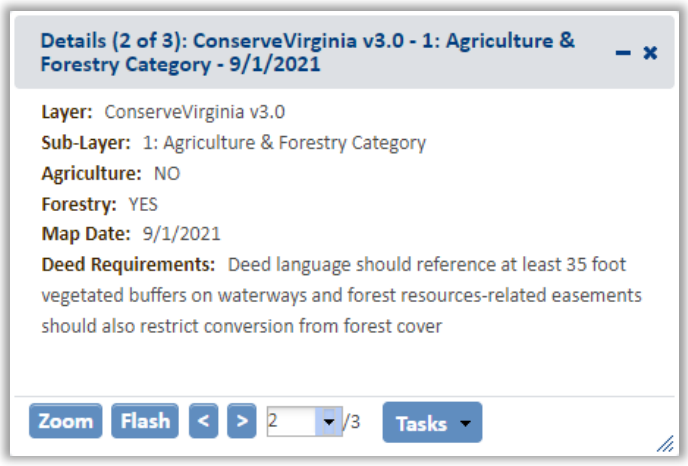
Interpret the ConserveVirginia v3.0 data layers

Explore ConserveVirginia layers to identify Virginia's highest priority lands for protection per Governor Northam's ConserveVirginia Initiative. The ConserveVirginia Map layer is a summary of the seven category inputs (see ConserveVirginia Layer Description section for more information regarding data inputs). ConserveVirginia data layers are to be used as an initial screening to determine if a potential land protection project qualifies as a ConserveVirginia priority, and may be used in NHDE via the following method:



Identify tool

1. Click the  button to open the Identify window and enter applicable search parameters. In this example, 'Visible Layers in Resource' is selected for *Identify On* criteria and thus, all component ConserveVirginia categories overlapping the specified location of interest will be returned.
2. Click on the map at the location of a potential conservation project within the ConserveVirginia Map layer (black dot, right)
3. The ensuing results window for the ConserveVirginia Map displays which of the seven priority conservation values the project could protect (YES values, pictured above)
4. Click through the results using the navigation tools in the red circle to show the details for each of the intersecting priority conservation values, or component categories (Agriculture and Forestry and Natural Habitat and Ecosystem Diversity, in this example). The category datasets contain required basic deed language that restricts certain land uses, which would help to assure the protection of the conservation values identified for each category (pictured below). In other words, including suggested deed language would also help to assure that the project could be considered a ConserveVirginia success.

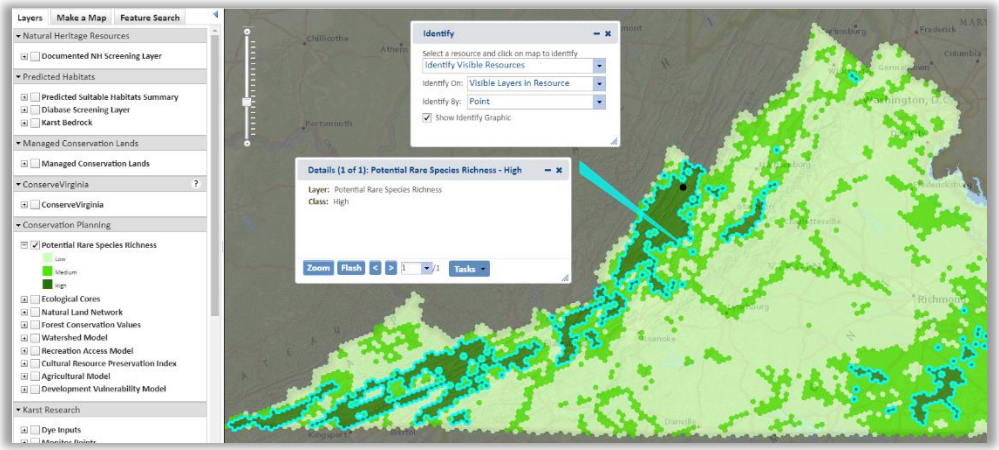


5. Other optional search parameter configurations:
   a) Specify different *Identify By* criteria: Point, Box, Polygon, or Line
   b) Choose a buffer distance when identifying. This will expand the search range from the search location placed on the map by the specified buffer distance, returning results located within that distance.

   See the Retrieve information about a particular feature section for more help with the Identify tool.

