Comments and responses on Urban Tree Canopy Expert Panel Report
Version: June 23, 2016

Source	Comment	Response	Label
	Comments are verbatim from email or the attachment sent to the panel coordinator. Comments may be separated into different rows for providing a response. Comments are organized by the source. Order is not a statement of significance, it was simpler to organize by the source and separate the statements/comments by topic within that source.		Land Use loading rate; mapping; reporting and tracking; modeling; BMP verification; future research needs; FWG proposal; edits
Marian Honeczy, MD DNR	1) The document doesn't address the different types of tree planting. Will mitigation planting be eligible as well as voluntary planting? Will WIP plantings be eligible as these are for mitigation purposes? If mitigation plantings are not to be included, I would argue that there is a misconception that all mitigation tree planting is to mitigate for tree loss. The MD Forest Conservation Act requires forest mitigation for land use change or ground disturbance - not only forest impact. Mitigation can be for ground disturbance (afforestation) as well as for forest impact (reforestation). Afforestation should be allowed to be used for UTC purposes.	The panel's recommendations do not affect the existing Forest Conservation Act BMP that is currently tracked and reported in the Phase 5.3.2 Watershed Model. Generally, credit toward TMDL nutrient and sediment targets are not applicable for practices installed for regulatory mitigation purposes (e.g. wetland mitigation). The partnership followed this approach for Urban Tree Planting BMP in Phase 5.3.2 and the panel's Phase 6 recommendations do not change it. Edits made to clarify the non-applicability of tree planting for mitigation purposes. (Section 5.4)	Tracking and reporting; modeling
Marian Honeczy, MD DNR	2) There appears to be an underlying theme in the document that UTC is an urban activity. Urban meaning Baltimore City - highly paved, low forest canopy. The CB Agreement applies to almost all of Maryland including urban, urban-suburban, suburban and rural land use classifications. In order to accomplish the CB Agreement goals all areas will need to increase canopy coverage. This document should reflect that. See comment for Section 5 pg 18.	The panel was formed to look at areas that are considered "urban" or "developed" for CBP modeling purposes. This includes urban and suburban areas or any "developed" land uses in the Phase 6 Watershed Model as determined by the partnership's Phase 6 mapping and imagery procedures outside this panel's purview. Generally, these "developed" areas coincide with Urban Area Urban Cluster (UAUC) boundaries, which were most recently set by the 2010 Census. Areas classified under agricultural land uses in Phase 6 will continue to be covered under the existing Tree Planting BMP for	Edit

		that sector. Edits will be made to Section 2 prior to finalizing the report to clarify the applicability of the BMP for Phase 6.	
Marian Honeczy, MD DNR	3) The document doesn't specify who will be reporting. Will the entity (town, state or non profit) planting the trees input the data or will the state? Will those planting the trees be responsible to verify the survival rate either through field work or via mapping or will that responsibility fall to the states?	The state ultimately reports the BMP implementation to the CBP, but other entities will report their data accordingly to the state. The details of the process will vary by jurisdiction. Details about verification and the role for the implementing agencies are described in the Forestry Workgroup's BMP Verification Guidance. The procedures and protocols for BMP verification are determined by the state and documented in their Quality Assurance Project Plan (QAPP) submitted to EPA for the BMP data that they report to EPA. The collection and application of the hi-resolution mapping is yet to be determined, but will likely be a joint effort between CBP staff and state partners.	Tracking and reporting; BMP verification Modeling
Marian Honeczy, MD DNR	4) The CB goal is to plant x acres by 2025 but the trees planted in 2016 won't appear or count as land use by 2025 as the 2017/2018 and 2022/23 mapping cycle won't capture the planting. So aren't we just tracking the planting as a BMP credit ?	All acres of land use change BMPs like Urban Tree Planting receive credit between updates to satellite imagery-based land use data. Since tree canopy is updated based on annual BMP submissions and periodic land use updates there is a potential risk for double counting the benefits in the model simulations. This double counting can be avoided or minimized by applying the same model procedures that are applied to all land use change BMPs. Specifically, all acres of land use change BMPs such as Urban Tree Planting receive an annual credit between updates to satellite imagery-based land use data. Following an update all historic implementation effort will still be tracked toward milestones set by the jurisdictions and all new implementation will be counted	Tracking and reporting

		as a land use change. This avoids double-counting in the model simulations while demonstrating implementation and effort toward milestone goals Text added to report (Section 6)	
Marian Honeczy, MD DNR	5) There are references to CBP, CBP Partners and CB partnership and Partnership throughout the document. If these reference the same entity, revise to reflect one name.	CBP refers to the Chesapeake Bay Program itself or its staff, whereas CBP Partnership or Partnership refer to the wider organization that includes signatory members and other non-governmental partners, and CBP partners refers to those partners, which includes the federal and academic staff located at the CBP in Annapolis, MD.	No Edit
Marian Honeczy, MD DNR	6) Section 2: Definitions pg 3. The definition of forest land use states that it is "defined and mapped" and includes the definition or how the area is identified. The definition of tree canopy land use states how these areas are defined or identified but is missing the "mapped" or recordation aspect as stated in forest land use. Is this mapped areas or acres collected by database or "see section x for data collection by CBP".	Will add the word “mapped” to the tree canopy land use definition	Mapping and imagery Edit
Marian Honeczy, MD DNR	7) Section 2: Performance Measure pg 4. There is mention of the BMP being a "stackable" BMP. Does this include only other non forest BMP or any BMP? A twist to this, could the BMP be "counted" for other purposes after it is included in the BMP database/mapping? A suggestion that the first sentence second paragraph be expanded to explain the carryover. My understanding is that this accounts for the continuing tree growth and continuing effect on loading rates. (The hint that tree replacement and maintenance is beneficial.)	“Stackable” means that other BMPs can be applied in addition to this BMP in the model. Urban BMPs could be applied to the same acres as the Urban Tree Planting land use change BMP in Phase 6. Non-urban BMPs, such as cover crops, would not be applicable. For example, the same acre that is converted to Tree Canopy over Turfgrass can then be treated by Urban Nutrient Management, and could also be treated by a stormwater wet pond. To clarify, the BMP is cumulative for annual progress report purposes and is counted towards the jurisdictions’ implementation milestones; this “database” of BMP implementation is different from the land use data that is mapped using hi-resolution imagery. The annual BMP submissions would be	Modeling

		credited based on expected average canopy growth per tree planted, as described in the panel's report. The hi-resolution imagery will capture net changes in tree canopy. Together the annual BMP data and the periodic imagery data provide the partnership with information about implementation and changes on the ground.	
Marian Honeczy, MD DNR	8) Section 3.2: .... Represented in Phase 6 Watershed Model pg 6. Found the description of the 90% versus 10% confusing / unclear. Paragraph over table is confusing. Does the entire paragraph refer to Phase 6 or Phase 5.3.2? Got confusing in the middle. Table 2 column titles need a key for CSS and MS4 so abbreviations are clearly understood by all.	Edits made to the paragraph noted to clarify this is in reference to Phase 6.	Edits
Marian Honeczy, MD DNR	9) pg 13 Table 5. Column titles need a key so abbreviations are clearly understood by all.	Edits made to the column headers.	Edits
Marian Honeczy, MD DNR	10) pg 14 Table 5. Page et al 2014. Should it state 71, 84 or 71 - 84?	The values represents results of a study from two different sites. Edits made in Table 5.	Edits
Marian Honeczy, MD DNR	11) pg 15 Table 6. See previous Key comment.	Edits made to headers	Edits
Marian Honeczy, MD DNR	12) pg 15 Leaf Litter second paragraph. Second sentence, reference to Scientific and Technical .... does not make sense.	The Science and Technical Advisory Committee is a body of the Chesapeake Bay Program Partnership. The report is based on a workshop they supported.	Edits
Marian Honeczy, MD DNR	13) Section 5: Protocols pg 18 top paragraph. Development throughout the Chesapeake Bay area is not the same as development or forest loss in Baltimore City as implied by referencing Nowak and Greenfield's research.	Edit made to the text clarifying 'city tree cover' in reference to work by Nowak and Greenfield (2012)	Edits
Marian Honeczy, MD DNR	14) Section 5.1 The Metric pg 18 - 19. The results should be highlighted to reflect the importance - here's is how it will be counted.	This section provides a review of the Phase 5.3.2 credit with information on the recommended credit in later sections after new method is described. No edits made.	Edit s

