What are Natural Climate Solutions?

The Global Bathtub of Greenhouse Gases

Imagine the world in a bathtub filling with greenhouse gases from the burning of fossil fuels (depicted as the faucet in Figure 1). As the level of carbon rises in the bathtub, so do the impacts of climate change, like rising temperatures and worsening fires, floods, droughts, and storms.

Natural and working lands remove carbon from the atmosphere (the bathtub water) through various earth system processes, which mitigate climate change and climate change impacts while also delivering essential ecosystem services that society relies on. Actions that meet climate mitigation and adaptation aims, like protecting land, restoring land, and implementing improved land management practices, are called natural climate solutions (NCS).

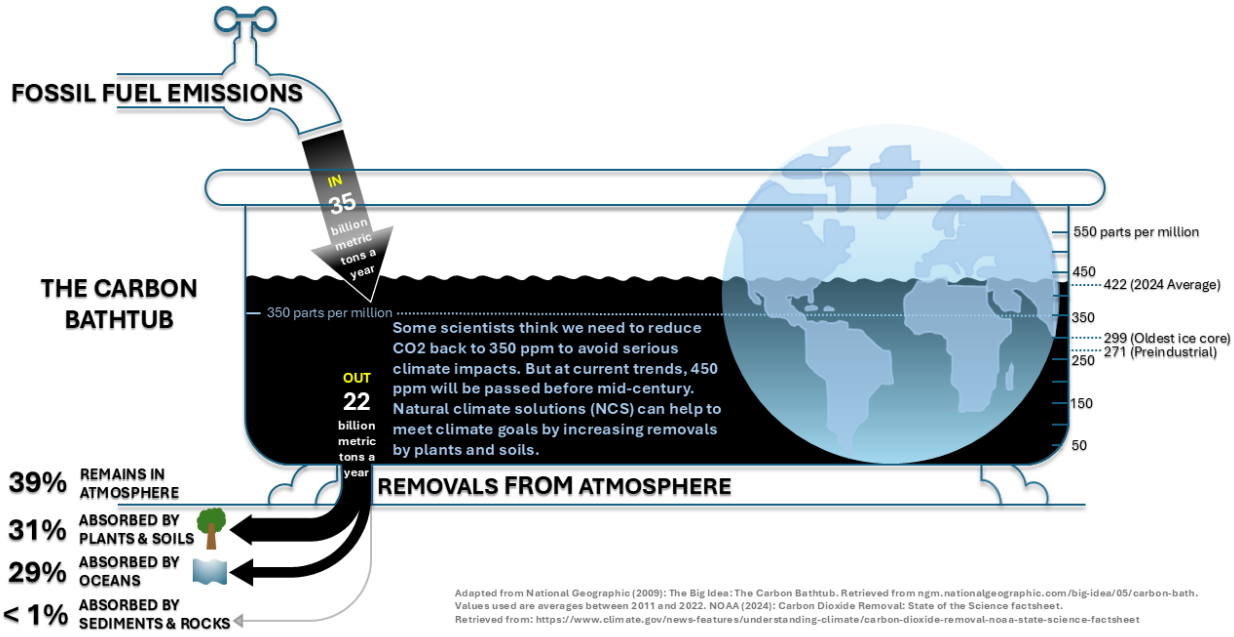

Figure 1. The Carbon Bathtub**.** Adapted from National Geographic (2009).[1] Values used are averages between 2011 and 2022, from NOAA (2024)[2].

Natural climate solutions are considered a carbon removal strategy and do not slow or reduce emissions from fossil fuel burning (the faucet). Only transitioning society to renewable energy sources can achieve emission reduction goals (tightening the faucet). To meet global climate goals, experts recommend the use of natural climate solutions among a suite of other carbon removal strategies.[3] Compared to other carbon removal strategies still in development, such as direct air carbon capture and storage or others (Figure 2 noted with "G"), natural climate solutions can be deployed at a meaningful scale and are ready to deploy.

