



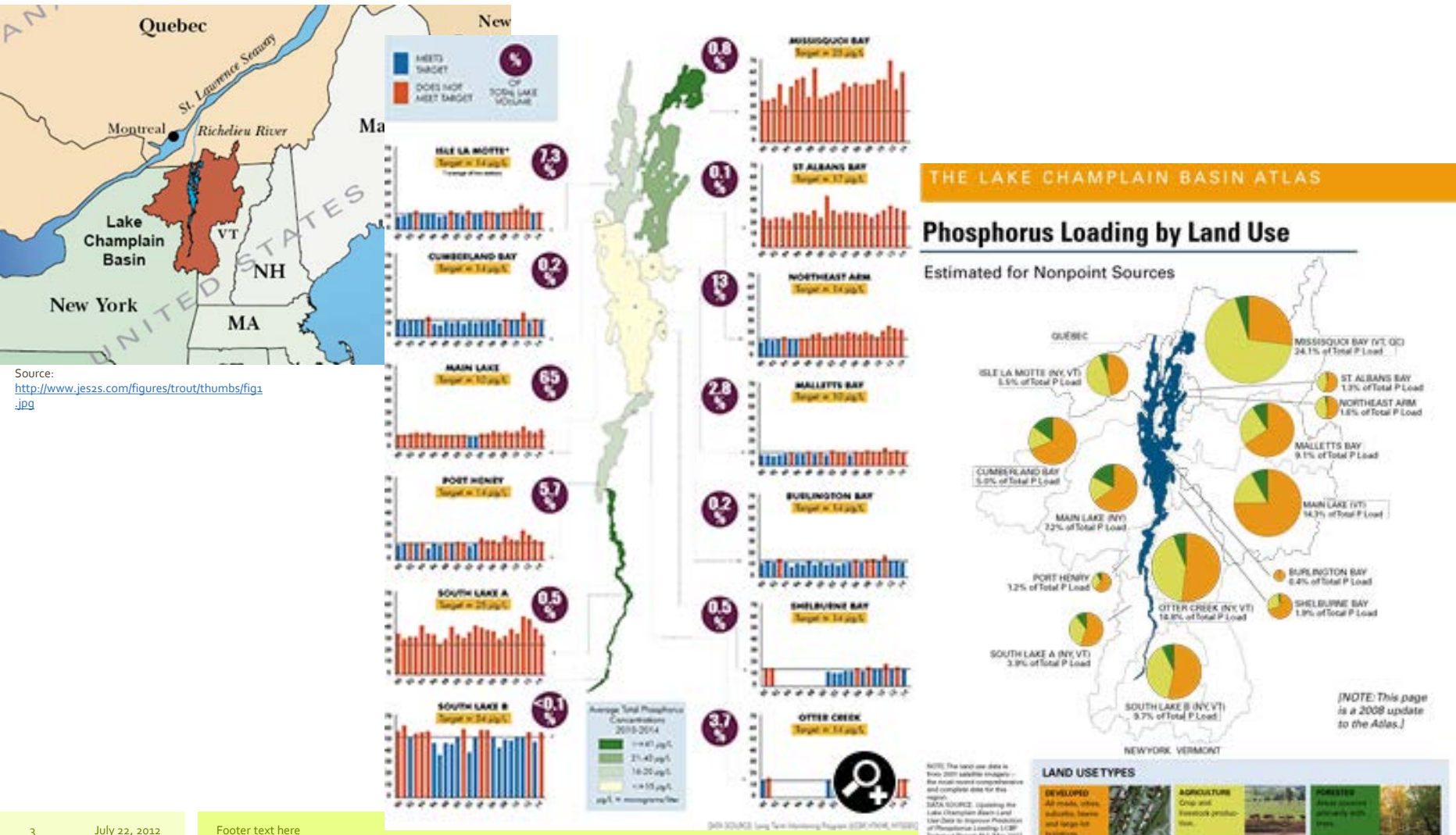
A Statewide Ag BMP Mapping System to Protect Water Resources in the Lake Champlain Basin of Vermont

