Aggregating and Reporting NRCS and FSA Conservation Program Data for the Chesapeake Bay Watershed

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U.S. Geological Survey
Eastern Geographic Science Center

CBP Agricultural Working Group Meeting
March 8th, 2011, Fish Shack, Annapolis

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

Objectives

- Summarize USDA conservation practice implementation records
- Support states in NEIEN submission
- Resolve issues related to double counting
- Support watershed studies

Data transfer allowed under signed 1619 Conservation Cooperator Agreements between USGS and USDA-NRCS, USDA-FSA

USGS

Data management

- Data are currently available from 2006 – 2011
- For NRCS data, ‘practice applied date’ can be used to segment records to match July 1 – June 30 annual reporting periods
  - Dave Butler, NRCS Information Technology Center, Fort Collins, CO
- For FSA data (CRP/CREP), no practice applied date is available, and Oct 1 – Sept 30 reporting seems to be necessary.
  - David Parry, Customer Service Supervisor, USDA FSA, Salt Lake City, UT
- To obtain future data records, an Oct 1 request is most effective, because databases are updated particularly well at the end of the Federal fiscal year

Data Privacy

- To fulfill Sec. 1619 privacy requirements, practices can be reported for any area with >=5 farms participating a particular practice
- Non-reportable data are rolled up to a larger scale
- Easiest to report at the county level, or by HUC12, but geospatial information can also be used to summarize within model segments or watershed boundaries.
- Recently, we have created 2011 county totals, with the remainder reported at the state level

USGS

NRCS DATA			FSA DATA (CRP, CRE
NRCS conservation practices	randomized example		FSA Common Land Us
Chesapeake_Practices_Nov2011			**FSA CLU attributes**
fips_code	10005		FID_
practice_code	340		COMMENTS
practice_name	Residue and Tillage Management, No-Till/Strip Till/Direct Seed		ADMNSTATE
applied_date	1/20/2006		ADMNCOUNTY
report_applied_amount	45		STATECD
measurement_unit	ac		COUNTYCD
program_name	DE-SL-District Cost Share Program		FARMNBR
national_program	Conservation Technical Assistance - Ge		TRACTNBR
latitude	38.62165023		CLUNBR
longitude	-75.24217134		CALCACRES
huc_12	021305100418		HELTYPECD
conservation_plan_id	{86CD423-475F-4C04-A8B5-E7EF0C9B9B77}		CLUCLSCD
practice_instance_id	{E569C0CB-40F4-4A1D-A0E6-507346596A62}		FSA_ACRES
land_unit_id	{2b96b51b-4ed2-467e-ae5c-811571d3a9bd}		CLUID
			crp.DBF
Chesapeake_Plans_Nov2011			CLUID
customer_folder_id	{0382E871-B9E0-4C04-B54C-37AEAEB80A9C}		STATECD
admin_fips	51015		COUNTYCD
customer_id	9296318	>5 = public	CONTRACT
customer_type	B or I		ACRES
decision_maker	-1 or 0		EXPDATE
land_owner	0		PRAC_NBR
conservation_plan_id	{E569C0CB-40F4-4A1D-A0E6-507346596A62}		
cnmp_plan	N		
lu_fips_code	{7380B201-929D-4E1F-B9E0-EC8804EF7089}		CRP information is joi
Processing currently in tabular format			
farm tract field can be obtained by overlay of x,y coordinates with CLU shapefiles			

	2011 newly implemented practices	
Practice_Code	Practice_Name	Measurement_U
100	Comprehensive Nutrient Management Plan	Numbers
102	Comprehensive Nutrient Management Plan - Written	Numbers
103	Comprehensive Nutrient Management Plan - Applied	Numbers
122	Agriculture Energy Management Plan, Headquarters - Written	Numbers
313	Waste Storage Facility	Numbers
327	Conservation Cover	Acres
328	Conservation Crop Rotation	Acres
329	Residue and Tillage Management, No-Till/Strip Till/Direct Seed	Acres
330	Contour Farming	Acres
332	Contour Buffer Strips	Acres
340	Cover Crop	Acres
342	Critical Area Planting	Acres
344	Residue Management, Seasonal	Acres
345	Residue and Tillage Management, Mulch Till	Acres
362	Diversion	Feet
378	Pond	Numbers
382	Fence	Feet
391	Riparian Forest Buffer	Acres
412	Grassed Waterway	Acres
449	Irrigation Water Management	Acres
468	Lined Waterway or Outlet	Feet
472	Access Control	Acres
511	Forage Harvest Management	Acres
512	Forage and Biomass Planting	Acres
516	Pipeline	Feet

	2011 newly implemented practices	
Practice_Code	Practice_Name	Measuremen
100	Comprehensive Nutrient Management Plan	Numbers
102	Comprehensive Nutrient Management Plan - Written	Numbers
103	Comprehensive Nutrient Management Plan - Applied	Numbers
313	Waste Storage Facility	Numbers
314	Brush Management	Acres
316	Animal Mortality Facility	Numbers
327	Conservation Cover	Acres
328	Conservation Crop Rotation	Acres
329	Residue and Tillage Management, No-Till/Strip Till/Direct Seed	Acres
329A	Residue Management, No-Till/Strip Till	Acres
330	Contour Farming	Acres
332	Contour Buffer Strips	Acres
340	Cover Crop	Acres
342	Critical Area Planting	Acres
344	Residue Management, Seasonal	Acres
345	Residue and Tillage Management, Mulch Till	Acres
362	Diversion	Feet
380	Windbreak/Shelterbelt Establishment	Feet
382	Fence	Feet
386	Field Border	Acres
390	Riparian Herbaceous Cover	Acres
391	Riparian Forest Buffer	Acres
393	Filter Strip	Acres
412	Grassed Waterway	Acres
430DD	Irrigation Water Conveyance, Pipeline, High-Pressure, Underground, Plastic	Feet
441	Irrigation System, Microirrigation	Acres
449	Irrigation Water Management	Acres

		Sum of Acres by FI
Practice_Code	Practice_Name	42001
CP1	Establishment of Permanent Introduced Grasses and Legumes	1231.83
CP10	Vegetative Cover - Grass -Already Established	248.7
CP11	Vegetative Cover - Trees -Already Established	
CP12	Wildlife Food Plot	19.59
CP15A	Estab. of Permanent Vegetative Cover (Contour Grass Strips)	
CP2	Establishment of Permanent Native Grasses	633.84
CP21	Filter Strips	109.98
CP22	Riparian Buffer	741.67
CP23	Wetland Restoration	
CP29	Marginal Pastureland -Wildlife Habitat Buffer	
CP3	Tree Planting (Timber planting	
CP30	Marginal Pastureland -Wetland Buffer	
CP3A	Hardwood Tree Planting (Timber planting)	54.52
CP4D	Permanent Wildlife Habitat	51.23
CP8A	Grass Waterways	