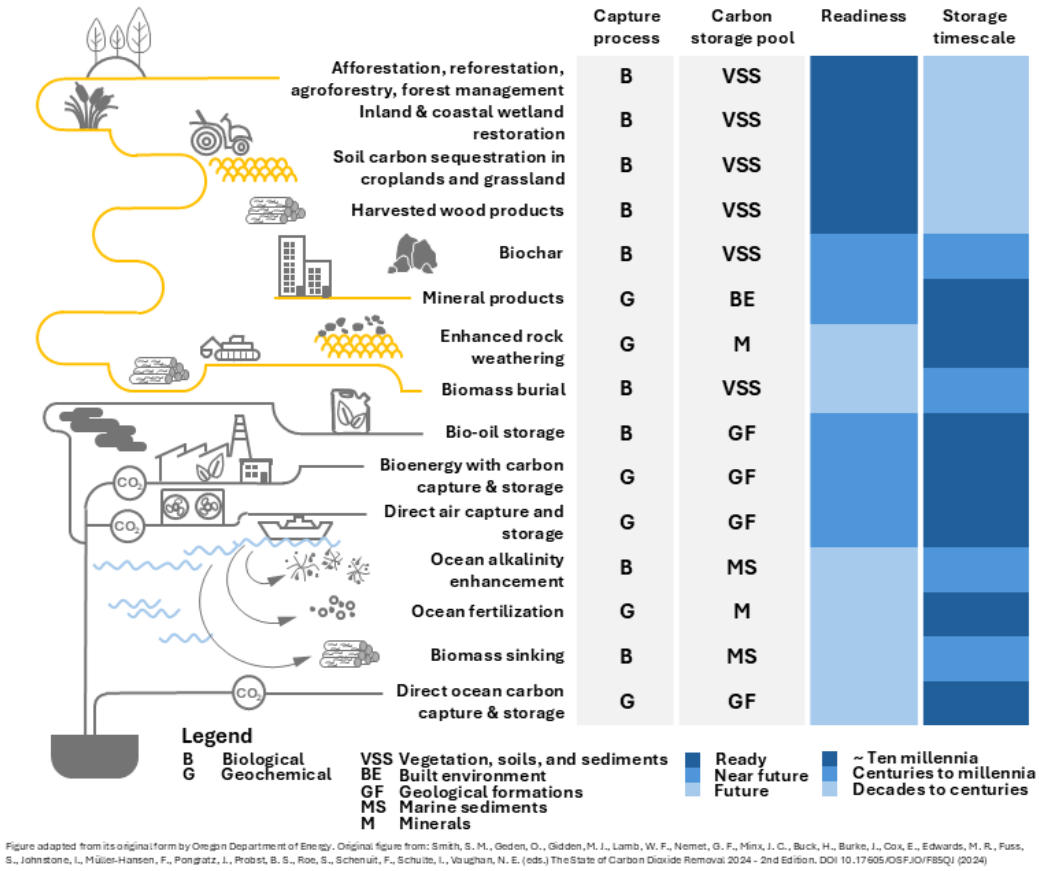

Figure adapted from its original form by Oregon Department of Energy. Original figure from: Smith, S. M., Geden, O., Gidden, M. J., Lamb, W. F., Nemet, G. F., Minx, J. C., Buck, H., Burke, J., Cox, E., Edwards, M. R., Fuss, S., Johnstone, I., Müller-Hansen, F., Pongratz, J., Probst, B. S., Roe, S., Schenuit, F., Schulte, I., Vaughan, N. E. (eds.) The State of Carbon Dioxide Removal 2024 - 2nd Edition. DOI 10.17605/OSF.IO/F85QJ (2024)

Figure 2. Carbon removal strategies, including natural climate solutions. Adapted from Smith et al. (2024)[4]

Natural Climate Solutions in Oregon

Oregon has adopted a new policy for nature-based climate action to realize benefits gained from land protection, restoration, and better land management practices, including sequestering and storing carbon, and being better able to adapt to a changing climate. Oregon House Bill 3409 (2023) defines natural climate solutions as activities that enhance or protect net carbon sequestration on natural and working lands while maintaining or increasing ecosystem resilience and human well-being. Natural climate solutions are nested under the broader category of nature-based solutions.

The Oregon Department of Energy is tasked with coordinating the following work among seven land managing agencies (Department of Agriculture, Department of Forestry, Oregon Watershed Enhancement Board, Oregon Department of Fish and Wildlife, Department of State Lands, Department of Land Conservation and Development, and the Parks and Recreation Department) and the Oregon Climate Action Commission to accelerate the adoption of natural climate solutions across Oregon. Together, we will:

- Create an official Oregon-specific list of natural climate solutions that currently provide a quantifiable carbon benefit (or will if data and monitoring is improved).
- Select metrics to track natural climate solution activities and their effects on communities.

- Develop and continually improve a land-based net carbon inventory to track progress toward increasing net carbon sequestration and storage across Oregon.
- Establish land-based net carbon sequestration and storage goals.
- Identify workforce development and training program gaps and needs to ensure natural climate solutions can be deployed quickly and effectively.

Program elements will evolve over time. Additional work will be needed to improve the accuracy and resolution of the inventory, fill workforce information gaps, and improve monitoring and data gathering to support the tracking metrics selected. The information gathered will aid multiple nature-based climate action efforts occurring among Oregon's land managing agencies.

Nature-based climate action is improved by identifying desired adaptation outcomes in addition to identifying which actions offer a quantifiable carbon benefit. This information will help Oregon understand where and how to apply government time and resources and to understand the services that need more support to achieve nature-based climate action aims.

Key Resources

1: National Geographic (2009). *The Big Idea: The Carbon Bathtub*. Retrieved from: ngm.nationalgeographic.com/big-idea/05/carbon-bath

2: National Oceanic and Atmospheric Association (NOAA; 2024). *Carbon Dioxide Removal: State of the Science Factsheet.* Retrieved from: https://www.climate.gov/news-features/understanding-climate/carbon-dioxide-removal-noaa-state-science-factsheet

3: Intergovernmental Panel on Climate Change (2022). *CDR Factsheet*. Retrieved from: https://www.ipcc.ch/report/ar6/wg3/downloads/outreach/IPCC_AR6_WGIII_Factsheet_CDR.pdf

4: Smith, S. M., Geden, O., Gidden, M. J., Lamb, W. F., Nemet, G. F., Minx, J. C., Buck, H., Burke, J., Cox, E., Edwards, M. R., Fuss, S., Johnstone, I., Müller-Hansen, F., Pongratz, J., Probst, B. S., Roe, S., Schenuit, F., Schulte, I., Vaughan, N. E. (eds.; 2024). The State of Carbon Dioxide Removal 2024 - 2nd Edition. doi:10.17605/OSF.IO/F85QJ