

Dear Bromus REEEnet Colleagues,

It has been sometime since we've had a group-wide communication, and there are several updates that we would like to share. There has been a considerable amount of activity just implementing the infrastructure of the grant up to now, new discussions and interactions amongst members, and inquiries from others not formally in REEEnet about REEEnet. If you did not receive the full and abbreviated notes from the SLC meeting, let Matt G know, and of course any news relevant Bromus REEEnet (especially for the upcoming website and database).

- 1) **Subcontracts** to Colorado St U and USGS for the database development and REEEnet website were finally issued, recently. We thank these partners for their patience since December, as ISU worked its way through the paperwork following our continued "encouragement".
- 2) **Database:** Sheryl Atkinson emailed the group to solidify input on the structure of the database, and has established the data dictionary.
- 3) **Website:** We do not yet have a URL, but USGS set up a Quickr site to get the ball rolling (username is your name, eg. Matt Germino; password is bromus101). See http://quickplacepubwr.wr.usgs.gov/QuickPlace/bromusreenet/Main.nsf/h_Toc/7CB1ED9DCD9FCEAB852567C3006E2DBE/?OpenDocument
- 4) **Subgroups** (see SLC meeting subgroup notes below)

Integration of the social-economics aspect into subgroups is still requiring contemplation and implementation. There has been several follow-up discussions, but more action is needed.

Changing distributions under current and future climates:

- Matt G needs to produce an outline for synthesis on change in *Bromus* distributions.
- As planned, Bethany B submitted a USGS Powell Center proposal for "integrative ecological forecasting" for cheatgrass and other species. It was selected for funding (!), and the interdisciplinary group activities are in planning already, including members of this REEEnet subgroup.

Resistance, resilience, and transitions:

- Jeanne will be proposing some definitions for the group to discuss.
- A possible ARS postdoc to help facilitate this groups activity is being considered.

Adaptive management:

- Syntheses are underway
- See the pre-print of the first National Resource Inventory synthesis and relevant info on *Bromus* spread online, *Front Ecol Environ* 2010; doi:10.1890/100017

Appropriate restoration tools:

- Plans for a synthesis paper are still on the table, to be revisited Fall 2010
- EB-IPM will hold their second training session in Sept 2010 in Boise

Communication and technology transfer:

- As noted above, a temporary Quickr website is now available for collaboration use, and database development is well underway. Linda S is on leave from USGS, now that USGS has been given the contract, we can hope to establish the formal website.

5) USDA NIFA opportunities

The 2010 NIFA RFP came out this spring, and there was a short window of time to submit proposals. Recall that Michael Bowers had visited our SLC meeting and suggested that Bromus REEnet was poised to propose a large, transformative proposal that would be on the order of \$4M/y x 5 years. In the SLC meeting, Bromus REEnet decided to have a NIFA grant writing workshop in Fall 2010, near the end of October. As planned, we have already begun preliminary planning for developing a steering committee to guide the group through development of a proposal, which will occur largely during the fall writing workshop. The committee will produce an outline and plan for the proposal writing efforts, well in advance of the writing workshop. Please see the forthcoming Doodle scheduling links and requests for your input and involvement.

Some additional NIFA information: Bromus REEnet had decided at that point to not disrupt development of the networks goals in pursuit of these proposals. Matt G contacted Dr Bowers to ask REEnet's follow-up questions on whether phase-in and planning grants would be possible. It turned out that the new 2010 RFP stated that 1) the \$20M level of funding is for "Coordinated Agricultural Programs" (CAP) that do more than focus on exotics (eg. regional carbon, nutrient, and water budgets, see A3101 description below), 2) CAP proposals for rangelands are not being accepted for this year's RFP (deadline now passed) but, conveniently, they are one of the few foci for next year's RFP (2011, CAP area code A3101), and 3) for this years RFP, there was a call for planning grants for future CAP proposals (A3111). In addition to the A3101 program, there are more focused and smaller grant (eg, \$1M) programs that will accept proposals in 2011 (See A3141 program summary pasted below).

Matt G consulted with Jeanne C and Cini B on how to proceed with the 2010 RFP, and we felt that submitting a proposal for a planning grant (A3111 in 2010) would at least get some preliminary NIFA panel feedback and help keep the option open for a large A3101 proposal in 2011 from Bromus REEnet. Matt G then submitted a proposal, and would have used the funds to devote several months of a sabbatical towards the coordination efforts. The following abstract is from that NIFA A3111 planning grant proposal – it not funded, but did receive some useful comments for REEnet.

