VERIFICATION GUIDANCE
FOR FORESTRY BEST MANAGEMENT PRACTICES

I. Introduction

This guidance provides information on Forestry Best Management Practices (BMPs) and how best to verify that they have been installed correctly and are being maintained to provide the water quality benefits (nutrient and sediment load reductions) which they should be attaining.

Forests cover the majority of the landscape in each Bay state. Protection of forested lands and restoration of trees in priority areas, such as riparian forest buffers (RFBs) along streams and shorelines, are vital for Bay watershed water quality and ecological health. The CBP Executive Council adopted an ambitious, science-based RFB goal in 2007 as part of the Forest Conservation Directive. Riparian forest buffers planted on agricultural land are one of the BMPs on which the states are relying the most to achieve Bay water quality goals in their Phase II Watershed Implementation Plans.

In addition to RFBs, other forestry BMPs play an increasingly important role, especially in the urban sector.

Forests are not generally pollution sources. Instead, they absorb and use nutrients (greatly reducing nutrients from airborne sources, for example) and retain and use sediment, thus aiding pollution prevention. Four of the five Forestry BMPs covered by this guidance are types of tree planting designed to improve environmental and water quality conditions in currently non-forested areas, including tree planting in riparian areas. These tree planting practices apply to Agriculture and Urban landscapes. The Forest Harvesting BMPs are the only BMPs applied specifically to current forest lands at this time.

Generally speaking, forest planting BMPs (riparian buffers and tree planting) are intended to last for a very long time. After verifying that buffer and tree planting projects have been installed correctly, and after performing site inspection and maintenance during the initial growth period (~ 5 years or until considered established), forest BMPs will become easier to verify by aerial photography and inexpensive to maintain compared with other types of BMPs. Once the tree planting is established, the remaining concern is whether channelization will become an issue. Channelization can hamper the effectiveness of a buffer granted when water flows into it uniformly.

The five Forestry BMPs for which verification guidance is presented are: (a) Agricultural Riparian Forest Buffers; (b) Agricultural Tree Planting; (c) Expanded Tree Canopy; (d) Urban Riparian Forest Buffers; and (e) Forest Harvesting. Because of similarities in how the two agricultural BMPs are funded and implemented, the background information and BMP verification guidance for these will be presented together in Part 2. Background information and BMP verification guidance for the two urban forestry BMPs is presented in Part 3. Part 4 covers Forest Harvesting.

Forestry BMPs have definitions and nutrient/sediment removal rates developed and approved through the CBP BMP review protocol. Two BMPs are currently in review: Riparian forest buffers and Expanded urban tree canopy.

Role of Forestry Work Group in Verification:
Since the late 1990s, the Forestry Work Group has worked with Bay states to improve tracking of riparian forest buffers on agricultural lands, and Bay watershed state forestry agencies are involved to varying degrees in inspecting newly-installed buffers and providing guidance and assistance for other forest restoration activities. When the Work Group reviewed jurisdictions' tracking practices for all forestry BMPs in a December 2011 workshop, it saw a notable disparity in how and whether jurisdictions collected BMP implementation data. For example, regulation and oversight of forest harvesting vary considerably among states. Urban forestry BMPs (urban riparian buffers and expanded tree canopy) have only begun to be reported regularly by jurisdictions, despite having been defined Bay Program practices for over 10 years.

Seeing the disparities, the Forestry Work Group was primed to work on BMP verification and more consistent BMP tracking in 2012. The Work Group responded to the Water Quality Goal Implementation Team's request to technical workgroups to develop principles and protocols for verifying BMPs as part of the CBP's overall initiative to improve accountability of restoration practices. In addition, the Forestry Work Group tackled an even more difficult accounting issue: the extent to which agricultural riparian buffer planting has resulted in a net gain of forest buffers watershed-wide, given the loss of riparian forest to development and, in some areas, to crops.

In 2012, the Forestry Work Group began developing principles and protocols for verifying forestry BMPs. The Work Group, which meets monthly, discussed those principals and protocols at its February, March, June and August meetings in 2012 and its February and June meetings in 2013. Several written versions were shared with the Work Group over this time, and many comments were received. Other comments were contributed by the Expert Panels for Riparian Forest Buffers and Tree Canopy. All of the input that was received is summarized in Table 1.

