BMP Verification Program

Ad Hoc BMP Verification Meeting

November 12, 2020

Jason Keppler

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BMP Verification Program

- In the fall of 2016, MDA formed the **BMP Verification Task Force** in response to the new requirement to strengthen the accountability and transparency of reported BMP practices.

- Currently consists of 8 individuals who work regionally throughout in all 23 counties in Maryland.
  - No verifiers work in an SCD in which they've written conservation plans.

- Qualifications – NRCS Planner Certified, MDA Nutrient Management & CBNTT Certified

- Verifiers are mobile and work on 3-week rotations in each Soil Conservation District.

- Verifiers are equipped with Laptops, iPads, Parcel spreadsheets and Verification forms to prepare and perform duties.

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The Daily Life of the Verifier…..

- A typical 3-week stint of a task force member flows as follows:
  - Headquarters provides the Verifier with a list of parcels to visit ranked by N-reduction potential.
  - Headquarters provides pre-populated verification forms with WIP-eligible BMP data pulled directly from ***Conservation Tracker*** that includes the following:
    - BMP-ID: A unique identification number
    - Practice code and type
    - Install amount and Install date
    - Cost-share data, both MACS or Federal
    - Cooperator contact information
    - Farm/Tract numbers and Maryland Property Account ID information

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The Daily Life of the Verifier, cont….

- Typically, the first week of the verification period is spent reviewing conservation plans to identify BMP locations and to perform a QAQC of the data in ***Conservation Tracker***.
  - If discrepancies in data are found between the conservation plan, cost-share contract data, and Conservation Tracker data, the BMP is assigned an "ADMIN" status which will be joined with the field-observed Verification Status during reporting to the SCD.
- As plans are reviewed, Verifiers map extents using ArcGIS.
  - ArcGIS app includes several years of imagery layers to confirm locations for BMPs that no longer exist.
  - If a practice cannot be mapped due to insufficient data, it can be mapped in the field using the ArcGIS Collector app on the iPad.

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Farm-by-Farm Verification

- After confirming access, Verifiers spend the next 2 weeks of the verification period visiting each parcel in a manner to maximize efficiency and review the most reduction potential.
  - Properties managed by the same cooperator are grouped to limit contact.
  - Properties that have been visited by MDA for other purposes are culled from the list.
  - Bio-security measures are in place, including for poultry operations.

- Each BMP is measured by its model definition and NRCS standard. These general questions are also considered:
  - Are NRCS Standards and Specifications in place at the time of construction still being met or does the practice still meet RI visual indicators?
  - Is the BMP being utilized as intended and achieving its original purpose?
  - Are resource concerns being addressed?
  - Were any alterations made to the project that lessened the effectiveness?
  - Is any maintenance needed to bring the BMP to the minimum NRCS standard or to an RI level?

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Determining a BMP Status

- Upon visual inspection of a BMP, the Verifier can make any one of the following Status Determinations:
  - **Meets Standard**
  - **Does Not Meet Standard**
  - **No Longer Present**
  - **Administrative** (can be joined with any of the above other statuses)
  - **Meets Standard, No Animals** (for those practices that Meet Standard, but are no longer providing the intended water quality benefit or for BMP types that are not WIP eligible, such as Poultry HUAs)
  - **TYPO/Duplicate** (for those practices found to be database entry errors or those that never existed)
- After verification forms are completed, they are delivered to Headquarters for database entry, whereupon reconciliation reports are created for SCD feedback.

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Groundtruthing every BMP…..

- Since the fall of 2016, the task force has verified approximately 50% of all the WIP-eligible practices installed in Maryland.
- 1,100 practices verified annually per verifier.
- At our current pace, we will complete the initial verification of all WIP-eligible practices before 2025.
- We have found that this process has produced co-benefits, to include:
  - Identifying new opportunities to install BMPs as we find resource concerns during site visits and deliver that information to the SCD for outreach.
  - The opportunity to identify and repair BMPs that do not meet standard
  - Improving the quality of our data and identifying gaps between agency data.
  - Identification of Resource Improvement practices eligible for reduction credit.
- Annual budget ~ $100,000/ verifier $90/practice

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MARYLAND AGRICULTURAL WATERSHED IMPLEMENTATION PROGRAM
ON-FARM BMP VERIFICATION MAINTENANCE AND USE

Plan #: [redacted]
Parcel #:

Cooperator Contact Information

[redacted]

SCD: Caroline
Farm/Tract: [redacted]
MPV Acct ID:

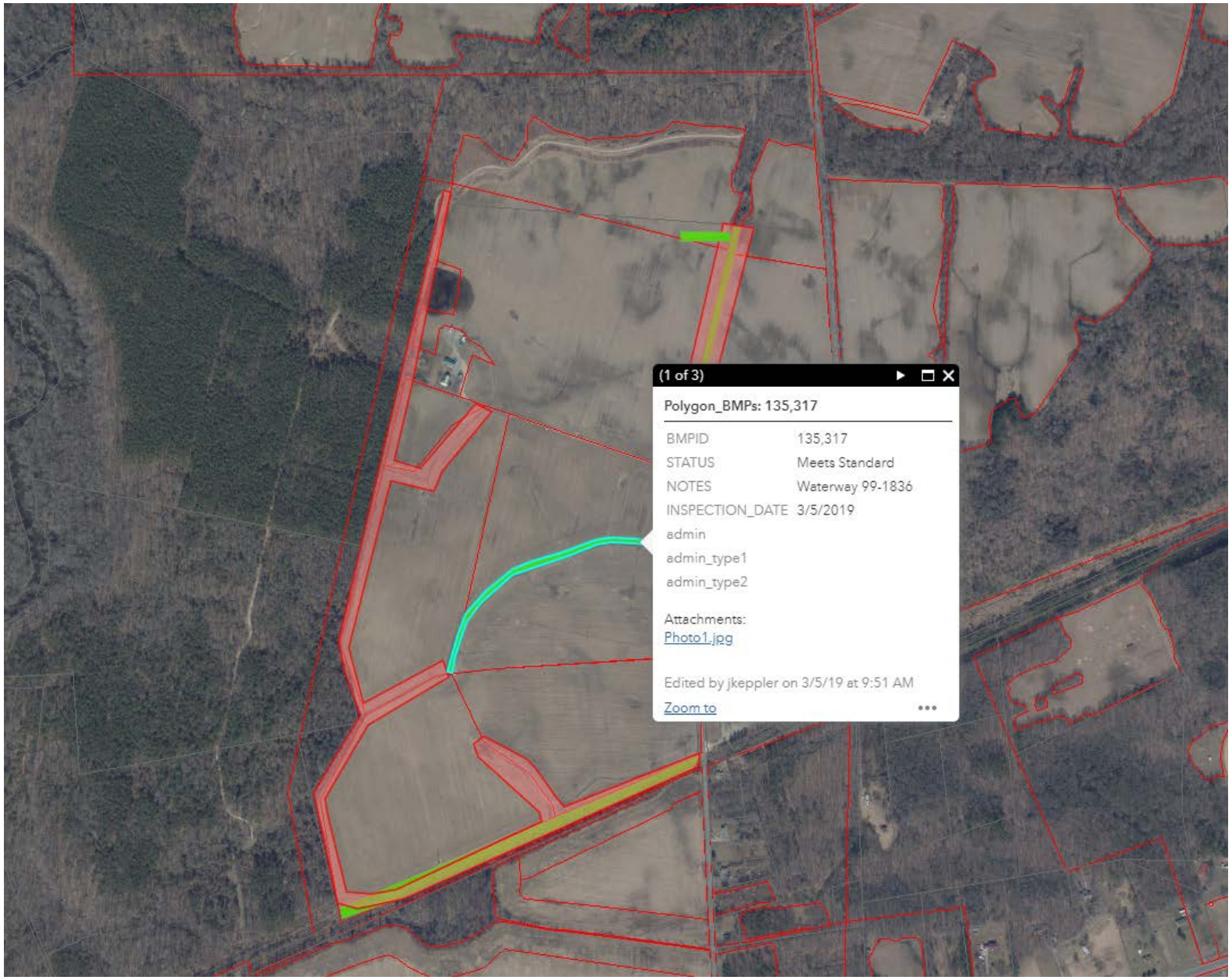
BMP ID	BMP Practice Code and Name	Install Date / Verified Date	Install Amount / Verified Amount	Unit	MACS / FED CS	1. Are NRCS Standards & Specs in place at time of construction still being met or does the practice still meet RI visual indicators?	2. Is the BMP being utilized as intended and achieving its original purpose?	3. Are resource concerns being addressed?	4. Were any alterations made to the project that lessened the effectiveness ?	5. Is any maintenance needed to bring the BMP to the minimum NRCS standard or to an RI Level?*	BMP Status
13	412 - Grassed Waterway	10/05/1999 3/5/19	1.00 1.00	AC	[redacted]	Y☒ N☐ N/A☐	Y☒ N☐ N/A☐	Y☐ N☐ N/A☐	Y☐ N☐ N/A☐	Y☐ N☐ N/A☐	MS DNMS DNE ADMIN
13	390 - Riparian Herbaceous Cover	04/10/1999 3/5/19	14.20 0	AC	[redacted]	Y☐ N☐ N/A☐	Y☐ N☐ N/A☐	Y☐ N☐ N/A☐	Y☐ N☐ N/A☐	Y☐ N☐ N/A☐	MS DNMS DNE ADMIN
14	390 - Riparian Herbaceous Cover	09/30/2011 3/5/19	3.00 3.00	AC	CREP	Y☒ N☐ N/A☐	Y☐ N☐ N/A☐	Y☐ N☐ N/A☐	Y☐ N☐ N/A☐	Y☐ N☐ N/A☐	MS DNMS DNE ADMIN
16	412 - Grassed Waterway	11/19/2013 3/5/19	0.10 .10	AC	[redacted]	Y☒ N☐ N/A☐	Y☒ N☐ N/A☐	Y☐ N☐ N/A☐	Y☐ N☒ N/A☐	Y☐ N☒ N/A☐	MS DNMS DNE ADMIN
16	412 - Grassed Waterway	11/19/2013 3/5/19	0.40 .40	AC	[redacted]	Y☒ N☐ N/A☐	Y☒ N☐ N/A☐	Y☒ N☐ N/A☐	Y☐ N☒ N/A☐	Y☐ N☒ N/A☐	MS DNMS DNE ADMIN

Contract Expires
9/30/09
9/30/20

* Forest and Grass Buffers should be evaluated for water quality functionality and not planting density or species mix. Observation of some noxious and/or invasive weeds should be noted but alone will not result in an unsatisfactory review. If checked "Y" briefly describe below 1) the maintenance work required, and 2) the follow-up discussion with SCD staff to address project deficiencies.

Matthew Mitchell FAP — 3/6/19
Reviewer Name, Position and Signature — Date of Review

For Admin Use Only:
Status entered into Conservation Tracker _____ Initials:_____


(1 of 3)
Polygon_BMPs: 135,317
BMPID 135,317
STATUS Meets Standard
NOTES Waterway 99-1836
INSPECTION_DATE 3/5/2019
admin
admin_type1
admin_type2
Attachments:
Photo1.jpg
Edited by jkeppler on 3/5/19 at 9:51 AM
Zoom to

(1 of 3)

