VERMONT MONITORING COOPERATIVE PROGRAM APPLICATION FOR 2001

FOR MONITORING AND/OR RESEARCH AT LYE BROOK AREA SITE

Applicant's Name : Linda H. Pardo
Telephone No.: (802) 951-6771 x1330

Applicant's Address: PO Box 968
Burlington, VT 05401

Organization/Affiliation USDA Forest Service
Northeastern Research Station

Project Title : Regional Assessment of N Saturation using ^{15}N Natural Abundance: Network Development and Foliar 15N, Soil C:N, and Net Nitrification Synthesis

1. Describe your project, including: purpose, details on study area size and location, number of samples and parameters to be taken, any changes made to the site, study area markings, structures or equipment to be installed. (This application may be accompanied by a more detailed project description of up to 2 pages in length.) We would like to include information on your activity in our annual VMC Project Description document. See the attached example for format and content required.

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Overall Project Objective:

We propose to construct a regional database of ^{15}N natural abundance by bringing together measurements from independent research groups, and by supplementing these with additional foliar ^{15}N measurements at sites where other N cycling parameters have been measured (including Lye Brook). From this database, potentially the largest of its kind, we hope to evaluate the utility of foliar ^{15}N as an index of N saturation. (see project abstract attached)

Lye Brook Sampling Component

In the context of our regional study, Lye Brook is a critical site because of the high atmospheric deposition it receives, which puts it at higher risk of forest health damage than other sites in the immediate area. Vermont is under-represented among our sites.

We propose to collect foliar samples of up to 5 individuals of up to 3 dominant species at each of the 5 sites. The sampling sites will be three stands adjacent to soil sampling sites used by John Campbell (USFS-Durham, NH) in the central portion of the watershed off Lye Brook (see map attached): a hardwood site, a softwood site and a mixed site. The final two sites will be adjacent to the long-term soil pits in the southern portion of the watershed (Don Ross-UVM). The samples will be collected using a single shot shot-gun. We will measure foliar C:N and ^{15}N on these samples.

We will co-ordinate with John Campbell and Don Ross in planning the field work, and co-operate with them in sharing data.

2. What types of activities by other VMC cooperators would be incompatible on the area/water body you are using (for example, observational data collection, management manipulations, shoreline erosion, stream alteration, etc)?

This would be a one-time collection at sites where other necessary measurements (soil C:N and net nitrification potential) have already been made. It would not require limiting future activities in any way.

3. What is the anticipated duration of this project?
Approximately one week in mid to late July 2001.

4. Has a specific study area location been identified, and if so, please indicate location on attached map (this applies to existing projects, too). If location is not known at this time, what criteria are you looking for in locating a plot?
Five sites have been identified, to co-ordinate with previous measurements of soil C:N and net nitrification potential. The first three are sites that John Campbell monitored. The second two would be adjacent to the long-term soil pits.
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5. Long-term soil pit Road site (hardwood site, Sugar Maple dominated)

5. List ways in which this project fits the goals and objectives of the VMC and the Lye Brook Area site.

This project will benefit the VMC and on-going research at Lye Brook by increasing understanding of the susceptibility of the Lye Brook Area to the detrimental effects of elevated N deposition and to nitrogen saturation. By co-ordinating our foliar sampling with established research sites, we will be contributing to a database that will increase the ability of current researchers to link their previous and on-going work to components of the ecosystem that they have not measured themselves. By providing information about the vegetation component, we will facilitate inter-disciplinary research co-operation at these soil-focused study areas.

6. Is your project data going to be available to other VMC cooperators, and if so, when and in what form?

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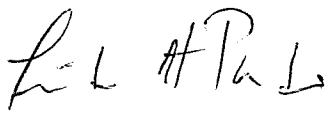

Date
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29 June 2001

Terms of approval (if any):

Project approval:
Location approval:

VMC Official signature
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Date
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GMNF Official signature
Official signature

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Date
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2001 VMC Project Description Form

project name

Regional Assessment of N Saturation using ^{15}N Natural Abundance: Network Development and Foliar 15N, Soil C:N, and Net Nitrification Synthesis

Objectives

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Project Start Date
July 2001

Site Characteristics

Locations: 3 sites in the central part of the LBWA, one hardwood, one softwood and on mixed
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Sampling Frame
Sampling will be in 15 m x 15m plots adjacent to the sampling area for the long-term soil pits, and the plots used previously by John Campbell.