Presented by Mike Middleman
Esri Water User Conference Meeting
San Diego, CA
Sunday, July 9, 2017

Overview

- Ecological and Policy landscape in Vermont
- Agricultural Technical Assistance: Issues and Needs
- Goals of Partner Database Project
- Partner Database Application
- Integrating Partner Database Data to Meet Reporting Needs
- Challenges
- Current Work Underway
- Future of the Partner Database

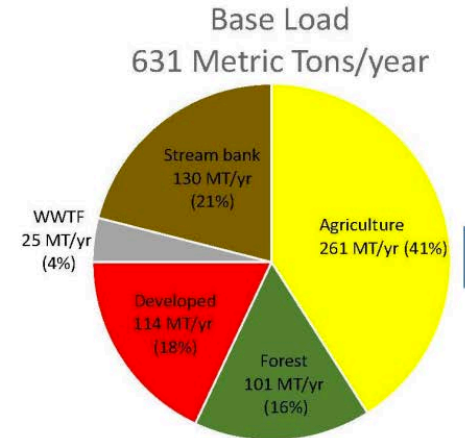
Ecological and Policy Landscape in Vermont



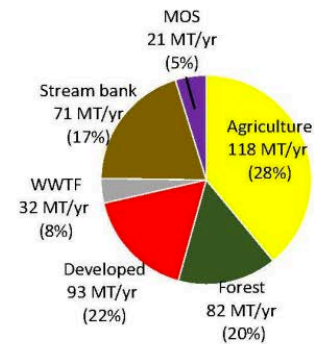
$$\text{TMDL} = \text{WLA (PS)} + \text{LA (NPS)} + \text{MOS}$$



Source: <http://blogs.usda.gov/2013/04/25/water-quality-index-for-agricultural-runoff-streams/> and-accessible/



Vermont Reduction
Required=213 mt/yr (34%)



TMDL Loading Capacity and Allocations
418 Metric Tons/yr

Total Maximum Daily Loads for Phosphorus in Lake Champlain, by Segment

Lake Segment	Total Overall	Wastewater ¹	CSO	Developed Land ²	Agricultural Production Areas	Forest	Streams	Agricultural Nonpoint
01. South Lake B	41.4%	0.0%		21.1%	80.0%	40.0%	46.7%	62.9%
02. South Lake A	55.5%	0.0%		18.1%	80.0%	5.0%		62.9%
03. Port Henry	55.4%			7.6%	80.0%	5.0%		62.9%
04. Otter Creek	23.6%	0.0%		15.0%	80.0%	5.0%	40.1%	46.9%
05. Main Lake	20.5%	61.1%		20.2%	80.0%	5.0%	28.9%	46.9%
06. Shelburne Bay	11.6%	64.1%		20.2%	80.0%	5.0%	55.0%	20.0%
07. Burlington Bay	31.2%	66.7%	11.8%	24.2%	0.0%	0.0%		0.0%
09. Malletts Bay	17.6%	0.2%		20.5%	80.0%	5.0%	44.9%	28.6%
10. Northeast Arm	12.5%			7.2%	80.0%	5.0%		20.0%
11. St. Albans Bay	24.5%	59.4%		21.7%	80.0%	5.0%	55.0%	34.5%
12. Missisquoi Bay	64.3%	51.9%		34.2%	80.0%	50.0%	68.5%	82.8%
13. Isle La Motte	11.7%	0.0%		8.9%	80.0%	5.0%		20.0%
TOTAL	33.7%	42.1%	11.8%	20.9%	80.0%	18.7%	45.4%	53.6%

- **Huge Reductions in Agriculture NPS Needed**
- **Resources Available to Help Farmers Make These Reductions**
- **We Need to Track and Account for Efforts to Reduce Ag NPS**