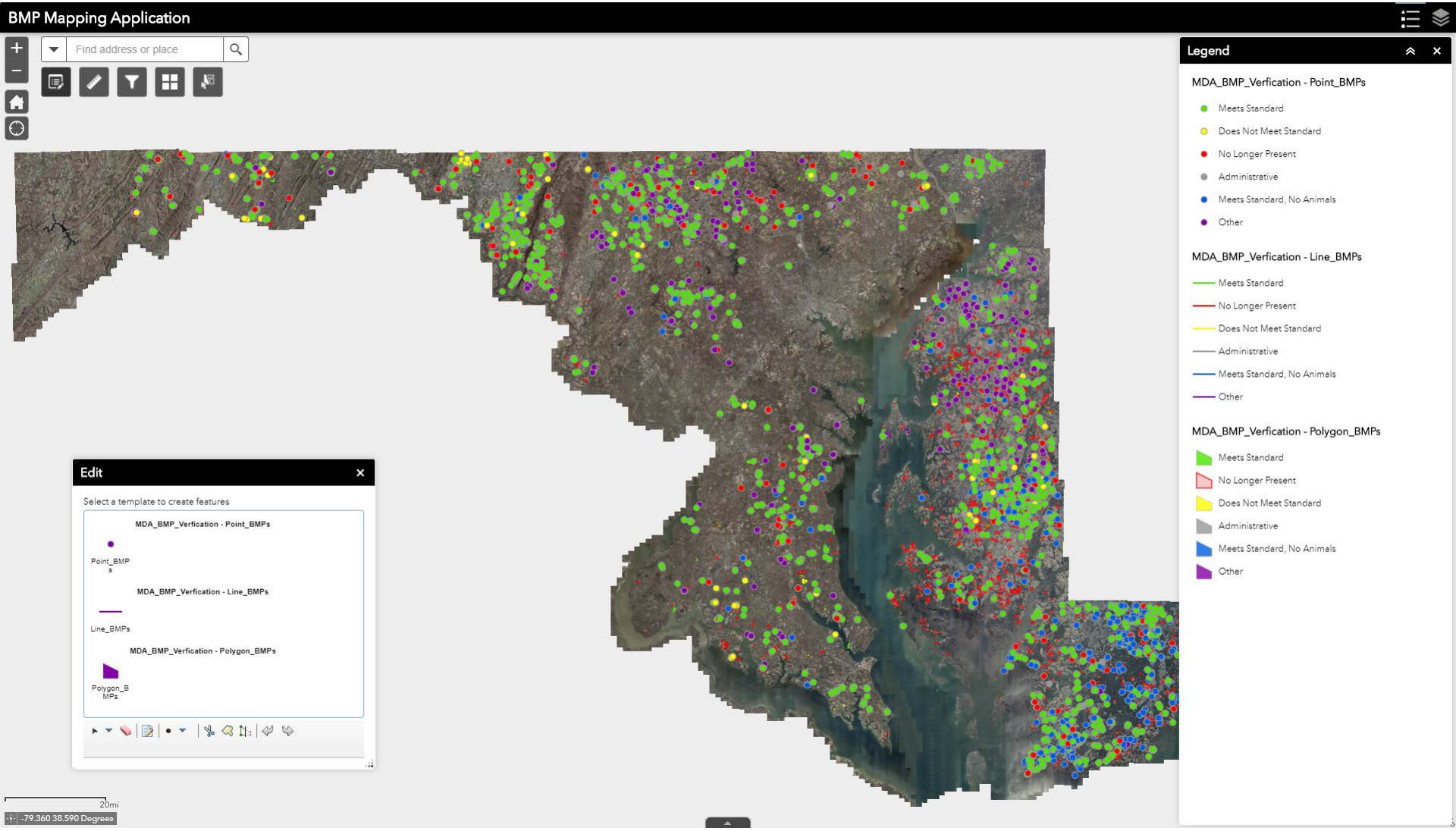
Polygon_BMPs: 135,317

BMPID	135,317
STATUS	Meets Standard
NOTES	Waterway 99-1836
INSPECTION_DATE	3/5/2019
admin	
admin_type1	
admin_type2	

Attachments:
Photo1.jpg

Edited by jkeppler on 3/5/19 at 9:51 AM

Zoom to



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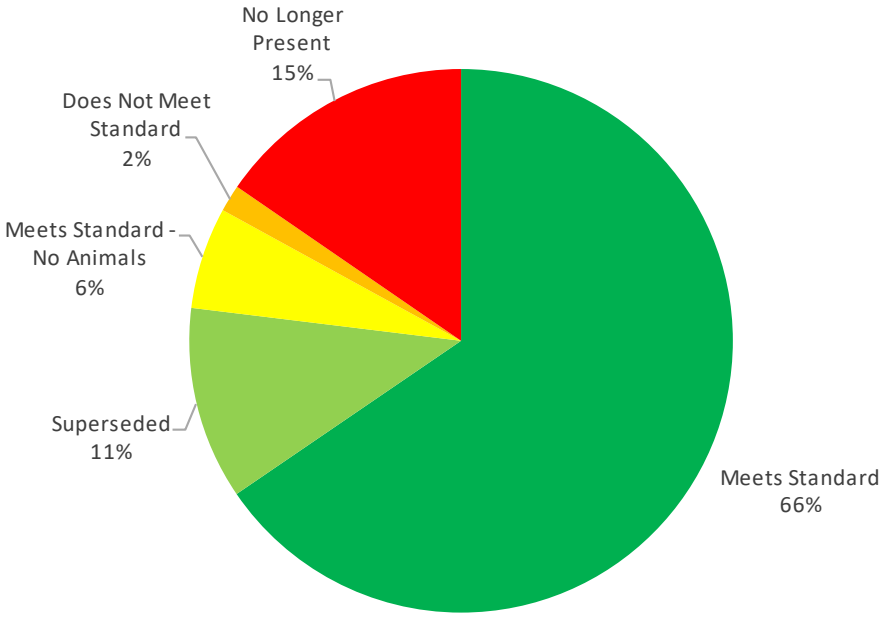
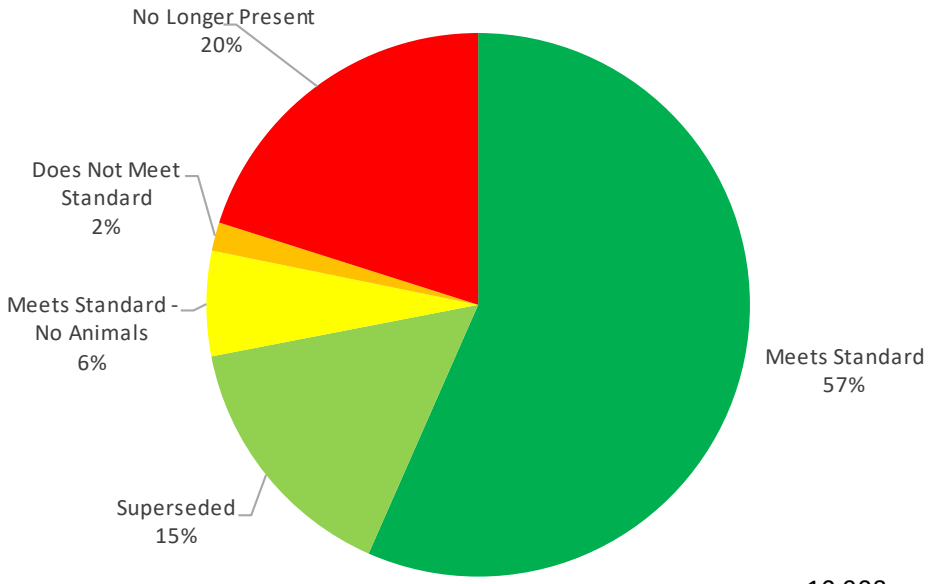
Total BMPs Verified