*Note: Missing practice codes or FIPS codes indicate either no data or the number of records within the CB Wate

PRAC_NBR	Practice_Name	Sum of A
CP1	Establishment of Permanent Introduced Grasses and Legumes	
CP10	Vegetative Cover - Grass -Already Established	
CP11	Vegetative Cover - Trees -Already Established	
CP12	Wildlife Food Plot	
CP15A	Estab. of Permanent Vegetative Cover (Contour Grass Strips)	
CP19	#N/A	
CP2	Establishment of Permanent Native Grasses	
CP20	#N/A	
CP21	Filter Strips	
CP22	Riparian Buffer	
CP23	Wetland Restoration	
CP29	Marginal Pastureland -Wildlife Habitat Buffer	
CP3	Tree Planting (Timber planting	
CP30	Marginal Pastureland -Wetland Buffer	
CP3A	Hardwood Tree Planting (Timber planting)	
CP4D	Permanent Wildlife Habitat	
CP8A	Grass Waterways	
CP9	Shallow Water Areas for Wildlife	

Avoiding double counting

- Solutions are under development, currently vary by State
- Probably best addressed at the county level, by folks who have access to State plus Federal data, as well as knowledge of the specific farms and practices
- State – USDA signed 1619 Conservation Cooperator agreements are key to full comparison

USGS

Avoiding double counting

Scenario 1 (MD):

- develop Conservation Tracker system that records co-cost share dollar amounts for each practice
- use this system to report both State and Federal data
- do not use USGS summaries
- possible source of error = completeness of data entry

USGS

Avoiding double counting

Scenario 2 (VA):

- **identify practices that can be co-cost shared by both State and Federal programs**
- **assume NMP is duplicate and remove Federal records, assume advanced NMP is Federal only and report that**
- **for remaining practices (cover crop, pasture management) compare NRCS records obtained through 1619 agreement with State records, using farm-tract-field, acreage, and owner to eliminate duplicate records**
- **do not use USGS summaries**
- **drawback = time consuming, ~8000 records to compare**

USGS

Avoiding double counting

Scenario 3 (PA):

- **Use USGS summaries to report Federal practices**
- **Examine state data, which includes cost amounts % State and % Federal; for any practice that has any Federal cost share, assume it is reported by NRCS, and do not report it via the State (primarily CBIG and nutrient management)**
- **Drawback = because no 1619 agreement is in place, it is unclear which records are reported by NRCS, and some state records are erroneously deleted (e.g., cover crops in Lancaster County)**
- **What is reported in NRCS dataset needs clarification and may vary from county to county**

USGS

Avoiding double counting

- It would be nice to also get cost information for NRCS records via USGS – not currently available
- It would be good to sit down with folks from USDA, USGS, States, and counties in each state and discuss what does and does not go into the NRCS database.
- We are planning to pursue this in 2012, with a focus on the Showcase Watershed counties

Crosswalk

- USGS data summaries will report FSA and CREP practice code
- Crosswalk to NEIEN xml format is best addressed by the State NEIEN responsables
- Grouping of practice codes within NEIEN categories will increase the number of reportable records at the county or subwatershed scale
- We can program a crosswalk, if supplied with instructions on how to do so

Lifespan

- NEIEN reporting does not currently work with practice lifespan, only with new implementations. However, the sum of functioning practices in the landscape is of interest
- NRCS practice codes contain an associated lifespan
- For NRCS data, practice applied date + lifespan ~ expiration date, making it possible to calculate annual totals for each practice code broken out as follows:
  - Newly implemented practices
  - Cumulative unexpired practices
  - Practices that expired in the past year
- Expiring practices could then be checked by county offices, to provide upkeep and retain credit

