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SECTION 1: WELCOME

Congratulations on your position as a REACCH graduate student. You are part of a small group of dedicated scholars interested in climate science, agriculture and interdisciplinary research. We are excited to support your research and your development as an academic scholar. This document is intended to help organize some of the relevant information you'll need to successfully be part of the REACCH team as well as meet the requirements of your programs' degree.

1.1 THE REACCH-PNA PROJECT:

The *overarching goal* of Regional Approaches to Climate Change for Pacific Northwest Agriculture (REACCH, in this report) is to:

Enhance the sustainability of cereal production systems of northern Idaho, north central Oregon, and eastern Washington under ongoing and projected climate change while contributing to climate change mitigation by reducing emissions of greenhouse gasses.

Scientists, educators and students from diverse disciplines and four institutions are working together in a transdisciplinary effort with stakeholders to ensure results are innovative, useful and impactful. The context of this project is global, but the focus is regional because of the unique climatic conditions, agricultural systems, social and economic conditions that pertain in the Inland Pacific Northwest.

1.2 REACCH OVERVIEW

Climate Science Northwest Farmers Can Use

An overview: who we are, why we're funded and what we are doing

Managing agricultural systems efficiently, profitably and sustainably is a tremendous challenge. In the US we have addressed this challenge for generations through partnerships between farmers, agricultural industries, researchers at land grant universities and the USDA Agricultural Research Service. The evidence is clear that climates are changing globally and in the US. Climate change will … "add another layer of complexity and uncertainty onto …[an agricultural] system that is already exceedingly difficult to manage on a sustainable basis" (Coakley et al. 1999). To address anticipated effects of climate change on US agricultural systems, the National Institute for Food and Agriculture (NIFA) has funded more than 30 projects nationally within its the Climate Variability and Change Program within the past two years. The broad goals of NIFA's programs are to work with producers to assist them in adapting to projected climate variability and change ("adaptation"), and to minimize agriculture's emission of greenhouse gasses (GHG) that contribute to climate change ("mitigation").

REACCH is a $20 million, five-year NIFA project that aims to ensure the long-term viability of cereal-based farming in the Inland Pacific Northwest (IPNW) amid a changing climate and to identify farming

practices that can help reduce agricultural greenhouse gas emissions. Our project is a partnership involving scientists and educators from three land-grant institutions (Oregon State University, the University of Idaho and Washington State University) and the USDA's Agricultural Research Service in the Pacific Northwest. REACCH will build upon the legacy of research and extension to improve soil conservation and the efficiency and profitability of the region's production systems, but differs in the breadth and depth of its integration. Research, extension and education efforts will integrate diverse elements such as climate modeling, cropping systems modeling, economics, agronomy, crop protection and others in a transdisciplinary manner. Critical to the success of this effort is ensuring that our project communicates effectively with farmers, industry personnel and other stakeholders and partners with them to achieve the adaptation and mitigation goals of REACCH.

Adaptation

For the Inland Pacific Northwest, climate models are consistent in projecting warmer temperatures, especially in the summer months and many project trends for drier summers. Within REACCH we aim to use the best available models to project conditions for farming and to test alternative production practices suitable for those conditions. The alternatives we will consider include intensification of cropping systems, greater cropping system diversity and use of biofuels, amendments that promote greater nutrient cycling and use efficiencies, and reduced tillage that enhances soil C sequestration. Climate will also change pressures from some pests, weeds and diseases. REACCH is working to anticipate these change and their implications for management.

Mitigation

GHG (carbon dioxide, nitrous oxide and methane) trap heat in the atmosphere, contributing to increasing global temperatures and associated shifts in climates. Direct GHG emissions from agriculture account for at least 6% of total US emissions from all sources (US Environmental Protection Agency (EPA)) and 12% worldwide (Intergovernmental Panel on Climate Change). Farming practices that store more soil carbon and reduce nitrous oxide and methane emissions could reduce overall GHG emissions by 5 to 14% according to some estimates. Examples include adoption of precision nitrogen management that increases nitrogen use efficiency thereby reducing nitrous oxide emissions, and conservation tillage practices that sequester more soil C and improve soil productivity and sustainability. REACCH will assess the potential of these approaches to reducing emissions and assist with adoption.

