

Minutes, NoRMEO Meeting, 12 and 13 December 2005
University of Montana, Missoula, MT

Participants: (see attached spreadsheet)

Monday, 12 December 2005

Following introductions and a review of proposed agenda and goals of meeting, several overviews of existing programs were presented to provide information on regional strengths and resources for NoRMEO. These included:

Steve Running, Numerical Terradynamics Simulation Group, U Montana.

Steve described the regional and landscape modeling efforts of his program that among other things model: climate; changes in growing season; and gross and net primary productivity and their changes by incorporating measurements of CO₂ from flux towers into their models. They've developed methods to paint environmental variables across study areas including: land-use change; surface temperature, water balance, snow depth and duration to help predict evapotranspiration and drought, stream discharge, and fire-related phenomena. <www.nts.g.umt.edu/>

Ron Hartman, Rocky Mountain Herbarium and National Herbarium of the US Forest Service, U Wyoming.

The Rocky Mtn Herbarium under Ron's direction has flourished and is strongly bucking the national trend in declining collections. The Herbarium now includes the US Forest Service collections. The overall goal is a botanical inventory of the Rockies. It recognizes the future applications in DNA sequencing for herbaria and is well set up for retrospective data capture. <www.rmh.uwyo.edu/>

John Marshall, Idaho Stable Isotope Laboratory (ISIL), U Idaho.

ISIL provides *stable* isotopic analyses to departments and colleges at U Idaho for student and faculty research. Their applications range from tree physiology to nutritional food-web studies, but the biogeochemical possibilities are open. ISIL also provides service and support to regional collaborators including private consultants, universities, and government agencies. They focus on C, H, O, N and S isotopes, processing samples of streamwater, groundwater, xylem, and other tissues. ISIL is also actively developing improved methodologies for stable isotope analyses of N in groundwater, soil CO₂, and in situ measures of atmospheric CO₂ and H₂O. <www.cnrhome.uidaho.edu/isil>

These presentations were followed by an update on NEON by Carol Brewer, U Mt, who is a Co-PI on the NEON Planning award, and leads the Education component. Much of Carol's presentation is paralleled by Bill Michener's NEON update at the last COREO Meeting and the reader is referred to the minutes of that meeting for a detailed summary <www.coreoneon.org/NationalMeetingMinutes/November2005MeetingMichigan.pdf> (pages 10-25).

Carol emphasized that NEON has the potential to transform ecology, and will serve as a major educational platform as well as supporting research. She also made it clear that NEON continues to evolve, and that the human dimensions aspect of NEON remains unresolved.

She was followed by Katy Kavanagh who gave an update of the COREO meeting at Kellogg Biological Station in November (see URL above for minutes). In particular, this presentation emphasized the draft prospectus requirements for siting an observatory node. The node will consist of an observatory infrastructure located in a transect from urban, managed and wild. For more details pay attention to the upcoming science report from NEON Inc. In the meantime visit the COREO website listed above.

The afternoon ended with a discussion led by Steve Running about what are the “pressing observable ecological and environmental changes” within the NoRMEO region. Suggestions included changes in: snowpack depth and duration; temperature, phenology; land use and population.

13 December 2005

Continued overviews of existing programs to provide information on regional strengths and resources. Those presentations on the 13th included:

Cathy Whitlock, Montana State U

Cathy described the rich set of paleoecological resources present in the NoRMEO region in the context of her group’s research. She pointed out that the steep gradients associated with the mountainous topography within the region require a large number of sites to properly characterize the paleo history, and that a high resolution of the paleo history would be essential for properly describing the environmental legacies of the NEON sites. <www.montana.edu/wwwes/facstaff/whitlock.htm>

