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SUMMARY OF COMMENTS & RESPONSES DRAFT URBAN FOREST PROJECT PROTOCOL VERSION 2.0

9 sets of comments were received during the public comment period for the Climate Action Reserve (Reserve) draft Urban Forest Project Protocol Version 2.0. Staff from the Reserve summarize and provide responses to these comments below.

The comment letters can be viewed in their entirety on Reserve's website at <http://www.climateactionreserve.org/how/protocols/urban-forest/rev/>

COMMENTS RECEIVED BY:

1. California Urban Forests Council (CUFC)
2. David Diaz (Diaz)
3. Greg McPherson (G.McPherson1, G.McPherson2)
4. Mark McPherson (M.McPherson)
5. Sacramento Municipal Utility District (SMUD)
6. Sacramento Tree Foundation (STF)
7. TreePeople (TreePeople)
8. Zagori (Zagori)

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General Comments

1. Although the Reserve staff and workgroup put in long hours and much effort, one of the central goals of the revision effort, which was to streamline and make more feasible the Urban Forest protocol, has not been realized in the comment draft.

The Urban Forest Management Project Protocol is a very useful step toward canopy quantification. This document will be an extremely valuable tool toward advancing and refining the various tools and methods discussed in it. But issues of carbon ownership and owners opting in or out will cripple the practical use of that protocol.

That makes the Tree Planting protocol even more important as a practical protocol for urban forest carbon projects. As drafted, the Tree Planting protocol remains too complicated and burdensome to be of practical use.

To provide a realistic alternative to the Reserve draft, I have drafted a simpler, more feasible Tree Planting protocol. I believe that if the Reserve wants a tree planting protocol that will in fact be used, it needs to re-draft the current Tree Planting protocol. My draft would be a good place to start in drafting a feasible protocol for urban forest tree planting projects. **[See M.McPherson public comment submission to review his draft protocol.] (M.McPherson)**

RESPONSE: The Reserve acknowledges that there are many challenges associated with developing real, additional, permanent, and verifiable carbon credits from urban forests. One of the biggest challenges is arriving at a scale of carbon needed for projects to be viable. The Urban Forest Management Protocol is written in such a way that landowners with substantial holdings within the urban area defined by the U.S. Census Bureau, or landowners that can identify solutions to aggregating carbon from a variety of landowners can develop adequate scale. The Reserve is more optimistic than the commenter that this can be achieved. Additionally, the workgroup generally agreed with the principles of Urban Forest Management as a project type to be pursued.

The Urban Tree Planting Protocol may be important to certain stakeholders. The revised protocol adds increased standards for rigor, principally regarding additionality, permanence, and verifiability. It does so with quantification and verification methodologies which are more efficient than previous versions.

At the time of the receipt of the comment, the Urban Forest Management Protocol and the Urban Forest Tree Planting Protocol were combined in one larger protocol. These methodologies have been separated into two separate protocols to make them clearer.

The draft received from the commenter, who was a workgroup member, was helpful in identifying the benefits of splitting the methodologies into two separate protocols, but otherwise lacked basic requirements consistent with a compliance protocol. The Reserve develops its protocols through a stakeholder workgroup process. The Reserve's duty is to ensure that any solutions meet adequate rigor for a compliance-grade protocol and to ensure that any quantification methodologies can be replicated and verified. The simpler version of the Reserve's workgroup draft did not meet the Reserve requirements for rigor nor for process.

2. It makes sense to offer the new UF protocol application in a modern, user-friendly, web-based interface where the steps are laid out for the applicant with links to important references and resources embedded for easy access and use. **(CUFC)**

RESPONSE: Access to all references and resources described in the protocol will be available on the Reserve website (www.climateactionreserve.org), under the Urban Forest Protocol link in the How It Works section. This will include the development of a user-friendly calculation worksheet as described in the protocol.

3. The Tree Foundation highly recommends further face-to-face meetings to resolve these challenging issues. The full-day, in-person meetings of the workgroup were very powerful and resulted in discussion and insights that were not possible via email and telephone conference calls. We believe the protocol merits the additional time to guarantee a workable protocol.

Funded by a grant from the California Department of Forestry and Fire Protection, this draft is a promising start on a revised protocol. The Tree Foundation strongly urges the Climate Action Reserve to continue to refine the draft and ensure a protocol which can be implemented in the near future. **(STF)**

RESPONSE: The Reserve ensures that we will continue to improve the usability of the protocol as it is implemented. The final protocol provides avenues for alternate methodologies to be submitted to the Reserve for review and potential inclusion in the quantification guidance. Additionally, the Reserve will continue its practice of releasing Errata & Clarifications as necessary.

4. I agree with STF's comments, and those of Dr. Greg McPherson and Mark McPherson. Even though the new draft protocols are improved and maintain their rigor and ensure permanence, appropriate documentation and verification, etc., the economic, legal, and logistical hurdles are still too great to enroll significant participation.

I hope that these issues can be revisited (perhaps by another group) still maintaining all legally required rigor, in a newly creative way, to revise the protocols further to create an affordable, realistically implementable version that cities and communities will embrace.

