



Who are we?



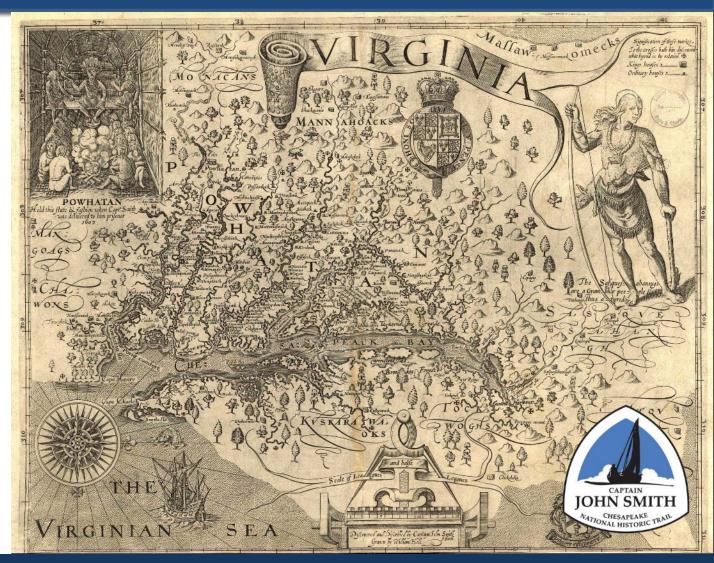
- We conserve and protect the region's treasured landscapes and waterways, connecting people to its natural, cultural and historic resources.
- We develop and use the *latest technologies* to identify the places most worthy of conservation.
- We *collaborate with local communities* to understand their visions for their Chesapeake, their rivers, and their landscapes, working with landowners, businesses, governments, and other conservation groups to accomplish our goals.



Captain John Smith Chesapeake National Historic Trail



- Signed into law in 2006
 - Nation's first Historic Water Trail
 - Akin to the Appalachian Trail
- Spans 3,800 miles and interprets:
 - Smith's exploratory voyages
 - 17th century Indian culture
 - Natural history of the region
- Chesapeake Conservancy serves as:
 - Primary partner for trail implementation with the National Park Service



Catalyst for Conservation



The Chesapeake Conservancy builds partnerships across the watershed, linking on-going efforts, generating new data, and adding resources to advance the pace of conservation



Saving the Chesapeake's Great Rivers and Special Places

Establishing Partnerships to Advance Conservation Science



New York









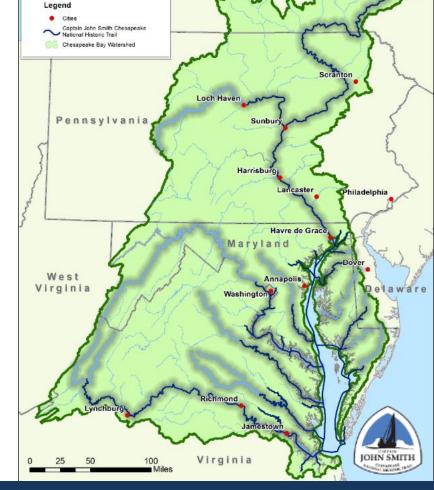












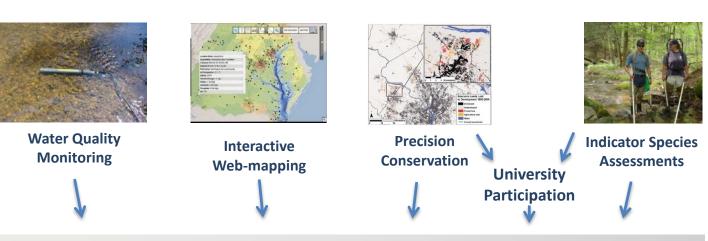
Chesapeake Conservancy





Developing new tools and resources to help partners improve the effectiveness and efficiency of their conservation programs

- Precision Conservation
- Interactive Web-mapping
- Water Quality Monitoring
- Climate Adaptation
- University Engagement
- Contractual Services





