Mobile Tools for Watershed Management and Adaptive Management Verification

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What is Adaptive Management (AM)?

• A strategy for point sources to reduce phosphorus in the watershed upstream of the discharge point by partnering with nonpoint sources
  • Goal is less costly more sustainable water quality solutions
  • Works well for point sources where upstream watersheds are agricultural

• Silver Creek Pilot Project – 7.5 mi²
  • NEW Water – can we be successful with AM?
  • Developed many project partners
  • Developed a plan of action for data collection
Silver Creek Pilot Project

- Watershed Size: 4,800 Acres
- Land Use: 48% Agriculture
- Stream Length: 15 Miles
Partnerships Have Been Critical in the Silver Creek Pilot Project
Diversity of Team and Density of Data Collection Required Innovative Data Management
Silver Creek Baseline – GIS Analysis

• Aerial photo and desktop analysis
  • Hydric Soils
  • Existing wetlands
  • Potentially restore-able wetlands
  • Watershed and sub-watershed boundaries
  • EVAAL results
  • Buffer strips
  • Grassed waterways
  • Many others

• Intensive soil sampling (2.5 Acre grid over entire watershed)
Comprehensive Field Walks – Collector App

- Tablet based application from ESRI
  - ArcGIS Collector app for Android or Apple tablet/phone
  - ArcGIS Online for desktop
- Allowed for focused and comprehensive field walk investigations of every agricultural field in the watershed
- Team of professionals combined for different perspectives on conservation
  - Agronomists, engineers, county conservationists
  - Collect data on problem areas and what BMPs would be recommended at those locations
Collector App – Recommended BMPs

- Customized Geodatabase
- Updates can be viewed in real time
- All practices identified by a Unique ID number
Collector Centralized Data and Fostered Collaboration
Conservation and Enhanced Nutrient Management Plans

• Created from the data collected in the field
  – Stakeholders help refine the plans – needed a collaborative tool
  – Grower ‘kitchen table’ meetings to gain consensus – needed a tool with easy communication
  – Prioritization of implementable practices and support cost-share conversations – needed a tool to support implementation
  – Tool that was living and always up to date
  – Tool that was accessible to team members
Tools Support Implementation
Collector App - Verification

- Verify practices before, during, and post-construction/implementation
- Inspection tables utilized
  - Structural practices
    - Pre-construction, During Construction, 100% Complete, and Maintenance inspections
  - Operational practices
    - BMP table related to field boundary
    - Inspection table related to BMP table
Collector App – Verification

• Structural Practices
Collector App - Verification

- Operational Practices – all tables related to a field boundary
Advantages/Challenges of Mobile Data Collection

• Advantages
  • Collaboration
  • Able to be paperless – smart phones & tablets
  • Real time, viewable data collection
  • Improved QA/QC
  • Improved oversight
  • Centralized database
  • Increased efficiency – less time creating documents
  • Ability to automate workflows
  • Can convert to files usable by almost everyone – KMZ for Google Earth

• Challenges
  • Accuracy is dependent on strength of wireless connection
  • Can require large amounts of mobile data
  • Electronic devices in the weather elements
  • Management of photos can become cumbersome between databases
  • Software is evolving
  • Large database with lots of information – complicated
Opportunities to Extend Database for Other Uses

• Create web app with all implemented practices for growers to give their equipment operators – avoid driving over and destroying practices in the ground

• Created reports for repeated queries/conservation plan reports
  • Progress reports and commission updates
  • Assist for grant reporting requirements

• Create workflow triggers within the app
Opportunities for Mobile Tools and ArcGIS Online

- Inventory assets or opportunities for infrastructure
  - Stormwater Green Infrastructure
- Construction Progress and Milestone Verification
- Infrastructure Inspection
  - Collection system, pump stations, detention ponds, bridges, etc.
- Operation and Maintenance
  - Condition assessments of infrastructure and workflow for repairs
Thank You

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