I would like to echo STF's request to bring the workgroup together again, as was originally planned, for a discussion looking at this outcome as it is now and what realistic, workable alternatives may exist. **(CUFC)**

RESPONSE: See Response to Comment 3.

2 Urban Forest Project Definitions and Requirements

5. A summary or flow chart, perhaps at the end of this section 2, with the specific document reference/citation, would make this document much easier to comprehend. (I.e. for a planting, who does what and when?) **(TreePeople)**

RESPONSE: Noted. The Reserve will look into developing user tools and guides such as these for inclusion on the Reserve's website.

2.1.1 Urban Tree Planting

6. "...areas where trees have not been harvested with a primary commercial interest during the 10 years prior to the Project Commencement Date." Why the 10 year wait? **(TreePeople)**

RESPONSE: The ten year time frame is intended to enforce project eligibility. This includes ensuring that the project area takes place in an Urban Area, and ensuring that the trees being replanted would not have been replanted as part of commercial harvesting regeneration efforts in the business as usual scenario.

2.1.2 Urban Forest Management

7. We applaud your leadership of the workgroup's efforts to recognize the carbon sequestration benefits of the entire urban forest at a canopy-wide level with the introduction of the Urban Forest Management Project concept. The Urban Forest Management Project Protocol concept has the potential to recognize the greenhouse gas reduction capacity of all urban forest trees rather than just the 10 – 20% comprised of publicly owned trees. **(STF)**

RESPONSE: The Reserve acknowledges the comment and agrees that increasing the scale of urban forest activities to account for carbon at a broader scale provides increased opportunities for participation, which should serve to incentivize activities within the U.S. Census Bureau Urban Area. There will remain additional challenges, mostly arising from ownership patterns of carbon in urban areas, that will need to be addressed to engage carbon from all parts of the urban forest.

8. [First bullet] "Rotation age" is a concept for timber harvesting. This infers that growing trees for future harvest is allowable as a carbon sink, such as a Christmas tree farm. Is that what is meant by "management for commercial products"? Or does this imply that fruit and nut orchards are allowed and individual trees will be removed when past their productive stage? And if so, is there a percentage of living/healthy trees that must remain as others are "rotated" out? **(TreePeople)**

RESPONSE: The term 'rotation age' has been removed from the final draft. The Urban Forest protocols do not include methodologies for calculating emissions and/or removals and reductions associated with timber harvesting. Therefore, projects that are managed with a principal interest in harvested wood products are not eligible to use this protocol. Instead, such projects should consider using the Reserve's Forest Project Protocol or the California Air Resources Board Compliance Forest Protocol. Exceptions to the prohibition of harvesting commercial timber products are recognized where the provision of commercial timber products might be generated where harvests are conducted primarily for safety, salvage, and developing improved resilience to wildfire and pests. There is no identified maximum level of harvesting that meets the terms of the exceptions, other than a general prohibition against removing carbon stocks to the point that a reversal, as defined in the protocol, occurs.

9. [Second bullet] So you'd get credits for just removing dead and dying trees? This is great for management, but it doesn't increase the net carbon sink...except that it then leaves room to plant trees in their place. Perhaps this should read, "Increasing the urban forest productivity by removing diseased and suppressed trees and replacing them with healthy trees." (TreePeople)

RESPONSE: No, the reference to the removal of dead and dying trees is to identify an eligible harvesting activity. Carbon benefits in the Urban Forest Protocol are realized from increasing carbon stores in total standing trees. That will only happen if the general population of urban trees is healthy and growing.

10. [Last bullet] Define "increasing resilience." (TreePeople)

RESPONSE: Increasing resilience (to wildfire and pests) may result in many different types of activities. The protocol allows harvest activities that increase resiliency of urban forests. This type of activity may include thinning that reduces competition between trees for water, nutrients, or light, reductions of species that are prone to certain diseases or insects, replacing highly flammable species with trees that are more fire resistant, etc. The protocol is intentionally vague as it is difficult to fathom the full set of threats to urban forests that may arise where management for increased resilience may arise. The protocol is clear, however, that harvesting and commercialization of trees based on market demand for wood products is not allowed.

11. I think that cities with recent 100% street/park tree inventories are most likely to put their toe in the water and start an urban forest management project. The costs and risks are relatively low because:

- 1) They have clear ownership of the carbon in public trees
- 2) They have a complete inventory in-hand
- 3) They need new revenue streams to help pay for management of their trees

CAL FIRE has funded about 50-60 municipal inventories over the past few years, and many cities across the US have computerized tree inventories. The urban forest management protocol needs to provide these cities with a simple and inexpensive way to begin management projects that produce credits that are real, additional, quantifiable and permanent. Ideally, to contain up-front costs the baseline calculation would involve no remote sensing and no additional field work. The baseline is simply backcast from the current 100% inventory. To reduce monitoring costs, a combination of remote sensing and field measurements could be used.

