

CLAD (Critical Loads Ad Hoc) Sub-Committee DRAFT Notes
Fall NADP Meeting- Saratoga Springs, NY
October 6, 2009

9:30 Welcome– *Tamara Blett (NPS)* (Web meeting logistics; Introductions; Update mailing list; Agenda overview/ Items to Add)

9:45-10:30 Education and Outreach- Critical Loads Workshops and Products – *Joint meeting with EROS Subcommittee*

NADP maps – rework to illustrate lower threshold levels? – *Ellen Porter (NPS) and Mark Rhodes (NADP):*

Overview of presentation:

Background:

- NADP QA Manager approached chairs of EROS and CLAD to discuss whether color scheme should be modified
- Recent maps, particularly for SO₄ and NO₃, show large areas of green, suggesting that deposition is now at a “safe” level for ecosystems in those areas; however, very sensitive ecosystems respond at very low deposition rates and may be harmed in these green areas.

Issues:

- Current color scale does not give fine detail at low/high ends
- Additional bins would add information: ID areas where deposition is very low/very high
- Proposed Changes:
- Use same color scale as current maps for most bins, but expand low and high ends of color scale
- Use consistent low end values: approx. ≤ 0.5 kg/ha of either S or N (1.5 kg SO₄/ha; 2.2 kg NO₃/ha; 0.6 kg NH₄/ha)
- Use consistent values for blue bins: approx. < 1.0 kg/ha of either S or N, rates expected to cause minimal impact to ecosystems

Discussion

- Need to understand why NADP chose current values for color scale and bins
- If changes were adopted, maps using new scales would not be directly comparable to old maps.
- Is a finer scale division supportable by analytical precision for each analyte?
- Should new scale be considered for all analytes or only for those with direct ecological impact (SO₄, NO₃, NH₄)?
- Would finer distinctions in the map values be useful to scientists studying ecological impacts?

Action Items:

- NADP QA manager will investigate analytical precision to determine if a more finely divided scale is supportable.

- Ad-hoc map redesign team will discuss options and present suggestions at Spring or Fall 2010 meeting.

Critical Loads Brochure – results of web vote and status – Tamara Blett & Andy Johnson (Maine)

The CL brochure was accepted via web-based vote of CLAD and EROS in summer 2009, by a vote of 32 (for) to 0 (against). Representatives from 18 different groups/agencies participated in the voting. *(Note: the NADP Executive Committee approved the brochure at the Fall 2009 meeting[immediately following this CLAD meeting], based on the CLAD/EROS recommendation).*

The brochure is now available at <http://nadp.sws.uiuc.edu/clad/>.

10:30- 11:45 Critical Loads Updates and Discussion Items

National Forest Systems CL strategies – Cindy Huber (FS)

The Forest Service consults with and advises States on permit applications for new/modified sources with the potential to impact FS areas. The FS sees CLs as a valuable assessment tool for this purpose, as well as a good communication tool, i.e., for communicating information on ecosystem condition. CLs can help answer the question, “Are there current impact or anticipated future ecosystem impacts due to current/planned emission control strategies?” FS is participating in efforts to obtain information on appropriate ecosystem indicators and endpoints for CLs. FS is now conducting watershed assessments in FS areas and CL could be good tool for these; CL are now included in the national FS protocol for assessments. Because CLs can help identify areas with impacts, FS can justify requesting funding to develop CLs.

Forest Service and ICP Forests- European Coordination – Rich Pouyat (FS)

FS is expanding forest/rangeland sites for CL development; also trying to develop network approach. FS is using ICP2 protocol; co-locating deposition samplers at these sites. Originally funded 18 sites a couple of yrs ago, obtained instrumentation to get data needed for ICP protocol. Meeting will be held Nov 23-23, 2009 in DC to discuss program. Also have FIA plots and minimal FHM parameters (question: soils – will samples be useful for CL modeling?)