Better Understanding of What Land to Protect and What Land to Restore

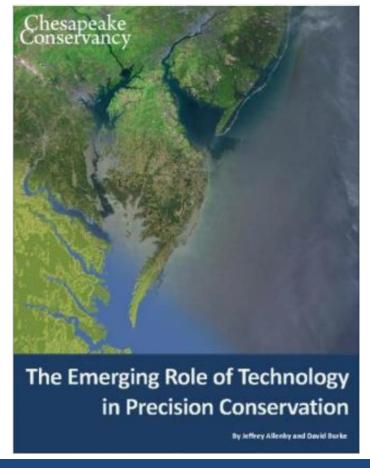


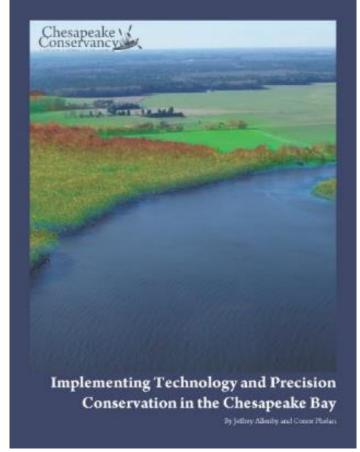


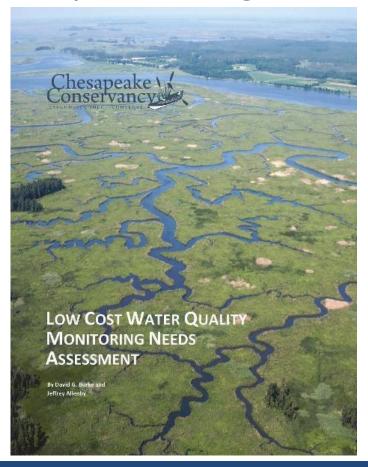
Precision Conservation Landscape Analysis



"Getting the **right practices**, in the **right places**, at the **right scale**, at the **right time** and making sure **they are working**"





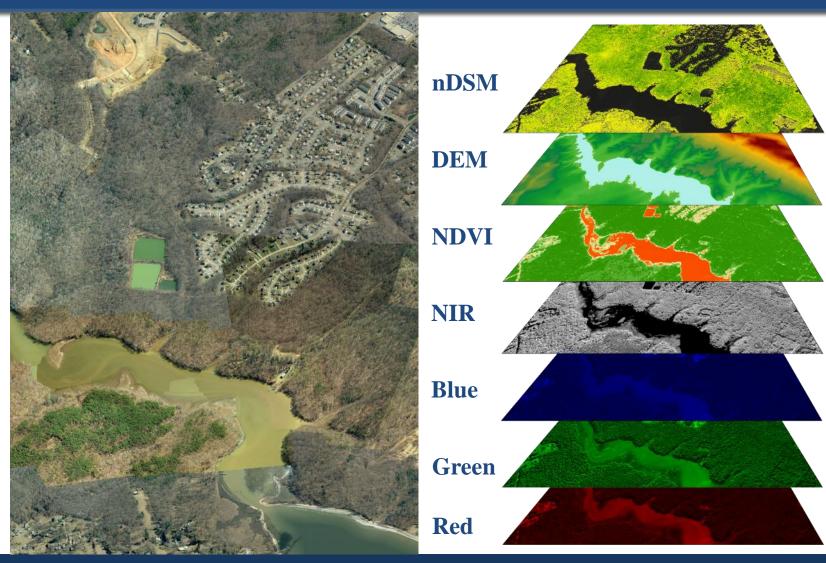


The Need for Precision Conservation



We are using remote sensing and GIS modeling to generate new data that allow us to identify priorities for conservation and restoration at the parcel-scale

