United States Department of Agriculture

Natural Resources Conservation Service
359 East Park Drive, Suite 2
Harrisburg, PA 17111

April 18, 2018

State Technical Committee
AGENDA
PA State Technical Committee
Wednesday, April 18, 2018

1:00 Welcome – Denise Coleman, State Conservationist

1:10 CIG Phosphorus Project – Jake Tomlinson and Dr. Bob Hedin, Trout Unlimited

1:40 Helping Farmers Adapt to Storms, Floods, and Droughts – Dan Dostie, PA NRCS

2:10 NRCS Technical Guide Report – Dan Dostie, Pete Vanderstappen

2:20 Easement Programs Update – Hathaway Jones

2:35 Programs Update – Susan Kubo
- Cancellations, Terminations and Liquidated Damages – Susan Kubo
- EQIP Update – Ed Sanders
- CIG and CSP Update – Noel Soto

3:10 Regional Conservation Partnership Program Update – Susan Marquart

3:25 Next State Technical Committee Meeting Wednesday July 19, 2018

Committee Input: Do the State Technical Committee members have any suggestions for topics or agenda items for future meetings?

Dates for 2018 State Technical Committee Meetings:
Thursday July 19, 2018
Tuesday October 16, 2018

Listen in/participate by calling:
Toll free 888-844-9904
Access Code: 6941559

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Pennsylvania State Technical Committee Meeting

April 18, 2018

<u>Denise Coleman (NRCS)</u> opened the meeting by welcoming all to the Pennsylvania State Technical Committee Meeting by introducing all in attendance and those participating by tele-conference.

Denise then recognized and thanked Abigail Appleman, (NRCS) Outreach Coordinator, Tim Kinney (NRCS) and Alexis Tirado (FSA) for their efforts in producing inroads with the Hispanic Community. Tim and Alexis worked on the establishment of the NRCS Spanish Website. She announced that we now have twenty Hispanic producers contracted and are expecting more.

<u>Jake Tomlinson of Trout Unlimited</u> was introduced, and assisted by Dr. Bob Hedin of Hedin Environmental, made a presentation concerning details of their CIG Phosphorus Project. (See attached hand-outs.)

Utilizing Mine Drainage Residuals to Control Phosphorous from Land-Applied Animal Manure

A Presentation by Trout Unlimited and Iron Oxide Recovery
April 18, 2018

This presentation describes progress to date of a Trout Unlimited project that is assessing the feasibility of using mine drainage residuals (MDR) as a best management practice (BMP) to lessen the environmental mobility of phosphorus in land-applied manure.

Land applied animal manure from farms is a significant source of phosphorus to the Chesapeake Bay because many farms do not have a sufficient area to land-apply manure, which then results in an excess of nutrients to the streams and eventually the Bay. Although no-till practices have proven to be effective for lessening the runoff of solids and nitrogen from fields, no-till manure applications can actually result in higher losses of phosphorus, specifically water extractable phosphorus (WEP), during runoff events than is observed under conventional tillage practices.

Mine drainage residual (MDR) is the solid precipitate that is formed as a result of mine drainage treatment.

No economically viable BMP currently exists that allows small farms to substantially decrease WEP in the dairy manure before it is land-applied. Incorporating MDR into animal manure prior to land application does not require equipment purchases or long-term investments that will be problematic for small and mid-sized dairy and swine farmers. This BMP provides a means to continue land application of manure while decreasing the risk of phosphorus pollution to receiving streams and ultimately the Chesapeake Bay.

The use of MDR to adjust the WEP of land-applied manure could be a valuable stop-gap BMP for controlling phosphorus pollution in the Bay watershed.

MDRs have chemical characteristics that make them particularly reactive with oxyanions such as phosphate. This current project involved the collection and characterization of 21 MDRs collected from a variety of mine water and treatment environments in Pennsylvania (USA). The chemical composition of the MDRs was assessed relative EPA's Part 503 Biosolids Rule hazardous metal limits. Nine of the MDRs were found to have elevated

concentrations of nickel or arsenic. The chemical characterization of MDRs prior to their use in agricultural applications is necessary.

The effect of MDR additions on the WEP content of dairy manures was evaluated with laboratory experiments and field trials. The effectiveness of MDR for WEP reduction was a function of purity and particle size. Highly impure MDRs, which had low iron and aluminum were ineffective. Particle size was important. Coarse particle preparations of MDRs were less effective at reducing WEP than fine particle preparations. Reducing the particle size of an MDR increased its reactivity.

One trial tested MDR addition at a large concentrated animal feeding operation, a second tested at a 100-cow freestall operation, and a third tested at an 80-cow operation at which 400,000 gallons of stored manure was treated prior to land application. All three trials decreased WEP similar to laboratory testing. The results confirmed that solids produced in mine drainage treatment can have value for decreasing phosphorus pollution associated with animal manure management.

A finely-milled MDR was tested in field trials at three dairy farms.

This project is being continued with the following objectives:

- Standardize MDR testing with Pennsylvania State University Agricultural Analytical Services Lab
- Conduct simulated precipitation events using MDR-amended manure with the USDA Agricultural Research Service
- Conduct dose-effect test and field trial(s) with swine manure
- Conduct additional field trials to evaluate the economics and develop cost-effective methods
- Conduct crop yield measurement studies associated with field trials
- Develop into BMP for inclusion in the PA Technical Guide practice standards listing for NRCS

For more information or to find out how you can become involved in this project, please contact:

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This project was financed in part by a Growing Greener Grant provided by the Pennsylvania Department of Environmental Protection. The views expressed herein are those of the author(s) and do not necessarily reflect the views of the Department of Environmental Protection.

Utilizing Mine Drainage Residuals to Control Phosphorus from Land-Applied Animal Manure

Jake Tomlinson

Trout Unlimited, Pennsylvania Coldwater Habitat Restoration Program

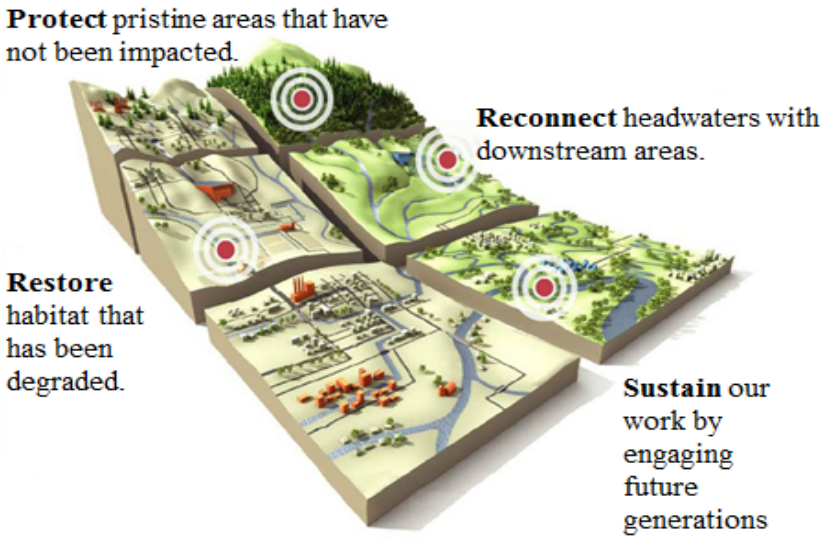
Bob Hedin

Hedin Environmental

TROUT UNLIMITED

www.tu.org

Trout Unlimited overview in Pennsylvania



Mission – To conserve, protect, and restore North America's coldwater fisheries and their watersheds

<u>Abandoned Mine Drainage</u>

- AMD Technical Assistance Program
- On-the-ground AMD remediation
- AMD youth education, outreach, and policy work
- Recovery research and monitoring

<u>Coldwater Habitat</u>

- Design and permitting assistance
- Instream habitat improvement
- Dirt and gravel road improvement
- Riparian reforestation
- Aquatic organism passage inventory and training
- Culvert replacement
- Coldwater habitat youth education, outreach, and policy work

Two significant sources of pollution to PA's waterways

Phosphorus pollution

- Dairy and swine manure contains high content of phosphorous (P)
- Animal manure is often applied based on the N requirements of a crop causing increased amounts of P
- Portion of P is water extractable (soluble) and can be environmentally mobile
- Agricultural-based P is a significant contributor to degradation of water quality in the Chesapeake Bay

Mine drainage residuals (MDR)

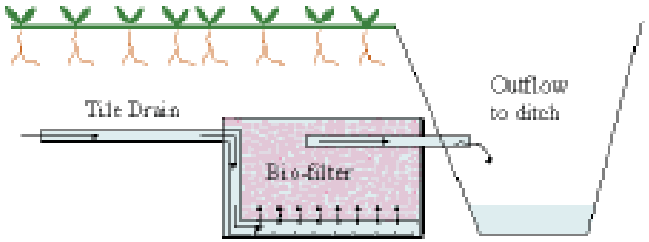
- Solids produced through the treatment of mine drainage
- Fe, Al, and Ca oxides, hydroxides, carbonates
- Considered nonhazardous by PA DEP
- Thousands of tons produced annually at systems operated by private companies, PA DEP, and non-profits
- Routinely disposed of through burial or landfilling
- MDR management can be substantial cost of operations of mine drainage treatment systems

MDR and P management?

- MDR consists of Fe, Al, and Ca solids that have capacity for adsorbing or reacting with phosphate
- Reactions shift P to a solid form that is not water extractable
- Adding MDR with P-sorption capacity to manure should decrease water extractable P and decrease environmental mobility of P
- Novel means to lower the P Source Coefficient
- Potential new BMP for producers with P concerns
- Win-win for dealing with both AMD and Ag pollution

Similar Work and P Removal

- Treating point source and ground water flows with bio retention basins (bio-filters)
- ARS MAnure PHosphorus EXtraction (MAPHEX) System



INTERIM CONSERVATION PRACTICE STANDARD

PHOSPHORUS REMOVAL SYSTEM

Code 782

(Each)

DEFINITION

A system designed to remove dissolved phosphorus (P) from surface runoff, subsurface flow, or groundwater usually consisting of a sorption media with a high affinity for dissolved P, a containment structure that allows flow through the media and retains the media so that it does not move downstream, and a means to remove and replace the media.

PURPOSE

This practice is applied for the following purpose:

To improve water quality by reducing dissolved phosphorus loading to surface water through the sorption of phosphate (dissolved) P from drainage and runoff water.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where phosphorus (P) presents a resource concern to surface water bodies and is mobilized and transported as a dissolved constituent and where a phosphorus sorption product is available locally. Sources of phosphorus sorption material (PSM) include steel slag, drinking water residuals, acid mine drainage residuals, bauxite mining waste, paper mill waste, fly ash, and gypsum waste. PSMs are typically high in Calcium (Ca), Aluminum (Al) and Iron (Fe)*. Sources of dissolved P in agricultural areas include ditches, tile drains, livestock heavy use areas, manure storage and handling areas, fields saturated with P relative to the soil sorption capacity, and other areas with high impervious surface area and converging flow. Sites typically have runoff containing dissolved phosphorus > 0.5 mg L^{-1}.**

This standard is not for treatment of particulate phosphorus, which is typically bound to soil particles. If adsorbed P is a concern, use the criteria found in NRCS Conservation Practice Standard (CPS) 350, *Sediment Basin* or CPS 638, *Water and Sediment Control Basin*.

*Refer to Stoner et al., 2012, and use PhROG software. Source: Oklahoma State University http://p-structure.blogspot.com/2015/05/software-release-phrog.html . NRCS projects require use of this software. NRCS staff to contact NRCS State Engineer for access. **On-site test results are needed as this value is a critical assumption. See PhROG Reference Chapter 6 for guidance on this and other needed data.

Phosphorus Removal System

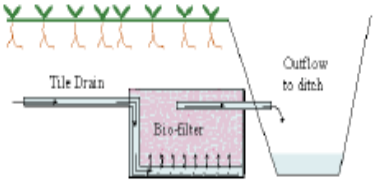
The United States Department of Agriculture Natural Resources Conservation Service (NRCS) is offering Phosphorus Removal System as an interim conservation practice standard, # 782. This system is installed to intercept subsurface (tile) flow and reduce the concentration of phosphorus.

Sources of agricultural outflows to surface waters include agricultural tile drains. The Phosphorus Removal system is designed to achieve a reduction in the phosphorus concentration of water flowing through subsurface drains by directing the flow through a filtering media with a certain retention time.

Many farms have installed subsurface drainage systems to remove excess water from the soil in order to enhance crop production. While maximizing crop yields is a goal of all producers, subsurface drainage systems can have negative effects on water quality.

Phosphorus and nitrate losses from tile drains can be high because the nutrients are very soluble and easily flow through soil fractures, worm and root channels and then into the drainage lines. The Phosphorus Removal System's purpose is to decrease the amount of nutrients, especially phosphorus, in tile train discharge.

The practice lifespan for the Phosphorus Removal System is ten years, but the filtering media is anticipated to need replacement once within that time frame. The media may require landfill disposal.



This system can also be used to treat small surface runoffs by application inside a ditch.

A 1,000 gallon tank is needed. The tank may require a second chamber to restore pH of discharge water.

Top: Heavy equipment is used to position container of filtering media above tank

Bottom left: Filtering media being loaded into tank

Right: Filled tank positioned below surface level

photo credits: Ehsan Ghane and Larry C. Brown (Ohio State University), and Norman R. Fausey (USDA-ARS Soil Drainage Research Unit)

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USDA United States Department of Agriculture
Agricultural Research Service

National Soil Erosion Research Laboratory
275 S., Russell St., West Lafayette, IN 47907-2077
http://www.ars.usda.gov/mwa/lafayette/nserl

FACT SHEET: Phosphorus Removal Structures

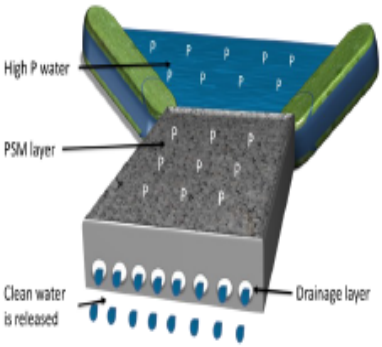
A Tool for Trapping Dissolved P

The P removal structure is a large, landscape scale filter for dissolved P (DP), intended to intercept and trap P from "hot spots" before reaching a surface water body. The P removal structure has *four basic principles*:

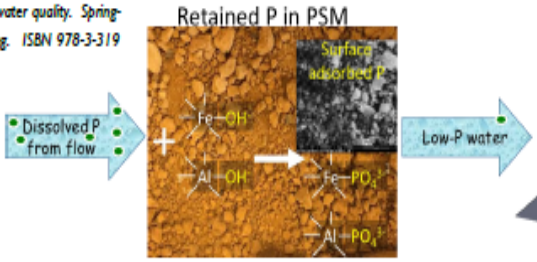
1. Contains solid media with high affinity for P, commonly known as a "P sorption material", or PSM.
2. PSM is contained and placed in a hydrologically active area with high dissolved P concentrations.
3. High DP water is able to flow through the contained PSM at a sufficient rate.
4. The PSM is able to be removed and replaced after it is no longer effective.

