BMP Planning and Reporting: Scaling Precision Conservation in the Chesapeake Bay watershed

EPA Geospatial Support Cooperative Agreement
FAIN: 96363001

What is Objective 3?

BMP Planning and Reporting: Scaling Precision Conservation in the Chesapeake Bay Watershed

Challenge 1

Partners are looking for better ways to identify and prioritize opportunities for restoration projects to maximize impact of dollars to meet WIP goals.

Challenge 2

There are gaps in current restoration progress reporting structures. Additionally, planners receive progress data in aggregated summaries, which doesn't help at the parcel-scale.

Proposed Solution

Create a data-driven blueprint and spatial planning, tracking, and reporting system that will better support project implementers and communicate local actions and regional goals. System is based on high-performance analysis and current data to keep planning efforts informed by tracked progress.

Goal: develop a platform that helps organize on-the-ground action towards priority gaps for nutrient loading and better inform funding programs and state agencies about the current status of on-the-ground activities to maximize accuracy in annual reporting.

Who is on the Objective 3 project team?

- Chesapeake Conservancy's Conservation Innovation Center
  - BMP Opportunity Mapping
  - Programmatic administration
- The Commons
  - Software and web development of FieldDoc platform
- Drexel Environmental Data Science (EDS) Group
  - *Collaboration between Academy of Natural Sciences (ANS) scientists with the College of Computing and Informatics (CCI) scientists and PhD students*
  - Computational and environmental modeling
  - Software development for underlying APIs
- EPA Chesapeake Bay Program
  - Programmatic input

Chesapeake Conservancy

The COMMONS

Drexel UNIVERSITY

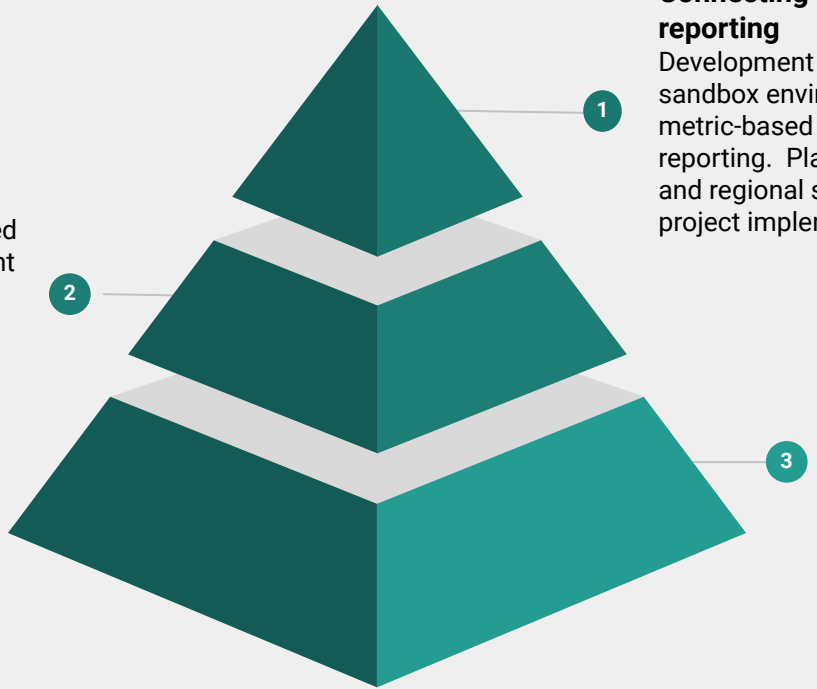
Chesapeake Bay Program
Science. Restoration. Partnership.

What is being produced through this effort?

BMP Planning and Reporting: Scaling Precision Conservation in the Chesapeake Bay Watershed

Understanding BMP impacts at the site scale

Researchers at Drexel University, developed software to estimate nutrient and sediment reduction impacts of specific BMP polygons on-the-fly. These estimates can also be compared to regional averages to gauge confidence for effective impacts.



Connecting BMP planning, tracking, and reporting

Development of a concept platform which connects sandbox environments for BMP planning, metric-based BMP tracking workflows, and project reporting. Platform supports BMP planning at site and regional scales and allows data transfer between project implementers and program administrators.

BMP Opportunity Layers

Based on research from USDA and insights from on-the-ground restoration practitioners, uses geospatial data to generate footprints of potential opportunities for BMP implementation to support watershed planning.