If cities find that urban forest management projects are doable for the trees they own, they will be more likely to take on the challenge of initiating projects that include trees on private property. (G.McPherson2)

RESPONSE: The mission of the workgroup was to develop a revised standard that improved the usability of the protocol. Producing credits that are real, additional, quantifiable, and permanent, as well as verifiable and enforceable are prerequisite conditions that must be met for a compliance-grade protocol. Absent those conditions, the protocol has little value. The protocol does allow full inventories to be used (in place of sampling) for current and historic inventories to develop project inventories and baselines. If the owner does not have a 100% inventory in the past, backcasting alone will not enable the landowner to create a historic inventory as there are many variables,

including conversion of urban forests or aggressive tree planting activities which could result in wildly different outcomes if trees were simply 'grown backwards'.

The protocol does provide some pragmatic and relatively simple ways of calculating a historic inventory through the use of widely available tools, including Google Earth. Many GIS tools are available to generate random (ITree Canopy, for instance) or systematic points/areas that can be used to sample historic canopy area. The current inventory can be used to generate the carbon/canopy area ratios (transfer functions) that greatly facilitate the development of a historic inventory.

Additionally, the protocol has been modified to facilitate the evolution of quantification methodologies. The quantification guidance has been separated from the general body of the protocol and a process has been identified whereby developed quantification methodologies can be reviewed by the Reserve and made available through a facilitated updating process of the quantification guidance.

2.2 Urban Forest Owners

12. "This protocol recognizes the fee owner as the default owner of urban forest carbon where no explicit legal encumbrance exists." (pg. 5)

Should read: "This protocol recognizes the fee owner as the default owner of urban forest carbon where no explicit legal encumbrance exists **or no municipality, educational institution or utility has legislated otherwise.**"

This change makes it possible for eligible entities to pursue legislative options that might streamline the carbon ownership issue. **(G.McPherson1)**

RESPONSE: Legislative actions would in most cases be considered a legal encumbrance. The Reserve would establish that the municipality, educational institution, or utility is the rightful owner where that is clear through legislative actions. The default would yield to such a legal encumbrance.

13. If I'm reading this correctly, non-profits could not be an Urban Forest Owner. But they may be in partnership with an owner to carry out a project? **(TreePeople)**

RESPONSE: Non-profits could own trees if they possessed a legal and recorded encumbrance identifying them as the owners of the trees. Otherwise, non-profits can certainly work in partnership with urban forest owners to develop projects.

14. Is a project area a city? Does this mean for instance that only one project is allowed for the city of Los Angeles? **(TreePeople)**

RESPONSE: Urban forest landowners can submit one or multiple projects for the carbon they own. Since there are many owners of forest carbon, there could be multiple projects within the area identified by the U.S. Census Bureau. However, municipalities and counties able to coordinate with individual urban forest landowners are able to aggregate urban forest carbon into one project.

2.3 Project Operators

15. Securing the agreement of every Urban Forest Owner – which means every individual homeowner - is as much of a barrier to implementation of an Urban Forest Management Project as tracking each tree for a Tree Planting Project, which was a concern shared by many stakeholders with the first version. Given that homeowners move or can change their minds, it is likely to be even more of a barrier. The Tree Foundation still believes that an automatic inclusion of homeowners based on the public good benefits of a community-wide, tree canopy project with an opt-out option for individual owners is more effective as well as consistent with other public good actions of municipalities, especially if homeowners are reassured that they will receive benefit from the arrangement. We believe further legal and policy research is necessary to ascertain the best method of implementing an opt-out option. **(STF)**

RESPONSE: The Reserve cannot legislate ownership or use of urban forest carbon through the development of the Urban Forest Protocol. The protocol recognizes municipalities and/or counties as entities that have existing processes and authorities to work within their jurisdictions to develop appropriate agreements regarding forest carbon ownership and use. The Reserve agrees that this is a new frontier for urban forest carbon and will require creativity and energy to realize.

3.1 Project Location

16. Why are locations outside of designated urban areas not allowed to participate? **(Zagori)**

RESPONSE: Only areas within the U.S. Census Bureau defined Urban Areas are eligible. No areas outside of these areas are eligible. Projects outside eligible urban areas may be covered under the Reserve's Forest Project Protocol.

3.2 Project Area

17. Define KML file. It is not in the glossary. **(TreePeople)**

RESPONSE: A KML file is a file generated from Google Earth that can be shared with others. KML files can also be opened in most other GIS programs.

18. "...50% of the Urban Area..." Is this the entirety of a city's urban area? **(TreePeople)**

RESPONSE: The U.S. Census Bureau Urban Area establishes the urban area eligible for projects in this protocol.

3.3 Limits to Site Preparation

19. Does this include turf removal and then subsequent weeding and mulching? **(TreePeople)**

RESPONSE: It would include turf removal if turf removal would be managed with deep ripping. It is hard to contemplate that this would amount to the threshold stated in the protocol.

3.5.2.1 Performance Standard for Urban Tree Planting Projects

20. What are the performance standards for other entities and/or aggregated projects? (Zagori)

RESPONSE: Only Urban Forest Management Projects can produce an aggregated project. The performance standard used in Urban Tree Planting Projects can only be used by the specific submitted entity.

21. ["1. For Municipalities/counties: trees per capita."] If the population increases, that means the per capita ratio decreases. Does that mean the project gets less credits over time if planting has halted? (TreePeople)

RESPONSE: Credits are issued based on increases in carbon compared to the performance standard. Carbon increase can occur through growth in trees already planted should additional planting be halted. The ratio determined at the initiation of the project for the project's baseline is the ratio that will be used for the project's crediting period.