Marian Honeczy, MD DNR	15) Section 5.2 Table 8. Column titles are written out and not abbreviations as per the previous tables. I like it written out but am fine with a key. Need consistency.	No edits needed	Edits
Marian Honeczy, MD DNR	16) Section 5.2 unknown table pg 23. Is this Figure 2 in addition to Figure 2 on pg 24?	I cannot locate this "unknown table". Yes, it is the same Figure 2. Edits made to specify "2a" and "2b"	Edits
Marian Honeczy, MD DNR	17) Section 5.4 Final Recommendations pg 30. The CB goal is to plant x acres by 2025 but the trees planted in 2016 won't appear or count as land use by 2025 as the 2017/2018 and 2022/23 mapping cycle won't capture the planting. So aren't we just tracking the planting as a BMP credit ? Regarding qualifying conditions, guidance on the acceptable methods of determining existing land cover (impervious vs turfgrass) should be included in the reporting guidance document.	The mapping cycle will be determined and the dates provided in the report are our best estimate. As currently stated, the BMP will be tracked as acres of land use change to tree canopy over impervious or pervious. The determination of underlying land use would be observational and reported as optional given the feedback we received from the FWG to keep the information reported very basic from partners for tree planting. Text added "This information would be provided based on site conditions at the time of planting."	Tracking and reporting
Marian Honeczy, MD DNR	18) Section 6 Accountability pg 32: The last paragraph should be highlighted such as "recommendation" as it explains an important rule to the credit.	In review of the text, the paragraph referenced is redundant and will be deleted.	Edits
Marian Honeczy, MD DNR	19) Section 6 Verification pg 33 second paragraph. After (CBP, 2014), the sentence uses term "commendations" should this be "recommendations"? The verification process does not require field work or counting of trees yearly or after 10 years but verification via the mapping is acceptable. Will this verification be required of the local or state governments or by the entity that did the planting?	Spelling error corrected. Defer to FWG verification guidance and that being developed by States and District. The FWG has already written verification guidance and the jurisdictions have submitted their initial verification plans as a part of their QAPP to EPA for BMP data submissions.	Edits; BMP verification
Marian Honeczy, MD DNR	20) Appendix E. Should there be a table for default broadleaf CEL/CEM? These categories are included at the top of the page. Do the A1, A2, A3, B1,etc have a	Appendix E provides the full set of i-Tree Forecast output that was used to inform the Expert Panel recommendations. The Expert Panel decided to	Edits

	meaning? B1 default tree column headers refers to what tree? Title 2 Climate Regions for last tow charts refers to what? Maybe Climate 2 Regions is better reference	recommend a single credit for any tree planted.	
Marian Honeczy, MD DNR	21) pg 115 #4 spelling error. #7 Need to capital titles similar to #8.	Spelling and capitalization corrected	Edits
Arlington Co (VA) Dept. Parks & Rec	Throughout, but particularly the finding of no unintended consequences on page IV: The use of "turfgrass" as the only alternative for understory underneath tree canopy is insufficient. While trees over turfgrass should be credited, this does not reflect the natural state of our forests. Our natural forest understory has shrubs, herbaceous cover, and a duff/leaf layer, providing significantly higher value than trees over turfgrass. I suggest adding a category for trees over herbaceous/shrub, or not specifying turfgrass at all. If no stormwater benefit research exists on the value of these complete vertical forests, this needs to be performed. Not including this option could be very counter-productive, with requirements to maintain turfgrass, where a forest can provide a wider range of benefits, including, potentially, higher stormwater benefit (the research mentioned on page 12 shows the value of leaf litter and understory on stormwater infiltration (Bartens et al.; Kays 1980)). Additionally, turfgrass often competes strongly with our native forest, as it prefers higher pH ranges, which explicitly excludes whole groups of tree species from succeeding with this BMP.	The proposed addition of an Urban Forest Planting BMP is associated with an unmanaged understory in order to mimic forest-like conditions that are distinct from managed turfgrass or compacted urban soils. A summary of the Expert Panel response to the proposal and recommendation is provided above. However, there was not consensus amongst the panel to accept the proposal. The underlying land cover is prescribed by the two new land uses for the Phase 6 model. The literature and research on urban tree canopy, with managed or unmanaged, understory is very limited. Therefore, quantification of the water quality benefit recommended by the BMP is limited to the two tree canopy land uses.	FWG proposal Research

	The explanation on page 46 is not sufficient to exclude these multi-story plantings, as many communities explore planting understory plants with the trees planted, to provide a fuller spectrum of benefits. Even properly-applied mulch and compost can be a sufficient groundcover for water retention, as research has shown.		
Arlington Co (VA) Dept. Parks & Rec	General: Consider encouraging native planting, where appropriate, for greater added benefit to the Chesapeake Bay. Invasive non-native tree species, while not currently counted as stormwater pollution, do cause similar damage to our ecosystems, affecting the Chesapeake Bay in a broad way.	Text added in "Qualifying Conditions". "Tree planting projects are encouraged to represent a selection of native species. "	edit
Arlington Co (VA) Dept. Parks & Rec	Page 29: Not crediting evergreen trees because they tend to be planted less is not enough justification not to provide credit. Evergreen trees are an important part of our forest ecosystems, and can provide year-round stormwater interception.	Coniferous trees can be planted and reported under the recommended BMP. See text on page 31 as part of Recommendation 3, "…This recommendation does not limit the type or density of trees planted that are eligible for credit. The credit applies to all tree types, whether planted individually or in a contiguous area (i.e., trees other than broadleaf species may be planted)."	Tracking and reporting
Arlington Co (VA) Dept. Parks & Rec	General: Research should be performed on the cost of growing plantable trees. There is an explicit cost and stormwater pollution impact from the facilities needed to grow the trees for these BMPs, which needs to be factored into comparing planting Vs. Preservation of tree canopy.	Added the following text to 4th bullet future management research needs " ..A cost-benefit analysis comparing the benefits of planting new trees with tree conservation should be a part of this research."	Edit
Arlington Co (VA) Dept. Parks & Rec	General: Continue research on conservation over planting. Conservation of existing forestland, soils, and hydrology is critical to the survival of the Bay's ecosystem, and planting, while an important aspect of forestry, often does not fully replace a lost forest and its function.	The panel agrees that the conservation and protection of existing tree canopy and forested areas is critical to the overall Bay ecosystem as well as to water quality. Please see Sections 5 (p. 17) and 7 (p. 35) of the report	No edits

Arlington Co (VA) Dept. Of Env Services	General: Need a detailed calculation example of how to claim the credit in year 1 of the tree planting, what to do in years 2-10, and then after year 10.	The nutrient and sediment reductions from the land use change are the same in years 1-10. An example calculation will be added.	Edit
Arlington Co (VA) Dept. Of Env Services	General: Consider providing a general default computational method, regardless of tree type, dbh, etc. With jurisdictions planting hundreds and even thousands of trees per year, the database accounting will get very complicated. The intent here is to account for 'every tree' in a way that captures the benefits for regulatory compliance accounting purposes, without creating excessive accounting complexity.	This is what the panel strove to do with the proposed Urban Tree Planting BMP for the Phase 6 Watershed Model. The panel's methods and the use of the i-Tree Forecast tool provide a reasonable estimate of the average tree canopy that can be expected per tree planted (144 sq ft.) accounting for a range of variables (mortality, common species, light exposure, etc.) that apply in urban and suburban areas.	Edit (to provide example calculation for clarification)
Arlington Co (VA) Dept. Of Env Services	Page 22, Table 8: For street trees in residential areas (and some other areas) the underlying surface will often be a combination of turf and impervious. Can you consider providing ''blended' % reduction rates explicitly in the table?	The benefits of all BMPs are often "blended". If a jurisdiction does not know the specific type of land use the BMP treats, e.g., whether it's pervious or imperious or, in this case, "blended", the BMP is reported by a more-general land use category (e.g., urban) and the modeling tools proportion the treated acres among all land use types in the larger category according to the relative proportion of acres among the land use types.	Modeling
Arlington Co (VA) Dept. Of Env Services	Page 31, recommendation #4: This section is confusing re pre vs post 10 year timeframe and crediting. Earlier in the report it suggests the Land Use updates by the Bay program will take on the ground tree canopy into account, suggesting that any tree at or beyond 10 years from planting will no longer be credited as an individual tree but instead will be accounted for as 'tree canopy' land use. Please clarify.	All acres of land use change BMPs like Urban Tree Planting receive credit between updates to satellite imagery-based land use data. Following an update all historic implementation effort will still be tracked toward milestones set by the jurisdictions and all new implementation will be counted as a land use change. This avoids double-counting in the model simulations while demonstrating implementation and effort toward milestone goals.	Tracking and reporting; modeling
Baltimore County	1. **Baltimore County is concerned with the 10 year growth/mortality analysis, and timing of the new aerials and LiDAR as it pertains to verification.**		
Baltimore County	a. **We recognize that the model is based on good information derived from i-Tree tools, but has the model been tested to support the conclusion that "on average, a 10 year old tree**	All acres of land use change BMPs like Urban Tree Planting receive credit between updates to satellite imagery-based land use data. Following an update all historic implementation effort will still be tracked	Tracking and reporting; modeling