Agricultural Technical Assistance: Issues and Needs

- In January 2012, a Memorandum of Understanding was signed among 8 organizations in Vermont, including the Lake Champlain Basin Program
- Identified the need for **increased coordination** among partner field staff
- Identified the need for **consistency in on-farm data collection**, both for farm information and for conservation practices
- Identified the need for **consistency in tracking and reporting on Agricultural BMP implementation** across the partnership to avoid double counting of practices, and to ensure the inclusion of all of the work being done on farms to improve water quality across the entire partnership



Goals of Database – Planning and Tracking

- **Consistency in data collection** among all database users
- Ability for field staff to quickly **see the work of others** from outside their organization when working with a farm
- **Allow for easy conservation planning** for partners who didn't have access to NRCS computers

Goals of Database - Reporting

- **Ability to create flexible reports** on BMP implementation across the partnership
- **Ability to create basic maps** of farms (most typically used in NRCS conservation or land treatment planning)
- **Ability to export data** so that planning that started with one partner could easily shift to another (NRCS)

Log-in and Landing Page

VT-AMP-ITS
**Vermont Agricultural Management Practice
Implementation Tracking System**

username:

password:

Login

 **SEARCH & ADD DATA**
find and add data for farms, practices, activities, and people

 **GENERATE REPORTS**
create and share custom reports

 **HELP**
system documentation

 **LOGOUT**
end your current session

Farm Search and Add Data

Search farms by name, town or owner:

FARM LIST (15 farms found matching filter)

Farm Name	Town	Owner
User Test Farm	Waterbury city	Test
Test Farm	city	
alan test		
User Test NF	Richmond	Floersch
Mikes House Test	Waterbury	
Mike Test 1	Duxbury	Middleman
Test Bennington Farm		
Testing Demo		Kane

FARM LIST (EMPTY - Please Search For a Farm Above)

FARM INFORMATION (undefined)

Farm Name:
 Farm Address:
 Farm Address 2:
 Address City:
 Address State: VT
 Address ZIP:
 Primary Enterprise:
 Size:
 State ID:
 County: not set
 Major watershed: not set
 HUC12 watershed: not set
 Nutrient Management:
 Manure Management:
 Manure Storage:
 Well Type:
 Location:

Farm Information: Home Screen

Search farms by name, town or owner:

FARM LIST (15 farms found matching filter)

FARM INFORMATION (User Test Farm)

Save Cancel

Farm Name:

Farm Address:

Farm Address 2:

Address City:

Address State: VT

Address ZIP:

Primary Enterprise:

Size:

State ID:

County: not set

Major watershed: not set

HUC12 watershed: not set

Nutrient Management:

Manure Management:

Manure Storage:

Well Type:

Location: Draw Point

Fields Practices Visits & Interactions People Involved

Crop: ALL Expand All Add Field Toggle Map Labels

Field ID	Field Name	Landuse / Crop	Farm Tract #	Acres
172		Forest	none	8.03
240		Crop Cool Season Grass	none	11.15
215		Farmstead	none	6.64

Farm Information Detail

FARM LIST (15 farms found matching filter)

FARM INFORMATION (User Test Farm)

Farm Name:

Farm Address:

Farm Address 2:

Address City:

Address State: VT

Address ZIP:

Primary Enterprise:

Size:

State ID:

County: not set

Major watershed: not set

HUC12 watershed: not set

Nutrient Management:

Manure Management:

Manure Storage:

Well Type:

Location:

Fields Practices Visits & Interactions People Involved

Crop: ALL Expand All Add Field Toggle Map Labels

Field ID	Field Name	Landuse / Crop	Farm Tract #	Acres
172		Forest	none	8.03
240		Crop Cool Season Grass	none	11.15
215		Farmstead	none	6.64

Farm Information: Fields

Search farms by name, town or owner:

Form Fields:

Farm Name:
 Farm Address:
 Farm Address 2:
 Address City:
 Address State: VT
 Address ZIP:
 Primary Enterprise:
 Size:
 State ID:
 County: not set
 Major watershed: not set
 HUC12 watershed: not set
 Nutrient Management:
 Manure Management:
 Manure Storage:
 Well Type:
 Location:

Fields | Practices | Visits & Interactions | People Involved

Crop: ALL

Field ID	Field Name	Landuse / Crop	Farm Tract #	Acres
172		Forest	none	8.03
Field Name: Field ID: 240 Landuse: Crop Crop: Cool Season Grass Management: Field Acres: 11.15 ----- Created by: Stone Environmental (Stone) on Nov 9, 2015 Updated by: Stone Environmental (Stone) on Nov 9, 2015				
215		Farmstead	none	6.64

Farm Information: Add/Edit Field

Search farms by name, town or owner:

FARM INFORMATION (User Test Farm)

Farm Name:
Farm Address:
Farm Address 2:
Address City:
Address State: VT
Address ZIP:
Primary Enterprise:
Size:
State ID:
County: not set
Major watershed: not set
HUC12 watershed: not set
Nutrient Management:
Manure Management:
Manure Storage:
Well Type:
Location: Finish Point

Fields | Practices | Visits & Interactions | People Involved

Field Editor

Field name:
Landuse:
Crop:
Rotation - Corn and Hay Mix
Management: Corn Silage - HayLequme-grass
Boundary:

Farm Information: Add/Edit Field

Search farms by name, town or owner:

Address City:
Address State: VT
Address ZIP:
Primary Enterprise:
Size:
State ID:
County: not set
Major watershed: not set
HUC12 watershed: not set
Nutrient Management:
Manure Management:
Manure Storage:
Well Type:
Location:

Fields [Practices](#) [Visits & Interactions](#) [People Involved](#)

Crop: ALL

Field ID	Field Name	Landuse / Crop	Farm Tract #	Acres
172		Forest	none	8.03
240		Crop Cool Season Grass	none	11.15
215		Farmstead	none	6.64

Field Name: Test Field 3
Field ID: 333
Landuse: Crop
Crop: Rotation - Corn and Hay Mix
Management: Corn Silage - Hay/Legume-grass
 Hay - 3 cuts yr Corn Silage, FP - 5 yrs legume-grass Hay, 3 cuts, manure, Z60
Field Acres: 7.04

Created by: Mike Middleman (VAAF) on Jan 4, 2017
 Updated by: Mike Middleman (VAAF) on Jan 4, 2017

Farm Information: Practices

File Edit View Favorites Tools Help

Sign in to your account

Search farms by name, town or owner:

County: not set
 Major watershed: not set
 HUC12 watershed: not set
 Nutrient Management:
 Manure Management:
 Manure Storage:
 Well Type:
 Location:

Fields Practices Visits & Interactions People Involved

Status: Program:

Practice ID: 176
 Practice: Fence
 Status: interested
 Meets NRCS Standard:
 Is Req'd Ag Practice: false
 Notes: barblest2
 Program: Farmer
 Application Date:
 Approval Date:
 Install Date:
 End Date:
 Added to Toolkit:
 Grant Status:
 Grant ID:
 Associated Field ID: 240

Created by: Stone Environmental (Stone) on Jan 12, 2016
 Updated by: Stone Environmental (Stone) on Jan 12, 2016

Practice ID: 128
 Practice: Composting Facility
 Status: planned

Farm Information: Interactions and People Involved

Involved Tabs

Fields Practices **Visits & Interactions** People Involved

New Visit

Contact Date	Contact Type	Person Contacted
Jan 3, 2017	phone call	Richard Hall
<p>Hours: 0.5 Status: Complete Person: Richard Hall</p> <p>Notes: Phone conversation with Richard, discussed financial assistance available for converting two corn fields to permanent hay. He said we would stop in the office to look over maps and fill out paperwork.</p> <hr/> <p>Created by: Mike Middleman on Jan 4, 2017 Updated by: Mike Middleman on Jan 4, 2017</p> <p style="text-align: right;">Edit Delete</p>		
Nov 1, 2015	phone call	(not set)
Oct 31, 2015	e-mail	Richard Hall

