

Offset Project Data Report for the Initial Reporting Period Bluesource – Wolf River Improved Forest Management Project

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OPR Staff Use Only	Date Report Received	OPR Tracking Number:	Date Report Reviewed	OPR Staff Use Only

Part I. Entity Submitting Report

This form being submitted by the Authorized Project Designee (APD).

Completed By: Joshua Strauss

Mailing Address: 1935 E Vine Street, Suite 300, Murray, UT 84121

Phone Number: 949-233-1501

Email: jstrauss@bluesource.com

Date Form Completed: 10/25/2017

Part II. Offset Project Information

Project Name: Blue Source-Wolf River Improved Forest Management Project

City: Antigo

State: Wisconsin

Zip: 54409

Registry: Climate Action Reserve

Compliance Offset Protocol: U.S. Forest Projects

Version: November 14, 2014

Start Date: 10/30/2015

Reporting Period End Date: 5/31/2017

Crediting Period: 10/30/2015 to 10/29/2040

The commencement date was signified by the submittal of the project listing form to CAR. Per page 15 of the ARB Forest Protocol, an IFM project's commencement date can be signified by the submittal of the project's listing information.

Part III. OPO/APD Information

Offset Project Operator

OPO Name: Wolf River ATP, LP

CITSS ID#: CA2006

Mailing Address: 1180 Peachtree Street, NE, Ste 1810, Atlanta, GA 30309

Contact Person: Frank Carroll

Phone Number: 610-517-1637

Email: fjcarroll@frontier.com

Authorized Project Designee

APD Name: Blue Source LLC

APD's CITSS ID#: CA1278

Contact Person: Joshua Strauss

Mailing Address: 1935 E Vine Street, Suite 300, Murray, UT 84121

Phone Number: 949-233-1501

Email: jstrauss@bluesource.com

Part IV. Land Ownership

1. **Whether the Offset Project Operator is the owner in fee for the project area.** Yes
 - a. **If yes, provide documentation (e.g. deed of trust, title report) showing the Offset Project Operator's ownership interest in the property and its interest in the trees and standing timber on the property.**
Please see corresponding folder "Wolf River deeds", provided separately for verification.
2. **Forest Owner:**
Wolf River ATP, LP
3. **Offset project type (reforestation, improved forest management, or avoided conversion).**
Improved Forest Management
4. **Indicate if the offset project occurs on public or private lands, and further specify if the offset project occurs on any of the following categories of land:**
Private Lands
 - a. **Land that is owned by, or subject to an ownership or possessory interest of a Tribe;** No
 - b. **Land that is "Indian lands" of a Tribe, as defined by 25 U.S.C. §81(a)(1);** or No
 - c. **Land that is owned by any person, entity, or Tribe, within the external borders of such Indian lands.** No

Part V. Offset Project Area

1. **Governing jurisdictions, and latitude/longitude coordinates**

Latitude of Offset Project Location:	Longitude of Offset Project Location:	Project Area Total Acreage:
-88.86° W	45.23° N	13,552

2. **Project Area Assessment Areas**

Supersection	Assessment Area	Acres
Laurentian Mixed Forest Green Bay Lobe	Northern Hardwoods	646
	Pine-Oak-Hickory	7
Laurentian Mixed Forest Northern Highlands	Conifer Bog	409
	Northern Hardwoods	12,229
	Pine-Oak-Hickory	263
TOTAL		13,552

*Sub-totals may not sum to 100% due to rounding.

The project area naturally consists of a mixed species distribution where no single species' prevalence, measured as the percent of basal area of all live trees in the Project Area, exceeds the percentage value of standing live carbon shown under the heading 'Species Diversity Index' in the Assessment Area Data File. Specifically, as noted in section VI.7.a., the species with the highest frequency (%) throughout the project area is Sugar Maple with 56% of the total live basal area, below the 60% threshold found within the Laurentian Mixed Forest Green Bay Lobe Northern Hardwoods assessment area. The remaining assessment areas have a species diversity index threshold ranging between 65-70%.

3. Governing Jurisdiction

The project area is located wholly within Langlade County, which is within the Wisconsin Court of Appeals District III. The people of Langlade County are served by the 9th District Circuit Court. The United States District Court for the Eastern District of Wisconsin has jurisdiction in Langlade County.

4. Describe how the Project Area was determined.

The project area was determined using GIS to include 13,552 forested acres owned by Wolf River ATP, LP (also referred to as Wolf River throughout the OPDR).

Wolf Rivers owns in total 18,513 acres. The offset Project Area was determined using the most recent geospatial file of the of the property. To ensure the Project Area did not overlap into neighboring properties, project boundaries were confirmed and refined using publicly available PLSS layers. All roads, right-of-ways, major water bodies, and other non-forested areas were removed from the Project Area. Aspen stands were also excluded due to management considerations.

A supporting georeferenced shapefile has been provided separately for verification purposes.

5. Existing land cover and land use

Land Cover: Northern hardwood/mixed conifer forestland
Land Use: Commercial timber production

6. Forest vegetation types

Vegetation Type: The main forest type across the project area is mature northern hardwood and mixed hardwoods (95% total forest cover). Additionally, there is a small component of Pine-Oak-Hickory (2%) and Conifer Bog (3%) dispersed throughout the project area. The project owner also owns large tracts of aspen stands which were excluded from the project area due to the even-aged management not qualifying under sustainable forest management.

7. Site classes

Overall, approximately 98% of the property is considered low site class with productivity <120 cubic feet/ acre. All of the pine acres are considered high site class with productivity > 120 cubic feet/acre. Please see the Wolf River Modeling document for additional details on the site index and site productivity analysis.

Site Class	Acres
High	270
Low	13,283

8. Land pressures and climate zone/classification

The property is currently protected by a conservation easement which prevents conversion and subdivision. Consequently, there is no land pressure affecting the long-term use for timber production.

Climactic zone: The project area falls within climactic zone 4a on the USDA plant hardiness zone map. Average annual extreme minimum temperatures for 4a range from -30 to -25 degrees Fahrenheit.¹

¹ <http://planthardiness.ars.usda.gov/PHZMWeb/>

9. Historical land uses, current zoning, and projected land use within project area and surrounding areas

This property and surrounding areas have been historically used for commercial timber production and recreation. The majority of the Project Area falls within incorporated areas and is not zoned. Some portions of the property fall within shoreland zoning. Timber harvesting is allowed within shoreland zoning subject to Wisconsin's Forestry Best Management Practices for Water Quality.

The property has been under forest industry ownership for the last 60 years until it was acquired by ATP in the late 2000s. Consequently, the property has been managed exclusively for timber production and recreation for many years.

10. Indicate whether the project will employ a Qualified Conservation Easement. No.

Part VI. Offset Project Eligibility

- 1. A statement as to whether any GHG reductions or GHG removal enhancements associated with the Project Lands have ever been listed or registered with, or otherwise claimed by, another registry or program, or sold to a third party prior to listing, including;**
 - a. Have any lands within the Project Area ever been listed or registered with an offset project registry or program in the past?**
 - b. Have greenhouse gas emission reductions or removal enhancements associated with lands within the Project Area been credited or claimed for the purpose of greenhouse gas mitigation or reduction goals, whether in a voluntary or regulatory context?**
 - c. If yes, identify the registry or program (include vintages and reporting period).**

None of the Project Lands have ever been listed, registered with, or otherwise claimed by, another registry or program. No greenhouse gas emission reductions or removal enhancements associated with lands within the Project Area have ever been credited or claimed for the purpose of greenhouse gas mitigation or reduction goals, whether in a voluntary or regulatory context.

- 2. A statement as to whether the project is being implemented and conducted as the result of any law, statute, regulation, court order, or other legally binding mandate? If yes, explain.**

The project is not being implemented and conducted as the result of any law, statute, regulation, court order, or other legally binding mandate.

- 3. Declaration that the offset project does *not* employ broadcast fertilization.**

The offset project does not employ broadcast fertilization.

- 4. If the Forest Project is located on public land, a description and copies of the documentation demonstrating explicit approval of the offset project's management activities and baseline including any public vetting processes necessary to evaluate management and policy decisions concerning the offset project.**

This project does not occur on public lands, so therefore this section is not applicable.

- 5. If the Forest Project is located on the following categories of land, a description and copies of documentation demonstrating that the land within the Project Area is owned by a tribe or private entities:**

This project does not occur on tribal lands, so therefore this section is not applicable.

6. If commercial harvesting is either planned or ongoing within the Project Area, a description of how the Forest Owner satisfies one of the three requirements for employing and demonstrating sustainable long-term harvesting practices on all of its forest landholdings (refer to Section 3.8.1).

Third party certification under the Tree Farm System, whose certification standards require adherence to and verification of harvest levels which can be permanently sustained over time.