3.6 Project Crediting Period

22. Does this mean that a single planting's credits can be claimed for 25 years? The appendix speaks about a 5 year minimum planting time for a planting project, which I assume means you can't plant for only one year - it must span over 5 years. Is this correct?

Again, more justification for a summary and flow chart explaining the process better.
(TreePeople)

RESPONSE: The project crediting period addresses the time in which the baseline is recognized and not subject to adjustments. At the end of the crediting period, any additional credits issued will be subject to an updated baseline that may reflect adjustments to trends and performance standards as well as changes in legal requirements.

3.8.1 Social Co-Benefits

23. [Last sentence: "...skewed toward more affluent communities..."] Does this insinuate that projects in poorer neighborhoods will be given preference over those in more affluent areas? (TreePeople)

RESPONSE: No, it means that public entities must consider the issue of social status and document how their approach to tree planting addresses this issue. It is recognized that these documents are subject to public process and that the public will have a role in the decision-making aspect of a tree-planting program.

3.8.2 Environmental Co-Benefits

24. [Table 3.2, Non-native species] It is beneficial to our local fauna to emphasize natives, but many city-approved species lists may greatly limit the use of natives. Also, planting only natives can greatly decrease the tree biodiversity. **(TreePeople)**

RESPONSE: The Reserve agrees with the comment. The protocol requires that public entities consider the use of native species and document the rationale behind the solution they arrive at. As with the response to Comment #23, the purpose of the exercise is to ensure the issue is raised within a public context.

25. [Table 3.2, Air quality, number 2] This is in direct conflict with the emphasis on increasing natives, at least for southern California. Most of our natives (oaks and sycamores) are high biogenic emitters. **(TreePeople)**

RESPONSE: The protocol is not prescriptive with the use of native trees. The format ensures consideration of the use of natives was provided and allows Project Operators to justify the decisions they made.

4 GHG Assessment Boundaries

26. [Table 4.1, UF-7] Although not significant yet, there is an increase in urban wood used for lumber/furniture. **(TreePeople)**

RESPONSE: We appreciate the comment and will continue to monitor the trend. We will consider modifying our approach significant quantities or urban forest wood are trending toward long-term carbon storage in wood products.

5 Quantifying Net GHG Reductions and Removals

27. "Secondary effects" is not defined (pg.14). Primary vs. secondary is not clear. **(G.McPherson1)**

RESPONSE: Both primary and secondary effects are defined in the protocol's glossary.

5.1 Urban Forest Protocol Baselines

28. We applaud the inclusion of a Planting Baseline developed per Performance Standards for each type of entity, so that innovative early adopters are encouraged to expand their work and serve as role models for others in their sector. **(STF)**

RESPONSE: Comment noted.

5.1.1 Urban Tree Planting Projects

29. Given the rapid advance of remote technology's ability to map, photograph, and measure details of the earth's surface since the first Urban Forest Protocol, it is imperative to include remote sensing and measurement as a tracking, monitoring and verification option for Tree Planting Projects.

The next 25 years will experience an extraordinary acceleration of the use of remote sensing. The current draft requires 100% onsite sampling every 10 years, which is extremely inefficient and cost prohibitive – especially given the 125 year timeframe and the current price of carbon offset credits. Remote sensing and measurement methods are integral to a practical and economically feasible protocol. The Tree Foundation wholeheartedly recommends that remote sensing and measurement be included. **(STF)**

RESPONSE: Remotely sensed data has always been included for purposes of measure tree canopy area. Remotely-sensed data does not currently have the ability to develop the carbon estimates directly and relies on data collected on the ground, due largely to variation associated with the wood density of different tree species. The relationship between wood density/carbon/ and urban forest canopy is unfortunately highly variable. The revisit to the ground plots every 10 years is established to ensure the carbon/tree canopy ratios (transfer functions) remain valid. This process is a sampling process and does not require a 100% remeasure as the comment suggests. Rather, approximately 30 plots per Urban Forest Class must be re-measured. The protocol has been modified since the public draft to allow greater flexibility for improvements in technology. The quantification guidance has been separated from the main protocol and a provision has been added to the protocol that will allow for developed quantification methodologies to be reviewed by the Reserve and included into a revised quantification guidance document.

5.1.2 Urban Forest Management Projects

30. ***The baseline projection for Urban Forest Management projects embeds a faulty assumption that historical growth in canopy cover can be continued under historical levels of effort and can be assumed linear and constant for the next 20 years.***

The current baseline approach taken in the Urban Forest Project Protocol to project forward canopy cover change in a linear fashion based on the past 10-20 years of change relies on a faulty assumption that the effort and funding required to increase urban canopy cover is linear.

In the case of Portland, the latest available analysis from Portland Parks & Recreation [**see reference in Diaz public comment submission**] found an increase in urban canopy cover from 2000-2010 of 2.6% (0.7% from 2000-2005, and 1.9% from 2005-2010) [**see reference in Diaz public comment submission**]; this growth required significant investments by the City to achieve.