Opportunities

Fortunately, efforts to achieve adaptation and mitigation are coupled, presenting the potential for win-win scenarios for agriculture. Farming practices that improve nitrogen use efficiency, carbon storage and resilience to changing climates can be more profitable while they address GHG mitigation goals. REACCH activities will seek to identify these win-win opportunities and help industry realize them. The work of REACCH will provide the tools and decision support to meet effectively and profitably any proposed agricultural emission standard in our region and to ensure that any standards are reasonable and science-based.

Partnerships

REACCH is benefiting from close cooperation with other regional projects to make the best use of our resources and the legacy of research, education and extension in the region. We are working closely with the two other large coordinated agricultural projects (CAPs) funded by NIFA to address climate

variability and change: the Sustainable Corn project led by Iowa State University and PINEMAP, the southern pine project, led by the University of Florida.

REACCH and the Future

A successful REACCH will not only help our region's agricultural systems respond to climate variability and change, but will also establish integrated approaches that can address other emerging challenges as they arise for the region's agriculture such as changing commodity prices, costs of inputs, emerging pests and diseases and others. Our project aims to establish the networks and infrastructure that will prepare us to meet these challenges.

1.3 REACCH, PINEMAP, CORN-CAP

REACCH is one of three NIFA USDA sponsored grants of its kind. In the southeast, PINEMAP and in the Midwest, the CORN-CAP project teams are working to:

PINEMAP

PINEMAP focuses on the 20 million acres of planted pine forests managed by private landowners in the Atlantic and Gulf coastal states from Virginia to Texas, plus Arkansas and Oklahoma. These forests provide critical economic and ecological services to U.S. citizens. Southeastern forests contain 1/3 of the contiguous U.S. forest carbon and form the backbone of an industry that supplies 16% of global industrial wood, 5.5% of the jobs, and 7.5% of the industrial economic activity of the region. PINEMAP integrates research, extension, and education to enable southern pine landowners to manage forests to increase carbon sequestration; increase efficiency of nitrogen and other fertilizer inputs; and adapt forest management approaches to increase forest resilience and sustainability under variable climates.

CORN-CAP

A transdisciplinary team from 10 Midwestern Land Grant Universities and one USDA Agricultural Research Service laboratory is focusing on mitigation and adaptation strategies within corn-based cropping systems in response to long-term weather variability. A network of 26 sites across the region provides baseline measurements on greenhouse gases, carbon, nitrogen and water usage. The team is assessing the dominant corn-soybean rotation and a variety of crop management practices including tillage, cover crops, extended crop rotations, drainage water management and nitrogen management techniques. Data from each site are recorded in a central database and available to all team members. Researchers are applying physical, climatic, and socio-economic models to derive the data's "real world" implications. Team members are studying social and economic findings, working directly with producers and stakeholders to develop crop management practices that consider climate uncertainty and environmental sustainability. Researchers are also assessing the data's social role and how changes in public policy could affect the models. Extension and education will transfer what the team learns to science teachers and farmers.

1.4 REACCH OBJECTIVES

RESEARCH ACTIVITIES (OBJECTIVES 1-5 AND INTEGRATING THEMES)

The long-term environmental and economic sustainability of agriculture in the Inland Pacific Northwest (northern Idaho, north central Oregon, and eastern Washington) depends upon improving agricultural management, technology, and policy to enable adaptation to climate change and to help realize

agriculture's potential to contribute to climate change mitigation. To address this challenge, three land-grant institutions (Oregon State University, the University of Idaho and Washington State University) (OSU, UI, WSU) and USDA Agricultural Research Service (ARS) units are partners in a *Regional Consortium for Agricultural Sustainability* [the Consortium] aimed at ensuring the long-term viability of the region's cereal-based agriculture.

Overarching Goal

• Enhance the sustainability of Inland Pacific Northwest (IPNW) cereal production systems under ongoing and projected climate change while contributing to climate change mitigation.

Supporting Goals

• Develop and implement sustainable agricultural practices for cereal production within existing and projected agroecological zones throughout the region as climate changes.