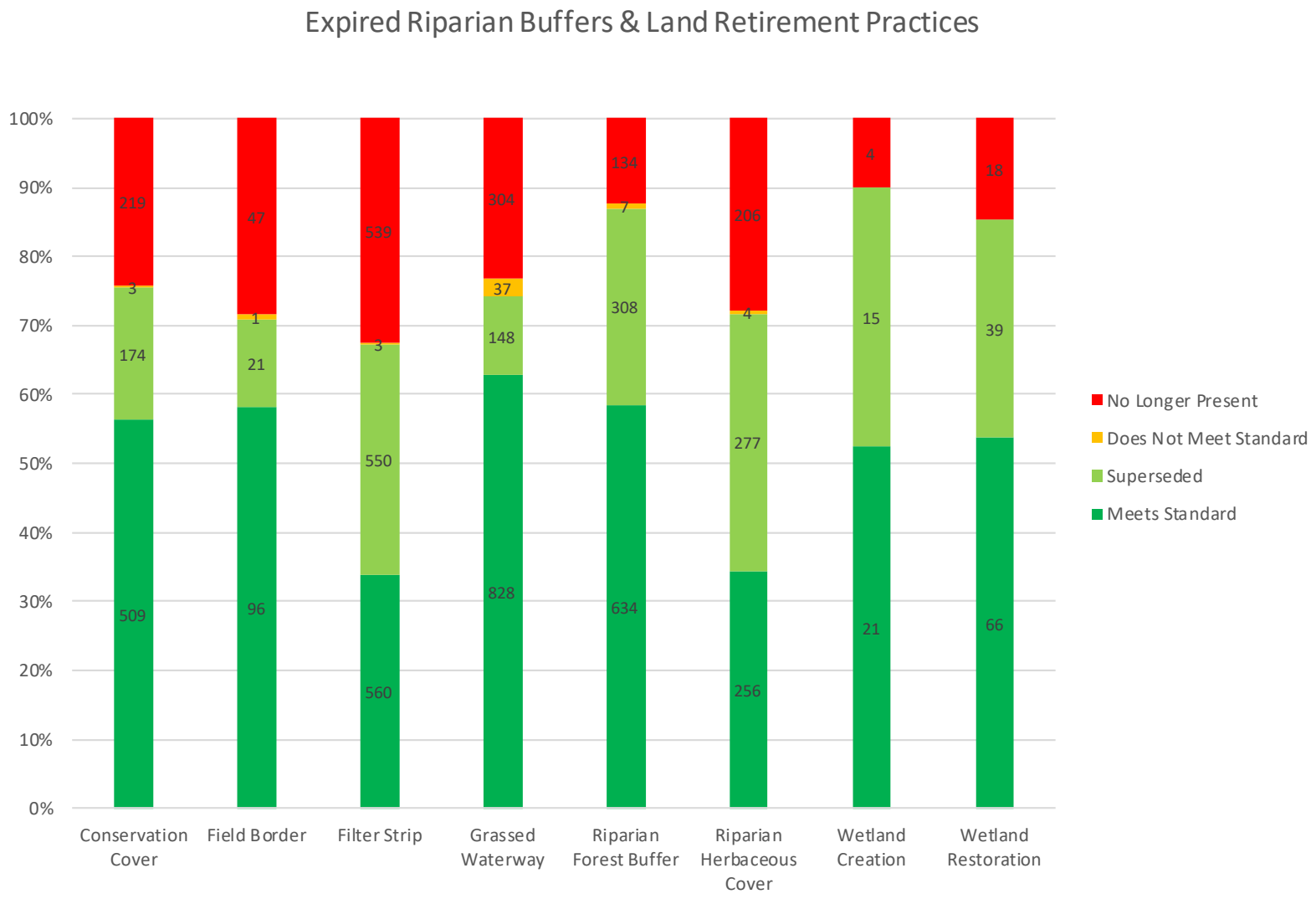


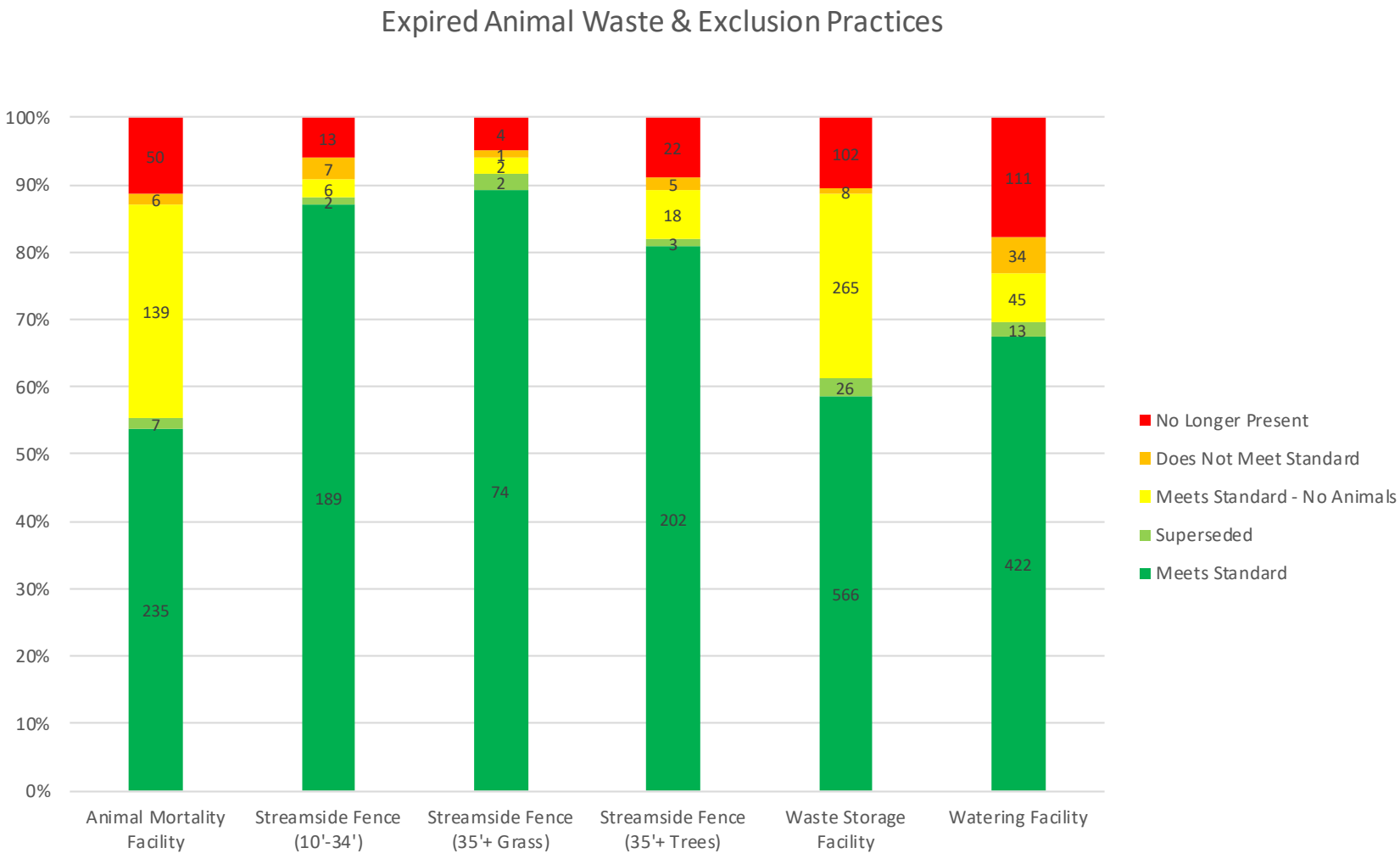
n = 15,079

Expired BMPs Verified



n = 10,908


Expired Riparian Buffers & Land Retirement Practices
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
219
3
174
509
47
1
21
96
539
3
550
560
304
37
148
828
134
7
308
634
206
4
277
256
4
15
21
18
39
66
Conservation Cover
Field Border
Filter Strip
Grassed Waterway
Riparian Forest Buffer
Riparian Herbaceous Cover
Wetland Creation
Wetland Restoration
No Longer Present
Does Not Meet Standard
Superseded
Meets Standard


Expired Animal Waste & Exclusion Practices
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
50
6
139
7
235
13
7
6
2
189
4
1
2
2
74
22
5
18
3
202
102
8
265
26
566
111
34
45
13
422
Animal Mortality Facility
Streamside Fence (10'-34')
Streamside Fence (35'+ Grass)
Streamside Fence (35'+ Trees)
Waste Storage Facility
Watering Facility
No Longer Present
Does Not Meet Standard
Meets Standard - No Animals
Superseded
Meets Standard

