Section 5: Project Description

1. Project Objectives:

The primary objective of this project will be to acquire a conservation easement over the entire 5,344-acre forested watershed property. The terms of this conservation easement were developed in consultation with the CDFW- Region 1 office to achieve a number of objectives including: enhanced carbon sequestration and avoided conversion, protection and enhancement of unique wildlife habitats, protection of important water resources, and public recreational access.

- **Protection of carbon stores and increased carbon sequestration**: The proposed conservation easement will prevent the property from being converted out of forest use through prohibitions or limitations on subdivision, residential development, and commercial and industrial activities. Specific timber harvest restrictions within the conservation easement will increase direct carbon sequestration through increased growth and maintenance of forest carbon stocks.
- **Provide lasting connectivity across public and private boundaries** to enhance wildlife habitat migration and adaptation to climate change and better watershed management and functionality in the Sacramento River basin headwaters. The property's boundaries bridge a key north-south gap between Late Successional Reserves within the Shasta-Trinity National Forest and enhance connectivity within an existing 17,500-acre network of working forest conservation easements in the McCloud area.
- **Protecting sources of water and water quality** for drinking water and agriculture including: 5.1 miles of Class I streams, 20.9 miles of Class II and III, 50 springs, and 219 acres of wetland areas.
- **Protecting and enhancing habitat for 17 special status plants and animals** including but not limited to the northern spotted owl, Pacific fisher, American pine marten, and the willow flycatcher.
- **Supporting sustainable forestry and related jobs** that are central to the regional resource-based economy, which is among the most depressed in the nation.

- **Providing for public recreational access** across the entire property to complement the trail systems on the adjacent national forest and protecting the **scenic viewshed** for the town of McCloud and the National Volcanic Scenic Byway.

2. *Background and Conceptual Models:*

This conservation easement conveys a variety of climate benefits including protection of carbon stores, increased carbon sequestration, the likelihood of enhanced resiliency and adaptive capacity for wildlife, and other attributes by:

- Conserving a relatively high level of carbon stocks and avoiding emissions by dedicating the land to forest use with minimal (20 acres) potential permanent disturbance of forest cover. No subdivision or sale of smaller parcels is permitted, meaning that all 5,344 acres are merged into one parcel.
- Improving landscape resiliency by enhancing forest and habitat connectivity in the McCloud watershed, bridging gaps in the Shasta-Trinity National Forest (including those between Late Successional Reserves) and among 17,500 acres of other properties protected by working forest conservation easements.
- Increasing habitat resiliency for the needs of climate adaptation through designation and management of rare/sensitive habitats to conserve and enhance their functionality. These "Special Habitat Management Zones" include 50 springs, 219 acres of wet meadows, 575 acres of riparian areas, 165 acres of mature forest (see Exhibit D in the attached conservation easement describing SHMZ performance goals). When the conservation easement is funded and granted, PFT and the landowner intend to cooperate in implementing habitat enhancement projects within the SHMZs, subject to future funding. State investment in the next phase of habitat enhancement will have more assured long term benefits with the conservation easement in place.
- Further, the easement requires the conservation and recruitment of habitat features that are rare in private commercial forestlands (large trees, hardwoods, snags, down wood); and through assuring connectivity of habitats within and across the property boundary.
- Specific forest management requirements include the following terms, all of which are standards higher than required under regulation and which benefit ecological functionality, forest resilience and carbon sequestration:
    - At least 10 square feet of basal area (BA) on average of trees >= 30" diameter at breast height (DBH) to be restored and retained across the property.
    - 15% retention of BA after harvest favoring high habitat value trees.
    - At least 20% of the forest area characterized as at least two-storied, with an overstory of trees averaging at least 24" DBH. Limit on clear-cutting.
    - Management of 10% of area in post-harvest openings for enhanced early seral habitat value.
    - Goals for recruitment and retention of more and larger snags and down wood.
- Conserving existing carbon stocks and increasing carbon sequestration over the baseline of forest management otherwise permitted, physically feasible and financially

optimal under California regulation. The property currently has a timber inventory of approximately 87,650 MBF or 16.5 MBF/acre; with an estimated GHG stock equivalent of 162 mt CO2 per acre or 857,903 total tons for the tract (Jenkins et al.)[1] (plus associated carbon stores in smaller trees, hardwoods, shrubs and other vegetation). This is higher than average timber stocking in the region.

Specifically, more forest carbon will accrue on the property due to the following restrictions:

- Rate of harvest is limited to 30% of net merchantable inventory per decade. This conservatively equates to 80% of growth, leading to a steady, measurable increase over current inventory over approximately 80 years, at which point harvest will likely equal growth and carbon stocks will be maintained by management.
- The large tree and snag retention and increase; other habitat enhancements (see above).

- Managing wildfire risk through encouraging active forestry that maintains forest health, addresses fuel loading and creates variable forest densities.

Inventory Data: Is available as necessary on a confidential basis for CDFW's review. Douglas-fir site classes range from 74 – 102 for this tract. The statistical quality of the Hancock inventory has been reviewed and confirmed by three RPFs who appraised or reviewed the appraisal for the property.

Climate Change Adaptation: This project sits in the middle of the Klamath-Cascade region, which is recognized as a potentially important area for species refugia and critical landscape linkages for species migration and adaptation in the face of climate change. This specific property has the potential to help play a critical role in providing a landscape linkage and migratory corridor for wildlife moving from south to north and up in elevational gradients across private lands to the Shasta-Trinity National Forest.

3. *Detailed project description, including all tasks to be performed:*

The conservation easement project can be divided into stages with tasks to be performed for each stage of the project.