Comments:

- TNC may be able to help ask for funding if needed
- Need to link with NRCS for better soil parameters
- Need AQ data at sites

N Empirical Critical Loads Monograph (status) – Linda Pardo (FS)

The monograph will discuss the CL concept, focusing on nutrient nitrogen empirical CLs and the range of aquatic and terrestrial ecosystem responses. Monograph will include summary tables of CLs for a variety of indicators, including fungi, lichens, and other forest indicators. The monograph will include a chapter synthesizing current information on N effects. A journal article will be developed from the monograph, which will be published as a FS technical document. A database of CLs is also under development. The audience for the

monograph and database include scientists, managers, and policymakers. Many authors have contributed to the monograph, which grew out of Bobbink's 2002 synthesis of CLs. The monograph was organized around the CEC map of ecoregions. The monograph will include a summary table of CLs with explicit information on how the specific CL was determined. Challenges for empirical CL N include differences in how deposition is measured, a lack of fertilization studies that used very low N additions (close to ambient), paucity of data on ecological responses (especially for tundra, taiga, and deserts). As deposition estimates get better, CL values can be refined. Also, much research is underway to develop CLs; this information will be added to database.

Questions:

Can we see spatial differences in forest species response (sugar maple, spruce); Does the deposition measurement method used to develop CLs introduce bias into the CLs?

Deposition (dry and total) monitoring needs for CL: discussion – Gary Lear, Rick Haueber (EPA) and Kristi Morris (NPS)

Overview of NC workshop to redesign CASTNet

- no new funding for CASTNet is anticipated; budget has been flat for 10 years
- many suggestions are being considered, including adding adding NH₃ measurement; setting up supersites, e.g., using MARGA instrumentation and mobile lab flux measurement to get direct deposition measurements to validate CMAQ model; reduce # sites (most are in NE)
- recommendations – keep most sites, add intensive sites; eliminate hourly met measurements - use historical or modeled met data
- Van Bowersox will prepare report from meeting
- No resolution on whether to include organic N
- No resolution on throughfall deposition measurements
- Report will be distributed through CLAD listserv

Discussion:

- Because of climate change concerns, it's bad time to discontinue met measurements
- may be better met networks for climate change measurements
- still have to save \$, so need to strategize
- should send out report to broader audience to get feedback and to elicit support
- Important to make connection to CC – that's where the funding is; many states do not see value of deposition monitoring because they're focused on human health

Status of the FOCUS Group (US Focal Center Utility Study for CL)- Tamara Blett

Purpose of FOCUS efforts is to set groundwork for future US Critical Loads Focal Center.

Roles of focus center are to: (1) Facilitate enhanced coordination between CL research, development, modeling, monitoring, mapping; (2) Provide clearing house function for getting CL data consistency w/in a country; (3) Bring together communities to develop protocols for national scale CL; (4) Conduct or oversee national CL mapping efforts; (5) Submit a country's CL data to the CCE- LRTAP Convention on Critical loads; (6) Enhance the formation of research groups and consortia for making scientific progress,

writing papers in the open literature and for acquiring funding; (7) Enhance the development of region-specific integrated assessment models.

Why needed?

- Now getting “critical mass” of critical loads data in US... but lots of variability in calculations and types
- Different methodologies OK for science or site specific applications but need comparability for national policy and management uses
- Interest in science of CL will wane in US if no “so what” process is developed. CL effort must go to next level to be most useful, and the next level requires consistency
- Demonstrated interest in US in using CL as an assessment tool for ecosystems, but no process in place to do so
- Interpolation of site data needed to develop national scale maps- UNECE has guidance

FOCUS Tasks:

- (1) Send out a survey on CL methods and data in the U.S. to determine: a) the types of critical loads models used in the US to calculate CLs, b) the model parameters and model formulations, c) the datasets used to derive the various parameters, d) critical thresholds used, e) who is doing CL modeling, f) sites and locations for which CL modeling has taken place or is planned, g) gaps in data availability. (*Lynch, Pardo – summer, 2009*)
- (2) Sponsor CL modeling workshops to bring key U.S. CL developers together and work through issues generated through the survey. (Focus the first workshop primarily on acidity and steady state models, and progress towards other endpoints and models in subsequent workshops). (*Lynch, Pardo, Blett – fall 2009*)
- (3) Organize a “mock submittal” to the UNECE-CCE “call for critical loads data” (using information gained during the survey to identify a few regional or site specific databases as test cases). The purpose is to learn more about the process (e.g. protocols, data needs, data gaps, etc.) for submitting CLs of N and S data to a future national coordination center. (*FOCUS- TBD*)
- (4) Develop protocols for using existing CL modeling and mapping methodologies and databases (with input from the Technical Interest Group) to compile a fine scale preliminary map of nutrient and acidification CL for natural areas within the U.S. (*FOCUS- TBD*)
- (5) Work towards developing a “CL background” (input variables) database to complete grid cells for fine-scale ecosystem and deposition data for the US, encompassing both acidification and nutrient thresholds. (*FOCUS- TBD*)
- (6) Develop a process to identify gaps and information needs for the future (e.g. compare modeled to empirical CL values to better model uncertainties; determine where crosswalk between deposition and ecosystem models is needed; etc) (*FOCUS- TBD*)