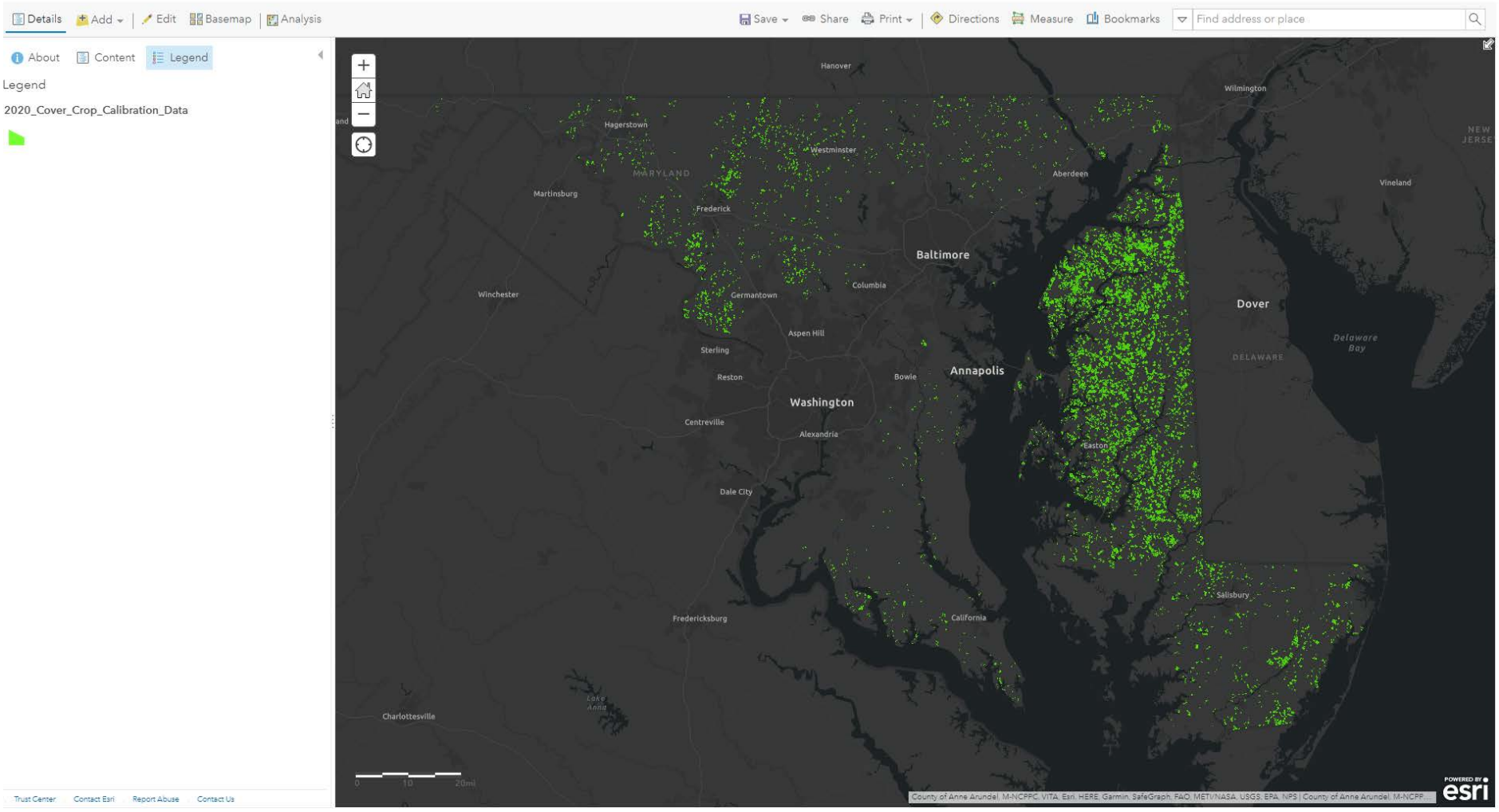
Satellite remote sensing analysis of winter cover crop planting, performance, and termination on the Delmarva peninsula, 2018-2021

Summary slides for Jason Keppler

W. Dean Hively, Alex Soroka - USGS
Feng Gao – USDA-ARS

10/7/2020

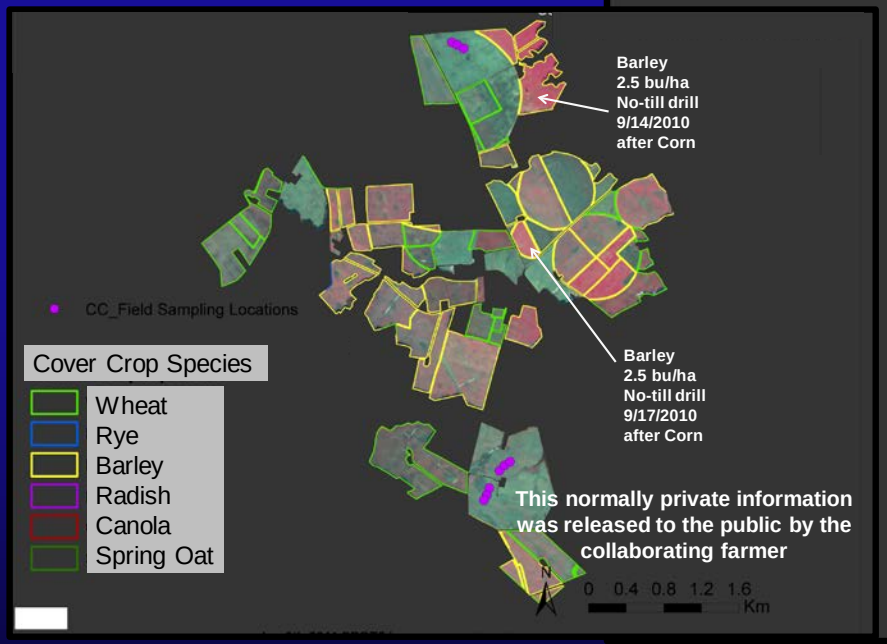
•U.S. Department of the Interior
•U.S. Geological Survey


Details
Add
Edit
Basemap
Analysis
Save
Share
Print
Directions
Measure
Bookmarks
Find address or place
About
Content
Legend
Legend
2020_Cover_Crop_Calibration_Data
Hanover
Wilmington
Hagerstown
Westminster
Aberdeen
Vineland
MARYLAND
Martinsburg
Frederick
Baltimore
Columbia
Winchester
Germantown
Dover
Aspen Hill
Delaware Bay
Sterling
DELAWARE
Reston
Bowie
Annapolis
Washington
Centreville
Alexandria
Easton
Dale City
Salisbury
Fredericksburg
California
Lake Anna
Charlottesville
0
10
20mi
Trust Center
Contact Esri
Report Abuse
Contact Us
County of Anne Arundel, M-NCPPC, VITA, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS | County of Anne Arundel, M-NCPP...
POWERED BY esri

Satellite reflectance data can be used to evaluate winter cover crop performance

Cover crop enrollment data provide digitized field boundaries and agronomic management information:

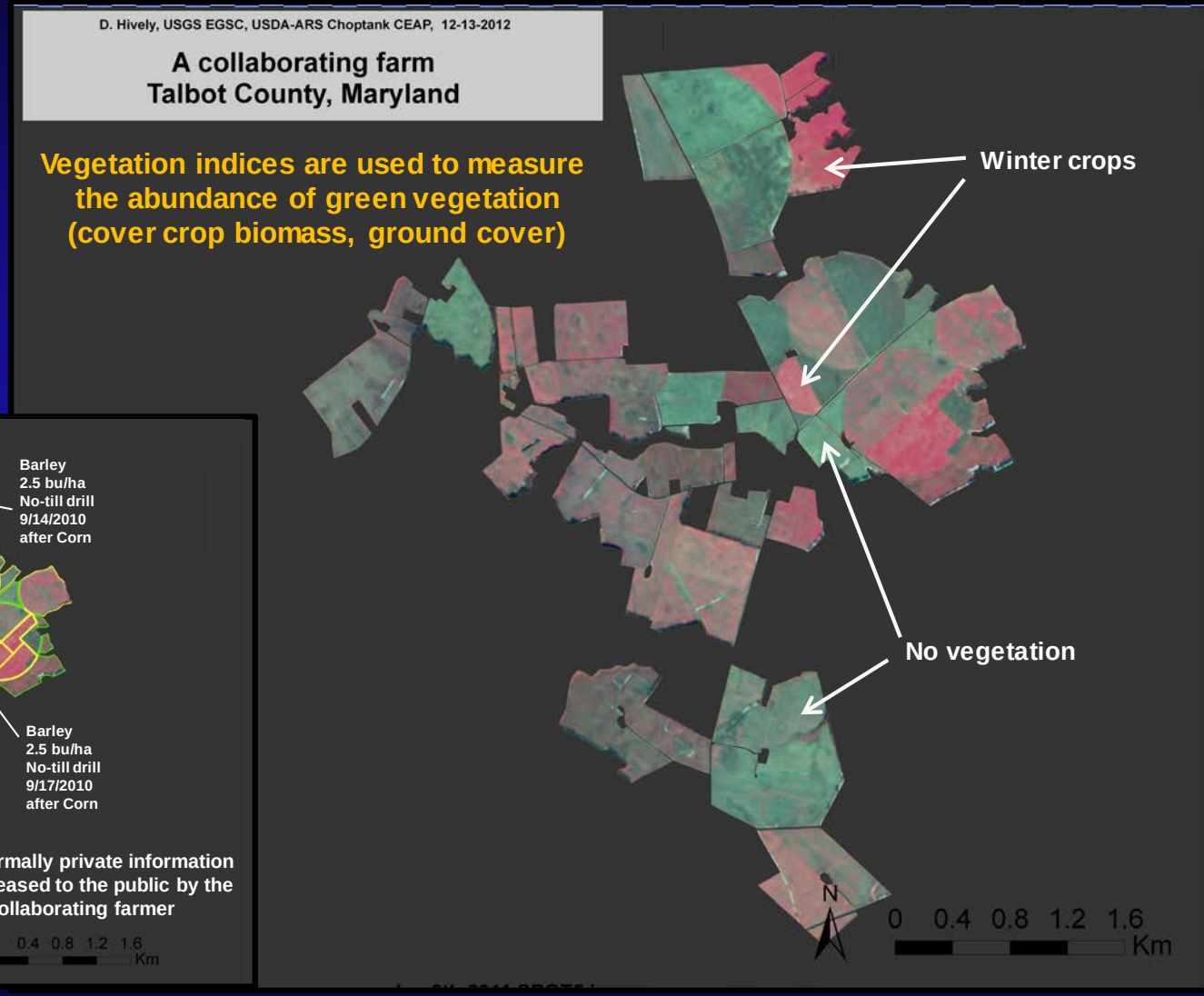
(Species, planting method, planting date, termination date, previous crop, etc…)



D. Hively, USGS EGSC, USDA-ARS Choptank CEAP, 12-13-2012

A collaborating farm
Talbot County, Maryland

Vegetation indices are used to measure the abundance of green vegetation (cover crop biomass, ground cover)



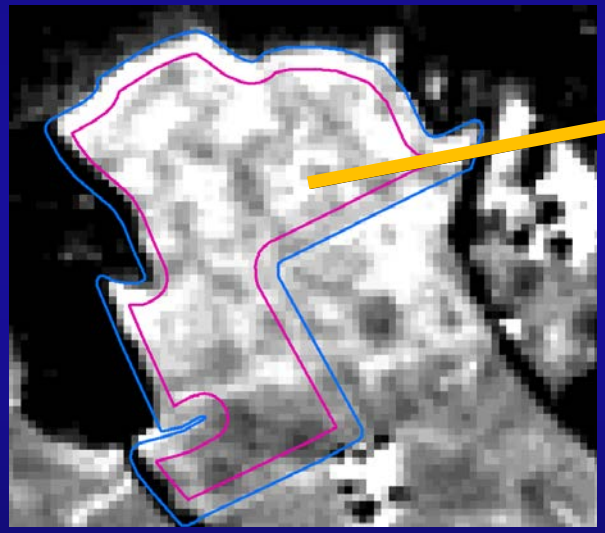
USGS

Satellite vegetation time series derived for each field

Data source

- Harmonized Landsat and Sentinel (HLS) satellite imagery
- Up to 4-day repeat frequency depending on clouds

Overlay cover crop field enrollment boundaries on satellite imagery time series data



Curve fitting approach to phenology identifies:

- Green-up date
- Green-up momentum
- Maximum wintertime and springtime NDVI and associated performance
- Termination date

