Non-Intrusive BMP Verification

BMP Analysis utilizing aerial imagery, GIS, and digitized reporting forms for completion of non-intrusive field verification within partnership counties.

LDG

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Abstract

Non-Intrusive Best Management Practice (BMP) Verification is the process of using publicly accessible data and observation methods to identify and verify the functionality of targeted agricultural conservation practices, also known as Best Management Practices (BMPs), without intruding on the privacy of landowners. The methodology for this program uses publicly accessible data, remote imagery interpretation, historical practice implementation documents, and observations from public roadways to confirm an identify a BMP is present and functioning as intended. By using this methodology, certain BMPs can be collected and verified in a reduced timeframe and at a reduced financial cost while not requiring a release of private records by the landowner.

Scope

Multiple Conservation Districts within the Northern Tier of Pennsylvania have identified a need for the creation of a BMP verification program that can be conducted with non-invasive methods.

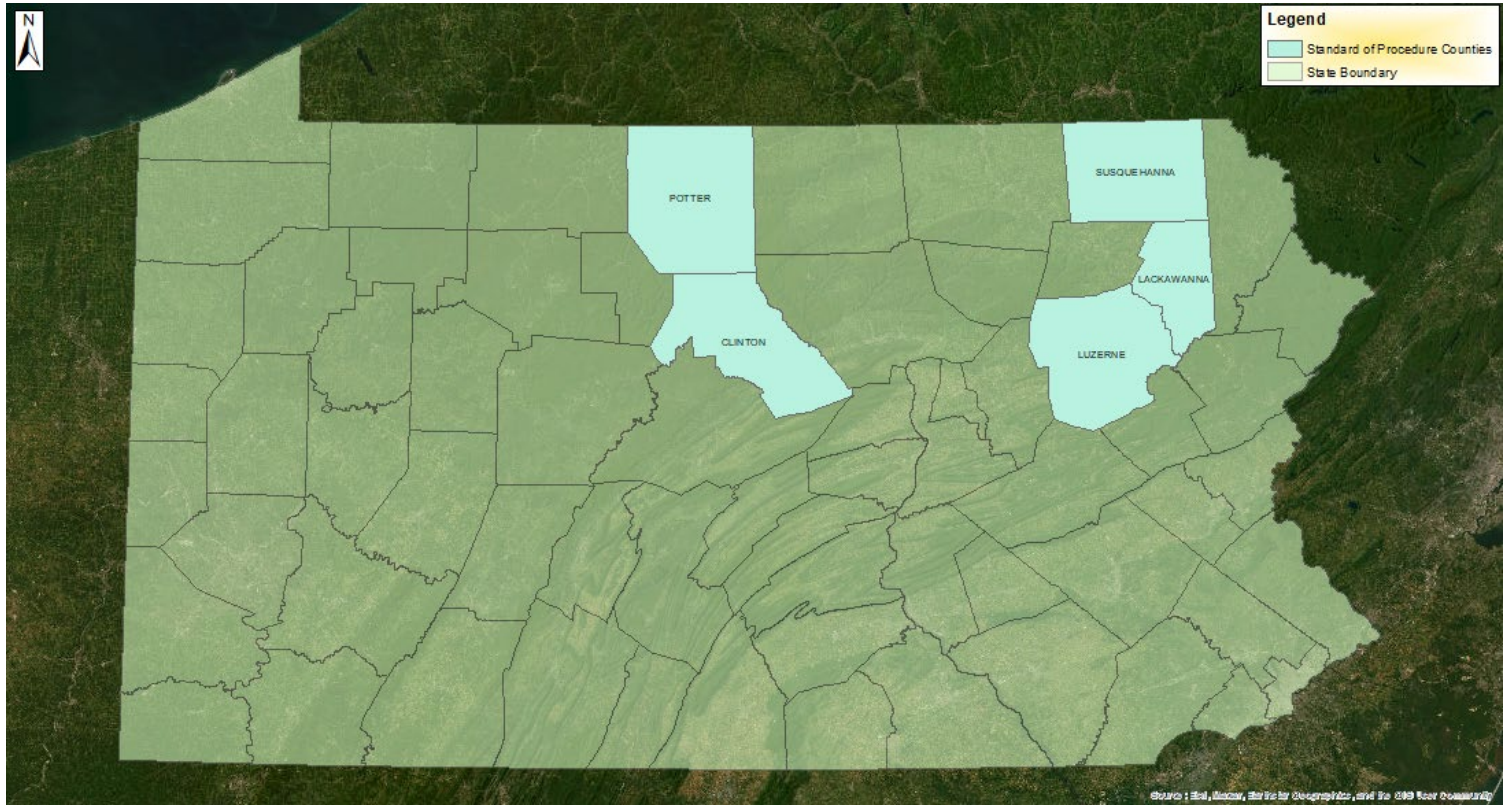
This pilot program contains an established focus to limit the amount of additional staff time dedicated towards the identification, collection, and documentation of practices, while also limiting reporting of private information required for BMP verification completion.

