Agroforestry EPEG Status Update and Agriculture WG Pulse Check

June 12, 2025

Ruth Cassilly, UMD CBPO

Bottom Line Up Front:

I. **Informational:** Remind and update the workgroup about the charge of the EPEG, and where we are in the process.

II. **Action**: In response to the preview of the expected recommendations, seek comments/questions from the group before we begin drafting the EPEG Report (including the "technical appendix").

I. Agroforestry Expert Panel Establishment Group (EPEG) Update:

- **Review**: Why was the EPEG formed?
- **EPEG Process**: Steps taken during the EPEG evaluation
- **Deliverable**: EPEG Report (details data/research/information, process, considerations, recommendations regarding BMP crediting), planned for June-July (compose) and August (EPEG approval)
- **Timeline for EPEG Report Review and Approval** (consider report recommendations and approve)

  Agriculture WG, Forestry WG, WTWG ⟶ WQGIT

Review: Why was the EPEG formed?

- At the request of members of the Forestry and Agriculture Workgroups, the Agroforestry EPEG was formed in August 2024 to evaluate the NRCS Conservation Practice Standards (CPS) Silvopasture 381 and Alleycropping 311 for their water quality benefits and consider them for Chesapeake Bay Program BMP crediting

Rationale:

- USDA Forest Service Chesapeake Forest Restoration Strategy, Eastern Region State and Private Forestry | NA-IN-03-13 | Revised September 2020- Section 3 - Restoration in Agricultural Landscapes
- These practices are increasingly being implemented in most Bay jurisdictions and provide multiple benefits beyond water quality improvement, including resilience to changing environmental conditions
- In addition to NRCS support, many jurisdictions have state level standards for these practices and are providing technical assistance, cost-share and grant funding towards implementation, there is also growing private sector and non-profit support

EPEG Process/Steps for Evaluating the BMPs:

Definitions	• a clear and concise definition of the practice and why an evaluation is being considered- water quality benefits
Current Science	• references to available science/data on the on the nutrient and sediment reduction efficiencies to support the request
Tracking & Reporting Info	• types of data the jurisdiction(s) currently track and report, and how the request could impact these efforts
Support for Panel	EPEG determined credit is warranted and recommended method is based on existing land-use loading rates; can but does not require the formation of an Expert Panel

Definition of practices: Used NRCS Conservation Practice Standards as a starting point- made modifications

NRCS Practice	Altered NRCS Definition	Conditions Where Practice Applies:	Purpose
Alley cropping 311	**Trees or shrubs planted in sets of single or multiple rows integrated with agronomic, horticultural crops or forages produced in the alleys between the sets of woody plants that produce additional products.** **Key Additional Criteria for BMP**: Minimum percentage of canopy coverage per acre, **based on existing NRCS/state practice recommendations**	On all cropland and hayland where trees, shrubs, crops, and forages can be grown in combination.	•Enhance microclimatic conditions to improve crop or forage quality and quantity. • **Reduce surface water runoff and erosion.** • **Improve soil health by increasing utilization and cycling of nutrients.** • **Alter subsurface water quantity or water table depths**. • Enhance wildlife and beneficial insect habitat. • Increase crop diversity. • **Decrease offsite movement of nutrients or chemicals**. • Increase carbon storage in plant biomass and soils. • Develop renewable energy systems. • Improve air quality.

Red text denotes changes and additional criteria the EPEG added to the existing NRCS CPS to qualify as a CBP BMP

NRCS Practice	Altered NRCS Definition	Conditions Where Practice Applies:	Purpose
Silvopasture (381)	**Establishment and management of desired trees and forages on pasture.** **Key Additional Criteria for BMP:** tree addition only, forage management, precision/prescribed grazing (precursor to impending NRCS change), minimum percentage of canopy coverage per acre- **based on NRCS/state practice recommendations**	May be applied on any **pasture** that is suitable for the desired forages, trees and livestock	•**Improve water quality.** •**Reduce erosion**. •Enhance wildlife habitat. •Improve biological diversity. •**Improve soil quality**. •Increase carbon sequestration and storage- Tree/Shrub planting on grazed grasslands only •Provide for beneficial organisms and pollinators.