Phosphorus Sorption Materials (PSMs):

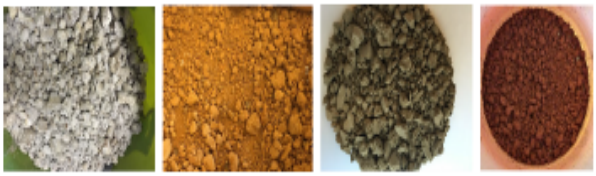
Many PSMs are by-products from different industries, and therefore can be obtained for low cost. Some PSMs are manufactured. However, all PSMs must first be screened for safety before use in a P removal structure. Some examples are shown below.



Penn, C.J., and J.M. Bowen. 2017. Design and construction of P removal structures for improving water quality. Springer Publishing. ISBN 978-3-319-58657-1



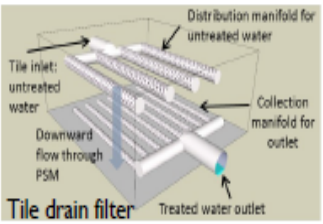
Examples of different P sorption materials (PSMs)

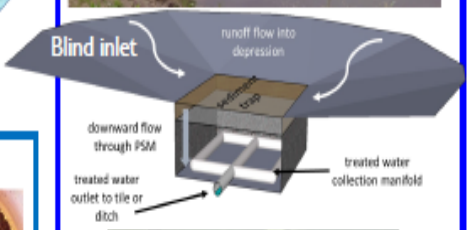


Steel slag | Mine drainage residuals | Drinking water residuals | Manufactured PSM "PhosRedeem"

Types of P Removal Structures

P removal structures can appear in many different forms. They can be located on the surface, subsurface, in ditches, tile drains, drainage swales, drop inlets, blind/surface inlets, etc. Any unit that possesses the four basic components is essentially a P removal structure. Several examples of P removal structures are shown below:





Dr. Chad Penn, USDA-ARS Phone: 765-494-8673 E-mail: Chad.penn@ars.usda.gov

Project Partners and Funding 2008-present

Project Manager: Trout Unlimited

Principal Investigator: Hedin Environmental

Funding

Phase I - NRCS Conservation Innovation Grant (NFWF administered)

Phase II & III, - PA Growing Greener Program

Technical Steering Committee

- PA DEP, Office of Water Resources Planning
- USDA Agricultural Research Service, University Park, PA
- Penn State University Department of Ecosystem Science and Management
- USGS Leetown Science Center, Kearneysville, WV

Focus on Research and Applicability

- Do MDRs have chemical components of concern for use in agriculture?
- How effective are MDRs for decreasing water extractable P in manures?
- Do MDR amendments decrease P mobility in land-applied manures?
- Do MDR additions affect crop yields?
- How would MDR be incorporated into manure management practices?

Using BMPs to decrease P Index

	Units or source	Base-line	Increase buffer	Decrease manure	Modify spread	Change PSC
Soil P	ppm P	210	210	210	210	210
Fertilizer						
Rate	lb P_2O_5/ac	20	20	20	20	20
Method	Injected	0.2	0.2	0.2	0.2	0.2
Manure						
Rate	lb P_2O_5/ac	90	90	45	90	90
Application	method	Surface	Surface	Surface	Surface	Surface
Application	time	anytime	anytime	anytime	Apr-Oct	anytime
PSC	From lab	0.65	0.65	0.65	0.65	0.30
Transport						
Erosion	ton/acre/yr	3	3	3	3	3
Sub-drains		none	none	none	none	none
Distance to Stream	feet	150	250	150	150	150
P Index		**100**	**86**	**75**	**87**	**73**

MDR testing

- Chemical Analysis
  - pH
  - Elemental composition
  - Neutralization potential
- MDR dosing effect on water extractable P
- Greenhouse crop yield evaluation
- MDR used in field trials

Chemical composition of MDRs

- Collected 21 MDR samples from coal mine drainage treatment systems that varied in water chemistry and treatment technology
- Chemical variation:
  - Low pH acidic with Fe, Al, Mn
  - Neutral pH alkaline with Fe
- Treatment Technologies
  - Hydrated lime
  - Pebble lime
  - Hydrogen peroxide
  - Limestone (passive)
  - Aerobic ponds/wetlands (passive)

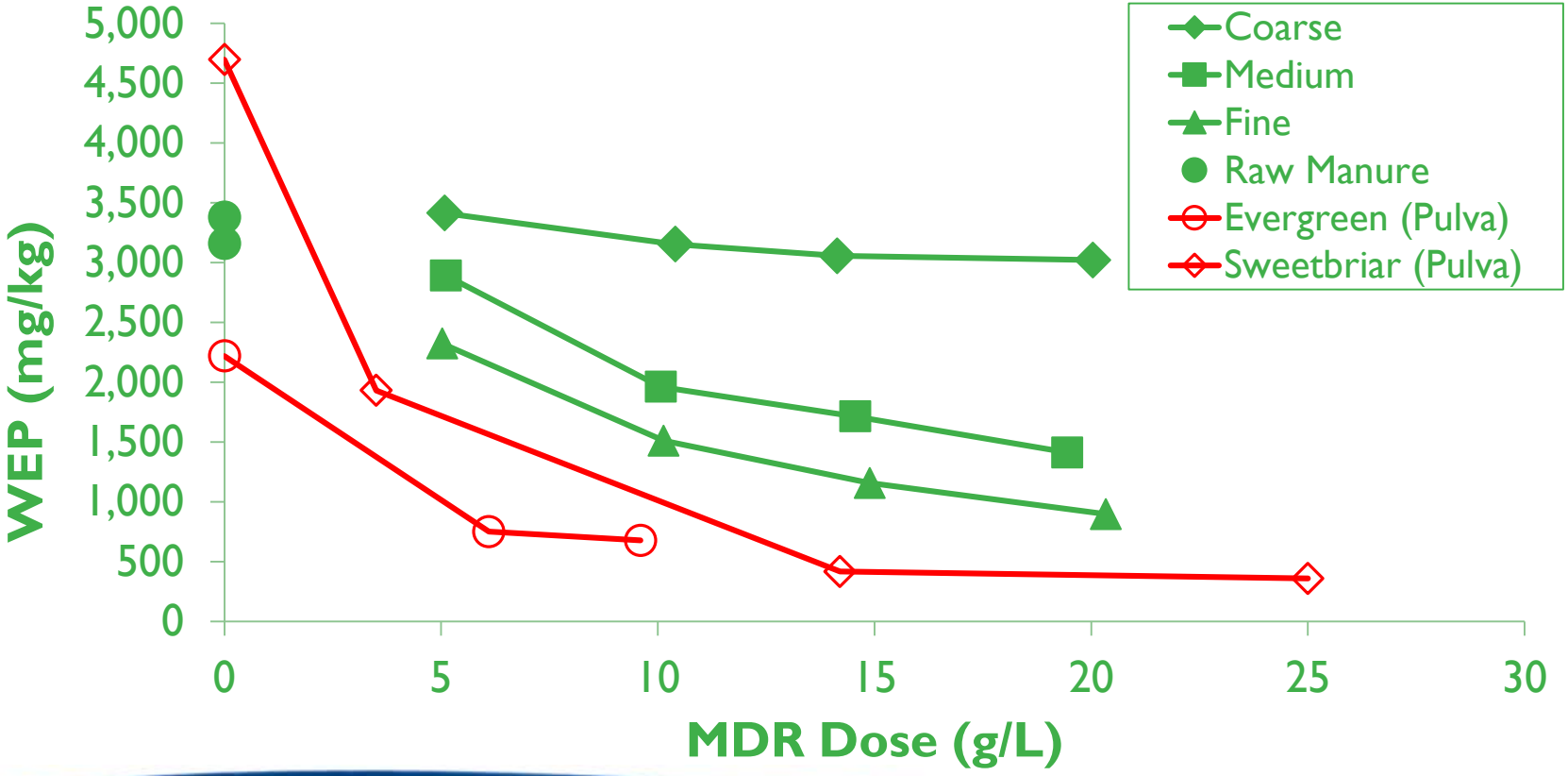
EPA Part 503 Biosolids Rule Screening

- Used as guideline; rule is not applicable to manure management practices
- Rule contains metal limits for land-applied biosolids
- For21 MDRs analyzed, 3 exceeded the ceiling concentration for Ni and 2 exceeded the ceiling concentration for As
- After 99:1 dilution with manure, none of the mixtures exceed Part 503 Biosolids Rule standards
- MDRs need screened before being used in manure management

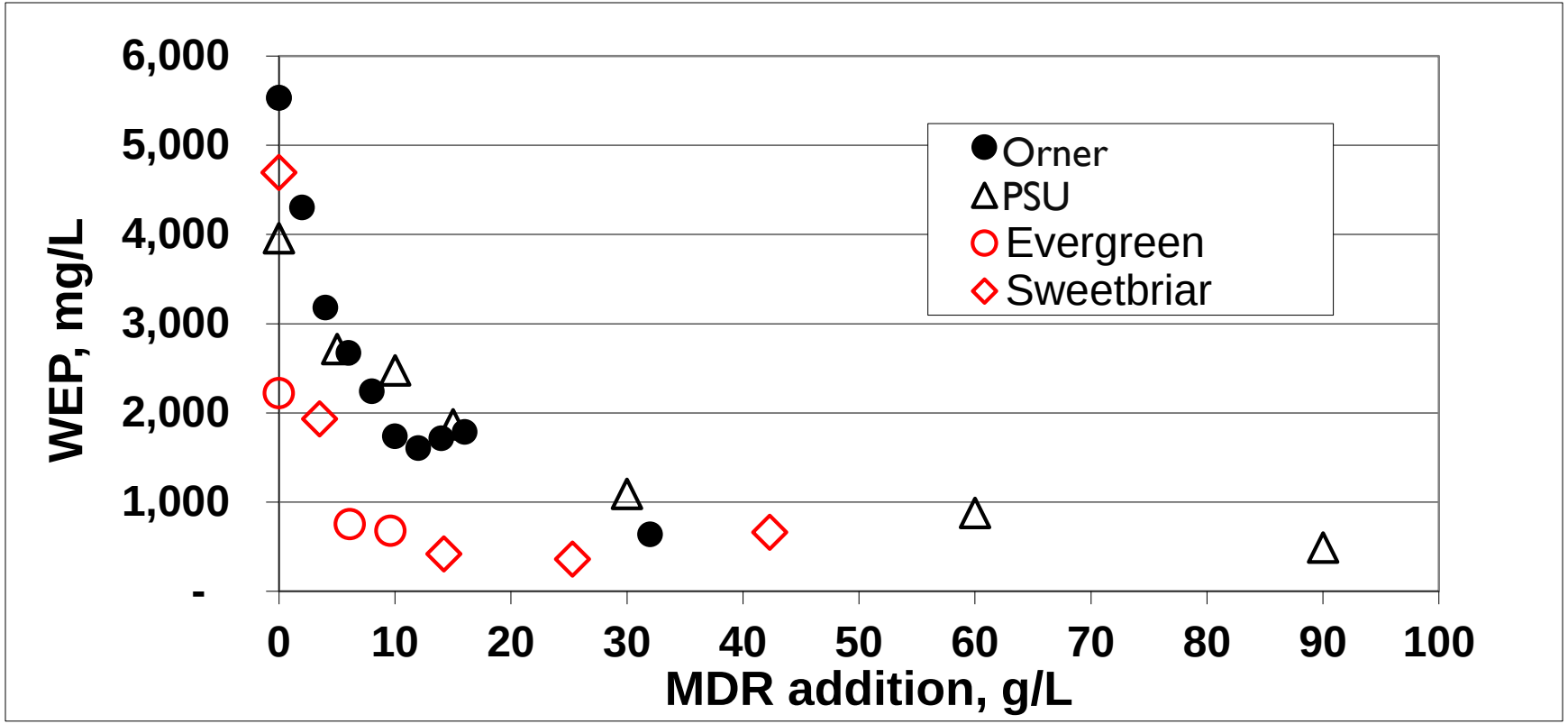
Dose-effect lab/field testing results

- MDR can significantly decrease WEP of manure
- Factors that influence the efficacy of the treatment
  - MDR chemistry
  - MDR particle size
  - Water extractable P content of manure