The establishment of the Non-Intrusive BMP Verification Program originated from the supplied resources and provides a procedural outline for Conservation Districts to utilize while completing BMP verification efforts to ensure proper data recording and landowner confidentiality.

Pilot Counties

- Clinton
- Lackawanna
- Luzerne
- Potter
- Susquehanna

- This methodology can be implemented in any region within the Chesapeake Bay Watershed.



Resource Improvement Practices

Targeted Resource Improvement Practices as outlined within Appendix H consisted of:

- RI-7 & 8 – Grass Nutrient Exclusion Area or Buffer on Watercourse
- RI-9 &10 – Forest Nutrient Exclusion Area or Buffer on Watercourse
- RI-16 Barnyard Clean Water Diversion
- RI-17 Water Control Structure

Qualified Professionals

Group 1

- Has qualified Training and Experience.
- Has demonstrated expertise in the field.
- Can complete all levels of the methodology.

Group 2

- Has completed minimum training requirements.
- Has completed 40 of on-the-job training with a Group 1 individual.
- Can only complete components of the methodology under the supervision of a Group 1 individual.

Responsibility	Group 1 Qualified Professional	Group 2 Qualified Professional	Responsible Party for SOP Completion
Utilize Aerial Imagery Platform to identify possible BMP locations.	X	X	CCD, LDG
Record possible BMP locations within the Aerial Imagery Platform.	X	X	CCD, LDG
Complete Non-Intrusive Field Verification efforts from publicly accessible roadways.	X	X	CCD, LDG
Completed BMP Verification Windshield Survey and report collected data into Practice Keeper Database.	X	X	CCD, LDG
Review and approval of Practice Keeper Database entries for final submittal.	X		CCD, PADEP
Program Management and Oversight	X		CCD, LDG, PADEP

Aerial Review Platform

- An aerial review platform was created through ArcGIS Online to allow for desktop mapping of practice locations.

- Each platform was designed per county and included county specific layers to map Resource Improvement BMP's.

- Layers within the platform included things such as:
  - Streams, Stream buffers
  - Roadways
  - Parcel Lines
  - Land-use Data
  - Municipality Boundaries

BMP Form Collection

- The BMP Form was created through the Survey123 Application to allow in-field as well as office access to enter BMP data.

- This form includes the Practice Keeper data entry fields which allows the form to be utilized for all BMP data collection, not just Resource Improvement Practices.

The 5 Step Procedure

Locate
- Identify previous practice locations as per historical government agency documentation.
- Utilize Aerial Imagery Platform to identify possible BMP locations.
- Responsible Party: Governmental Agency, Third-party Entity

Record
- Record possible BMP locations within the Aerial Imagery Platform and take notes about each practice such as practice type, approximate size, and location on property.
- Responsible Party: Governmental Agency, Third-party Entity

Verify
- Drive to the recorded BMP locations to complete Non-Intrusive Field Verification.
- Completion of the BMP Verification Windshield Survey.
- Responsible Party: Governmental Agency, Third-party Entity

Report
- Transfer of BMP Verification Windshield Survey data into Practice Keeper System.
- Responsible Party: Governmental Agency, Third-party Entity

Review
- Data entered into the Practice Keeper System.
- Third-party submissions are sent to Governmental Agency for review and approval prior to submission to PADEP for final review submission.

Locate

- Identify BMPs previously completed in the area by reviewing state and local government files.
- Review aerial imagery within GIS Hub site to discover any additional BMPs.
- Review of additional agricultural plans for practice locations.