USGS

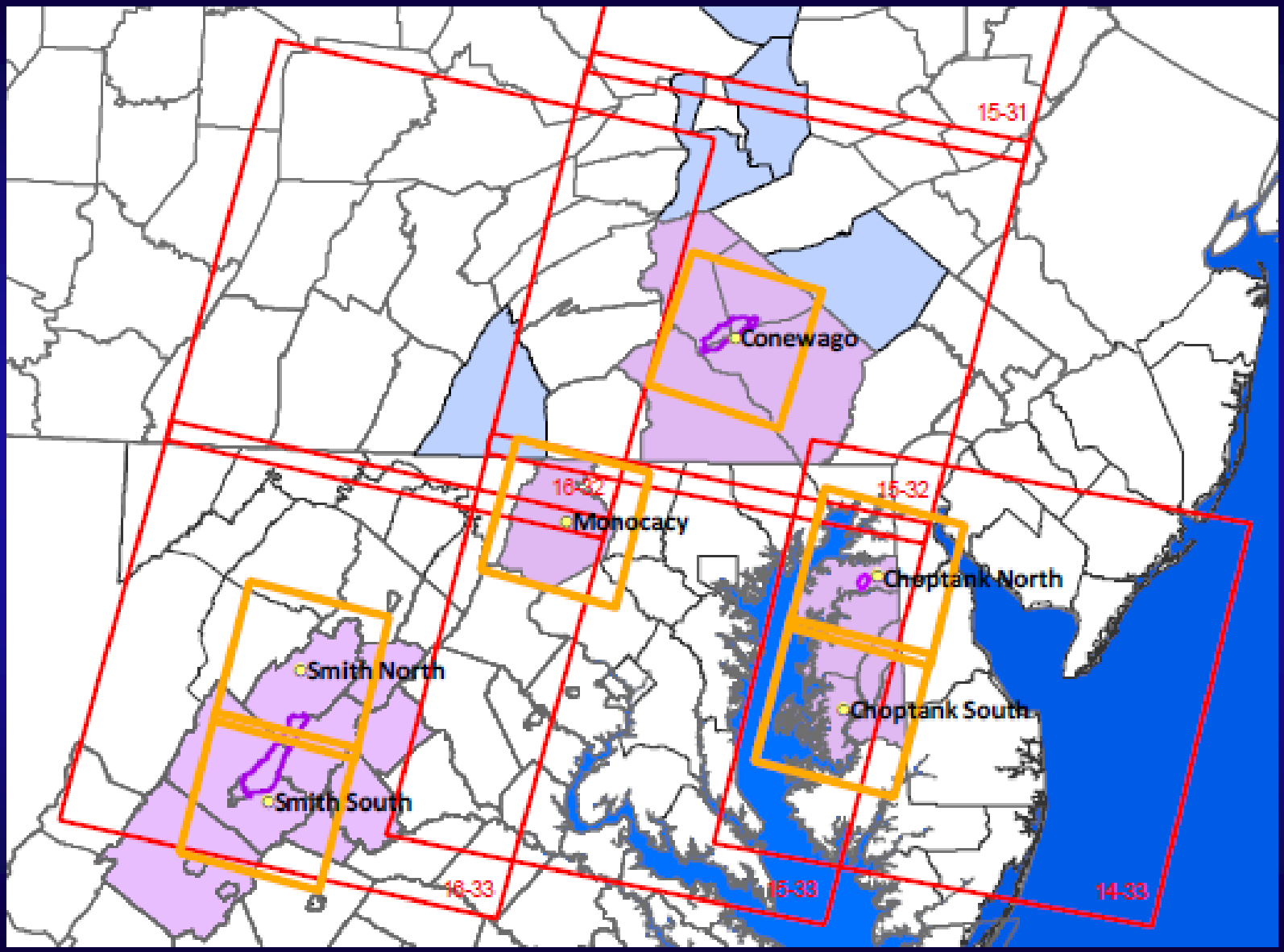
2012 USGS Activities

- Explain and develop State-specific protocols for resolving double counting problems.
- Work with NRCS and States to identify what practices are included in NRCS and FSA records
- Initiate county-level pilot projects in each Bay state to verify reporting accuracy and to identify issues
- Produce summary report detailing current data usage
- Develop 2012 dataset and distribute to States before Nov 1

Partner Roles

- Identify and describe state-specific reporting nuances (States, USGS)
- Identify practices with potential for double counting (States, NACD)
- Develop protocols to resolve double-counting (States, NACD, FSA, NRCS, USGS)
- Crosswalk practice codes with NEIEN and Watershed Model descriptions (States, EPA, UMD)

Site specific watershed studies



USGS

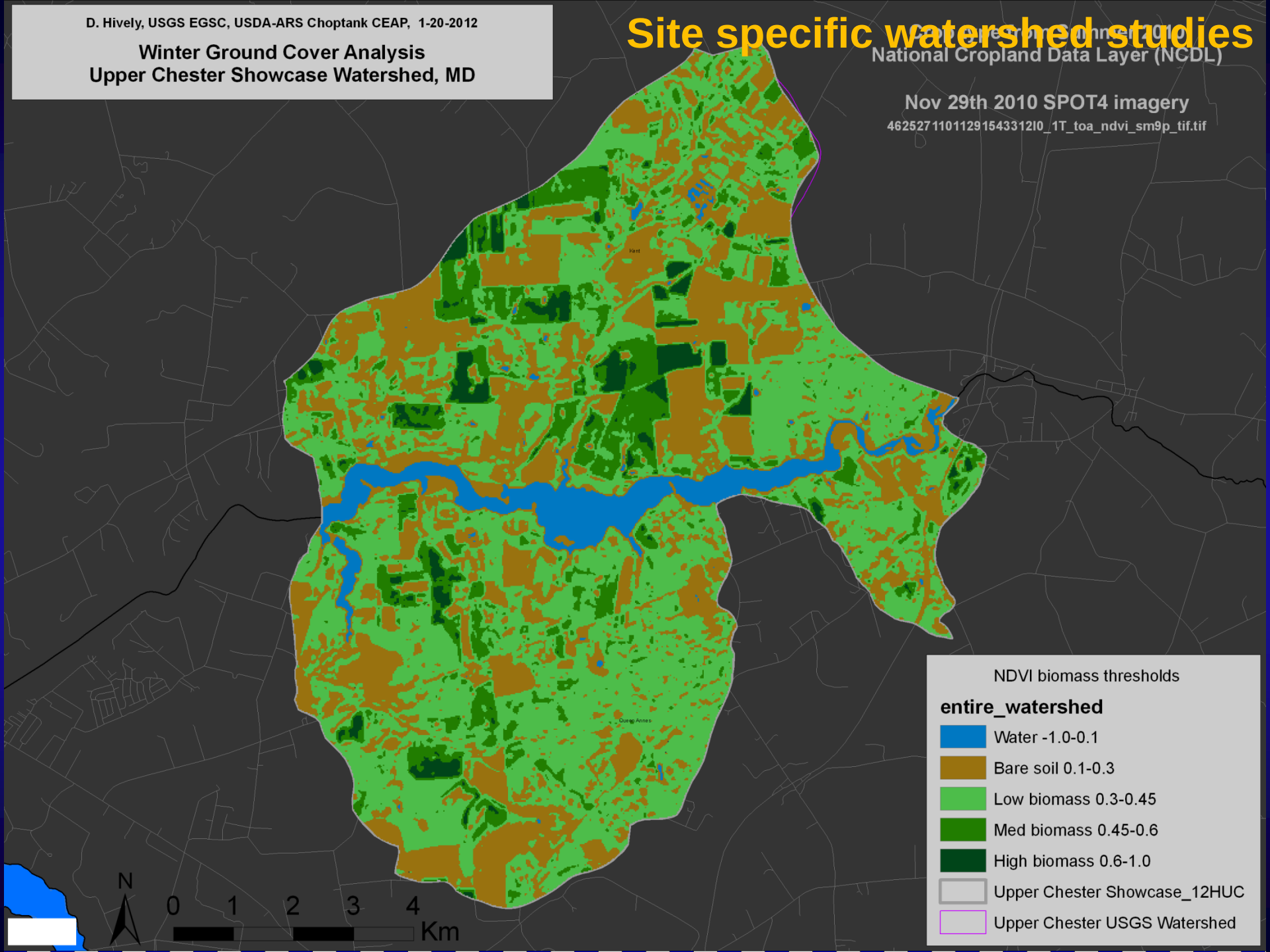
Site specific watershed studies

D. Hively, USGS EGSC, USDA-ARS Choptank CEAP, 1-20-2012

Winter Ground Cover Analysis
Upper Chester Showcase Watershed, MD

Cropland Data Layer (2010)
National Cropland Data Layer (NCDL)

Nov 29th 2010 SPOT4 imagery
46252711011291543312l0_1T_toa_ndvi_sm9p_tif.tif



NDVI biomass thresholds

entire_watershed

- Water -1.0-0.1
- Bare soil 0.1-0.3
- Low biomass 0.3-0.45
- Med biomass 0.45-0.6
- High biomass 0.6-1.0
- Upper Chester Showcase_12HUC
- Upper Chester USGS Watershed