Fields Practices Visits & Interactions **People Involved**

+ Add People To Farm

First Name	Last Name	Role
User	Test	other, owner
Michael	Middleman	
<p>Mailing Address: 116 State Street City: Montpelier State: VT ZIP: 00000 E-Mail: michael.middleman@vermont.gov Home Phone: +1 802 505-5190 Cell Phone: +1 802 505-5190 Organization: VAAFM</p> <p>Role/Type: Water Quality Specialist <input type="checkbox"/> CREP Planner <input type="checkbox"/></p> <p>or... <input type="text" value="CREP Planner"/> <input type="button" value="Add!"/></p> <hr/> <p style="text-align: right;">Edit Delete</p>		
NewUser	Testing	other

Map layers and Map Making

Search farms by name, town or owner:

Map Controls

Export Map Tools

Map Theme:

Basemap:

Optional Layers:

- PLU Boundaries
- CLU Boundaries
- ANR Counties
- ANR Towns
- ANR Deer Wintering Areas
- ANR Rare and Endangered
- ANR Wetlands VSWI Advisory
- ANR Waterbody/Streams
- ANR Soils
- ANR Soil Hydrogroup
- ANR Watersheds HUC12
- ANR Watersheds HUC10
- ANR Watersheds HUC8
- ANR Roads
- VCGI Parcels

Map showing Test Field 3 (333) and (240), User Test Farm, and (215). The map includes a search bar, map controls, and a search result for 'test'.

Map Controls

Export Map Tools

Map Theme:

Basemap:

Optional Layers:

- PLU Boundaries
- CLU Boundaries
- ANR Counties
- ANR Towns
- ANR Deer Wintering Areas
- ANR Rare and Endangered
- ANR Wetlands VSWI Advisory
- ANR Waterbody/Streams
- ANR Soils
- ANR Soil Hydrogroup
- ANR Watersheds HUC12
- ANR Watersheds HUC10
- ANR Watersheds HUC8
- ANR Roads
- VCGI Parcels

Map Controls panel showing a dropdown menu for Basemap with options: Topo, VT Topo, Satellite, VCGI Imagery, DEM, Contours.

Map Controls

Export Map Tools

Title:

Format:

Show Field Details

Map Theme:

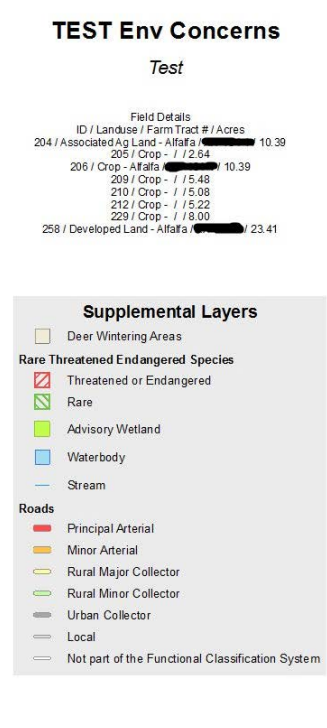
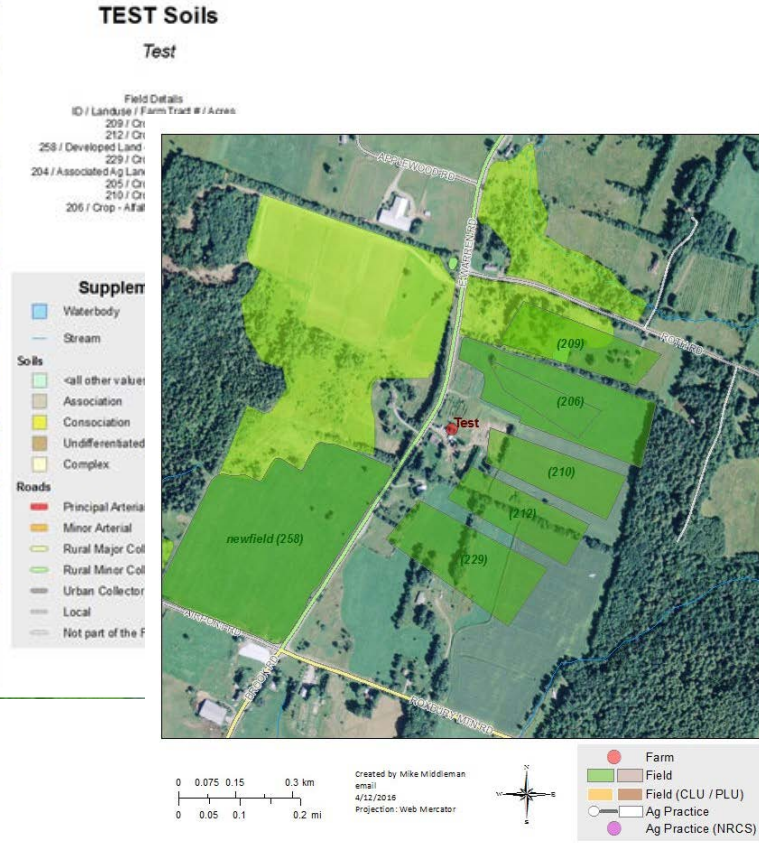
Basemap:

Optional Layers:

- PLU Boundaries
- CLU Boundaries
- ANR Counties
- ANR Towns
- ANR Deer Wintering Areas
- ANR Rare and Endangered
- ANR Wetlands VSWI Advisory
- ANR Waterbody/Streams
- ANR Soils
- ANR Soil Hydrogroup
- ANR Watersheds HUC12
- ANR Watersheds HUC10
- ANR Watersheds HUC8
- ANR Roads
- VCGI Parcels

Map Controls panel showing export options and a list of optional layers with some checked.

Map Examples



Reports Home Screen

Reports

- Detailed Practice Report
- Summary Practice Report

Summarized Reporting

Reports

Detailed Practice Report

Summary Practice Report

Select criteria (click items below to display criteria)
If no filter is applied, all records will be returned.

Summarize By
REQUIRED: Please select a value

Practice List Filter
ALL

Geography Filter
ALL

Status Filter
ALL

Funding Program Filter
ALL

Technical Organization Filter
ALL

Date Range Filter
ALL

Submit

Detailed Reporting

Reports

Detailed Practice Report

Select criteria (click items below to display criteria)
If no filter is applied, all records will be returned.

Output Columns to Include
REQUIRED. Please select a value

Practice List Filter
ALL

Geography Filter
ALL

Status Filter
ALL

Funding Program Filter
ALL

Technical Organization Filter
ALL

Date Range Filter
ALL

Get CSV

Get Shapefile (NRCS Practices not included)

