

# Creating a Soil Vulnerability Index to Identify Drought-Sensitive Areas in the North Pacific, USA



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In recent decades, there has been an increase in forest dieback in the western USA, often connected with insect outbreaks. Studies have correlated these events to changes in precipitation and temperature. GIS analyses and modeling have shown that: 1) tree mortality is not uniformly distributed on the landscape and 2) soil characteristics such as water storage capacity, soil temperature and fertility are related to vulnerability.

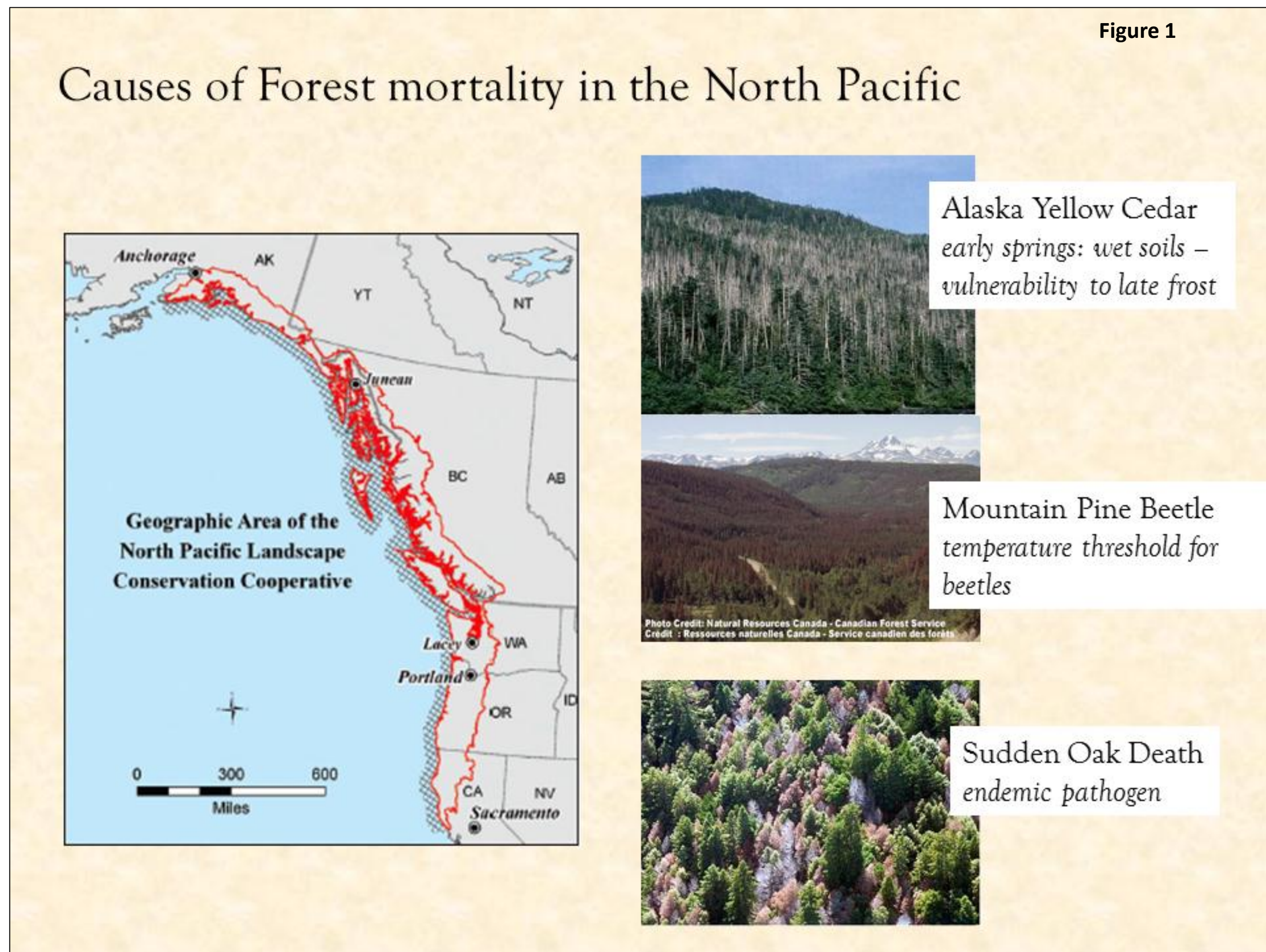


Figure 1 Climate affects trees in the North Pacific in a variety of ways. In areas where snowpack historically insulated soils, changes in soil temperature stress Alaskan Yellow Cedar. In British Columbia, increases in air temperature may be increasing evaporation and supporting higher populations of forest pests. In California and southern Oregon, the sudden oak death pathogen is thriving and moving to new areas in transported soils.