Red text denotes changes and additional criteria the EPEG added to the existing NRCS CPS to qualify as a CBP BMP, only silvopasture establishment by the addition of trees will be credited

Where we are in the EPEG Process

Request from WG to evaluate a BMP:
1. Agroforestry EPEG Charge approved by FWG, AgWG, WQGIT **May 2024**
2. Formed EPEG: member approval, orientation, gather research/information for BMP evaluation- **August 2024**

**Request was sent to the Water Quality GIT for review*

STEP 1

Consensus: BMP definitions and water quality benefits, crediting, produce EPEG report recommendations **June 2025**

******E.g., if BMP is comparable to previously approved BMPs, lacks sufficient available scientific data, is comparable to another panel request, etc.***

STEP 2

Expert Panel (EP) is recommended & formed to establish BMP credit

Expert Panel (EP) is NOT recommended: **EPEG Report: efficiency credit recommended**

STEP 3: Must be approved by AgWG, Forestry WG, WTWG, WQGIT

BMP Protocol Excerpt: This Protocol in its entirety will be reviewed by the CBP partnership on an as-needed basis to incorporate new information and/or changes to process based on input received from the CBP partnership.

- **Requests for Evaluation of New Technologies and Practices**

  a) A clear and concise definition of the practice including common versions of the practice that are either explicitly included or excluded from the requested practice.

    a. Specific scientific information on how the practice reduces nitrogen, phosphorus, and/or sediment, and the sources/loads that will be treated.

  b.) References to available science/data on the nutrient and sediment removal efficiencies with the contact information and affiliation of the lead researchers, including the geographical location of where the data was collected.

  c.)Types of data the jurisdiction(s) currently track and report for a practice

  d) A general description of how the panel will be supported, if convened. For example, identification and provision of any funding needed to convene and execute the panel, as well as a coordinator and supporting staff.

Alternatively, these groups may determine that the requested BMP is comparable to, or represents an improvement relative to, a previously approved practice

Precedent for this approach- Crediting evaluation sponsored by the *AgWG for the Agricultural Stormwater Management BMP in Phase 6 was conducted by an EPEG, resulting in a formal report and approval for crediting

* The Ag WG's EPEG process was fully reviewed and approved by the CBP partnership from the workgroups (AgWG and WTWG) all the way up to the WQGIT in supplement to the BMP Protocol.

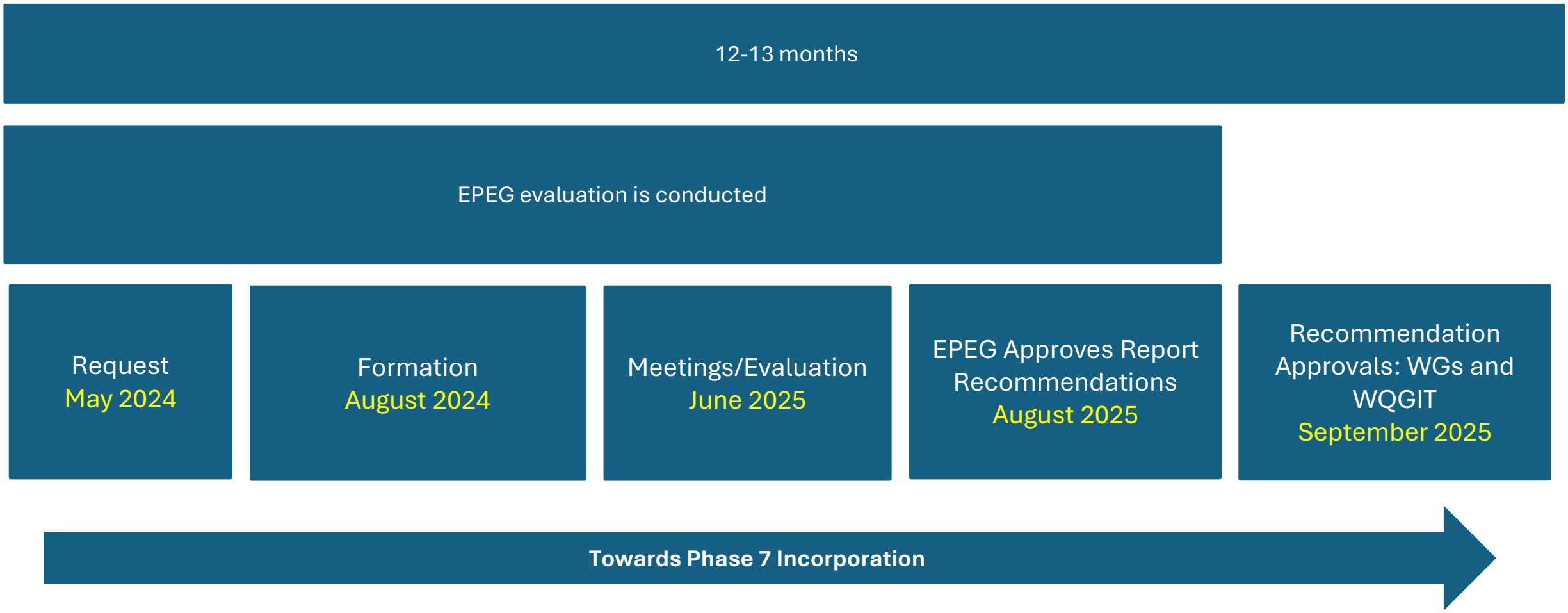
Deliverable: EPEG Report- Finalized August 2025