N

0 1 2 3 4 Km

Site specific watershed studies

Upper Chester River Showcase Watershed

NRCS conservation practices valid between Jul 1 2010 and Jun 30 2011

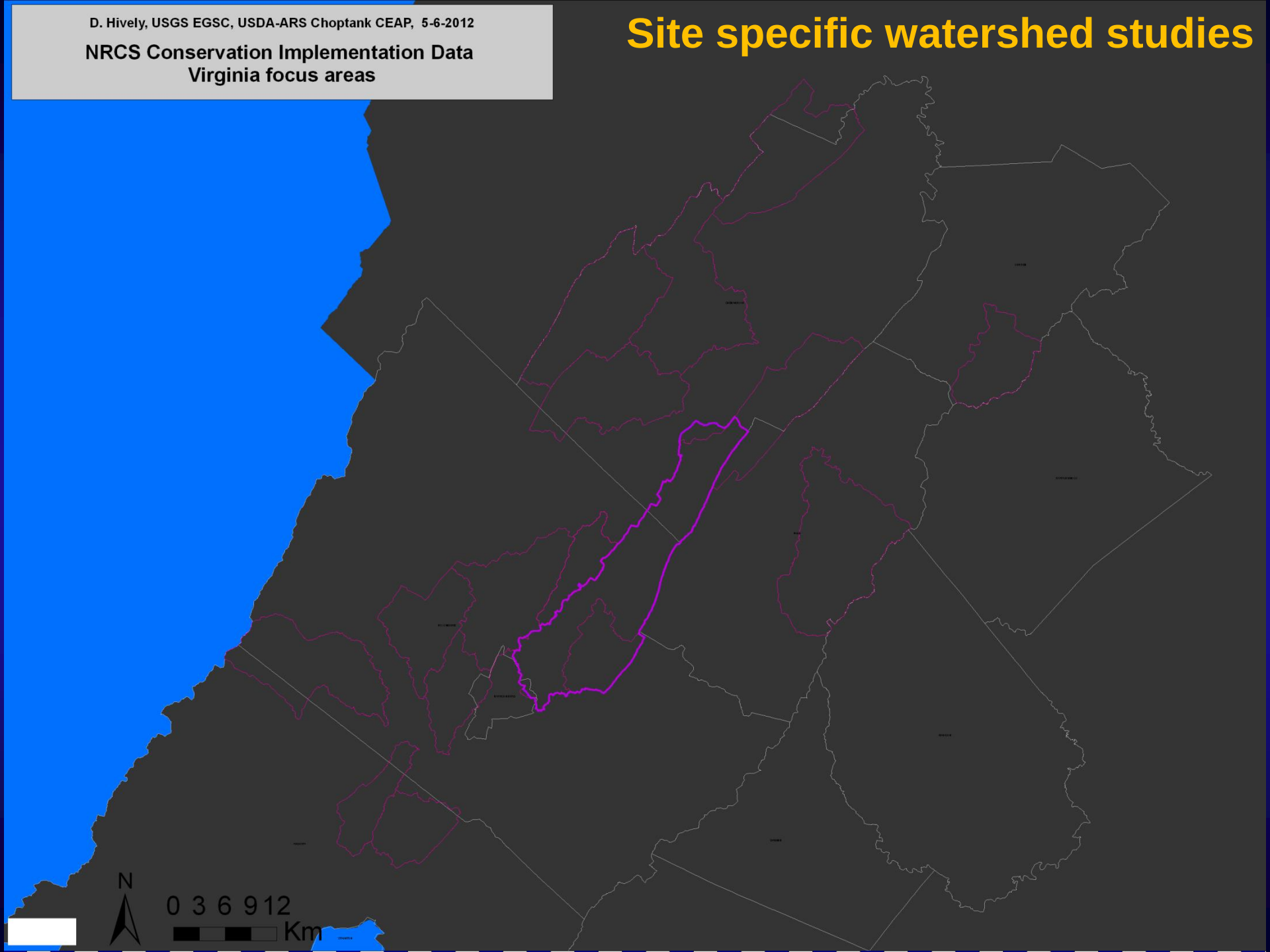
Practice_Code	Count	Sum	Units	Practice_Name
340	231	5752	Acres	Cover Crop
328	78	3246	Acres	Conservation Crop Rotation
412	77	58	Acres	Grassed Waterway
590	54	1773	Acres	Nutrient Management
595	47	1350	Acres	Integrated Pest Management (IPM)
645	28	312	Acres	Upland Wildlife Habitat Management
345	26	1067	Acres	Residue and Tillage Management, Mulch Till
313	18	18	Numbers	Waste Storage Facility
327	18	74	Acres	Conservation Cover
393	13	46	Acres	Filter Strip
329	12	497	Acres	Residue and Tillage Management, No-Till/Strip Till/Direct Seed
441	12	158	Acres	Irrigation System, Microirrigation
378	11	11	Numbers	Pond
633	11	655	Acres	Waste Recycling
410	10	12	Numbers	Grade Stabilization Structure
391	9	19	Acres	Riparian Forest Buffer
646	9	21	Acres	Shallow Water Development and Management
442	7	437	Acres	Irrigation System, Sprinkler
512	7	54	Acres	Forage and Biomass Planting
558	7	646	Numbers	Roof Runoff Structure
561	7	1	Acres	Heavy Use Area Protection
386	5	5944	Acres	Field Border

USGS

D. Hively, USGS EGSC, USDA-ARS Choptank CEAP, 5-6-2012

NRCS Conservation Implementation Data
Virginia focus areas

Site specific watershed studies



Questions?