Pre-Easement Acquisition Stage

These tasks will be completed by Pacific Forest Trust's Co-CEO, President, Conservation Director, and Stewardship Associate.

- Title review and other property due diligence (completed)
- Finalize the conservation easement with CDFW and landowner (completed)
- Secure option agreement with the landowner to acquire easement by February 5, 2016 (completed)
- Wildlife Conservation Board appraisal of the conservation easement (completed)

[1] Carbon stock estimate was generated using Hancock tree and stand data (incorporating species, dbh, height). Jenkins, J.C.; Chojnacky, D.C.; Heath, L.S.; Birdsey, R.A. 2003. National-scale biomass estimators for United States tree species. Forest Science. 49: 12–35.

- Independent 3rd party appraisal review and DGS appraisal review and approval (completed)
- Apply for acquisition funding from state agencies, including the WCB, EEMP Program, Cal-Fire Forest Legacy Program (in-process)

Conservation Easement Acquisition Stage
Same PFT staff as listed above will complete these tasks

- PFT submits request for payment into escrow by all funding agencies
- Closing Documents Reviewed by funding agencies
- Conservation Easement recorded and title insurance issued
- Stewardship funding secured from landowner

On-going Perpetual Monitoring Stage
Performed by PFT's Stewardship Associate with oversight from the Co-CEO and Conservation Director

- Once the easement is recorded, PFT will monitor the property annually for compliance with the easement terms.
- In addition to annual monitoring of timber harvests and other activities for compliance with the easement terms, carbon stocks will be monitored on a decadal basis through review and analysis of landowner inventory data.

Mountain Meadow Research Project
The research component would be led by PFT's President, Co-CEO and Stewardship Associate. The initial vegetation survey of wet meadow SHMZs and core sampling would be completed by a contract plant biologist. And, the on-going monitoring would be completed by PFT's Stewardship Associate and volunteers in conjunction with our annual monitoring of the conservation easement. Dean Urban, professor of environmental sciences and policy at Duke University and PFT board member, will serve as an advisor on this research project.
We suggest a 3-step approach to the research project:
1. Complete an initial inventory of the vegetation on a select set of mountain meadows and associated habitat types (springs, aspen) with a preference for meadows identified for future restoration work and control sites; mapping the vegetation gradient from wet to dry.
2. Take soil samples at each gradient and having these tested for soil carbon.
3. Assess and monitor over time the changes in both restored and non-restored meadows within the property over a 10 year period to assess if wetness persists longer in various parts of the wet meadows, and if it extends to a larger area as a result of restoration. Take soil samples of carbon every 2 years, as well as monitor change in vegetation types annually. Seek to establish a correlation between vegetation type and soil carbon changes; or define a trajectory of soil carbon by vegetation type.

4. *Timeline:*

Activity Description	*Approximate Date*
Complete property and title due diligence	2011
Conservation Easement finalized and option signed	August 2012

Wildlife Conservation Board (WCB) Completed appraisal on conservation easement	May 2014
DGS completed their appraisal review and approved the appraisal	November 2014
PFT pursuing matching funds from the Greenhouse Gas Reduction Fund (AB 32 Cap and Trade Auction Revenue)	Ongoing - WCB to consider $1.5 million grant in Feb 2015 - EEMP to consider a $1 million grant in March 2015 - CalFire GGRF to consider $2.8 million grant in January 2015
Signing of CDFW grant agreement	June 2015
PFT submits request for payment from funding agencies to escrow	July 2015
Deeds and Closing documents submitted to the State for review	July 2015
Conservation Easement recorded	September 2015
Stewardship Monitoring	Annually in perpetuity
Mountain Meadow Research Project	- Begin vegetation surveys and soil sampling the spring/summer of 2016. - Continue to monitor vegetation annually and take soil samples to measure carbon stores through 2026.
Carbon Monitoring	Forest carbon stocks monitored annually consistent with conservation easement monitoring; and quantified each decade, based on inventory data.

5. *Deliverables:*

- Copy of the recorded conservation easement
- Copy of the baseline report for the easement
- Annual stewardship monitoring reports
- Report on results of mountain meadow research
- Final Grant Report

6. *Expected quantitative results (project summary):*

Our project will achieve emissions reductions through the future management of the project area under the permanent restrictions on forestry and other activities defined in the conservation easement (see Appendix) that would be placed on the property and held by the Pacific Forest Trust (PFT). Such reductions would be produced in upland stands as well as the Riparian Management Zone (RMZ) and Special Habitat Management Zone (SHMZ) stands, as identified in the conservation easement. RMZs and SHMZs on the project area comprise riparian habitat, wet meadows, wetlands, and aspen stands, as well as mature forest.

As is demonstrated below, timber harvesting under the conservation easement will be limited relative to the harvesting that could otherwise occur in the absence of the easement. The primary driver behind the harvest limits on the property as a whole is the restriction that limits harvest within a given decade to a maximum of 30% of the net merchantable timber inventory, which conservatively equates to 80% of growth. This restriction, in combination with other forest management-related restrictions, is expected to steadily increase timber and carbon stocking levels over the entire project area for the next 80 years before harvest and growth levels approach equilibrium.

RMZs are expanded relative to state requirements, with more strict limits on the harvesting that can take place within them. Harvesting will be limited in these areas relative to what would otherwise occur in the absence of the project. Similarly, active management in SHMZs is limited to activities that restore and/or maintain the habitat types identified for each zone within the terms of the conservation easement, such as aspen stands or wet meadows. While we recognize that some restoration activities may cause a reduction in stocks at the restored sites (e.g., through removal of conifers to foster aspen expansion) such emissions would be subsumed by the significant increases in stocks elsewhere in the project area.