Interpret the Potential Rare Species Richness Layer

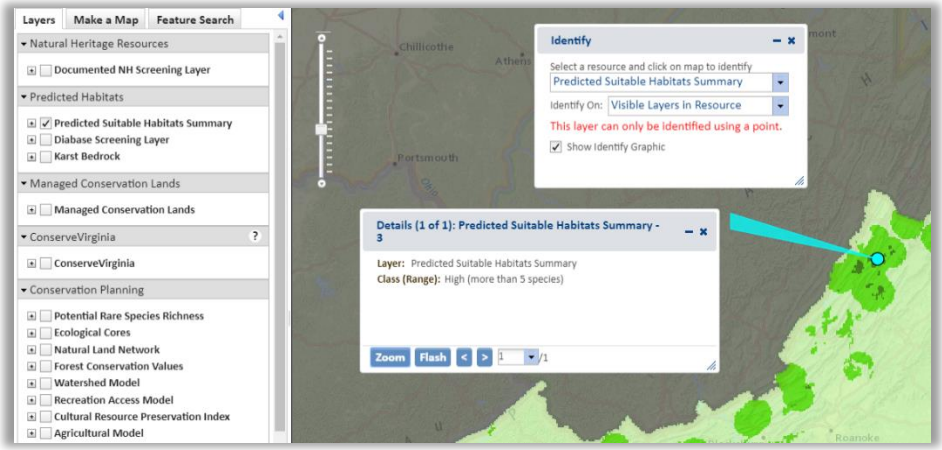
1. Turn the Potential Rare Species Richness layer on in the Layers list.
2. Select the Identify tool
3. Click on the map and delineate the area of interest
4. The resulting popup window will show the Potential Rare Species Richness for the area specified by the Identify criteria
5. Alternatively, the user may:
   a) Zoom to a map scale no closer than 1:2,311,162 and visually inspect the map to compare the Potential Rare Species Richness layer legend to the location of interest on the map.
   b) Use the Zoom to Coordinates and Scale tool (select scale 1:2,311,162) and then use the Identify tool



In this example, the point that was used to identify intersected an area with a High potential for rare species richness. All other areas on the map with 'High' potential are highlighted (in blue, as shown above). Locations or properties with a high potential for rare species richness signal "hot spots" for conservation planning focus. Locations with a low potential for rare species richness, or "cool spots," may contain places to site development. The Potential Rare Species Richness layer may be used in conjunction with the other Conservation Planning datasets to further guide conservation planning and decision making. **Note that the Potential Rare Species Richness layer is publically available.**

Interpret the Predicted Suitable Habitats Summary layer

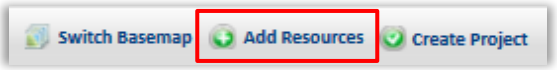
1. Turn the Predicted Suitable Habitats Summary layer on in the Layers list.
2. Select the Identify tool and specify Predicted Suitable Habitat Summary as the Identify resource. Note that point is the only option for identification on this layer.
3. Click on the map at the desired location
4. The resulting popup window will show the Predicted Suitable Habitats summary for the point location.
5. Alternatively, the user may:
   a) Visually inspect the map and compare the layer legend to the location of interest on the map.
   b) Use the Zoom to Coordinates and Scale tool, then use Identify.



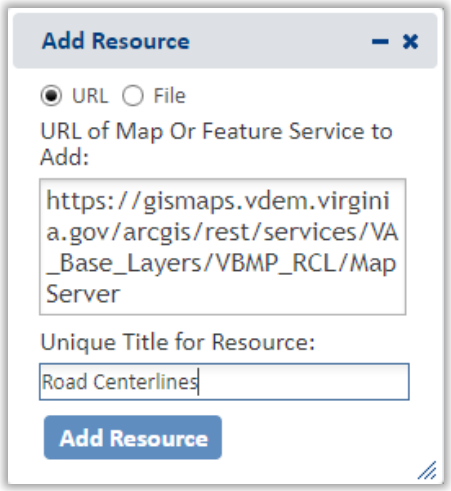
In this example, the point that was used for identify has a High Predicted Suitable Habitats (PSH) Summary class, with a range of more than 5 species' individual PSH layers. In other words, the raster cell is categorized as having a high probability that there is suitable habitat present for more than 5 different species. If there is a potential project in this area, the user should create and submit a project, as a location with High PSH class will warrant a project review. **Note that the Predicted Habitats layers are available to Tiered NHDE users only.**