TimT – has CL work been done on other than fed lands – yes

CL-proposed NADP Resolution to Climate Bill (Gary Lovett)

Gary’s been working with TNC on the publication “Threats from Above” at http://www.nature.org/tncscience/files/threats_from_above.pdf, with a “Call for Action” that specifically calls for the development of CLs, as being essential for ecosystem assessment

and protection. It may be possible for TNC to get support for CL in an upcoming climate bill, and as background to that effort, if NADP supports the concept of CL in general, it would be good to get a statement in writing to that effect. This could take the form of a general resolution from NADP supporting CLs.

Discussion:

- Need to be consistent in CL definition (see CL brochure)
- Focus on CLs for N and S; if we have success with these CLs, perhaps in future could work on other pollutants, e.g., mercury

Action:

- A motion was made to approve suggested resolution; another motion amended first to make sure CL definition was consistent; motion seconded; vote followed with none opposed to resolution.

Resolution:

Whereas the National Atmospheric Deposition Program (NADP) is a public, nonprofit association of scientists from federal, state, academic and private organizations throughout the U.S., that monitors atmospheric deposition of air pollutants and studies their effects; and **Whereas** atmospheric deposition of air pollutants containing sulfur and nitrogen has been well documented to cause harmful ecological changes to aquatic and terrestrial ecosystems in the U.S. (including long-term acidification of soils and surface waters, nutrient imbalances affecting plant growth, loss of biodiversity, and eutrophication of estuaries); and **Whereas** climate change exacerbates some of the harmful ecological changes caused by sulfur and nitrogen deposition; and

Whereas plant and animal species will be best able to adapt to climate change if other stresses, including air pollution, are minimized; and

Whereas critical loads, which are defined as the levels of pollutant deposition “below which significant harmful effects are not expected to occur according to present knowledge”, has been used effectively in many countries for assessing the levels of sulfur and nitrogen deposition that minimize the stress on species and ecosystems; and

Whereas careful monitoring of forests, soils, streams, lakes and other natural ecosystems is crucial to understanding the long-term impacts of both climate change and other forms of air pollution;

Therefore, be it resolved that the National Atmospheric Deposition Program finds that critical loads is a science-based approach for assessing air quality impacts on natural ecological systems, and supports creation of a multi-stakeholder critical loads program to coordinate development of critical loads for sulfur and nitrogen for areas of the U.S. that are sensitive to pollution by these elements;

Further, be it resolved that continued, modernized, and expanded monitoring of atmospheric deposition and ecological effects is necessary to provide the infrastructure for critical loads as a science-based decision support tool.”

11:45- 12:00 CLAD Business- Tamara Blett

2010 CLAD Chair – it was suggested that Rick Pouyat (FS) and Tamara Blett (NPS) co-chair CLAD next year. Co-chairs would be a good idea, as CLAD has become much bigger job since beginning. All agreed.

Should CLAD request full NADP subcommittee status? –

- there are now 150 on CLAD list and interest in CLs is growing, as are the number of CLs projects
- suggest recommending at next spring meeting that CLAD request from NADP “full sub committee” status – no longer appropriate as ad hoc.

Discussion:

- How does this affect FOCUS? Should CLAD be dissolved if FOCUS moves forward? No, CLAD is broader in scope and will have a long term role as a forum for coordinating, sharing and communicating critical loads information. FOCUS is simply a pilot study looking at ways to make some aspects of CL reporting consistent to the extent that some of the regional/national scale CLs and maps for the US can be shared and coordinated with the UNECE and other countries.
- CLAD should interact with other groups focused on deposition, e.g., GLAD (great lakes)
- CLAD chairs should discuss the issue of full committee status with the executive committee prior to the spring 2010 meeting. (*Chair’s Note: this discussion took place at the 2009 Fall Exec committee meeting*)
- CLAD should consider how CLAD relates to the other NADP subcommittees; what would it cost NADP to have CLAD as full committee; how does CLAD benefit NADP?

Action: motion to recommend CLAD pursue full subcommittee status within NADP; motion seconded, approved.

Adjourn

Note: A Critical Loads Modeling Workshop followed the CLAD meeting. Contact Jason Lynch at EPA (lynch.jason@epa.gov) for more workshop details.