The project will be produce emissions reductions by virtue of the conservation easement terms that require forest management activities to achieve higher timber stocking that would be required under the Forest Practice Rules. This additionality is shown quantitatively below. Furthermore, the additional reductions generated by the project will be maintained–barring any natural catastrophic disturbances—in perpetuity since the conservation easement will be held and monitored in perpetuity by the PFT. Risks of reversals such as wildfire and pest outbreaks will be managed via active management of the forest, especially in upland stands, which will be managed for timber production over time. The conservation easement also guides the management of the project site toward more healthy and resilient forest conditions, thereby further reducing the reversal risk.

General Approach to Quantification

The quantification of the initial carbon stocking and the projections for the baseline and project carbon stocks is based primarily on guidance from the USDA.[2] Additionally, we draw certain elements from the Forest Project Protocols of the Climate Action Reserve (CAR) and the US Forest Offset Protocol of the California Air Resources Board (ARB) where they seemed appropriate or added to the level of conservatism in the estimate of emissions reductions.

[2] Hoover, C., R. Birdsey, B. Goines, P. Lahm, G Marland, D. Nowak, S. Prisley, E. Reinhardt, K. Skog, D. Skole, J. Smith, C. Trettin, C. Woodall, 2014. Chapter 6: Quantifying Greenhouse Gas Sources and Sinks in Managed Forest Systems. In *Quantifying Greenhouse Gas Fluxes in Agriculture and Forestry: Methods for Entity□Scale Inventory*. Technical Bulletin Number 1939. Office of the Chief Economist, U.S. Department of Agriculture, Washington, DC. 606 pages. July 2014. Eve, M., D. Pape, M. Flugge, R. Steele, D. Man, M. Riley□Gilbert, and S. Biggar, Eds.

More specifically, belowground live tree carbon stocks were estimated using the equation specified by Cairns et al.;[3] Emissions reductions were moderated by the inclusion of secondary effects (leakage) calculations.[4]

Projections were conducted using a basic spreadsheet model in which we applied the growth and harvest assumptions contained within the appraisal prepared for the project area to determine the value of the conservation easement (see Appendix). The appraisal was prepared by James P. Saake (Certified General Real Estate Appraiser #AG004439), and Philip E. Nemir (RPF#1666) using methodology well established under the requirements of the Uniform Standards of Appraisal Practice of the Appraisal Standards Board of the Appraisal Foundation and requirements of the State of California. Data used in the appraisal include a detailed current timber inventory prepared by Registered Professional Foresters to a high degree of statistical accuracy, interviews with personnel managing the property, and relevant local market data. and evaluated the harvesting that could be done under existing legal, physical and financial constraints, as well as the harvesting that could be done under the additional restrictions of the conservation easement. As such, the appraisal provides a very credible basis for projecting future forest management options and their impacts on the timber stocks. For our purposes here, the assumptions used by Mr. Nemir for the "before" conservation easement case are the basis for our baseline calculations, whereas the assumptions he used for the "after" conservation easement case serve as the basis for our project activity calculations. This approach to modeling changes in carbon stocks was reviewed by Bill Wilkinson (RPF#2463), the PFT's staff forester, and were deemed to be sound for the purposes of reasonably estimating the emissions reductions that could be achieved by the project.

Baseline and project activity projections were performed for all stands in the project area. Data for RMZ and SHMZ stands were also isolated and separate baseline and project activity projections were performed on them based on the harvest assumptions for those stands outlined in the appraisal. The intent of such separate projections is to show the general GHG impacts from changes in management and restoration activities within those stands. That said, the projections on all stands encapsulates those overall impacts, including potential decreases in carbon stocks at restoration sites where the goal is to reduce conifer presence in favor or aspen, riparian hardwood or other mountain meadow areas.

Due to limited data availability, only carbon in live trees and harvested wood products were included in our analysis. Furthermore, the dynamics of carbon in other pools in the ecosystems involved in the project would not produce significant changes in the reduction outcomes, particularly since the live tree carbon stocks are so high. Indeed, the ARB's U.S. Forest Offset Protocol and the CAR's Forest Project Protocol do not require accounting of

[3] Cairns, M. A., S. Brown, E. H. Helmer, and G. A. Baumgardner. 1997. Root biomass allocation in the world's upland forests. Oecologia 111:1–11.
[4] California Air Resources Board. 2011. Compliance Offset Protocol U.S. Forest Projects. Sacramento, CA.

shrub, herb and soil pools (the latter only included if significant soil disturbances are planned). Reporting of standing dead tree stocks is required by both protocols; however, such stocks are not expected to change significantly in our project under the baseline scenario and would likely increase under the conservation easement scenario, given the easement restriction requiring snag retention. Thus, omitting changes in standing dead trees from our modeling contributes to a more conservative estimate of emissions reductions.

The approach described here allowed us to produce what we believe to be reliable estimates of initial and future carbon stocks while working within the constraints of the data available to us. Such data was limited to that contained in the appraisal and current stand-level forest inventory data provided by the landowner, the statistical accuracy of which was reviewed in the independent appraisal process and review conducted by the State of California.