• Contribute to climate change mitigation through improved fertilizer, fuel, and pesticide use efficiency, increased sequestration of soil carbon, and reduced greenhouse gas (GHG) emissions consistent with NIFA's 2030 targets.

• Work closely with stakeholders and policymakers to promote science-based agricultural approaches to climate change adaptation and mitigation.

• Increase the number of scientists, educators, and extension professionals with the skills and knowledge to address climate change and its interactions with agriculture.

PROJECT OBJECTIVES

Our proposed project *Regional Approaches to Climate Change for Pacific Northwest Agriculture* (REACCH-PNA) will pursue eight interrelated objectives concerning complex climate related issues facing agriculture in the region. We group these objectives under three focus areas: RESEARCH, EDUCATION AND EXTENSION, and CAPACITY BUILDING. The project's success will depend on skillful transdisciplinary integration of these objectives due to the complexity of climate change adaptation and mitigation; we develop an approach for this under Objective 9.

RESEARCH

1. Create a theoretical framework that integrates biophysical and socioeconomic aspects of regional cereal production systems under current and projected climate scenarios.

2. Establish a baseline and monitor changes in soil carbon and nitrogen levels and GHG emissions related to mitigation of and adaptation to climate change in the region's agriculture.

3. Determine the effects of current and potential alternative cropping systems on GHG emissions and carbon, nitrogen, water, and energy budgets as well as local and regional farm income impacts using models and replicated field trials.

4. Determine social and economic factors influencing agricultural management, technology adoption, and development of policy to improve production efficiency while mitigating greenhouse gas emissions.

5. Anticipate and develop approaches to climate-related changes in crop protection requirements and the effects of beneficial biota within cropping systems.

EDUCATION AND EXTENSION

6. Introduce innovative agricultural approaches to climate change mitigation and adaptation into K-12 and undergraduate and graduate curricula to prepare citizens and professionals for climate related challenges and defining agriculture's role in providing food, energy and ecosystem services.

7. Incorporate stakeholder perspectives and needs in research design and translation of science into policy and practice that is effective for climate change mitigation and adaptation through enhanced extension networks and capacities.