****EPEG Report will detail the process, data, research, supporting information, considerations, and the final recommendations regarding BMP crediting of alleycropping and silvopasture**

- Group agreed that both of these practices provide water quality benefits by reducing N,P and S losses from soil
- Group emphasizes that benefits exist only if established EPEG definitions and critical management protocols are followed
- Group will recommend crediting by calculating BMP efficiency reductions for both practices based on establishing a minimum percentage of required tree canopy based on NRCS criteria
- Similar to Tree Canopy BMP crediting, but percent conversion to forested loading rate is simulated to obtain a reduction estimate- land remains in agricultural land-use
- BMPs can be applied to pasture or cropland, allow stacking of management BMPs such as nutrient management, conservation tillage, alternative pasture watering, etc. on same acreage

****Note: Final decisions concerning canopy values for crediting and additional recommendations as well as drafting, review, finalization and approval of the EPEG Report is scheduled for June-August 2025**

Timeline Overview- EPEG Report Review and Approval



II. WTWG Pulse Check:

- The finalized report with a summary of recommendations (including the "technical appendix"), will be made available to Agriculture WG members as soon as it has been approved by the EPEG, goal for that is August 2025

- The recommendations or path forward presented here is still DRAFT and subject to change based on EPEG or partners' preliminary feedback.

- AgWG questions, comments, requests for clarification or information?

Reference Slides:

DRAFT Report Recommendation Summary:

- **Credit as a variation of the existing Agricultural Tree Canopy BMP by establishing percent efficiency reductions for both practices,** to be applied to pasture or cropland respectively, allow stacking of cropland and pasture management BMPs on these acres
    - Establish efficiency values for both BMPs by calculating the load/acre reduction achieved when an established percentage of the crop or pasture acre is converted to a forested land-use loading rate, the calculated reduction would be subtracted from the existing cropland or pasture load/acre
    - Key qualifying criteria is the requirement for percent of canopy coverage per acre (model simulation only- no actual conversion of the land-use footprint)
- **Recommend a 10 year credit duration** with directive to revisit crediting methods for these practices at the end of this period or earlier (from whatever Progress year starts the reporting)
- **Revisitation** to address the current land-use misclassification (much current implementation being classified as forest harvest or suspended succession) and future conversion issue (mature trees being identified as forest in the CBP land-use imagery) and re-evaluate how the BMPs are treated in CAST

  GSAT input: in 10 years we expect significant changes in land-use imagery capabilities, may be able to map silvopasture and alley cropping BMPs explicitly and supplement with improved Ag Census data, see the conversion concern as a Phase 8 issue