The process was greatly aided by interactions with the Agriculture and Stormwater Work Groups, who are keenly interested in the forestry practices taking place on agricultural and urban lands. These groups have agreed that the Forestry Work Group should develop technical verification definitions and guidance for forestry practices which supplements the general verification guidance of these two groups. In particular, the Forestry Work Group guidance goes beyond BMP-by-BMP verification to focus on net gain in riparian forest buffers and tree cover.

II. Forestry BMPs Implemented on Agricultural Lands

Agricultural riparian forest buffers and tree planting are most often implemented in the Chesapeake Bay watershed through the USDA and state agricultural cost-sharing programs. In fact, a single project may be funded by multiple agencies. Cost-shared project design and implementation are guided by technical standards, and there are verification programs already being implemented by the funding agencies. In some states, state forestry departments provide additional monitoring for agriculture cost-shared projects involving tree planting.

Riparian forest buffers and tree planting may also be carried out voluntarily by a farmer at his own expense. To date, such projects are a small fraction of the total projects credited in the Chesapeake Bay Program, but there is a current initiative under the 2010 Chesapeake Executive Order Strategy to develop a program for recognizing and giving credit to voluntary agricultural BMPs, including forestry BMPs. The voluntary riparian buffer plantings reported to date have generally been orchestrated by large non-governmental organizations that regularly do this type of work with volunteers.

A robust verification program for insuring that riparian forest buffers and tree plantations are correctly installed and are functioning to achieve their assigned water quality benefits entails review of the planting plans, verification that installation has taken place according to plan, and periodic inspections during the life of the buffer or tree plantation, on a timetable described below. Where projects are cost-shared, the concerned federal and state agencies should be able to provide most or all of the recommended verification. However, where projects are carried out voluntarily, there is no existing verification mechanism. This guidance therefore distinguishes between cost-shared and voluntary projects.

Agricultural Riparian Forest Buffers

Description:
Agricultural riparian forest buffers are linear wooded areas along rivers, streams, and shorelines. Forest buffers help filter nutrients, sediments and other pollutants from runoff as well as groundwater. The recommended buffer widths for riparian forest buffers (agriculture) is 100 feet, with a 35-foot minimum width required.

Current Procedures for Verifying Establishment of Buffers:
The vast majority of Forest Buffer practices are cost-shared conservation practices on agricultural land that are long-term in nature (once established, the practice often continues in perpetuity without need for management or maintenance) and originate with a Conservation Reserve Enhancement Program (CREP) contract. Often, more than one agency has oversight of these agriculture-tree practices, including the federal USDA's Farm Services Agency (FSA) and Natural Resources Conservation Service (NRCS), state forestry, Conservation Districts, etc. For simplicity, and because roles vary from state-to-state, all those providing oversight are referred to as CREP partners. For instance, FSA will keep contracts for CREP, a forestry agency will write a planting plan and check for compliance, and a technical service providing agency may make multiple site visits and have landowner contact. Sometimes multiple databases track the

same practice.

There are well-documented procedures on how to establish a riparian forest successfully (MD DNR 2005). It starts with a planting plan designed by a forester. Aspects of a good plan include: species selection, site preparation, and spacing of trees, among other factors. Forest buffer plantings almost always use tree shelters (e.g., 98% of the time in VA) to protect against herbivory. Shelters increase survival from 12% (no shelter) to 74% (with 4-foot shelter). Herbicide treatment is also highly recommended. Some of the trees planted are expected to perish but most must survive or be replanted to comply with contractual specifications. Repeated visits are made during establishment.

After establishment, a buffer planting may need additional maintenance to be fully functional. Adverse impacts include excessive traffic, livestock or wildlife damage, fire, pest infestations, and concentrated or channelized flows. The NRCS standard for this practice (Code 391) says the buffer will be inspected periodically and protected from these impacts. Maintenance is the responsibility of the landowner and a portion of the public funding provided to the landowner is designated for maintenance expenses.

Below is the current protocol for verifying contractual agreements in CREP:

a) **Verify Planting Establishment**
- In practice, NRCS or other technical assistance partner (e.g., state forestry) confirms establishment on every site at the 1 or 2-year point, and every year thereafter until the planting is determined to be established. "Established" means that the buffer meets the NRCS forest buffer practice standards (Practice 391) and any additional state requirements (required stocking/survival rates vary by state).