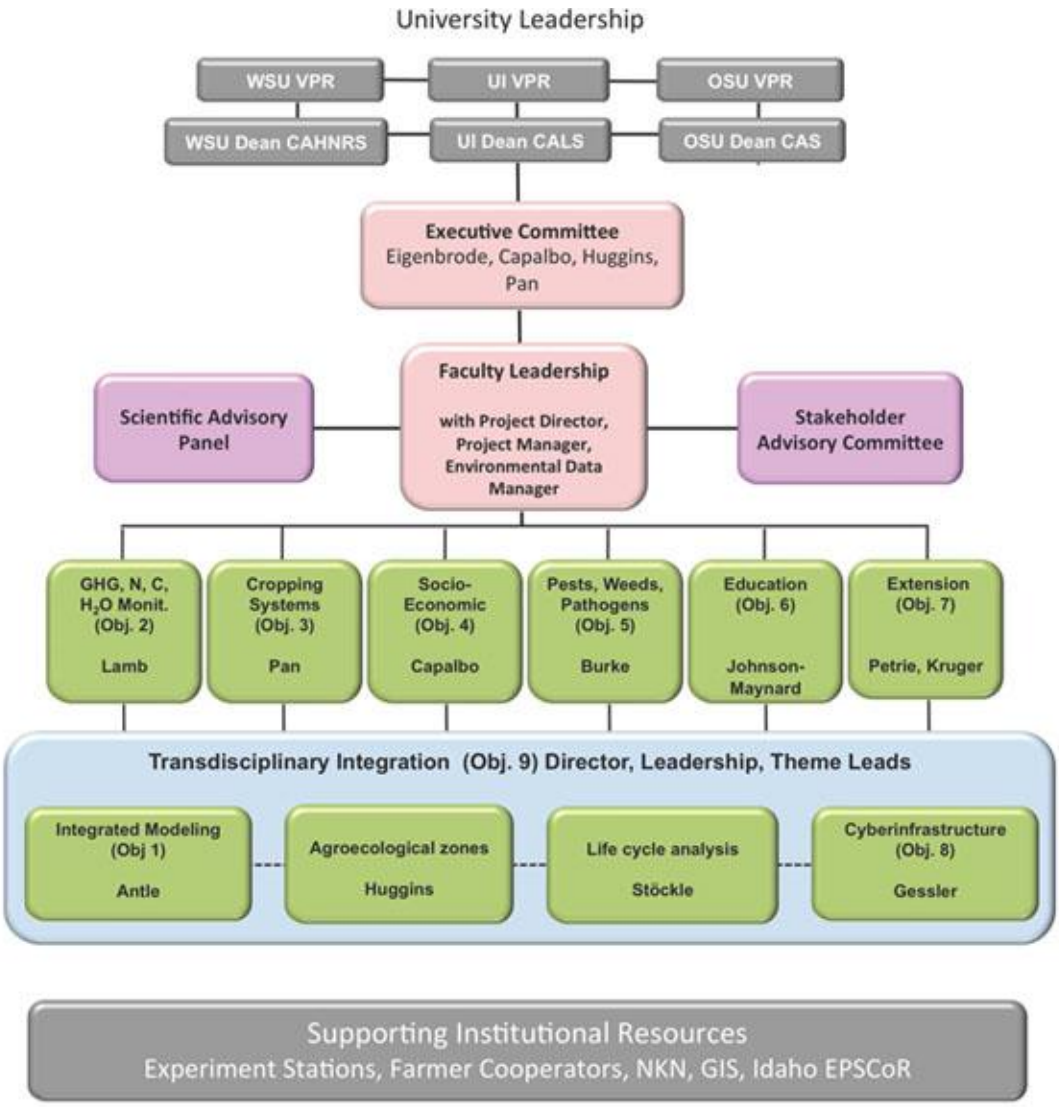
CAPACITY BUILDING

8. Develop the regional capacity for continued, long-term research, education, and extension efforts to mitigate and adapt to climate change.

PROJECT-WIDE INTEGRATION

9. Address climate change effects with a transdisciplinary research focus to enable researchers stakeholders, students, the public, and policymakers to acquire a more holistic understanding of how agriculture is interrelated with climate change.

1.5 REACCH HIERARCHY AND ORGANIZATION



SECTION 2: REACCH GRADUATE STUDENTS

2.1 Graduate student institutional requirements

Each graduate student must meet requirements in their disciplinary field of study at their home institution in terms of preliminary exams, number of credits, specific required courses and dissertation guidelines. Please see the specific guidelines available on the graduate college website of each institution for details.

Washington State University: http://www.gradschool.wsu.edu/

Oregon State University: http://oregonstate.edu/dept/grad_school/

University of Idaho: http://www.uidaho.edu/cogs

2.2 TIMELINE OF MAJOR EVENTS

REACCH faculty have developed goals in training graduate students. A rubric available in Section 4 suggests skills that all REACCH graduate students should have at the end of their PhD experience. To facilitate the development of these skills REACCH faculty will provide opportunities including courses, webinars and workshops, seminars and experience with the development of educational and extension materials for all REACCH students. While the timing and details may vary according to prior preparation and other individual circumstances, students are expected to follow the guidelines below. Please consult with your advisor and committee members often and provide them with regular updates of your progress. See the Curriculum Guidelines section of this handbook for details on course offerings . **Please note that the following guidelines are in addition to those established at your home institution and to your field/laboratory research. The field/laboratory research component will be determined by the student, major advisor and committee.**

1. Graduate Student Retreat (Year 1 early fall, Year 2,3,4 summer): We will begin by building community among the students and faculty, discussing program requirements and opportunities and providing short exercises on trans-disciplinary communication at our first retreat. In future years a shortened version of this retreat will allow face-to-face time for student groups to make progress on project requirements and for students to connect with faculty. Short informative sessions targeting specific skills will be included. All graduate student meetings are mandatory for REACCH-funded students.

2. Objective Team Meetings (on-going, years 1-4): REACCH graduate students should attend objective team meetings regularly as well as the weekly integration meetings. These meetings will provide a mechanism for keeping in touch with project updates as well as deadlines and expectations. In terms of

professional development, these meetings will also provide opportunities for students to become involved in projects outside of their disciplinary fields as well as insight into project management.