Title: Planning And Coordination For A Regional Integrated CAP: Mitigation And Adaptation To Climate Change And Exotic Grasses In Western Rangelands

Productivity of rangeland agroecosystems in Western North America has been markedly reduced by the interaction of exotic plants, climate change, and a complex range of socioeconomic and ecological pressures. Planning and coordinating activities are proposed to aid in developing a future proposal for a Regional Coordinated Agricultural Project (CAP) aimed at improving agroecosystem conditions of semiarid rangeland ecosystems. The proposal will integrate all aspects of the rangeland life cycle and adaptation and mitigation to climate change, with a focus on the most pervasive, extensive, and unifying agent of rangeland change: exotic annual grasses in the Bromus genus, including cheatgrass and red brome. The requested resources will be used to leverage the existing Bromus REEnet, a USDA AFRI Research, Extension, and Education network, to enable effective planning and coordination of researchers and

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extension specialists. Bromus REEnet provides a new and diverse network of 30 Bromus specialists and interactive web resources, database, and meeting-travel expenses to allow for efficient and effective networking. The current funding request is for the most critical proposal-development need, which is a person's time to foster communication in Bromus REEnet towards concensus on the content of a CAP proposal, and then to lead the preparation of the proposal. A proposal writing workshop will be held, and a CAP proposal will be submitted on mitigation and adaptation to climate change as it relates to spread, impacts, and management of exotic annual grasses in semiarid rangelands.

Reviewers rightly noted that Bromus REEnet can legitimately use its existing funds to have a NIFA proposal writing workshop. Again, please see some correspondence coming from us in the 2nd week of August on establishing plans for this activity. In the meantime, please feel free to emails questions, ideas, thoughts/recommendations on composition of the grant-writing coordinating committee, or any other news for Bromus REEnet.

Sincerely,

Matt Germino, Jeanne Chambers, Cini Brown

SLC Meeting Notes on subgroups

Group 1—Changing distributions of invasive species

Group members:

Bethany Bradley, Matt Germino, Steve Novak, Kristina Schierenbeck, (Beth Leger, Jayne Belnap, Cini Brown)

Goal: understand the factors affecting changing distributions at large, regional scales

Objectives:

- Improve regional scale models of current and future distributions
- Increase awareness of need for improved modeling
- Quantitative comparison of different modeling approaches (eg. bioclimate envelope vs. process based)
- Determine what spatially explicit data exists on *Bromus* occurrences for validating models, consider whitepapers or proposals for this need
- Syntheses will consider how we can know distributions now and in future (remote sensing), biogeographical controls and dispersal, population and evolutionary/genetic constraints, physiological and epigenetic/plasticity relationships to climate, relative importance of abiotic (climate) and biotic effects, large-scale feedbacks that affect change in distribution.
- Develop concepts and designs for experimental approach (large scale)
- Sensitivity of population dynamics (life stages) and relationship to climate
 - Plan climate manipulations at edges of distributions
- Observational transects along disturbance gradients to tease apart effects of climate and disturbance
- Establishment/transplant studies along elevational gradients

Action plans:

- Begin a synthesis document that serves as a template for a possible review paper submitted later (eg. ~in year) for publication (eg. on the topic of suitability of *Bromus* for range modeling) and posting to website - Matt
- Outreach to landscape/regional modelers—Bethany
- USGS proposal for integrated modeling paper w/ new focus on cheatgrass and support of group—Bethany is PI

Group 2—Resistance, resilience, and transitions

Group members:

Carla D'Antonio, Matt Brooks, Gene Schupp, John Stark, Jeanne Chambers, Cindy Salo, Jayne Belnap, Roger Sheley

Goal: to create tools that managers will use to assess resistance, resilience, and the likelihood of transitions

Objectives:

- Examine how systems differ in resistance and resilience (across/within ecoregions, ecological types)
 - Understand changes that alter resistance, resilience, and their interacting ecological effects
 - Climate, land use, fire, grazing, management activities
 - Understand ecological memory (history)
 - Website
- Define resistance, resilience and other issues
- Use visuals (including Whisenant's step model)
- Include conceptual frameworks of ecology (fluctuation resources, niche theory, etc)

- Synthesis of existing quantitative framework of info (esp. for all habitats in Great Basin, Colorado Plateau, Mojave, Columbia Plateau)
- Evaluation of applying it to larger spatial scale (plots to landscapes)
 - Possibly bring in focus groups of managers to query them about their knowledge/insights to determine if concepts/findings align with their perceptions
 - Turn synthesis of information into management recommendations
 - Synthesis would identify knowledge gaps and work towards proposal focused on critical experiments
 - Perhaps keep R and R and transitions separate² Can focus on resistance to Bromus, but resilience is a more general response to disturbance. Check literature and decide