7. A description of how the offset project meets (or will meet) the definition of “Natural Forest Management” (refer to Section 3.8.2), including:
- Composition of native species;

Species	BA/Acre	%
American elm	2.07	2.07%
balsam fir	0.86	0.86%
balsam poplar	0.01	0.01%
basswood	19.37	19.30%
bigtooth aspen	0.02	0.02%
Bitternut Hickory	0.37	0.37%
black ash	0.72	0.71%
black spruce	0.22	0.22%
cherry	1.49	1.48%
eastern hemlock	0.61	0.61%
hophornbeam	2.41	2.40%
northern red oak	2.33	2.32%
northern white cedar	2.18	2.18%
quaking aspen	0.77	0.76%
red maple	0.87	0.87%
red pine	1.04	1.04%
sugar maple	56.29	56.09%
tamarack	0.07	0.07%
white ash	4.52	4.50%
white birch	0.46	0.46%
white pine	0.04	0.04%
white spruce	0.18	0.18%
yellow birch	3.45	3.44%
Total	100.35	100.00%

*Total may not sum to exactly 100% due to rounding.

- Distribution of age classes / sustainable management;

Wolf River IFM falls into five 12-digit HUC watersheds (Attachment E.4.) and the acreage of Wolf River property in each respective watershed was less than 10,000 acres.

Watershed	Acres	% Less than 20 Years
East Branch of the Lily River	933.5	11%
Elton Creek-Evergreen River	4,373.6	3%
Ninemile Creek	1,121.9	0%
Peters and Lawrence Lakes-Non-Contributing-Spring Brook	336.7	0%
Slough Gundy Rapids-Wolf River	6,786.7	2%

Age class distributions for each watershed were developed using tree core data and FIA site index curves. All watersheds meet the requirement of less than 40% area maintained in age classes of less than 20 years.

c. Structural elements (standing dead wood);

Live C	Dead C	% Standing Dead
29.1	0.3	0.9%

As of the end of the first reporting period, standing deadwood accounted for 0.3 mt C/acre or 0.9% of the total carbon in standing live trees throughout the property. There are no portions of the property that are currently subject to salvage harvesting operations. As of the end of the first reporting period, the project did not meet the 1 mt C/acre structural elements criteria of the COP for U.S. Forest Projects, but the Project will continue to progress towards meeting this criteria based on the standing deadwood retention requirements laid out in the Project's forest management plan.

- 8. On a watershed scale up to 10,000 acres (or the Project Area, whichever is smaller), projects must maintain, or make progress toward maintaining, a maximum of 40% of the project's forest lands in ages that are less than 20 years old. (Areas impacted by Significant Disturbance are exempt from this test until 20 years after reforestation of such areas.) Does the acreage within this project meet this requirement? Yes.**

- a. Explain how the project demonstrates continuous progress toward meeting this requirement within the next 25 years. NA**

- 9. A description of the management activities that will lead to increased carbon stocks in the Project Area, compared to the baseline.**

The management objectives on the Wolf River property include managing the forest resources in an economically prudent manner to generate optimal revenue while exercising sound environmental stewardship. In addition to the sustainable production of the commercial forest crops, Wolf River ATP is committed to considerations for watershed protection, recreational uses and wildlife. Wisconsin's BMPs will be adhered to as well as compliance with the US forest Service's Forest Legacy Program to protect soil, water, range, aesthetic quality, recreation, timber, and fish and wildlife resources.

The project employs a mix of uneven aged and even-aged management practices. Even-aged management practices, such as shelterwood and clearcut harvests, are employed in accordance with FOP section 3.8.4. Clearcutting occurs primarily on aspen stands. Because many aspen stands exist on the property which exceed 40 acres, aspen stands were removed from the Project Area at the project outset to prevent any potential problems with future management constraints on this forest type.

Maintaining these practices shall lead to increased carbon stocks in the project area compared to the baseline.

- 10. Does the Project Area have a canopy cover that is greater than 10 percent?**

Yes. See Attachment F for supporting documentation

11. Indicate how the offset project meets the definition of Natural Forest Management per Table 3.2 in the Compliance Offset Protocol US Forest Offset Projects, November 14,2014:
- Does the project consist of at least 95% native species based on the estimated sum of carbon in the standing live carbon pool? Improved Forest Management Projects are assessed using estimates of basal area per acre. Yes

Part VII. Carbon Stock Inventory

- A. Provide a description of the inventory methodology used to quantify carbon stocks for each required carbon pool in the forest project's offset boundary. The inventory methodology must describe the information required in Appendix A.3 of the Compliance Offset Protocol U.S. Forest Projects, November 14, 2014.

Inventory Methodology

For all applicable carbon pools, the following inventory methodology was employed:

Project Boundary: The offset Project Area was determined using the most recent geospatial file of the property. All roads, right-of-ways, major water bodies, and other non-forested areas were removed from the Project Area. Some forested areas were removed due to management considerations.

Stratification: The Project was stratified into three distinct strata. The stratification is based on the most recent stands geospatial file and inventory in order to reduce the sampling error below 5.1%. The original shapefile provided by the landowner was used to differentiate hardwoods, bottomland hardwoods, pine plantations, and conifer bogs. Hardwoods and bottomland hardwood areas were assigned the northern hardwoods and mixed hardwoods assessment areas, conifer bogs were assigned the conifer bog assessment areas, and pine plantations were assigned the Pine-Oak-Hickory or Mixed Pine-Oak assessment areas. For the purposes of verification (having enough plots to pass sequential sampling), we treated the pine and conifer bog plots areas as one "Conifer" stratum. Post-inventory stratification adjustments were made to the spatial boundaries and plot stratification if plots or stands were found to have been incorrectly stratified. The resulting strata acres and spatial distribution are shown below. The minimum mapping unit for the project area was 2.5 acre (or approximately 1 hectare) (Knight and Kunetta 2003).

Strata	Acres
Bottom Hardwood	11,870
Conifer	678
Hardwood	1,004
Total	13,552

*Note: sums may not total to 13,552 acres due to rounding.

Plot Number and Locations: A network of randomly selected permanent inventory plots were installed across the project area. Using the Random Point Generator tool in ArcGIS, a total 210 plots were sampled across the entire project area, placed at least 74.4 feet apart, ensuring no overlapping plot boundaries. The final 210 plots sampled were the number needed to reach <5.1% sampling error.

Monumentation: Permanent inventory plot centers were monumented with a rebar pole pounded into the ground and topped with a small rebar cap flush with the ground.

Sampling Method: Permanent, fixed-radius plots were established across the Wolf River property to facilitate precise tracking of individual tree growth and ease of verification. At each plot location, a fixed-radius plot was established to measure all trees greater than or equal to 5.0" in diameter at breast height (DBH); and a sub-plot was taken to capture live woody trees and saplings less than 5" (1.0 to 4.9" DBH). This plot design gave forest managers the opportunity to consistently track the growth and development

of specific trees over an extended timeline and will allow for improved ease of plot location during field work and site verifications.

The protocol defines trees as “A woody perennial plant, typically large and with a well-defined stem or stems carrying a more or less definite crown with the capacity to attain a minimum diameter at breast height of 5 inches and a minimum height of 15 feet with no branches within 3 feet from the ground at maturity.” As a result, inventory crew measured all species ≥ 1 ” DBH that met this definition. For all trees in the fixed-radius plot, species, status, DBH (to the nearest tenth of an inch), 4” top height (to the nearest foot or $\pm 5'$ for difficult to measure trees), phantom 4” top height (using nearby live trees of same species and DBH), and decay class (for snags) were measured. In the subplot, species and DBH were recorded for each eligible tree. Measurements for DBH and height of irregular trees used the methods outlined in the Forest Inventory and Analysis National Core Field Guide Version 7.1. Further specification for field measurements are provided in the Wolf River Carbon Plot Methodology document.

Statistical Standard: Mean volume estimates (e.g. above ground carbon per acre) for the ownership were reported with a minimum statistical precision of $\pm 5\%$ of the mean at the 95% confidence level. These objectives may be adjusted for more or less precision based on a property-specific analysis of data collection cost relative to return.

Data Collection Materials: Data was collected on hand held electronic data recorders. If data recorders were not available, field data was collected on paper tally sheets and manually entered into a computer for data analysis. All data sheets were scanned and sent to Blue Source.

Field personnel used the following equipment for obtaining forest-carbon inventory data: 75' or longer Logger's Tape designed to measure in 10ths of feet and 10ths of inches for diameter, clinometer capable of measuring height in feet and slope angle, laser rangefinder capable of measuring height to the nearest $\pm 1'$, as well as distance ($\pm 1'$), electronic data recorder (EDR), compass, GPS handheld unit (capable of 3 meter accuracy) with point locations, Distance Measuring Equipment (DME) or rangefinder, cover type maps and aerial Photographs, pencils and permanent marker, flagging, aluminum tree tags, aluminum nails (cannot contain iron as this may damage the tree), hammer, tube paint or spray paint for marking DBH measurement and tree number, rebar poles and caps for marking plot centers (.5 in diameter, 2 ft. length), species code list, paper tally sheets (in case EDR fails), overview and point location maps.