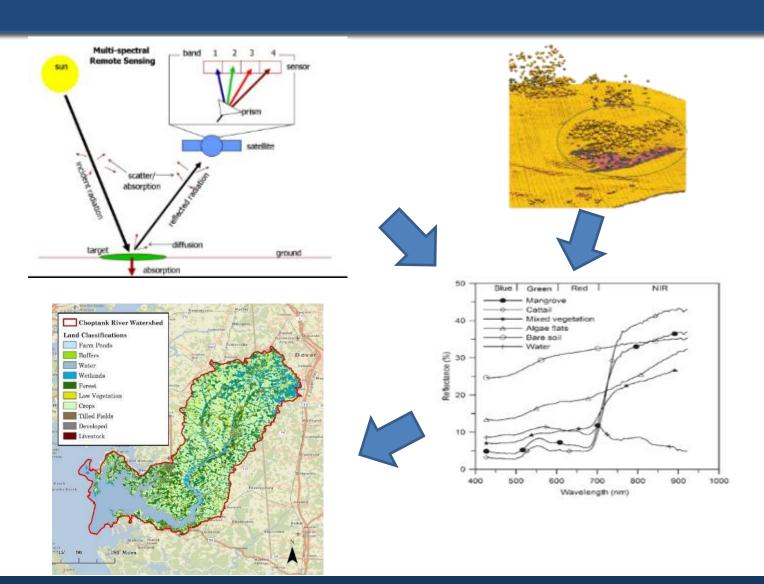
- High-resolution Land Cover Classification
- Concentrated Flow Path Analysis



High-resolution Land Use Classification



- Rule-based, object oriented image classification identifies land cover types with 900x the resolution of National Land Cover Dataset (NLCD)
- Identifies 8 major land cover types with an additional three detailing agricultural lands in the Choptank River



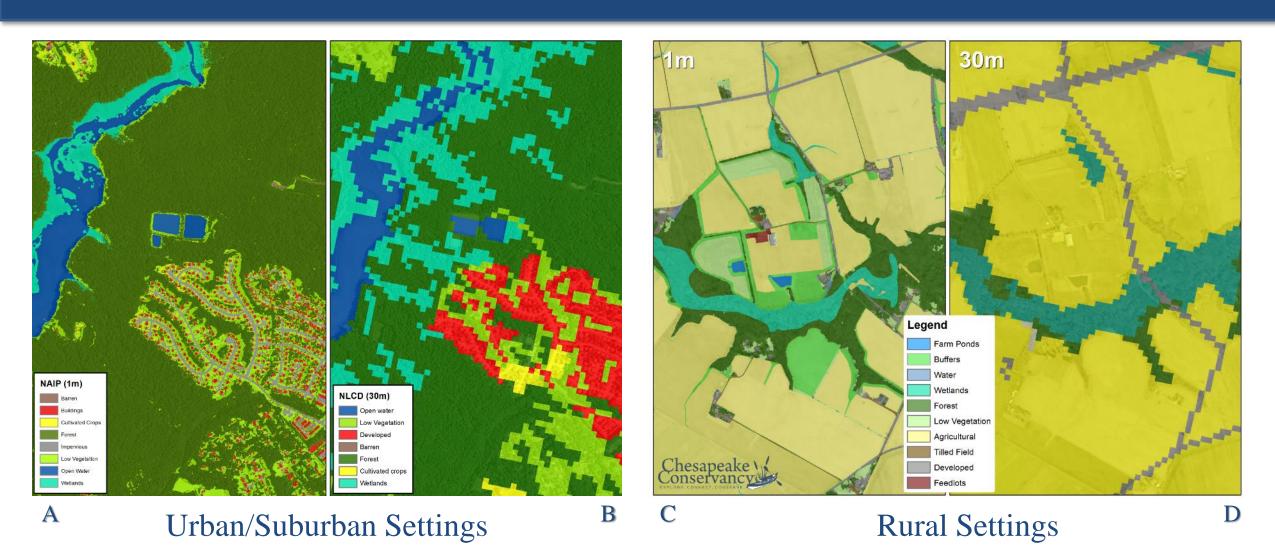
High-resolution Land Use Classification



- 2-stage process:
 - Initial semi-automated feature extraction
 - Manual reclassification to improve overall accuracy
 (>90% accuracy)
- Currently incorporates
 LiDAR data but we have an
 alternate method that still
 produces high accuracy
 data for areas where LiDAR
 has not been collected











