

## **DRAFT Proposed Practice Life and Credit Duration for Forestry BMPs in the Chesapeake Bay Model**

The Forestry Workgroup agreed to take a new look at Practice Life and Credit Duration that is used in CAST.

### Definitions

**Practice Life--** The length of time a practice is expected to persist. This is primarily used to analyze annualized cost-benefit. The longer the practice life, the lower the cost of establishment/year as the cost is more spread out.

**Credit Duration--** The length of time a practice can be credited in the model (CAST) before it needs to be verified. This is important for planning and administering work to assure the validity of CAST.

**Back Out--** A process by which, after a prescribed amount of time, the CB Land Use model incorporates a land conversion BMP and that practice is taken off NEIEN at that time.

### Forest and Tree Establishment

Once established, forests can grow indefinitely with little maintenance-- even in the event of a natural disaster (flooding, ice storms, etc.) -- as they are the natural land cover for this region. BMPs that are intended as “forest plantings” are ag and urban riparian buffers and urban forest plantings. These are distinguished from the “tree planting” practices (ag and urban tree planting) as they have a higher standard of planning, implementation, maintenance, and regeneration (natural regeneration can be part of forest plantings per Verification protocol).

Both forest and tree planting survival depend on site characteristics, quality of planting stock, species selected for planting, early maintenance, and weather. The primary reason that the practice life for trees/forests is not indefinite, is due to changes in site management – something that is true for all practices. As information on good planting practices and “right tree, right place” is shared and heeded, the practice life will continue to be extended. Most urban tree planting occurs on lawns and community space, less often along streets. Less is known about the life span of these “lawn” plantings.

Agricultural tree planting is distinguished from urban tree planting by occurring in lawns or fields outside developed areas. Trees may be planted as individuals, in a cluster, or in a row (e.g., the so-called narrow buffers are an example of tree planting and receive a similar credit).

The Practice Life outlined in the graph below is largely based on professional judgement.

Forestry BMPs (Pink= forest plantings Blue-=tree plantings)	Practice Life Span		Credit Duration		Back Out <sup>1</sup>
	Current	Proposed	Current	Proposed	Proposed
Ag Forest Buffer (w/o fencing- crop)	40 years <sup>1</sup>	80 years	10 years <sup>2</sup>	15 years	10 years <sup>1</sup>
Ag Forest Buffer (w/ fencing- pasture)	30 years <sup>2</sup>	“	10 years <sup>2</sup>	15 years	“
Urban Forest Buffer	40 years <sup>2</sup>	40 years	10 years <sup>2</sup>	15 years	“
(Urban) Forest Planting	28 years <sup>2</sup>	40 years	15 years then modeled as Land Use <sup>2</sup>	10 years <sup>1</sup>	“
Ag Tree Planting	40 years <sup>2</sup>	40 years	10 years then modeled as Land Use <sup>2</sup>	No change	“
Narrow forest buffers (w/o fencing)	40 years <sup>2</sup>	40 years	“	No change	“
Narrow forest buffers (w/ fencing)	25 years <sup>2</sup>	40 years	“	No change	“
Urban tree planting	40 years <sup>2</sup>	40 years	“	No change	“
Forest Harvesting BMPs	1 year	3 years	3 years then reverts to Forest Land Use	No change	n/a

<sup>1</sup> *Projection of 10 years is DRAFT* until MD DNR completes their analysis. The timeframe is based on time since the most recent imagery (i.e., plantings must be at least 10 years old at that time).

<sup>2</sup>Determined without consultation with the Forestry Workgroup.

### Buffer Practice Life

Forest plantings are given a longer Practice Life Span than Tree Planting practices. The reasoning is:

1) A forest established after 15 years, is unlikely to be converted (compare to grass buffer or single tree). Multiple landowner surveys have shown that 80-88% of landowners intend to keep their new forest buffer indefinitely (English and Hyberg 2019, Cooper 2005, Fesco 1982).

2) Forests are naturally regenerative.

3) The practice life of a forest is not dependent on fencing (fencing is for cows, not trees). After a 15-year establishment period some grazing can occur without impacting buffer function. The 2018 Farm Bill, for instance, now permits grazing in some buffers.

## Buffer Credit Duration

Forest Buffers receive a 2-part credit: 1) land use conversion, and 2) upslope processing efficiency. The Riparian Forest Buffer Expert Panel (2014) addressed these credits and when to apply them. Any modification would require a similar effort.