QA/QC Field Procedures: At least 5% of the plots were checked by a different forester than cruised the plot, specifically by someone senior to the field crew. This involved full plot measurement to identify any problems with determining in/out trees, species calls, defect measurements, DBH measurements, and height measurements. Any consistent height, species, DBH, or defect errors were resolved by talking with the foresters.

QA/QC Desk Procedures: The following QA/QC approach was designed to ensure that field data, once input, was appropriately managed and maintained, and that subsequent calculations using that data to determine onsite carbon stocks and associated ARBOC issuance were correctly implemented. A three-stage QA/QC process with a defined review group for the project was established, engaging both personnel intimately familiar with all project files and documentation, as well as independent reviewers were able to bring “fresh eyes” to key outputs.

Independent Forester Review: The project implementation team (Blue Source) has a team of foresters with intimate knowledge of the files, models and documents. The development of quantitative components, such as Access databases, FVS model runs and Excel workbooks, were led by one of these foresters. Prior to finalization, a second forester who did not lead development of that component was tasked with a QA/QC review including random examinations and data checks to identify and fix any errors.

Technical Review: Once quantitative outputs were finalized, exported from Access/FVS to Excel, and were ready to be transferred into the Offset Project Data Report (OPDR) and other project documents, an independent manager reviewed these outputs. This individual performed data checks by tracing key

outputs back from final ARBOC calculations through the chain of Excel documents to the underlying Access/FVS database.

Senior Management Review: Once outputs were transferred from Excel to the OPDR and other project documents, a senior manager reviews these documents and checks that all quantitative elements have been correctly exported from the underlying workbook. At this stage, the senior manager (or other individual not involved in document preparation) also reviewed text, grammar and formatting for presentation and accuracy.

Data Processing and Storage: Manually and electronically filed data are stored and archived. Backup copies of all electronically stored data are maintained in a separate data center with scheduled archiving to assure data protection. Future revisions to project documents after initial verification and registration will be clearly identified by saving them as separate files and including the date of revision in any modified documents. All data will be stored on Dropbox or similar online cloud storage service as well as on an external hard drive and kept by Blue Source for a minimum of 15 years.

IFM-1 Standing Live

For further information, please see the “Wolf River Carbon Plot Methodology” document’, provided separately for verification.

IFM-3 Standing Dead

For further information, please see the “Wolf River Carbon Plot Methodology” document’, provided separately for verification.

IFM-6 Soil (if applicable)

Excluded.

IFM-7 Carbon in in-use forest products

Carbon in in-use forest products was calculated based on harvest volume data. No specific inventory processes apply.

IFM-8 Forest product carbon in landfills

Forest product carbon in landfills was calculated based on harvest volume data. No specific inventory processes apply.

IFM- 9 Biological emissions from site preparation NA

IFM-14 Biological emissions/removals from change in harvesting on forestland outside the Project Area

Calculated using a default 20% “leakage” factor applied to the difference in harvest volume relative to baseline.

IFM-17 Biological emissions from decomposition of forest products

Biological emissions from decomposition of forest products will be calculated based on standing tree inventory data. No specific inventory processes apply. Biological emissions from decomposition of forest products will be quantified as a component of carbon stored in in-use forest products (IFM-7) and landfills (IFM-8). Please see the “Wolf River Carbon Plot Methodology” document’, provided separately for verification.

Monitoring Plan

Annual monitoring will be carried out to track changes in carbon stocks. The Project Owner will submit annual Offset Project Data Reports and undertake 6-year site verification for 100 years following ARBOC

issuance. Annual monitoring reports will contain inventory updates reflecting growth, harvest, and any significant disturbances.

The Project Area will be re-inventoried at least every 12 years. During re-inventory, a subset of the current 210 permanent plots, sufficient to maintain desired inventory confidence statistics, will be visited and re-measured. If it is calculated for future inventories that less than the full number of plots are needed to achieve the desired confidence statistics of $<5.1\%$, then randomly selected plots in the applicable strata will be excluded from future calculation and retired, ensuring no continually measured plots are older than 12 years. Similarly, if it is found that more plots are needed to achieve the desired confidence statistics, plot may be added into the inventory in a random design. Otherwise, if the re-inventory results in a sampling error of $\geq 5.1\%$, then the appropriate confidence deduction will be applied in accordance to the requirements of the COP. Inventories of select portions of the Project Area will be updated periodically in response to natural disturbance or significant forest management activities. Any plots that are subject to harvesting activities or significant disturbances will be reinventoried.

If plot monumentation cannot be found during a re-inventory, the plots will be re-monumented using the same procedures as the original monumentation at the same GPS location of the given plot.

Any updates to the inventory methodology will be approved in advance by a third-party verification body and by ARB, and documented in the project change log.

In addition to inventory sampling, management staff will monitor the general health and condition of the forest forest management activities (e.g. road maintenance, timber harvesting, boundary marking, etc.), typically conducted on primary accessroads and notable bridges/culverts annually.

Each year, the forest carbon inventory and documentation will be updated via the following process:

New forest inventory data obtained from scheduled sampling during the previous year will be incorporated.

Annual harvests will be carefully tracked based on timber sale data.

Inventory data will be updated to account for any significant natural disturbance (e.g. insect infestation, fire, destructive wind storm, etc.). A significant event is any singular event that impacts one or more of the plots, or impacts collectively 64.5 acres or more of the property (each plot represents ~64.5 acres, 210 plots/13,552 acres). If there is removal of $\geq 50\%$ of the standing stocks as a result of the disturbance across the affected area, then the disturbance will be considered a “significant event” and require a remeasurement or addition of plots.

In the event that 64.5 acres or more are impacted by a singular event, but no plots are impacted, a proportional number of plots will be installed so that the inventory reflects the impacts of the event (i.e. 1 plot per 64.5 acres). Plots will be placed using an approved random selection method in GIS such as the random point generator tool. If plots are impacted by a significant event, they will be remeasured and incorporated into the inventory statistics, and will thus be reflective of the event.

New inventory samples or harvest data, modeling growth, and disturbances using FVS or another approved growth will be incorporated. If new individual tree growth data is available from remeasured plots, this data will be used to calibrate the diameter increment model to the actual tree growth. If no growth data is available, or if the growth estimates seem unreasonable, all calibration parameters used in the baseline modeling will be applied to modeling the new inventory data.

Any necessary modification to spatial data based on strata boundary adjustments or other changes will be made.

Results will be incorporated in the annual OPDR.

Potential Diseases

Emerald ash borer (EAB), (*Sapreda vestita*), is currently the greatest concern of a future infestation that may impact the Wolf River property. ATP is cooperating with the State of Wisconsin in monitoring forests for signs of EAB. Other known insect and disease damage is limited to naturally occurring species at expected levels of occurrence, given current conditions. The important tree species found within the northern hardwood forests are not significantly affected by native insect or disease attack.

B. Describe the calculation methodologies used to determine metric tons per acre for each of the carbon pools included in the Offset Project Data Report.

IFM-1 Standing Live:

Gross and sound cubic foot volume was calculated using equations and coefficients developed by Hahn (1984), based on guidance from "Methods and Equations for Estimating Aboveground Volume, Biomass, and Carbon for Trees in the U.S. Forest Inventory", 2010. (Woodall, 2011).

Biomass was computed using the component ratio method and Jenkins coefficients following the procedures and equations outlined in "The Forest Inventory and Analysis Database: Database Description and Users Manual Version 4.0 for Phase 2," and as specifically described in Appendix J, Tables 1 through 4. As stated in the COP, biomass was converted into 0.5 to calculate the mass (kg) in carbon. This product was multiplied by 0.001 tons/kg to convert the mass to metric tons of carbon. Then, the product was multiplied by 3.664 to convert the metric tons of carbon into metric tons of CO₂e.

Projected Growth

The Lake States variant of the Forest Vegetation Simulator (Keyser 2010) was used to model forest growth, mortality and harvest over 100 years. All constraints on forest management found within the existing conservation easements and the Managed Forest Law, as well as all best management practices as set forth in the *Wisconsin's Forestry Best Management Practices for Water Quality* Field Manual (detailed below in section VIII.B.5), were modeled into the project and baseline scenarios. For further specification, please see the "Wolf River Modeling" document, provided separately for verification.

Site Index

Site index was determined by taking site index cores at every plot and sent to a tree core lab for analysis. North Central Research Station Forest Inventory & Analysis Site Index Curves Field Guide was used to determine the site index of every tree that had an estimated age. Annual productivity was determined based on the site indices and the NRCS soil data for the region. For further specification, please see the "Wolf River Modeling" document, provided separately for verification.

Silvicultural Methods

Below is a description of the silvicultural prescriptions used in the modeling. To determine the amount of additional regeneration after certain types of harvests, regeneration model input ratios from Nunery and Keeton 2010 were used ("Forest carbon storage in the northeastern United States: Net effects of harvesting frequency, post-harvest retention, and wood products", Table 4).