Sustainable Fisheries (GIT 1)



- Improve the characterization of edge-of-shore habitats (e.g. wetlands, riparian corridors)
- Increase the predictive modeling capabilities of river and stream suitability for migratory fish habitat and spawning



Habitats (GIT 2)



- Create more detailed habitat connectivity models and identify priorities for habitat restoration
- Establish a baseline for critical habitat and track development pressure and fragmentation of core habitats to prioritize conservation
- Monitor success and implementation of restoration efforts across entire landscapes (e.g. increased riparian buffers, wetland restoration, etc.)



Water Quality (GIT 3)



- Increase the accuracy of modeling efforts by providing better estimates of landscape composition (e.g. impervious surface percentage)
- Identify specific landscapes (often at the parcel scale) that are priorities for restoration or BMP implementation



Healthy Watersheds (GIT 4)



- Calculate and track natural landscape condition metrics (e.g. riparian buffer attainment, ecological connectivity, headwater stream condition, etc.)
- Establish a highly accurate baseline to track changes in impervious surface and natural landscape coverage in highfunctioning sub-watersheds
- Identify specific high-functioning landscapes that are priorities for conservation because they are providing water quality benefits



Stewardship (GIT 5)



- Target outreach and education efforts and identify tangible actions landowners could take to reduce the impact of their land (e.g. install BMPs) or conserve high-functioning landscapes (e.g. conservation easements)
- Create individualized reports for land owners detailing the land use composition of their properties and how they fit into the watersheds in which they are located (e.g. showing that they have critical habitat)







Conservation and Restoration Prioritization



We are improving targeting for:

- Identifying or comparing potential projects in a high-priority watershed
- Working with a willing landowner to locate a potential project where it will have the greatest impact on water quality
- Education and outreach to landowners to help them understand what they can do reduce the impact of their land and improve ecosystems



Detailing the Importance of Projects in Grant Proposals



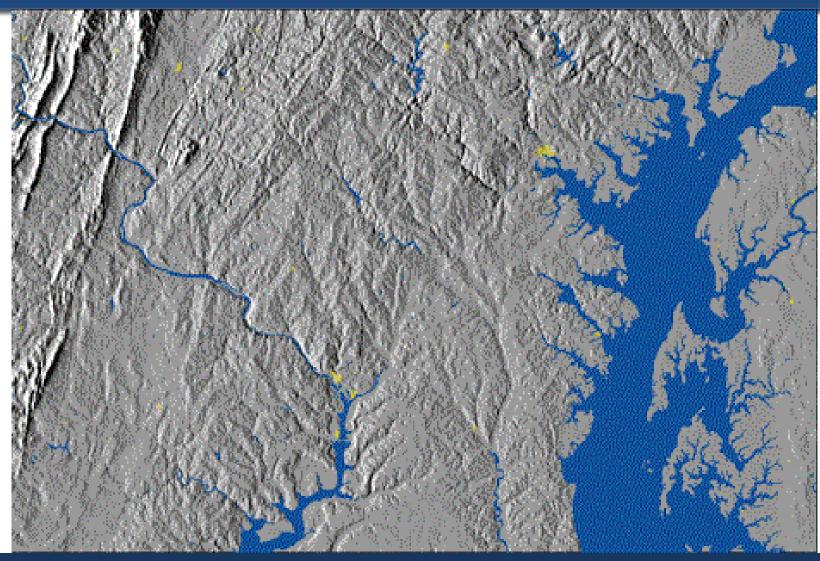
We are helping our partners communicate the need for implementation funding and helping funders prioritize where to protect and restore the most important habitats and maximize improvement of water quality



