

# *Precision Conservation in the Chesapeake Bay Watershed*



The Chesapeake Conservancy is pioneering the application of emerging technologies and freely available high resolution aerial imagery and elevation data to develop new targeting datasets that are increasing the effectiveness and efficiency of conservation and restoration practices throughout the Chesapeake Bay watershed. ***Precision Conservation***, or “getting the right practices, in the right place, at the right scale,” determines the landscape characteristics across an entire watershed, provides us with a greater ability to target projects that will help maintain water quality and critical habitats at the parcel scale, and allows us to locate restoration activities where they will have the greatest potential to improve water quality. The Conservancy has generated these high-resolution land use and concentrated flow path datasets for the Eastern Shore from the Chester River watershed south to Cape Charles, VA.

## **High Resolution Land Use/Land Cover Analysis**

Land use and land cover (LULC) information is one of the most important spatial datasets needed for environmental management. Used for everything from ecological habitat mapping to tracking development trends, LULC data is a central part of conservation targeting. Existing LULC datasets, such as the National Land Cover Dataset (NLCD), have proven extremely useful in identifying priority watersheds in need of conservation and restoration, however as we begin to implement projects on the ground, this information often lacks the resolution needed to make field-scale decisions about where to focus our efforts to maximize the benefits to water quality while protecting critical habitats.

To help provide local partners with the level of detail needed, the Chesapeake Conservancy is producing high resolution, extremely accurate LULC datasets. Using publicly available aerial imagery from the USDA’s National Agriculture Imagery Program (NAIP), the Conservancy has created and will continue to create land classification datasets within the Chesapeake Bay watershed with a resolution of 1 meter. Our datasets have 900 times as much information as the NLCD and has close to a 90% accuracy, compared to the NLCD’s 78% accuracy. With funding from NOAA’s Chesapeake Bay Office, the Conservancy partnered with Washington College to develop an additional data layer in the Choptank River watershed that outlines agricultural lands; visible agricultural best management practices, such as grass filter strips, cover crops, and contour tilling; irrigated lands; and poultry houses and feedlots with close to a 100% accuracy.

## **Concentrated Flow Path Mapping**










Combined with our LULC data, LIDAR-derived concentrated flow path (CFP) mapping can help conservation organizations and other local partners identify priorities for conservation and restoration that will generate real environmental benefits, target outreach and education efforts where they are needed, and help property owners identify potential projects.

The Conservancy’s new CFP datasets identify how water flows across the landscape, even before it reaches a stream channel, while also rating the channels based on their upstream land use composition and potential nutrient and sediment loads. Using a D-infinity analysis, which tracks water flow better in low-relief terrains, staff extracted CFPs that drained at least 0.25 acres of land to identify the locations where best management practices (BMPs) would intercept the greatest amount of runoff. This data allows for a more efficient prioritization of funding and BMP implementation, targeting the areas that will create the greatest reductions in nutrient and sediment runoff. Those channels with higher accumulation will naturally be the most critical streams on which to focus BMPs such as planting cover crops, restoring streamside buffers and wetlands, or creating retention ponds.

1m

30m

### Legend

-  Farm Ponds
-  Buffers
-  Water
-  Wetlands
-  Forest
-  Low Vegetation
-  Agricultural
-  Tilled Field
-  Developed
-  Feedlots





## LIDAR Derived Hydrology Compared to National Hydrologic Dataset (NHD) Flowlines

### Legend

— NHD Flowline — LIDAR Flow Paths