Scott Bischke, Yellowstone Ecological Research Center (YERC), Bozeman

Scott described the research and education programs of YERC. Among other projects, YERC has three study areas: 1) carnivores in the Greater Yellowstone Ecosystem, YERC researchers are documenting the populations of species, the interactions among predators, and between predators and their prey; 2) riparian and aquatic ecology studies of streams and wetlands within the Greater Yellowstone Ecosystem; and 3) use of advanced remote sensing techniques for ecological research on topics ranging from habitat selection by vertebrates to regional atmospheric carbon flux by providing critical model inputs such as land cover, plant phenology and vegetation structure. <www.yellowstoneresearch.org/>

Duncan Patten, Big Sky Institute (BSI), Montana State U

Duncan reviewed the background and progress of the Big Sky Institute, emphasizing the potential of the developing educational program at the Yellowstone Field Station near Big Sky, MT. The Field Station will be innovative, dedicated to investigating and communicating science. Researchers at Montana State associated with

BSI are developing and implementing cutting-edge strategies to take the pulse of the Yellowstone ecosystem, measuring everything from wolf populations to the fate of pollutants in streams. The Yellowstone Field Station will build an ongoing dialog among researchers, educators, and community members. <bsi.montana.edu/>

Bob Gresswell/Geneva Chong, USGS BRD

Bob and Geneva did a tag-team presentation about USGS's Northern Rocky Mountain Science Center, the extensive existing infrastructure and EROS tools available. Other resources include data sets available on a variety of biological and ecological subjects, many of them spatially explicit. Bob presented examples of spatially continuous data bases for streams in the Oregon Coast Range. <www.nrmssc.usgs.gov/>

Andy Hansen, Landscape Biodiversity Lab, Montana State U

Andy gave an overview of his group's landscape-scale studies of the driving variables that determine biodiversity. They capitalize on de facto experiments where existing reserves are surrounded by areas undergoing land-use change to explore the effects of shifting patterns of habitat patch and corridors in time and space. An important emerging theme of the work is the need to manage landscapes across ownerships, and the potential vulnerability of biota within reserves/preserves to land-use and climate change. <www.homepage.montana.edu/~hansen/>

Ric Hauer, Flathead Lake Biological Station (FLBS), U Montana

FLBS is one of the Nation's oldest field stations (est. 1899) with a diverse education program and long history of cutting edge research. Ric's overview of the research and education programs of FLBS detailed the rich legacy of long-term studies of water quality, aquatic ecology and terrestrial-aquatic linkages within the Flathead River watershed (including Glacier Park) and associated data sets. Current research programs are very diverse: floodplain ecology focusing on controls of flux of energy and nutrients, and biological diversity; C flux at high latitudes; ecology of river systems around the Pacific Rim with and without anadromous salmonids; and large lake limnology. A central component of these current studies is the development and application of remote sensing imagery, both hyperspectral and multispectral, that provides data for models from reach to regional scales. Recent merger of hyperspectral imagery data with expert systems informs managers about regulation of river discharge (below reservoirs) to achieve resource management goals. <www.umt.edu/flbs/>

Bob Denner, USFS Rocky Mtn Sta, Moscow, ID – Experimental Forests in Idaho
Ward McCaughey, USFS Rocky Mtn Sta, Missoula, MT – Exp Forests in Montana

Bob and Ward described the history and on-going research at several Experimental Forests in ID and MT that are managed by the US Forest Service Rocky Mtn Research Station. They both provided excellent cases for the increase in value through time of Experimental Forests with their long legacies of environmental and biological data. They pointed out that Experimental Forests are dedicated to research and education, and are perfectly appropriate places to install the kinds of research infrastructure currently proposed by NEON and to conduct experiments – indeed many already have NEON-like sensor networks in place. They also provide excellent security

for such installations and manipulations. Experimental Forests also have a proven track record of cooperation and collaboration among universities and state and federal agencies. Descriptions of individual Experimental Forests within ID and MT can be found at <www.fs.fed.us/rm/main/expfor.html>.