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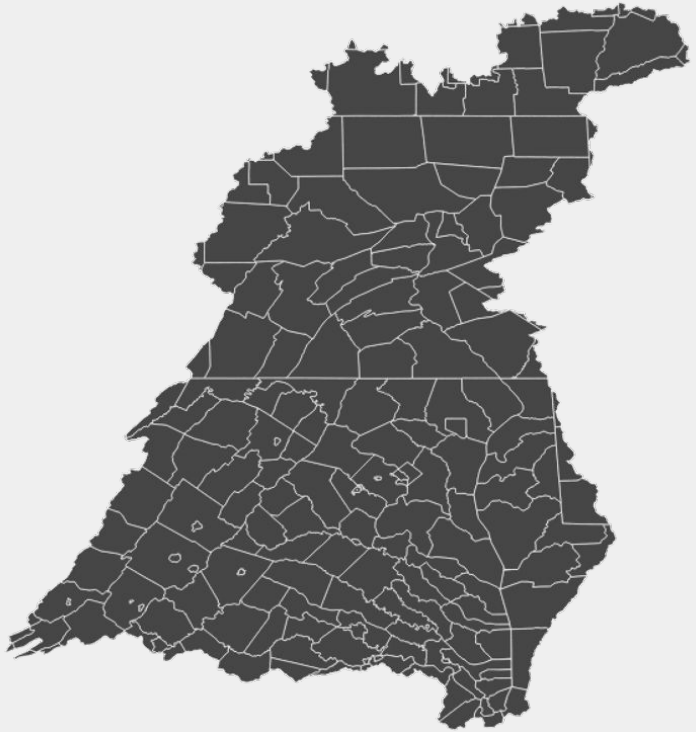
Chesapeake Conservancy

What are challenges to tracking BMP implementation?

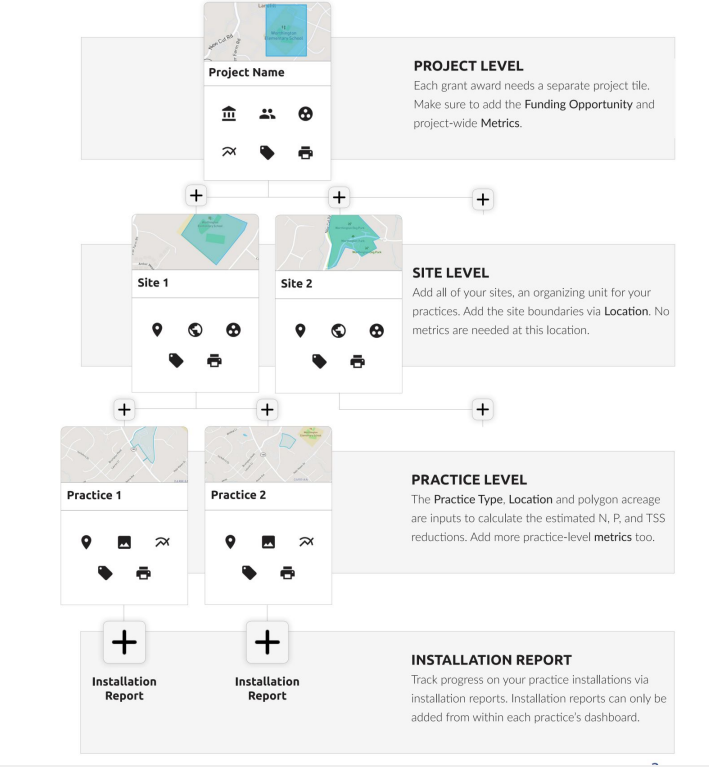
- Several programs are independently funding and tracking implementation efforts
  - Each reporting protocol has its own metrics, standards, and requirements
  - Varying functionality across the systems
  - Lack of centralized system until final reporting
- Data Privacy
- Lack of spatial resolution
- Static/stale data
  - Data are passed via spreadsheet
  - Data are transposed manually
  - Poor Documentation



What is FieldDoc?

https://www.ourcommoncode.org/fielddoc

- An online platform developed by The Commons for metric based restoration planning and tracking that can also help practitioners set goals and track progress towards goals.
  - Standardized metrics, reporting processes, and project implementation reports
  - Supports grant program managers with metric-specific dashboards that rollup insight across their grant portfolio
  - Functionality to aide planning from individual practices on site to regional grant programs
- Current users
  - Grant administrators/managers
  - Regional WIP planners
  - Grant recipients/project implementers



