

# Background and Objectives for the Greenhouse Gas (GHG) Inventory for Natural and Working Lands in Oregon

## Goal

The goal of this task is to create a methodology for a greenhouse gas (GHG) inventory for Oregon's natural and working lands (i.e., NWL inventory) that provides estimates of carbon stocks, net carbon sequestration, and GHG flux.

The methodology proposal will include three options for creating a NWL inventory, consistent with IPCC GHG Inventory guidance and Tiers. The options will range from more basic, using simple and general methods (Tier 1) to more complex, using state-specific and regionally specific data on carbon stocks, GHG flux, and land change (Tier 3). The proposed Tiers differ with respect to the uncertainty, with Tier 1 methods typically having larger uncertainties than Tier 3.

## Key Definitions

1. "Greenhouse gas fluxes" represents the total assemblage of climate gases, translated into CO<sub>2</sub> equivalents (CO<sub>2</sub>E).
2. Ecosystem carbon stock is the total carbon in a given volume. For our accounting purposes, the ecosystem carbon stock includes five carbon pools – 1) soil carbon (organic and inorganic), 2) dead wood, 3) litter, 4) below-ground biomass, and 5) above-ground biomass.
3. Ecosystem fluxes are a measure of climate gasses passing through a surface (i.e., soil, water, vegetation, etc.) in a given amount of time, represented as (CO<sub>2</sub>E). Harvested wood products and flux between organic soil carbon and mineral soil carbon pools are separate from the 5 standard ecosystem carbon stocks reported and would be included in the methodology, if possible.

## Assumptions based on the OGWC and Funded Proposal Requirements

The methodology developed will:

- Be compatible with national, and international methods for tracking these changes, and if possible adjacent states.
- Be developed by classifying Oregon's natural and working lands into seven categories, of which 5 will be included in the initial inventory. The data used to create these land category maps would allow for change detection (e.g., transition from one land category to another) and aid in estimation of carbon stocks and fluxes. These land use/land cover categories include:
  1. Forests and Woodlands (IPCC i)
  2. Cultivated Farmlands (i.e., annual crops, perennials, orchards, nurseries, vineyards, improved, planted pastures; IPCC ii)
  3. Rangelands (i.e., native or introduced shrublands, grasslands, hayed native meadows, and wet meadows; IPCC iii. Grasslands)
  4. Urban and Suburban Areas (IPPC v. Settlements and developed areas), and
  5. Blue Carbon (tidal wetlands/estuaries, intertidal and near-shore marine landscapes).

These categories may be further segmented into subcategories to facilitate measurement or change detection. The sixth type (Freshwater or IPCC iv. Wetlands) represents lakes, streams

and freshwater wetlands and will be addressed in future work. The last type, IPCC vi. Other land, in Oregon represents snow and ice, bare rock (unvegetated lava flows active temporary mines and gravel pits), would be addressed in the landscapes in which they occur.

## Methodology Objectives

The inventory should:

- Establish a spatially explicit baseline for carbon stocks, emissions, and net sequestration on NWL. Decisions related to spatial resolution, which emissions are part of the baseline, and what are the current rates of net sequestration on the different working lands will be different in each of the proposed Tiers.
- Allow the state to track changes in carbon stocks and emissions through time. To do this, it will need to be temporally explicit and updatable, meaning it will need to use datasets that are consistently updatable on a regular basis, allow continual improvements as new data becomes available, and quantify GHGs changes. Decisions on the frequency of the updates and reporting (either year-to-year change vs. two, three, or five-year averages) need to be determined and are likely going to vary by Tier.
- Track the impact of management interventions and disturbances on emissions through time (e.g., attribute changes in emissions to various causes). The numbers of these that can be tracked will likely vary by Tier and by land use category.