Efficiency Reduction Methods: Example for Pastured Land-Use

State	Nutrient	Total Acres	Treated Acres	Untreated Acres	Method	% Reduction	Load Per Acre	Load Before BMP	Load After BMP	Total Reduction
VA	Nitrogen	100	30	70	Red5	5%	3.92	392.0	386.1	-5.88
VA	Nitrogen	100	30	70	Red10	10%	3.92	392.0	380.2	-11.76
VA	Nitrogen	100	30	70	Red20	20%	3.92	392.0	368.5	-23.52
VA	Nitrogen	100	30	70	5%Conversion	4.32%	3.92	392.0	386.9	-5.08
VA	Nitrogen	100	30	70	10%Conversion	8.63%	3.92	392.0	381.9	-10.15
VA	Nitrogen	100	30	70	20%Conversion	17.27%	3.92	392.0	371.7	-20.31
VA	Phosphorus	100	30	70	Red5	5%	0.62	62.0	61.1	-0.93
VA	Phosphorus	100	30	70	Red10	10%	0.62	62.0	60.1	-1.86
VA	Phosphorus	100	30	70	Red20	20%	0.62	62.0	58.3	-3.72
VA	Phosphorus	100	30	70	5%Conversion	4.76%	0.62	62.0	61.1	-0.89
VA	Phosphorus	100	30	70	10%Conversion	9.52%	0.62	62.0	60.2	-1.77
VA	Phosphorus	100	30	70	20%Conversion	19.04%	0.62	62.0	58.5	-3.54
VA	Sediment	100	30	70	Red5	5%	17.74	1,774.0	1,747.4	-26.61
VA	Sediment	100	30	70	Red10	10%	17.74	1,774.0	1,720.8	-53.22
VA	Sediment	100	30	70	Red20	20%	17.74	1,774.0	1,667.6	-106.44
VA	Sediment	100	30	70	5%Conversion	0.90%	17.74	1,774.0	1,769.2	-4.79
VA	Sediment	100	30	70	10%Conversion	1.79%	17.74	1,774.0	1,764.5	-9.53
VA	Sediment	100	30	70	20%Conversion	3.58%	17.74	1,774.0	1,754.9	-19.05

Simulated land-use conversion method

Existing efficiency reduction method

EOT Loads

Existing CPS Data Tracking Sheets
Example: MD NRCS Silvopasture Establishment Code 381

USDA United States Department of Agriculture

SILVOPASTURE ESTABLISHMENT
CODE 381

Maryland Conservation Practice Implementation Requirements and Certification

Cooperator Name	County	Planner	Date

Farm/Tract/Field(s)	Program/Contract No. (if applicable)	Amount Planned
		AC

Purpose (check all that apply)

- ☐ Provide forage, shade, and/or shelter for livestock.
- ☐ Improve the productivity and health of trees/shrubs and forages.
- ☐ Improve water quality.
- ☐ Reduce erosion.
- ☐ Enhance wildlife habitat.
- ☐ Improve biological diversity.
- ☐ Improve soil quality.
- ☐ Increase carbon sequestration and storage.
- ☐ Provide for beneficial organisms and pollinators.

Associated Practices

This practice may be applied alone or in combination with other supporting Maryland conservation practice standards. (check as appropriate)

☐ The following practices are needed, and have been or will be implemented:

- ☐ Brush Management (314)
- ☐ Fence (382)
- ☐ Forage Harvest Management (511)
- ☐ Herbaceous Weed Treatment (315)
- ☐ Livestock Pipeline (516)
- ☐ Nutrient Management (590)
- ☐ Prescribed Grazing (528)
- ☐ Upland Wildlife Habitat Management (645)
- ☐ Watering Facility (614)
- ☐ Other practices (specify):

☐ No associated practices are needed.

Existing CPS Data Tracking Sheets Example: MD NRCS Silvopasture Establishment Code 381

Existing Site Conditions and Brief Description of Work (check all that apply)

- ☐ Establish trees (may include shrubs) into existing pasture that contains an adequate forage stand.
- ☐ Establish trees (may include shrubs) and forage plantings on an existing field (e.g., pasture or cropland) that does not contain adequate tree cover and forage.
- ☐ Establish forage in a wooded area that is currently pastured. The existing stand of trees has an appropriate density for silvopasture. No thinning needed.
- ☐ Establish forage in a wooded area that is currently pastured. Trees need to be removed or pruned to reduce canopy shading and allow growth of desired forage.
- ☐ Other (explain):

Predominant Soil Type/Texture/Slope Class (%)

WOODY PLANTING SPECIFICATIONS

Planting Dimensions and Number of Trees/Shrubs Needed

☐ Row Layout: For each planting strip, determine the number of rows, spacing, and quantity of plants needed.1/

☐ Irregular Layout: Provide spacing on the aerial view, and list the number of plants needed per field in the table below.