- If the site visit determines that the practice has not yet been established, replanting is usually required to get the buffer up to standard, and further site visits until the replanting is established. If the buffer never becomes established, it is taken out of contract.

-Some states include detailed monitoring of plantings as well. Virginia CREP partners—VA Dept of Forestry is the primary forestry technical expert-- visit every planting site 3 times and have routine documentation about species planted, survival rate, and other issues.

b) **Spot Check Plantings**
- After the practice has been reported as established, USDA has a standard program of compliance checks on a portion of all contracts; the requirement is for a minimum of 10% of the buffer contracts to be spot-checked.

- State agriculture conservation programs that provide a portion of CREP cost-share may have additional verification requirements, for example, VA DCR requires spot checks on 5% of practices under contract each year throughout their lifespan (including CREP).

A minor portion of riparian forest buffers are volunteer plantings and are not cost-shared. There

are no current verification procedures for volunteer plantings.

c) **Tracking**
Currently, USDA data is used by most states to report accomplishments to the model. This data does not currently include width of practice, but does include acres. Because of the Chesapeake Bay Program agreements and directives giving priority to riparian forest buffer restoration, and to assure good reporting by jurisdictions (containing the necessary information and avoiding double-counting), a second complimentary process was developed. The Forestry Work Group has been tracking buffers installed on agricultural lands since 1997. Each fall, the Work Group requests geo-spatial data from the Bay states. The following 10 fields are requested from the state contacts and every year CBPO maps the point data for analysis, determination of average width, and cross-checking.

Field 1: Unique identifier (parcel ID, etc.)
Field 2: State
Field 3: Latitude
Field 4: Longitude
Field 5: Miles of forest buffer
Field 6: Width of forest buffer
Field 7: Planting date
Field 8: Ownership type (public/private: Federal, state, other public, private)
Field 9: Notes/Comments field
Field 10: Watershed name or HUC

Agricultural Riparian Buffer BMP Principles

1. Verification methods for cost-shared agricultural riparian forest buffers will utilize and build upon the verification programs already implemented for cost-share contracts.

2. Inspection and maintenance are critical a) to ensure riparian forest buffers become established effectively; and b) to verify that the buffer is being maintained throughout the contract.

3. Special attention is needed at the end of contract life, to determine if a new contract will ensure continuation of the buffer or the buffer will be maintained voluntarily. The buffer BMP "lifespan" is the period of the cost-share contract, unless physical inspection verifies that the landowner will continue the buffer after the contract expires.

4. Any new acreage of riparian forest buffer reported represents a net gain in overall buffer for a county or land-river segment. The following examples support this principle:
- Laws or ordinances that encourage conservation of existing buffers are in place.
- Monitoring and maintenance occurs on both newly planted buffers and also on existing buffers.
- Periodic sampling of total buffer area to indicate that riparian overall riparian buffer canopy in the county or watershed segment is increasing (Part 3 below).

5. Where agricultural riparian forest buffers are being planted voluntarily and reported by

farmers or non-governmental organizations, jurisdictions may give them credit for an initial four years without inspection, if such plantings are a very small percentage (less than 10%) of the total acreage of buffer plantings reported in a given year.

Agricultural Riparian Forest Buffer Verification Guidance

Part 1: Collect and review data
Continue following the current protocol for verifying contractual agreements in CREP and verifying the buffer has been installed according to plan. In the plan, it is suggested to note likely site impacts that need to be addressed with maintenance. The reporting agency should capture width of buffer in addition to acres of practice in NEIEN. (Do we want to suggest forgoing separate FWG buffer reporting?)

Part 2: Verify maintenance of new plantings
After establishment, proceed with periodic inspections (spot checks) to see how well maintenance issues are being addressed by landowner. Currently, a minimum of 10% of contracts are spot-checked. Additional spot checks are needed because of the number of impacts that can affect water quality benefits. States should be 70% confident that water quality impacts are being avoided in the most likely places. Statistical sampling is recommended to check on specific maintenance issues that have the biggest potential impact to water quality. For instance, to protect from concentrated flows, a stratified sampling design could look at all sites that are on slopes of 7% or greater where this impact is more likely. Sampling is recommended as a targeted and cost-effective means to have confidence that maintenance is happening effectively. Plantings to be spot-checked for maintenance should be between 5 and 10 years old because this is the period between establishment and re-enrollment when the least number of inspections occur. Most maintenance issues are easily detected, and states could make available descriptions of maintenance violations. If statistical sampling design help is not available, states can recommend other means of spot-checking reach a 70% confidence level.