Figure 2 Vegetation models use complex algorithms to describe aboveground and belowground biotic and abiotic processes. In many cases, modelers express a need for improved soils data and a more representative balance between atmospheric and soil processes. This study tests the sensitivity of various vegetation models to soils and suggests improvements.

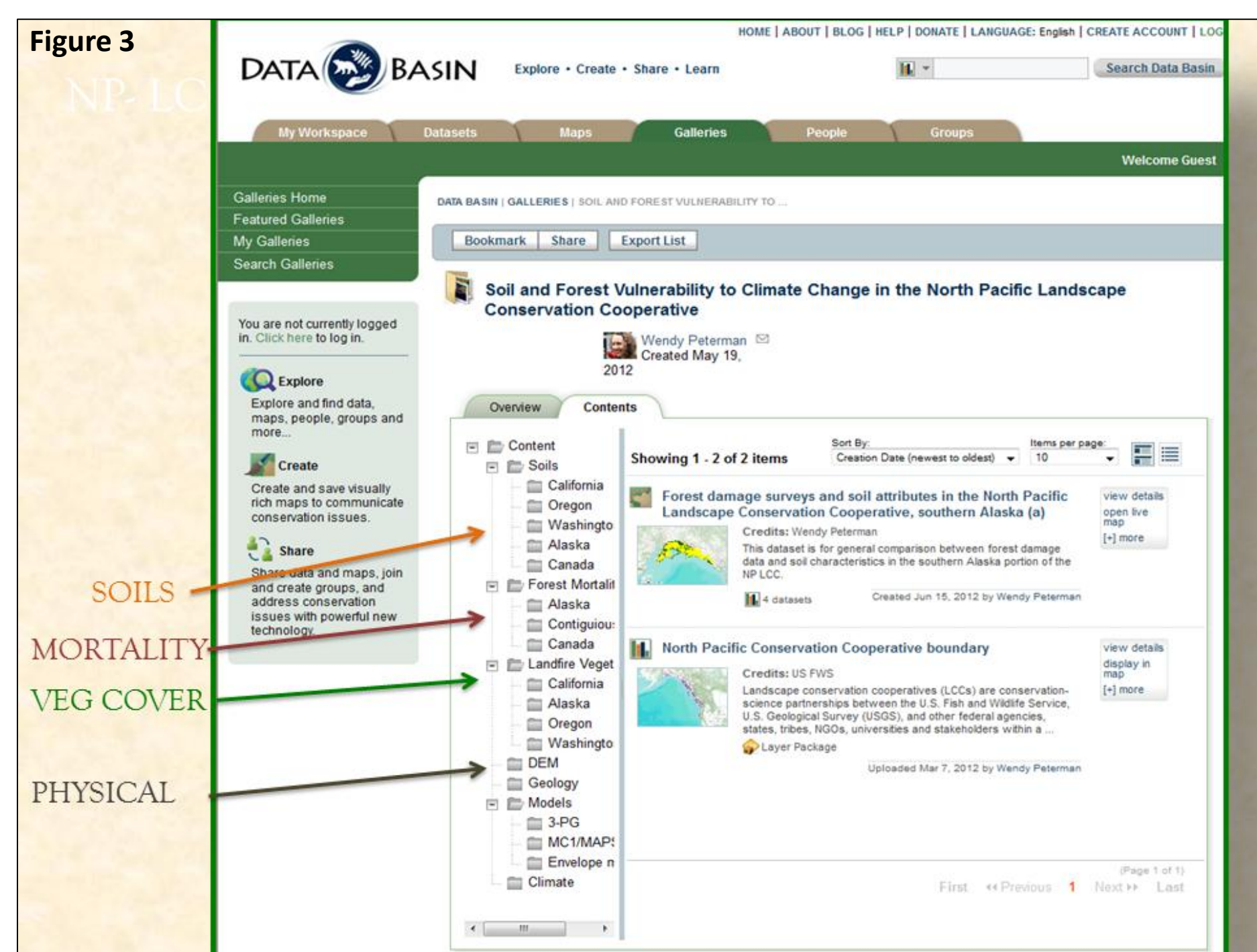
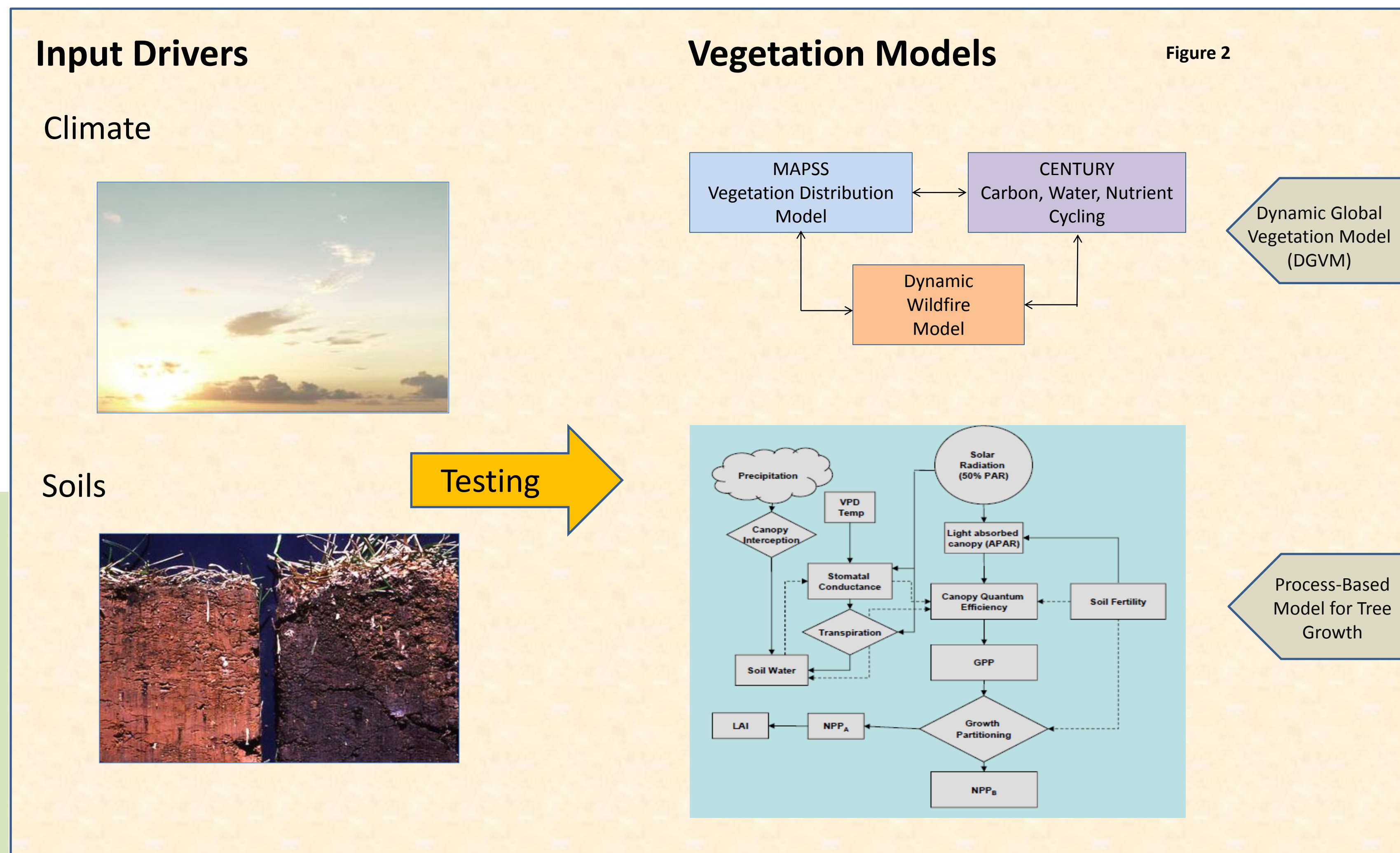


Figure 3 All data used or produced by the study are freely accessible online at databasin.org.