The Panel debated whether to delay the assignation of credit until the planting was older but decided against it. The following was excerpted from the Expert Panel report: “Some forest buffer functions are realized quickly following planting and increase as forest soil and canopy functions are rebuilt... the recommended efficiencies for forest buffers are sufficiently conservative to address any lower efficiency experienced when buffers are new.” For the first year of a buffer planting, it functions as a grass buffer which receives 70% the efficiency of a forest buffer. The first 1-4 years of establishment, the forest planting looks and functions much like a mixed-open land use, which loads slightly more than forest in CAST (i.e., for nitrogen, forest loads around 1.5 #/acre/yr and Mixed Open loads around 1.8 - 2.0#/acre/yr).

Credit duration for buffer plantings are suggested to be longer (10->15 years) because of:

- 1) Contract length (The majority of CREP forest buffers have 15 year contract commitment which includes required maintenance and oversight by USDA. Contracts can be extended another 15 years, after the initial contract period.)
- 2) Landowner investment— considerable investment is involved in establishing a forest and the landowner is unlikely to convert after establishment (see Practice Life discussion above).
- 3) Consultation with forester—as has been stated, forest plantings have a higher bar for planning, implementation and establishment and are therefore more likely to persist.

After 15 years, new buffers will need to be verified to maintain the upslope efficiency in NEIEN. While Verification of most tree practices is simplified by regular Land Use Model updates, buffers should continue to register a net gain in buffer acres in order to maintain their upslope efficiencies.

## Back Out

For forestry practice credits that can be detected in the Land Use Model after the prescribed amount of time, Back Out will be the same as Credit Duration.

The 2016 Tree Canopy Expert Panel researched the question of when planted trees are expected to be picked up in the land cover data. The following is excerpted from their Report (Cappiella et al.):

### **Recommendation 1: Decision Rule for Tree Canopy as a BMP and as a Land Use**

The high resolution imagery used by the Partnership to develop the Phase 6 CBWM land use distribution has a minimum mapping unit for tree canopy land uses of 97-ft<sup>2</sup> in area (Chesapeake Bay Image Interpretation and Mapping Standards, Chesapeake Conservancy, and pers. comm., J. O’Neil-Dunne, University of Vermont, 1/21/2016). In review of the Forecast results, a tree will, on average, meet the 97 sq. ft. threshold 10 years after planting (assuming a DBH of 1” at planting with an assumed mortality of 5%). Therefore, the recommended decision rule be that trees will require a minimum of 10 years growth after planting to reach an area necessary to be captured by high resolution imagery and mapped as a land use. Based on this decision rule,

trees planted for BMP credit in 2016 and onward will continue to be tracked as a BMP through 2025.

### **Recommendation 2: Lifespan of Annual BMP Credit (Credit Duration)**

The lifespan of the BMP credit is based on the time period until it is mapped as a land use based on the high resolution imagery analysis completed by the Partnership and i-Tree Forecast results (i.e., minimum of 10 years of growth after planting). This BMP would not be eligible for renewal in the NEIEN once it is classified as a land use to avoid double counting of tree canopy acreage.

MD DNR and the FWG are currently comparing shapefiles of trees planted 5-15 years ago to the Bay high-resolution imagery to determine the average number of years when the imagery reliably captures these plantings. At this time, we will continue to use the 10-year from the Expert Panel report mark as a placeholder, until it is supported by the current analysis.

How Buffers are Different: Back Out of forest plantings, including buffers, will also use the 10-year mark for land conversion credits to avoid double-counting of land use. The FWG proposes that the 2-part credit for buffers be separated so buffers will not continue to receive land use conversion credit after 10 years (upslope efficiencies for this practice will continue for an additional 5 years before needing re-verification--see also discussion above for Credit Duration). Preliminary feedback from Bay Program experts is that the separation of the 2 types of buffer credit can occur and be tracked in NEIEN.

### **References**

Belt et al. Recommendations of the Expert Panel to Reassess Removal Rates of Riparian Forest Buffers and Riparian Grass Buffer BMPs. October 2014.

[https://www.chesapeakebay.net/documents/Riparian BMP Panel Report FINAL October 2014.pdf](https://www.chesapeakebay.net/documents/Riparian_BMP_Panel_Report_FINAL_October_2014.pdf)

Cappiella et al. 2016. Recommendations of the Expert Panel to Define BMP Effectiveness for Urban Tree Canopy Expansion. Approved by WQGIT September 2016.

Cooper, E.R. 2005. The Attitudes and Opinions of Pennsylvania Conservation Reserve Enhancement Program (CREP) Participants Towards Riparian Buffers and Conservation Easements. A Thesis in Forest Resources Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Science, The Pennsylvania State University. State College. PA.

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Fesco, R.X., H.F. Kaiser, J.P. Royer and M. Wiedenhamer. 1982. Management practices and reforestation decisions for harvested southern pinelands. Staff Report No. AGES5821230. Washington DC.: USDA, Statistical Reporting Service.