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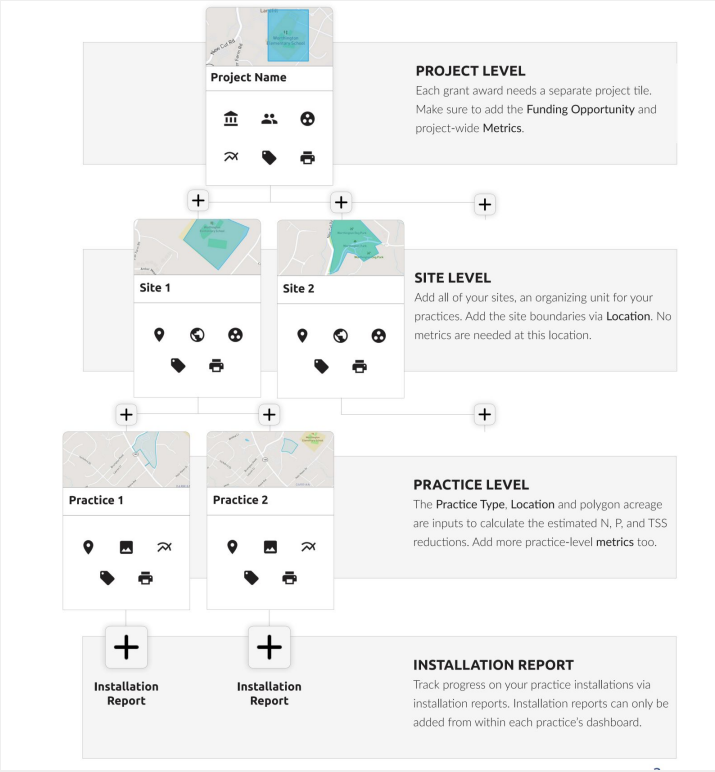
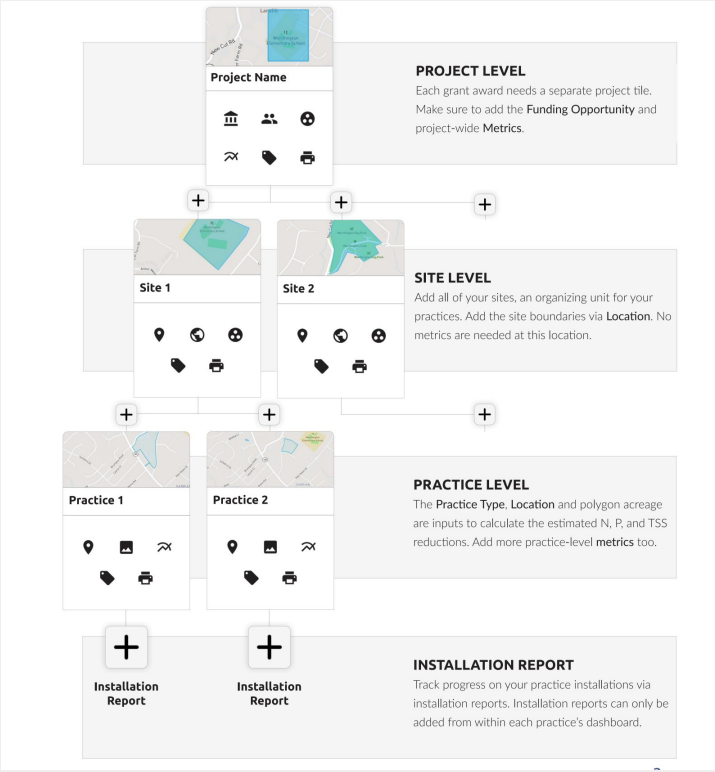
- For project implementers, they can plan and track work through project folders that contain
  - Sites - > Where work is occurring
  - Management practices - > actions to improve water quality
- Grant/program administrators can establish Program groups that can be related to projects
  - Programs contain metrics and targets for documenting implementation progress.
  - Practices and their implementation reports roll up toward program metrics and targets.



Who is FieldDoc for?

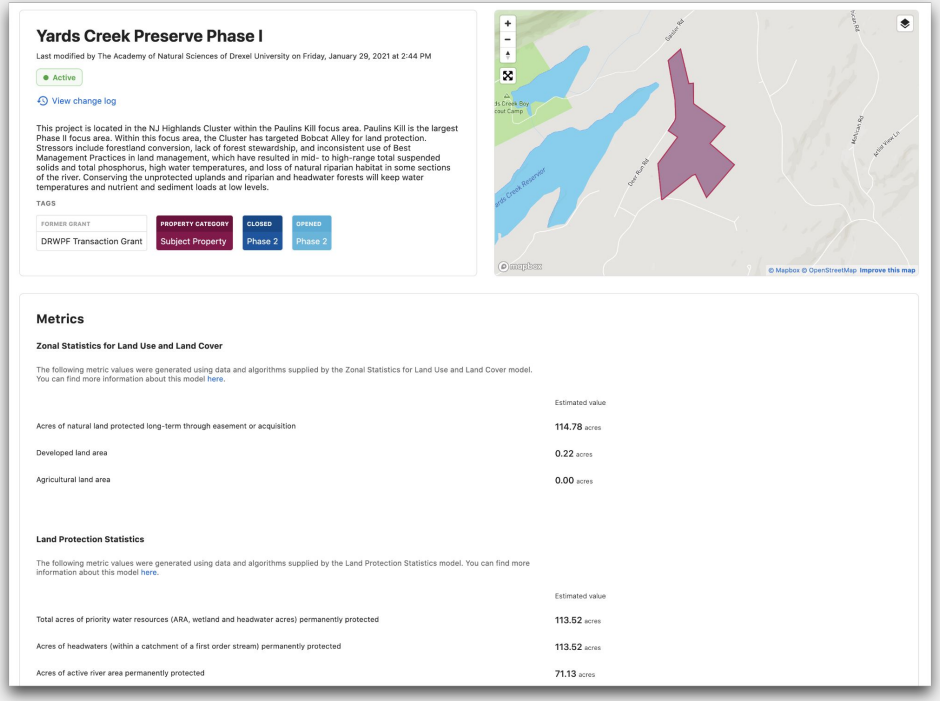
https://www.ourcommoncode.org/fielddoc

- Anyone can have a free account on FieldDoc for sandbox planning and implementation tracking
  - Likely will be staff at local watershed groups, conservation districts, or other non profits involved in in-field restoration activities
- Administrators for grant programs that are looking for more streamlined tracking and reporting workflows can discuss a service contract with Commons for customized support
- State agencies can aggregate data from multiple grant programs and prepare data for NEIEN reporting