Strata	Prescription Description
Conifer Bog	Let grow with no harvesting
	Single-Tree Selection at 10-year intervals cut to appropriate basal area.
	Clearcut at 60-year intervals
Mixed Hardwoods	Let grow with no harvesting
	Single-Tree Selection at 10-year intervals cut to appropriate basal area

	Shelterwood harvest to appropriate basal area, overstory removal 5 years later, at basal area stocking trigger
Pine Plantations	Let grow with no harvesting
	Single-Tree Selection at 10-year intervals to appropriate basal area
	Clearcut and replant red pine at 60-year intervals

Adjustments for Start Date

To determine CO₂ stocks at the project commencement date, the tree data was grown backwards to 10/30/2015. Detail on how the data was grown can be found in the “Wolf River Modeling” document, provided separately for verification.

Adjustments for Reporting Period Calculations

To determine CO₂ stocks at the end of the reporting period, the initial inventory was assumed to be reflective of the end of reporting period stocks. This is because the inventory was completed 1 month prior to the end of reporting period (and during leaf-off), so the inventory is fully reflective of all growth and harvesting that occurred during this period.

Belowground Live/Dead

The belowground portion of live and dead trees is calculated using the component ratio method (“CRM”) described in Appendix J of the Forest Inventory and Analysis (FIA) documentation cited in the COP.

IFM-3 Standing Dead:

Standing dead wood carbon CO₂ is calculated by estimating above and below ground biomass in the same manner it was for live trees (using appropriate volume equations and using the component ratio method and Jenkins coefficients), but then adjusting for defect and decay by applying the Domke et al. 2011² structural loss factors, and the Harmon et al. 2011³ density decay coefficients, before finally converting to CO₂e.

The estimates of standing dead wood are calculated on a per acre basis for each stratum. A project-wide estimate of standing dead wood is calculated using a weighted average with weights assigned based on stratum size.

Estimates of standing dead will be updated in the project scenario every time new inventory data is collected. For the baseline, standing dead is projected to remain constant over the 100-year baseline at 0.97 tonnes CO₂e per acre.

IFM-6 Soil (if applicable): NA

IFM-7 Carbon in in-use forest products:

Carbon in in-use forest products was calculated using actual harvest volumes, following the steps in Appendix C.3 of the COP. Calculations have been provided separately for verification purposes.

A default regional value was used for mill efficiency and product mix based on weighted average of relative acreage.

IFM-8 Forest product carbon in landfills (if applicable):

² Domke GM, Woodall CW, Smith JE. 2011. Accounting for density reduction and structural loss in standing dead trees: implications for forest biomass and carbon stock estimates in the United States. Carbon Balance Manage 6:1–11.

³ Harmon, M.E., C.W. Woodall, B. Fasth, J. Sexton, and M. Yatkov. 2011. Differences between standing and downed dead tree wood density reduction factors: A comparison across decay classes and tree species. Research Paper NRS-15. Newtown Square, PA: U.S. Department of Agriculture, Forest Service.

Forest product carbon in landfills is calculated in accordance with the procedures described in Appendix C of the Forest Protocol.

IFM- 9 Biological emissions from site preparation: NA

IFM-14 Biological emissions/removals from change in harvesting on forestland outside the Project Area:

Calculated using a default 20% "leakage" factor applied to the difference in harvest volume relative to baseline.

IFM-17 Biological emissions from decomposition of forest products:

Biological emissions from decomposition of forest products was quantified as a component of carbon stored in in-use forest products (IFM-7) and landfills (IFM-8).

C. Provide a summary of the inventory of carbon stocks for each carbon pool (or approach used, if inventory is not applicable).

IFM-1 Standing Live:

	Average tCO2e/acre	Total tCO2e
Start Date	103.61	1,404,218
End of Reporting Period	106.47	1,442,866

IFM-3 Standing Dead:

	Average tCO2e/acre	Total tCO2e
Start Date	0.98	13,289
End of Reporting Period	0.98	13,289

IFM-6 Soil (if applicable): NA

IFM-7 Carbon in in-use forest products:

End of Reporting Period Long-term storage in in-use wood products (tCO2e)						
Units	Lumber	Plywood	Oriented Strandboard	Non-Structural Panels	Miscellaneous Products	Paper
Hardwood	136	-	1,849	36	74	-
Softwood	-	-	1	-	-	-

IFM-8 Forest product carbon in landfills (if applicable):

End of Reporting Period Long-term storage in wood products in landfills (tCO2e)						
Units	Lumber	Plywood	Oriented Strandboard	Non-Structural Panels	Miscellaneous Products	Paper
Hardwood	225	-	740	32	192	-
Softwood	-	-	-	-	-	-

IFM- 9 Biological emissions from site preparation: NA

IFM-14 Biological emissions/removals from change in harvesting on forestland outside the Project Area:
Calculated using a default 20% “leakage” factor applied to the difference in harvest volume relative to baseline.

IFM-17 Biological emissions from decomposition of forest products: NA

Actual Harvested Wood Products Summary	Total (tCO₂e)	tCO₂e / acre
Actual Carbon in Harvested Wood Delivered to Mill	6,351	0.47
Actual Carbon in Trees Harvested for Wood Products	12,293	0.91
Actual Carbon Stored Long-term in Wood Products - Excluding Landfill	2,096	0.15
Actual Carbon Stored Long-term in Wood Products - Landfill	1,191	0.09
Actual Carbon Stored Long-term in Wood Products - Including Landfill	3,287	0.24

D. Inventory Confidence Statistics

Total	n	Stratified Standard Error	Bound	Sampling Error
1,456,155	210	37,600	61,853	4.2%

The inventory sampling error at the end of the reporting period is calculated as follows:

- 1) $37,600 \times 1.645 = 61,853$
- 2) $(61,853 / 1,456,155) \times 100 = 4.2\%$

The sampling error at the end of the reporting period of 4.2% is below 5.1%, so no confidence deduction should be applied to the inventory results.

E. Reversal Risk Rating

Reversal Risk Rating was calculated using the following formula:

$$\begin{aligned} \text{Reversal Risk} &= 100\% - (1 - \text{Financial Failure}\%) \times (1 - \text{Illegal Forest Biomass Removal}\%) \times (1 - \text{Conversion}\%) \times (1 - \text{Over Harvesting}\%) \\ &\times (1 - \text{Social Risk}\%) \times (1 - \text{Wildfire}\%) \times (1 - \text{Disease/Insect Outbreak}\%) \times (1 - \text{Other Catastrophic Events}\%) \\ &= (1 - .05) \times (1 - 0.0) \times (1 - 0.02) \times (1 - 0.02) \times (1 - 0.02) \times (1 - (.04 \times 0.826)) \times (1 - 0.03) \times (1 - 0.03) \\ &= 18.65\% \end{aligned}$$

Buffer Pool Contribution: $588,728 \text{ net ARBOCs} \times 0.1865 = 109,798 \text{ ARBOCs}$ contributed to the Forest Buffer Account. The default rating for wildlife risk was not used as it was determined that the project employed low levels of fire risk reduction, based on the rationale below.

Fire Risk Reduction

The Wolf River ATP, LP property in Langlade County, Wisconsin is dominated by the northern hardwood cover type with approximately 70% of the acreage covered by northern hardwood stands. The northern hardwood cover type is very resilient to fire. This resistance to fire is due to the mesic nature of the northern hardwood cover type and the ground litter associated with it typically being damp. Most fires that affect the northern hardwood type often originate in adjacent cover types that are more prone to wildfire such as conifer forests or grasslands. The vast majority of cover types surrounding the Wolf River property consists of northern hardwood. Continual forest management of the property has also and will continue to remove areas of wind throw that if left could provide fuel for potential fires.

Along with the fire resistance of the northern hardwood type there is a vast road and trail network that creates firebreaks and allows for access and suppression of any actual fires on the Wolf River ATP, LP property.

Part VIII. Offset Project Baseline

1. The aboveground Common Practice (CP) value is 52.1 mtCO₂e/acre with a live value of 62.35 mtCO₂e/acre. The project's ICS live carbon stocks of 103.6 mtCO₂e/acre is above the CP value.

Supersection	Assessment Area	Site Class	CP	Acres
Laurentian Mixed Forest Green Bay Lobe	Northern Hardwoods	Low	72	646
	Pine-Oak-Hickory	High	91	7
Laurentian Mixed Forest Northern Highlands	Conifer Bog	All	32	409
	Northern Hardwoods	Low	51	12,229
	Mixed Pine-Oak	High	73	263
Weighted Average/ Total			52.12	13,552

*Sub-totals may not sum to 100% due to rounding.

Summary of Applicable Baseline Carbon Pools

Carbon Pool	Total tCO ₂ e	mtCO ₂ e / acre
IFM-1 Standing Live:	845,030	62.35
IFM-3 Standing Dead:	13,289	0.98
IFM-7: Long-term storage in in-use wood products	5,081	0.37
IFM-8: Long-term storage in wood products in landfills	3,728	0.28

2. If the Forest Project's initial standing live carbon stocks are below Common Practice, a determination of the "High Stocking Reference" for the Project Area.