Record

- Record all know data on BMPs survey forms.
- Adding all known data is key to accurately recording all BMPs.
- Data included, landowner name, practice type, size, and location, etc.
- BMPs with existing documentation will have additional data added.

Verify

- Complete Driving Routes to maximize field verification.
- Drive to each identified BMP and stop at a location where the BMP can be seen.
- Complete necessary form for each observed BMP.

Verify

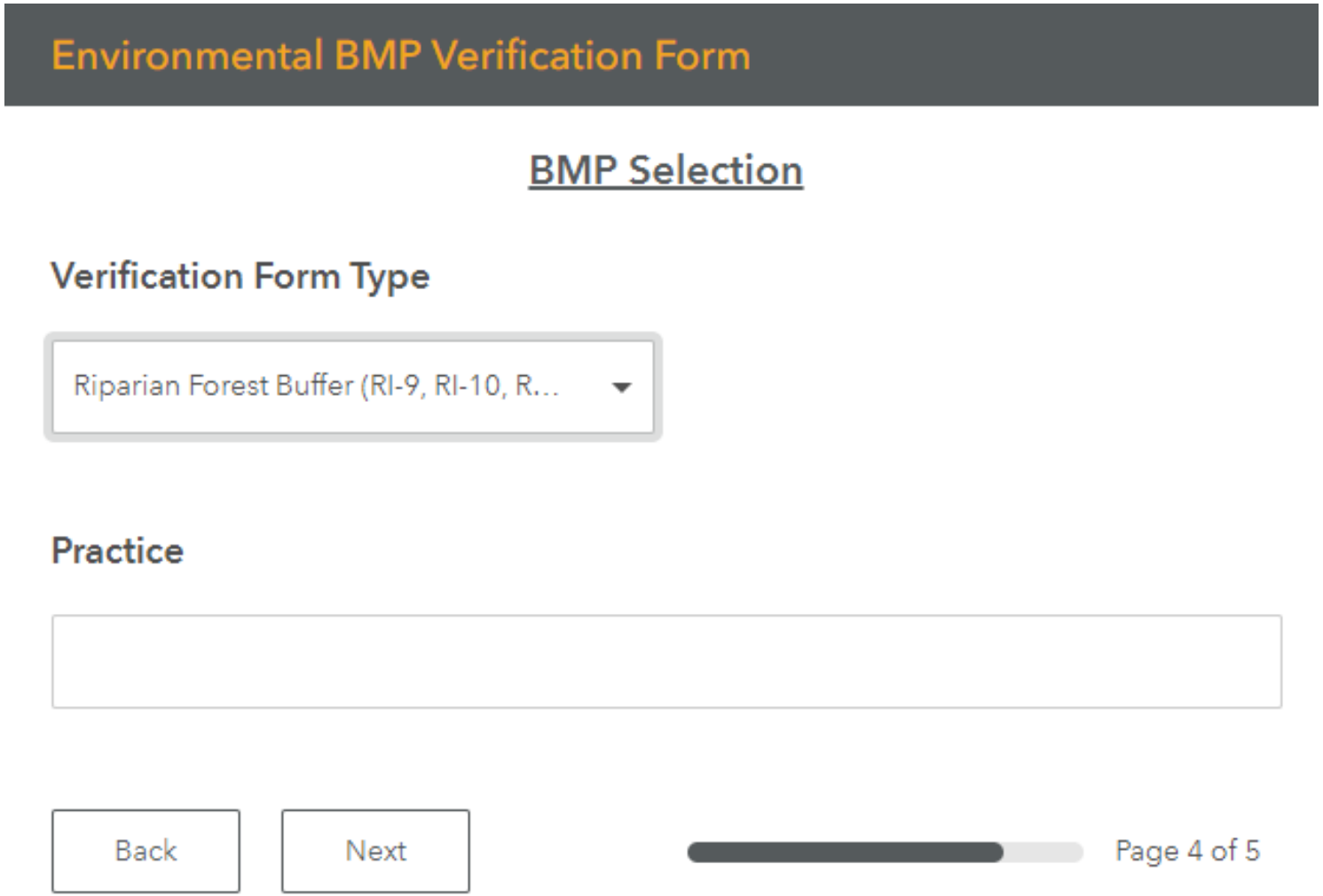
- The field verification process starts with the development of a driving route that follows a path of identified practices.
- The driving route is developed utilizing public roadways only, following the priority of zero intrusion.
- The routes are then driven, and BMP coordinates are utilized to know when a practice is approaching.