Long-term Trend and Development Threat Analysis



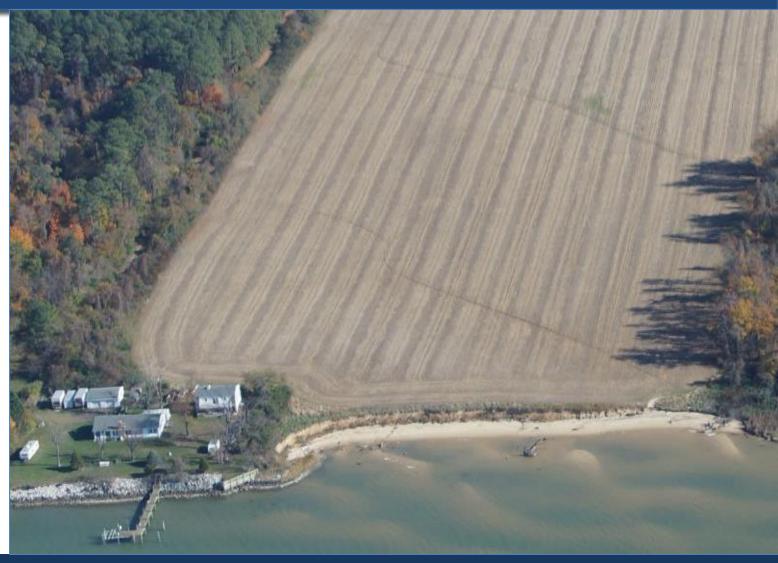
Creating high-resolution datasets provides the baseline for detailed land use change analysis over time to understand where projects are working best and where development may be threatening critical ecosystems



Building Regional Partnerships for Large-Landscape Conservation



Providing relevant targeting information to our federal, state, local, and non-profit partners helps to facilitate and catalyze large-landscape conservation