	will appear in tree canopy land use data"? Baltimore County has many years of experience with reforestations and many of our plantings show up on aerial imagery, two years after planting. What percentage of plantings might be healthy and growing but don't show up or are too small at the 10 year mark, resulting in a loss of BMP credit with no land use credit?	toward milestones set by the jurisdictions and all new implementation will be counted as a land use change. This avoids double-counting in the model simulations while demonstrating implementation and effort toward milestone goals.	
Baltimore County	b. **Dates of tree plantings and aerial/LiDAR acquisition will not line up neatly and there will be gaps when a planting provides 0 credit.** IF BMP credit is lost 10 years after planting, and tree canopy credit cannot be taken until tree canopy land cover data is available, plantings will receive 0 credit during this gap. Baltimore County is concerned that the timing of new aerials and LiDAR will not match up and there will be a gap between losing the UTC BMP Credit and receiving the land use conversion. This gap will be largest for plantings done immediately after aerials/LiDAR are acquired, and will shrink to a minimum for plantings done immediately before aerials/LiDAR are acquired. ***We recommend that jurisdictions do not lose the UTC BMP until they receive the land use conversion. Aerial photography can be used to verify that the reforestation are surviving and growing, even if the trees are not yet 144 square feet in size.*** ***If this is not acceptable, we recommend that the BMP credit last until tree canopy land cover data is available with a ground***	All acres of land use change BMPs like Urban Tree Planting receive credit between updates to satellite imagery-based land use data. Following an update all historic implementation effort will still be tracked toward milestones set by the jurisdictions and all new implementation will be counted as a land use change. This avoids double-counting in the model simulations while demonstrating implementation and effort toward milestone goals. The criteria to map urban tree canopy were defined by the CBP Partnership. This decision making was outside of the scope of the Expert Panel. However, the Expert Panel accounted for this criteria developed for the tree canopy land use to ensure consistency across the Bay watershed and multiple methods for tracking and reporting.	Tracking and reporting; modeling

	condition date 10 or more years after the date of planting. We would be happy to share aerial photographs of our projects where trees are detected.		
Baltimore County	c. **If a planting grows particularly quickly, and new land cover becomes available before the 10 year lifespan has ended, there will be double-counting.** For example, if trees planted 5 years ago appear in land cover data, the BMP credit will be provided, and some amount of land conversion credit will also be provided.	This is the reason for modeling procedures summarized above.	
Baltimore County	d. **What date will be assigned to the land cover derived from the non-coincident aerials and LiDAR data?** Usually, LiDAR and aerials are acquired together. However, leaf-on aerials (4-band or more) are needed for this classification work, and LiDAR is usually acquired at leaf-off. Unless some program begins flying leaf-on aerials and LiDAR at the same time, there will be a date difference between the aerials and the LiDAR. ***We recommend that, when aerials and LiDAR are non-coincident, the more recent date be used as the date of the tree canopy data. This way, the BMP credit period lasts longer and you are unlikely to eliminate BMP credit for a tree planting before it is detectable via remote sensing/land use classification.***	This recommendation will be shared with the CBP's GIS and Modeling staff as it applies to specific modeling issues outside of the expert panel's purview.	Modeling

Baltimore County	e. **Is there a way that high survival rates and improved infill planting practices can be credited more immediately?** Reserving credit for better planting practices/maintenance until 10 years after planting discounts the value of this work. With our many years of reforestation experience, Baltimore County has evolved our planting practices to a method that is more successful and cost effective. We knew early on the importance of tree survival and have included maintenance and survivability guarantees into our planting contracts. Maintenance and tree survival is most important in the first few years after planting. Baltimore County's tree planting program is backed by contracts that lay out our approach for reforestations and landscape style plantings. We have survival guarantees of 90% survival for the first three years after planting for reforestation projects and 100% survival for the first year after planting for large caliper (landscape) trees. We are currently working on an extended maintenance and replacement planting contract that will extend maintenance up to 10 years after planting. We are concerned that the proposed credit will discourage local governments from spending time and resources on good planting practices and maintenance. ***<u>While we appreciate that the Panel was</u>***	The FWG has proposed a second Phase 6 BMP – Urban Forest Planting that was reviewed by the Expert Panel. A summary of the Expert Panel response to the proposal and recommendation is provided above. However, there was not consensus amongst the panel to accept the proposal. The Expert Panel recognized the many factors that affect the growth of trees and programmatic conditions that affect survivability as well. The Expert Panel sought to provide a credit that would uniformly be applicable across the entire watershed as the Partnership (FWG and WTWG representatives on the Panel) emphasized the need to limit the reporting requirements given information typically reported for tree planting projects (i.e.,number of trees). Thus a balance was sought to reflect the science, the numerous factors affecting tree canopy area (tree growth and survivability) and complexity of reporting and tracking given the (historical) land area reported to be treated by tree planting BMPs.	FWG Proposal

	charged with determining pollution control performance estimates for BMPs of expanded urban tree canopy (UTC) for the entire Chesapeake Bay Watershed, we recommend crediting tree planting based on established programs and good planting practices. We further recommend an automatic credit for the UTC BMP for local government planting programs that provide enhanced reforestation projects. Our approach involves planting 3 gallon saplings of native canopy species with survival guarantees.		
Baltimore County	**2. Baltimore County strongly recommends that crediting 300 trees as an acre for the UTC BMP does not become the crediting mechanism as the Panel Recommendations do not take into account constraints of planting in urban areas.** Due to the characteristics of developed areas, "single tree" plantings are often more appropriate. In addition, limited space and utility conflicts make planting a continuous acre very difficult. Due to these constraints, expanding the UTC requires more resources, including time and money than planting in rural areas. Though there are real constraints associated with planting trees in developed areas, the environmental benefits that urban tree canopies provide are very important, including lowering urban air temperatures, reducing carbon dioxide, and intercepting rainfall. While we understand that the Expert Panel is not recommending planting 300 trees per acre, we are concerned that crediting the UTC BMP at 300/acre will disincentivize jurisdictions from planting trees in developed areas. It is already more costly and	This is an excellent point that highlights the difficulties of urban tree planting. The panel's consideration of factors such as mortality and planting conditions were made to reflect these difficulties that are typical in urban and suburban areas. It must be emphasized that maintaining and expanding both the Forest and Tree Canopy land uses will be very important in the long run. The more Forest and Tree Canopy that a county or jurisdiction has relative to higher loading developed land uses (e.g., impervious surfaces), the lower their total loads will be. The panel's methods provide a reasonable short-term credit for urban tree planting, but the long term benefits for protecting and expanding Forest and Tree Canopy offer the largest incentives and will reward the jurisdictions that invest the time and resources in their trees. It is likely the Partnership will continue to track and report post 2025, where as such the credit for tree canopy would be captured by continued mapping assessments. There are multiple benefits for tree planting in developed areas, that while the credit for water quality benefits is relatively small relative to other BMPs, a	

	time consuming to plant street trees, urban forests, and landscape style trees.	rationale and credit explicitly providing credit for street and/or landscaping trees is available. While trees planted for this purpose were likely given the tree planting credit for CBWM vers 5.3.2. , these types of plantings will not likely to achieve the water quality benefit associated with a forested land use as previously credited	
Baltimore County	**3. We are concerned that the UTC BMP is based on planting location and not on planting style and will not provide adequate crediting for traditional reforestations in developed areas.** We appreciate that there were limitations in the Phase 5.3.2 Watershed Model, specifically on how the CAST definition was developed to only award a reduction to projects that plant a certain density (100 trees/acre), whereas in practice this does not always happen. We also realize that the Expert Panel was tasked with recommending how to address this issue and capture all tree canopy. We are concerned that in the process of addressing "single tree" plantings like street trees, there was too much focus placed on where trees are planted (developed areas) and not on the different types of planting styles. Through policy and planting projects, Baltimore County has developed standards for two planting styles, traditional reforestations and landscape style plantings. Traditional reforestations include planting 110, 3 gallon containerized trees per acre with 3 to 10 years of maintenance and a 90% survival guarantee for the duration of the maintenance period. These areas are typically converted from turf to meadows and herbicide application and mowing is used to address	The Expert Panel report weighed the benefits of developing a credit that would be applicable and provide realistic growth expectations given the numerous factors affecting the growth of trees and their information typically available for reporting tree planting projects, historically to the Bay Program for TMDL credit.	FWG proposal; mapping