Verify

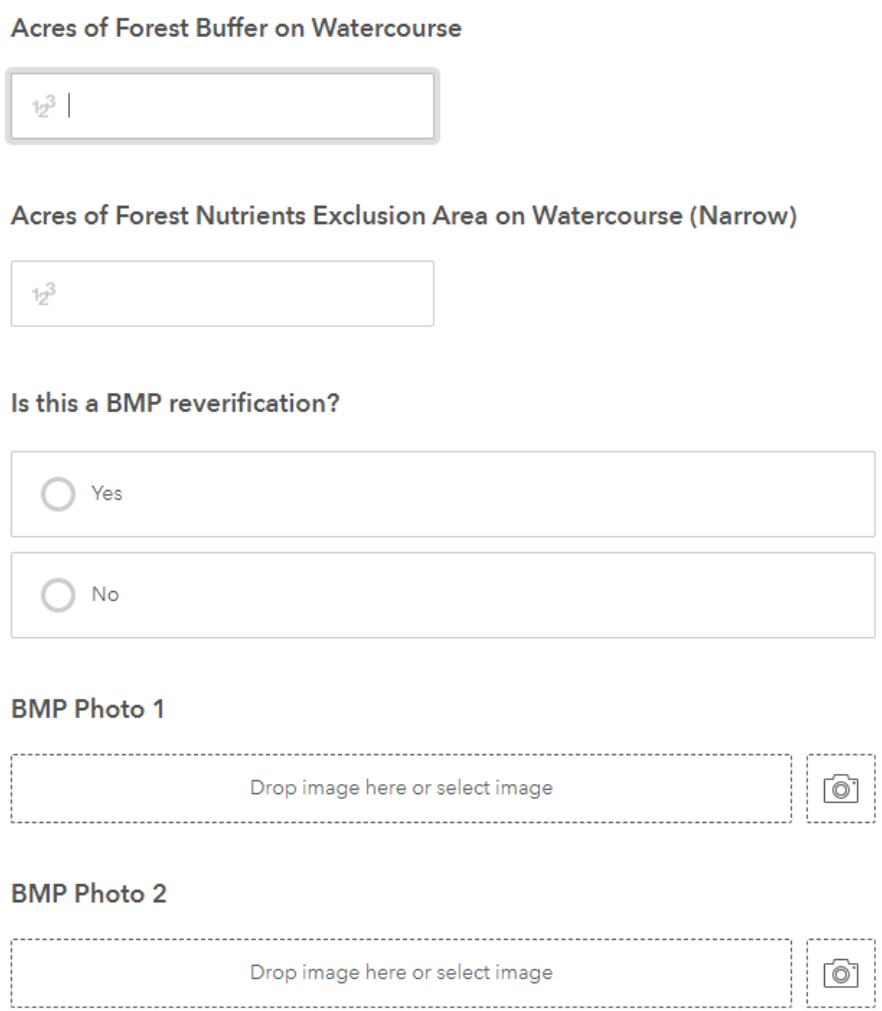
- Upon arrival at a practice location, visual indicators and site conditions are noted to ensure the practice is present and functioning properly.
- Once it is safe to do so, the vehicle is parked, and the notes are utilized to record the verified information into the Survey123 Online BMP Form.
- If the practice is unable to be seen from the roadway, that practice cannot be verified unless site access is provided by the landowner.

BMP Form Collection

This form is accessed through the Survey123 App or via the Survey123 website.