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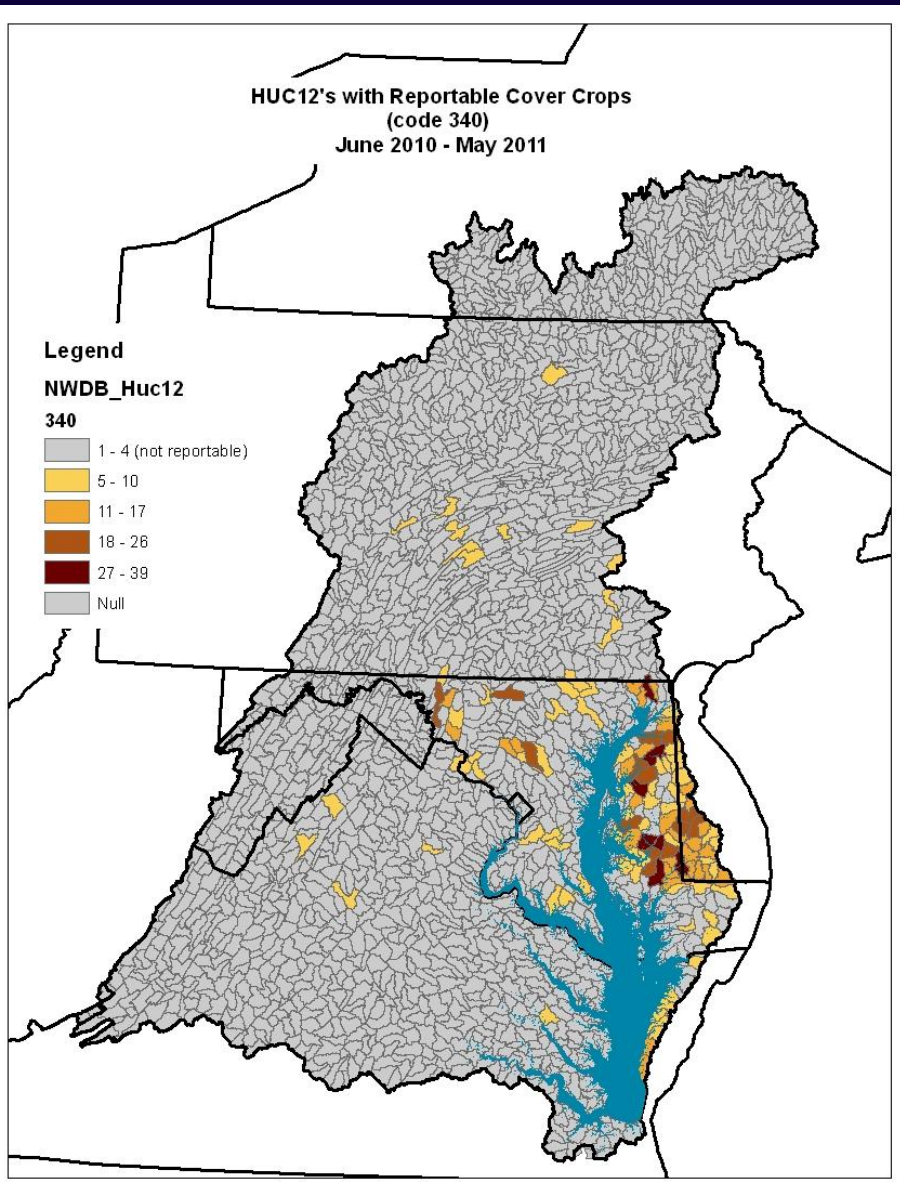
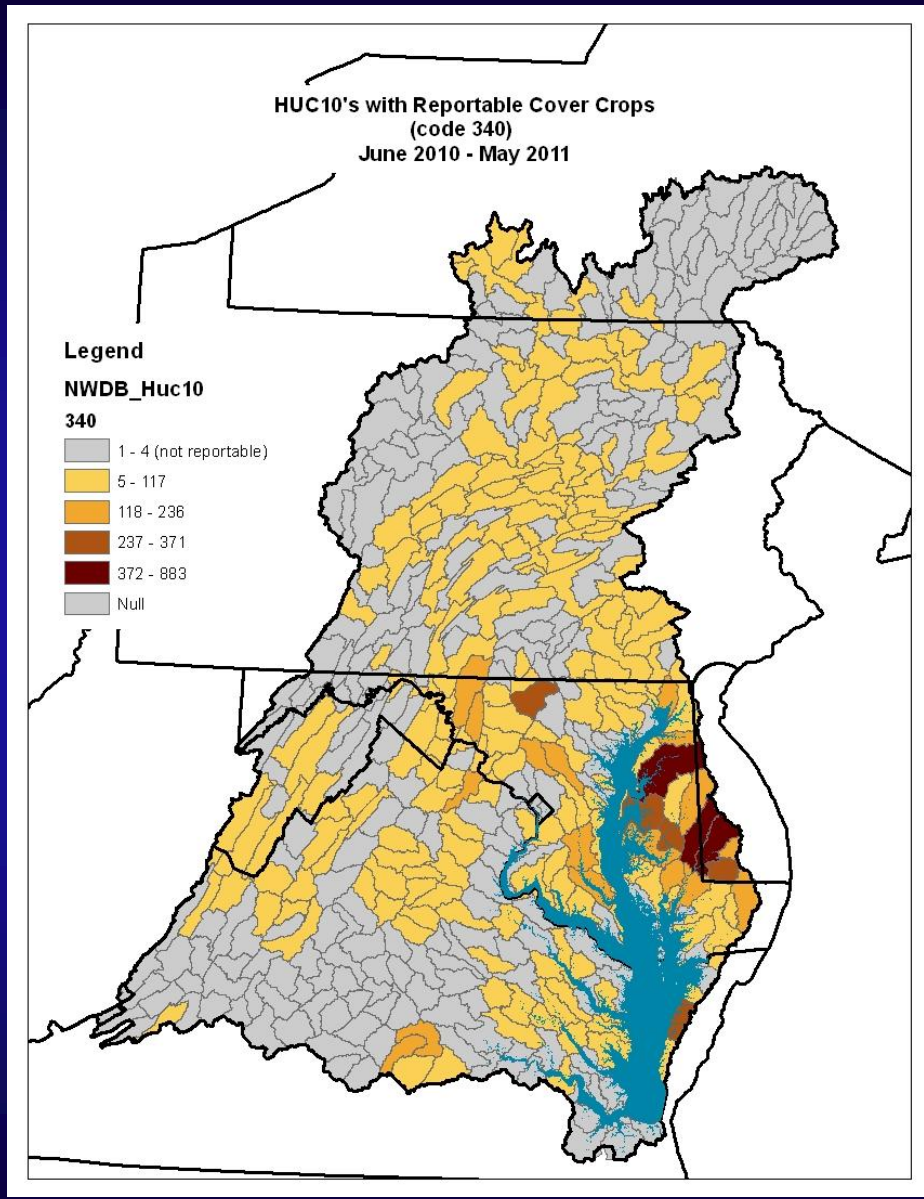
USGS


HUC12's with Reportable Cover Crops
(code 340)
June 2010 - May 2011
Legend
NWDB_Huc12
340
1 - 4 (not reportable)
5 - 10
11 - 17
18 - 26
27 - 39
Null


HUC10's with Reportable Cover Crops
(code 340)
June 2010 - May 2011
Legend
NWDB_Huc10
340
1 - 4 (not reportable)
5 - 117
118 - 236
237 - 371
372 - 883
Null