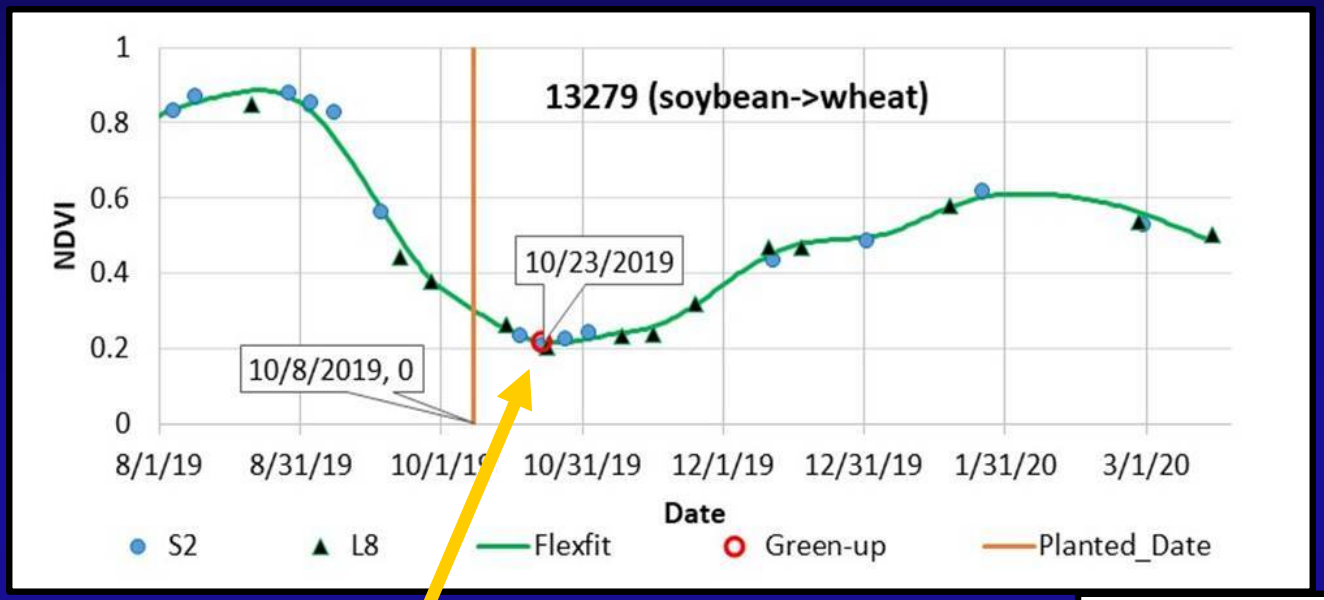
Use calibrations with field data to translate vegetation indices into cover crop performance measures

USDA ARS

Remote sensing science development by USDA-ARS and USGS

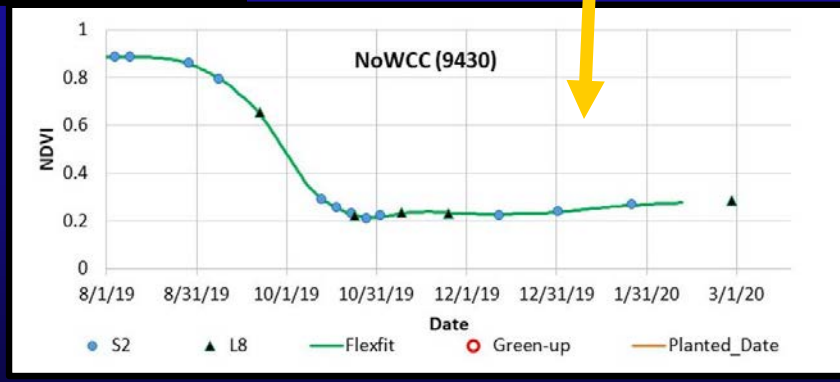
USGS

Fall / Winter phenology analysis



Greenup detected within 1-2 weeks of planting

Fallow fields do not exhibit green-up associated with cover crop



These data are preliminary and are subject to revision.

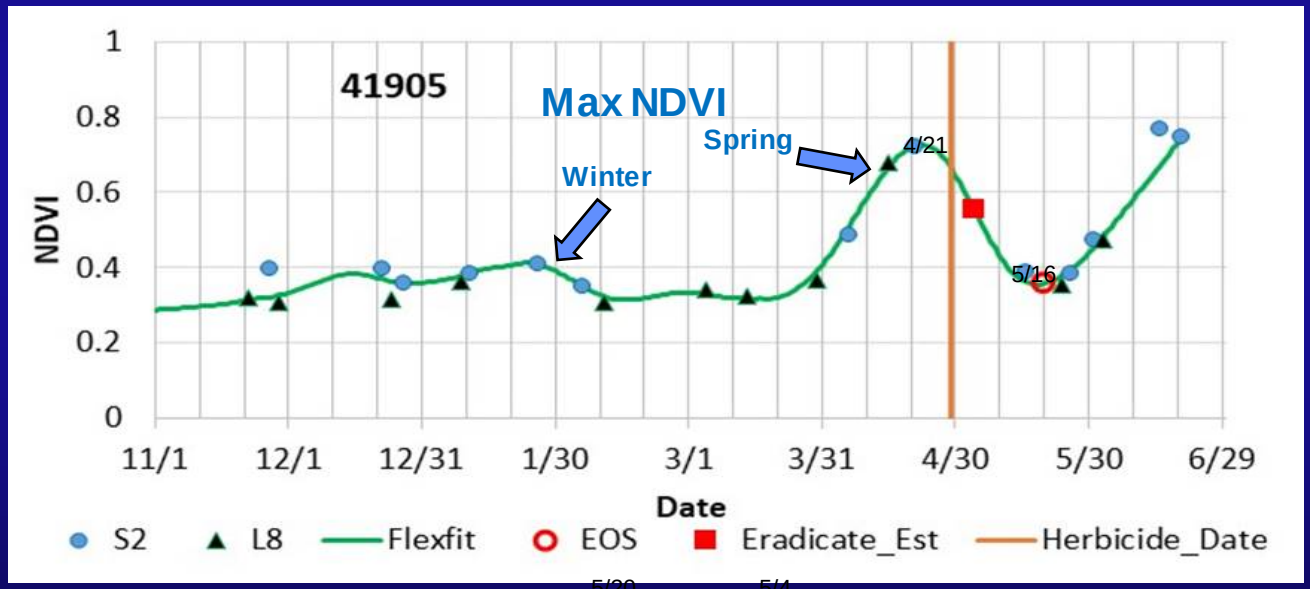
USGS

Springtime Termination analysis

Similar technique applied to the end of the growth curve

- Difference in Spring and Winter performance used to quantify environmental benefits of late termination
- Termination dates identified by vegetation index inflection points

There was a cloudy gap in imagery in the critical period in spring 2019: "terminated between 4/21 and 5/16"



Continued collaboration with USDA-ARS and USGS, with publication of results ongoing

Goal to better understand environmental benefits and management of cover crops

These data are preliminary and are subject to revision.