Comments:

Field No. & Planting Strip Identification	(a) Length of Planting Strip (ft)	(b) No. of Rows in Strip	(c) Spacing btw. Plants in Row (ft)	Distance btw. Rows (ft)	Number of Plants Needed [(a x b) / (c)]	Companion Planting 2/ (if needed)		
						(d) Total Width (ft)	(e) Square Feet (a x d)	Acres (e / 43,560)
Totals								

1/ The calculations in this table are applicable when row widths and spacing between plants will be the same within a single row or group of rows. For variable spacing (e.g., different spacing for each species in a row, based on mature canopy size), use another method to determine the number of plants needed.

2/ If a companion planting (e.g., a non-forage cover mix of red fescue and white clover) will be seeded within the woody strip, determine total width and area to be planted.

Existing CPS Data Tracking Sheets Example: MD NRCS Alleycropping 311 Practice Implementation Requirements and Certification

United States Department of Agriculture

ALLEY CROPPING
CODE 311

Maryland Conservation Practice Implementation Requirements and Certification

Cooperator Name	County	Planner	Date

Farm/Tract/Field(s)	Program/Contract No. (if applicable)	Amount Planned
		AC

Purpose

- ☐ Enhance microclimatic conditions to improve crop or forage quality and quantity
- ☐ Reduce surface water runoff and erosion
- ☐ Improve soil health by increasing utilization and cycling of nutrients
- ☐ Alter subsurface water quantity or water table depths
- ☐ Enhance wildlife and beneficial insect habitat
- ☐ Increase crop diversity
- ☐ Decrease offsite movement of nutrients or chemicals
- ☐ Increase carbon storage in plant biomass and soils
- ☐ Develop renewable energy systems
- ☐ Improve air quality

Description of Work

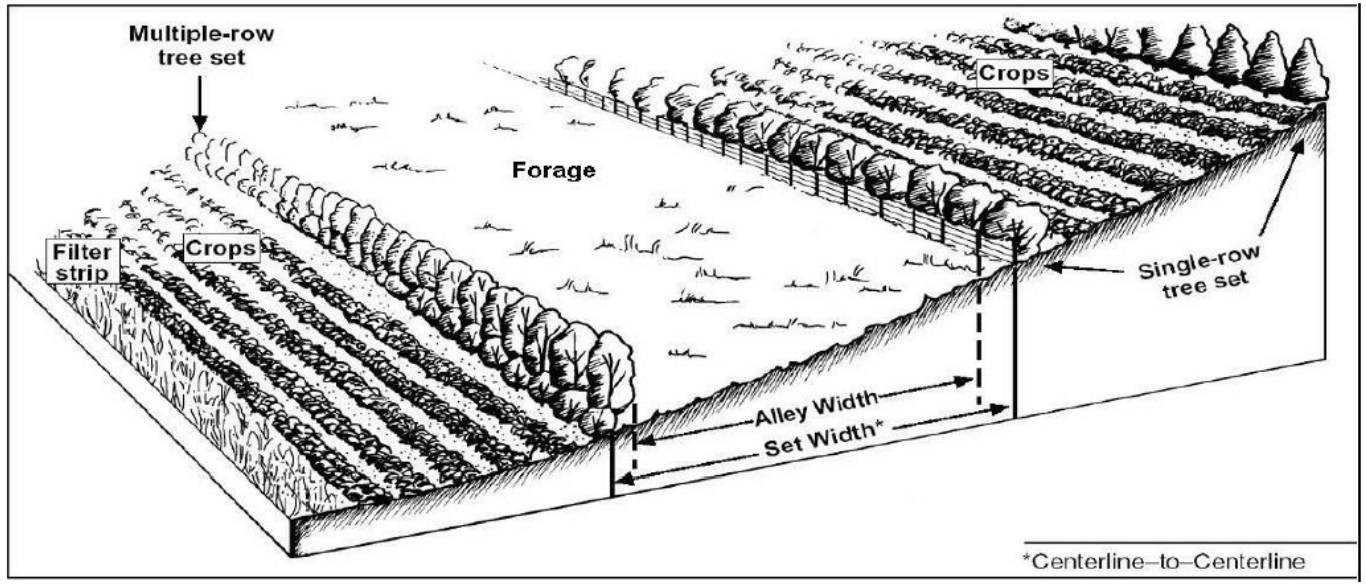
Existing CPS Data Tracking Sheets Example: MD NRCS Alleycropping 311 Practice Implementation Requirements and Certification