Calculation of Initial Conditions

Equations developed for general groups of species by Jenkins et al.[5] were applied to the tree list from the forest inventory data for the project area to estimate the current total aboveground biomass in each stand and in the entire project area. The tree list included data such as tree species, diameter at breast height (DBH), trees per acre and stand acreage. Belowground biomass was then estimated by applying the equation from Cairns et al. to the aboveground biomass values calculated for each stand. Aboveground and belowground live tree stocks were added to determine total live tree stocking levels at the stand level, allowing for later analysis for the project area as a whole and for just the RMZ and SHMZ stands. Furthermore, total live tree carbon stocks were then compared to timber volume stocking estimates (in thousands of board feet, MBF) from the appraisal to establish carbon to MBF ratios, which would then be applied to growth and harvest projections to determine carbon stocking.

Important initial conditions relevant to baseline and project activity projections are shown in Table 1. Initial conditions and basis for modeling, River Block.

River Block	All stands	RMZ/SHMZ stands
Acres	5,283	824
MBF	85,053	15,374
C	233,761	38,511
C:MBF	2.7	2.5
Growth	3.4%	3.4%
Harvest during first decade, as % of Inventory		

[5] Jenkins, J.C., D.C. Chojnacky, L.S. Heath and R.A. Birdsey. 2003. National-scale biomass estimators for United States tree species. *Forest Science* 49(1):12-35.

Baseline	59%	53%
Project	30%	0%

Projections of Changes to Carbon Stocks

The basic approach employed here to projecting future carbon stocks was the application of the growth and harvest framework from the conservation easement appraisal to the initial timber volume on the project site. The appraisal compared the scenario of maximizing the net present value of future income from "business as usual" timber harvest during a 10-year period to the scenario of timber harvest under the conservation easement for that same period of time. Although the appraisal only looked at a 10-year projection, it set out enough guidance regarding future harvesting that the projection could be extended here to a 50-year projection.

Growth and harvest rates outlined in the appraisal were applied to the initial timber volume data on an annual time-step using an Excel spreadsheet for the first ten years. For the baseline scenario for all stands in the project area, a subsequent 10-year harvest was initiated at the start of the decade after the MBF stocking recovered to at least 12.0 MBF/acre (approximate initial stocking of Town Block and representative of pre-harvest stocking typical of other commercial forestlands). Harvest rates were assumed to be the same as during the initial 10-year period in terms of the percentage of net volume to be harvested. For the baseline scenario on RMZ and SHMZ stands, we applied the same harvest timing determined for the baseline projection on all stands.

For the project activity scenario for all stands, harvest rates were based on the easement restriction limiting harvest volumes to no more than 30% of net merchantable volume present at the start of each decade. No harvests occurred under the project activity scenario for RMZ and SHMZ stands.

The C:MBF ratios previously determined for the property were applied to the resulting baseline and project activity volume projections to estimate carbon stocks in live tree stocks and the stocks in harvested trees. Estimates of harvested stocks were then used to derive the amount of carbon stored in in-use harvested wood products and the amount of stocks that would contribute to the calculation of secondary effects. Harvested wood products carbon and secondary effects calculations were based on the method described by the ARB and CAR in their respective forest project protocols. However, for simplification purposes, we assumed that only softwoods were harvested and that 70% of the volume delivered to mills went toward the production of lumber while the remaining 30% went into plywood.

Expected GHG Reductions

For all stands, as well as for just RMZ and SHMZ stands, significant emissions reductions will be achieved during the first 50 years of the project. Table 2 and figures 1-2 show the modeling results for all stands, whereas Table 3 and Figures 3-4 display the results for the RMZ and SHMZ stands. Across all stands, >400,000 metric tons of additional CO2 will be removed from the atmosphere during the first 50 years of the project.

Our modeling of RMZ and SHMZ stands shows a similar scale of reductions as those for all stands. This is likely an overstatement of reductions due to: 1) no attenuation in the growth rate over time even though growth on such stands would likely slow as the canopy closes further and they become more densely vegetated, and 2) no harvest occurring under the project activity scenario even though some light harvesting likely would occur, including as a part of restoration activities. However, since the timing and intensity of any harvesting and restoration work that may occur will be determined by the landowner, there is no way to factor such removals into our modeling here. Thus, although we recognize that the estimate of reductions on the RMZ and SHMZ stands may be an overstatement, our modeling nonetheless shows that reductions reasonably can be expected on such stands relative to what would happen in the absence of the project (see Figure 3). Furthermore, we would assume that some of the harvest volume to be removed during harvests in our modeling of all stands would be taken from RMZ and SHMZ stands. As such, any harvest activities in the RMZ and SHMZ stands would be subsumed by the overall increases in carbon stocks across all stands.

Note that reductions results from two different calculations are presented in each table, though both calculations are based on the same modeling data. The first is based on the difference between the project stocks and the “moving” baseline, or the modeled changes to the baseline live tree stocks capturing carbon flux from timber harvest and regrowth. The second calculation is based on the difference between the project stocks and the average value of the baseline live tree stocks during the 50-year modeling period.

The moving baseline is useful for illustrating how carbon stocks under the project directly compare to how carbon stocks may have changed in the absence of the project. On the other hand, the averaged baseline value allows for reductions to be quantified that more realistically reflect how changes to management are impacting the GHG emissions over time. For example, the emissions reductions on all stands climbs steadily to over 400,000 metric tons of CO_2 after 50 years (Table 2) when using the averaged baseline value, whereas the emissions reductions fluctuate by hundreds of thousands of metric tons when using the moving baseline. As such, we consider the reductions based on the averaged baseline value to be more appropriate for describing the expected climate benefits of the project. Indeed, this is the same method of calculating reductions as is required by the forest project protocols of both CAR and the ARB.