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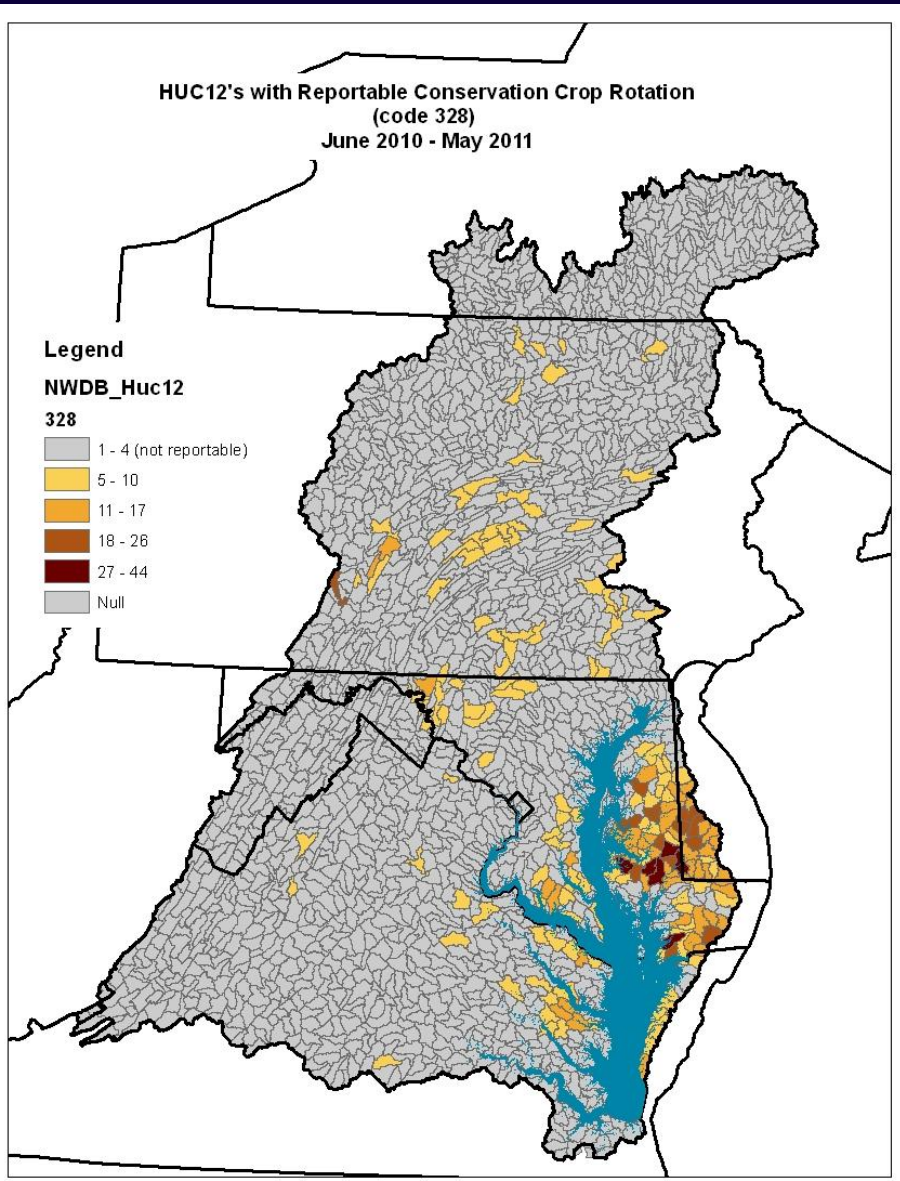
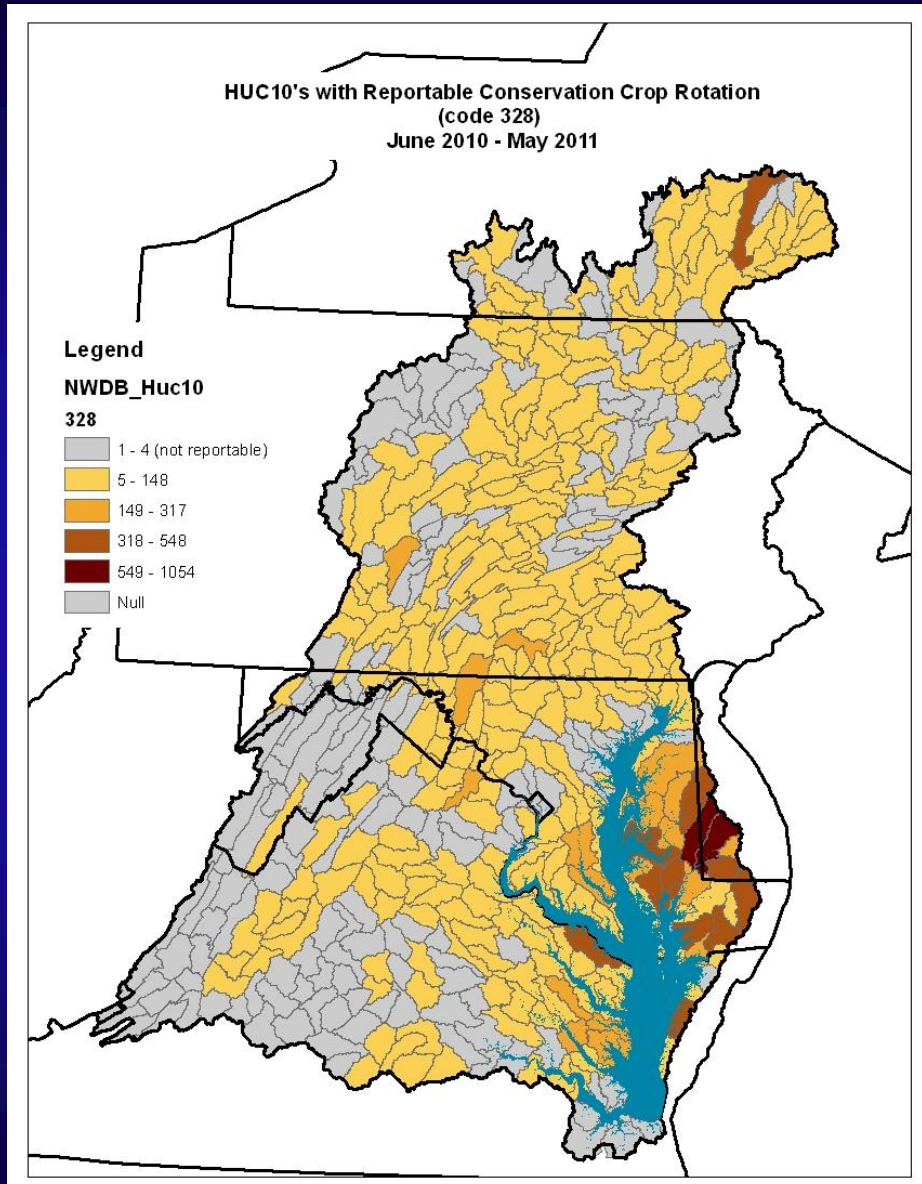

HUC12's with Reportable Conservation Crop Rotation
(code 328)
June 2010 - May 2011
Legend
NWDB_Huc12
328
1 - 4 (not reportable)
5 - 10
11 - 17
18 - 26
27 - 44
Null


HUC10's with Reportable Conservation Crop Rotation
(code 328)
June 2010 - May 2011
Legend
NWDB_Huc10
328
1 - 4 (not reportable)
5 - 148
149 - 317
318 - 548
549 - 1054
Null

USGS

Nineteen top reportable conservation practices for the Chesapeake Bay HUC 10 watersheds.