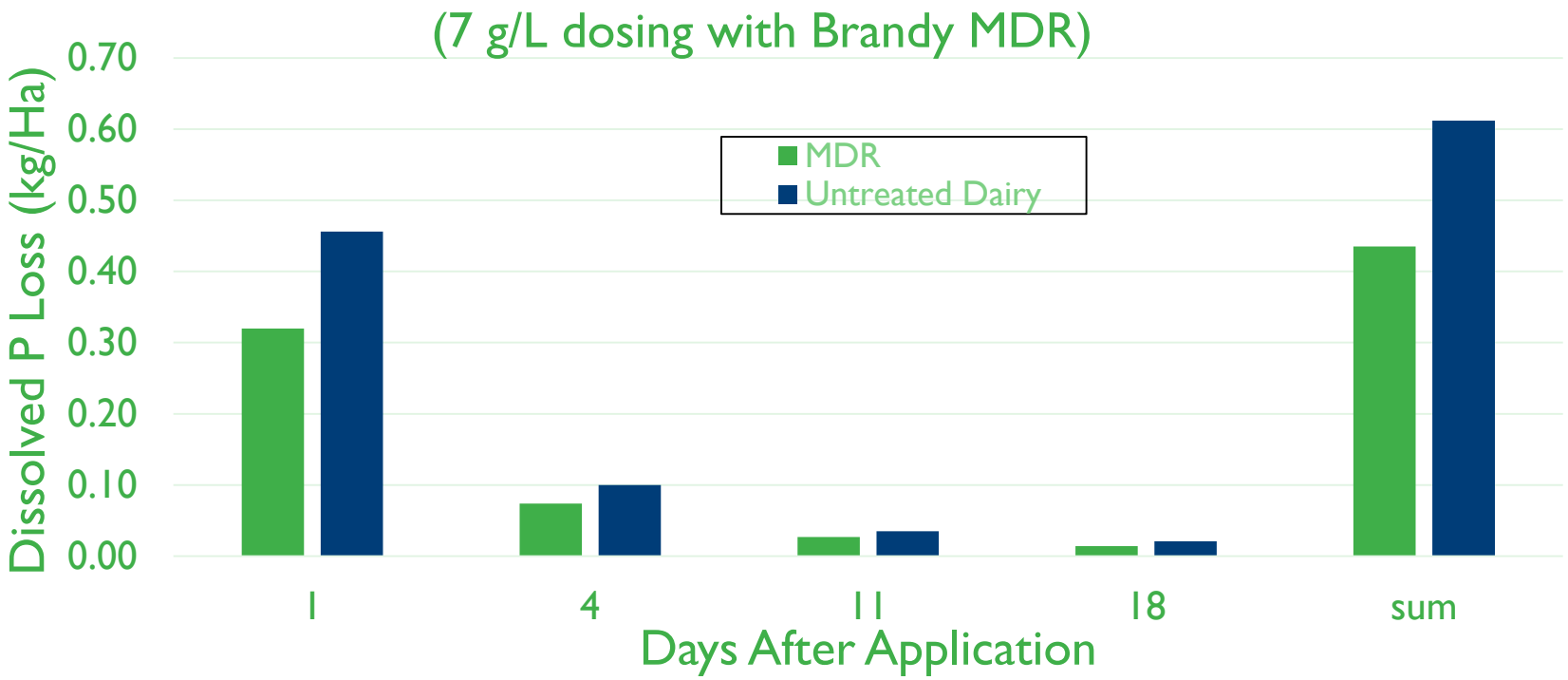
Effect of four particle size preparations of MDR on WEP



Effect of MDR additions on WEP



ARS Simulated Precipitation Study



Greenhouse crop yield evaluation results

- Manure additions increased ryegrass growth
- No decrease in ryegrass growth at either MDR rate
- Leachates collected from pots of MDR-treatments contained less P than leachates from control pots

Field trial scenarios

- Operations ranged from 80 - 3,000 cows
- Manure storage tanks ranged from 100,000 - 400,000 gallons (some w/mechanical solids separator); added MDR into sump or tank
- Sawdust bedding in freestall where manure washed/pumped to earthen lagoon; bedding amended with MDR

Field trial results to date

- All scenarios resulted in decreasing water extractable P from 22% to 66%
- MDR addition decreased WEP similar to bench testing
- Dusty injection method; solved by modifying position of supersack in the tank

Summary to Date

- MDR (or any solid material) should be screened for hazardous metal contents before consideration for WEP management
- MDR's ability to decrease manure WEP is directly related to Fe and Al content and indirectly related to particle size
- Most common problem in field applications is dust
- No evidence that MDR interferes with crop growth
- Measurements of field runoff confirm that MDR amendments decrease in soluble P losses

Plans for 2018/19

- PSU AASL is standardizing procedures for evaluating a solid's suitability and effectiveness for modifying P solubility in manure
- Field Trials involving 200-400 acres of crop fields in Chesapeake Bay watershed
- Crop yield measurements by TeamAg that are coordinated with Field Trials
- Develop concept into BMP (PA Technical Guide practices list/NRCS)

THANK YOU!

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TROUT UNLIMITED

<u>Dan Dostie (NRCS)</u> was introduced and provided a very interesting presentation concerning climate change. (See attached hand-outs.)

USDA Climate Hubs
U.S. DEPARTMENT OF AGRICULTURE

April 19, 2018

Key Principles for Adapting Farms, Ranches, & Forests to Extreme Weather and Variable Climate

Extreme Weather and Climate Variations

Extreme weather is on the rise across the country. Heavy downpours have increased dramatically in some regions while others are seeing more intense drought. Winters have generally become warmer, leading to greater weed and pest survival. Shifts in seasons increase uncertainty in decision making. How can farms, ranches, and forests be adapted to these changes?

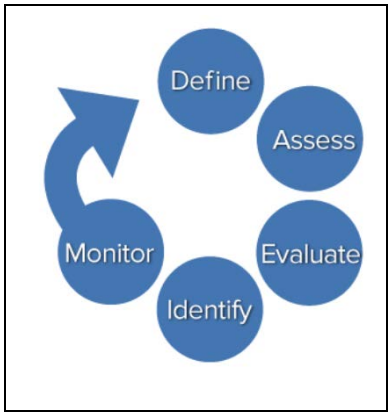
What is Adaptation?

Adaptation is a process of natural or human response to challenges and opportunities. In this case, the challenges and opportunities are created by a wider potential for extreme weather, regional changes in temperature or rainfall, and increased uncertainty of future climatic conditions. Managers of farms, ranches, and forests can be proactive and take adaptive actions to respond to disruptions caused by weather or climate related stress, disturbance, and disasters or to take advantage of potential opportunities from gradual changes.

Farmers, ranchers, and other private lands managers have always adjusted to sustain operations, maintain or improve productivity, increase profitability, and provide resource stewardship services in face of changes in market conditions, input costs, neighbor relations, labor shortages, pest invasions, and adverse weather. Such adaptive actions reduce risks from loss as well as enhance the resilience of systems to absorb potential disruptions.

The 5-Step Process of Adapting to Change

The 5-step process of adapting to changing weather and climate conditions is like addressing other threats and opportunities. It begins with defining current goals and objectives. The next step assesses potential impacts in the climate region. These impacts are incorporated as an additional "filter" through which to critically evaluate goals and objectives. Once appropriate adaptive actions are identified, monitoring and evaluation are used to determine if expected outcomes are being achieved. This flexible process draws upon locally relevant information resources about anticipated climate impacts on the farming, ranching, or forestry system.



A New Perspective: Principles of Adaptation

Farm, ranch, and forest land managers need more information to adjust to extreme weather and climate impacts. However, **a new perspective** can be as important as information. The following principles serve as a starting point for this adaptation perspective:

- Setting priorities and taking intentional actions to address the most vulnerable resources
- Taking precautionary actions where vulnerability is high to reduce near-term risk
- Being flexible and creative in developing contingencies and options to maintain or transform the operation
- Continuously learning through an iterative process of adaptive management that incorporates new knowledge and experience
- Looking for feasible, "no-regret" actions that result in co-benefits for multiple goals with little or no risk
- Considering both short- and long-range time frames the adjustments to reduce impacts already occurring and strategies for expected larger impacts
- Considering reductions of greenhouse gas emissions or storage of carbon from the atmosphere. These additional actions help society reduce atmospheric greenhouse gases causing climate disruptions and the cost of adaptation for future generations.

Introducing the Adaptation Resources

What are the Adaptation Resources?

The Forest Adaptation Resources and the Adaptation Resources for Agriculture were created to help forest managers and agricultural producers step through climate change information in a way that helps them develop their own, customized adaptation actions based on their overall goals. The Adaptation Resources do NOT offer specific recommendations on what to do in response to climate change. Chapter topics include:

- What is Climate Change Adaptation?
- A Guide to Climate Change Vulnerability Assessments (forests)
- *Adaptation Strategies and Approaches
- *Adaptation Workbook
- *Adaptation Demonstrations

*Described in more detail below

Are the Adaptation Resources specific to a region?

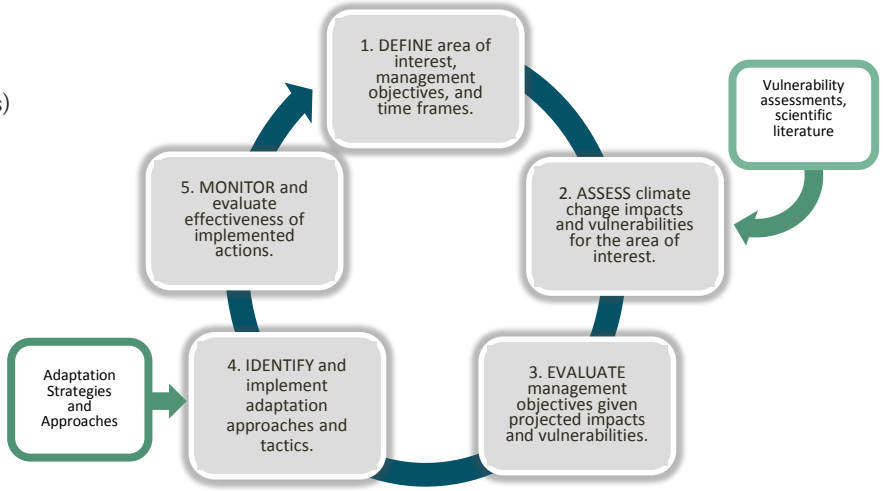
Some sections are broadly applicable and can be used in any region, whereas some sections are specific to the Midwest and Northeast United States.

Broadly applicable: General information on climate change adaptation, vulnerability assessments, and the Adaptation Workbook.

Midwest/Northeast-specific: Adaptation Strategies & Approaches, Adaptation Demonstrations.

What is the Adaptation Workbook?

A 5-step structured process to integrate climate change considerations into management and planning. It is one component of the Adaptation Resources, and can be completed by filling out a series of worksheets found within the publications, or by going through the electronic version at www.adaptationworkbook.org



What are the Strategies & Approaches?

A "menu" of adaptation actions that managers or producers can choose from to help meet their goals under climate change. These menus are normally used as a part of the Adaptation Workbook process, and can help users connect the dots between an overall approach to adaptation and their specific on-the-ground tactics. These menus were created by conducting a literature search, organizing the results by scale and theme, and putting this through extensive review and testing.

How many "menus" of Strategies & Approaches are there?

Strategies and Approaches sets, or "menus", can be specific to region or resource type. Currently, menus include:

- Forests (northeast/Midwest)
- Urban Forests (northeast/Midwest)
- Agriculture (northeast/Midwest)
- Water Resources (in development)

Introducing the Adaptation Resources

What is the outcome of using the Adaptation Workbook?

After completing the Workbook, managers or producers will have the information needed to create a custom adaptation plan for a project or a property. This information can be used independently, or combined with other management documents. Some demonstrated outcomes of the Workbook include:

Climate-informed plans:

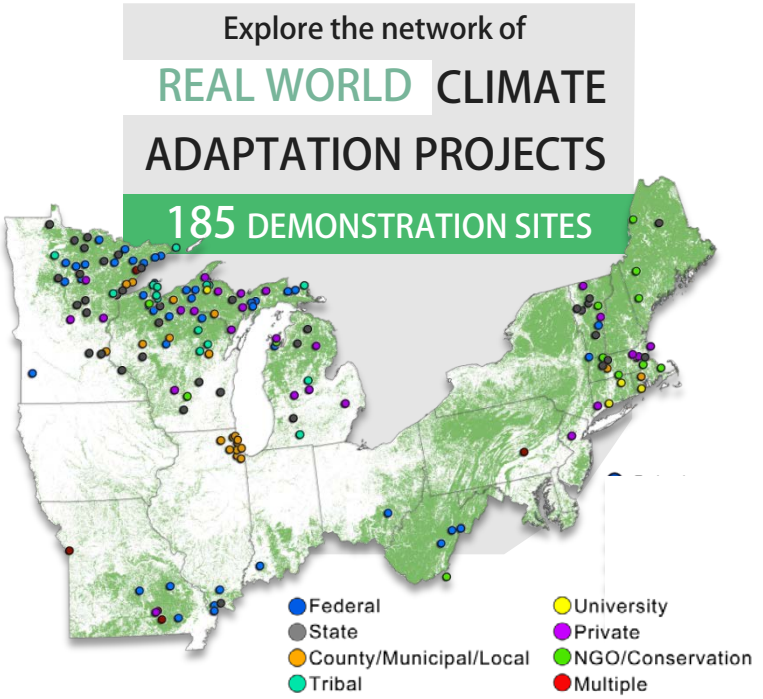
- Habitat management
- Forest management
- Tribal adaptation

Climate-informed projects:

- Restoration
- Vegetation management
- Water resources

What are Adaptation Demonstrations?

Real-world examples of how managers and producers meet management goals and adapt to changing conditions. There are over 180 projects at various scales, land ownership types, and stages of action that have used the Adaptation Workbook to consider climate change. To see a map and read about each project in more detail, visit www.forestadaptation.org/demonstration-projects.



How have we helped people use the Adaptation Workbook?

Methods include:

- A coordinator works with an individual or small group to complete the Workbook.
- Forest Adaptation Planning and Practices workshops with 5-8 groups who work on their own projects. A facilitator helps the groups complete the Workbook and share information.
- Managers and producers use the Workbook independently.

What if I want to use the Workbook in another region?

The Workbook has been used with audiences across the U.S. and is not specific to a region. However, it can be helpful to have regional vulnerability assessments and sets of adaptation strategies. To work with audiences outside the Midwest/Northeast you may consider:

- Using the Workbook with the existing menus of Strategies and Approaches as a starting point for generating ideas.
- Using the Workbook alongside other regionally specific adaptation resources.
- Creating new menus of Strategies and Approaches that are specific to a region or resource of interest.

How do I create a menu?

There may be several ways to get started depending on the specific menu you'd like do. For example:

- Conducting a literature search to collect and organize ideas.
- Obtaining regional input on existing menus from experts.
- Testing menus among key audiences to identify gaps.

How do I find out more?

- Adaptation Resources for Agriculture
- Forest Adaptation Resources, 2nd edition
- Online Adaptation Workbook (currently for forests; agriculture & urban coming in early 2017!)

