

California Air Resources Board

Quantification Methodology

**California Conservation Corps
Training and Workforce Development Program
Riparian Restoration Projects**

California Climate Investments



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Section A. Introduction

California Climate Investments is a statewide initiative that puts billions of Cap-and-Trade dollars to work facilitating greenhouse gas (GHG) emission reductions; strengthening the economy; improving public health and the environment; and providing benefits to residents of disadvantaged communities, low-income communities, and low-income households, collectively referred to as “priority populations.” Where applicable and to the extent feasible, California Climate Investments must maximize economic, environmental, and public health co-benefits to the State.

The California Air Resources Board (CARB) is responsible for providing guidance on estimating the net GHG benefit and co-benefits from projects receiving monies from the Greenhouse Gas Reduction Fund (GGRF). This guidance includes quantification methodologies, co-benefit assessment methodologies, and benefits calculator tools. CARB develops these methodologies and tools based on the project types eligible for funding by each administering agency, as reflected in the program expenditure records available at: www.arb.ca.gov/cci-expenditurerecords.

For the California Conservation Corps (CCC) Training and Workforce Development Program (TWDP), CARB staff developed this TWDP Riparian Restoration Quantification Methodology to provide guidance for estimating the net GHG benefit of proposed riparian restoration projects. This methodology uses calculations to estimate carbon sequestration from restoring degraded streambanks with woody plantings.

The TWDP Riparian Restoration Benefits Calculator Tool automates methods described in this document, provides a link to a step-by-step user guide with a project example, and outlines documentation requirements. Projects will report the total project GHG benefit estimated using the TWDP Riparian Restoration Benefits Calculator Tool as well as the total project GHG benefit per dollar of GGRF funds requested. The TWDP Riparian Restoration Benefits Calculator Tool is available for download at: <http://www.arb.ca.gov/cci-resources>.

Projects will also report the following key variables from TWDP riparian restoration projects: land restored (in acres) and trees planted. Key variables are project characteristics that contribute to a project’s net GHG benefit and signal an additional benefit. Additional co-benefits may also be applicable to the project. Project sponsors should consult the TWDP guidelines, solicitation materials, and agreements to ensure they are meeting TWDP requirements. All CARB co-benefit assessment methodologies are available at: www.arb.ca.gov/cci-cobenefits.

Methodology Development

CARB and CCC developed this Quantification Methodology consistent with the guiding principles of California Climate Investments, including ensuring transparency and accountability.¹ CARB and CCC developed this TWDP Riparian Restoration Quantification Methodology to be used to estimate the outcomes of proposed projects, inform project selection, and track results of funded projects. The implementing principles ensure that the methodology would:

- Apply at the project-level;
- Provide uniform methods to be applied statewide, and be accessible by all applicants;
- Use existing and proven tools and methods;
- Use project-level data, where available and appropriate; and
- Result in net GHG benefit estimates that are conservative and supported by empirical literature.

CARB assessed peer-reviewed literature and tools and consulted with experts, as needed, to determine methods appropriate for the TWDP riparian restoration projects. CARB also consulted with CCC to determine project-level inputs available. The methods were developed to provide estimates that are as accurate as possible with data readily available at the project level.

CARB released the Draft TWDP Riparian Restoration Quantification Methodology and Draft TWDP Riparian Restoration Benefits Calculator Tool for public comment in May 2019. This Final TWDP Riparian Restoration Quantification Methodology and accompanying TWDP Riparian Restoration Benefits Calculator Tool have been updated to address public comments, where appropriate.

In addition, the University of California, Berkeley, in collaboration with CARB, developed assessment methodologies for a variety of co-benefits such as providing cost savings, lessening the impacts and effects of climate change, and strengthening community engagement. Co-benefit assessment methodologies are posted at: www.arb.ca.gov/cci-cobenefits.

Tools

Project sponsors must use COMET-Planner to estimate the annual GHG benefit of the proposed project. COMET-Planner is a web-based tool available at: www.comet-planner.com.