Action plans/deadlines:

- Provide verbiage for definitions for the webpage (resistance, resilience, and transitions) by late March
 - Jeanne Chambers initiates, draw upon relevant PDFs, sent to Linda/Sheryl
- Synthesis paper
- Matt and Jeanne—pull together info about red brome from project in southern Nevada Science Synthesis for Southern Nevada Public Land Management Act (SNPLMA) Projects—with Burton Pendleton’s assistance
 - Region-wide—Roger Sheley’s will recruit an ARS postdoc to undertake majority of effort; he'll write request for a post doc for next funding cycle next summer.
- Outline of synthesis paper for comments—Matt (late March)
- Database on REE.net website—add data into resistance/resilience folders
- Jayne will check USGS (upper Colorado, Wyoming) and will talk to Linda
 - Jeanne will check USFS data archive
- Invest in grant-writing workshop—fall 2010 (instead of symposium)
 - Need to invite social scientists/economists to help understand how people make decisions, barriers to adoption, best ways to communicate

Group 3—Monitoring and adaptive management

Group members:

Mike Pellant and David Pyke

Goal: synthesis of current knowledge

- Tools used: NRI, FIA, weed database, EFR, Restoration
- Tools proposed: BLM ecoregional assessments
- Spatial scales: landscape, rapid assessment, detailed project level assessment

Objectives:

- Assess capabilities for monitoring
- Evaluate current methods for assessing and monitoring
- Invasive bromes at multiple scales (from remote-sensing to ground-based methods)
- Accuracy/precision of techniques, statistical reliability, consistency among land ownerships
- Current state of soil survey and state transition models, who, when completed, etc
- Determine current databases available and evaluate their usefulness (try to link them)
- Interdisciplinary multiscale experiments combining research, mgmt, extension
- Connections between assessments and genotypes of invasive species—yield genotypes of natives and invasives that cohabitate
- Other individuals to include—NRCS NRI, USFS FIA, BLM AIM, and ecoregional assessment reps, TNC, USGS EROS (landfire), Hines Foundation and SRR reps, NPS vital signs

Action plans/deadlines:

- Synthesis info on assessment/ monitoring tools

Group 4—Appropriate restoration tools

Group members:

Julie Beckstead, Cini Brown, Stuart Hardegree, Jeremy James, Tom Monaco, Brenda Smith, Beth Leger, Mark Brunson, Maria Fernandez-Gimenez, Marshall Frasier

Goal: assess/synthesize appropriate tools for restoration

Objectives:

- Synthesis of quantitative projects (e.g. rangeland seeding in invaded areas)
- White paper about the approach to management and restoration needs
 - Including social dimensions, agencies, prof societies, etc
- Research proposal to identify gaps
- Broaden expertise to include social dimensions

Action plans/deadlines:

- Synthesis paper
 - Develop methods for doing synthesis based on personal experience
 - Collect literature—diff topics assigned to various group members
 - Manuscript for submission

Group 5—Communication and technology transfer

Group members:

Linda Schueck, Sheryl Atkinson, Sean Finn

Goal: provide REEnet group information to members and the public

Action plans and deadlines:

- Get public website out—Linda (<30 days of collaborative site, end of March)
 - Meeting notes, timelines, etc
- Get timelines onto collaborative site—Sean (end of this week)
- Database—Sheryl (<30 days, end of March for initial stage, June/July for web publication)
 - Controlled vocabularies for queries
- When database has content, it will be incorporated into public website (May 31/over summer)

NIFA 2010 RFP INFO

Regional Approaches to Climate Change

Program Area Code – A3101

Regional Coordinated Agricultural Project (CAP) Grants must not exceed \$4,000,000 per year (\$20 million total, including indirect costs) for project periods of up to 5 years. Program anticipates making 5 to 8 awards in FY 2010.

Requested Project Type – Integrated Projects

Requested Grant Type – Regional CAP, Conference, and FASE Grants

Program Area Contact – Dr. Michael Bowers (202-401-4510 or mbowers@nifa.usda.gov)

A Regional Integrated CAP will bring together a multi-state, multi-institutional, and trans-disciplinary team to integrate scientific discoveries and technology with practical application. Project participants serve as a team that conducts targeted research, education, and extension activities in response to the goals of the Climate Change Program. A CAP contains the needed science-based expertise in research, teaching, and extension, as well as expertise from principal stakeholders and partners, to accomplish project goals and objectives. Applications should outline the potential of the project, the structure, coordination, and plan of implementation, and should achieve specific research, education, and extension milestones that will be evaluated during the study period.