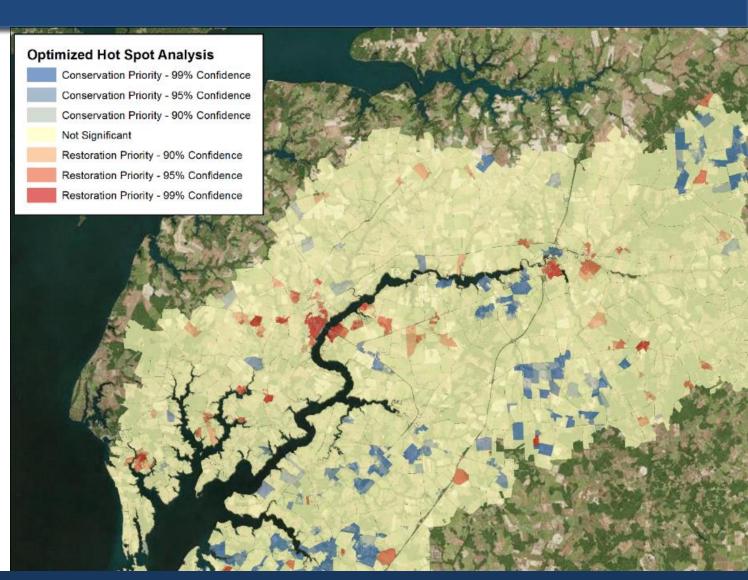






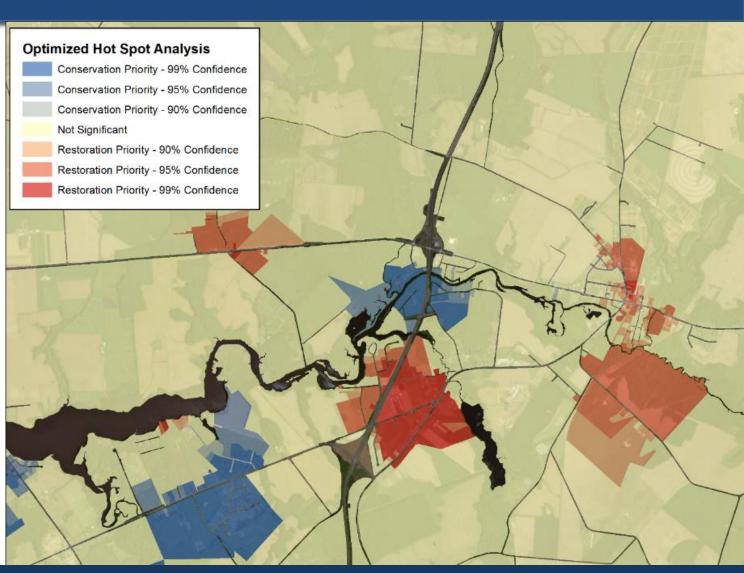


- Help incorporate high resolution data into conservation and restoration targeting
 - *Identify Hotspots*
 - Target outreach and education
 - Direct project funding to where it will have the greatest impact
 - Design BMPs based on the landscape



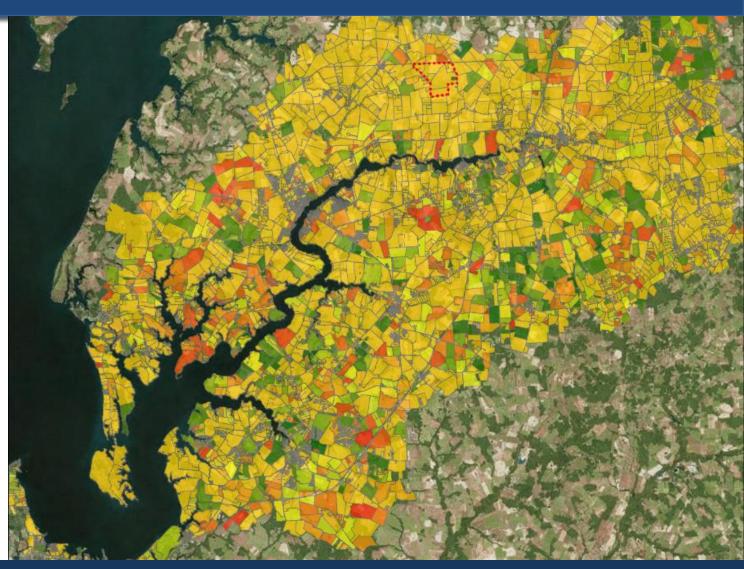


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Next Steps



- Continue to develop data for new landscapes
- Help incorporate existing data into conservation and restoration targeting
 - *Identify Hotspots*
 - Target outreach and education
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 - Design BMPs based on the landscape

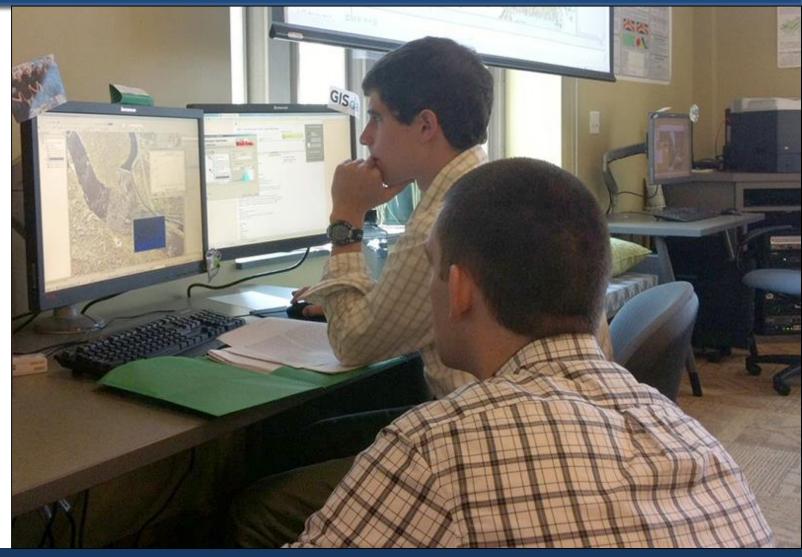


Next Steps



Continue to develop new tools and resources to help local partners apply high-resolution data

