



UpStream

Forestry Carbon & LCA Tool

ARC 2021-22 UpStream Development Charter

Project: Continuation of 20-21 Draft title: Biogenic carbon accounting method for upstream forest & end-of-life: A regional approach

Project Dates: 09.29.2021 – 06.10.2022

Firm Advisors: Continuation of 20-21 (Marty Brennan and Jacob Dunn)

Faculty: Continuation of 20-21 (Tomás Méndez Echenagucia and Indroneil Ganguly)

Student researcher: Chuou Zhang – University of Washington

Project Vision

To improve carbon accounting transparency of wood products with immediate impacts to design, procurement, construction, disassembly and end-of-life scenarios.

Project description:

In last year's research, the team designed the UpStream Carbon & LCA Tool to integrate different forest management practices and various wood product end-of-life scenarios into building-focused life cycle assessment. In the 2021-22 academic year, the goal is to refine the original spreadsheet tool and identify three development phases:

1. Module A1 - Specify forest harvest operation scenarios and transportation factors in the raw material supply stage
2. Module C to D - Research wood end-of-life scenarios around landfill distribution, recycling process, and salvage.
3. Module A0 - Validate forest data and methodology

The team's proposal has been accepted for incubation with the Carbon Leadership Forum to advance research collaboration and methodology review.

Key Stakeholders

ZGF Architects is working in collaboration with the University of Washington's Applied Research Consortium (ARC) program to develop the tool and its underlying methodology. The Carbon Leadership Forum (CLF) has provided early input on the tool's LCA methodology and will be engaged throughout its future development. Ecotrust has provided the first forest carbon factors based on previous and ongoing

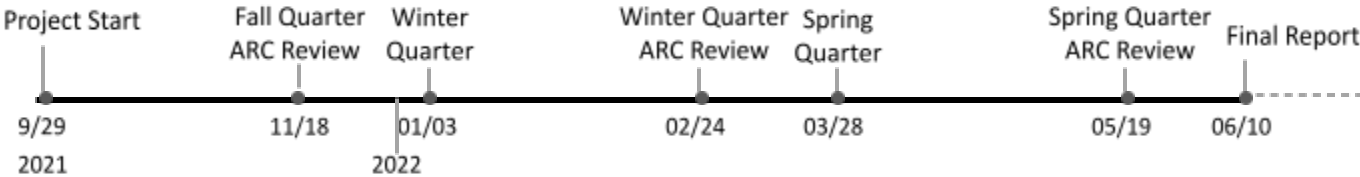
research which can be used in the tool alongside other forest factors as they get developed by other entities.

Tool Development Plan

Advisors & Researchers	Schedule	Description & Deliverables
<p>ZGF Indroneil Ganguly Francesca Pierobon</p>	<p>09.29.2021 – 12.17.2021 25 hours/week (15 hours at ZGF 10 hours at UW)</p>	<p>A1-A4 Forest Harvest, Manufacturing, and Transportation Impacts Research</p> <ul style="list-style-type: none"> o Module A1: develop factors for different harvest intensities o Develop transportation distance factors from harvest site to sawmill, sawmill to CLT and Glulam facilities (A2), and manufacture facilities to site (A4). o Extract CLT and glue-laminated lumber production impacts factors o Document factors and input to spreadsheet o Disaggregate the above impacts from Module A1-4 in the industry-wide EPD
<p>ZGF Tomas Mendez Echenagucia Indroneil Ganguly Christina Bjarvin</p>	<p>01.03.2022 – 03.18.2022 25 hours/week (15 hours at ZGF 10 hours at UW)</p>	<p>End-of-life research (TBD)</p> <ul style="list-style-type: none"> o Research EOL distribution scenarios to create guidance for UpStream input <ul style="list-style-type: none"> o Conduct interviews with structural engineers on reuse suggestions o Document other tools EOL o Document landfill for state-level wood disposal scenarios o UpStream Features development around custom EOL <ul style="list-style-type: none"> o State-specific energy production o Decomposition rate sensitivity input o Document emission assumptions for landfill decompose process o Species-specific biogenic carbon storage o Collaborate with Christina Bjarvin’s research on LCA end-of-life of CLT o CLF incubation collaboration to identify existing EOL research and data gaps

<p>ZGF Indroneil Ganguly Francesca Pierobon</p>	<p>03.28.2022 – 06.10.2022 25 hours/week (15 hours at ZGF 10 hours at UW)</p>	<p>A0 Forest research (TBD)</p> <ul style="list-style-type: none"> o CLF Incubation collaboration to evaluate existing A0 sources (Ecotrust, FSC, SFI, etc.) <ul style="list-style-type: none"> o Document forest factors and pros and cons of different analysis scenarios o Propose alternate approach for forestry carbon/ sustainability matrix
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Milestones



Research Methods:

Interviews and Case studies: The research will investigate current CLT facilities and study current manufacturing practices in both the industry and supplier-specific scale. Conducting interviews with structural engineering to document professional objectives around wood reuse and salvage wood product application.