	competing vegetation only. Landscape plantings include planting 1.5-2" dbh street trees and a dozen or more of "single tree" plantings on "managed grounds" (e.g. schools, condominiums, business parks). Landscape style trees come with one year of maintenance and a 100% survivability guarantee. Both planting styles are used throughout the County; inside and outside of developed areas. As mentioned previously, we believe that reserving credit for better planting practices/maintenance until 10 years out discounts the value of this work. We are also concerned that this crediting method will incentivize poor planting practices in these areas. Jurisdictions may look at short-term compliance and "on-paper" restoration vs long-term compliance and real water quality restoration. If jurisdictions receive 1/3 acre credit for 100 trees planted in a contiguous acre, we are concerned that they will increase their planting density to 300 trees/acre which is not sustainable in the long-term and will cause overcrowding of the canopy. While our landscape style trees fall into the UTC BMP, we believe that traditional reforestations within developed areas should have their own category, especially when a jurisdiction has an expectation of what their mortality will be based on current planting practices and established contracts. In addition, Baltimore County is concerned with defining a forest as "a contiguous patches of trees that are greater than or equal to 1-acre,	The definition for the Phase 6 forest land use is not set by this expert panel.	

	corresponding to a patch of trees with a minimum internal radius of 36m, and are generally 20m-30m away from non-road impervious surfaces (e.g., structures, driveways, and parking lots) in developed areas and approximately 10m away from non-road impervious surfaces in rural areas." Due to the structure of Baltimore County, many of our reforestations are within 20m-30m of non-road impervious structures in developed areas and 10m away from non-road impervious surfaces in rural areas. These reforestations are still functioning as a forest with ecological and environmental benefits. ***In addition to the Forest Classification outside of developed areas, we support two tiers of tree planting classifications in developed areas, the UTC Classification and an Urban Forest Classification that includes any traditional reforestation within developed areas of 0.25 acre or more***, no matter how close they are to non-road impervious structures. We further recommend an automatic credit for the UTC BMP for local government planting programs that provide enhanced reforestation projects.	Enhanced reforestation projects may qualify depending on planting location; otherwise a new BMP may be required	
Baltimore County	4. **Please clarify how tree plantings that occur beneath existing tree canopy should be handled.** Planting canopy trees beneath existing tree canopy is not a good forestry practice, and Baltimore County does not condone it. However, we are aware that some plantings like this have occurred. It would be useful to have clear guidance from the expert panel on this topic. For example, should a tree planted under existing	Replacement tree planting within a forested area or an area that was reported as an Urban Forest Planting BMP should not be reported as that area would already be receiving credit as a Forest and it would be double-counting to get Urban Tree Planting credit on top of that. However, areas that are not forested (e.g., a row of street trees) could count replacement tree planting under the Urban Tree Planting BMP since the panel's recommendations account for mortality and the	Reporting and tracking

	tree canopy receive urban tree canopy BMP credit? That would be double counting, and shouldn't be allowed? But what if the tree is at the edge of a well establish canopy (e.g. near a road), and the new tree is expected to extend the existing tree canopy outward? Should a BMP credit be provided, perhaps a reduced credit?	replacement trees would not be double-counting.	
MDE and DNR	**Comment 1.** Replacement of the Urban Tree Planting BMP Section 2 of the report states that, "[t]his BMP will only apply starting with Phase 6 of the CBWM, replacing the Phase 5.3.2 BMP for Tree Planting (Urban)." Maryland does not agree with the elimination of the Urban Tree Planting BMP in Phase 6. The January 12, 2016, memo from Peter Claggett to the WQGIT , *Mapping Adjustments to Forest and Tree Canopy Land Uses for Phase 6*, states of the forest land use that it is, "[a]ssumed to have an unmanaged and pervious understory." Maryland agrees with this assumption, and maintains, that where trees are planted in a manner that is intended to comply with this assumption, that credit should continue to be applied based on a land use change to forest. This position will be described more clearly in the memo from Justin Hynicka of Maryland DNR, *Response to the Urban Tree Canopy BMP Expert Panel Report*.	The Urban Tree Planting BMP will still be available in Phase 6, but it will be a conversion to Tree Canopy in place of forest, per the panel's recommendations.	FWG proposal
MDE and DNR	**Comment 2.** Credit based on 10-year growth projection The report describes a logical approach for crediting the BMP, whereby it is handled as a BMP until the point where it is subsumed into the UTC land use through mapping tools—a time period estimated to be ten years. Based on this analysis, the panel recommends areal credit for the BMP (1 planted tree= 96 square feet) using the predicted canopy coverage that will exist in ten years. While this approach makes		Modeling

	sense, it seems like a departure from how other land use change BMPs are credited. Previously, land use change BMPs, such as Urban Forest Buffers, Wetland Restoration and Tree Planting, have been fully credited immediately based on *full* growth potential. It is our understanding that this maintains an assessment framework consistent with the expectation that all pollution control measures needed to restore the Bay be *in place* by 2025. We interpret *in place* to mean installed, rather than fully mature or operational. Following the precedent set by other BMPs, we would expect the UTC credit to be based on the full, or long-term average, canopy level rather than a 10-year growth prediction. As a practical matter, we understand the underlying logic and benefits of the panel's approach, and we are not advocating for or against the full, immediate crediting of land use change BMPs. Rather, we believe that it is important to maintain consistency between how BMPs are credited. We ask the panel to weigh in on whether this approach is consistent with how other land use change BMPs have been credited. If it is not consistent—or if consistency cannot be determined—we request that it either be adjusted to match the other BMPs, or that a formal review of land use change BMP crediting be undertaken by the WQGIT.	As described in the report and considering the range of conditions that exist in urban and suburban areas, the panel recommended crediting Urban Tree Planting based on 10-years of growth is reasonable. The only factor determined based on this 10 years of growth is the estimated average area of canopy per tree planted. This allows conversion from number of trees planted into acres for the Watershed Model. Other land use change BMPs like forest buffers or wetland restoration are already reported in terms of area (e.g., acres). The nutrient and sediment reduction is applied in full when the BMP is credited, I.e. the relative land use loading rate is applied immediately in the model. There is no inconsistency in the approach compared to other land use change BMPs it is just an extra step that other land use change BMPs do not need.	
MDE and DNR	**Comment 3. Tree Canopy Landuse Method** Section 2 of the report describes the definition of forest as, "contiguous patches of trees that are greater than or equal to 1-acre, corresponding to a patch of trees with a minimum internal radius of 36m, and are generally 20m – 30m away from non-road impervious surfaces." Please ensure that the forest definition is consistent with the Partnership's latest approved forest	It should be emphasized that the Phase 6 land use definition for the Forest land use is not defined by this expert panel, but by other groups within the Partnership. The Land Use Workgroup defines forest as "trees farther than 30'-80' from non-road impervious surfaces and forming contiguous patches greater than 1-acre in extent. The variable distance is a result of filtering algorithms (e.g., focal moving windows) applied	Mapping and imagery

	land use definition, or clarify whether it is consistent with a proposed revision to the definition.	to the high-resolution non-road impervious surface class."	
MDE and DNR	**Comment 4. Reporting Trees or Acres** On page 17 the report states "In practice, reported trees were converted to acres of the BMP in Phase 5.3.2 using the 100 trees/acre conversion rate." It is not clear where or if this statement has a reference. On page 32, the report states "The qualifying condition for this BMP is to report the number of trees planted. This is consistent with the previous urban tree planting BMP reporting requirements and information typically available given the diversity of project implementation." This is not consistent with the current urban tree planting reporting requirements. NEIEN accepts acres of trees planted. Jurisdictions have developed tracking mechanisms based on acres of trees planted that meet the requirements. Maryland currently report acres of trees planted rather than the number of trees planted. To change to trees planted with no acres would mean the assumption that all of the trees reported are 300 trees to 1 acre which may not be the case.	It is correct that the Phase 5.3.2 Urban Tree Planting BMP can be reported in acres, but it can also be reported as number of trees planted. The number of trees planted could be used to convert to acres (100 trees to one acre in Phase 5.3.2). The Phase 5.3.2 BMP would treat all acres as a conversion to Forest, but there was no explicit requirement that the trees needed to be planted in a contiguous area, so 100 trees planted over 100 different front yards could be reported as 1 acre of UTP in Phase 5.3.2. For historical acres the jurisdictions will need to determine which acres should be counted as Urban Tree Planting or Urban Forest Planting.	Tracking and reporting
MDE and DNR	**Comment 6. Appendix G** The land uses to which the Urban Tree Canopy BMP is applied are incorrect. The land uses that urban tree canopy BMP will be applied to are Impervious and Pervious/Turfgrass.	We will correct Appendix G and Appendix F so they are consistent and have the proper Phase 6 land use names.	Edits
Ken Belt	You, Neely and the panel should be congratulated; this was a tough assignment and I think they did good work here that will make a valuable contribution to our ability to manage the CBay watersheds. It is no easy matter to take the science here, which is in reality highly complex, and use it in what has to be a highly generalized and simplified context. Thanks is due, considering the many months of work you all went	Commentary; no response provided	-