Program Area Priority – Applicants must address the following:

Applications must demonstrate a well developed plan that addresses the mitigation, adaptation, education, and outreach goals within a region defined by climate variables (*e.g.*, precipitation, temperature):

In FY 2011:

Cropping systems: legume production systems, forage production systems

Animal systems: ruminant livestock production systems, dairy production systems

Forest systems: western conifers

Grassland, pastureland, and rangeland systems

These projects must be trans-disciplinary, involve multiple investigators, and address a significant regional issue with respect to greenhouse gas mitigation and adaptation through increased resiliency in agriculture production and sustainable natural resources management under variable climates. These Integrated Projects are expected to develop and implement a network for multi-institutional cooperation and coordination, data management structures, and defined milestones and goals for the duration of the project. Projects must increase capacity for institutional research, education, and extension to address climate impacts on agriculture.

Other Program Area Requirements:

All applications must adhere to the requirements beginning in Part IV (page 25).

Applications must include all three functions of the agricultural knowledge system (research, education, and extension). Each function should be represented by one or more objectives within the application.

Applications from and collaborations with Minority Serving Institutions are strongly encouraged.

Proposed projects must host a national conference on the regional issue of investigation.

Applications must conduct summer programs for undergraduate research experience and support graduate students under a program that includes agriculture and climate science.

Applications must also conduct an extension program that educates producers or the public and leads to measurable changes in behavior.

Education activities should:

- develop human capital relevant to program goals
- train students for Associate, Baccalaureate, Master's or Doctoral degrees; and/or prepare K-12 teachers and higher education faculty
- synthesize and incorporate a wide range of the latest relevant research results
- lead to measurable, documented changes in learning, actions, or conditions in an identified audience or stakeholder group

Extension activities should:

- conduct programs and activities that deliver science-based knowledge and informal educational programs to people, enabling them to make practical decisions
- include program delivery that may range from community-based to national and from face-to-face to electronic or combinations thereof
- synthesize and incorporate a wide range of the latest relevant research results
- lead to measurable, documented changes in learning, actions, or conditions in an identified audience or stakeholder group

The funded project is expected to achieve the following general milestones within the lifetime of the project. Failure to achieve these general milestones within a reasonable timeframe may result in the withholding of succeeding year funds or termination of the project.

- 1) Describe the existing monitoring networks within the region and how these existing networks will be used and/or supplemented through this activity. The project is expected to develop and implement a functional network of monitoring sites that will be used to measure and monitor stores and fluxes of water, carbon, nitrogen in the agricultural production system within the region. This network of sites should capture the spatial and temporal variability in stores and fluxes representative of the region.
- 2) Develop standardized methodologies for estimating the carbon, nitrogen, and water footprints of the system in the region and for evaluating the feedback linkages between changes in the agricultural product or production system with human behavior and decision-making. Analysis of these footprints should reflect information generated through the network of monitoring systems established in the region.
- 3) Establish the current baselines for carbon fluxes and energy, nitrogen and water use and storage in the region to advance coupled climate and agriculture models. The project must also inventory the set of existing agricultural or forestry productions practices that impact carbon, nitrogen and water within the region, and determine the links to current management practices.
- 4) Develop a suite of existing or novel approaches and management practices that leads to a net decrease in the footprints or increased carbon sequestration with a focus on long-term sustainability of the production system. This can include the use of modeling, classic/conventional breeding, genomics, or genetic technologies.
- 5) Conduct a comprehensive life cycle analyses of the agricultural production system. Life cycle analyses should include physical and economic supply chain information (e.g., fertilizer use, water sources - rainwater, surface and groundwater, or recycled water, and energy inputs to the supply).
- 6) Demonstrate the adoption of approaches and practices across the region to achieve reductions in greenhouse gas fluxes, and nitrogen and water use in the production system and document economic and social acceptance and/or implications for individuals, regions, funding agencies, and the economy from such changes. Regional projects should prioritize specific producers/managers where adoption of improved practices will have the greatest environmental benefit.

SEE ALSO, THIS OTHER NIFA PROGRAM:

Climate Change Mitigation and Adaptation in Agriculture

Program Area Code – A3141

Letter of Intent Deadline April 30, 2010 (5:00 p.m., ET); see Part IV, A (page 25) for instructions

Application Deadline – July 2, 2010 (5:00 p.m., ET) 12

Proposed Budget Requests –

Standard Grants must not exceed \$1,000,000 per year (\$5 million total, including indirect costs) for project periods of up to 5 years. Program anticipates making up to 13 awards in FY 2010.

Conference and Food and Agricultural Science Enhancement (FASE) Grants must adhere to the guidelines outlined beginning in Part II, D. 4 and 5 (page 17).