Under the current proposed rules for Urban Forest Management projects, the City of Portland would be expected to compete against a baseline of 32.5% canopy coverage by 2020, and **35.1% by 2030**. Portland's ambitious 2009 Climate Action Plan [**see reference in Diaz public comment submission**] set a city-wide canopy cover goal of **33.3% by 2030**. For Portland to

achieve this canopy cover target, substantial new investments are needed (in addition to ongoing challenges to fund the maintenance and health of the existing urban forest), and yet the City would still fall well short of the baseline calculated under the current version of the Protocol.

The policy incentives and programs the City of Portland has been leveraging to achieve these gains in canopy cover are under serious threat (as mentioned above) due to both budgetary constraints as well political challenges to the basic premise that the City should be using utility fees to reward landowners for additional ecosystem service benefits provided to the City by their newly planted trees.

In reality, the ability for a city like Portland to increase canopy cover is not a linear function, but rather asymptotic. There are hard limitations to the maximum area where cities can plant and maintain trees, and for cities like Portland that are striving to get as close to that maximum value as possible, a baseline projected forward linearly for 20 years is wildly unrealistic, and would effectively preclude Portland and cities like us from accessing carbon finance to achieve the additional tree planting and maintenance required even to hit our existing canopy cover goals. **(Diaz)**

RESPONSE: The protocol strives to ensure crediting is conducted for GHG removals that are additional. Furthermore, the guidelines must be replicable and verifiable. The protocol provides flexibility in the identification of the historic inventory so that Project Operators are able to develop a trend most characteristic of the variables affecting trees and tree growth.

31. *Replace the historical baseline projection for Urban Forest Management projects with a Performance Standard comparable to the approach taken in the Urban Tree Planting project type.*

Remote sensing analysis of 20 major cities across the U.S. shows these urban forests are losing canopy coverage at an average rate of 1.29% per year. **[See reference in Diaz public comment submission.]** I encourage The Reserve to consider a performance standard approach for Urban Forest Management projects similar to that proposed for Urban Tree Planting projects. Studies such as Nowak and Greenfield (2012) indicate there is sufficient data available to develop such performance standards.

A performance standard approach would reward cities for doing better than ‘business as usual’ as judged by their performance compared to peers in terms of maintaining or expanding canopy coverage, and not effectively preclude cities like Portland with ambitious and aspirational green infrastructure goals from accessing critical new revenue streams that are very much needed to even approach our historical rate of increasing canopy cover. **(Diaz)**

RESPONSE: The workgroup considered the use of a performance standard for urban forest management projects. We recognized that there is considerable variation with regards to policies, programs, financial capacity, and environmental conditions that affect urban forests and urban forest management. Therefore, developing a standardized “business as usual” scenario across multiple urban landscapes/cities was not considered at this time.

7.3.1 Reporting Period Duration and Cycles

32. For the annual reporting, how soon after the year is ended must the report be submitted? There is only a timeline given for the commencement report. I.e. Income tax returns are due by April 15, although the reporting period ends December 31. **(TreePeople)**

RESPONSE: The updated protocol provides more description of the requirements associated with Annual Monitoring Reports and Verification Reports. In short, Annual Monitoring Reports must be completed and submitted to the Reserve within 12 months of the end of the Reporting Period. During years when verification is required, both the Verification Report and the Annual Monitoring Report must be submitted to the Reserve within 12 months of the end of the Reporting Period.

7.4 Issuance and Vintage of CRTs

33. See my comment for section 8.2.3. **(TreePeople)**

RESPONSE: See response for comment #34.

8.2.3 Optional Annual Verification

34. If the Project Operator doesn't opt for the Annual Verification, does that mean the project will only get credits every fifth year, when the reporting is mandatory? Or does it mean the projects will get all the 5 years' worth of credits every 5 years? **(TreePeople)**

RESPONSE: In the case where the project foregoes optional annual verification and is verified during the mandatory fifth year, all credits generated to the end of the Reporting Period being verified will be issued (if the verification is successful).

8.3 Verifying Carbon Inventories

35. UFMP: It appears that no accuracy assessment is required for current tree canopy classified wall-to-wall – given multiple sources of error, one can't assume results are accurate, and need to specify allowable bounds/confidence statistics/ tolerance standards. (pg. 28-31) **(G.McPherson1)**

RESPONSE: An accuracy assessment has been added to the final draft within the quantification guidance. As with all things related to quantification, the Reserve will update the guidance as needed as technological and methodological improvements are identified.

36. Field verification every 5 years is too often and too expensive. **(G.McPherson1, SMUD)**

RESPONSE: It is important in a compliance-grade protocol to ensure the stated carbon is accurately reported. In Urban Forest Management projects, the variable that is likely to change the most in a 5-year time frame is the canopy area (not the transfer functions).

The Reserve asserts that the actual costs of verification are yet unknown since it has yet to be tested, but believes that the verification process is efficient. The field verification aspect of the protocol is critical to developing and maintaining credibility of the credits issued.

Additionally, the protocol verification guidance has been updated to allow for an office verification of accuracy of canopy measurements where the canopy measurements were acquired through sampling or 100% measure of remotely sensed data. The field revisit of canopy area is required only where the canopy cover estimates were developed from ground-based measurements.