CONTACT

Northern Forests Hub, USDA Forest Service, Northern Research Station, Houghton, MI.
Chris Swanston, Director cswanston@fs.fed.us

HELPING FARMERS ADAPT TO STORMS, FLOODS, AND DROUGHT

April 18, 2018

Climate Hubs
Natural Resources Conservation Service
Agriculture Research Service
U.S. Forest Service

Dan Dostie
NRCS Pennsylvania

With help from USDA Climate Hubs

United States Department of Agriculture
Climate Hubs

Helping Farmers Adapt

1. Extreme Storms, Floods, and Droughts – the New Normal
2. Adapting to Change – Guiding Principles
3. Resources and Tools for Making Informed Decisions

United States Department of Agriculture
Climate Hubs

The New Normal

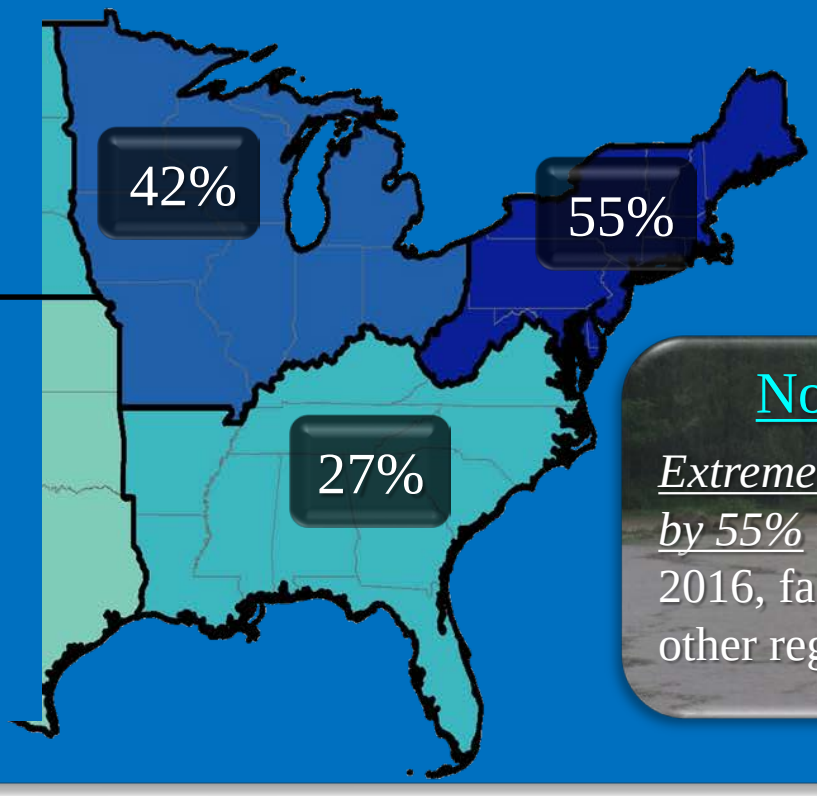
1. Extreme Storms
2. Floods
3. Droughts

Weathering Water Extremes

Anthony Buda
USDA Agricultural Research Service
University Park, PA

United States Department of Agriculture
Climate Hubs

Extreme rainfalls more frequent *especially in the Northeast*



Northeast

Extreme rainfalls rose by 55% from 1958 to 2016, faster than any other region in the US.

Percent change in extreme rainfall (heaviest 1% of daily events)

<0	0 to 9	10 to 19	20 to 29	30 to 39	40 to 49	>50

Karl et al., 2009; US National Climate Assessment, 2017

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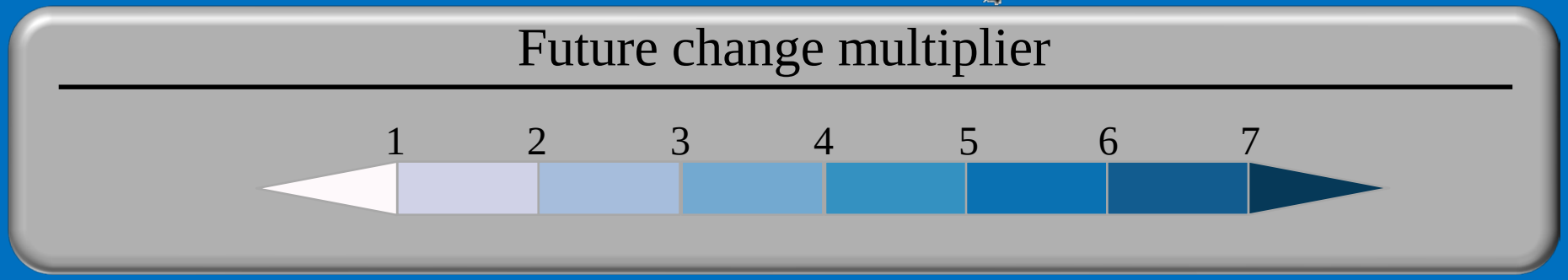
More frequent 20-year storms (~5 in/day) *with a 3-fold increase in frequency expected by 2100*

Northeast

By late century, events that recurred once in 20 years may happen three to four times as often.



Wuebbles et al., 2014 (BAMS); US National Climate Assessment, 2014

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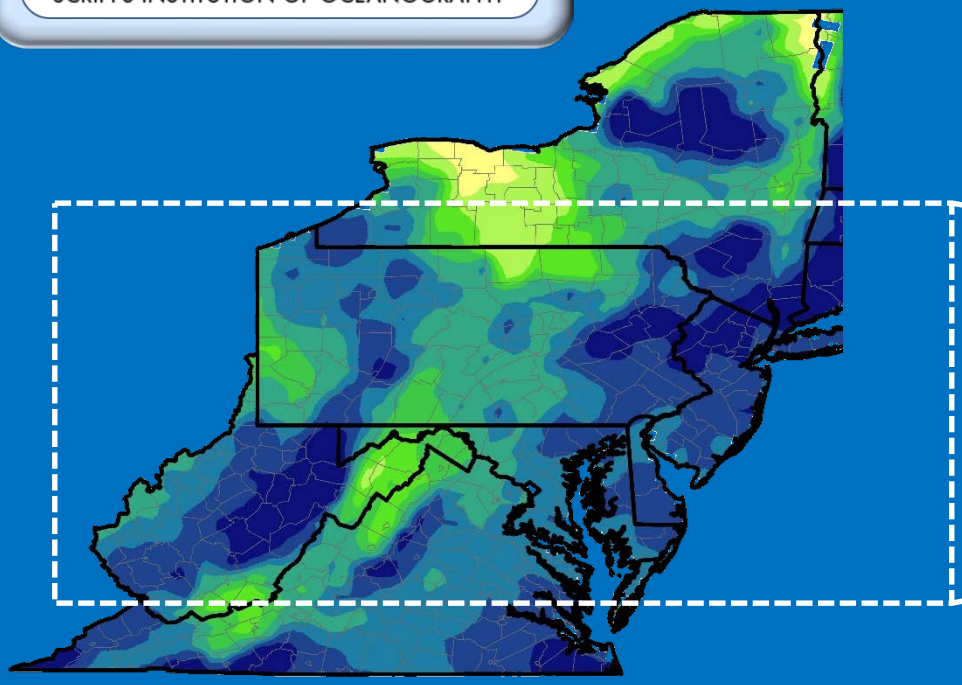
Climate Hubs

RECLAMATION NCAR USGS
Santa Clara University CIRES CLIMATE CENTRAL
SCRIPPS INSTITUTION OF OCEANOGRAPHY

Annual rainfall to increase *with the region-wide average rising from 42 to 44 in/yr*



Mid-Atlantic's mid-century precipitation range

in	38	44	50
mm	965	1118	1270

Mean annual precipitation (2041 to 2070)

in	35	38	40	42	45	47	50
mm	889	965	1016	1067	1143	1194	1270

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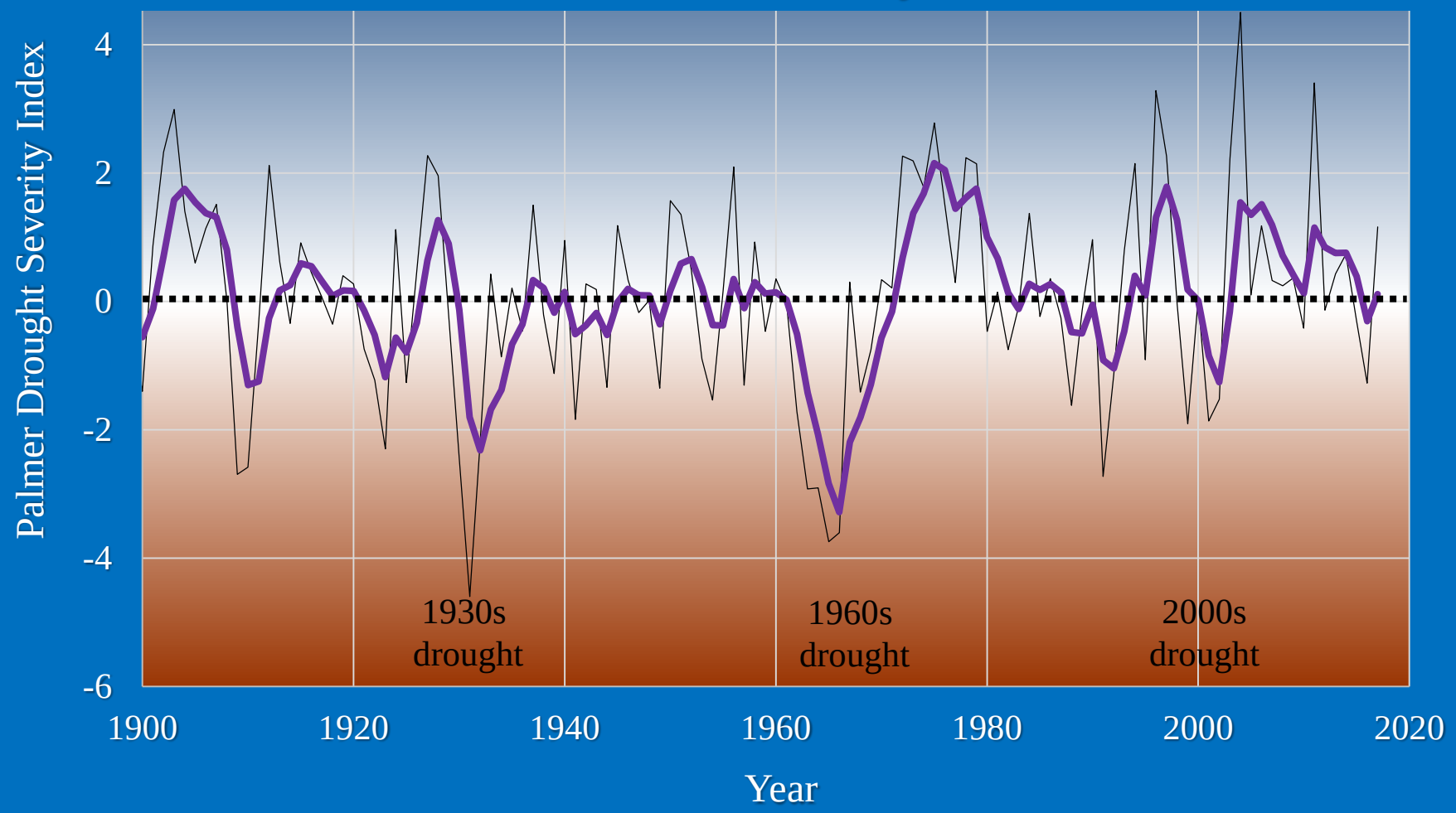
Climate Hubs

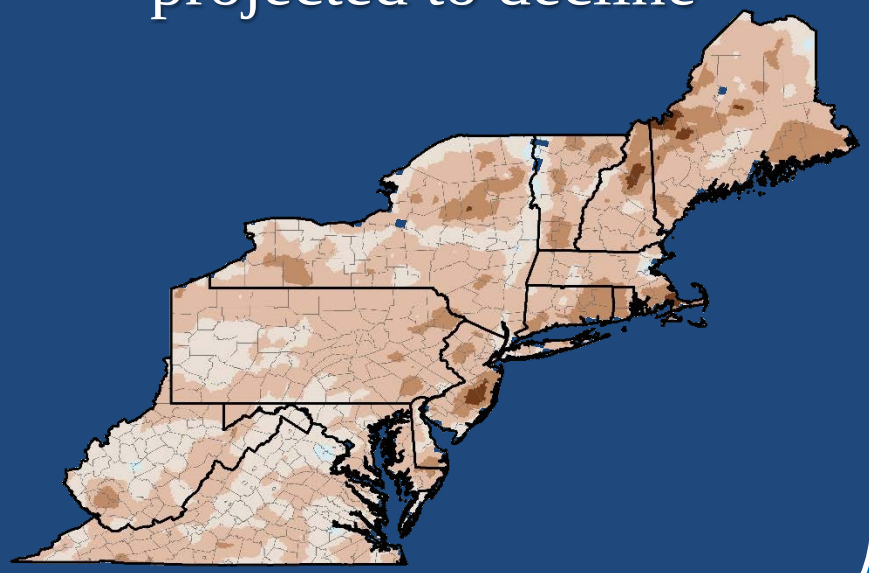
there has been no evident change in drought trends in Pennsylvania



Data source: NOAA National Climatic Data Center

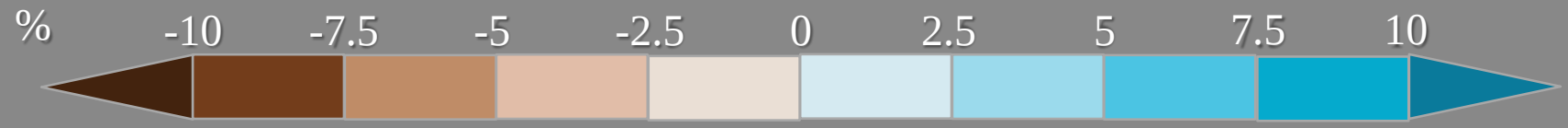
United States Department of Agriculture
Climate Hubs

Summer soil moisture is projected to decline



Increased need for irrigation in summer?