Part 3: Contract Expiration/Re-enrollment

This protocol is recommended to encourage conservation of existing buffers. CREP contracts expire after 10 or 15 years, and a record amount of sign-ups in 2001-2007 are due to expire in the next few years. There are three likely scenarios when a contract is ending: 1) the landowner re-enrolls the buffer into another 10 or 15 year contract; 2) the landowner does not re-enroll, but plans to keep the buffer; or 3) the landowner does not re-enroll and plans to get rid of the buffer. Actions taken now by CREP partners can lead to more landowners being in the re-enrollment category (#1), and what to expect for those lands coming out of contract (#2 or 3). To re-enroll, CREP partners must determine that the buffer still meets the practice standards (survival/stocking rate). To facilitate the re-enrollment process, the following actions are recommended.

a. CREP partners field check buffer sites in the last 2-3 years of contract to assess whether buffers meet standards and will be continuing after contract expiration, either through re-enrollment in CREP or voluntary retention of buffer.

b. Acres of buffer that do not meet the practice standard or will not be retained, should be taken out of the CB model. FSA will assign a unique identifier to each project in the future so they can be tracked better and don't become double-counted with re-enrollment.
c. CREP partners conduct outreach/technical assistance to landowners with expiring contracts.

Part 4: **Assure reported buffers represent a net gain in total buffer coverage**
CREP partners should establish a baseline for total riparian forest buffer acreage in a given county using high resolution aerial imagery, Land Image Analyst, or other tool. Every 10 years, the reporting agency will re-sample the three counties in each state that have experienced the most development or increase in agriculture (per agriculture census) to show there has not been a loss in total buffer cover. Loss of overall riparian forest buffer coverage in these counties will result in county-wide removal of buffers reported as a "net gain" for those years. The theory is that if a state can show that it is maintaining buffers in the counties with the most threat, then it is assumed that it is protecting buffers in less critical counties.

Part 5: Voluntary BMPs
If jurisdictions report that voluntary projects account for over 10% of total forest buffer practices, additional verification of establishment and maintenance is required. If voluntary practice is done in cooperation with a CREP partner, the state can credit for four years without inspection. Practices that are inspected for establishment and then included in a spot check protocol to ensure practice function (similar to federal cost-share practice) can stay as part of the NEIEN record. [CBP wants more uniformity among the groups on how voluntary projects are handled.]

Tracking and Avoiding Double Counting

The Forestry Work Group's procedure for tracking riparian forest buffer installation has been described above. Cost-shared buffers may be funded by multiple agencies, and the Work Group's specialized tracking has been a means of cross-checking what is reported to the model, establishing average width of practice, and mapping where practices are occurring. Riparian forest buffer information now also comes through the USDA data agreement with EPA and USGS. The Forestry Work Group has not stopped collecting the data fields described above in part because the USDA data do not include width of buffer. As information collection through the USDA data agreement develops, the Forestry Work Group will evaluate whether to continue its own tracking.

Agricultural Tree Planting

Description: Agricultural tree planting includes any tree planting, except those used to establish

riparian buffers targeting lands that are highly erodible or identified as critical resource areas.

Agricultural tree-planting is a cost-shared practice under the Environmental Quality Improvement Practice (EQIP). The current procedure for verifying agricultural tree planting is through the normal contract procedures established by NRCS.

Until now, Agricultural Tree Planting has not been a commonly-reported practice to the Bay Program. However, there are new and expanding opportunities through agroforestry to plant trees on agricultural land. Agroforestry is the intentional mixing of trees and schrubs into crop and animal production systems for environmental, economic, and social benefits, and includes practices such as windbreaks, silvopasture, and alley cropping.

Agricultural Tree Planting BMP Verification Guidance

For tracking and crediting purposes, 100 trees planted equals one acre of practice (the same as for expanded urban canopy).