Access an external Map Service for use in the map viewer

1. Click the 'Add Resources' tool in the upper left corner of the map viewer (in red, below).

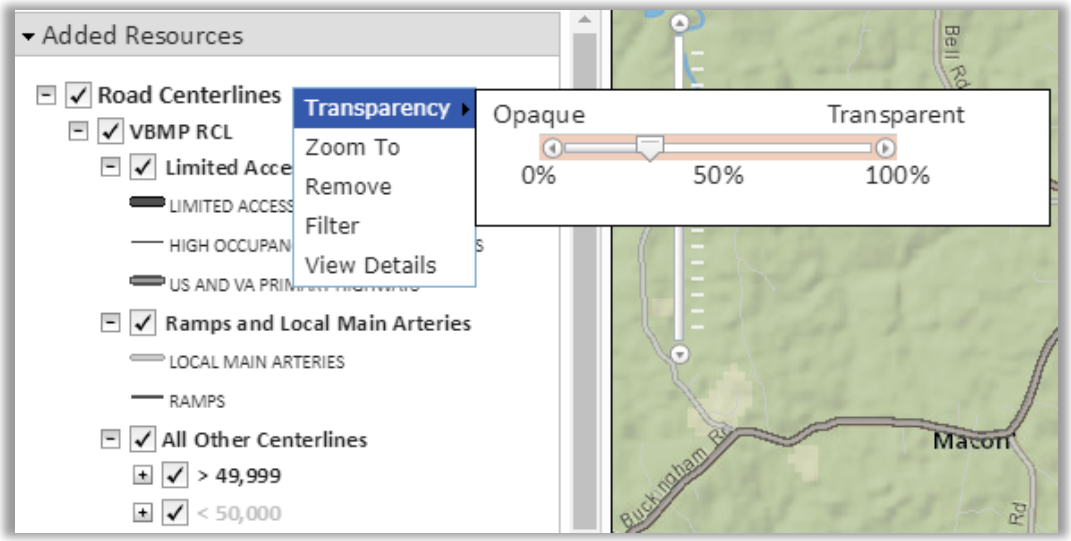


2. Select the 'URL' radio button and type or copy/paste the URL of the Map Service to add. Give the map service a unique title; this title will be displayed in the layer table of contents on the map viewer. *Note that the URL of the map service should be in the following format:* ***https://<your server>/arcgis/rest/services/<service name>/MapServer****. See example below.*

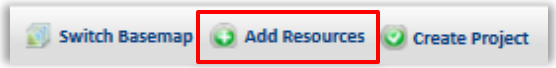


If the URL provided is for a map service not protected by SSL (insecure), attempts to add the insecure service will be blocked by NHDE, as http map services are no longer supported as of September 2020. First try adding the URL with the "https:" prefix instead of "http." If that does not work, contact the data provider of the external map service and ask to make their services available under SSL, which is a general internet security best practice.

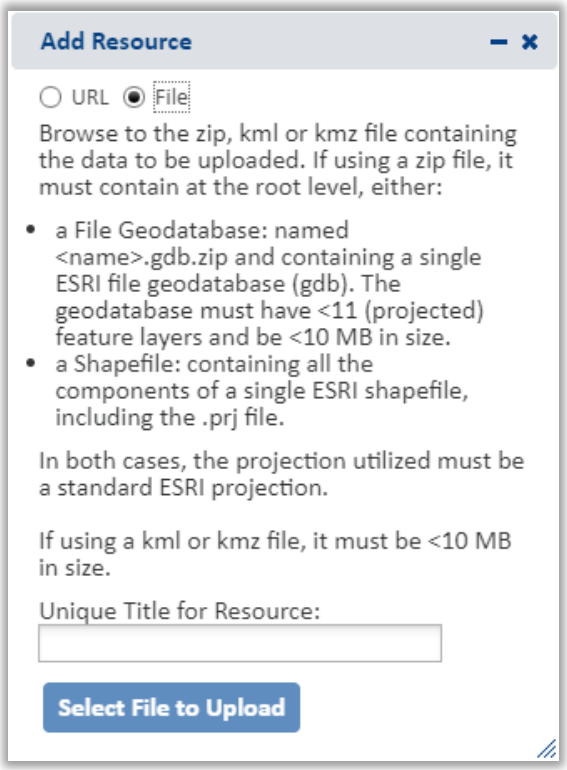
3. Once the map service has been added to the map viewer, an 'Added Resources' heading will appear in the layers tab above other NHDE map layers, with the newly added map service (see graphic, below).
4. Hover to the right of the added layer to reveal an arrow. Click this arrow for options to change the layer's transparency, zoom to, remove, or filter the layer, or view its map service details. *Note that added map services will persist in Saved Maps.*



Import a shapefile or file geodatabase to the map viewer



1. Any user can import a kml, kmz, or zipped shapefile or geodatabase to the map viewer by clicking 'Add Resources' on the Map page.
2. Click on the 'File' radio button, and then click 'Select File to Upload' to browse and select the kml, kmz, or **zipped** shapefile or file geodatabase.
3. Enter a unique title for the layer; this title will be displayed in the map viewer table of contents under the heading 'Added Resources.'
3. Imported shapes by default appear orange; the symbology cannot be changed, but the transparency can be adjusted by clicking the arrow to the right of the layer name and adjusting the transparency slider.
4. To remove the shapefile, click on the arrow to the right of the layer title and select 'Remove.'