Mid-century increase change in surface soil moisture (%)



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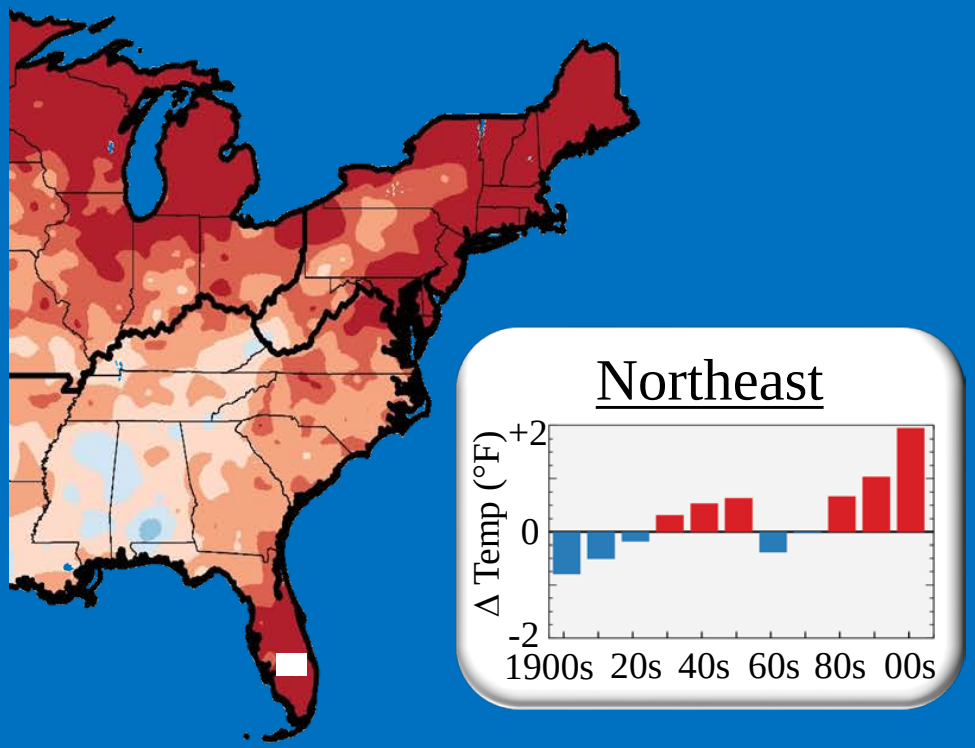
Average annual temperatures are rising *with the last decade 2°F warmer than the 1901-1960 US average*



Temperature change (°F / °C)

°F	> -1.5	-1.5 to -1.0	-1.0 to -0.5	-0.5 to 0	0 to 0.5	0.5 to 1.0	1.0 to 1.5	> 1.5
°C	> -0.8	-0.8 to -0.6	-0.6 to -0.3	-0.3 to 0	0 to 0.3	0.3 to 0.6	0.6 to 0.8	> 0.8

US National Climate Assessment, 2017; mean temperature change = 1986-2016 mean minus 1901-1960 mean

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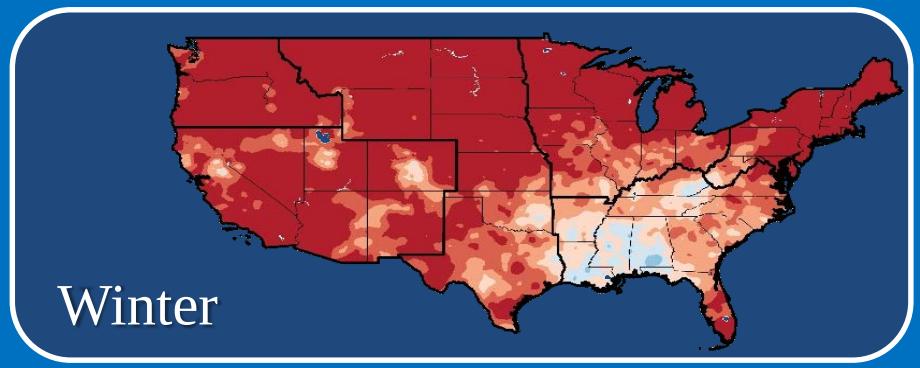
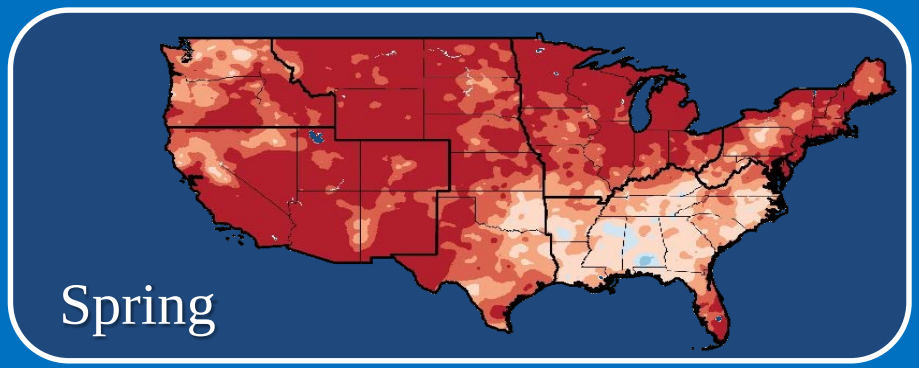
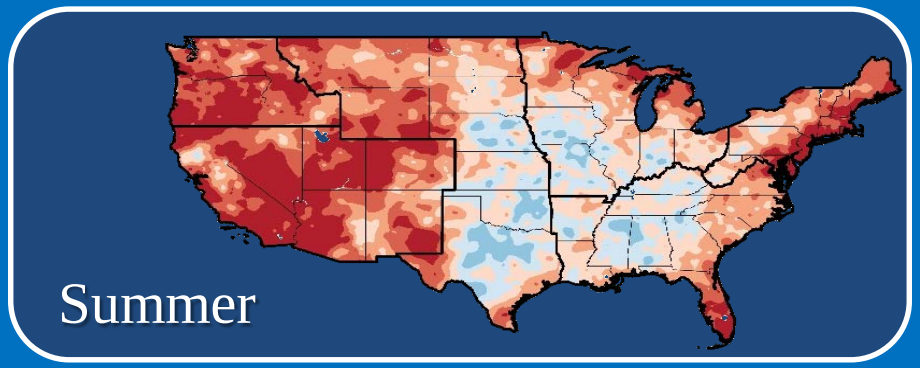
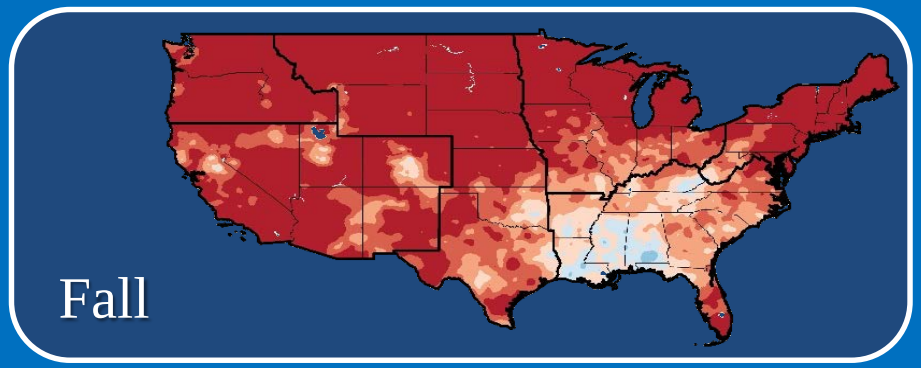
Climate Hubs









Temperature change (°F / °C)

°F	> -1.5	-1.5 to -1.0	-1.0 to -0.5	-0.5 to 0	0 to 0.5	0.5 to 1.0	1.0 to 1.5	> 1.5
°C	> -0.8	-0.8 to -0.6	-0.6 to -0.3	-0.3 to 0	0 to 0.3	0.3 to 0.6	0.6 to 0.8	> 0.8

US National Climate Assessment, 2017; mean temperature change = 1986-2016 mean minus 1901-1960 mean

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In summary, our climate is changing resulting in more storms, floods, & droughts

- **Annual average temperatures will continue to warm**
  The annual average temperature may be 3 – 6 °F higher by mid-century (2041-2070) than it was in the late 20th century (1971-2000).
- **Heat waves and intensity will continue to increase**
  especially in summer.
- **Annual precipitation amounts will continue to increase**
  especially in winter and spring.
- **Precipitation events will be heavier with longer dry spells**
- **The growing season will be longer . . .**

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Climate Hubs

Adapting to Change

A New Perspective:

Guiding Principles of Adaptation

Adapting to Change

Or addressing challenges and opportunities

(from storms, floods, & droughts and related

stress, disturbance, & disasters)

means prepare and respond

to reduce risk of loss and

enhance resiliency to absorb the disruptions

Adapting to Change

Guiding Principles:

1. Setting priorities for the most vulnerable
2. Taking precautionary actions
3. Being flexible and creative to maintain or transform
4. Considering co-benefits of planned actions

. . . guiding principles cont.

5. Consider short term adjustments and long range strategies
6. Consider storing carbon and reducing GHG emissions to reduce the cost of adaptation for future generations
7. Monitoring & adaptive management

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Resources and Tools

for adapting farms, ranches, and forests

5-Step Process of Adapting

Workbooks

Risks and Vulnerabilities

Adaptations and Rationale

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Adaptation Resources for Agriculture:

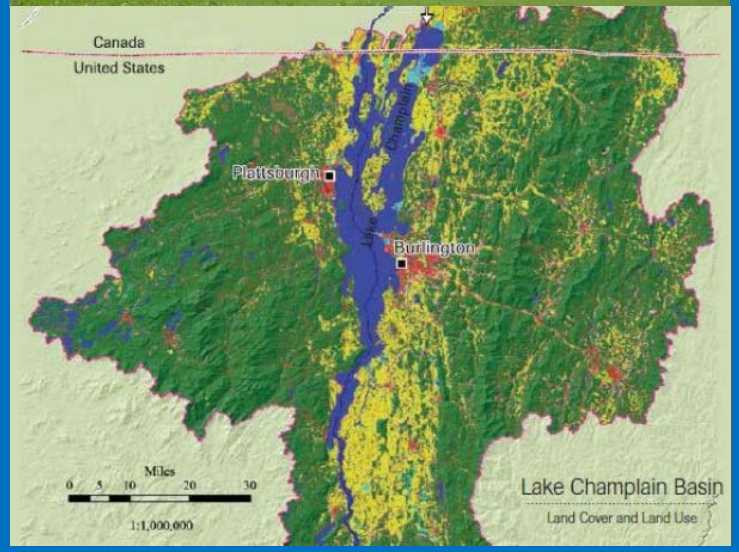
Responding to Climate Variability and Change in the Midwest and Northeast

U.S. Department of Agriculture, Washington, DC, Technical Bulletin 1944, October 2016

United States Department of Agriculture
Climate Hubs

Adapting Farms to Change

- Considerations **NOT** specifications
- Farm or area wide scale, **NOT** state or national policy scale
- Broad ecological site and planning considerations, **NOT** financial, legal, market, or human resource considerations



5-Step Process of Adapting

- Business/Conservation Plans
- Local Assessments
- Decision Support Tools
- Menus of Strategies & Approaches, Tactics
- Monitoring Tools

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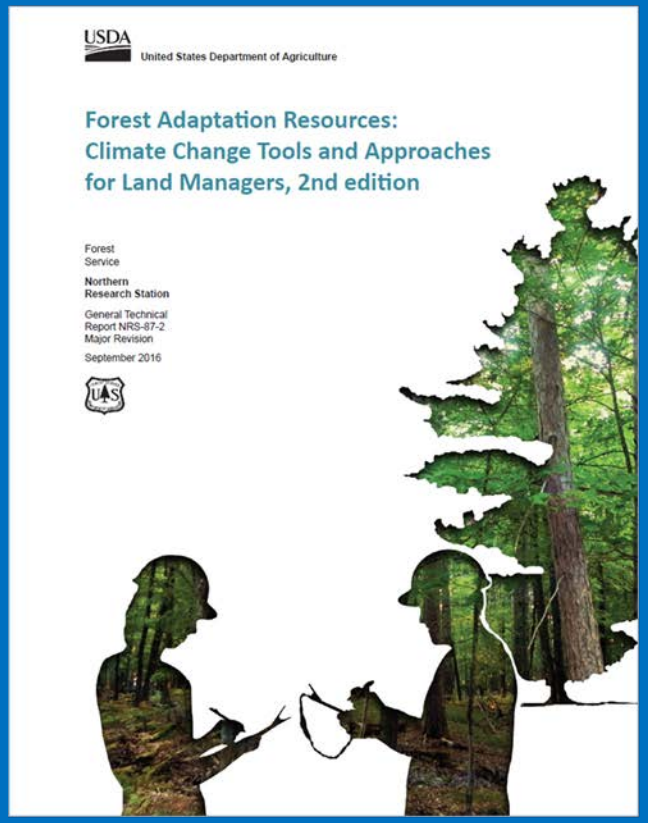
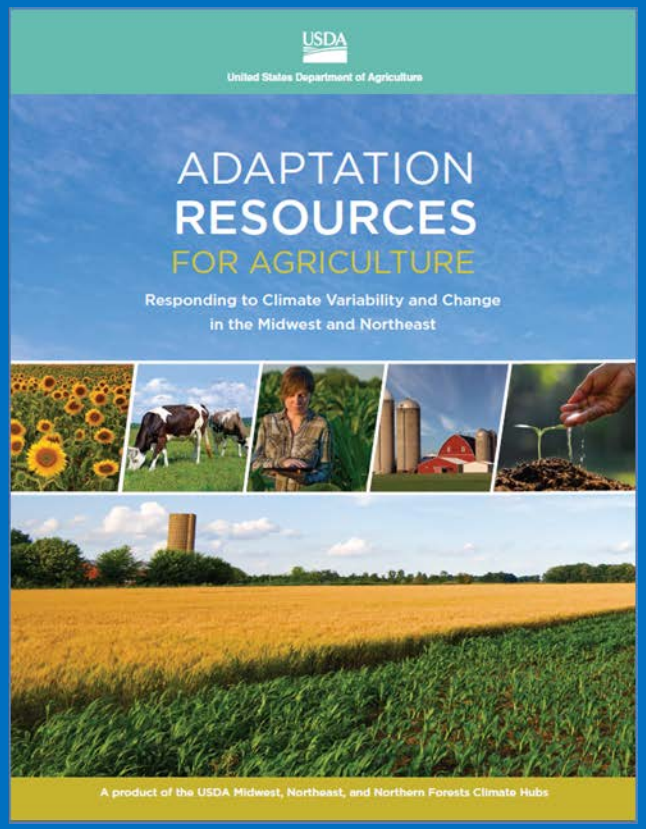
Climate Hubs