	through!		
Ken Belt	There are a number of small "editing" kinds of things (flow, grammar, flow, etc.) that need attention but I have avoided commenting on them here to focus on more overarching or larger things. So there are below some thoughts, in no particular order that I hope are helpful to you all.	We intend to fix lingering small edits when the report is approved by the WQGIT.	-
Ken Belt	It is probably worth underscoring that much of this work is exploring new territory, and that even though really good specific data is extremely sparse, we know enough to get started here. After all we already know very well that the land use everyone wants in their drinking water reservoir is a nice stable forest… and there are decades of many publications to back that up! The work of Hynicka and Divers is central to the UTC, but I had a great deal of difficulty understanding what the methodology and approach was by reading the main body of the report. For example, there seemed to be quite a jump to how they arrived at loading reductions from a few simple equations. Also there was a basic unease regarding using a CN approach to quantify what are really small scale hydrological processes without new field data to support the process. The NRCS urban hydrology model was never meant to do this kind of work, and is not particularly equipped to handle small but frequent storms (its use is primarily in avoiding flooding related problems. You may want to consult someone who is familiar with the model development to weigh in here (the NRCS still supports the model so they would be a good choice). It may be best to publish the Appendix B separately and get some peer review done by modelers who are familiar with the development of CN based modeling at small scales to insure the validity of the approach? It is	The tree canopy land use loading rates were approved by the Water Quality GIT in March 2016. The methods and the CN approach described in Appendix B were previously reviewed and approved by the partnership. As a part of that process Randy Greer (DE DNREC) did note that the CN approach can underestimate the contribution of smaller events. Based on that feedback Hynicka adjusted some assumptions to better account for smaller events (see page 53, Appendix B; I_a/S was changed to 0.05 instead of 0.2).	Land use loading rates

	likely a bit too late in the process but I did wonder if other models could have been used or adapted?		
Ken Belt	Care should be taken when using measured vs. modeled hydrologic processes. Each approach has strengths but you should be clear in how these were used in this process. For example, in tables 3 and 4, there were what seemed to be big differences between the modeled and the measured ranges of values. The models may also represent the used of measured hydrologic processes that may, depending on the model and context, simply reflect other measured processes.	The summary of the literature was not applied directly to the land use loading rates or water quality benefits attributed to tree canopy. The information, in the end, was used to illustrate the multiple processes by which urban trees impact runoff. Hynicka and Divers used the literature as guidance and selected median or average values in the development of the land use loading rates, that are applied to the BMP as a land use change.	No edit
Ken Belt	In a number of places I had trouble visualizing exactly how the trees in the UTC BMP are working here. It may be worth emphasizing how the UTC BMP is different than a "normal" stormwater BMP. How is the output handled (i.e., transport to deeper groundwater, surface runoff). Is part of the function avoided erosion from the under canopy surface?	The water quality benefit for the BMP is a land use change BMP, therefore the processes taken into consideration are those described by Hynicka and Divers (Appendix B). While there is potential for tree canopy to reduce the effects of stream erosion, the method is not explicit to this extent. Rather, page 10 of the land use loading rate documentation includes a description of the derivation of the sediment reductions attributed to tree canopy that is separate from lessening the downstream stream impact on streams. A sediment retention factor was assigned to relative reduction in water yields summarized in Table 1.	No edit
Ken Belt	The UTC BMP does not address the treatment of any runoff, right? It sometimes seems that these are only intercepting rainfall and air depositional pollutants. It would be helpful to make this clear with a figure comparing the two kinds of BMPs, especially since comparative statements are made in the document.	Awaiting clarification for this comment.	
Ken Belt	It is worth considering that it is not the canopy that does most of the work here, so we are dealing with not just the effectiveness of the canopy but of it and the soil surface layers and the entire root ecosystem (which is typically as large as the canopy). For example a planted	The literature review attempts to describe the many factors that affect the growth and consequently water quality benefits provided by trees. Will add text to Section 4. Edits beyond those provided will require additional references that unless provided with respect	edit

	tree that has poor soils and has a stunted root system wont develop a full canopy and so cannot adequately transpire and take up nutrients.. etc.	to 'poor soils' the literature review is considered complete.	
Ken Belt	I love figure 1! To emphasize the larger, integrated nature of the above and belowground ecosystems, however, I would create the root zone below the tree (as large as the canopy), with all the ecohydrologic processes that go with it (root channels, mycorrhizal communities, macroinvertebrate burrows, hydraulic redistribution, etc.)	We appreciate the comment and given the space and legibility for the graphic, it will not be revised.	Edit
Ken Belt	Table 3 (interception) is very nice; I would separate it into modeled and measured sections though, and give more information of climate and season. Make it clear that Interception depends on may things (eg conifer needles intercept more P than broad leaves do). The canopy is simply a temporary storage area where, the larger or more intense the rainfall event, the more quickly the precip starts to exit as throughfall. Even though most estimate are described as percentage of annual rainfall, it this context it is the storm event viewpoint that is more relevant to UTC as a BMP, making climate, morphology, event frequency and many other characteristics important.	Table 3 currently identifies modeling vs measured studies. The geographic locations are provided to infer climate areas (e.g. SW, arid, humid regions). We included text that references the effect of storm characteristics. We will edit the text to add an 'e.g. frequency, intensity"	Edit
Ken Belt	Be sure to talk about throughfall (i.e., P that makes it through the canopy). It is the vehicle for significant pollutants (air pollutants washed from leaves, insect and animal excretions, etc). In terms of DOC, e.g., leaf exudates create huge DOC loads via the throughfall, even in pristine forests. Treatment happens when this hits the ground, so It is worth remembering that tree roots and their associated microbial and macroinvertebrate communities can work in-between storms by a) moving water and nutrients around below the surface (vertically and horizontally) at night and b) removing soil water via ET in the daytime, making for healthy soils that are better able to infiltrate and	Section 4 references the role of throughfall. The literature review focused on urban tree canopy, and includes summary of references provided. However, Hynicka and Divers discuss throughfall. See Appendix C. We will add text to Section 4 noting throughfall processes.	Edit

	percolate rainfall.		
Ken Belt	Table 4 has a lot of potential; I cannot help but wonder why there are not more published field and plot studies that say something about tree cover and runoff flow magnitudes?	The literature review did not find additional work on this topic. No edit made.	Edit
Ken Belt	Leaf litter is an emerging area for research and I am glad it was mentioned here. Be sure to mention that it is highly dynamic with respect to pollutants… We have little data because it falls as greenfall as well as in the autumn and immediately breaks down, leaving a wide range of small partials that defy sampling and have complicated leaching characteristics. In terms of particulates and dissolved constituents we only suspect that they interact greatly with typical urban gutter contaminants.	Current text captures this comment, "While recent studies illustrate the available supply of leaf litter in urban areas, further research is needed to better quantify the fate, transport, and processing of leaf litter in urban watersheds and how to best account for this source as part of an urban nutrient mass balance." No edit made.	Edit
Ken Belt	I wondered about what we mean by tree planting. Since we are using projected growth as a central process here, should we talk about preparing and amending soils as part of the planting, in at least the areal projection of a full canopy status?	The Expert Panel noted the importance of soil conditions and media (depth, volume etc) that affects tree growth. The planting specifications, much like design specifications for other urban BMPs, are specific to local and state stormwater manuals and beyond the 'level of detail' to provide as part of recommendations. The Panel provides a recommendation for continued research on this topic. This may be modified, or another recommendation added to include a Soil Amendment BMP for a future expert panel. No edit made.	Edit
Ken Belt	In considering future research it may be worth not prognosticating the future using yesterday's lenses. Just as hi resolution imagery allows us to do so much more here, I cannot help but think that technology will make much more possible in the future, allowing us to do things at smaller spatial and temporal scales to measure and account for hydrologic tree functions in the landscape. Look at how we assess stormwater BMPs now (paperless, wireless, digital..	As of 6/21 follow-up with commenter still needed to clarify specific addition or edits.	