8.3.1 Verifying Urban Forest Management Projects

37. Confidence stats for canopy cover: not clear if this refers to sampling 1/10 ac plots for transfer functions or for citywide canopy cover estimates. (pg. 29) **(G.McPherson1)**

RESPONSE: Confidence statistics are applied to both canopy area estimates (where estimated and not measured) and to the transfer functions. The final guidance has attempted to clarify this language. As stated in other responses, the quantification guidance has been separated from the main body of the protocol to allow increased flexibility for ongoing improvements as methodological and technological tools are developed.

38. There is need to clarify tree canopy measurement methods and confidence stats for:

Field plots – 24 tube sitings per plot vs. remote sensing of tree cover

City – UTC classified wall-to-wall vs. sampled using field plots? Are the plots used for remote sensing the same as used for field plots? If so, what if there is a discrepancy between tree cover measured using tube sitings and remote sensing? Which is more accurate? **(G.McPherson1)**

RESPONSE: The methodology for estimating canopy area for ground-based plots using site tubes is to develop appropriate transfer functions using carbon estimates from the same plots, which will reduce the number of ground-based plots needed. Where the exact plot area (same as used for ground-based plots) can be accurately measured, such that the comparison of canopy area on the fixed area plot to carbon can be accurately calculated, it could replace the need for the use of sampling using siting tubes. Such a methodology would be welcomed for review by the Reserve as an optional approach.

8.3.1.1 Field-based Inventory Verification Activities

39. [Table, Verification Element 11, “The verifier must determine if the urban forest class identified for each plot is appropriate or **not** based on characteristics present during the field visit...”] “Not”? Don't you want the plot to be based on characteristics present during the field visit? **(TreePeople)**

RESPONSE: This appears to be a grammatical error/typo that we will correct.

8.3.2 Verification of Urban Tree Planting Project Inventories

40. My comment concerns the protocol's use of "allometric equations" and satellite images for quantifying carbon stocks. If that is the case, why not clarify and state upfront to allow allometric equations for subsequent verifications. That would dramatically lower the cost of verification for a utility-funded tree planting program, which plants trees all over a map, over a huge service territory. In other words, the 1st year verification requires the initial or onsite visits, and then the subsequent verifications can be done using allometric equations and satellite data.

The cost of frequent verifications is a substantial barrier to participation in your urban tree carbon protocol. For instance, SMUD would have to hire an independent consultant to perform the verifications, and all of them would have substantial fixed cost, whether we have a few or many trees in the sample. The 5 year verification time frame means that we would have to require too many onsite visits over the 100 year time frame, and thus impose a substantial cost. I can tell you that 2 years ago SMUD's Shade Tree program went out to solicit bids from consultants for the initial CARB and Reserve carbon certification verification and application, and we received three bids ranging from \$30,000 to \$50,000 to perform only the 1st year verification. Needless to say, we have determined that SMUD is not willing to incur that kind of cost for the 1st year verification. Now imagine, for the next 100 years we need to hire contractors for 20 more onsite verifications because of the proposed 5 year verification cycle requirement.

I appreciate the desire to maintain the rigor, integrity, and accuracy of these estimates of carbon sequestration and storage benefits, but if you make the urban tree carbon verification requirements too costly (i.e. onsite verification every 5 years), all of your invested efforts to revise the protocols would be a moot point—nobody would participate. A ten-year verification cycle that uses remote sensing would provide the rigor, integrity, and accuracy of these carbon estimates and would be a far less costly solution—this would be the only way to keep the future cost of verification reasonable.

If verification process is too cumbersome and expensive, nobody will participate in an Urban Tree Planting Carbon Project. All of this effort to revise the existing urban tree protocol would not generate any positive future results. **(SMUD)**

RESPONSE: The Reserve welcomes alternative methodologies where they have been tested and demonstrated to provide accurate results. As the protocol was being drafted, no such methodology was presented. An offset protocol requires a high level of accuracy. Reducing the standards to a level of quantification that cannot ensure the credits issued are real will quickly be dismissed from consideration as a compliance tool for entities that need to reduce their emissions. The 5-year requirement for site verification is aligned with this thought. In fact, credits can only be issued when the reported emissions reductions/removals are verified by a third-party verifier. Annual verification is provided with a non-site visit approach, which is intended to manage the cost burden for the participant. Since urban forests can change in a meaningful way over five years, the five year site verification is necessary to ensure quality in the reported project benefits.

8.3.2.2 Field-Based Inventory Verification Activities

41. Include remote sensing, which can be used to detect tree presence, size and condition, with field measurements. Remote sensing every 5 years and field verification every 10 years. Otherwise, it is too expensive. (pg. 34) (G.McPherson1)

RESPONSE: The comment is appreciated. The revised protocol was completed with the objectives of cost-effectiveness and maintenance of GHG-emissions accounting rigor as mutually important aspects. We hold that the costs of the verification approach cannot be deemed too expensive since it has never been attempted or adequately modeled. The updated protocol sought efficiencies in design:

- By expanding the scope of creditable carbon in urban forests from individual trees to the entire urban forest.
- By expanding the project area scope to the entire urban area defined by the US Census Bureau. Version 1.0 is limited
- By reducing the verification oversight from an annual site verification process to a five-year site verification process for individual tree planting projects.
- By reducing the verification oversight to only those trees within a project rather than all trees owned, as with the net tree gain method.