Resources: Workbooks





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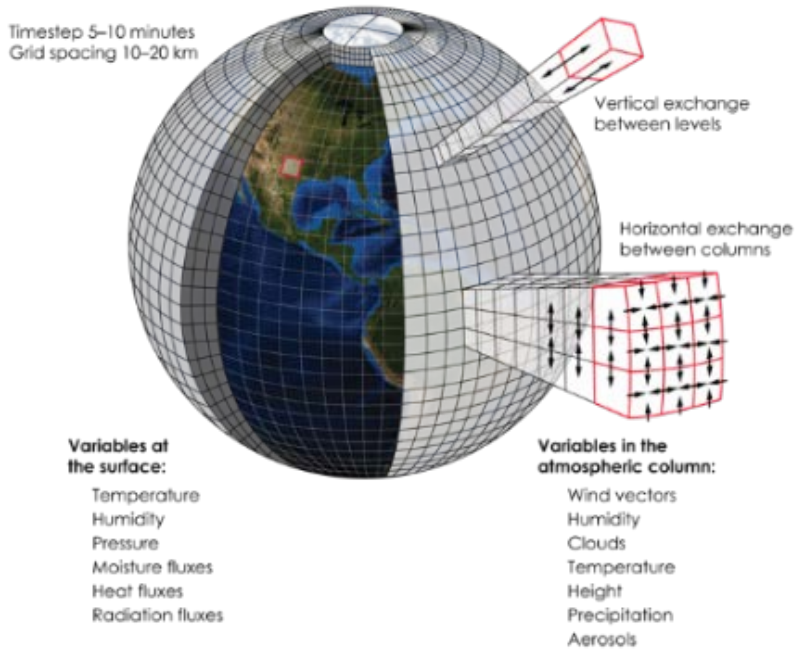
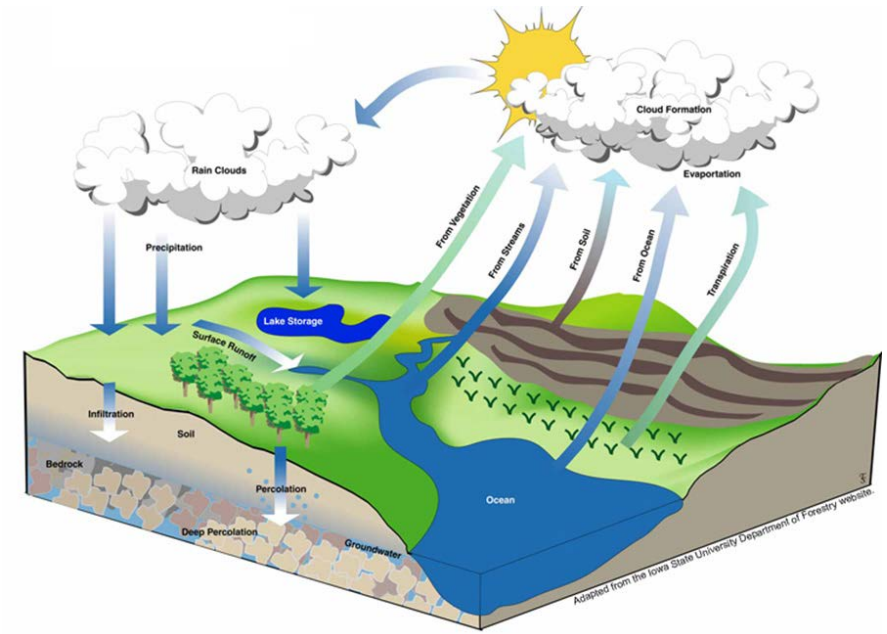
Climate Hubs

Runoff Risks

Weather model ✚ Hydrologic model





Runoff forecast

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Climate Hubs

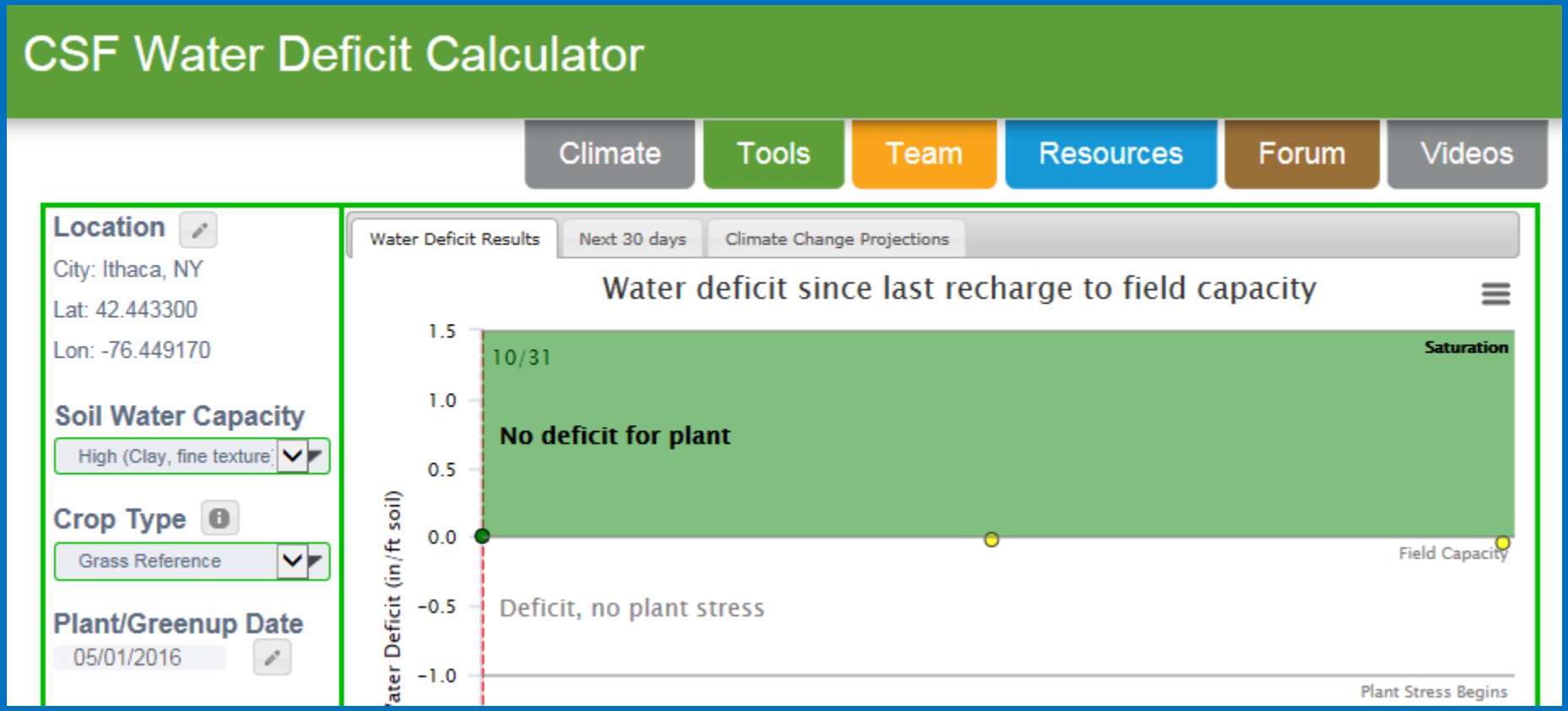
Four runoff forecasting tools

two other tools provide insight from rainfall forecasts

Easton et al., 2017 (J. Environ. Qual.)

United States Department of Agriculture
Climate Hubs

Cornell's Water Deficit Calculator

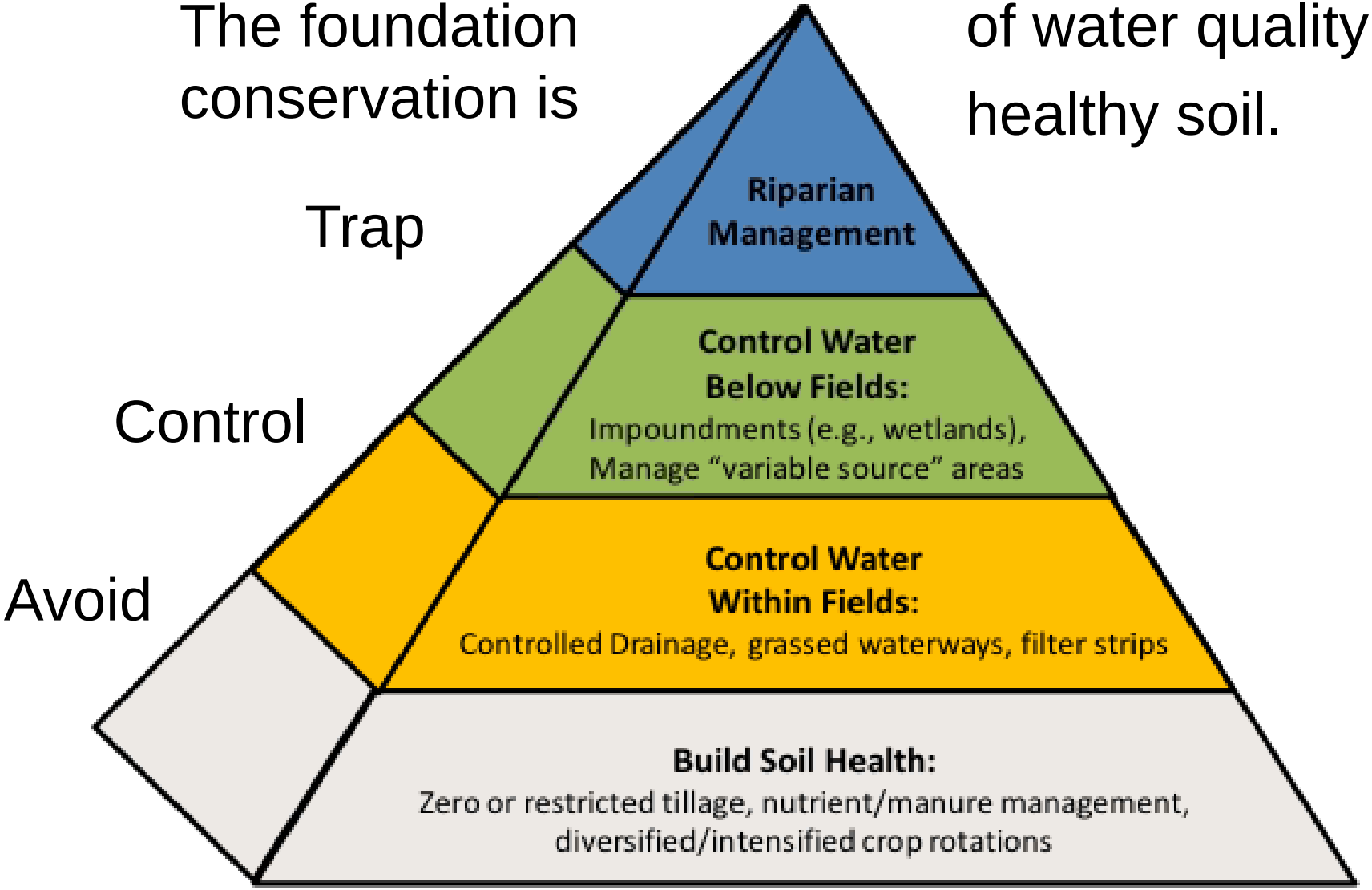


http://climatesmartfarming.org/tools/

United States Department of Agriculture
Climate Hubs

Adaptations and Rationale

The foundation of water quality conservation is healthy soil.



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Climate Hubs

Adaptation Strategies

(purposes of adjustments or transformations)

1. Sustain fundamental functions of soil and water.
2. Reduce existing stressors of crops and livestock.
3. Reduce risks from warmer and drier conditions.
4. Reduce the risk and long-term impacts of extreme weather.
5. Manage farms and fields as part of a larger landscape.
6. Alter management to accommodate expected future conditions.
7. Alter agricultural systems or lands to new climate conditions.
8. Alter infrastructure to match new and expected conditions.

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Different Approaches

for different types of agriculture

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Climate Hubs

This is what we do!

II. Conservation Values 3

A. Voluntary Approach 3

B. Practical Solutions that Fit Site-Specific Needs 3

C. Use of Conservation Systems 4

D. Adaptive Management 5

E. Science-Based 5

F. Strong Productivity Components Mutually Compatible to a Healthy Environment 5

NRCS Pennsylvania Strategic Plan 2016 to 2020

Newsroom General Conservation Publications

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An example of policy scale application

Sector	BMP Name	Climate Adaptation	Energy Efficiency	Flood Control/ Mitigation
Agriculture	Ag Forest Buffer	2.5	0.5	3.5
Agriculture	Ag Shoreline Management	0.0	0.0	4.0
Agriculture	Ag Stream Restoration	2.0	0.0	0.0
Agriculture	Ag Tree Planting	2.0	1.5	2.0
Agriculture	Agricultural Ditch BMPs	0.0	1.0	-1.0
Agriculture	Alternative Crops and Alternative Crop/Switchgrass	0.0	0.0	1.0

Source: Estimation of Best Management Practice Impact on Chesapeake Bay Program Management Strategies (Tetra Tech, 2017)

Co-benefits of reducing loads to the Chesapeake Bay

United States Department of Agriculture
Climate Hubs

Questions ?

Dan Dostie daniel.dostie@pa.usda.gov
Joan Howard joan.howard@gnb.usda.gov
https://adaptationworkbook.org/

Pete Vanderstappen (NRCS) and Dan Dostie (NRCS) were introduced and provided updated information on the NRCS Technical Guide Report.