Although we are confident in the general trends that our modeling shows, there are nonetheless several areas of uncertainty that we recognize as affecting the accuracy of our results. These are:

- As previously mentioned, the growth rate could moderate on the project site as stand densities change over time, particularly in the SHMZ stands.
- Also previously mentioned, harvesting of RMZ and SHMZ stands under the project, though limited by the easement in several ways, is uncertain since no active management is required by the easement. The appraisal and our projections assume no active management and therefore may overestimate onsite stocks for the project.
- For simplification purposes, stocks in harvested wood products that could ultimately end up stored in landfills was not calculated, potentially causing a slight overestimation of reductions. However, this would not affect the overall magnitude of the expected reductions.
- Since the shrub, herb, soil and standing dead tree pools were not included in our analysis, the reductions estimated may be affected somewhat. However, shrub, herb and soil pool carbon is not expected to change significantly as a result of the project. Standing dead tree stocks are expected to increase under the conservation easement. Therefore, our model underestimates reductions in that regard.
- Though appraisals are a well recognized approach to analyzing changes to future forest inventories, the appraisal our model was based on only projected changes in timber inventories over 10 years. Our extrapolation of the appraisal's baseline harvest assumptions across 50 years incorporates some uncertainty regarding the exact timing of subsequent harvest events, as well as the rate of harvest. Nonetheless, the general trend of significant emissions reductions being produced by the project is still valid. The application of harvests in the baseline projection was relatively conservative, thus likely contributing to an understatement of the emissions reductions.

The areas of uncertainty identified above contribute to both underestimations and overestimations of emissions reductions from the project. Taken as a whole, such uncertainties likely balance each other out and do not affect the overwhelmingly positive reduction results of the project.

Table 2. Results of baseline and project activity projections of timber volume and carbon stocks on all stands for the River Block, including emissions reductions estimates based on annual baseline stocks reported as modeled and on baseline stocks averaged across the 50-year modeling time frame.

River Block - All Stands												
	Baseline				Project				Reductions			
									Moving Baseline		Averaged Baseline	
Year(s)	Total Growth (MBF)	Total Harvest (MBF)	MBF (ending)	mt CO2 (ending)	Total Growth (MBF)	Total Harvest (MBF)	MBF (ending)	mt CO2 (ending)	Onsite Reductions	Reductions Net of HWP and Secondary Effects	Onsite Reductions	Reductions Net of HWP and Secondary Effects
2014			85,053	857,903			85,053	857,903	0	0	0	0
2015-2024	24,488	-55,329	54,212	546,819	29,489	-25,516	89,026	897,975	351,156	343,507	234,772	227,123
2025-2034	21,524	0	75,736	763,923	30,866	-26,708	93,184	939,919	175,996	182,849	276,716	283,568
2035-2044	22,574	-44,684	53,626	540,908	32,308	-27,955	97,537	983,822	442,914	438,622	320,619	316,328
2045-2054	21,291	0	74,917	755,665	33,817	-29,261	102,093	1,029,775	274,111	276,897	366,573	369,359
2055-2064	22,330	-44,201	53,046	535,061	35,396	-30,628	106,861	1,077,876	542,814	539,333	414,673	411,191

Table 3. Results of baseline and project activity projections of timber volume and carbon stocks on RMZ and SHMZ stands for the River Block, including emissions reductions estimates based on annual baseline stocks reported as modeled and on baseline stocks averaged across the 50-year modeling time frame.

River Block - RMZ and SHMZ Stands												
	Baseline				Project				Reductions			
									From Moving Baseline		*From Averaged Baseline*	
Year(s)	Total Growth (MBF)	Total Harvest (MBF)	MBF (ending)	mt CO2 (ending)	Total Growth (MBF)	Total Harvest (MBF)	MBF (ending)	mt CO2 (ending)	Onsite	Onsite, Net of HWP & Secondary Effects	Onsite	Onsite, Net of HWP & Secondary Effects
2014			15,374	141,335			15,374	141,335	0	0	0	0
2015-2024	4,728	-8,202	11,900	109,400	6,104	0	21,478	197,449	88,049	86,061	61,318	59,330
2025-2034	4,725	0	16,625	152,834	8,528	0	30,006	275,842	123,007	123,007	139,711	139,711
2035-2044	5,113	-8,870	12,869	118,301	11,913	0	41,919	385,359	267,058	264,907	249,228	247,077
2045-2054	5,109	0	17,978	165,270	16,643	0	58,563	538,358	373,088	373,088	402,227	402,227
2055-2064	5,529	-9,591	13,916	127,926	23,251	0	81,814	752,101	624,175	621,850	615,970	613,645