Measurements
Foliar samples

Spatial Context
This data will supplement a regional database of foliar ^{15}N. Although we have some samples from Mount Mansfield and Wolcott, Vermont, the Lye Brook samples would be the only samples co-ordinated with the soil measurements that we need to do our regional assessment.

QA/QC
Trained or certified field crews.

Contact person:
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Project Abstract

REGIONAL ASSESSMENT OF N SATURATION USING ^{15}N NATURAL ABUNDANCE: NETWORK DEVELOPMENT AND FOLIAR ^{15}N, SOIL C:N, AND NET NITRIFICATION SYNTHESIS

The goal of this project is to create a regional network of researchers who use the natural abundance of ^{15}N as a tool to evaluate N cycling and N saturation in forest ecosystems. The factors that regulate N retention and loss in forest ecosystems are complex and difficult to assess. Natural abundance of ^{15}N is a powerful tool for evaluating ecosystem N cycling, because it can integrate the effects of microbial N transformations over space and time, providing a unique record of the net N transformations at a site. Natural abundance of ^{15}N may, therefore, be an excellent indicator of ecosystem N saturation. We propose to construct a regional database of ^{15}N natural abundance by bringing together measurements from independent research groups, and by supplementing these with additional foliar ^{15}N measurements at sites where other N cycling parameters have been measured. From this database, potentially the largest of its kind, we hope to evaluate the utility of foliar ^{15}N as an index of N saturation.

Objectives:

1. **Facilitate regional co-operation among researchers measuring natural abundance of ^{15}N in ecosystem N cycling assessments.**
2. **Compile a regional dataset of natural abundance ^{15}N measurements.**
3. **Augment existing data sets with new ^{15}N measurements on previously-collected foliage samples from sites with other N cycling measurements**
4. **Evaluate the relationship of foliar $\delta^{15}N$ to soil C:N and net nitrification, and explore the usefulness of foliar $\delta^{15}N$ as a regional indicator of N saturation.**

This project will address several NERC goals, including (1) enhancement of on-going regional evaluations [of soil and foliar $\delta^{15}N$] and (2) encouragement of a regional perspective for cross-site synthesis and database development.

Date to review by: July 25, 2001

VMC APPLICATION

OVERALL PROJECT REVIEW (PHASE I)

Project Title: Regional assessment of N saturation using 15-N natural abundance: network development and foliar 15-N, soil C:N, and net nitrification synthesis

Applicant's Name: Linda Pardo, USDA Forest Service

1. Validity of project:
   a. Meets goals and/or objectives of VMC? yes / no

   b. Has scientific merit/applicability? yes / no

2. Destructive sampling is warranted, and kept to a minimum? yes / no ?

3. Restrictions on land use are warranted and reasonable? yes / no

4. Duration of project reasonable? yes / no

5. Should this application be approved? yes / no

   Are there any special conditions for approval? yes / no

Brent Ewers
VMC Advisory Committee Member

Date 7/18/01

VMC APPLICATION

PROJECT LOCATION REVIEW (PHASE II)

Project Title: Regional assessment of N saturation using 15-N natural abundance: network development and foliar 15-N, soil C:N, and net nitrification synthesis

Applicant's Name: Linda Pardo, USDA Forest Service

1. Is the plot location appropriate? (yes) / no

   Will plot location interfere with other projects? yes / no ?

   If yes, what is the conflict?

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Brent Ewers
VMC Advisory Committee Member

Date 7/13/01

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6. Is your project data going to be available to other VMC cooperators, and if so, when and in what form?

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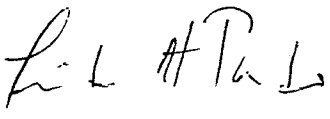

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QA/QC
Trained or certified field crews.