Description of Work		
Associated Practices (must be implemented in combination with this practice)		
Alley Width[1]	**Set Width[2]**	**Supplemental Herbaceous Cover Width**

Tree/Shrub Set Orientation

☐ North – South ☐ East – West ☐ On Contour ☐ Other: _____

1-Distance available for herbaceous crops; set equal to multiple agricultural equipment widths.
2-Distance from center of one set of trees/shrubs to center of the next set.



Additional Instructions

Notify the NRCS or SCD office when the planting is completed.

WOODY PLANTING DIMENSIONS

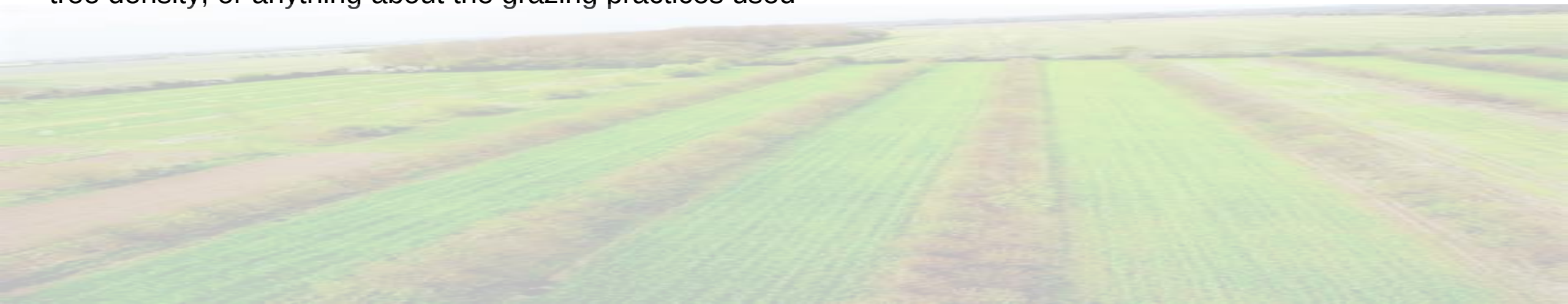
Set Number	Row Number	Spacing Within Rows	Spacing Between Rows	Number of Plants/Row

Ag Census:

2022 Ag Census Question: “At any time in 2022, did this operation practice alley cropping, silvopasture, or forest farming, or have riparian forest buffers or windbreaks?” still doesn’t allow us to separate the information out for our two practices

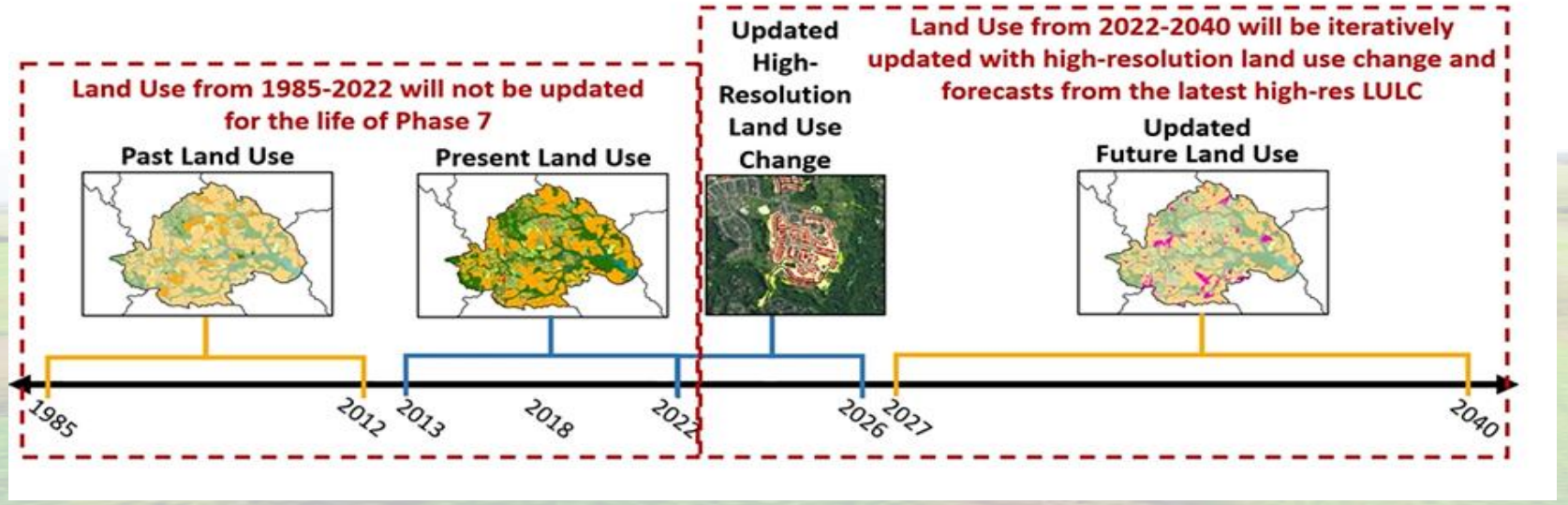
2017 Ag Census had 2 general questions about agroforestry- but the practices were not broken out