For purposes of verification, this practice will follow the BMP Verification Guidance put forth by the Agriculture Work Group.

For plantings over an acre, a forester-developed planting plan is recommended.

III. Forestry BMPs Implemented on Urban Lands

Bay states have had urban forestry programs for the past ~30 years having been established after the 1978 Cooperative Forestry Assistance Act. These programs provide assistance through competitive matching grants for urban and community forestry projects including tree planting and maintenance. Other urban forestry grants to localities have become established and localities have developed their own programs because they realize the many benefits (water quality being one) that urban trees bring people and because the investment by the Programs in planning and maintenance of trees has been shown to pay back in multitudes. Other efforts are grassroots. Many localities in the watershed have had assessments done of their tree canopy and have set goals to increase their urban tree canopy (Figure 1). Still the practice has not been consistently reported to the Bay Program for credit.

In recent years, the number of tools available for assessing and monitoring an urban canopy has soared, especially those using aerial imagery and software technology. In 2004, the Science and Technology Advisory Committee (STAC) held a workshop introducing these tools (STAC 2004). One leading program, the iTree suite of tools, is a free, peer-reviewed software suite from the USDA Forest Service that provides urban forestry analysis and benefits assessment tools (www.itree.com). Even more basic is the use of Google Earth® imagery to view tree canopy.

The two urban forestry practices, Expanded Tree Canopy and Urban Riparian Forest Buffers, overlap with practices covered by the BMP Verification Guidance of the Urban Stormwater

Work Group. As noted in that guidance, the practices may be implemented as part of a program to meet regulatory requirements, such as Clean Water Act MS4 permits. Tree planting has received a boost as federal, state and local stormwater requirements have strengthened provisions for maintaining and restoring natural hydrologic conditions in developed and developing areas.

Expanded Tree Canopy BMP

Description: Expanding tree canopy includes 1) conserving existing tree cover as much as possible; 2) planting trees; and 3) allowing for natural regeneration. Credit is applied according to the number of new acres intended for tree cover. If trees are reported as number planted (not acres, non-contiguous), a conversion factor of 100 trees = one acre of new tree cover. Area of intended tree canopy via natural regeneration should be a minimum of 1/4 acre (or adjoin to existing forest)

Current Procedures: at present, reporting of urban forestry practices by jurisdictions is not well-established, and verification procedures have been limited. In particular, there has been no means of assessing that tree planting projects are resulting in a net gain of overall tree cover.

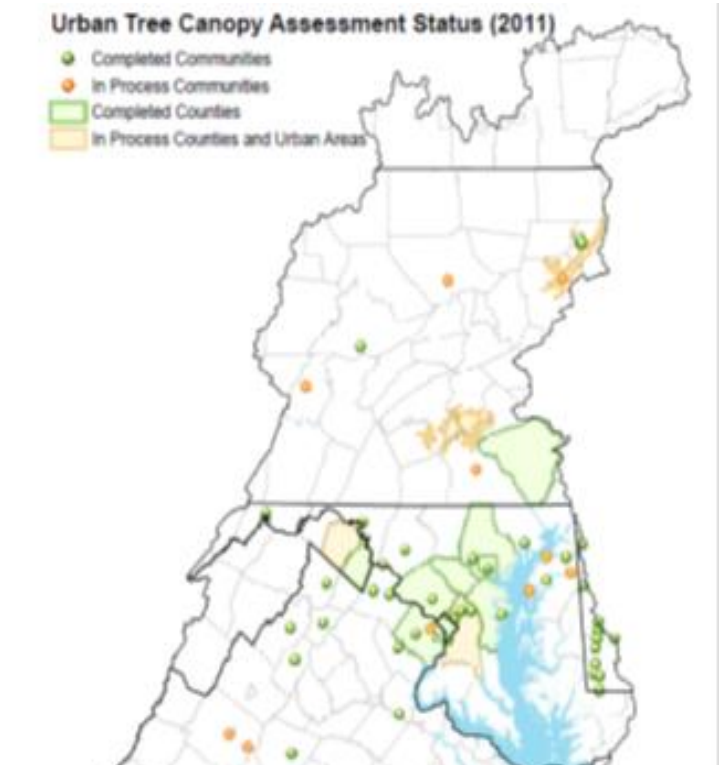

Figure 1. Urban tree canopy assessment status in the Chesapeake watershed.