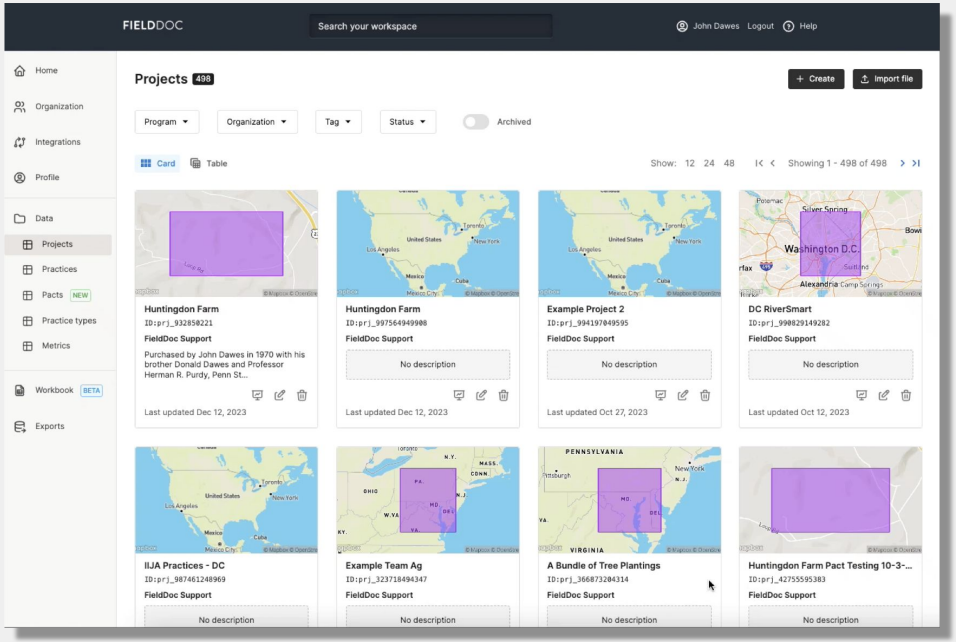
How FieldDoc is used

1. Supports users in sub-parcel scale management practice tracking and reporting
    - Currently used by private and public foundations and restoration programs
    - Growing to support other restoration efforts outside The Bay jurisdictions
2. Users Establish an organization within FieldDoc
    - Practices are imported or drawn within a project
    - Metrics are completed related to the tracking requirements of the program



Practitioner Data Management in FieldDoc

- My Metrics
  - User defined goals for documenting restoration
  - Positions platform as a data management utility
  - Track progress against organization metrics
- Pacts
  - Connect practices to established programs in FieldDoc and align reporting on program metric goals
  - Enables many practices to be reported to many funding programs
- NEIEN Module
  - Align practices attributes to NEIEN required fields



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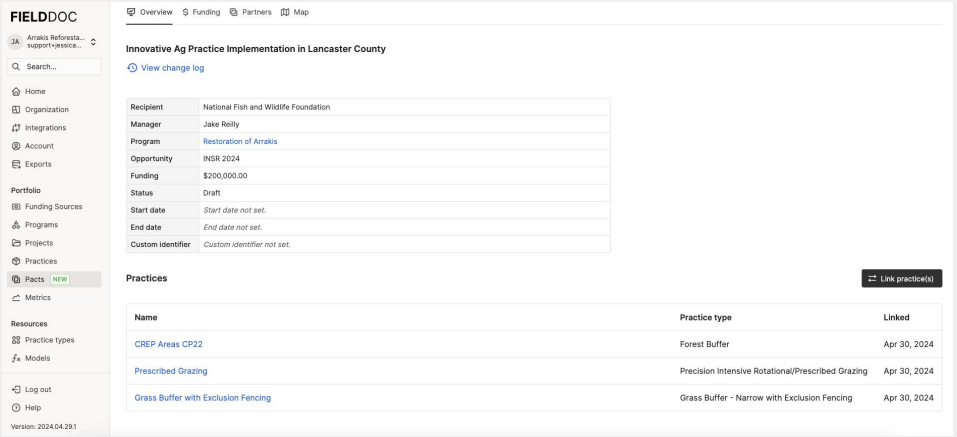