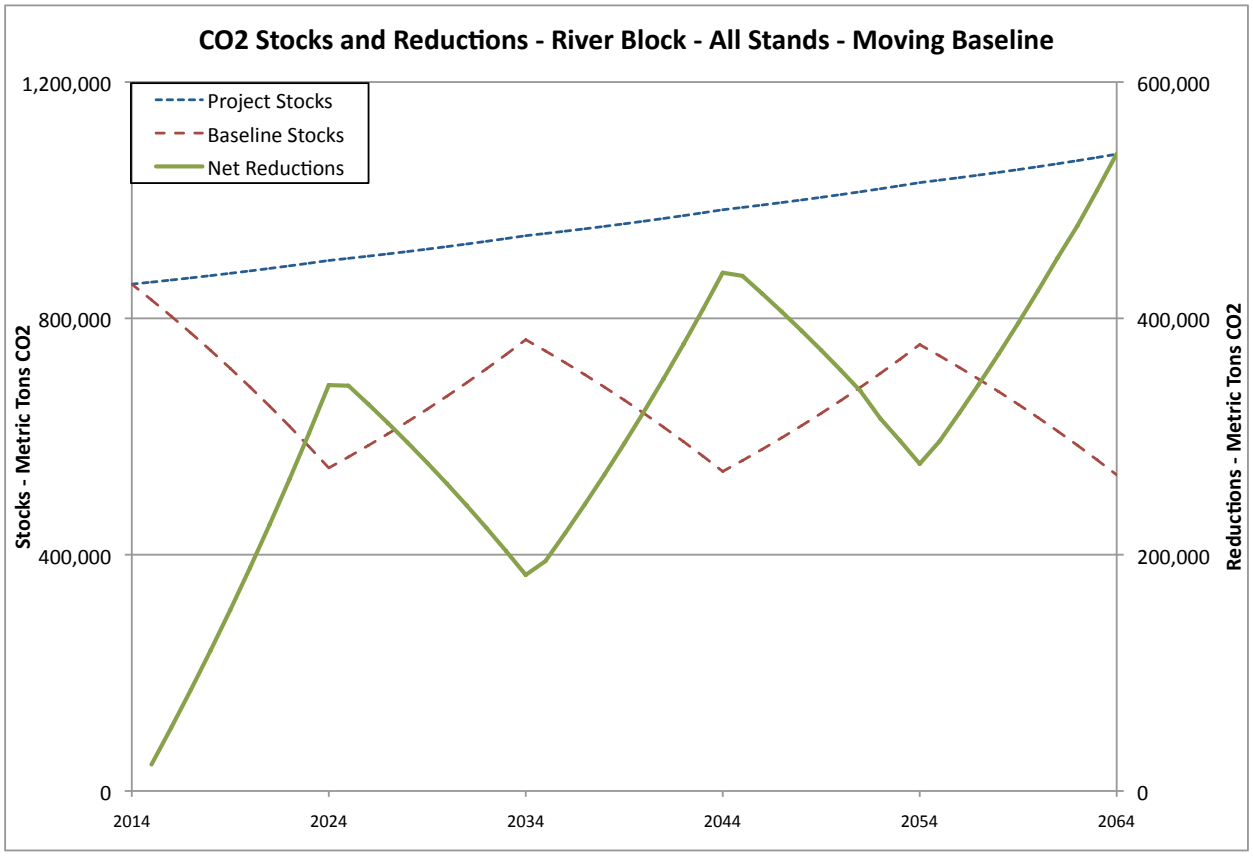

Figure 1. Estimated CO2 stocks and reductions for all stands on the River Block. Reductions are based on annual baseline stocks reported as modeled.

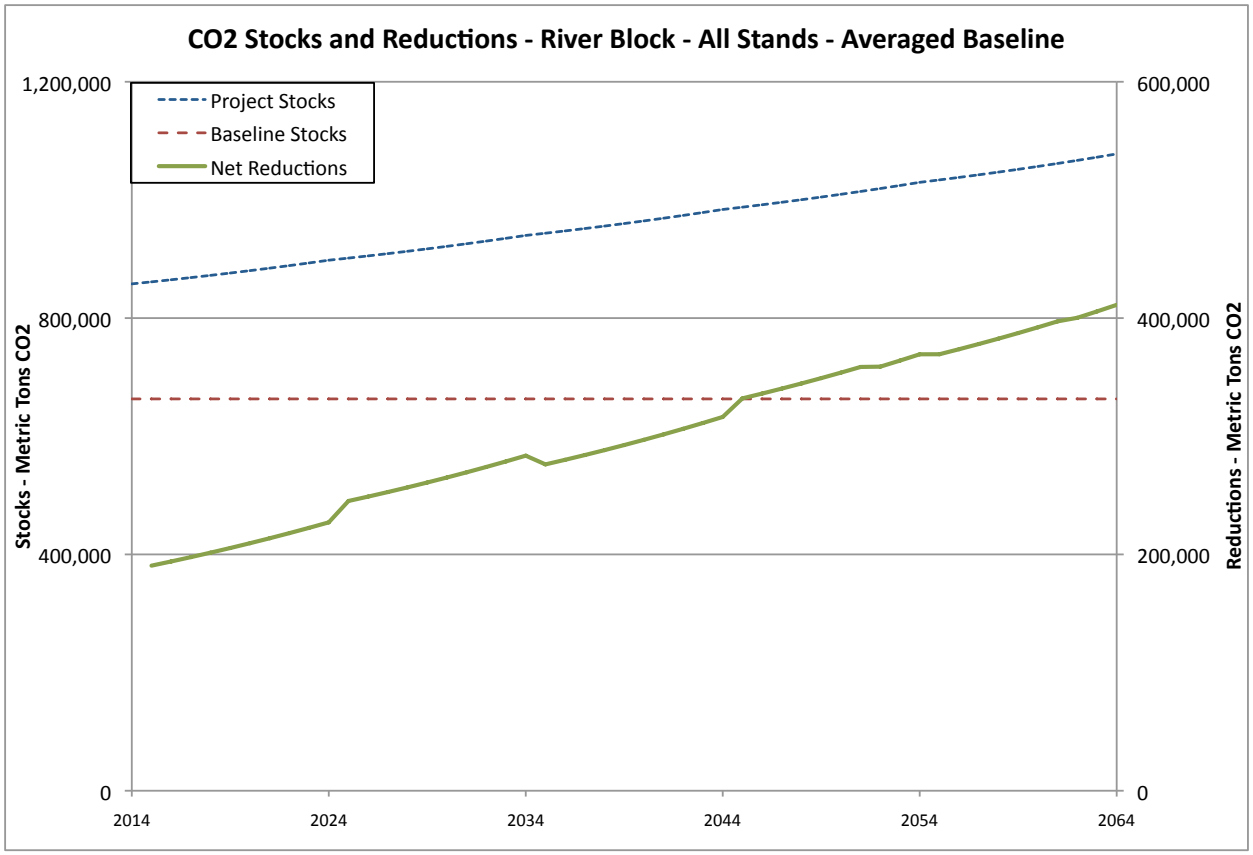

Figure 2. Estimated CO2 stocks and reductions for all stands on the River Block. Reductions are based on baseline stocks averaged across the 50-year modeling time frame.