Because the project's initial standing live carbon stocks are above common practice, this section is non-applicable.

3. **Baseline Modeling**

Please see document, "Wolf River Modeling", provided separately for verification.

4. **Harvest Planning**

- a. Is harvesting planned in the Project Area? Yes
- b. Optional: Does the project use a harvest schedule model? No.

5. Provide an estimate of carbon that was stored long-term in harvested wood products in the baseline.

End of Reporting Period Long-term storage in wood products in in-use wood products (tCO ₂ e)						
Units	Lumber	Plywood	Oriented Strandboard	Non-Structural Panels	Miscellaneous Products	Paper
Hardwood	961	-	3,509	252	141	-
Softwood	97	3	72	44	3	-

End of Reporting Period Long-term storage in wood products in landfills (tCO2e)						
Units	Lumber	Plywood	Oriented Strandboard	Non-Structural Panels	Miscellaneous Products	Paper
Hardwood	1,591	-	1,405	228	364	-
Softwood	62	2	29	40	7	-

Baseline Wood Products Summary	Total (tCO2e)	tCO2e / acre
Baseline Carbon in Harvested Wood Delivered to Mill	18,470	1.36
Baseline Carbon in Trees Harvested for Wood Products	35,750	2.64
Baseline Carbon Stored Long-term in Wood Products - Excluding Landfill	5,081	0.37
Baseline Carbon Stored Long-term storage in wood products in landfills	3,728	0.28
Baseline Carbon Stored Long-term in Wood Products - Including Landfill	8,808	0.65

Secondary Effects

The equation below outlines the process by which secondary effects are calculated for IFM projects:

$$\text{If } \sum_{n=1}^y (AC_{hv,n} - BC_{hv,n}) < 0, \text{ then } SE_y = (AC_{hv,y} - BC_{hv,y}) \times 20\%$$

SE_y = Estimated annual Secondary Effect (used in Equation 6.1).

AC_{hv,n} = Actual amount of onsite carbon harvested in reporting period n (prior to delivery to a mill), expressed in CO₂-equivalent tons.

BC_{hv,n} = Estimated average baseline amount of onsite carbon harvested in reporting period n (prior to delivery to a mill), expressed in CO₂-equivalent tons, as determined in Step 1 of Section 6.2.3.

Y = The current year or reporting period.

In the case of the Wolf River IFM project, this equation is calculated as follows:

$$= (12,293 - 35,750) \times 0.2 = -4,691$$

Secondary Effects Inputs	Tonnes CO2e
Actual Carbon in Trees Harvested for Wood Products	12,293
Baseline Carbon in Trees Harvested for Wood Products	35,750
Difference Between Actual and Baseline Carbon in Trees Harvested for Wood Products	-23,457
Secondary Effects Emissions	-4,691

Total Net GHG reductions and GHG removal enhancements (QRy) For the Reporting Period

This final calculation for the project reporting period is carried out in the *Wolf River ARBOC Calculation Worksheet* (provided separately for verification purposes) and summarized below.

Summary	Tonnes CO2e
ARBOCs Issued	588,728
Buffer Pool Contributions	109,798
Annual ARBOCs Issued to Account Holder	478,930

6. **Provide a projection of baseline and actual harvesting volumes from the Project Area over 100 years.**
Please see Attachment H.
7. **Baseline Modeling**
Please see provided proprietary document, "Wolf River Modeling."
8. **Provide a description of any and all legal constraints affecting forest management activities in the Project Area. Include documentation of legal constraints and a description of each constraint (referring to Section 6.2.1.2); for each constraint provide a narrative that constraint has on forest management.**
Please see Attachment I below.
9. **Provide a description of the modeling techniques used to simulate the effect of any constraints on carbon stocks.**
Please see provided proprietary document, "Wolf River Modeling."
10. **The OPO will demonstrate financial feasibility of the growth and harvesting regime assumed for the baseline by conducting a financial analysis of the anticipated growth and harvesting regime that captures all relevant costs and returns, taking into consideration all legal, physical, and biological constraints, using regional norms or documented costs and returns for the Project Area or other properties in the Forest Project's Assessment Area.** Please see Attachment J.

Part IX. Other Offset Programs

- A. **Have any GHG reductions or GHG removal enhancements associated with the Project Lands have ever been listed or registered with, or otherwise claimed by, another registry or program, or sold to a third party prior to listing?** No
- B. **Have any lands within the Project Area ever been listed or registered with an offset project registry or program in the past?** No
- C. **Have greenhouse gas emission reductions or removal enhancements associated with lands within the Project Area been credited or claimed for the purpose of greenhouse gas mitigation or reduction goals, whether in a voluntary or regulatory context?** No.

Part X. Attachments

- A. **If the answer to Part IV.1. is "yes," provide documentation (e.g., deed of trust, title report, etc.) showing the OPO's A. ownership interest in the property and its interest in the trees and standing timber on the property. If the answer to Part IV.A is "no," provide documentation supporting the explanation of the OPO's right to undertake and list the project.**
Please see corresponding folder provided, entitled Attachment A- Wolf River Deeds, provided separately for verification purposes.
- B. **If the answer to Part VI.4. is "public," provide documentation demonstrating explicit approval of the offset project's management activities and baseline including any public vetting processes necessary to evaluate management and policy decisions concerning the offset project.** NA

- C. If a Qualified Conservation Easement (QCE) has been recorded, provide a copy. The information contained in this form and the documents attached to it was submitted to ARB so submitting a copy of the QCE as an attachment to this document fulfills the requirement in 9.1.1.1(18)(a) of the Compliance Offset Protocol U.S. Forest Projects, November 14, 2014 to provide ARB with a copy. NA
- D. If the project is located on one of the categories of Tribal land listed in Part IV.E, provide documentation demonstrating that the land within the Project Area is owned by a tribe or private entity. Also provide documentation that demonstrates the existence of a limited waiver of sovereign immunity between ARB and the governing body of the Tribe entered into pursuant to section 95975(l) of the Cap-and-Trade Regulation. NA

Part X. Attachments

Attachment A: Forest Owner

Please see corresponding folder containing all deed, provided separately for verification purposes.

