Agroforestry Expert Panel Evaluation Group (EPEG): Status Update and Request for Input

Katie Brownson, USFS CBPO, FWG Coordinator
Ruth Cassilly, UMD CBPO
Eric Hughes, EPA CBPO, AgWG Coordinator

Review: Why was the EPEG formed?

- At the request of members of the Forestry and Agriculture Workgroups and WQGIT approval, 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 in some states, 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**: based on existing NRCS/state practice recommendations **Crediting is based on the EPEG determination of minimum percentage of canopy coverage per acre**	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), based on NRCS/state practice recommendations **Crediting is based on the EPEG determination of minimum percentage of canopy coverage per acre**	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/July 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

Major findings and recommendations

- Research supports crediting these practices for their water quality benefits if established critical management protocols are followed
- Recommend crediting by calculating a BMP efficiency reduction based on establishing a minimum percentage of added mature tree canopy
- **Comparable to Tree Planting BMP crediting (and uses partnership-approved loading rates for forest),** but percent of the acre converted to forested loading rate is simulated to obtain a reduction estimate- land remains in agricultural land-use
- Crediting will allow stacking of management BMPs such as nutrient management, conservation tillage, alternative pasture watering, etc. on same acreage
- EPEG will likely require that silvopasture must be stacked with precision intensive rotational grazing
- **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)

****Note: Final decisions and approval of the EPEG Report is anticipated July/August 2025**

Decision: 25% mature canopy minimum requirement for both practices

Rationale: Practice variability, similar criteria in terms of site design options, usage, light requirements for forages/crops

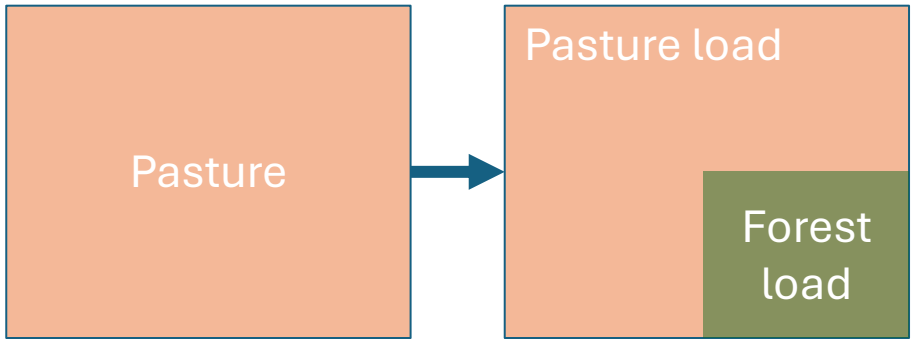
25%-35%: covers estimated minimum light needs for warm season grasses and variability of silvopasture and alleycropping system design

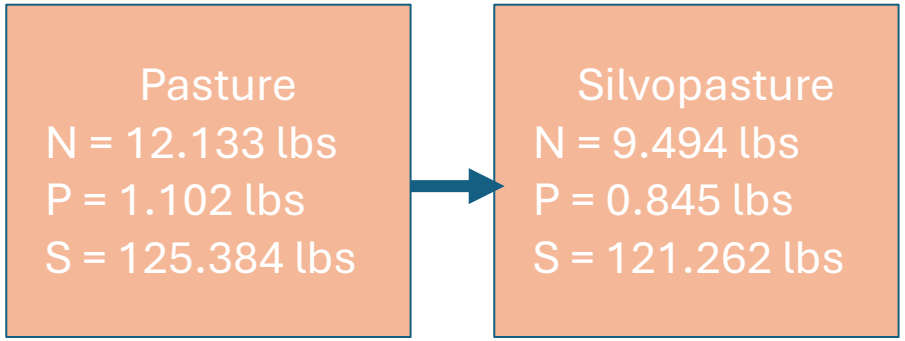
Group decided on the most conservative value to ensure majority of designs would reach this minimum