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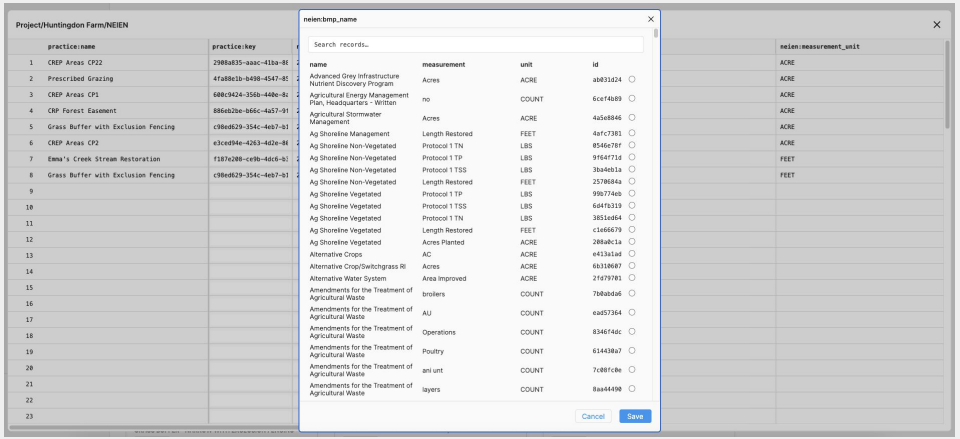
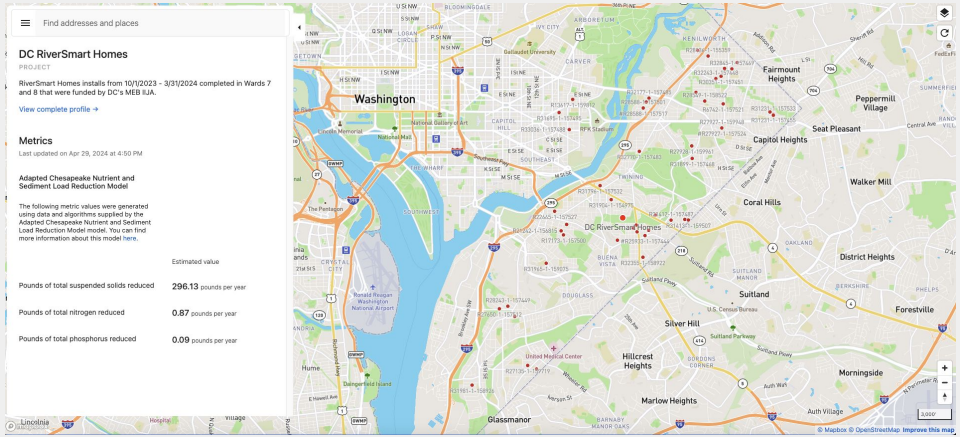


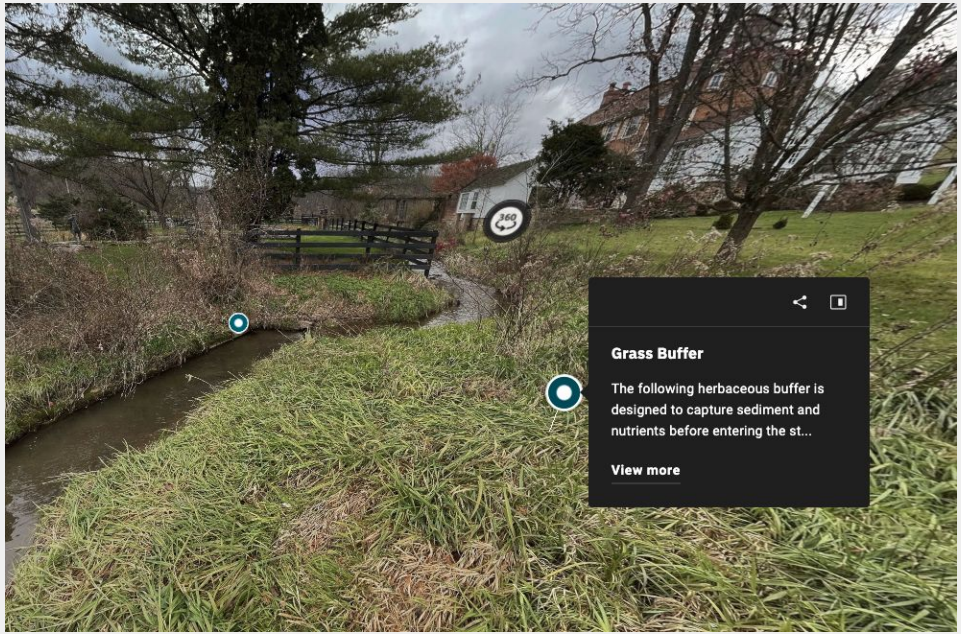
Program Admin. Data Management in FieldDoc

- Program Administration
  - Maintain core program metrics and pacts that enable practitioners report BMP Implementation
- View Program Implementation Summaries
  - Map and analytic based summaries detailing implementation across all programs
- Export or Integrate
  - Connect program data to live ArcGIS Online Feature Services
  - Export data in NEIEN ready format or as .CSV, GeoJSON or GeoPackage



Core Functionality Incentivizing Use

- Batch uploads / Data management
  - Table based editing of attributes
- Integrations with Esri's ArcGIS Online
  - Push FD Data to hosted Feature Service
- Integrations with Airtable
  - Extension of FieldDoc editing to Airtable's robust data management system
  - 2 way synch between Airtable and FieldDoc
- Linked Pages
  - Bring visualizations from third party systems (AGOL, Matterport, Quickchart, etc.) into FieldDoc project and practice pages



FieldDoc Use Case

James River Water Quality Improvement Program

- $15.595 million grant program designed to accelerate and advance significant water quality improvements throughout the James River watershed.
- Needed support establishing a prioritization regime that balanced investment portfolio deliverables along with current and prospective grantee restoration programing
- Wanted to quantify and measure the benefits of their investments in water quality improvements in the James.