Pete gave a brief update on PA NRCS Technical Guides. He noted that there were three Tech Guides currently out for comments: 578 – Stream Crossing; 587 – Structure for Water Control and 638 – Water and Sediment Control Base. Tech Guide 313, Waste Storage Facilities, is in revision and will be going out for comments in the near future.

Dan provided an update on Ecological Practices indicating there were several out for comments. He drew attention to a Fact Sheet, Hedgerow Planting – 422, Vegetative Environmental Buffers for Poultry Houses dated April 2018. A copy of which was provided as a hand-out (See attached). He continued on to explain the contents and purpose of the document.

Hathaway Jones (NRCS) was introduced and provided Easement Programs updates. She indicated that progress is being made on finishing up on WRP restoration practices which was repealed by Farm Bill 2014. These contracts will be finished up by September 30th as required. She also noted that NRCS is working on a Co-op agreement with RCPP to preserve 6 farms across Pennsylvania this year. NRCS is bringing funding to this project in the amount of one million dollars. Denise Coleman added that currently there are 35 to 40 restoration projects underway across the commonwealth.

United States Department of Agriculture

Hedgerow Planting - 422

Vegetative Environmental Buffers for Poultry Houses

Conservation Practice Information Sheet ***April 2018***

INTRODUCTION

The NRCS Hedgerow Planting Conservation Practice code 422 may be used to strategically arrange trees, shrubs and grasses around poultry houses to improve the environment for birds, producers, and neighbors as well as increase the efficiency of producing poultry meat and eggs. Part of a system of conservation practices known as Vegetative Environmental Buffers (VEBs) for Poultry Farms, certain Hedgerow Plantings can be grown for different purposes including filtering, buffering, screening, shading, or production of biomass (**Figure 1)**.

Figure 1

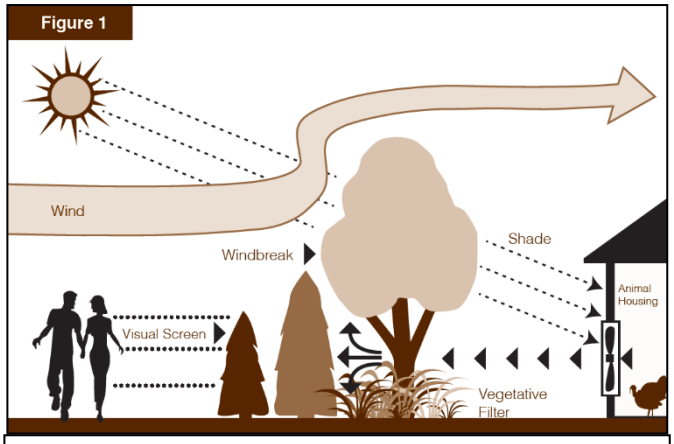


Figure 1 Vegetative Environmental Buffers around poultry farms *(Inside Agroforestry Volume 25, Issue 3)*

PURPOSES of VEBs around Poultry Houses

Trees and shrubs can be planted around poultry houses to provide shelter from winter winds; reduce dust and odors from exhaust fans; and create visual screens and beautify the farm. Tall, stiff-stemmed warm-season grasses can be planted near poultry house ventilation fans to help trap finer dust particles, reduce the dispersal of ammonia, odors, and even viruses, sequester additional carbon, and enhance the visual screen. (**Figure 2**).

Grasses have a large number of stems and relatively small leaves that provide a dense barrier to fan emissions. Warm-season grasses are more tolerant of heat and drying winds than most trees or shrubs. They may be planted alone or in front of trees or shrubs to provide an initial filter for ventilation fan emissions, slow exhaust air speed, and protect subsequent rows of shrubs and trees.

Figure 2. *Warm-season grasses planted near the ventilation fans, either alone or as an initial barrier in front of trees.*

Certain tree species may be allowed to grow tall and provide shade over barns to reduce solar heat loads and lower summer cooling expenses. When desired, switchgrass, willows, and possibly poplar plantings can be managed as a renewable source of shavings for use as bedding. The spent litter can also be used as a biofuel replacement for propane as a source of heat. Scrubbers and filters can be used to reduce pollution emissions from fuel combustion. By growing one's own renewable biofuel, carbon stored on the farm can offset carbon escaping the farm during one's lifetime.

Plants with best survival results

Common Name	Survival Percentage
Coastal panicgrass	100
Switchgrass var. Timber	100
Switchgrass var. Northwind	100
Switchgrass var. Thundercload	91
Prairie Cordgrass var. Southampton	100
Chinkapin var. Golden	100
Common Hackberry	100
Dwarf Hackberry	100
Eastern Redcedar	75
Honeylocust	100
Netleaf Hackberry	100
Purpleosier Willow (Streamco)	100
Red Maple	100

Land owners and managers please note: *If you receive financial assistance for your hedgerow, be sure to check with your funding agency/organization for specific management requirements.*

Why is Adapting to Change Important?

A land manager needs to understand the science-based rationale behind their decisions and actions to sustain an operation's production, profits, and stewardship under more extreme weather and seasonal climate variations. The 5-step process helps the land manager make climate-informed decisions that connect the effects of specific on-farm actions back to broad strategies and intent. This way management can overcome weather and climate related challenges or take advantage of opportunities, meeting the operation's goals and objectives.

Resources and Tools for Making Climate-Informed Decisions

The Adaptation Workbook is a website (https://adaptationworkbook.org/) that can help decision-makers organize information in a self-guided, step-by-step manner. The workbook helps land managers connect monitoring data back to planned actions as well as the risks, vulnerabilities, or opportunities they address. To facilitate each of the 5 steps, land managers gather the following information about their operation, climate region, and known adaptation responses:

Step	Resource or Tool
Define	Business and conservation plans
Assess	Local weather and climate impact assessments
	Operation-specific vulnerabilities and risks
Evaluate	Decision Support Tools
Identify	A Menu of adaptation strategies and approaches
	Locally relevant tactics for each broad response
Monitor	Tools to track effectiveness of actions and adjust

Where Can I Learn About Climate Impacts, Vulnerabilities, Risks?

General climate change effects on agriculture and natural resources already observed and anticipated are summarized in USDA Technical Bulletin 1935 **Climate Change and Agriculture in the United States: Effects and Adaptation**. Many other resources exist that assess impacts, vulnerabilities, and risks at global, national, regional, and state scales. To identify locally and industry relevant resources, contact your nearest USDA Regional Climate Hub. USDA Climate Hubs not only organize agency resources, but also provide access to University scientists and other partners engaged in providing education about climate science, weather variability, and the effects of climate change on working lands.

Where Can I Learn About Potential Adaptations and Rationale?

USDA Climate Hubs and their University and other partners also provide resources about known adaptive actions. Several resources offer a menu of adaptation options for land managers to consider. Adaptation menus organize on-the-ground (farm, ranch and landscape scale) example tactics under various approaches. These approaches may also consist of broad strategies commonly applied across systems and landscapes.

For more information, see the adaptation workbook website or these publications:

"Adaptation Resources for Agriculture: Responding to Climate Variability and Change"

"Forest Adaptation Resources: climate change tools and approaches for land managers, 2nd edition"

Ultimately specific adaptive actions must be developed to meet individual needs that consider the crop, livestock, or forestry system, site conditions, landowner goals, manager objectives, legal, market, and all other factors unique to the operation.

Acknowledgements

Due to challenging planting conditions near poultry houses and exhaust from fans that can hinder or kill some plants while stimulating growth in others, research and outreach on VEBs has been carried out by NRCS and partners for over ten years:

USDA's Agricultural Research Service and the University of Delaware and the have worked to quantify VEB effectiveness through a NRCS Conservation Innovation Grant (CIG).

The Penn State University has demonstrated through a NRCS Conservation Innovation Grant (CIG) methods of establishing and harvesting VEBs for environmental stewardship and biomass useful as litter and biofuel needed to provide heat or power.

NRCS offers farmers cost share incentives to plant hedgerow (422) VEBs in front of poultry facility exhaust fans, shelterbelts (380) around the farmstead, and filter strips (393) or forested buffers in riparian areas (391) through the Environmental Quality Incentive Program (EQIP).

NRCS's Norman A. Berg Plant Materials Center in Beltsville, MD has tested the performance of plant tolerance to emissions.

The Delmarva Poultry Industry Association has worked to encourage producer adoption of VEBs.

USDA's National Agroforestry Center also promotes VEBs for Poultry Houses through their Agroforestry Notes.

References:

Plants Tolerant of Poultry Farm Emissions in the Chesapeake Bay Watershed
https://www.nrcs.usda.gov/Internet/FSE_PLANTMATERIALS/publications/mdpmcsr12671.pdf

NRCS Practice Design Specifications may be found in the following documents in the section IV of the NRCS Pennsylvania Field Office Technical Guide:

- Conservation Practice Standard Hedgerow Planting (422)
- Trees and Shrubs for Poultry House Hedgerow Planting Fact Sheet
- Warm Season Grasses for Poultry House Hedgerow Planting Fact Sheet

Additional Information:

Pennsylvania State University Vegetative Buffers
http://extension.psu.edu/animals/poultry/nutrient-management/vegetative-buffers

Prior to introducing Susan Kubo (NRCS), Denise addressed the current Dairy Crisis and the possibility of contract cancellations by producers due to economic and financial hardships, and how those will be handled.

<u>Susan Kubo (NRCS)</u> presented a update concerning cancellations, terminations and liquidated damages. (See attached handout.) Susan provided detailed information on contract cancellations and terminations and what procedures producers must follow to effectively terminate a contract should a financial hardship would arise. Susan also provided an update on EQIP and CNMP.

Cancellations, Terminations and Liquidated Damages

State Technical Committee

April 18, 2018

Contracts

Contract Modifications

- Situations arise
- Minor modifications
- Prohibited modifications
- Most modifications
- Cancellations and Terminations

Cancellations

- Death
- Major Illness
- Natural Disasters
- Bankruptcy
- Destruction of farm through fire or theft
- Eminent Domain
- Military service
- Other economic or personal hardship

Cancellation

- Must provide an explanation
- Must substantiate their claim
- Condition must have materialized since the contact was obligated.

Termination

- Ineligibility
- Loss of control of land
- Violation of the terms of the contract
- Failing to install, operate or maintain practices
- Threat to the health and safety of NRCS employees
- Misrepresentation, scheme or device, or fraudulent representation

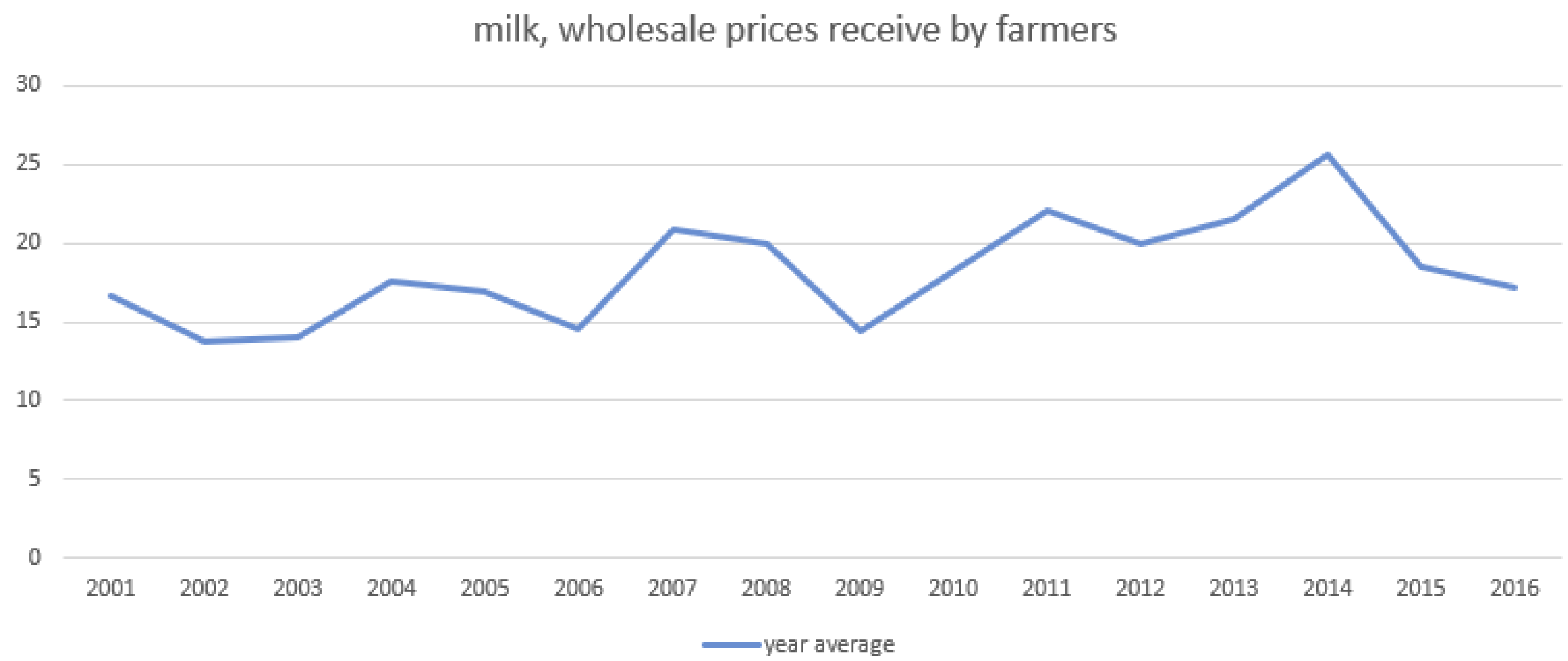
Liquidated Damages

In the event a Participant violates the terms of this Contract, the Participant voluntarily terminates this Contract before any contractual payments have been made, or this Contract is terminated with cause by CCC, the CCC will incur substantial costs in administering this Contract which may not be possible to quantify with certainty. Therefore, in addition to the refund of payments as set forth in Paragraph 11 of this Appendix, the **Participant agrees to pay, at the time of termination, liquidated damages in an amount equal to 10 percent of the total financial assistance obligated to the Participant in this Contract,** at the time of obligation. This liquidated damages payment is for recovery of administrative costs and technical services and is not a penalty.