	etc.)… lots of associated possibilities, and I think it is ok to put them out there, to inspire innovation?		
Ken Belt	Think about sustainability. As we maintain and replace UTC BMPs, are we thinking about wood products, reuse, and nutrient sequestration… instead of simply landfilling? Since we don't simply leave dead trees to decompose in urban landscapes it is worth putting these ideas out there, to promote innovation for the next round?	Awaiting clarification for any specific addition or edits from commenter.	
VA DEQ	The charge of the panel as stated in the report (section 1.2) was "to determine pollution control performance estimates for the best management practice (BMP) of expanded urban tree canopy (UTC)." It was not to evaluate the existing approved BMP of Urban Tree Planting. However, it seems the UTC panel is doing more than that by eliminating the urban tree planting BMP entirely (Recommendation 4). This completely eliminates the urban tree planting BMP or a method to credit actual forest creation in the urban sector. Urban tree planting is a land use change BMP converting urban lands (pervious urban) to forest. The UTC panel is recommending elimination of the urban tree planting BMP and replacing it with UTC with a minimum of 300 stems per acre. This has implications for the historical BMP record in phase 6. What urban tree planting that has been reported would have met the definition of that BMP as currently approved. To accept this proposed change by the UTC panel would mean most of the reported urban tree planting would not meet the new required definition (stems per acre) so would need to be excluded from the historical record. VA DEQ does not support re-defining urban tree planting or replacing it with UTC acres. A method to allow both conversion to forest (urban tree planting) and expansion of UTC land uses is required. And one that does not require re-defining what has already been approved and included	Tree planting is a key management action associated with tree canopy. Tree planting was always a component of the panel's charge and this includes the assessment of the existing Phase 5.3.2 Urban Tree Planting BMP. The FWG has proposed a second Phase 6 BMP – Urban Forest Planting. A summary of the Expert Panel response to the proposal is provided in the Technical Memo response to comments. The jurisdictions can consider which of the two Phase 6 BMPs describe their historical data. The new definitions do not necessitate the removal of previously reported acres from historical BMP data. The panel's recommendations should not be interpreted as a density requirement for stems or trees planted. Rather, the panel's methods and the use of the i-Tree Forecast tool provide a reasonable estimate of the average tree canopy that can be expected per tree planted (144 sq ft.) accounting for a range of variables that apply in urban and suburban areas. Without the ability to meet other qualifying conditions associated with the Urban Forest Planting BMP, there is no assurance that the planted tree is part of a larger project and not a single tree planted in a residential front yard or parking lot. **Every tree should count, but not every**	

	in the phase 6 BMP history. There is a concern that if one needs a contiguous acre with a minimum number of stems at planting to equal forest conditions that the historical BMP representation of riparian forested buffers would need to be examined for instances where less than a contiguous acre is reported. Point is redefinition of what constitutes a forested acre has impacts beyond just UTC forest differentiation. Or if one plants at a 400 stems per acre rate on a riparian ½ acre spot can one report it as a forested buffer or should it be reported as tree canopy?	**tree creates forest-like conditions**. A flaw of the Phase 5.3.2 definition for Urban Tree Planting is that it did not clearly distinguish or define differences between individual or smaller scale tree plantings from the projects that seek to establish forest-like conditions. If a planting project is managed to create forest-like conditions then the density of trees planted, or the density of existing trees not lost to mortality, to attain forest-like conditions is determined by the applicable local, state or federal guidelines and not prescribed by the CBP or the panel. This panel's recommendations have no effect on the existing definitions for Riparian Forest Buffer BMP as defined by the CBP.	
VA DEQ	The executive summary indicates "The Expert Panel recommendations are based on review and synthesis of the literature, best professional judgement and the approved tree canopy land use loading rates for nitrogen, phosphorus and sediment." Consideration and approval of the land use loading rates by the WQGIT does not seem warranted considering there were significant technical concerns raised at the Modeling WG that have not been addressed. Since the BMP aspect is a land use change BMP in that pervious urban or impervious urban including transportation impervious will be converted to tree canopy over these land uses the loading rate difference between these land uses are part of the BMP panel recommendations and subject to comment.	The land use loading rates for Tree Canopy over Impervious and Tree Canopy over Pervious/Turf Grass were reviewed by the Urban Stormwater Workgroup, Modeling Workgroup and Water Quality Goal Implementation Team. None of the groups identified fatal flaws with the proposed loading rates or methods. Following the USWG approval (3/8/16) the WQGIT approved the loading rates on 3/14/16 and the loading rates were incorporated in the second beta version of the Phase 6 Watershed Model. As such, the tree canopy loading rates are not subject to further partnership review unless the commenter feels that this issue represents a fatal flaw and is able to document the fatal flaw with supporting data and references for consideration by the partnership.	Land use loading rates
VA DEQ	Assuming a straight 1 to 1 ratio between percentage runoff reduced and loading reductions for both TN and TP does not seem conservative. In fact it seems that most of the literature cited was modeling studies and	The land use loading rates for Tree Canopy over Impervious and Tree Canopy over Pervious/Turf Grass were reviewed by the Urban Stormwater Workgroup, Modeling Workgroup and Water Quality Goal	Land use loading rates

	not actual measured results. In addition it seems a majority of the studies examined were from locations significantly outside the CB watershed to include much more arid locations. Since so much of the proposed benefits are from model estimates and or best professional judgement it would seem prudent to reduce the proposed TN and TP loadings assumed to be provided by tree canopy as indicated by the BMP Protocol? Or to increase the proposed loadings of these land uses by some factor to cover the large amounts of uncertainty in the proposed UTC land use loading rates. Considering the report indicates almost 900,000 acres of tree canopy in the Bay watershed it would seem more prudent to assume a lesser benefit for lands affected by tree canopy considering the dearth of measured studies east of the Mississippi. In terms of the modeling and loading impacts it is better to assume a 10% benefit and find out later it should have been 20% than the reverse situation.	Implementation Team. None of the groups identified fatal flaws with the proposed loading rates or methods. Following the USWG approval (3/8/16) the WQGIT approved the loading rates on 3/14/16 and the loading rates were incorporated in the second beta version of the Phase 6 Watershed Model. As such, the tree canopy loading rates are not subject to further partnership review unless the commenter feels that this issue represents a fatal flaw and is able to document the fatal flaw with supporting data and references for consideration by the partnership.	
VA DEQ	One of the reasons cited for runoff reduction was increased infiltration under tree canopy. For other BMP's where infiltration is increased the estimated total nitrogen reductions were lessened because of the potential for increase leaching losses of nitrate nitrogen. The CBP WSM simulates NHx, NO23, and Organic forms of nitrogen. It would likewise seem conservative to limit the amount of reductions to the NO23 component of total nitrogen simulated in phase 6 WSM in a similar fashion as done with other BMPs that increase infiltration. In phase 5.x hydrogeomorphic regional factors were applied to limit the amount of NO23 reduced when the BMP panel estimated the overall TN benefit. This resulted in an overall lower TN reduction estimate but was considered conservative since leaching losses of nitrate are real and simulated	The land use loading rates for Tree Canopy over Impervious and Tree Canopy over Pervious/Turf Grass were reviewed by the Urban Stormwater Workgroup, Modeling Workgroup and Water Quality Goal Implementation Team. None of the groups identified fatal flaws with the proposed loading rates or methods. Following the USWG approval (3/8/16) the WQGIT approved the loading rates on 3/14/16 and the loading rates were incorporated in the second beta version of the Phase 6 Watershed Model. As such, the tree canopy loading rates are not subject to further partnership review unless the commenter feels that this issue represents a fatal flaw and is able to document the fatal flaw with supporting data and references for consideration by the partnership.	Land use loading rates