BMP Planning in FieldDoc

- Identification of priority buffers opportunities
  - Buffer opportunity area (100ft)
- Parcel prioritization
  - Tier 1 (Highest Priority)
  - Tier 2
  - Tier 3
  - Tier 4
  - Tier 5 (Lowest Priority)

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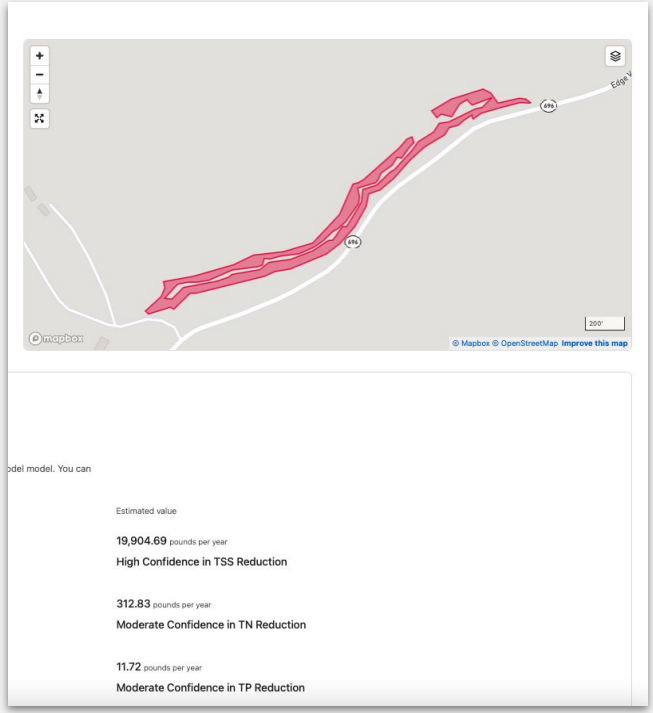
Understanding BMP impacts at the site scale

Relative Confidence Index (RCI) pilot

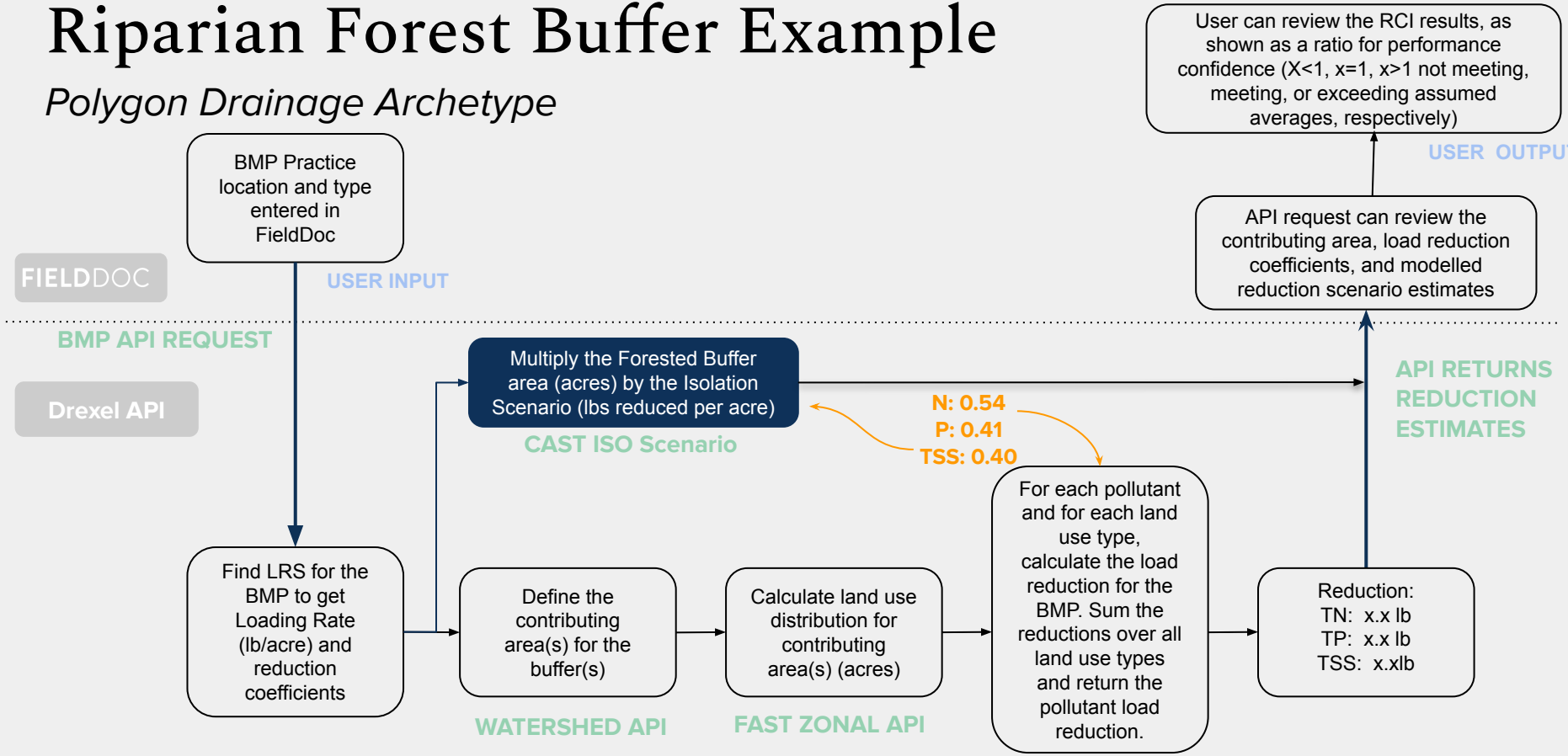
- **Goal**: to provide site-specific information about the impacts of BMP projects, and encourage BMP planning efforts to identify opportunities that could not only meet, but exceed expected water quality outcomes
- Evaluating implementation scenarios on their likelihood to achieve, exceed, or fall short of a CAST-ISO-based load reduction calculation based on site-specific metrics
- Incorporate high resolution data with current CAST ISO model estimates to provide a location and practice-specific confidence index to provide users a more locally relevant idea of reduction efficiency for a given best management practice (BMP) footprint
- Provided as an API through which user defined polygons and practice types can be returned as the RCI ratio of underperforming, performing, and overperforming. Currently available for forest and grass buffer practices, including narrow and exclusion fencing sub-types.