Attachment B: Public Projects

NA

Attachment C: Qualified Conservation Easement

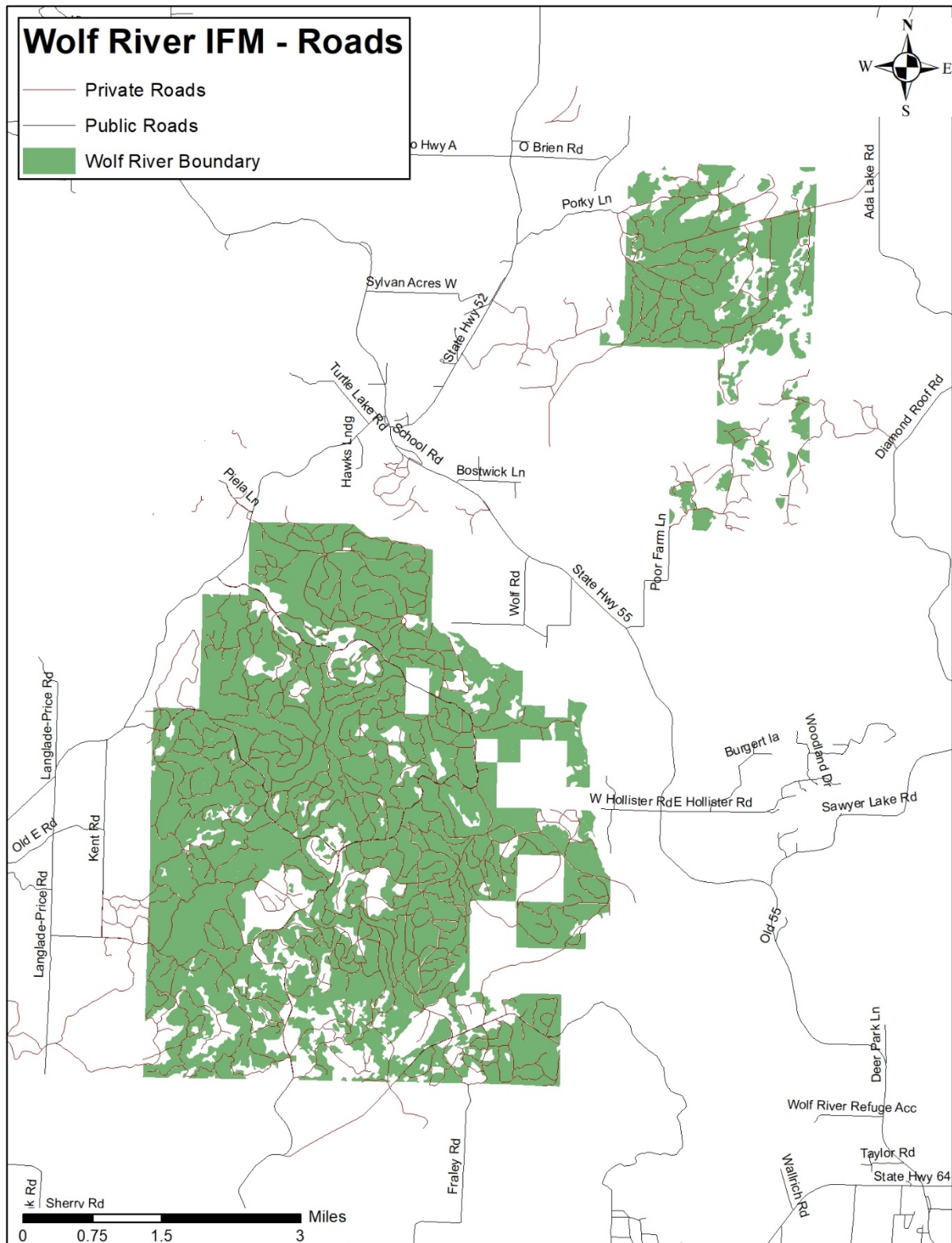
NA

Attachment D: Tribal Projects

NA

Attachment E: Project Maps

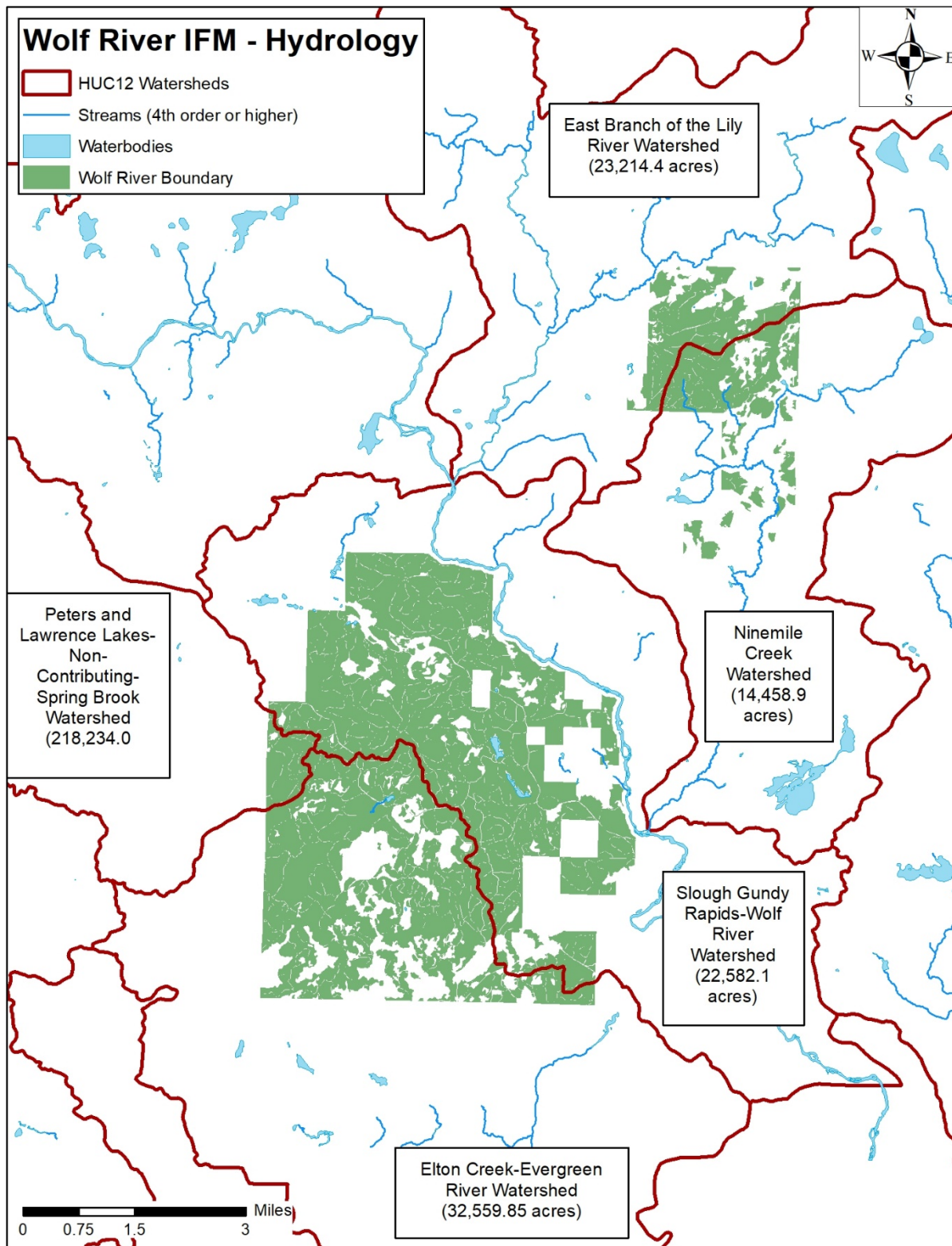
1. Governing jurisdictions, and latitude/longitude coordinates



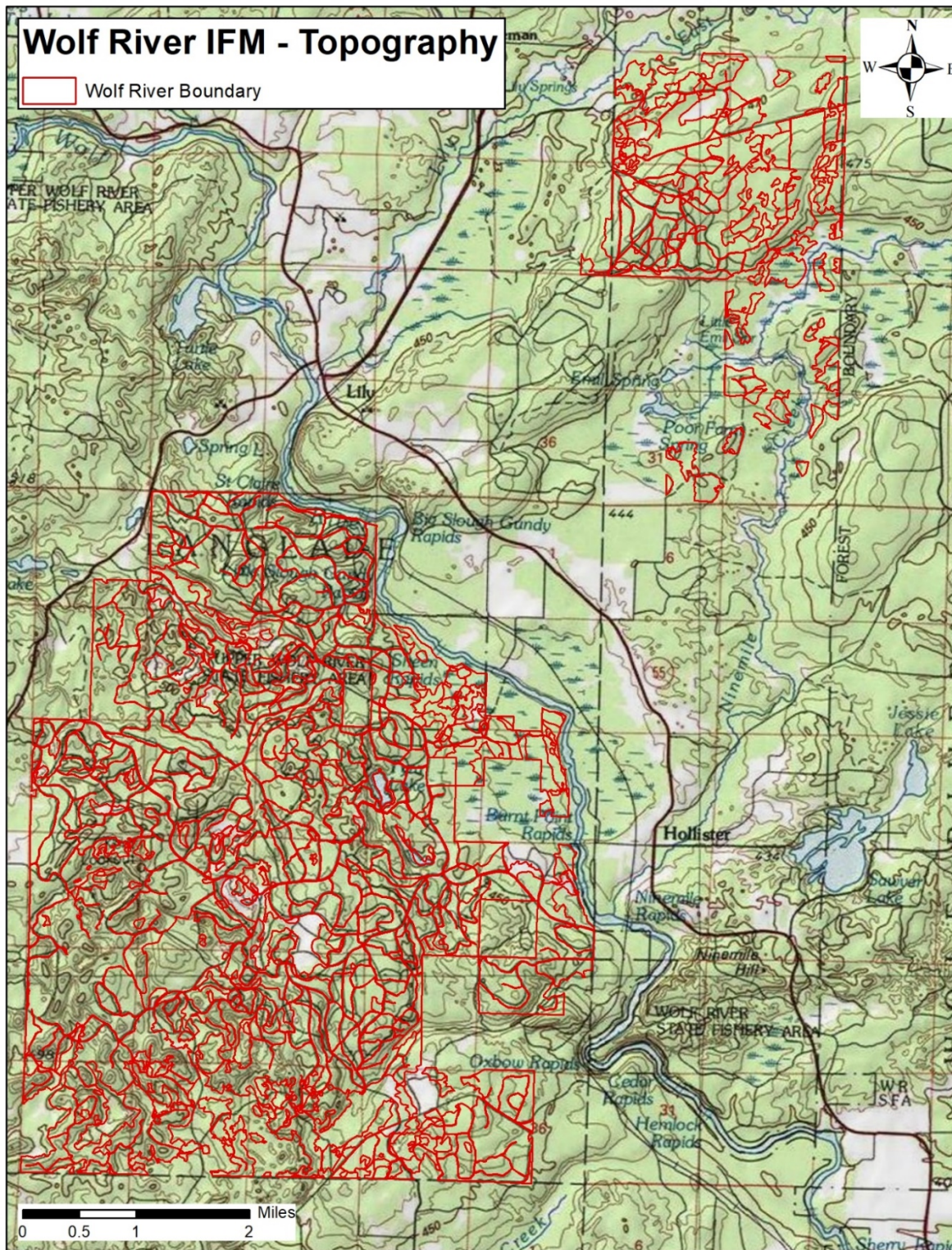
3. Towns (map)

For towns, please see map 1.