Kathy Tonnessen, Rocky Mountain Cooperative Ecosystem Studies Unit, Missoula, MT

Kathy wore two hats and spoke for both the National Park System within the NoRMEO region (Glacier, Teton, and Yellowstone National Parks) and the Rocky Mountain Cooperative Ecosystem Studies Unit (RM-CESU), headquartered on-campus at the University of Montana. She described the past history of National Park collaboration with university scientists, the developing program within the RM-CESU

<www.forestry.umt.edu/research/CESU/default.htm>, and the Park Service's Inventory and Monitoring Program

<www1.nature.nps.gov/protectingrestoring/im/inventoryandmonitoring.cfm>. She described a few of the different educational efforts of the Park Service including the public outreach interpretive programs at the Parks, resources for managers such as the Research Learning Center at Glacier Park, and cooperative programs such as the Glacier Institute and those with tribal colleges (such as Salish Kootenai College).

Those making the overview presentations did an excellent job, and the NoRMEO planning effort benefited greatly by these brief summaries of some of the region's strengths and resources.

Kevin Feris, Boise State, and John Marshall, U Idaho, provided an example of siting criteria for evaluating alternative locations of NEON nodes and associated platforms. The spreadsheet format presented of binary and scalable variables generated a lengthy discussion that seemed to resolve into three general questions that needed to be answered before NoRMEO could finalize an evaluation system and siting criteria:

- 1) What exactly does NEON want, require? We need to know:
 - a. Siting criteria as NEON sees them
 - b. Flexibility of scale of urban-to-wild transect
 - c. Flexibility of scale of "platforms' footprint" within transect
- 2) What are the key questions the region would want to address as part of NEON?
 - a. How do these fit into the three key NEON questions?
 - b. What ancillary infrastructure/funding might be required to address the regional questions?
- 3) How can NoRMEO be competitive? Need to design a solid organizing framework that:
 - a. focuses on science questions
 - b. provides diverse educational opportunities
 - c. is open to all institutions, agencies, tribes in NoRMEO region

A discussion followed, of TASKS to be done within the NoRMEO planning effort. In summary, these were:

NEXT MEETING. It was agreed that representatives from Montana State University would host the next NoRMEO meeting at Bozeman. Dates were tentatively set at 9-10 March 2006, subject to change in NEON timing and COREO meeting dates.

SITING CRITERIA. It was resolved that NoRMEO would continue to try and get information from NEON, Inc. to address issues associated with siting criteria. That Kevin Feris and John Marshall (lead) would circulate the siting criteria through the NoRMEO mailing list for feedback on criteria. That any information that clarifies NEON, Inc's siting criteria would be forwarded to Kevin and John for them to use as guide in evolution of siting criteria

REGIONAL QUESTIONS. A committee was formed to identify *Regional Questions* to be forwarded for consideration at the next planning meeting. The volunteers for this committee were: Andy Hansen (lead) Katy Kavanagh, Anna Sala, Duncan Patten, John Marshall, Steve Running, Bob Gresswell and Cathy Whitlock. A chair was not selected, but would be picked by the committee.

REGIONAL DATA SETS. A task force to compile and inventory of data sets was formed consisting of: Steve Running (Chair), Geneva Chong, and Cathy Whitlock.

GOVERNANCE. Art McKee agreed to continue looking for good models of governance for NoRMEO with the intent of providing alternatives for consideration at the next meeting.

TEMPORARY EXECUTIVE COMMITTEE. At the September 2005 meeting in Moscow, ID a Temporary Executive Committee was formed but not completely populated. The Committee's charge was to guide NoRMEO planning until a more formal system of governance was established. Suggestions for additions to that Committee were considered and the committee now consists of:

Katy Kavanagh, U Idaho
Duncan Patten, Montana State U
Art McKee, U Montana
Dave Williams, U Wyoming
Dave Evans, Washington State U
Steve Katz, NOAA
Jeff Kershner, USGS-NRMSC
Kathy Tonnessen, RM-CESU--agreed
Russ Graham, USFS-RMRS

Art McKee agreed to contact Kershner and Graham (whose names were forwarded but were not present) to discuss participating in NORMEO.