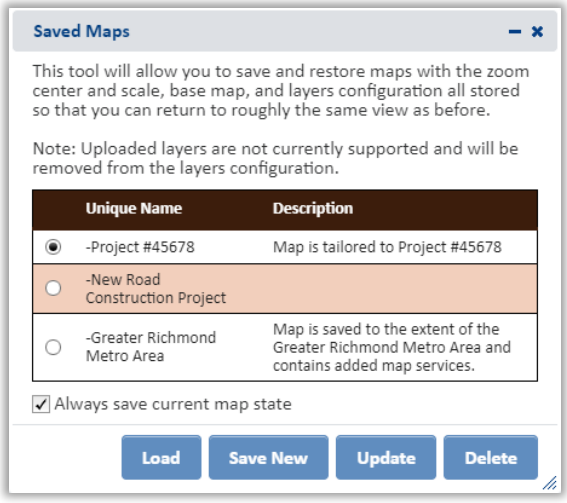


Note that shapefiles and file geodatabases must follow the format specifications listed in the Add Resources menu, pictured at right, and kml and kmz files must be <10MB in size:

Added resources will only remain visible during a current open map browser session. If the user logs out, or if the map viewer times out (after 30 minutes of inactivity), the uploaded shapefile or file geodatabase will no longer be available on the map viewer.

See Add Resources section for more information regarding importing shapefiles.

Save a map for later use

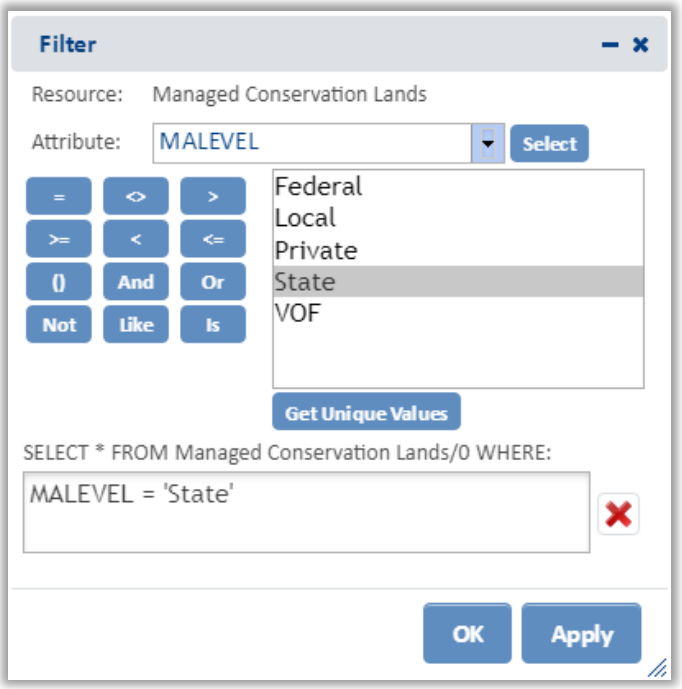


This tool allows the state of the map to be saved for use by the **logged in user,** to be accessed during a later map session. These saved settings apply to zoom, spatial bookmarks, basemap, overview map, map resources added via URL, and map layer configurations such as transparency and visibility. To use this tool:

1. Click on the saved maps button on the map viewer toolbar (pictured above) and the Saved Maps menu will appear (pictured right).
2. When the map is configured appropriately, click 'Save New' to save the map in its current state. Enter a name and description and click 'Save.'
3. To load the saved map, select the corresponding radio button in the Saved Maps menu and click 'Load.'
4. Update an existing saved map by making sure the map is configured appropriately, selecting the map's radio button in the Saved Maps menu, and clicking 'Update.' Edit the name and description if desired and click 'Save.'
5. Delete a saved map by selecting the corresponding radio button and clicking 'Delete.'
6. Check 'Always save current map state' to save the map by default; map automatically loads the last used map state.

Note that uploaded layers via shapefile or geodatabase are not currently supported by this tool, nor are map annotations created via the Make a Map tab. Because saved maps are attached to the NHDE user account, non-subscription users do NOT have access to this feature.

Filter a map layer



Filters are applied to limit the features displayed on the map to those that meet the filter criteria. The filter option is not available for cached map services or sensitive layers.

Create a Filter

1. Within the *Layers* tap of the Map Viewer, click the arrow to the right of the layer name and choose 'Filter'
2. Select the attribute to use in the query from the *Attribute* dropdown, and then click Select.
3. Click an operator (=, <>, etc.)
4. To see a list of values for the attribute, click Get Unique Values. Double click one of the values. Alternatively, type an expression directly into the query field. Text strings should be contained in single quotes. The query is case sensitive.

Note that if 'Get Unique Values' is used on a layer with many records, a message will likely appear (example, right). Respond 'Yes' to continue, or 'No' to cancel the search for unique values.