Prior to 2017:
No information addressing alleycropping practice
Only similar category to silvopasture would be “Natural or planted woodlots: Existing or newly planted forested areas where pasture is available”- no way to determine whether areas were existing or newly planted, tree density, or anything about the grazing practices used

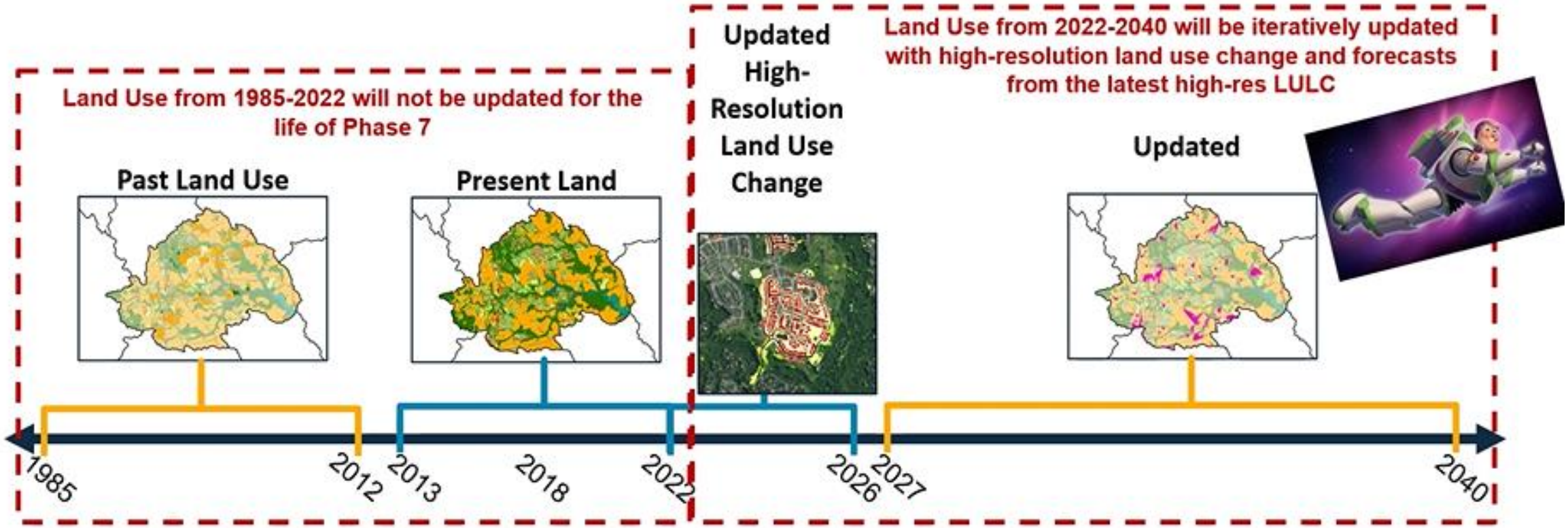


Describe current capabilities: Possible to Establish as a New Land-Use with Unique Loading Rate?