 # HUC 10 in Chesapeake Bay watershed: 426

Practice Code	# HUC 10 Reportable	% HUC 10 Reportable	Practice Name
328	342	80%	Conservation Crop Rotation
590	321	75%	Nutrient Management
329	239	56%	Residue and Tillage Management, No-Till/Strip
340	228	54%	Cover Crop
595	184	43%	Integrated Pest Management
382	174	41%	Fence
528	130	31%	Prescribed Grazing
645	125	29%	Upland Wildlife Habitat Management
614	106	25%	Watering Facility
511	103	24%	Forage Harvest Management
516	94	22%	Pipeline
512	90	21%	Forage and Biomass Planting
327	72	17%	Conservation Cover
472	71	17%	Access Control
345	62	15%	Residue and Tillage Management, Mulch Till
561	58	14%	Heavy Use Area Protection
633	58	14%	Waste Utilization
391	46	11%	Riparian Forest Buffer
314	42	10%	Brush Management

If (CustomerID ^ Practice Code) within each HUC > 4 then = reportable for that HUC

USGS

Reportable conservation practices for the Chesapeake Bay HUC 12 watersheds.			
# HUC 12 in Chesapeake Bay watershed:			1979
Practice Code	# HUC 12 Reportable	% HUC 12 Reportable	Practice Name
328	219	11.1	Conservation Crop Rotation
340	159	8.0	Cover Crop
590	150	7.6	Nutrient Management
329	85	4.3	Residue and Tillage Management, No-Till/Strip
595	80	4.0	Integrated Pest Management
645	70	3.5	Upland Wildlife Habitat Management
345	42	2.1	Residue and Tillage Management, Mulch Till
102	31	1.6	Comprehensive Nutrient Management Plan - Written
561	30	1.5	Heavy Use Area Protection
382	28	1.4	Fence
511	16	0.8	Forage Harvest Management
516	14	0.7	Pipeline
528	12	0.6	Prescribed Grazing
614	11	0.6	Watering Facility
390	10	0.5	Riparian Herbaceous Cover
412	10	0.5	Grassed Waterway
472	9	0.5	Access Control
103	8	0.4	Comprehensive Nutrient Management Plan - Applied
344	7	0.4	Residue Management, Seasonal
512	7	0.4	Forage and Biomass Planting
633	7	0.4	Waste Utilization