The Reserve will continue to pursue strategies that hold promise in maintaining appropriate accounting rigor and reducing costs.

9 Glossary of Terms

42. Please index the glossary with terms that appear in the text. (G.McPherson1)

RESPONSE: The final version includes all terms the Reserve identified as in need of definition.

Appendix A Urban Forest Quantification Guidance

43. *Provide greater flexibility in sampling design and quantification of carbon stocks for Urban Forest Management projects.*

As currently written, the Protocol's sampling methodology for Urban Forest Management projects is very detailed, prescriptive, and limiting in terms of sampling design. The sampling grid and plot design is one reasonable approach for sampling larger contiguous forest areas, but is ill-suited for a large proportion of our urban forest that does not occur in large contiguous blocks.

For example, many greenspaces containing street trees and trees alongside business and residences on private property are not large enough to support the 1/10th acre (~75-foot-wide) circular sampling plot required for measurement of all trees within an Urban Forest Management project.

The requirement to set up 75-foot-wide sampling plots to measure tree carbon storage in 4-to-6-foot-wide planting strips for street trees is a clear example of where greater flexibility is needed

in this Protocol. At the very least, I would encourage The Reserve to accommodate 100% tree sampling for those locations within an Urban Forest Management project area where it would be a more reasonable sampling strategy than 1/10th acre plots.

In general, I would even more strongly encourage the Reserve to adopt even more generalized guidance for sampling and quantification. A great example of a more flexible approach for relating ground-based carbon stock measurements in a systematic and quantifiable way to remotely-sensed data can be found in the “Tool for Remote Sensing Biomass Measurement” developed by Terra Global Capital and now open for public comment under the Verified Carbon Standard. **[See reference in Diaz public comment submission.]**

Several cities, including Portland, have already designed monitoring protocols for tracking changes in Urban Forest Canopy, and I would encourage the Reserve to base any needed sampling prescriptions from a review of sampling protocols that many cities already have in place. **[See reference in Diaz public comment submission.]**

I do not feel the Reserve must go to the extent of detailed specification of measurement of trees and sampling plot design shown in the current Protocol. I suspect that there are likely several other specifications in these designs, though intended to provide clarity and consistency for projects, are likely to unnecessarily preclude equally valid sampling protocols that a qualified third-party verifier should be able to recognize and certify with their own professional judgment. **(Diaz)**

RESPONSE: The Urban Forest protocols are indeed a step toward increased prescriptiveness from, say, where the Reserve’s Forest Carbon protocol is. The tradeoff for increased flexibility for sampling methodologies is that every project must have its methodology reviewed and deemed sufficient during verification by a skilled biometrician. The verification methodologies must then be adapted to the specific sampling methodology. In practice, this has been an expensive proposition for forest landowners, who are more carbon rich than urban forest landowners. Indeed, the same argument was raised for forest landowners to use their existing inventories, only to find that they could not be verified to a level needed for a compliance protocol. Many forest landowners ended up developing a new, and sometimes separate, inventory for forest carbon projects. We are trying to avoid the same problems with the Urban Forest Protocols.

The final draft of the protocol does provide increased flexibility for methodologies to be submitted to the Reserve for review and potential inclusion into the quantification guidance.

A.1 Reporting Requirements for Urban Forest Carbon Pools

44. [“...only Standing Live and Dead Trees can be included...”] On page 11, UF-3 states that dead trees are excluded. **(TreePeople)**

RESPONSE: The updated protocol references both live and dead trees as being included.

A.2.1 Stratifying the Project Area into Urban Forest Classes

45. Need more flexible stratification: 12 classes x 40 plots = 480 plots x \$200/plot = \$96,000. This will make it too expensive for most cities to conduct the initial carbon inventory. What is the justification for requiring 12 classes and minimum of 40 plots? (pg. 43, UFMP) **(G.McPherson1)**

RESPONSE: The Reserve initially thought that default values for transfer functions could be used in place of ground-based sampling to develop statistical relationships with canopy area. The Forest Service provided data that indicated transfer functions are highly variable and vary based on species and management. The Urban Forest Classes and their descriptions were provided by the Forest Service as a way to reduce the variation. Stratification into more discrete classes may result in fewer plots needed to arrive at a desired level of confidence. The final version of the protocol allows Project Operators to combine Urban Forest Classes. In place of the 40 plot requirement, the protocol has been modified to state that the statistical confidence of the overall estimate (of the transfer functions) must be +/- 20% of the mean estimate at the 90% Confidence Interval. The earlier rationale was based on the assumption that 40 plots would provide that level of statistical confidence. The updated language is a more appropriate approach from a statistical standpoint and may result in fewer than 40 plots being sampled.

46. [Table A.1, Institutional] What is the code for "Vacant"? **(TreePeople)**

RESPONSE: Vacant may be considered 'Open Space' or may be more related to one of the other classes. The guidance states that vacant spaces should be allocated to the most similar class prior to it becoming vacant. That said, the requirements for stratification have been modified. The Urban Forest Classes establish some recommended levels of stratification. Ultimately, Project Operators must achieve a level of statistical confidence with their transfer function estimates for the Project Area where the overall (combined strata estimate) meets or exceeds +/- 20% @ 90% Confidence Interval.