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5. Should this application be approved? (yes) / no

   Are there any special conditions for approval? yes (no)

Dean Way
VMC Advisory Committee Member

Date 23 July 01

VMC APPLICATION

PROJECT LOCATION REVIEW (PHASE II)

Project Title: Regional assessment of N saturation using 15-N natural abundance: network development and foliar 15-N, soil C:N, and net nitrification synthesis

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Dawne Wood
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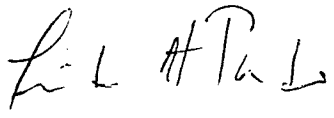

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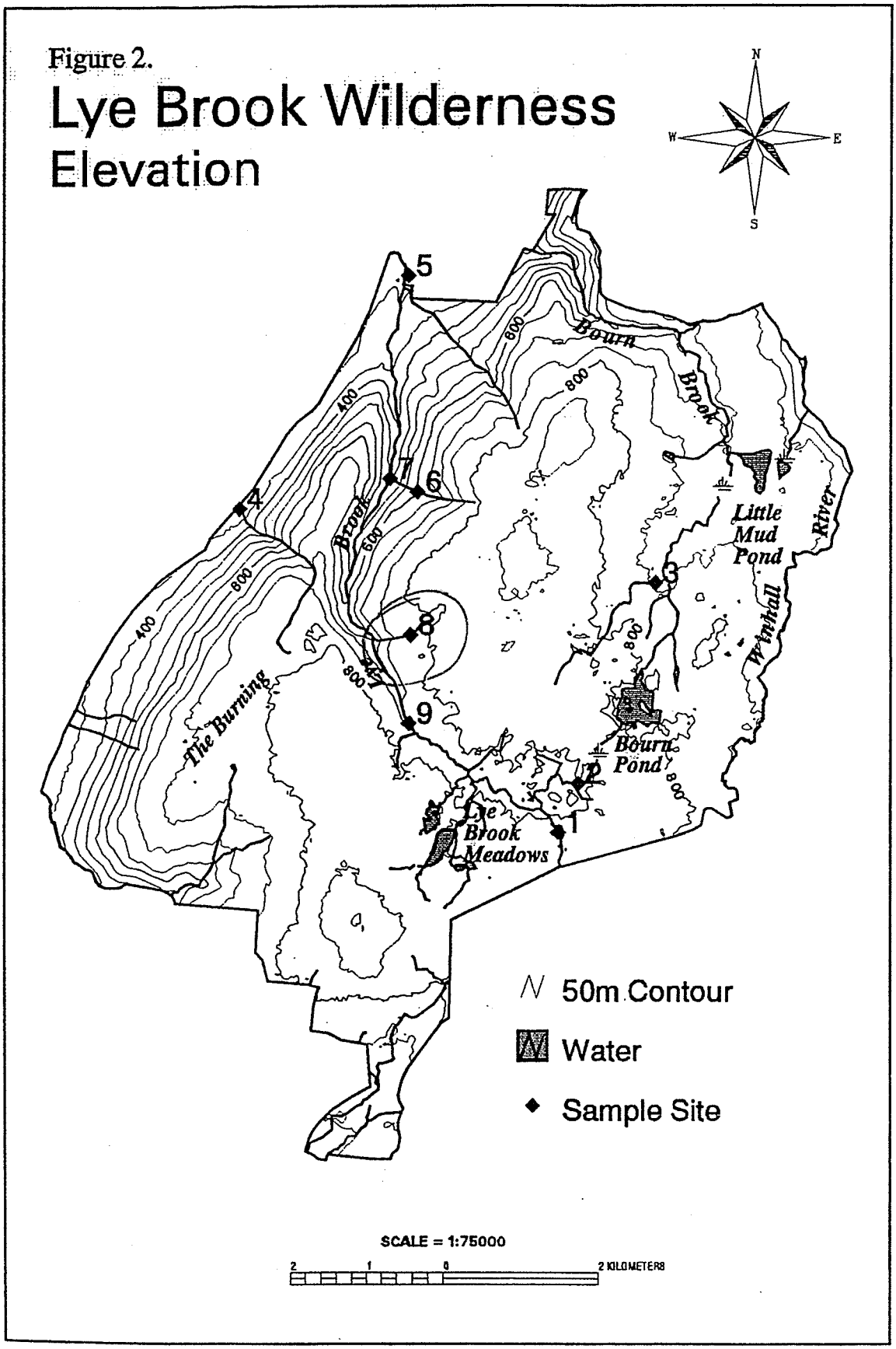
Figure 2.


Lye Brook Wilderness
Elevation
N
W
E
S
5
Bourn Brook
800
400
7
6
Brook
600
Little Mud Pond
River
Winhall
3
800
8
9
The Burning
Bourn Pond
2
Lye Brook Meadows
1
50m Contour
Water
Sample Site
SCALE = 1:75000
2
1
0
2 KILOMETERS