5. Click 'Apply' to apply the filter and keep the Filter window open, or click 'OK' to apply the filter and close the window.
6. The number of records resulting from the Filter will be reported in a black popup window. Within the Layers tab, **(Filtered)** will display next to the layer name to indicate that the layer has successfully been filtered. Only records returned in the filter will be displayed on the map layer. In the above example, only Virginia State level managed lands will be shown in the Map Viewer for the Managed Conservation Lands Layer after the filter is applied.

Note that if there is a typographical error, or the filter has been improperly defined, no records will be displayed.

Remove Filter

To remove the filter, hover over the arrow to the right of the layer name in the layer list and do either of the following:

- In the list of available tasks for the layer, select 'Clear Filter.'
- Select 'Filter' from the list of available tasks to open the Filter dialog. Click the Clear Attribute Filter Parameters (red X) icon.

The filter may also be cleared within the *Feature Search* tab of the map, by expanding the Current Layer Filter according section and clicking 'Clear Filter.'

Modify Filter

To modify the filter expression, place the cursor within the sequence and use either the Delete or Backspace keys on the keyboard to remove the desired parts. Click Apply to apply the revised filter and keep the Filter dialog open, or OK to apply the filter and close the Filter window.

Get help through NHDE support

Prior to submittal of issues through NHDE, contact the Administrator in charge of the subscription. If the issue persists, contact Virginia NHDE support at nhdesupport@dcr.virginia.gov. Please screen capture any error messages and attach them to the email so they can be sent electronically to Virginia DCR's Natural Heritage Program. Please title the subject line 'VA NHDE Support' in your email along with a brief note describing your need for support.

FREQUENTLY ASKED QUESTIONS

How often are the Natural Heritage Program datasets updated?

Element Occurrences, NH Screening Layer, and Managed Conservation Lands data are updated quarterly each year. The Virginia Conservation Planning datasets are updated less frequently – see http://www.dcr.virginia.gov/natural-heritage/vaconvision for information on the most recent updates. The predicted habitat models present in the NHDE map viewer are the most up to date; individual models may be updated if funding is available. Virginia DCR-Natural Heritage Program's goal is to secure stable funding that will enable all models to be updated approximately every 4 to 5 years. See the Map Layers section of this document for currency information related to the rest of the map view datasets.

Why did I get automatically logged out of my session?

The website times out for security reasons after 30 minutes of inactivity.

Why can't I input a specified view scale and zoom to it?

Due to the way basemaps are defined in web services, there are a set number of scales that can be viewed; these scales are standardized across the various available basemaps. Offering many more, or all possible scales for viewing would greatly reduce the speed and performance of the site.

How long will it take to receive my automated report when I submit a project for review?

Report PDFs are generated in batch files; it may take up to ten minutes for the user to receive the report after submittal.

How long does it take to receive a *full* response to my project submitted through NHDE?

For any and all submitted projects, the user will receive an emailed response with a link to summary PDF report of findings within ten minutes. When there are Natural Heritage resources within 100ft of the project boundary, or an intersect with a predicted habitat summary is present, it can take up to 30 calendar days for DCR-Natural Heritage project review staff to respond in writing, with full site-specific recommendations and considerations for the activities associated with the project.

Why doesn't NHDE save my Map Annotations?

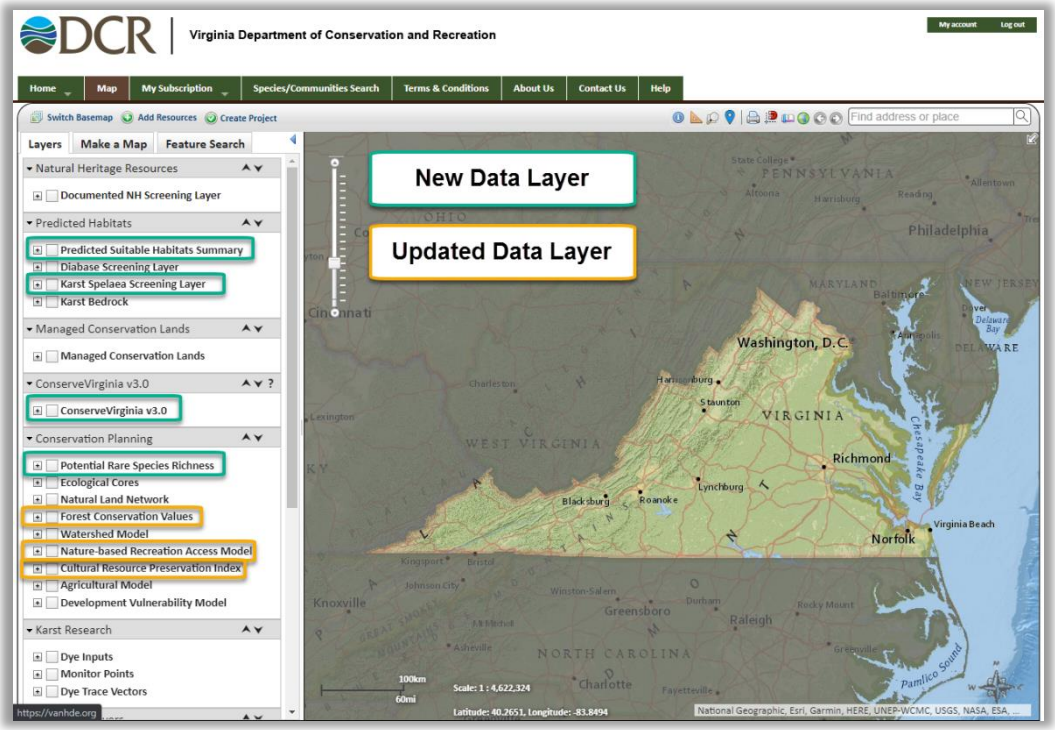
Unfortunately, these are only saved within a user's session. Logging out or timing out of a session will clear these settings. Map annotations do not persist in saved maps.