	within the model and with increased infiltration increased leaching losses are a distinct possibility. VA DEQ supports a TN reduction that is modified to account for increased potential leaching losses of nitrate.		
VA DEQ	HSPF will be used to simulate hydrologic and sediment processes in phase 6. The panel recommendation for sediment benefits on canopy over impervious are based on potential downstream benefits perceived from reduced runoff not what sediment is simulated as reduced under the acre of tree canopy. It is not clear if the HSPF simulation will reduce the sediment loadings on the acre of tree canopy over impervious or reduce stream bank erosion being lessened. What is needed from the panel is the amount of sediment prevented from being transported under the tree canopy acre. Not what a reduction in runoff in one location might mean for sediment to some stream downhill of the acre of tree canopy. Between that tree canopy area and the stream the panel seems to assume that there is always a hydrologic connection. What about intervening areas were both run-on and run-off both to and from pervious areas and other impervious areas occurs before reaching a stream? What about impervious areas without canopy uphill of canopy areas where runoff from upland areas is crossing areas with canopy (run-on to UTC land use)? How does UTC reduce run-on from non-UTC impervious areas? HSPF will simulate a single acre of tree canopy land use and route flows and loadings to the edge of stream. Then multiply that by all available acers of that land use to estimate the overall loadings from a given segment. It will simulate the other land uses similarly as separate entities without the real world interactions of run-on/run-off from intervening land uses. Basically there are other process occurring in	The land use loading rates for Tree Canopy over Impervious and Tree Canopy over Pervious/Turf Grass were reviewed by the Urban Stormwater Workgroup, Modeling Workgroup and Water Quality Goal Implementation Team. None of the groups identified fatal flaws with the proposed loading rates or methods. Following the USWG approval (3/8/16) the WQGIT approved the loading rates on 3/14/16 and the loading rates were incorporated in the second beta version of the Phase 6 Watershed Model. As such, the tree canopy loading rates are not subject to further partnership review unless the commenter feels that this issue represents a fatal flaw and is able to document the fatal flaw with supporting data and references for consideration by the partnership.	Land use loading rates

	the model and real world between other impervious areas, the tree canopy areas, and streams downhill that preclude a sediment benefit based on perceived downstream impacts from runoff reduced on an acre UTC uphill of a receiving stream. At this time VA DEQ cannot support the proposed sediment reduction for tree canopy over impervious or tree canopy over transportation.		
VA DEQ	The subject of leaf litter, tree detritus, and pollen loadings seems to be essentially disregarded by the panel. These are sources of nutrients that are a particular concern on impervious land uses. A quick internet search found pollen contains significant amounts of nitrogen and phosphorus. In fact a study was found indicating a lake in Ontario Canada had over 9% of annual TP loadings from tree pollen alone. And that sediment core studies indicated even higher TP loadings from pollen than the 9+% cited. For part of the year leaf litter and other detritus is a major concern and for other parts of the year pollen is a concern. However, there is no seasonal variation to the benefit of tree canopy. So during periods of significant rainfall, low ET, and little to no canopy the same reduction is applied as seasons where there is high interception and ET. This does not seem to be a conservative assumption. VA DEQ would be more comfortable with an acknowledgement of these seasonal issues and an adjustment to the perceived benefits for periods where there is limited to no canopy or when the streets are running yellow from pollen. It seems a double credit to get a tree canopy credit and street sweeping or catch basin clean out when much of what is swept or cleaned out seasonally is leaf litter and tree detritus. It would seem that one or the other BMP should be applied to the same acre but not both.	The loading rates and methods described by Hynicka and Divers in Appendix B are annual loading rates that do account for seasonal differences in the runoff reduction, leaching and throughflow calculations. As noted in the report, the Street Sweeping expert panel looked into the leaf litter issue quite extensively and concluded there is insufficient data to make a definitive adjustment for loads associated with litterfall. The tree absorbs nutrients to form the leaves come from another source in the soil and more research is needed to determine if this transformation and redistribution of nutrients represents a net difference on an annual basis.	
VA DEQ	Besides the already identified issue with the established	These specific NEIEN issues are the purview of the	Tracking and

	and approved urban tree planting BMP concern has been expressed regarding application of other BMPs to the UTC land uses. If a state does not know the exact land use(s) a BMP is treating other than urban acres CBP will proportion that BMP reporting to all available urban land uses including UTC. It is foreseen that this will create considerable confusion between reported and credited BMPs and verification requirements. Will states be allowed an option in NEIEN to report urban BMPs as urban without them being applied to the UTC land uses? For example there are land use codes available for reporting via NEIEN protocols that allow urban BMPs to be reported on land uses without CSO or with CSO. Without knowing the extent of UTC and that relationship to reported BMPs it may be preferred to report urban installations on non-UTC land uses or if known on UTC land uses. It is recommended the NEIEN codes list be amended to include land uses with and without UTC so that a reporting partner jurisdiction can specify the extent to which other BMPs are applied to UTC land uses. Please provide a listing or table of approved BMPs can be reported in conjunction with UTC land use change BMP?	WTWG and can be clarified in Appendix F.	reporting
VA DEQ	The report seems confused on the BMP verses the land use of UTC. The BMP is a land use conversion from pervious urban or impervious urban to UTC over pervious or impervious. The benefit of the BMP is the difference in land use loadings between for example pervious urban and UTC over pervious. Therefore, there is no difference between the BMP and the land use as the BMP is the creation of the land use and conversion from another higher loading land use. Recommendation 1 on page 30 is confusing in that the 97 square feet per tree needed for effective canopy (canopy threshold needed to provide the canopy benefit) with the ability to estimate canopy via remote sensing efforts. Remote	Comments or concerns over specific mapping procedures and classifications based on imagery are not the purview of this expert panel and should be directed to the CBP modeling and GIS staff. All land uses are simulated through the entire calibration period and it is false to characterize those carefully developed methods for forecasting back through time as "fabricated" since they are based on the best available historical data. However, these methods are not the purview of this expert panel. The 97 square feet is a threshold defined by the Bay	Mapping and imagery

	sensing may well indicate tree canopy areas that do not meet a 97 square foot threshold per tree needed to produce the recommended benefit. It seems the 97 square feet is what is needed for a single tree to provide canopy benefits not needed for detection via remote sensing. The current land use classification effort in VA is utilizing a mosaic of imagery over multiple years and resolutions (12, 6, and 3 inch) aggregated up to 1 meter. According to the GIS experts developing Virginia's high resolution land use 1 meter resolution equates to differentiating an object 4 square meters in size or slightly under 20 square feet or much less than the 97 or 144 square foot threshold for canopy benefits. Therefore the assumption that future remote sensing will capture plantings in a 10 year period is faulty and contradicted later in section 6 of the report. Remote sensing will capture things as tree canopy based on the decision rules and algorithms employed at the time. And have as much to do with the definition that a contiguous acre of trees is forest and any group of trees less than that size are part of UTC. In fact that single factor seems the biggest determinant of the extent of UTC. Assume ½ acre of contiguous trees equates to forest and UTC acres will be significantly lessened. Assume 1.5 contiguous acres of trees if forest and UTC acres swell. So the extent of UTC seems more related to what is assumed forest and less on what is remotely detected as canopy over some other land use. Remote sensing may include buffer and other tree planting BMPs and canopy areas less than 97 square feet per stem and include these in the remote sensed totals of UTC. We are also unaware of any other land use or major input factor like a land use in CBP modeling that is based on a single measurement point. The entire historical representation of the UTC simulated land uses must be fabricated because there is	Program as part of the land use mapping for tree canopy land uses. This threshold was used as guidance for the Expert Panel to develop its recommendations but mapping and imagery procedures are outside the panel's purview. That is, a credit based on a projected growth of a tree 10- years after planting. The current Phase 5.3.2 credit is based on a mature tree, at time of planting and the equivalent acreage credit as forest land use. The Expert Panel for reasons described in the report Section 5.1 did not support applying a credit based on a longer expected growth period, nor as a conversion to a forested land use.	

	insufficient high resolution imagery over time to make predictions or trends in these land uses on actual measured or surveyed results.		
VA DEQ	Recommendation 2 on page 30 and 31 is confusing. Is the BMP credit duration 10 years or annual as it says Recommendation 2: **Lifespan of Annual BMP Credit**. Also unless specific location information is provided to NEIEN such as coordinate pairs but only X stems or acres within a city or 12-digit hydrologic unit or larger area how will we know which NEIEN reported acres of UTC are being captured by the remote sensing efforts assumed to be done at some intervals in the future? This section also indicated that unlike other structural BMPs urban trees on average have an expected 19-28 year lifespan. So is the BMP an annual BMP needing annual accounting, a 10 year credit duration, or something much longer? It would seem that if one follows recommendation 3 and does plant coniferous trees it is unlikely they will ever reach the 97 square foot threshold or possible detection from remote sensing efforts. Yet acres of UTC would have been reported and simulated with all assumed benefits.	The reported trees planted or acres for the Urban Tree Planting or Urban Forest Planting BMPs will be tracked for the recommended credit durations of 10 and 15 years, respectively. All acres of land use change BMPs like Urban Tree Planting receive credit between updates to satellite imagery-based land use data. Following an update all historic implementation effort will still be tracked toward milestones set by the jurisdictions and all new implementation will be counted as a land use change. This avoids double-counting in the model simulations while demonstrating implementation and effort toward milestone goals.	Tracking and reporting; modeling
VA DEQ	The panel is proposing that we report in recommendation 4 of the report 300 stems per acre with tree canopy area of 144 square feet per tree equals 1 acre of UTC. Yet on page 31 Recommendation 3: Information for Reporting and Tracking BMP "This recommendation does not limit the type or density of trees planted that are eligible for credit. The credit applies to all tree types, whether planted individually or in a contiguous area (i.e., trees other than broadleaf species may be planted)." So in one place in the report it indicates 300 stems and 144 square feet per tree is needed and another section a single tree with 97 square feet of canopy is all that is needed. Which is it 97 square feet or 144 square feet of canopy area? Is it a single tree	The 97 square feet and 144 square feet refer to different things. Based on personal communication with GIS staff the imagery and mapping classification captures trees that are 97 square feet or larger. It has been pointed out that there may be variation in the exact size or area of a tree that is detectable, but such specific imagery issues are outside the scope of this panel. The panel's method for estimating canopy area for a planted tree is based on 10 years of growth for a variety of species and accounts for numerous factors (mortality, light exposure, etc.), and sets the estimated average canopy area of a planted tree at 144 square feet. Based on that area, it would take ~300 trees to equal one acre, but this is NOT a density requirement. Any tree that is planted, reported	Tracking and reporting; modeling