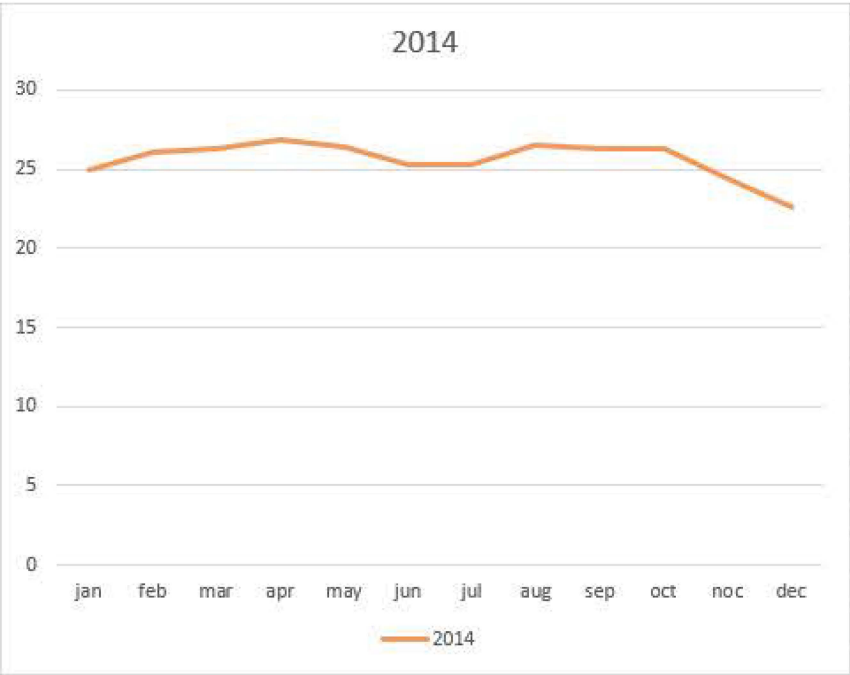
Cancellation or Termination?

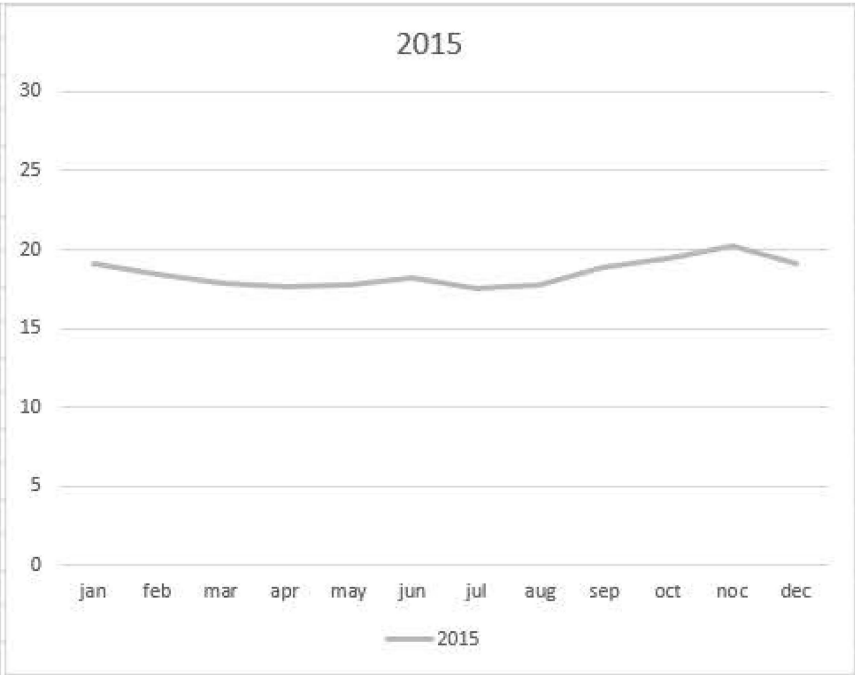
- What constitutes economic or personal hardship?
  - Didn’t realized how much they would have to pay
  - Changed their mind
  - Decided they want to do something different or not do what is in the contract
  - Fluctuating milk prices

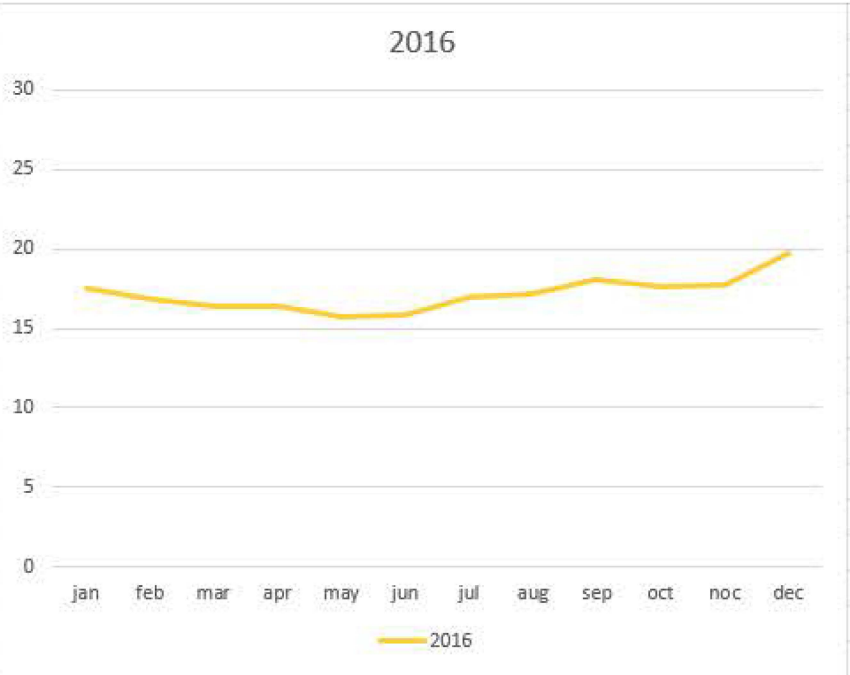
Fluctuating Milk Prices



Fluctuating Milk Prices







Proposals

1. Producer provides data that show an extended downward trend (20% reduction or more) ongoing for more than 2 years; or
2. Producer provides a letter from their ag lender or accountant showing their Debt Ratio has dropped below 1.

Recommendation

- Provide a guide for Field Staff for discussing contract expectations with applicants
- Recommend participant obtain a cash flow analysis or economic evaluation prior to signing

Termination with Liquidated Damages

Issue: High dollar contracts

Liquidated Damages

- The STC is encouraged to waive cost recovery and liquidated damage assessments that total $1,000 or less, as being in the public interest.
- Following consultation with the State Technical Committee, the STC may supplement this paragraph to identify additional considerations for evaluating CPC participant requests for full or partial waiver of the cost recovery amount.

Recommendation

- Waive liquidated damages > %15,000.

- State Technical Committee Subcommittee
  - 3 month commitment
  - If interested or have insights, please contact Susan Kubo before Monday, 5/14

susan.kubo@pa.usda.gov or (717) 237-2216

<u>Noel Soto (NRCS)</u> gave an update on CIG funding and CSP. He indicated that CSP has 231 obligations for 2018.

<u>Susan Marquart (NRCS)</u> reported on the Regional Conservation Partnership Program (RCPP). She reviewed the statistics shown for RCPP in the Pennsylvania NRCS FY-2017 Accomplishments report. (See attached handout.)

Being no further business to discuss, the meeting was adjourned by Denise Coleman. She also asked if anyone had ideas of items to discus at our next meeting which will be held on July 19th, 2018 at 1 pm.

NOTE: A recording of this meeting is available upon request.

STATE TECHNICAL COMMITTEE
ATTENDANCE

NAME	ORGANIZATION/ AGENCY/ COMPANY	E-MAIL ADDRESS (if different/changed since last meeting)	MAILING ADDRESS or PHONE # (if e-mail not available)	How did you hear about this meeting?		
				e-mail	newspaper	other (specify)
Chris Sigmund	Team Ag	chriss@teamaginc.com	717.721.6795	✓		
Fran Schneider	SCC	fschneider@pa.gov	717-599-6663	✓		
Laurel Etter	Land Studies	laurel@landstudies.com	717-627-4440	✓		
Jake Tomlinson	Trout Unlimited	jacob.tomlinson@tu.org	570-772-7969	✓		
Bob Hedin	Hedin Environmental	same	412 5712204			
Susan Parry	NRCS					
Danielle Roskovich	PAWA			✓		
David Boose	York Ag Land Preservation	doboose@yorkcountypa.gov	717-840-7460	✓		
Abigail Appleman	NRCS	abigail.appleman@pa.usda.gov				
Katie Turner	The Nature Conservancy	katie.turner@tnc.org	717-307-1002	✓		
Kelly O'Neill	CBF	koneill@cbf.org	717-200-4532	✓		
Diana Day	PA Fish & Boat	didayc pa.gov	717 346-8137	✓		
Curtis Schreffler	USGS	clschref@usgs.gov	717.730.6913	✓		
Bill Neilson	PFB	waneilson@pfb.com	717-761-2740	✓		
Kurt Bond	Pheasants Forever	kbond@pheasantsforever.org	570-490-0199	✓		
PATRICK BOWLING	DEP-BSDW			✓		
ED SANDERS	NRCS					
ERIC JESPERSEN	PA MAGIC	ecj@epix.net	717 475 7869			—
Katie Ombalski	Woods and Waters Consulting	katie@woodswaters.com	814-574-7281	✓		
Pete Vanderstappen	USDA NRCS	pete.vanderstappen@pa.usda.gov	717-237-2228			
Franklin Egan	PASA	franklin@pasaforming.org	814 349 9856	✓		
Gary Gilmore	DCNR	ggilmore@pa.gov		✓		
Kelly O'Donnell	PA Dept. of Ag	~~[illegible]~~		✓		

STATE TECHNICAL COMMITTEE
ATTENDANCE

NAME	ORGANIZATION/ AGENCY/ COMPANY	E-MAIL ADDRESS (if different/changed since last meeting)	MAILING ADDRESS or PHONE # (if e-mail not available)	How did you hear about this meeting?		
				e mail	newspaper	other (specify)
Doug Goodhouse	PA DEP	dgoodhouse@pa.gov	717-772-0141			
Marel King	CBC	mking@chesbay.us		✓		

Individuals who were present but didn't sign the Sign-in Sheet:

Susan Marquart	NRCS
Tim Kinney	NRCS
Dan Dostie	NRCS
Denise Coleman	NRCS
Susan Kubo	NRCS
Peter Hoagland	NRCS
Jim Gillis	NRCS

Individuals who were present via Toll Free Number Conference Call:

Greg Hostettler	PA Dept of Ag
Jennifer Farabaugh	Western PA Conservancy
Adam Tarr	Sen. Casey's Office
Jared Shippey	NRCS – DuBois, PA
Amanda Balin	Big Maple Farms
Mark Dubin	Univ of Maryland
Joe James	ATP-PA LLC
Adam Vattick	Western PA Conservancy
Jack Weaver	Hedden Environmental
Franklin Egan	Soil Health Benchmarking, PASA
Eric Jespersen	Hydrography

Pennsylvania State Technical Committee Meeting

April 18, 2018

Denise Coleman (NRCS) opened the meeting by welcoming all to the Pennsylvania State Technical Committee Meeting by introducing all in attendance and those participating by tele-conference.

Denise then recognized and thanked Abigail Appleman, (NRCS) Outreach Coordinator, Tim Kinney (NRCS) and Alexis Tirado (FSA) for their efforts in producing inroads with the Hispanic Community. Tim and Alexis worked on the establishment of the NRCS Spanish Website. She announced that we now have twenty Hispanic producers contracted and are expecting more.

00/10/45 - Jake Tomlinson of Trout Unlimited was introduced, and assisted by Dr. Bob Hedin of Hedin Environmental, made a presentation concerning details of their CIG Phosphorus Project. (See attached hand-outs.)

00/38/37 - Dan Dostie (NRCS) was introduced and provided a very interesting presentation concerning climate change. (See attached hand-outs.)

01/07/36 - Pete Vanderstappen (NRCS) and Dan Dostie (NRCS) were introduced and provided updated information on the NRCS Technical Guide Report.

Pete gave a brief update on PA NRCS Technical Guides. He noted that there were three Tech Guides currently out for comments: 578 – Stream Crossing; 587 – Structure for Water Control and 638 – Water and Sediment Control Base. Tech Guide 313, Waste Storage Facilities, is in revision and will be going out for comments in the near future.

Dan provided an update on Ecological Practices indicating there were several out for comments. He drew attention to a Fact Sheet, Hedgerow Planting – 422, Vegetative Environmental Buffers for Poultry Houses dated April 2018.

A copy of which was provided as a hand-out (See attached). He continued on to explain the contents and purpose of the document.

01/11/34 - Hathaway Jones (NRCS) was introduced and provided Easement Programs updates. She indicated that progress is being made on finishing up on WRP restoration practices which was repealed by Farm Bill 2014. These contracts will be finished up by September 30th as required. She also noted that NRCS is working on a Co-op agreement with RCPP to preserve 6 farms across Pennsylvania this year. NRCS is bringing funding to this project in the amount of one million dollars. Denise Coleman added that currently there are 35 to 40 restoration projects underway across the commonwealth.

Prior to introducing Susan Kubo (NRCS), Denise addressed the current Dairy Crisis and the possibility of contract cancellations by producers due to economic and financial hardships, and how those will be handled.

01/14/36 - Susan Kubo (NRCS) presented a update concerning cancellations, terminations and liquidated damages. (See attached handout.) Susan provided detailed information on contract cancellations and terminations and what procedures producers must follow to effectively terminate a contract should a financial hardship would arise. Susan also provided an update on EQIP and CNMP.

01/54/20 - Noel Soto (NRCS) gave an update on CIG funding and CSP. He indicated that CSP has 231 obligations for 2018.

01/57/28 - Susan Marquart (NRCS) reported on the Regional Conservation Partnership Program (RCPP). She reviewed the statistics shown for RCPP in the Pennsylvania NRCS FY-2017 Accomplishments report. (See attached handout.)

Being no further business to discuss, the meeting was adjourned by Denise Coleman. She also asked if anyone had ideas of items to discus at our next meeting which will be held on July 19th, 2018 at 1 pm.

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