

United States of America

The United States is pursuing several different lines of research related to the 2012-14 CCE Call for Data on 'no net loss of biodiversity'. This includes dynamic modelling using ForSAFE-Veg, static modelling using the SMB approach (Simple Mass Balance), and empirical critical loads across a range of terrestrial and aquatic systems nationwide. These are not yet integrated into a holistic national assessment, but that is the direction the U.S. is headed and plan to contribute to the CCE at a later date. The national policy that is driving much of this renewed effort is the 2013-2018 review of the secondary standards that protect ecosystems under the National Ambient Air Quality Standards (NAAQS), which is a central component of the Clean Air Act (CAA).

Many of these research efforts are coordinated under the Critical Loads of Acid Deposition (CLAD) Science Committee working group under the National Atmospheric Deposition Program (NADP), and are spearheaded by researchers and programs in the Environmental Protection Agency (EPA), the US Forest Service (USFS), the National Parks Service (NPS), the US Geological Survey, as well as several key private and academic research institutions. Some of these key projects are described below in brief, but do not constitute a comprehensive list of activities:

- Dynamic modeling for impacts to terrestrial biodiversity using ForSAFE-VEG in two areas, the subalpine meadows of the Rocky Mountains (McDonnell et al. 2014, Sverdrup et al. 2012), and the sugar-maple deciduous forests of the northeast (in progress).
- Development of empirical critical loads for various taxa (e.g. lichen, herbs, trees) nationally for Level 1 Ecoregions (Pardo et al. 2011).
- National assessment of impacts on terrestrial herb species across N deposition gradients using data from 24,000 plots and 5,700 species nationwide (Simkin et al. in prep).
- National assessment of impacts on US lichen species across N deposition gradients from 8,000 forested plots covering 450 species (Geiser et al. in review).
- Modeling impacts on terrestrial biodiversity in 3-5 case studies across the U.S. using VSD+PROPS (in progress).
- Large scale assessment of aquatic and terrestrial load exceedances including vegetation the Appalachian National Scenic Trail (in progress).
- Four studies by the National Park Service on impacts from N deposition on various systems and regions, including coastal sage scrub communities of California (Allen et al. in prep), the Craters of the Moon National Monument in Idaho (Bell et al. in prep), alpine communities in the North Cascades

of California (Rochefort et al. in prep), and on the Four Corners Region of Colorado and Utah (Reed et al. in prep).

- Compilation of U.S. critical loads into a central online database (<http://nadp.sws.uiuc.edu/committees/clad/db/>), including terrestrial acidification, terrestrial eutrophication, aquatic eutrophication, and empirical critical loads for various taxa and systems (Blett et al. 2014, Lynch et al. 2013).
- SMB modeling for aquatic acidification for lakes and streams (described in Lynch et al. 2013), and for terrestrial acidification nationally (McNulty et al. 2007). Researchers are investigating the potential for linking these critical load exceedances to biodiversity indices.

There is an additional body of work related to impacts on aquatic biodiversity, but given the focus of this Call for Data we highlighted the activities focused on terrestrial biodiversity above. It would probably be advantageous in future efforts to synthesize research across systems and taxa to get a more comprehensive understanding on the impacts from this global stressor on biodiversity.

References

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