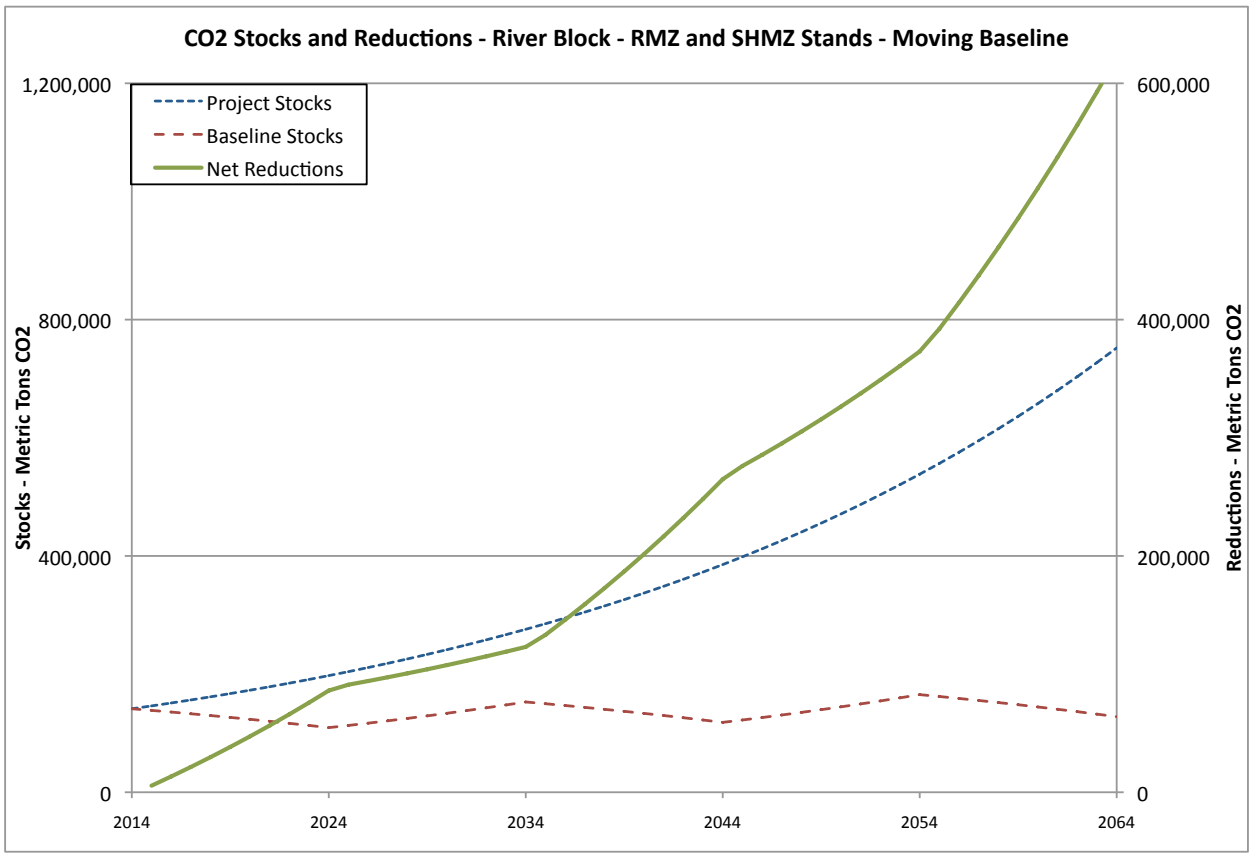

Figure 3. Estimated CO2 stocks and reductions for RMZ and SHMZ stands on the River Block. Reductions are based on annual baseline stocks reported as modeled.