http://watersheds.cci.drexel.edu/docs

Riparian Forest Buffer Example

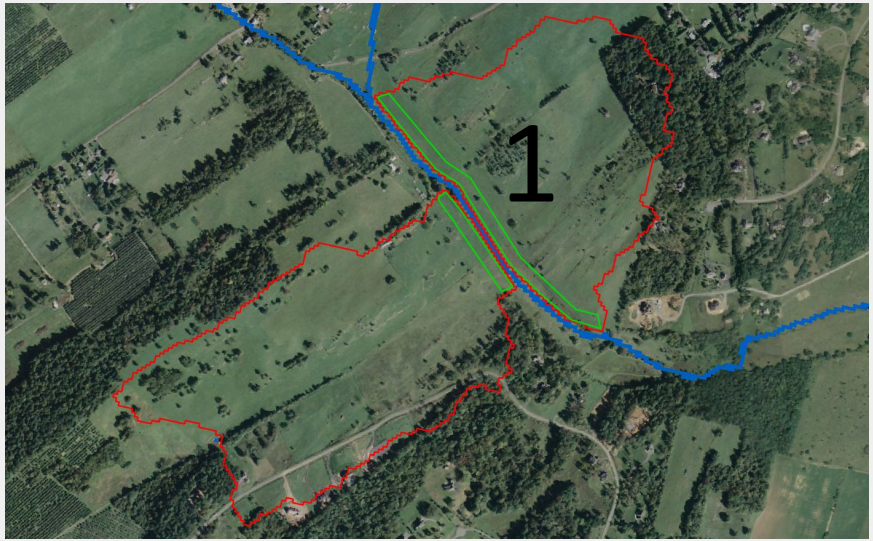
Polygon Drainage Archetype



Example: Testing Two Riparian Buffers

- Two riparian buffers, 100 ft wide each
- Buffer 1 is roughly 0.5 miles long, while buffer 2 is roughly 0.2 miles long