BMP Form Collection

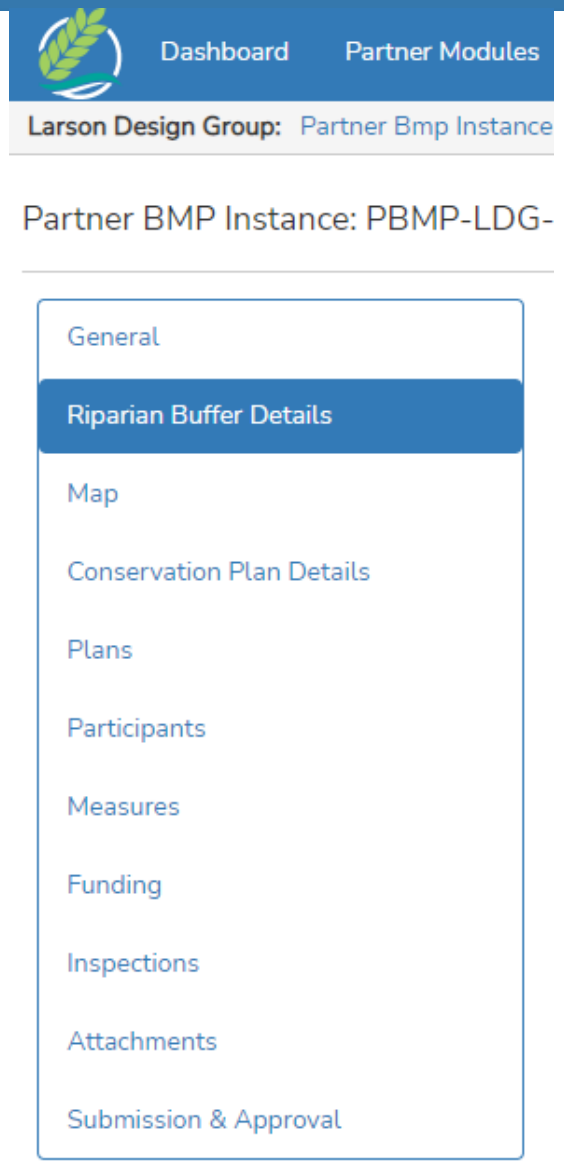


- Each BMP Form entry gets submitted to the Online Survey123 database. The database organizes all entries and allows Excel sheet export.
- This process removes the need for paper forms, scanning of documents, or organization of materials manually.
- Once the Excel sheet is exported from Survey123, this information can be organized by Excel coding to only display the fields needed for entry into Practice Keeper.

Report

- Transfer all BMPs with completed information into Practice Keeper.
- Practice Keeper is Pennsylvania's BMP Reporting site.
- Only BMPs with all field data completed can be entered into the system.

Practice Keeper Reporting



- Transferring data to Practice Keeper moves seamlessly as all the information needed to move through the tabs efficiently is saved in one location.

- After data is transferred into Practice Keeper, the internal Excel sheet can be updated to reflect the practices submission status.

Review

- A Group 1 Qualified Professional oversees all stages of the methodology.
- Conservation District staff reviews all entered data in Practice Keeper for accuracy for there county.
- DEP Staff review all entered data in Practice Keeper statewide.

Results – Case Study

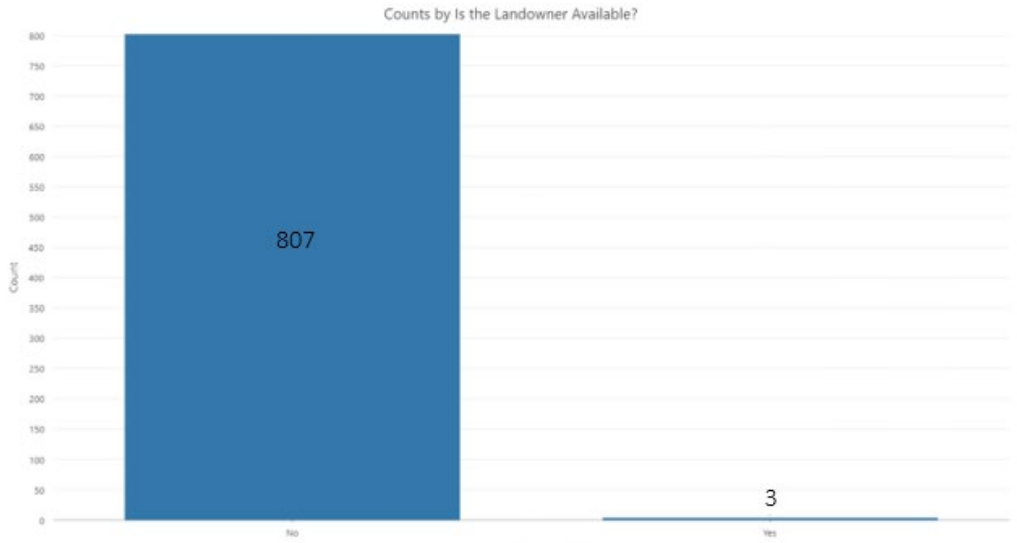
- We completed a case study review of 10% of the all practices that were collected during the Non-Intrusive BMP Verification Methodology.
- This study included visiting 81 sites and attempting to complete a landowner interview for the BMP.