Expanded Tree Canopy BMP Verification Principles

The Urban Stormwater Work Group BMP Verification Guidance outlines a number of principles, and the general principles apply to Expanded Tree Cover when used by a locality for stormwater management. The Forestry Work Group adds the following forestry-specific principles:

A. *Any new acreage of tree canopy represents a **net gain** in overall tree cover for a reporting jurisdiction. The following examples support this principle:*
   - Conservation measures are in place to help maintain existing canopy.
   - Monitoring and maintenance occurs on all acres of tree canopy, whether new or existing (e.g., community street trees are watered during periods of drought).
   - Periodic analysis of existing tree canopy within a reporting jurisdiction is used as assurance that overall tree canopy is not decreasing.

- Ordinances protective of tree canopy.

B. *State Oversight of Local Tree Canopy Reporting*. To provide accountability, Bay state forestry agencies should audit a subset of local partners by analyzing their tree canopy records, project files, and/or 5-year assessments of overall canopy expanse. The state oversight process needs to be transparent and publicly accessible so that NGOs, watershed groups and other stakeholders can be confident that BMP implementation is real.

Expanded Tree Canopy BMP Verification Guidance

Part 1: Establish Urban Forestry program support mechanisms

Reporting jurisdiction has an urban forestry program and therefore has more certainty of survival/net gain in tree canopy. Having a program in place will facilitate with all bullets mentioned in the Principle statement above. Land managers and tree stewards need to be able to educate about tree care and use good planting techniques.

Part 2: Urban forestry partner tracks and reports new acres of tree canopy

a) **For new plantings,** collect 1) acres of planting, 2) dates of planting, and 3) anticipated stature of trees at maturity (e.g., large or small). All plantings over ½ acre should be site-checked by partner.

b) **For natural regeneration acres**, three similar pieces of data should be recorded: 1) acres of treatment, and 2) date started. Because of the difficulty to establish tree canopy in this way, this information is reported for credit only after 4-year maintenance period. Regeneration areas can be mowed, fenced or signed as deemed necessary.

Urban forestry partner— a local government staff or non-governmental partner that is approved by the state forestry agency as competent to implement an urban forestry program.

Part 3: Urban forestry partner maintains new areas of tree canopy

a) **New urban plantings** can have a high rate of mortality succumbing to weed suppression, dehydration, physical damage, or other injury. Removing competing vegetation is often necessary. An individually planted tree (e.g., tree pit) that dies should be replaced, or removed from the National Environmental Information Exchange Network (NEIEN) database.

b) **For natural regeneration** areas, ensure desirable tree growth is not suppressed, until a density of 100 trees/acre is reached and the trees are of a height where they can grow unhampered (above competing vegetation and deer browsing level of 4 feet).

Part 4: Assesses overall canopy

For existing tree canopy within reporting area/jurisdiction, every 5 years, a locality should re-assess the canopy of the entire jurisdiction to show that there has not been a decrease in overall canopy. If tree canopy decreases, NEIEN tree canopy credit for that jurisdiction should be removed.

Use of free aerial imagery and assessment tools such as iTree Canopy (http://itreetools.org/) or the Land Image Analyst (not yet released) can be a cost-effective means of sampling and creating a quick assessment of canopy cover.

iTree Canopy is designed to allow users to easily and accurately estimate tree cover within selected jurisdiction. This tool randomly lays points (number determined by the user) onto Google Earth imagery and the user then classifies what cover class each point falls upon. The user can define any cover classes that they like and the program will show estimation results throughout the interpretation process. The more points completed per size of the area to be sampled, the better the cover estimate. From this classification of points, a statistical estimate of the amount or percent tree canopy can be calculated along with an estimate of uncertainty of the estimate (standard error (SE)). A confidence interval of 95% should be reached to show no loss of canopy in the 5 year period.

Example Canopy Assessment from iTree Canopy

To illustrate how to use iTree Canopy to estimate canopy cover, let us assume 1,000 points have been interpreted and classified within a city as either "tree" or "non- tree" as a means to ascertain the tree cover within that city, and 330 points were classified as "tree".