Guidance will be provided on planting density needed to achieve 25% mature canopy minimum

Silvopasture — Deriving the Efficiency N=21.75% P=23.36% S=03.29%

- Eligible on the pasture land uses
- Assume 25% of land is forest
- Reduce load from 25% of the area to the forested land use load and keep the remaining 75% of the area at the existing land use load
- Acres remain as pasture and are not shifted to a new land use category
- Report for the entire field area
- These reductions are separate from the precision grazing BMP efficiency reduction credit

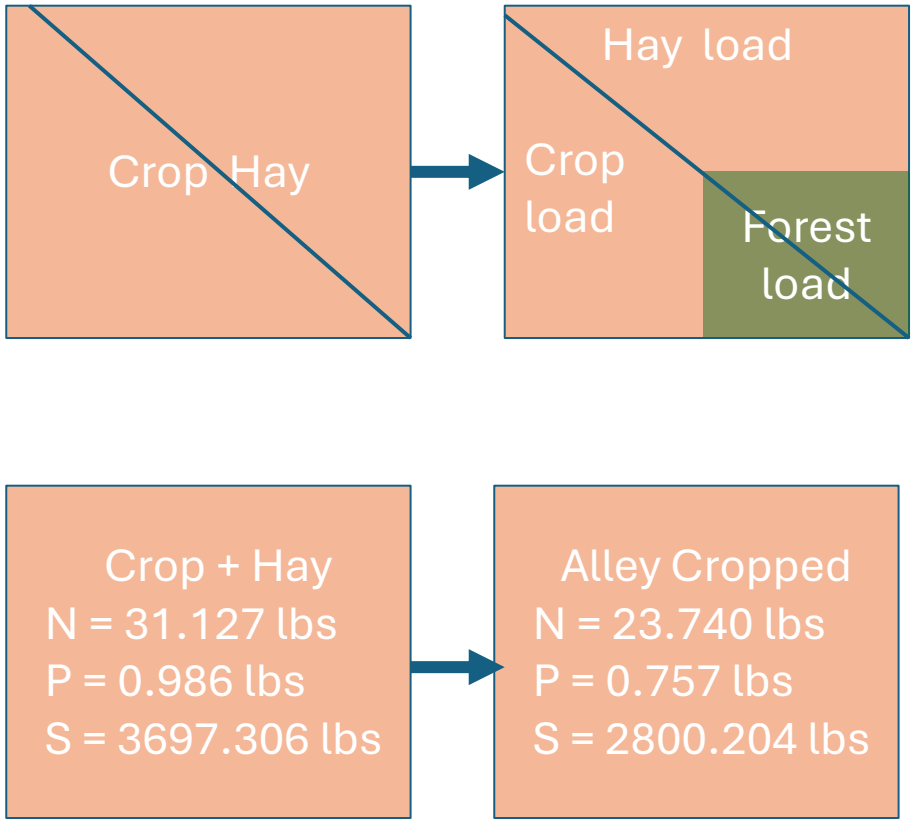




Slide courtesy of Ollivia Devereux

Alley Cropping — Deriving the Efficiency N=23.73% P=23.16% S=24.26%

- Eligible on the crop and hay land uses
- Efficiency calculated as the average load of crop and hay land uses
- Assume 25% of land is forest
- Reduce load from 25% of the area to the forested land use load and keep the remaining 75% of the area at the existing land use load
- Acres remain as crop or hay and are not shifted to a new land use category
- Report for the entire field area