Requests exceeding the budgetary guidelines will not be reviewed.

Requested Project Type – Research, Education, Extension or Integrated Projects

Requested Grant Type – Standard, Conference, and FASE Grants

Program Area Contact – Dr. Ray Knighton (202-401-6417 or rknighton@nifa.usda.gov)

Program Area Priority – Applicants must address the following:

Applications must demonstrate a well developed plan that addresses the mitigation, adaptation, education, and outreach goals for the following plant and animal production systems:

Cropping systems: cereal production systems (e.g., corn, barley, wheat, rice, oats)

Animal systems: swine or poultry production systems

Forest systems: southern conifers

For Research Projects: Projects must demonstrate a well developed plan for achieving a reduction of agricultural emissions and an increase in carbon sequestration in agroecosystems (Mitigation) or an increase in resiliency and sustainability of agriculture production and natural resources under variable climates (Adaptation). Specific priorities for research are:

1. Develop or improve management options for climate change adaptation or mitigation in any of the following areas:

Soil carbon sequestration and storage under changing land cover and land use practices;

Sustainable joint use of nitrogen and water that optimizes yield and quality while reducing greenhouse gas emissions; or

Integration of coupled climate-agriculture models and technologies into decision support tools for climate friendly agriculture and natural resource management in large, medium or small scale production systems.

2. Develop or improve models and technologies for climate mitigation or adaptation in any of the following areas:

Forecast and control of weed, pest, disease, and invasive species outbreaks and the survival and distribution of insect pollinators brought about by climate variability and long-term climate change;

Systems level analyses to allow targeted and predictable breeding strategies in conjunction with natural resource management to optimize water and nitrogen use efficiency, nutrient utilization and carbon sequestration; or

Application of classical/conventional breeding and/or new technologies that utilize recent advances in genomic sequence information to develop new plant varieties and animal breeding lines that are adapted to changing climates and maximize greenhouse gas mitigation potential.

3. Develop or improve knowledge of how human behavior, decision, and choices affect carbon, nitrogen, water, and energy footprints in any of the following areas:

Impacts of alternative mitigation and adaptation strategies on the prosperity of small and medium-sized farms and on rural communities; or

Local, regional and national barriers for the adoption of on-farm technologies and practices that reduce carbon, nitrogen, water and energy footprints.

For Education Projects: Develop human capital relevant to the primary program goals for the AFRI Climate Change Program. Education Projects must address the priorities described below and focus on enhancing formal classroom instruction, laboratory instruction, and practicum experience. Projects may include faculty development, curriculum development, instructional materials and equipment, and innovative teaching methodologies to address climate change impacts in agriculture and forestry. Specific priorities for education are:

1. Increase capacity of agricultural programs to meet the teaching and research demands brought about by climate change through faculty development, improved teaching methods, workshops on climate and agriculture, and collaborative efforts and networking with faculty outside the traditional agricultural disciplines.
2. Develop trans-disciplinary curricula for agricultural sciences programs that include education on climate change.
3. Develop and provide structured research training and academic programs for undergraduate and graduate students that lead to an increased number of professionals with cross-disciplinary training in agriculture and climate science.

For Extension Projects: Extension and outreach programs must deliver science-based knowledge and informal educational programs to various communities. Extension Projects must address the priorities described below and enable individuals and groups to make informed decisions regarding the production and consumption of climate friendly agricultural goods and services. Specific priorities for extension are:

1. Develop materials and outreach programs that raise youth and adult consumer awareness of carbon, nitrogen, energy and water footprints of agriculture production and /or resulting products..
2. Develop appropriate training and resource materials for extension educators to achieve target goals of mitigation and adaptation in farm and forest production systems and promote preparedness for extreme and variable climate conditions.
3. Develop educational materials and outreach programs (in collaboration with eXtension, 4-H, Agriculture in the Classroom, or similar youth programs) on methods that youth, families and communities can use to reduce carbon, nitrogen, energy and water footprints in their community.

For Integrated Projects: An integrated project may be built around a single research, education, or extension priority (as listed above) or integrated with another appropriate function(s) (*i.e.*, research, education, extension) to achieve desired outcomes. □

Other Program Area Requirements:

All applications must adhere to the requirements beginning in Part IV (page 25).

Applications from and collaborations with Minority Serving Institutions are strongly encouraged.

Priority will be given to applications that can reduce the breeding cycle time and most quickly develop new plant lines, varieties, cultivars, and/or animals adapted to anticipated future conditions.

If a project is funded, the project will be required to coordinate with an appropriate Integrated Regional CAP as identified by the Program Area.