To calculate the percent tree cover and Standard Error (SE), let:

N = total number of sampled points (i.e., 1,000)
n = total number of points classified as tree (i.e., 330), and
p = n/N (i.e., 330/1,000 = 0.33)
q = 1 – p (i.e., 1 - 0.33 = 0.67)
SE = $\sqrt{}$ (pq/N) (i.e., $\sqrt{}$ (0.33 x 0.67 / 1,000) = 0.0149)

Thus in this example, tree cover in the city is estimated at 33% with a SE of 1.5%.

This process should take an average user several hours to complete and is requested once every five years.

For more information on iTree Canopy and for similar directions on how to calculate Confidence Interval of 95%, go to http://www.itreetools.org/canopy/index.php.

Urban Riparian Forest Buffers

Description: An area of trees at least 35 feet wide on one side of a stream, usually accompanied by trees, shrubs and other vegetation that is adjacent to a body of water. An urban riparian forest buffer is any riparian buffer not in an agriculture or forest setting-- it is on developed land. Verification of this practice is similar to the Expanded Tree Canopy practice (page 5). The principle and guidance are the same except for the need to focus within the riparian area of a

jurisdiction.

Partner maintains information at local level of each new urban riparian forest buffer.

a) **For new plantings,** record: 1) location (lat/long) and name of property, 2) acres planted (if appropriate) and width, and 3) dates planted.

b) **For natural regeneration acres**, data to be recorded includes: 1) location, 2) acres of treatment, 3) width, and 4) date started. Naturally regenerating urban buffers should be reported after 4 years of regeneration if there are 100 or more live native trees per acre.

c) **To demonstrate there has been no loss of urban buffer in the jurisdiction,** a similar procedure using iTree Canopy is recommended, with more points being selected in riparian areas. Other software may be equally useful in demonstrating there has not been a loss of buffer. Any known loss of urban buffer in a jurisdiction should be mitigated prior to reporting new acres of this BMP.

IV. Forest Harvesting

Description: Forest harvesting practices are a suite of BMPs that minimize the environmental impacts of logging, including road building and site preparation. These practices help reduce suspended sediments and associated nutrients that can result from forest operations. The CB model currently assumes an average of 1% of forest is harvested on any given year, unless more accurate data is supplied by the state. The pollution load from forest harvesting is reduced based on reporting of forest harvesting BMPs being applied.

Current procedure: All States have adopted recommended BMPs for timber harvesting and forest management activities (also called Silvicultural BMPs) that have the potential to impact water quality. Consistent and reliable data on the use and effectiveness of these BMPs remain the most important evidence of a state's enforcement of and compliance with the Clean Water Act, and extensive protocols are available for monitoring (Welsh et al 2006, Southern Group of Foresters 2008). In some states, forest harvesting is closely regulated on both public and private land. Other states control harvesting on public lands and can thus monitor BMP implementation there, but have no accessible record of where private forests are harvested or what BMPs are used on those harvests. Public forests in all states are usually exemplary in following the BMPs, but roughly 95% of harvesting is on private lands. On-site visits of regulated harvesting operations are routinely made by state agency foresters in most parts of the Bay watershed.

Forest Harvesting BMP Principle

Track forest harvest acres annually and apply an implementation rate for forest harvest BMPs in that state. Public and private land harvesting operations should be tracked similarly. However, if only public land forest harvesting BMPs are tracked, acres of BMP implementation can only be reported on those lands.

Forest Harvesting BMP Verification Guidance

Part 1—State forestry agency will submit actual number of forest harvest acres to NEIEN if they are available, overriding the 1% harvest rate assumption made by the Bay Program. (If not available, the 1% rate will be applied to public and private forests.)

Part 2-- State forestry agency will submit actual acres of forest harvest BMPs implemented to NEIEN, based on state record or

Part 3-- State forestry agency will determine average rate of implementation in a given jurisdiction in lieu of actual acres of forest harvest BMPs. The rate of BMP implementation should be determined at least every 10 years or no credit will be allowed. Forestry staff or Cooperative Extension Offices can get this by assessing the overall rate of BMP implementation in a state by using data collected directly from local forest district offices. Harvest plan reviews provide one such record. If the record of BMP implementation is insufficient, forestry staff should interview regional forestry staff most familiar with timber operations. Private acres reported as using BMPs are calculated by multiplying acres being harvested by the average BMP implementation rate for a given 10-year period.