	or 300 trees at one or the other square footage of canopy per tree?	and credited under the Phase 6 Urban Tree Planting BMP converts 144 square feet, or 1/300 of an acre, from the previous land use to a Tree Canopy land use.	
VA DEQ	This seems a contradiction where the report indicates the panel's BPJ is that coniferous evergreen trees are not commonly planted and subsequently not considered as part of the recommended credit. And the following graphic on page 29 clearly shows the canopy projections from 6 classes of trees based on broadleaf or coniferous and leaf size. That graphic indicates only 2 of the 6 classes produce the needed 97 square feet of canopy area within 10 years that produced the exposed loading rate difference. Yet recommendation 3 would seem to indicate explicitly coniferous trees are acceptable for reporting even those which seem to never reach the 97 or 144 square foot threshold. It seems clear from the report that only broadleaf large and broadleaf medium meet the 10 years 97 square feet criteria and only broadleaf large meets the 144 square feet within 15 years. It would seem a qualifying condition of this BMP would be a type (only broadleaf large and broadleaf medium tree types planted can receive UTC credit) and density requirement (minimum 300 stems per acre at planting). Recommendation 3 and 4 seem to be at odds with each other suggest elimination of recommendation 3 and include tree type requirements (only broadleaf large and broadleaf medium) be a qualifying condition for recommendation 4 assuming clarity between recommendation 4 and the current urban tree planting BMP can be achieved. Without elimination or modification to specify tree type an unintended consequence of recommendation 3 would be wide spread planting of coniferous trees and the reporting of stems per acre planted. This would lead to a situation where a tree type identified by the panel as never reaching the square footage threshold (97 or	The canopy projections in Figure 4 represent the average canopy per tree planted. So, it is not suggested to assume based on that graph that coniferous trees will not reach the size needed to be captured in high resolution imagery, but rather that the average area per coniferous tree planted will not reach that area threshold. The estimated projections per tree also assumes annual mortality. The actual canopy area, while dependent in part on tree species, will also be affected by a number of other factors. Consequently, the panel feels that given the relative impact of the Urban Tree Planting BMP it is unnecessary to set prescriptive qualifying conditions. Local, state or federal agencies will have established rules or guidance to determine what types or species of trees to plant in specific areas and the panel did not want to dictate that coniferous trees are less valuable to water quality strictly because they provide less canopy coverage on average.	Tracking and reporting;

	144) needed to produce the canopy benefit but is credited in the modeling as providing such benefit.		
VA DEQ	There seems a large disconnect between reporting as few as a single stem planted of any tree type (recommendation 3), 300 stems per acre (recommendation 4) and the expectation that these will be captured via remote sensing at some future date. It seems highly unlikely the imagery processing remote sensing effort will match reported planted acreages. Thus setting up conflicts between what the jurisdiction has reported and what can be verified via an objective process as stated in the report using remote sensing with high resolution imagery provides. And if as the report indicates (Section 6 pages 33 and 34) periodic updates to the high resolution imagery would not verify specific tree planting projects and extraneous factors are likely to overwhelm the effect of tree planting. How using remote sensing processes will we differentiate the tree plantings credited in the model (increased UTC land use area) with what most likely not be detected or overwhelmed according to the report? This seems a direct contradiction to the assumption in Recommendation 1. In terms of verification the panel minutes indicated discussion on the need for adequate soil area at planting to ensure survival and optimum growth (canopy cover). Yet the panel is silent on this as a consideration or condition of the BMP. And if the canopy area is the primary determinant on interception and associated benefits should there also be a method to estimate canopy area by stem to verify reported installations are meeting the minimum canopy area needed to produce the estimated benefits? As is it seems the panel is saying as long as it is a tree and alive it passes verification. If specific actions on maintenance are needed to ensure the canopy area and function are meeting minimum requirements the panel should	As noted above, all acres of land use change BMPs like Urban Tree Planting receive credit between updates to satellite imagery-based land use data. Following an update all historic implementation effort will still be tracked toward milestones set by the jurisdictions and all new implementation will be counted as a land use change. This avoids double-counting in the model simulations while demonstrating implementation and effort toward milestone goals. The 144 square feet average canopy per tree planted is not a density requirement. It represents a reasonable average that can be applied to the aggregate of all individual or smaller scale tree planting projects in an area. Planting projects that are larger in scale and seek to create forest-like would be tracked under the Urban Forest Planting BMP proposed by the FWG, if that proposal is adopted by the partnership. Since the BMP will only be simulated in the model runs between updates to the high resolution imagery, this essentially acts as a built in verification mechanism for these BMPs in model simulations. As with all BMPs, the jurisdictions consider and determine how to verify their reported BMPs based on the BMPs' relative contribution to overall reductions, the state's priorities, programs, and other factors. Considering the scale and scope of urban tree planting and urban forest planting it is not expected that they will contribute large relative reductions in the model simulations compared to other urban BMPs.	Tracking and reporting; modeling; BMP verification

	provide them or at least a listing of the types of actions/equipment that are needed to verify the BMP is functioning properly. Based on the report as is there is great confusion as to what constitutes verification of the BMP and how VA would amend our existing Verification documentation to include UTC in annual reporting. Without the ability to clearly provide local governments with what the state considers needed for verification including maintenance of this BMP it is doubtful to be collected or reported annually.		
VA DEQ	The panel indicates that if not maintained and UTC plantings die, then the canopy will not be captured by the remote sensing updates. Since maintenance is important to the survival of the BMP and producing a verifiable BMP it is imperative that the experts provide guidance on what constitutes maintenance. How does one verify a BMP is properly functioning without knowing if the BMP is getting proper maintenance?	The Forestry Workgroup has provided extensive BMP verification guidance. Maintenance procedures should follow applicable local, state or federal guidance for trees in that given area.	BMP verification
VA DEQ	If tree canopy has such benefits on impervious and pervious urban it should have similar benefits to non-urban impervious and previous areas so should not be limited to just the urban sector.	This expert panel was not asked to make recommendations for non-urban sectors.	
WV DEP	*1. This sentence in section 3.2 confused me because you can't tell right away (although maybe it's obvious to others?) that you're talking about the tree canopy over impervious:* To account for the distribution of Tree Canopy over Roads and Tree Canopy over other impervious non-roads (building parking lots, etc.), 90% of existing canopy was assumed to be over Roads and the remaining 10% over non-road impervious surfaces for the Beta-1 version. This distribution may change for the final version of the Phase 6 CBWM as additional analysis and calibration is completed.	Edit made to read, "To account for the distribution of Tree Canopy over Roads and Tree Canopy over other impervious non-roads (building parking lots, etc.), in the Phase 6 Beta-1 version, 90% of existing canopy was assumed to be over Roads and the remaining 10% over non-road impervious surfaces (see **Error! Reference source not found.**)"	Edits

	But it appears again worded more clearly in the footnote to table 2.		
	2. Should this sentence in section 5.2 "i-Tree forecast" have the word "each" deleted? This mortality rate is applied in the initial each year (at planting) but will vary in subsequent years based on DBH as shown in Figure 2 below.	"each" deleted	Edits
	3. This sentence from the first paragraph under "Verification" seems to need a comma after "recommends" if I am understanding it correctly from the context of the rest of the paragraph: The Expert Panel strongly emphasized that it is unreasonable to assume a replanting of all trees that die in these first few years which the Verification Guidance recommends as the planting density in many cases are overplanted to account for expected mortality and the recommended crediting method accounts for a 2.5% to 5% annual mortality. *Thanks! Great report!* *-Alana*	Comma added	Edits