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# Workshop: A Cross-Biome Synthesis of Ecosystem Response to Global Warming; October 1998 in Santa Barbara, CA

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**Final Report for Period:** 03/1998 - 02/2000**Submitted on:** 11/15/2000**Principal Investigator:** Fernandez, Ivan J.**Award ID:** 9730110**Organization:** University of Maine

Workshop: A Cross-Biome Synthesis of Ecosystem Response to Global Warming; October 1998 in Santa Barbara, CA

### Project Participants

#### Senior Personnel

**Name:** Fernandez, Ivan**Worked for more than 160 Hours:** No**Contribution to Project:**

Iavn Fernandez assisted Lindsey Rustad in organizing this workshop.

**Name:** Rustad, Lindsey**Worked for more than 160 Hours:** Yes**Contribution to Project:**

Lindsey Rustad was the lead organizer of this workshop. Assistance was provided by Ivan Fernandez, Rich Norby, Pep Canadell, Gus Shaver, and Giles Marion.

#### Post-doc

#### Graduate Student

#### Undergraduate Student

### Organizational Partners

#### **USDA Forest Service - Northeastern Forest Experiment Station**

US Forest Service Northern Global Change Program co-sponsored this workshop, US Forest Service Northeastern Forest Experiment Station provided salary support for Lindsey Rustad, and database management support from John Campbell.

#### **Global Change in Terrestrial Ecosystems**

GCTE provided travel stipends for several participants.

#### **National Center for Ecological Analysis**

The workshop was largely supported by and held at the National Center for Ecological Analysis and Synthesis in Santa Barbara, CA.

### Other Collaborators or Contacts

### Activities and Findings

#### **Project Activities and Findings:**

Support from this grant helped support a workshop on 'A Cross-Biome Synthesis of Ecosystem Response to Global Warming,' which was held at the National Center for Ecological Analysis and Synthesis (NCEAS) in Santa Barbara, California, February 1-5, 1999. The objectives of the workshop were to (1) develop a conceptual model of ecosystem response to global warming, and (2) use meta-analysis to evaluate the response of soil respiration, N mineralization, and plant growth to experimental increases in temperature at 25 independent research sites. These sites represented six biomes, including broadleaf deciduous forests, needleleaf evergreen forests, perennial grasslands, tundra, polar deserts, and peatlands. Warming technologies included ground cables, closed chambers, open-top chambers, infra-red heaters, night warming,

and natural gradients. The workshop was attended by forty-two participants representing twelve countries (Argentina, Australia, Canada, China, Denmark, Finland, Norway, Spain, Sweden, Switzerland, United Kingdom, and the USA).

### **Project Training and Development:**

The results from this synthesis showed a strong positive response of soil respiration, N mineralization, and plant growth to experimental warming. Results also suggested that ecosystem response to warming will be more varied and complex than the response to increased atmospheric CO<sub>2</sub>, due to the wider spatial and temporal variations in the projected temperature increase, the multitude of interacting direct and indirect physical, biological, and chemical processes that will potentially be affected by temperature, and the variable time scale of response to temperature of different ecosystem components. Moreover, discussion of available data suggested that ecosystem response to warming will also be strongly affected by initial conditions, such as stocks and initial turnover rates of labile C and N in the soil, the relative size of the plant and soil C pools, the dominant form of available N in the soil, the soil water and precipitation regimes, the chemical composition and turnover rates of plant tissues and litter, and the longevity of individuals and population turnover rates of dominant species.

### **Research Training:**

This project included participant support for several graduate students and individuals from under-represented groups.

### **Outreach Activities:**

#### **Journal Publications**

Rustad, L.E., J.L. Campbell, G.M. Marion, R.J. Norby, M.J. Mitchell, A.E. Hartley, J.H.C. Cornelissen, J. Gurevitch, GCTE-NEWS., "A Meta-analysis of the Response of Soil Respiration, Net N Mineralization, and Aboveground Plant Growth to Experimental Ecosystem Warming", *Oecologia*, p. , vol. , (2000). ) Accepted

Shaver, G.R., J. Canadell, F.S. Chapin III, J. Gurevitch, J. Harte, G. Henry, I. Ineson, Ss. Jonasson, J. Melillo, L. Pitelka, and L. Rustad, "Global Warming and Terrestrial Ecosystems: A Conceptual Framework for Analysis", *BioScience*, p. , vol. , (). ) Accepted

#### **Books or Other One-time Publications**

Rustad, L.E, "GCTE-Network of Ecosystem Warming Studies (GCTE-NEWS);", (1999). *newsletter*, Published  
Collection: INTECOL Newsletter  
Bibliography: Newsletter

Rustad, LE, "GCTE-Network of Ecosystem Warming Studies (GCTE-NEWS)", (1999). *Newsletter*, Published  
Collection: GCTE NEWS  
Bibliography: newsletter

L.E. Rustad, "Warming Effects on Ecosystem Functioning", (2000). *Newsletter*, Published  
Collection: GCTE NEWS  
Bibliography: newsletter

#### **Web/Internet Sites**

**URL(s):**

**Description:**

#### **Other Specific Products**

**Product Type:** We launched the Network of Ecosystem Warming Studies

**Product Description:**

We launched the GCTE Network of Ecosystem Warming studies, which is an international network of sites evaluating elevated temperature

effects on terrestrial ecosystems, and consists of 28 study sites.

**Sharing Information:**

We have a web page at GCTE.org, and have an electronic list-server. We have also shared this information over the GCTE, INTECOL, and ESA Newsletters.

**Contributions**

**Contributions within Discipline:**

This was the first major synthesis of results from ecosystem warming studies. Major products included a conceptual framework for evaluating global warming effects on terrestrial ecosystems, and a synthesis paper re: the effects of warming on soil respiration, N mineralization, and plant productivity.

**Contributions to Other Disciplines:**

**Contributions to Human Resource Development:**

**Contributions to Science and Technology Infrastructure:**

**Beyond Science and Engineering:**

**Categories for which nothing is reported:**

Activities and Findings: Any Outreach Activities

Contributions: To Any Other Disciplines

Contributions: To Any Contributions to Human Resource Development

Contributions: To Any Science or Technology Infrastructure

Contributions: Beyond Science or Engineering