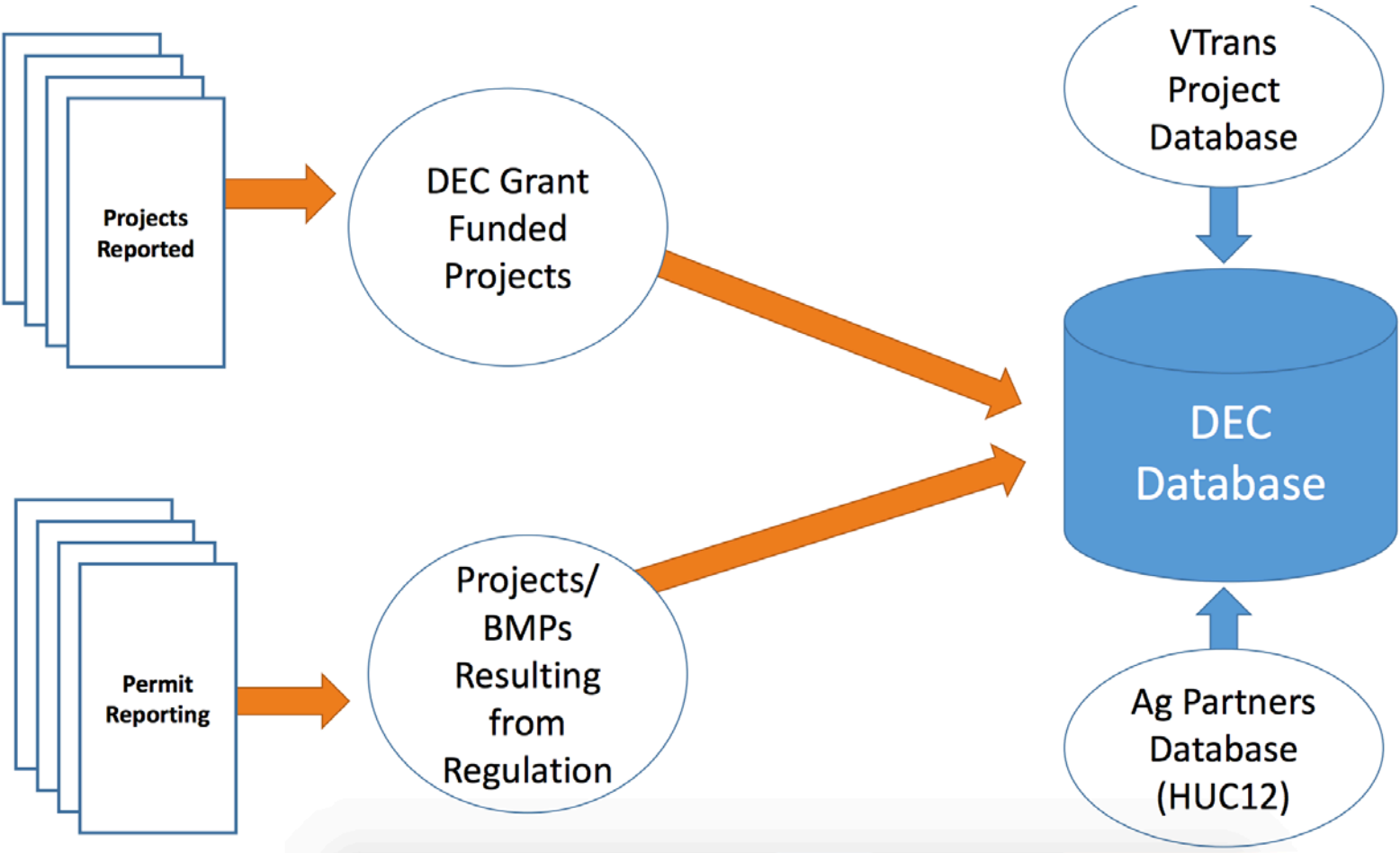
Summary Practice Report

Example Report

	A	B	C	D	E	F	G	H	I	J	K	L
1	practiceid	practicename	fieldlu	fieldacres	slopeclassfield	huc12	lakesegm	installdate	numunits	units	slopeclasspractice	hydrogroup
2	31199	Cover Crop	Cropland	4.64	<5%	41504050305	malletts b	10/23/2014	4.6	Acres (Ac.	<5%	C
3	64106	Cover Crop	Cropland	19.83	<5%	41504070601	missisquo	10/16/2014	7.3	Acres (Ac.	<5%	A
4	69882	Cover Crop	Cropland	22.79	<5%	41504081004	missisquo	10/21/2014	5.3	Acres (Ac.	<5%	C
5	45277	Cover Crop	Cropland	21.31	5%-10%	41504010203	south lake	10/14/2014	17.6	Acres (Ac.	<5%	A
6	2132	Cover Crop	Cropland	36.22	<5%	41504020501	otter cree	10/9/2014	13.4	Acres (Ac.	<5%	D
7	19966	Cover Crop	Cropland	27.35	>=10%	41504070204	missisquo	11/14/2014	25	Acres (Ac.	5%-10%	C
8	4733	Cover Crop	Cropland	4.64	<5%	41504080402	otter cree	10/14/2014	4.6	Acres (Ac.	<5%	C
9	58027	Cover Crop	Cropland	7.48	<5%	41504081101	missisquo	10/8/2014	4.8	Acres (Ac.	<5%	B
10	82874	Cover Crop	Cropland	20.46	<5%	41504030604	main lake	11/18/2014	9.4	Acres (Ac.	<5%	B
11	67823	Cover Crop	Cropland	3.39	<5%	41504080401	otter cree	10/8/2014	3.4	Acres (Ac.	<5%	D
12	38797	Cover Crop	Cropland	16.42	5%-10%	41504081204		10/6/2014	16.4	Acres (Ac.	<5%	C
13	71251	Cover Crop	Cropland	1.47	<5%	41504080802		10/20/2014	0.4	Acres (Ac.	<5%	D
14	60416	Cover Crop	Cropland	7.78	5%-10%	41504070402	missisquo	10/8/2014	7.8	Acres (Ac.	<5%	C
15	70039	Cover Crop	Cropland	12.05	5%-10%	41504050306	malletts b	10/15/2014	13.1	Acres (Ac.	5%-10%	A
16	74135	Cover Crop	Cropland	5.42	5%-10%	41504010301	south lake	10/20/2014	5.4	Acres (Ac.	5%-10%	B
17	55017	Cover Crop	Cropland	20.08	>=10%	41504010201	south lake	10/20/2014	20.1	Acres (Ac.	>=10%	C
18	19543	Cover Crop	Cropland	25.37	<5%	41504070601	missisquo	10/17/2014	11.8	Acres (Ac.	<5%	D
19	53657	Cover Crop	Cropland	6.82	<5%	41504080402	otter cree	10/14/2014	6.8	Acres (Ac.	5%-10%	B
20	76812	Cover Crop	Cropland	5.14	5%-10%	41504080602		11/1/2014	5.1	Acres (Ac.	5%-10%	C

PDB_ReportExample_FY2015_Revise