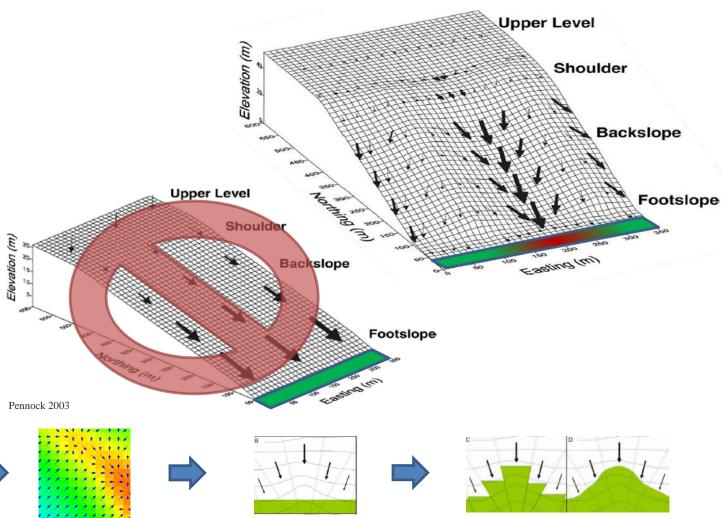
- Access to Data
- Trainings
- GIS Toolboxes
- Web-based tools
- Support for GIS Analysis
- Access to advanced workstations and software



Concentrated Flow Path Mapping

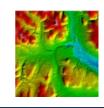


- Most regulations assume consistent flow off a landscape
- **Our D-Infinity analysis models** how water flows across the land and where it accumulates
- **Determines how much water is** flowing from "upstream" into each pixel to determine optimal buffer placement and size

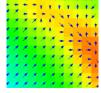
















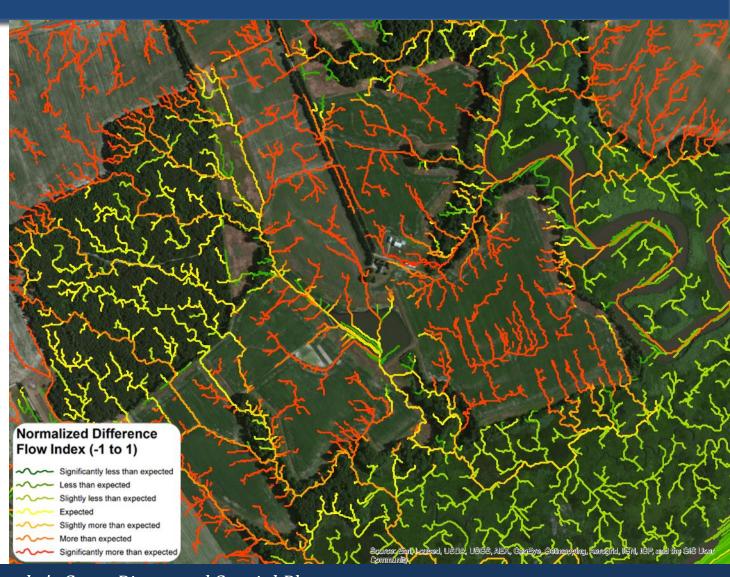
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Normalized Difference Flow Index (NDFI)



 Compares a weighted and unweighted flow accumulation to identify high-functioning landscapes that are a priority for conservation (lower NDFI) and underperforming landscapes that are a priority for restoration (higher NDFI)

$$NDFI = \frac{(Weighted\ flow\ accumulation\ -\ Unweighted\ flow\ accumulation)}{(Weighted\ flow\ accumulation\ +\ Unweighted\ flow\ accumulation)}$$



Next Steps



- Create cohesive, science-based, conservation and restoration plans for the Chesapeake Bay's tributaries
- Expand our local, state, and federal partnerships to coordinate conservation and restoration efforts throughout the Chesapeake Bay watershed