Slide courtesy of Ollivia Devereux

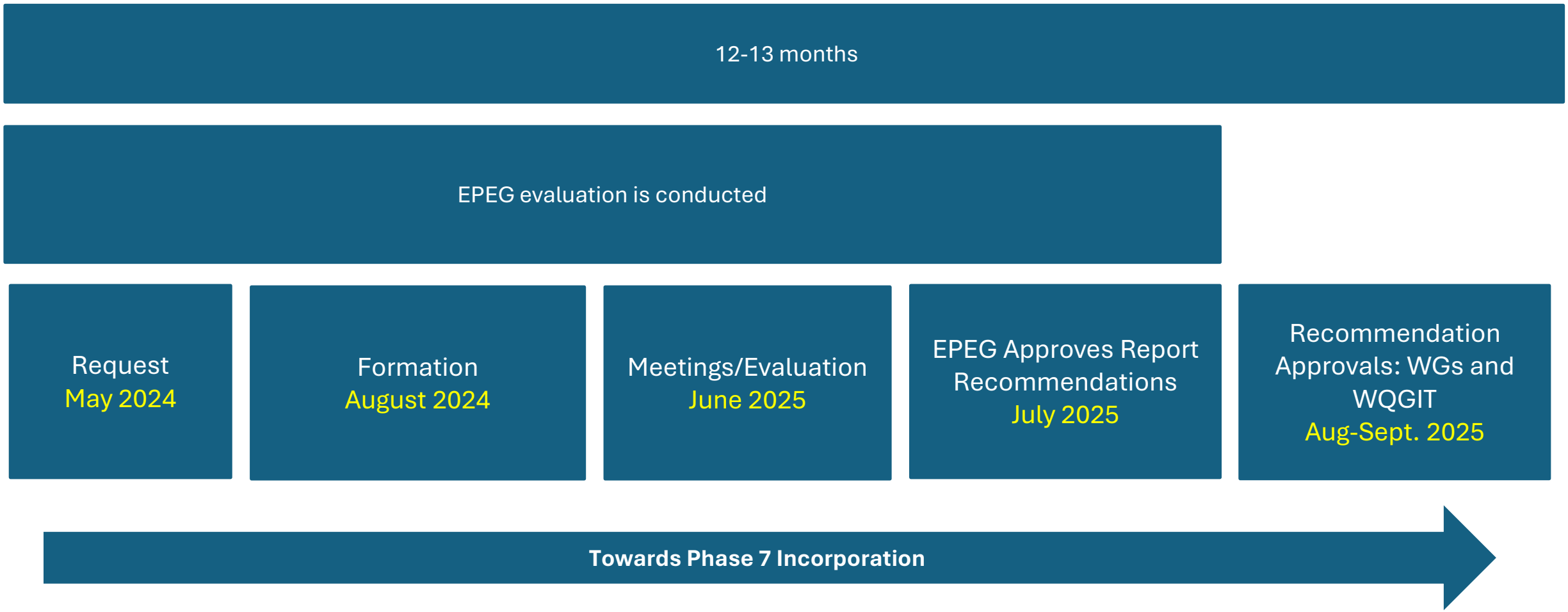
Efficiency Value Comparison: Research vs. CAST

- **Water quality improvements documented in the literature review:**
  - **Silvopasture: average reductions:**
    nutrient leaching losses (**45%**), **sediment (42%),** surface runoff (47%)
    [ranges: runoff (45–88%), soil losses (45–88%), (N –150–92%), P (– 48-91%)]
    average nutrient removal efficacy in North America of 45% (Zhu et al. 2020 meta-analysis)

  - **Alley Cropping**: Agroforestry buffer strips showed
    TN reductions 20-94%, TP reductions 17-91%, sediment reductions 0-97% (Tsonkova et al 2012 meta-analysis), lower values are coming from studies measuring reductions within the first 3-years post planting.

- **CAST Efficiency Reductions:**
  - **Silvopasture: N=21.75% P=23.36% S=03.29%**
  - **Alley Cropping: N=23.73% P=23.16% S=24.26%**

Timeline Overview- EPEG Report Review and Approval



Input Requested!

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

- Questions, comments, requests for clarification or information?

Reference Slides:

DRAFT Report Recommendation Summary:

- **Credit as a variation of the existing Agricultural Tree Planting BMP by establishing percent efficiency reductions for each practice,** 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

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