Integrating Report Outputs to Meet Requirements



Challenges Encountered

- State IT oversight and initial underestimate slowed the initial development of the database
- Database utilized NRCS and FSA data, which has strict data-sharing limits (section 1619 of the farm bill)
- 1619 interpretation was clarified by national NRCS half-way through database development, limiting the level of data sharing possible through the MOU partnership
- Few people have access to the partner database at this point – need NRCS sign off –each user needs to have a specific agreement to with NRCS/FSA to see USDA data

Addressing Challenges

- Agreed on a process in which USDA will sign off on individual users
- Secured additional funding (NEIWPC, VAAF) to upgrade database which will allow for USDA sign off on users (Yay!)
- **Silver linings**
 - we will be able to let some users in who do field work, but aren't part of the original MOU partnership (e.g. watershed groups)
 - We will be able to allow some users aggregate reporting functionality who won't have access to see specific NRCS data
 - **At the end of the day, we will have a more useful database!**

Current work

- Received additional funding from EPA/NEIWPCC/LCBP
- Contract Amendment with Stone Environmental to include:
 - Creating visibility filters to allow user access to see USDA data (goal complete Winter 2017)
 - Enhance reporting functionality to better suit TMDL reporting requirements
 - Additional year of hosting

Next Steps

- Finish all upgrades this year
- Training field staff and begin utilizing the database this year
- Begin utilizing partner data for BMP implementation analysis that we've never been able to do before
- Currently have funding for hosting database until April, 2018.
- Meet with Partner leadership to discuss long-term funding strategy for the Partner Database
- Potential for creating a farmer user interface in the future, where they can view information on their own farm

Questions?

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