"confidence_index": {"tn": 1.74, "tp": 1.56, "tss": 0.062}



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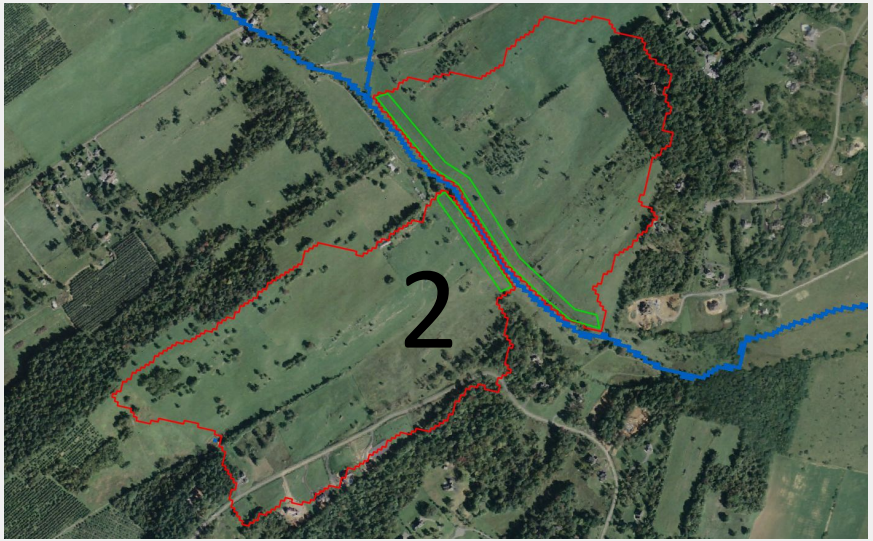
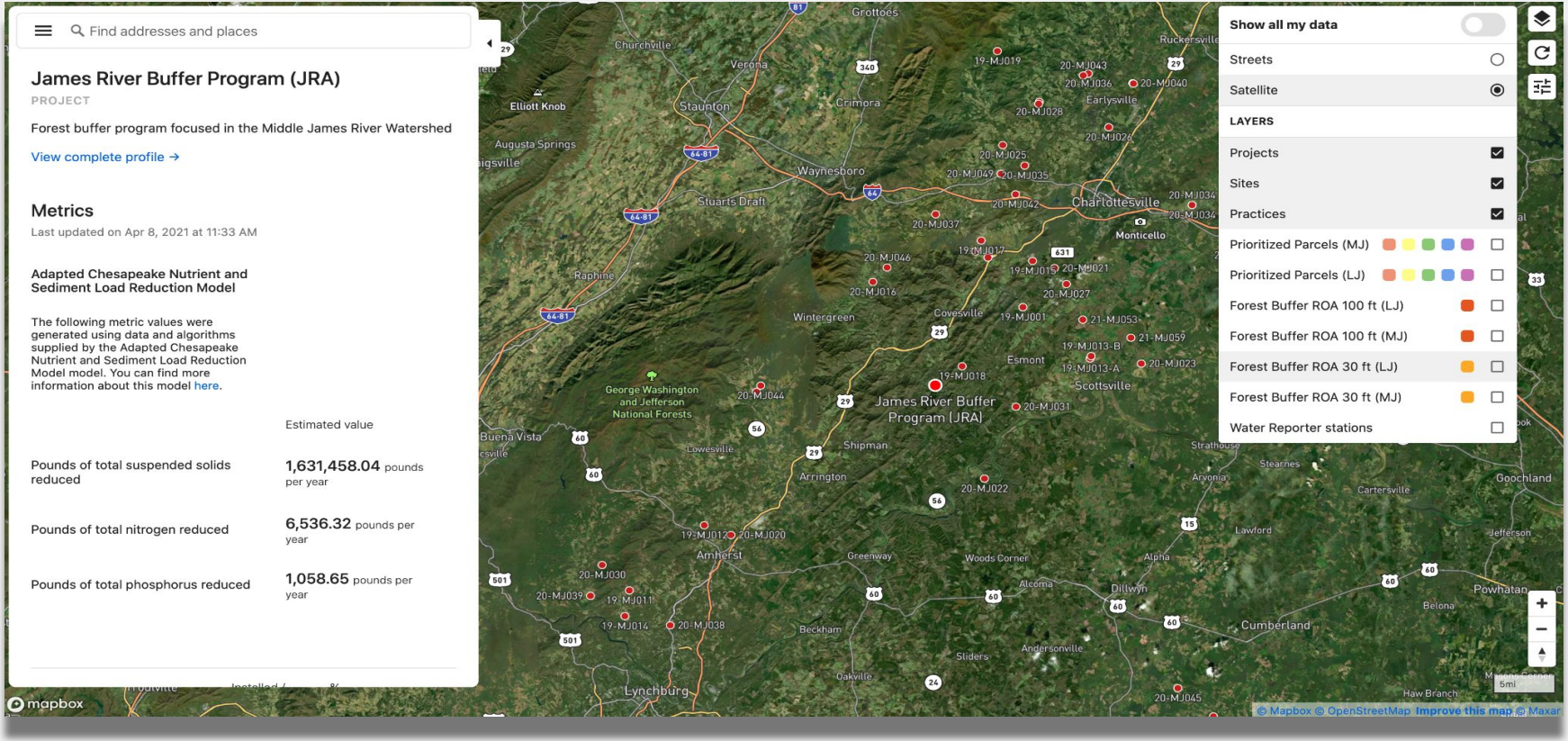


FieldDoc Dashboards



Contact Information & Next Steps

- Chesapeake Conservancy / Project Lead
  - Katie Walker, kwalker@chesapeakeconservancy.org
- Drexel
  - Ali Shokoufandeh, as79@drexel.edu
  - Scott Haag, smh362@drexel.edu
  - Barry Evans, bme39@drexel.edu
- The Commons
  - John Dawes, Dawes@chesapeakecommons.org
- CBPO
  - Ruth Cassilly, rcassilly@chesapeakebay.net