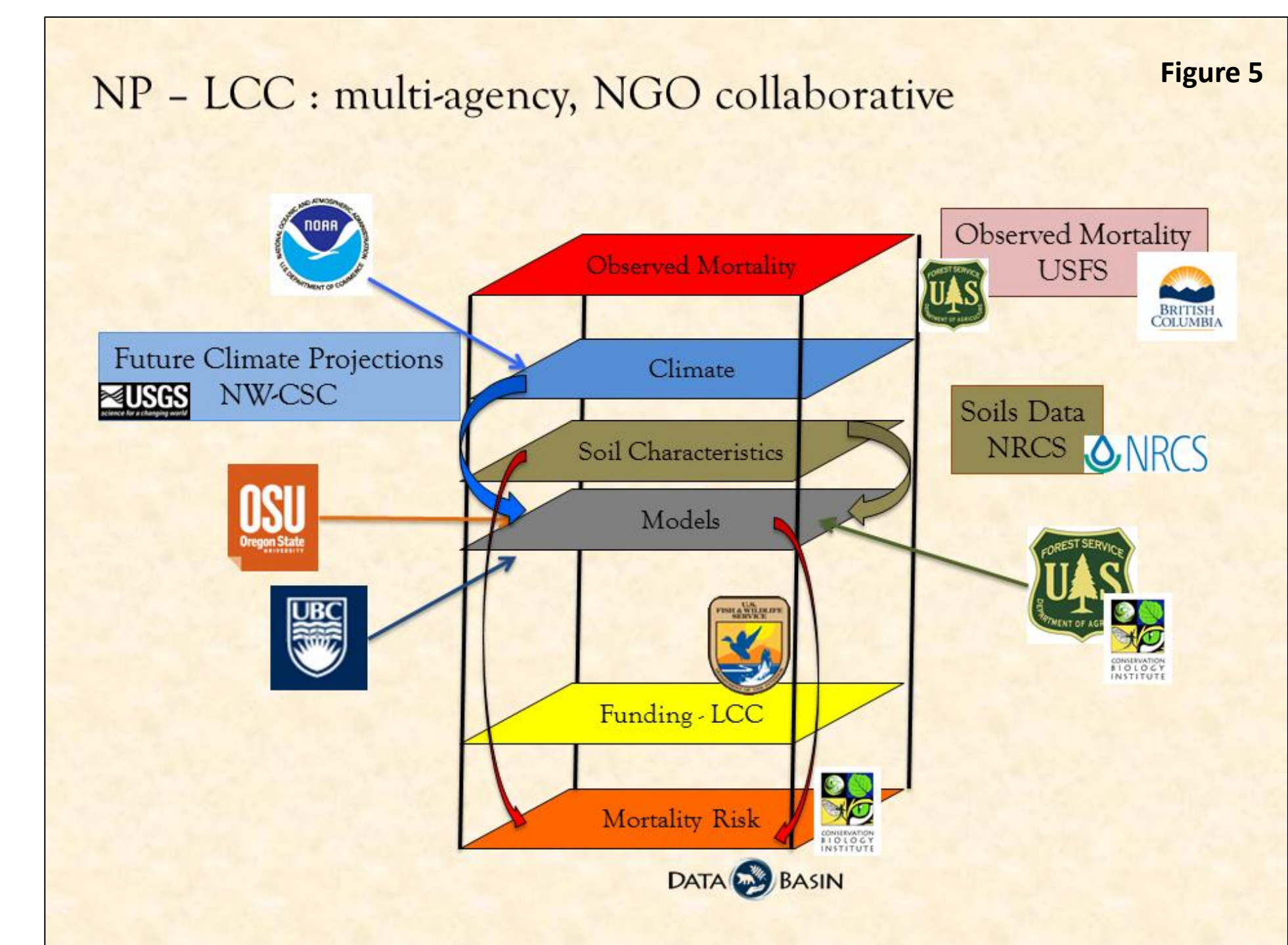
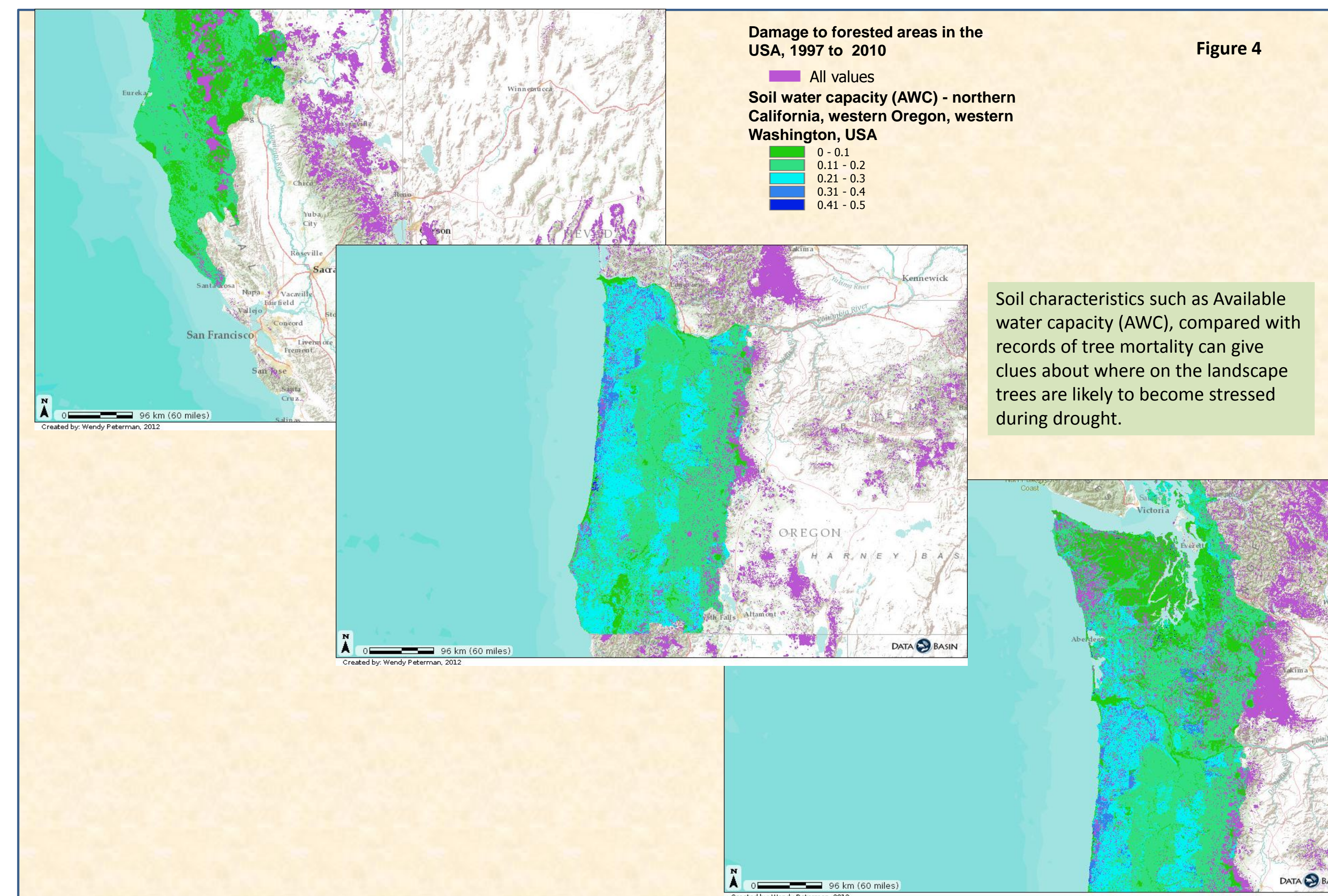


Figure 5 A major goal of the North Pacific Landscape Conservation Cooperative is the integrated collaboration of diverse stakeholders across political boundaries. This project benefits from data and expertise supplied by academic, private, local, national and international stakeholders.