47. [Table A.1, Residential Low Density] This note is confusing. Perhaps "Attached one-to-four family structures are considered a complex of many separate structures." And wouldn't this note be in Res High Density and in Res Low Density? **(TreePeople)**

RESPONSE: The definitions were acquired from Forest Service descriptions of Urban Forest Classes. The Reserve would prefer not to modify the definitions. It is important from a practical perspective to ensure consistency in stratification. Additionally, the final draft provides increased flexibility for defining strata.

48. [Table A.1, Transportation] It seems that street trees don't have a code if the speed limit is <45 mph. So they are categorized instead by the area they are in? So if the speed limit is >45 mph, you don't care what the area is? Or is this a way to differentiate between freeway trees and street trees? **(TreePeople)**

RESPONSE: The thought is that where vehicles travel at speeds less than 45 mph the area would be within another forest class already defined.

49. [Table A.1, Agriculture] Which code would account for Community Gardens? Agriculture? Parks? Other? Many have fruit and shade trees. **(TreePeople)**

RESPONSE: Urban Forest Classes are included in the list for agriculture, parks, and other (which generally shouldn't be selected frequently as the list is fairly comprehensive).

A.2.2 Develop Ratio Estimates (Transfer Functions) of CO₂e Estimates in Standing Trees

50. [Table A.2, DBH] The standard in urban forestry is to measure the dbh from the middle, rather than the uphill of downhill side. The "Guide for Plant Appraisal: 9th Edition" has the methods most used. **(TreePeople)**

RESPONSE: The Reserve is aware that there are varying standards. The standards identified in the protocol are aligned with Forest Service and therefore aligned with the biomass equations used to estimate carbon. The Reserve will consider adding guidance where existing inventories have been developed using the 'middle' standard to adjust the dbh measurement so that the measurement conforms to the biomass equations.

51. [Table A.2, DBH] Why not use the method from the "Guide for Plant Appraisal: 9th Edition"? Forked trees below DBH are either measured at the smallest circumference below forking or determine the cross-sectional areas of the multiple stems measured 12" above the crotch, then average the sum of the areas and the smallest cross-section below the branch. It will give a better estimate of tree size. **(TreePeople)**

RESPONSE: See the response to comment #50.

52. [Table A.2, Vigor, Code 5 and 6] It will be difficult to determine the difference between "Critical" and "Dying". **(TreePeople)**

RESPONSE: The intent of attributing trees with the vigor category is to allow the Project Operator to 'grow' the trees more accurately using growth models (or other means to increase the DBH and height measurements). While there may be some imperfections in the attribute descriptions, the net effect of imperfect attribution of this field is negligible since both critical and dying trees are not likely to be increasing in DBH. Additionally, it is not a value that will be verified directly. Rather, the net effect of the Project Operator's update procedures will be verified through random field measurements.

A.2.6 Baseline Development for Urban Forest Management Projects

53. "Any substantial change in legal requirements, including ordinances, regulations or other legal obligations that would modify the trend described above over the next 20 years must be modeled for the next 20 years or as long as stated in the requirements (whichever is longer)."

Should read: "Any substantial change in legal requirements, including ordinances, regulations or other legal obligations, **other than requirements for complying with this protocol**, that would modify the trend described above over the next 20 years must be modeled for the next 20 years

or as long as stated in the requirements (whichever is longer).”

This change makes it possible for eligible entities to pursue policies and planning authorities that might promote carbon projects as additional to a pre-existing baseline. (pg. 52)

(G.McPherson1)

RESPONSE: The thought expressed in this comment has been included in the final draft of the protocol.

54. Dead Trees – UF-3 states they are excluded. Yes? **(TreePeople)**

RESPONSE: The summary of carbon pools quantified (UF-3) has been edited to indicate that dead trees are included. Dead trees are likely to be a very small contribution to the overall carbon stocks in an urban setting. However, the eligible areas for urban forest projects are quite expansive and dead trees may be important to quantify in the midst of stochastic natural disturbances.

A.3 Methodology for Estimating CO₂e in Urban Tree Planting Projects

55. [Table A.7, DBH] See comment 50 for Table A.2. **(TreePeople)**

RESPONSE: See response to Comment #50.

56. [Table A.7, DBH] See comment 51 for Table A.2. **(TreePeople)**

RESPONSE: See response to Comment #50.

A.3.2 Baseline Development for Urban Tree Planting Projects

57. [“The Project Operator must complete a form indicating the project will not account for any newly planted trees for the minimum 5-year period.”] Does this mean you must plant trees for 5 years, but they're not counted? **(TreePeople)**

RESPONSE: The intent of this language is to avoid a situation where the area available for planting trees is close to or at saturation such that, without allowing for a process to arrest the baseline trend, the baseline may actually artificially exceed the project stocks. Where a Project Operator would utilize this allowed approach, they are indicating that they will not be planting trees in the next 5 years. Therefore, any trees planted will not be considered part of the project, other than maintenance of trees that may have died.