4. Major watercourses (4th order or greater), water bodies, and watershed description (map)



5. Topography (map)



6. Townships, ranges, and sections or latitude and longitude (map)

For latitude and longitude, please see map 1.

7. Georeferenced shape file

Please see provided georeferenced shapefile.

8. Project Strata

Wolf River IFM - Stratification

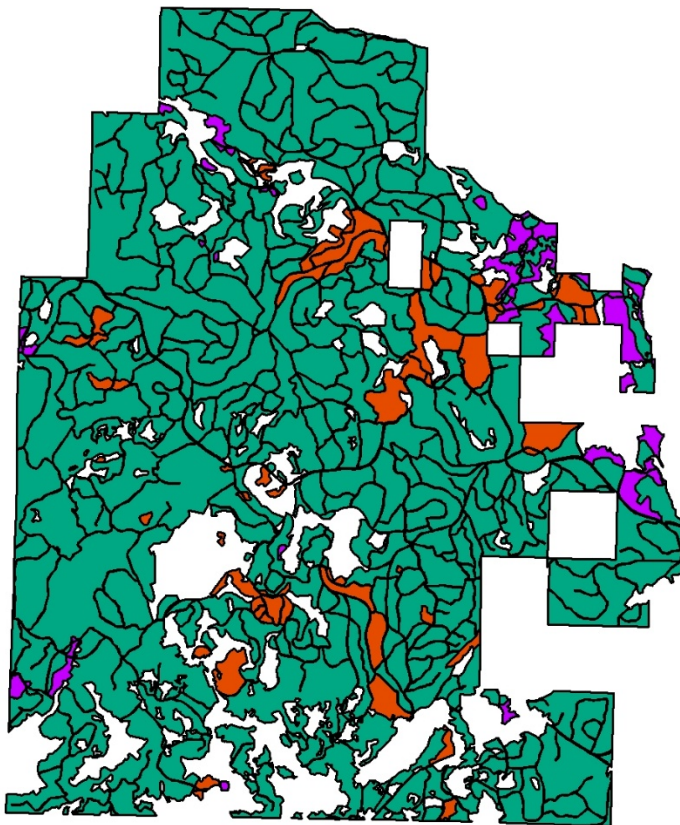
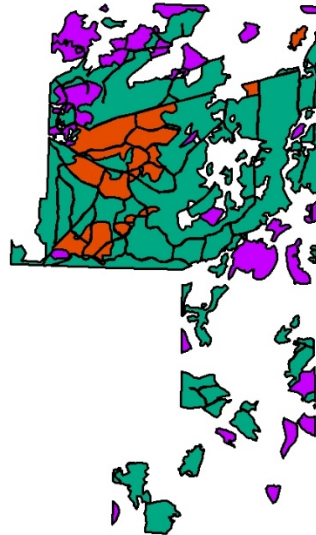
 Wolf River Boundary

Wolf River Strata

 BottomHwd

 Conifer

 Hwd



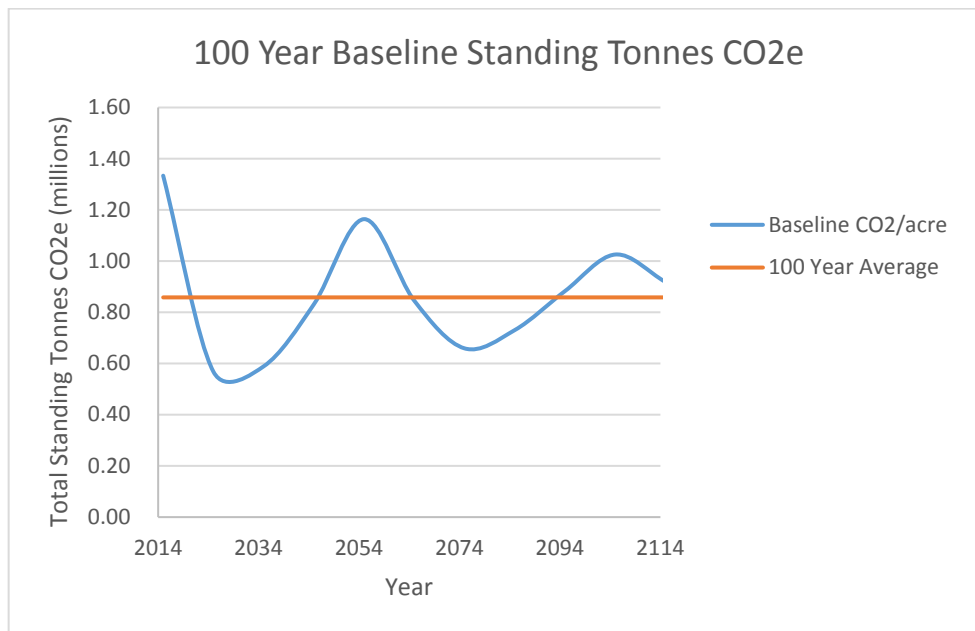
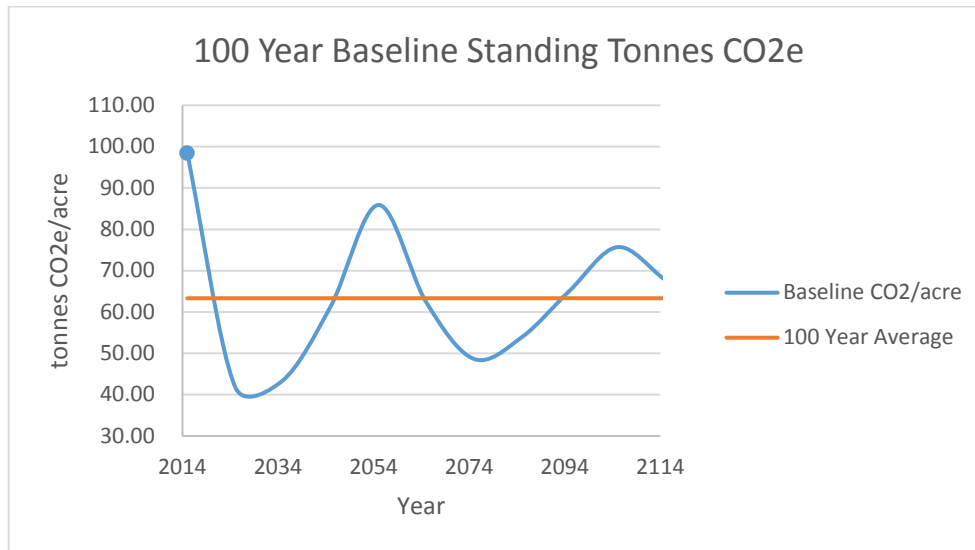
 Miles
0 0.75 1.5 3

Attachment F: Canopy Cover

As evident by recent aerial imagery, the Project Area contains greater than 10% canopy cover.