- **CBP Information**: CAST land uses are load sources with unique loading characteristics supported by the literature, expert opinion, and data, need a way to estimate land-use footprint on the landscape
  - Establishing a loading rate for a new land-use for Phase 7 CAST- land uses are being considered now; finalized late summer and will be fixed for the next 6-10 years (until Phase 8).
  - Panel or Workgroup approval to assign a loading rate similar to an existing CAST land use- ex. USWG decided solar panels and pervious should load like impervious structures and turf grass, respectively.
  - **Biggest barrier**: **Phase 7 land uses need to exist for the period 1985 – 2022**, cannot identify with imagery or data- we have no Ag Census data for specific agroforestry practices on the landscape before 2022 Ag Census (privacy issues-see next slide), states and/or NRCS have some recent practice data- but this is incomplete



Land Use Projection Beyond the Calibration Period



- Interpolation used for years beyond 2022
- Change product example:
  - 2035 adjustment =
    2035 new – 2022 original (by segment & agency)
  - applied to **CAST 2022 acres**
- Opportunity to evolve this method with explicit mapping of land use change (e.g. forest to developed)

Counties LULC **under-maps** ag compared to COA and **over-maps** compared to CLUs: West Virginia

Why are we over-mapping compared to CLUs?

Top Crops in Acres

Forage (hay/haylage), all	16,936
Corn for grain	861
Corn for silage/greenchop	278
Cultivated Christmas trees	(D)
Soybeans for beans	(D)

Grant

Top Crops in Acres

Forage (hay/haylage), all	32,758
Corn for grain	2,560
Soybeans for beans	1,465
Corn for silage/greenchop	285
Cultivated Christmas trees	(D)

Preston

Top Crops in Acres

Forage (hay/haylage), all	29,061
Corn for grain	1,358
Vegetables harvested, all	407
Soybeans for beans	334
Apples	179

Hampshire

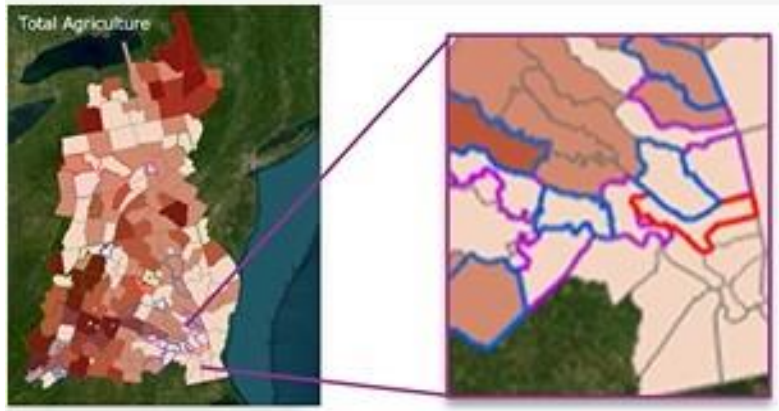
According to the Census, these counties have significant hay/haylage & alfalfa production. The LULC may be mis-classifying some of these acres as Natural Succession or Suspended Succession.

A lot of what the LULC maps as "pasture/hay" is picked up as "Rangeland" in the CLUs

However, "Rangeland" also classifies a lot of land uses outside of agriculture – including wetlands, natural succession, and forest.

Why are we under-mapping compared to COA?

CLU- Cropland Data Layer- from USDA, COA: Census of Agriculture



Counties LULC **over-maps** ag compared to COA and **under-maps** compared to CLUs: Virginia/Pennsylvania

County	FIPS	LULC	COA	Hi_COA	Lo_COA	CLU
Clearfield	42033	46,078	37,080	43,829	30,331	46,500
Henrico	51087	10,153	6,964	8,736	5,192	12,383
Lancaster	51103	13,791	7,570	9,463	5,677	16,295
Prince George	51149	20,635	15,590	19,469	11,711	23,000

Hi_COA: High COA estimate accounting for county-specific margin of error.
Lo_COA: Low COA estimate accounting for county-specific margin of error.

LULC is over-mapping ag in these counties, but just barely over the COA margin of error. The total difference in acres is not substantial.