Colorado State University and the United States Department of Agriculture (USDA)

¹ California Air Resources Board. www.arb.ca.gov/cci-fundingguidelines

developed COMET-Planner, derived from the COMET-Farm model,² to evaluate GHG carbon sequestration from the implementation of conservation practices on natural and working lands.³ COMET-Planner estimates are generalized by multi-county USDA Major Land Resource Areas and include on-site activities only. The TWDP Riparian Restoration Quantification Methodology utilizes COMET-Planner to compare woody biomass accumulation and soil carbon after planting trees or shrubs on degraded streambanks to a “business-as-usual” scenario. COMET-Planner GHG benefit estimates for riparian restoration are derived from United States Forest Service Forest Inventory and Analysis database woody bioaccumulation rates,⁴ USDA entity-scale GHG inventory carbon stock values,⁵ and Intergovernmental Panel on Climate Change stock change methods.⁶

COMET-Planner is used statewide, subject to regular updates to incorporate new information, free of charge, and publicly available to anyone with internet access.

Project sponsors must use the TWDP Riparian Restoration Benefits Calculator Tool to estimate the net GHG benefit proposed project. The TWDP Riparian Restoration Benefits Calculator Tool can be downloaded from: <http://www.arb.ca.gov/cc-resources>.

² Colorado State University and the United States Department of Agriculture. COMET-Farm. April 2019. <http://cometfarm.nrel.colostate.edu/>

³ Colorado State University and the United States Department of Agriculture. COMET-Planner Report. April 2019. http://bfuels.nrel.colostate.edu/beta/COMET-Planner_Report_Final.pdf

⁴ United States Forest Service. Forestry Inventory and Analysis. 2019. <https://www.fia.fs.fed.us/>

⁵ United States Department of Agriculture. Quantifying Greenhouse Gas Fluxes in Agriculture and Forestry: Methods for Entity-scale Inventory. July 2014. https://www.usda.gov/oce/climate_change/Quantifying_GHG/USDATB1939_07072014.pdf

⁶ Intergovernmental Panel on Climate Change. 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 4: Agriculture, Forestry and Other Land Use. 2006. <https://www.ipcc-nggip.iges.or.jp/public/2006gl/vol4.html>

Section B. Methods

The following section provides details on the methods supporting GHG benefits in the TWDP Riparian Restoration Benefits Calculator Tool.

Project Type

CCC developed project types that meet the objectives of the TWDP and for which there are methods to quantify a net GHG benefit. Other project features may be eligible for funding under the TWDP; however, this Quantification Methodology provides methods to estimate a net GHG benefit from riparian restoration projects that include woody plantings at a density of at least 35 trees or shrubs per acre.⁷

General Approach

Methods used in the TWDP Riparian Restoration Benefits Calculator Tool for estimating the net GHG benefit of riparian restoration projects are provided in this section. These methods account for carbon sequestration from woody plantings and soil in restored areas.

The net GHG benefit from riparian restoration projects is estimated as the increase in carbon sequestration over a baseline scenario using Equation 1.

Equation 1: Annual GHG Benefit from Riparian Restoration Activities

<i>GHG = Acres Restored × Emission Reduction Coefficient × Quantification Period</i>		
<i>Where,</i>		<u>Units</u>
<i>GHG</i>	= Net GHG benefit from riparian restoration activities	MTCO ₂ e
<i>Acres Restored</i>	= Degraded riparian area restored with woody plantings	Acres
<i>Emission Reduction Coefficient</i>	= Average annual carbon sequestration in riparian restoration scenario as compared to baseline scenario, from COMET-Planner	MTCO ₂ e/acre-year
<i>Quantification Period</i>	= 10 year duration over which COMET-Planner carbon sequestration values are averaged ⁸	Years

⁷ A minimum planting density of 35 trees per acre in COMET-Farm agroforestry calculations attain the GHG benefit assigned to sequestered carbon in biomass for the Riparian Restoration practice in COMET-Planner.

Section C. References

Colorado State University and the United States Department of Agriculture.
COMET-Farm. April 2019. <http://cometfarm.nrel.colostate.edu/>

Colorado State University and the United States Department of Agriculture.
COMET-Planner Report. April 2019.
http://bfuels.nrel.colostate.edu/beta/COMET-Planner_Report_Final.pdf