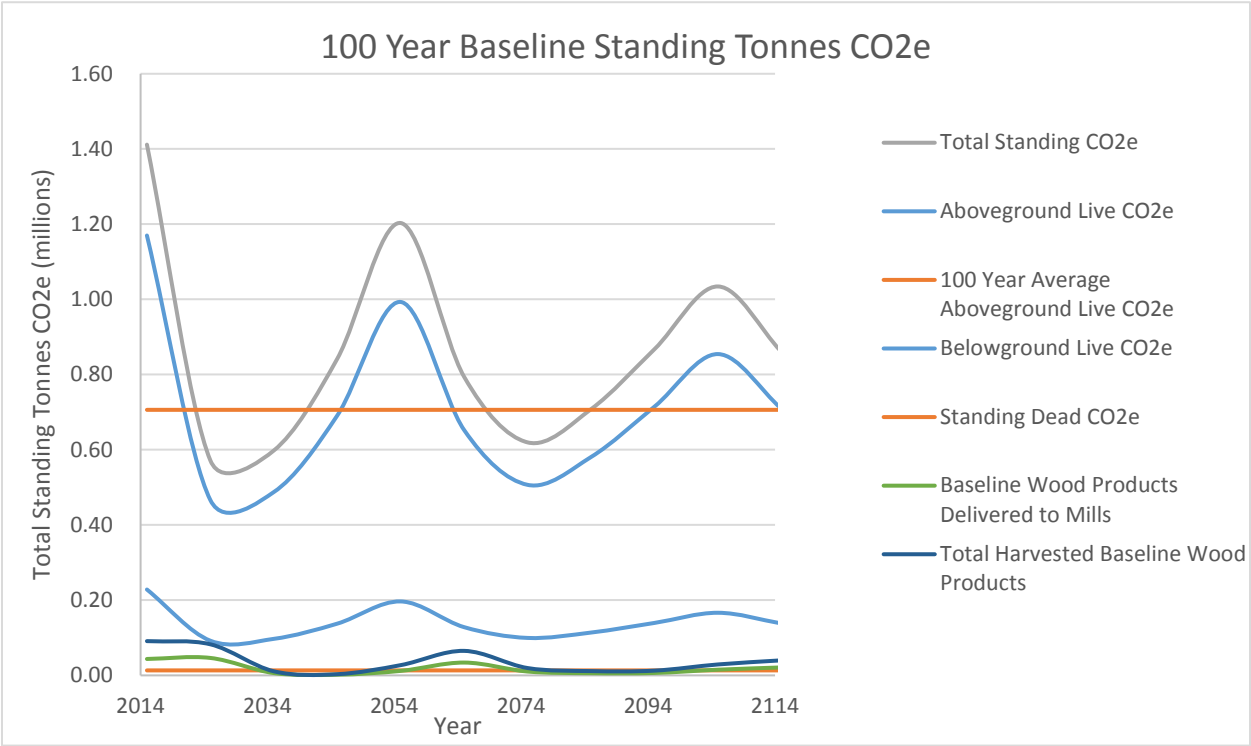


Attachment G: 100-year Baseline

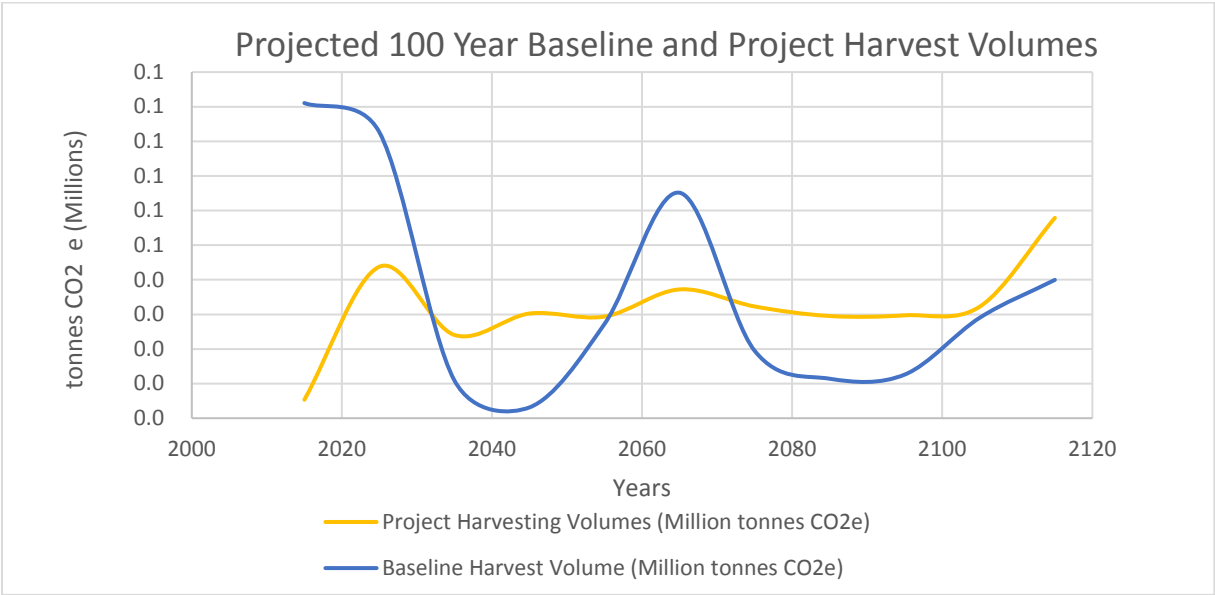


The graphs above reflect the growth of baseline onsite carbon stocks over time compounded with ongoing harvesting within the Project Area over 100 years. The baseline harvest scenario starts with an onsite carbon stock of 1,417,507 tonnes CO₂e and has a 100-year average of 858,318 tonnes CO₂e. Afterwards, baseline onsite carbon stocks fluctuate as additional harvesting cycles go into effect. The below graph shows these values per acre.

Attachment H: Baseline Onsite Carbon Stocks



The graph above represents the baseline harvesting scenarios for all carbon pools, including baseline harvest volumes. For a detailed description of the harvesting scenarios in the baseline, please see document “Wolf River Modeling”, provided separately for verification.



The graph above represents the baseline and project harvesting scenarios.

Attachment I: Legal Constraints

In Wisconsin, Forestry Best Management Practices (BMPs) for timber operations as set forth by "Wisconsin's Forestry Best Management Practices for Water Quality Field Manual" (Forestry Publication #93 2010) are mandatory if a private landowner participates in the Managed Forest Law Program (MFL). As such, all BMPs are considered legal constraints and have been modeled into the baseline prescriptions. The following outlines all harvest regulations and whether they affect the baseline:

Wisconsin BMPs:

o Baseline constraints:

- The recommended riparian management zone widths for lakes and streams are:

RMZ Width	Applies to:
RMZ = 100 feet	Lakes, Trout Streams, Streams 3ft wide+
RMZ = 35 feet	Streams less than 3ft wide
RMZ = 35 feet	Streams less than 1ft wide

- Harvest intervals at a minimum of 10 years on large and medium sized streams
- Minimum basal area per acre (60 sqft) on trees 5" DBH and larger, evenly distributed
- Use selection harvests and promote long lived tree species appropriate to the site

o Not constraining the baseline:

- 35-foot dry wash buffer utilizing only selection harvests or patch clear-cuts with a maximum of 50% (not applicable since there are no dry washes on Wolf River)
- No harvest of fine woody material within 50 feet of ordinary high-water mark (not applicable because this type of harvesting is not modeled in Wolf River IFM)

Additional Managed Forest Law Restrictions:

The MFL defines managed forest land as "Capable of producing 20 cubic feet of merchantable timber per acre per year", which means land determined capable of such production according to normal yield tables published by the North Central Forest Experiment Station and the Lake States Forest Experiment Station and meeting one of the following size and minimum density classifications (table available in NR 46.15, Definitions (2)). MFL requires that there are at least 200 living stems per acre six years after regeneration harvests. The modeled baseline is constrained such that post-harvest growth meets these size and minimum density classifications within five years after harvest.

Conservation Easement:

The property is encumbered by a working forest conservation easement with the State of WI. Mandatory forest management provisions include the requirement that management activities be supervised by a professional forester, that silvicultural standards shall comply with generally accepted and approved by the professional forestry community, and that all forest management activities comply with WI's FCL/MFL, described above.

Rare, Threatened or Endangered Species:

Finally, to confirm whether there are Rare, Threatened, or Endangered (RTE) species on the property, which would be subject to the Endangered Species Act (ESA), Bluesource contacted the Wisconsin DNR to perform an Endangered Resources Review of the project area to see if there is any known presence of RTE species that would impact baseline modeling. The email and corresponding report from WI DNR has been provided separately for verification. The report noted there should be a 330' no cut buffer around one bald eagle nest in the mixed hardwoods stratum, which works out to a total of ~8 acres. The report noted that for other species, there would only be harvest timing restrictions that would require winter harvesting only, but since winter harvesting goes on all winter across the property, this would in no way impact the baseline harvesting. As a result, we can be assured that there are no other RTE species that would impact baseline modeling.

These provisions ensure that the property will remain in a forested state and that timber removals will comply with MFL requirements. All constraints were modelled into FVS. For further detail on how each restriction was considered in the baseline see the “Wolf_River_Modeling.docx” provided separately for verification.

Attachment J: Financial Feasibility

A financial analysis (Forest Protocol section 6.2.1.3, option 1) of the baseline growth and harvest regime reveals that the activities represented in baseline scenario are clearly feasible.

Part XI. Attestations and OPO Signature

I certify under penalty of perjury under the laws of the State of California the GHG reductions and/or GHG removal enhancements for Blue Source-Wolf River Improved Forest Management Project from 10/30/2015 to 10/29/2040 will be measured in accordance with the Compliance Offset Protocol U.S. Forest Projects, November 14, 2014, and all information required to be submitted to ARB is true, accurate, and complete.

Initial: *RW*

I understand I am voluntarily participating in the California Greenhouse Gas Cap-and-Trade Program under title 17, article 5, and by doing so, I am now subject to all regulatory requirements and enforcement mechanisms of this program and subject myself to the jurisdiction of California as the exclusive venue to resolve any and all disputes arising from the enforcement of provisions in this article.

Initial: *RW*

I understand that the offset project activity and implementation of the offset project must be in accordance with all applicable local, regional, and national environmental and health and safety laws and regulations that apply to the offset project location. I understand that offset projects are not eligible to receive ARB or registry offset credits for GHG reductions and GHG removal enhancements that are not in compliance with the requirements of the cap-and-trade program.

Initial: *RW*

In signing this form, I certify under penalty of perjury of the laws of California that the information contained in this form is true, accurate, and complete. I further certify that I am an Account Representative of the Offset Project Operator (OPO).

Signature: *Roger Williams*

Printed Name: Roger Williams

Title: President, Blue Source LLC

Date: 10/25/2017