Why am I receiving errors when trying to add a map service to the map viewer?

If the URL provided is for a map service not protected by SSL (insecure), attempts to add the insecure service will be blocked by NHDE, as http map services are no longer supported as of September 2020. First try adding the URL with the "https:" prefix instead of "http." If that does not work, contact the data provider of the external map service and ask to make their services available under SSL, which is a general internet security best practice.

What are the main differences between NHDE 2.0 and NHDE 2.16?

The overall NHDE map navigation and tools functionality remains the same between the previous NHDE 2.0 and the updated NHDE 2.16. There are differences in the project review process, which are addressed in the next FAQ. Further, new information and updated conservation planning layers are available in the map viewer, which are outlined in the screenshot below. See the Map Layers section for more information regarding the new and updated data layers.



How is the project review process different in NHDE 2.16?

Key differences in the project review process between NHDE 2.0 and NHDE 2.16 include:

1. The project review buffer was significantly reduced from 2 miles to 100 feet (see next FAQ below for details)
2. General Location Natural Heritage Resources (GLNHR) are no longer included in project reviews. GLNHR records represent approximate locations of documented natural heritage resource occurrences that were not incorporated into Conservation Sites, either because they are poor quality, their location was not precisely identified, or they have not been re-verified in the field in over 30 years. Because the Predicted Suitable Habitat models are now included in the project review process, and these layers more accurately represent areas with relatively high potential for natural heritage resource occurrences, GLNHR locations were removed from the project review process. GLNHR occurrences are visible in the map viewer to Tier 3 NHDE users for reference purposes and to inform general conservation work.
3. Projects are intersected directly with features of the Ecological Cores layer of the Virginia Natural Landscape Assessment. If an intersection occurs, comments in the report are returned based on the ecological integrity of the intersected cores.

Why did the project review buffer change from 2 miles to 100 feet?

The use of a 2-mile buffer on submitted project boundaries has been included in past project review protocol to account for areas in the proximity of documented Natural Heritage resources that have *not* been surveyed, but where a rare species or natural community *may* occur. Now, with the inclusion of 138 Predicted Suitable Habitats modeled for

individual species in NHDE and the project review process, the likelihood for these nearby areas containing suitable habitat can be more accurately estimated and in most cases reduced in area. Thus, the 2-mile standard buffer is no longer needed. Instead, a smaller 100-foot buffer is included to account for the finer inaccuracies in the mapping of project boundaries based on projection inconsistencies between the map viewer and the digitized area or submitted shapefile.

What is the difference between ConserveVirginia v3.0 and Virginia ConservationVision?

ConserveVirginia v3.0 is Governor Ralph Northam's land conservation initiative that identifies Virginia's highest priority areas for protection based on seven input categories: Natural Habitat and Ecosystem Diversity; Agricultural and Forestry; Cultural and Historic Preservation; Protected Landscapes Resiliency; Floodplains and Flooding Resilience; Scenic Preservation, and Water Quality Improvement. These categories are comprised of 24 individual inputs developed and/or provided by an array of state and federal agencies, The Virginia Institute of Marine Sciences, The Nature Conservancy, and were screened against established priorities of DEQ-Coastal Zone Management Program, The Chesapeake Conservancy and land trusts throughout Virginia. See the How Do I Interpret ConserveVirginia v3.0 Layers section for more information.