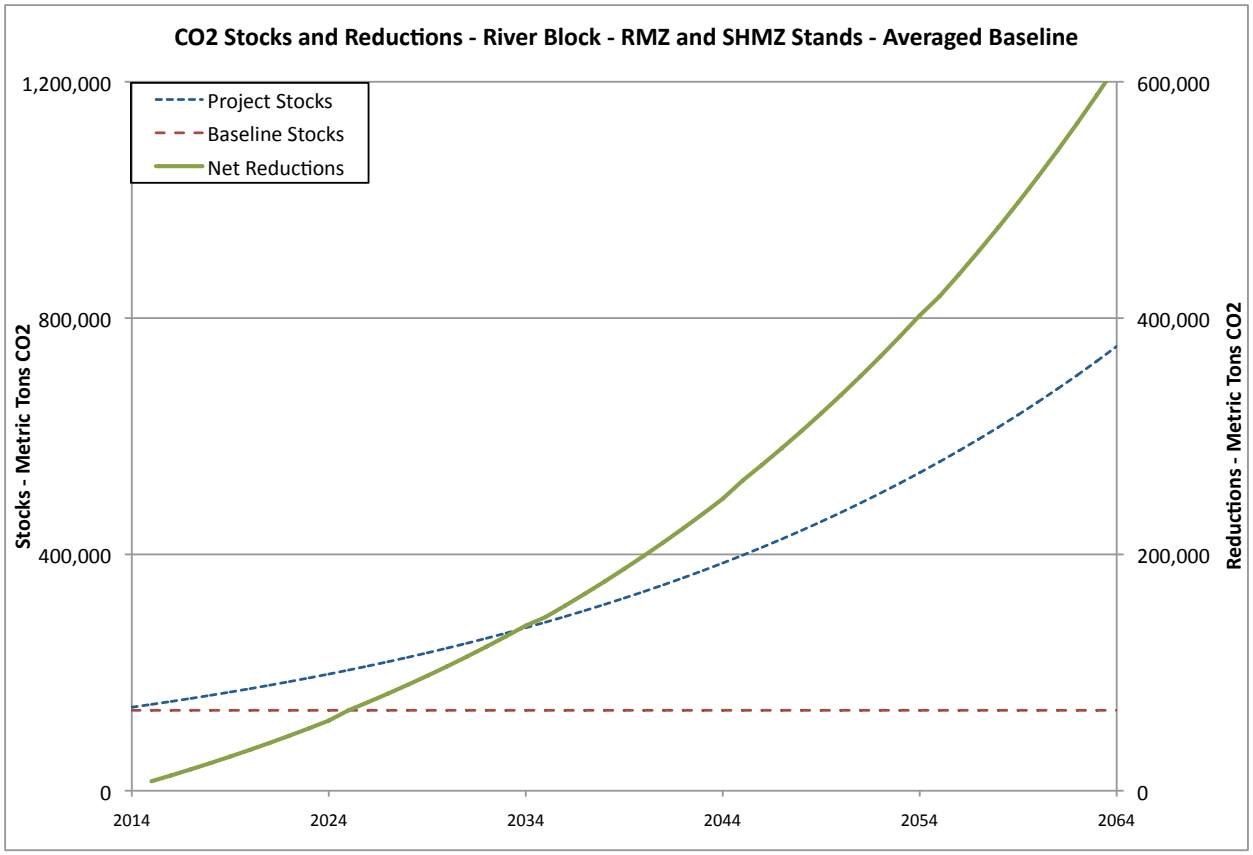

Figure 4. Estimated CO2 stocks and reductions for RMZ and SHMZ stands on the River Block. Reductions are based on baseline stocks averaged across the 50-year modeling time frame.

7. ***Protocols:***

The conservation easement (see Appendix) describes specific limits on forest management that may occur on the project site. These limits effectively set sideboards for the landowner, within which management is guided toward fostering more resilient and more highly stocked forests. In addition to providing for property access for monitoring and remedies for breach of easement terms, the easement also includes requirements for regular communication between the landowner and the Pacific Forest Trust (PFT), who would hold the conservation easement, thereby ensuring regular monitoring of the project as the landowner's management plans are formed initially and modified over time, to ensure conformance with the easement terms:

- Shortly after easement would be put in place, landowner must produce forest management plan that includes planned ways to address performance goals for SHMZs and RMZs.
- An annual meeting between the landowner and PFT will take place to discuss management activities for the coming year.
- PFT monitors the property for conformance with the terms of the easement at a minimum of once each year, and more often if the land is being actively managed.
- If management activities that are restricted in some way under the easement are planned, the landowner must provide advance notice to PFT, including thorough documentation of planned activities.
- Planned activities within SHMZs must be documented in a "voluntary habitat enhancement plan," which is to be provided to both PFT and the California Department of Fish and Wildlife for their review and approval.
- The forest inventory for the project area must be updated at a minimum of every ten years, with the standard error for the inventory estimate not to exceed +/-15% at the 90% confidence level.

The measurement of changes in onsite carbon stocks toward achieving emissions reductions will occur over time via monitoring of the conservation easement, as performed by PFT. Onsite stocks will be tracked over time and will be based on forest inventory updates, which are required at a minimum every 10 years, per the easement. Carbon stocks will be calculated in the same manner as calculated for the initial stocks presented in the Expected Quantitative Results section of this proposal, using the Jenkins equations for aboveground live tree biomass and the Cairns equation for belowground biomass. If another method of calculating carbon stocks is determined to be more appropriate in the future, that method will be applied to the initial inventory and any inventory updates that have occurred since project initiation. Thus, any changes in quantification methodology will not affect our ability to monitor the performance of the project toward continuing to produce emissions reductions.

Since the expected reductions from the project are based on consistently increasing the live tree stocking over time, the main concern is if an inventory update shows stocks have remained the same or declined, barring a natural catastrophe causing an unintended reversal.

The conservation easement contains performance measures that help ensure the project will produce emissions reductions for the coming decades. These performance measures include:

1. Forest inventory updates that must meet pre-defined statistical rigor, thereby providing regularly occurring opportunities to track stocking levels with relatively high confidence that stock estimates are accurate.
2. Restriction of harvesting no more than 30% of net merchantable timber inventory, which will be the main driver behind expected ongoing increases in C stocks on the project site since it is anticipated that such limits on harvest volumes will ensure growth exceeds harvest for approximately 80 years, at which point growth and removals, if maximized, would be equal.
3. SHMZ performance goals and the required external approval of "voluntary habitat enhancement plans," providing an opportunity for PFT and the California Department of Fish and Wildlife to intervene if such plans would have a significant and adverse impact on the project's ability to continue reducing emissions.

If this project is funded, we look forward to further refining our approach to quantification, including methods related to research component of this proposal

8. *Literature Cited:*

Please see footnotes.