Results

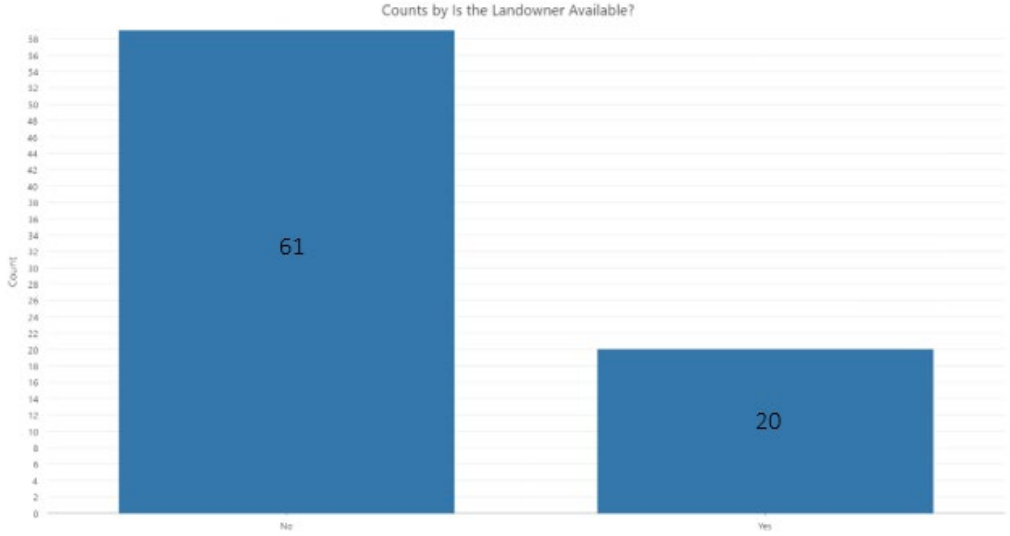
- All results were negligible.
- All required data for each practice was the same using the case study method and the Non-Intrusive method.
- Landowner interviews provided no new information and were difficult to schedule.

Results

Landowners available during Non-Intrusive BMP Verification



Landowners available during Traditional Inspection



Cost and Time Analysis

- A cost and time analysis was developed using the time required to complete both the Non-Intrusive and Traditional Inspection methodology.
- Estimates are from actual recorded time required from LDG and CCD staff to complete these tasks.

Time Analysis

Non-Intrusive Methodology

Task	Time Requirement – Per 50 BMP's	Comments
Database Development	24 Hours	Only needed at start of the program
Complete Aerial Review	4-hour average	Can differ based on concentration of farming operations. Includes base data collection
Complete Driving Routes	3 hours	
Windshield Survey	11-hour average	Includes drive time and form completion
Data Entry and Review	12-hour average	
Total	54 Hours – 30 hours without Data base development	

Traditional Field Inspection

Task	Time Requirement – Per 50 BMP's	Comments
Landowner Notification – Mailings, email, or calls	18 hours	Average 15 minutes per parcel with 50% needing a follow up communication.
BMP Identification	16 hours	Plan review or previously implemented BMP
Complete Inspections with Landowner	80 hours	Assume a 1.5-hour drivetime per day and 15 minutes between operations. Assuming 2 BMPs per site and 10 per day. Variable can occur and reduce number of site visits.
Data Entry and Review	12-hour average	
Total	126 hours	

Conclusion

The Non-Intrusive BMP Verification methodology is an effective and cost-efficient protocol that can be used to capture Resource Improvement BMPs. This method can be utilized to collect new BMPs or re-verify existing BMPs with the added functionality of data reporting consolidation within the Online ArcGIS Hub Site. This tool provides organization for agency staff and allows the ability to utilize third-party consultants to assist in the completion of this program.

Although this methodology does vary from traditional inspection reporting, overall data collection and accuracy are comparable to traditional field inspection methods.

Thank You

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