Some of the inputs in ConserveVirginia consist of very highest ranked conservation priorities that are mapped in Virginia ConservationVision. Virginia ConservationVision, developed and updated since 2007, is a set of seven statewide conservation planning maps developed and maintained by the Virginia Departments of Conservation and Recreation; Forestry and Historic Resources. More information on these conservation planning tools can be found here.

What is the difference between Potential Rare Species Richness and Predicted Suitable Habitats Summary?

The Potential Rare Species Richness layer is available to the public and is part of the Conservation Planning layer group. This layer categorizes 3-mile diameter hexagons into Low, Medium, and High classes, based on the number of Predicted Suitable Habitat layers that fall within the hexagon. This statewide layer can be used as a screening tool, as it shows "hot" and "cool" spots to guide conservation planning. For example, greater conservation priority may be given to hot spots, or areas with High potential for rare species richness. Cool spots, or areas with lower potential for rare species richness, could serve as areas of focus for development efforts, necessitating further examination and review. This layer may be used in conjunction with the other Conservation Planning layers to overlay additional green infrastructure resources to guide decision making. See the How Do I Interpret the Potential Rare Species Richness Layer section for more information.

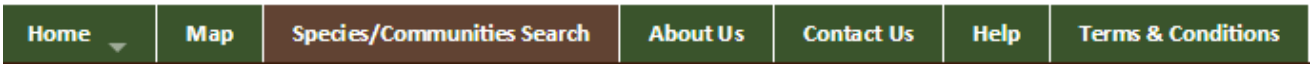
The Predicted Suitable Habitats (PSH) Summary layer, available to Tiered users only, is a statewide screening layer used to examine whether an area of interest contains potential suitable habitat for one or more rare species. A 'High' predicted suitable habitat class identifies areas that are most likely to have suitable habitat for rare species. In terms of project submittal, the higher the PSH class, the more likely a project review is warranted. PSH were developed using known occurrences, a Species Habitat Model, and expert opinion. See the How Do I Interpret the Predicted Suitable Habitats Summary Layer section for more information.

I am a Tier 2 Plus or Tier 3 user. What is the difference between Predicted Suitable Habitats by Taxa and Predicted Suitable Habitats Summary?

The Predicted Suitable Habitats by Taxa layers are viewable in the NHDE map viewer to Tier 2 Plus and Tier 3 users. They are the individual species' Predicted Suitable Habitat (PSH) layers. These layers are best utilized via visual map inspection and are intended for conservation planning purposes.

The Predicted Suitable Habitats Summary layer is a composite of multiple species' PSH layers and is visible in the NHDE map viewer. This summary layer is intended for use in project screening, and displays in project report results if the submitted project intersects the layer. Note that some individual species' PSH layers have been modified prior to being added to this summary layer.

SPECIES/COMMUNITIES SEARCH



The Species/Communities Search tool (formerly Species/Community Search) allows the user to search the Virginia Natural Heritage Program's database for summary information about rare species and natural communities. Searchable attributes include Taxonomic Group, Global and State Conservation Status Rank, Federal and State Legal Status, County, Physiographic Province, Watershed, and Subwatershed. Tabular PDF reports may be generated for printing or saving.

For more background information about this tool, visit the Natural Heritage Program's Search Our Database web page. The Species/Communities Search tool webpage also contains useful tips for streamlining and refining searches. For more detailed search help and useful example searches, visit Natural Heritage's Search Tips webpage: http://www.dcr.virginia.gov/natural-heritage/nhde-pages/nhde-spsearchtips.

NOTE THAT THE SPECIES/COMMUNITIES SEARCH REPORTS ARE NOT SITE SPECIFIC AND ARE NOT TO BE SUBSTITUTED FOR A PROJECT REVIEW, OR FOR ON-SITE SURVEYS REQUIRED FOR ENVIRONMENTAL ASSESSMENTS OF SPECIFIC PROJECT AREAS. DCR- Natural Heritage project review staff respond to submitted projects with full, site-specific recommendations and considerations for the activities associated with the project. These recommendations and considerations cannot be obtained solely from the Species/Communities Search, which provides coarse-level query capabilities. Please see the Project Review section of this document for more information.

DEFINITIONS

Abbreviations used on Natural Heritage Resource Lists

The following ranks are used by the Virginia Department of Conservation and Recreation to set protection priorities for natural heritage resources. Natural Heritage Resources, or 'NHRs,' are rare plant and animal species, rare and exemplary natural communities, and significant geologic features. The criterion for ranking NHRs is the number of populations or occurrences, i.e. the number of known distinct localities; the number of individuals in existence at each locality or, if a highly mobile organism (e.g., sea turtles, many birds, and butterflies), the total number of individuals; the quality of the occurrences, the number of protected occurrences; and threats.