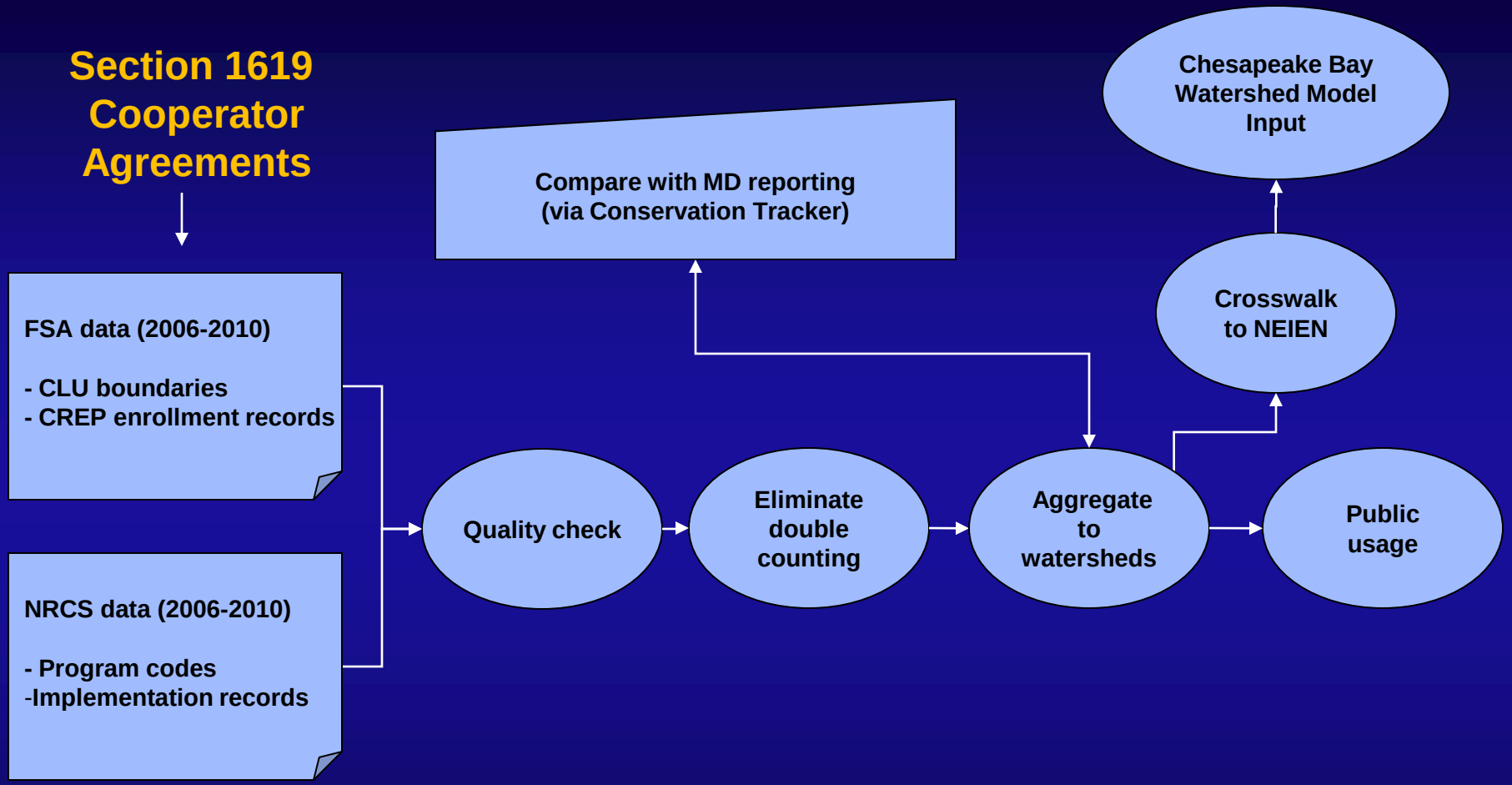
USGS

INCLUDING LIFESPAN - ALL 2011 UNEXPIRED PRACTICES

Practice_Code	Practice_Name	Measurement_Unit
102	Comprehensive Nutrient Management Plan - Written	Numbers
103	Comprehensive Nutrient Management Plan - Applied	Numbers
122	Agriculture Energy Management Plan, Headquarters - Written	Numbers
313	Waste Storage Facility	Numbers
314	Brush Management	Acres
316	Animal Mortality Facility	Numbers
327	Conservation Cover	Acres
328	Conservation Crop Rotation	Acres
329	Residue and Tillage Management, No-Till/Strip Till/Direct Seed	Acres
329B	Residue Management, Mulch Till	Acres
330	Contour Farming	Acres
331	Contour Orchard and Other Perennial Crops	Acres
332	Contour Buffer Strips	Acres
340	Cover Crop	Acres
342	Critical Area Planting	Acres
344	Residue Management, Seasonal	Acres
345	Residue and Tillage Management, Mulch Till	Acres
362	Diversion	Feet
378	Pond	Numbers
380	Windbreak/Shelterbelt Establishment	Feet
382	Fence	Feet
386	Field Border	Acres

	INCLUDING LIFESPAN - ALL 2011 UNEXPIRED PRACTICES	
Practice_Code	Practice_Name	Measurement_
102	Comprehensive Nutrient Management Plan - Written	Numbers
103	Comprehensive Nutrient Management Plan - Applied	Numbers
122	Agriculture Energy Management Plan, Headquarters - Written	Numbers
309	Agrichemical Handling Facility	Numbers
313	Waste Storage Facility	Numbers
314	Brush Management	Acres
316	Animal Mortality Facility	Numbers
317	Composting Facility	Numbers
327	Conservation Cover	Acres
328	Conservation Crop Rotation	Acres
329	Residue and Tillage Management, No-Till/Strip Till/Direct Seed	Acres
329A	Residue Management, No-Till/Strip Till	Acres
329B	Residue Management, Mulch Till	Acres
330	Contour Farming	Acres
331	Contour Orchard and Other Perennial Crops	Acres
332	Contour Buffer Strips	Acres
340	Cover Crop	Acres
342	Critical Area Planting	Acres
344	Residue Management, Seasonal	Acres
345	Residue and Tillage Management, Mulch Till	Acres
351	Water Well Decommissioning	Numbers
360	Waste Facility Closure	Numbers

Section 1619 Cooperator Agreements



USGS

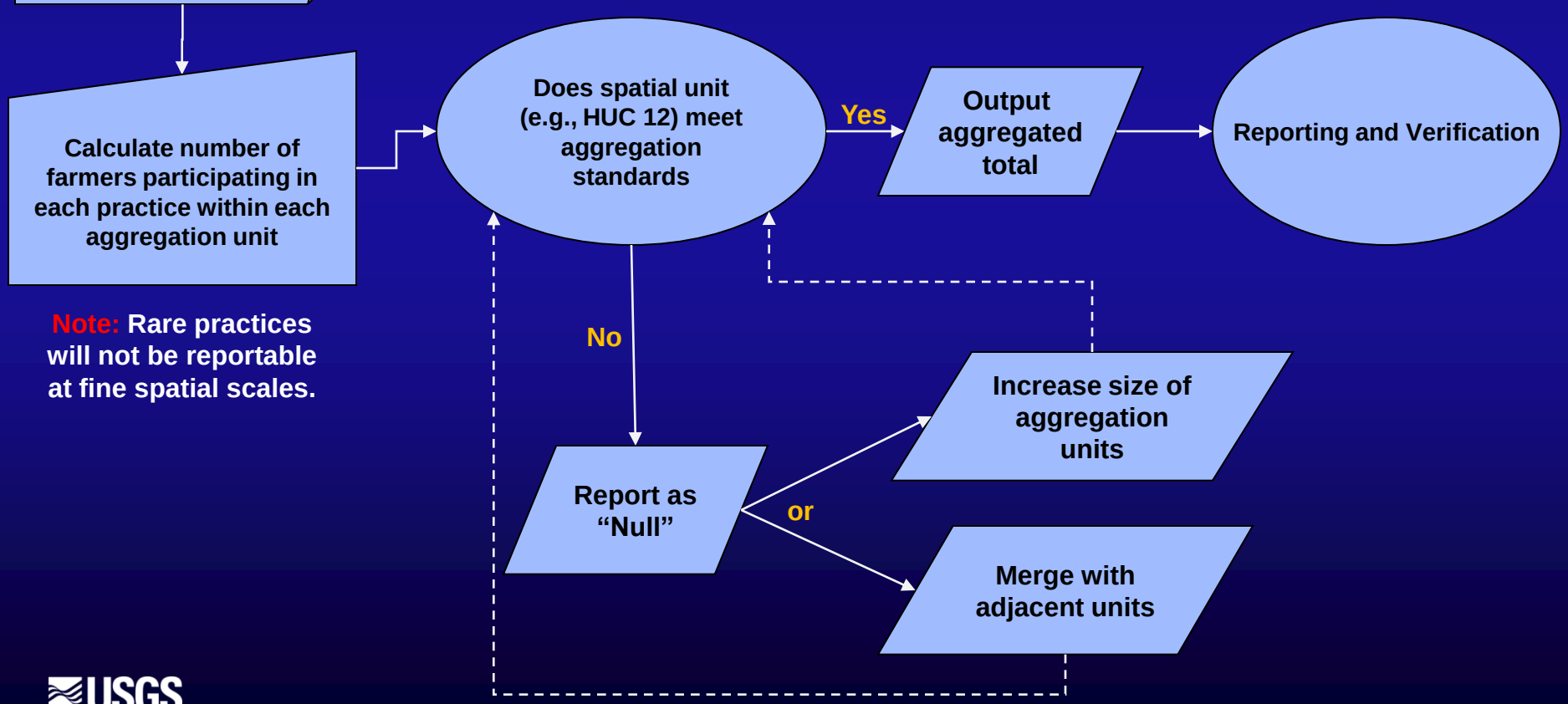
Aggregating Data: what is permitted under Section 1619?

NRCS data (2006-2010)
- Program codes
- Implementation records

<u>Identifying factors:</u>

Folder_ID
Conservation_Plan_ID
Practice_Instance_ID
Farmer_Name

Aggregated data products can be released to the public "if five or more farm owners or producers participate in the practice in the aggregation unit or at least three owners or producers participate in the practice in the aggregation unit and no one owner or producer provides 50% or more of the variation. "



Note: Rare practices will not be reportable at fine spatial scales.

USGS