State Ranks

- **S1** - Critically Imperiled; At very high risk of extirpation in the jurisdiction due to very restricted range, very few populations or occurrences, very steep declines, severe threats, or other factors.
- **S2** - Imperiled; At high risk of extirpation in the jurisdiction due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.
- **S3** - Vulnerable; At moderate risk of extirpation in the jurisdiction due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.
- **S4** - Apparently secure; At a fairly low risk of extirpation in the jurisdiction due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.
- **S5** - Secure; At very low or no risk of extirpation in the jurisdiction due to a very extensive range, abundant populations or occurrences, with little to no concern from declines or threats.
- **S#B** - Breeding status of an animal within the state
- **S#N** - Non-breeding status of animal within the state. Usually applied to winter resident species.
- **S#?** - Inexact or uncertain numeric rank.
- **SH** – Possibly Extirpated; Known from only historical records but still some hope of rediscovery. There is evidence that the species or ecosystem may no longer be present in the state, but not enough to state this with certainty. Examples of such evidence include (1) that a species has not been documented in approximately 20-40 years despite some searching and/or some evidence of significant habitat loss or degradation; (2) that a species or ecosystem has been searched for unsuccessfully, but not thoroughly enough to presume that it is no longer present in the jurisdiction.
- **S#S#**- Range rank; A numeric range rank, (e.g. S2S3) is used to indicate the range of uncertainty about the exact status of the element. Ranges cannot skip more than one rank.
- **SU** - Unrankable; Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
- **SNR**- Unranked; state rank not yet assessed.
- **SX** - Presumed extirpated from the state. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.
- **SNA**- Not Applicable; A conservation status rank is not applicable because the element is not a suitable target for conservation activities (e.g., hybrids without conservation value and non-native species).

Global Ranks

Global ranks are similar, but refer to a species' rarity throughout its total range. Global ranks are denoted with a "G" followed by a character. Note GX means the element is presumed extinct throughout its range, not relocated despite intensive searches of historical sites/appropriate habitat, and virtually no likelihood that it will be rediscovered. A "Q" in a rank indicates that a taxonomic question concerning that species exists. Ranks for subspecies are denoted with a "T". The global and state ranks combined (e.g. G2/S1) give an instant grasp of a species' known rarity.

The ranks above should not be interpreted as legal designations.

Federal Status

The Division of Natural Heritage uses the standard abbreviations for Federal endangerment developed by the U.S. Fish and Wildlife Service, Division of Endangered Species and Habitat Conservation.

LE - Listed Endangered	**LT** - Listed Threatened	**PE** - Proposed Endangered	**PT** - Proposed Threatened
C - Candidate (formerly C1 - Candidate category 1)	**E(S/A)** - treat as endangered because of similarity of appearance	**T(S/A)** - treat as threatened because of similarity of appearance	**SOC** - Species of Concern species that merit special concern **(not a regulatory category)**

State Legal Status

The Division of Natural Heritage uses the following abbreviations for State endangerment:

LE - Listed Endangered	**PE** - Proposed Endangered	**SC** - Special Concern - animals that merit special concern according to VDWR (**not a regulatory category**)
LT - Listed Threatened	**PT** - Proposed Threatened	**C** - Candidate

For information on the laws pertaining to threatened or endangered species, please contact:

- U.S. Fish and Wildlife Service for all **FEDERALLY** listed species;
- Department of Agriculture and Consumer Services, Plant Protection Bureau for **STATE listed plants and insects**
- Department of Game and Inland Fisheries for all other **STATE listed animals**

Conservation Sites Ranking

B-rank is a rating of the significance of the conservation site based on presence and number of natural heritage resources; on a scale of 1-5, 1 being most significant. Sites are also coded to reflect the presence/absence of federally/state listed species:

Conservation Site Ranks	**Legal Status of Sites**
B1 - Outstanding significance	FL – Federally listed species present
B2 - Very High significance	SL – State listed species present
B3 - High significance	NL – No listed species present
B4 - Moderate significance	
B5 - Of general Biodiversity significance	

Element Occurrence Ranking

Element Occurrence (EO) ranks provide a succinct assessment of the estimated viability (probability of persistence) of occurrences of a given species or ecological integrity of a natural community. They provide an estimation of the likelihood that, if current conditions prevail, a species or community occurrence will persist for a period of time. Because

occurrence ranks are used to represent the relative overall “quality” of an occurrence as it currently exists, they are based solely on criteria that reflect the present status of that occurrence. EO Ranks are available to some Tier levels and are used in NHDE are as follows:

EO Rank

A – Excellent estimated viability/ecological integrity

B – Good estimated viability/ecological integrity

C – Fair estimated viability/ecological integrity

D – Poor estimated viability/ecological integrity

E – Verified extant (viability/ecological integrity not assessed)

H – Historical

F – Failed to find

X – Extirpated

U – Unrankable

NR – Not ranked