3. Graduate committee (Year 1): In addition to your individual program requirements (discuss these with your major advisor) each student is expected to include at least one REACCH faculty in addition to the major advisor on the research committee. The additional REACCH committee member may be from within or outside of the student's home institution and REACCH objective team.

4. Study plan (Year 1): Please refer to the Curriculum Guidelines section of this handbook while preparing your study plan with your advisor and committee members. It is the responsibility of the major professor to ensure that the minimum requirements listed in the Curriculum Guidelines section of this handbook are met. Students and faculty advisors are welcome to contact REACCH education objective team members with any questions.

5. Interdisciplinary extension or education product (Year 1-product completion): Students will work in interdisciplinary groups to work on the development of either an education or extension based project (as described on page 13). Teams need to be formed during the first year that a student is REACCH funded. Faculty will assist with team development during the first retreat and at follow up events throughout the year. A description of the proposed education or extension product is due March 29, 2013). See details and format for project descriptions on page 14.

6. REACCH sponsored webinars (1-2 per semester every year): These workshops are intended to provide a minimum level of knowledge among all REACCH graduate students despite study area and background. Webinars will be announced through email and on Central Desktop by the education coordinator at least 1 month in advance.

7. Nitrogen/Carbon Cycling course (Year 1 or 2, spring semester): Students in the biophysical sciences are expected to complete a course focusing on Carbon and Nitrogen biogeochemistry and global change. Students in other areas (economics and education) will complete this requirement by either taking the course or by participating in a webinar covering the basics of these cycles. See Curriculum Guidelines for more details.

8. Annual project meeting (Years 1-4, Feb.): This mandatory event will allow students and faculty to share current research and communicate within and across objective teams. Please discuss travel plans and presentation requirements with your advisor well in advance of the meeting. Students will be expected to make presentations on their research as appropriate and to demonstrate progress made towards the interdisciplinary group projects.

9. Field tour (Years 1-4, Summer): The REACCH annual field tour offers the opportunity for all students to see experiments at field sites across the project area. Additionally, it is an excellent opportunity to connect with faculty from across the project.

10. Data analysis/GIS short course (2013): This course will be offered by REACCH faculty and will utilize a combination of face-to-face and distance communication. Students will be given credit for this course at their home institutions where they will be enrolled through a directed study. Each student should gain experience equivalent to a basic, introductory GIS class prior to the course. See Curriculum Guidelines for more suggestions.

REACCH CURRICULUM GUIDELINES

1. GIS/AEZ course

Rationale- REACCH faculty strongly believe that to be competitive in today's job market and to integrate effectively into the project all students need to have strong GIS skills and the ability to integrate data across disciplines. Methods of data integration including GIS, Life Cycle Analysis (LCA) and the Agroecological Zone (AEZ) concept will be utilized as tools in this short course.

All students are expected to gain basic knowledge of GIS prior to taking the required REACCH course. If you have not already taken a basic GIS class, or acquired this level of knowledge of GIS through professional experience, you can take the basic course at your home institution (UI=Geog 385; WSU=ES/RP 385; OSU=Geo 365) or complete the ESRI online course "ARC GIS 1: introduction to GIS (http://training.esri.com/gateway/index.cfm). Review these options with your advisor to gain his/her input on which option best fits your needs.

The intermediate GIS/Data integration course will be offered during 2013 and includes more detailed experience with GIS as well as guided experience in application of the AEZ concept to data sets. This course will be offered through a webinar type format to all REACCH graduate students during the same time period. A REACCH faculty member at each institution will open a graduate level directed study so that students will receive academic credit for the course. The course, therefore, could be listed on each students study plan.

2. Carbon and nitrogen cycling course

Rationale- The carbon and nitrogen cycles within agroecosystems control the flux of major greenhouse gasses. Students in each field of study under the REACCH umbrella, therefore, need to have a basic understanding of the processes and controls of these cycles as well as how common management practices may influence the products.

This REACCH requirement may be fulfilled in different ways depending on the student's background, discipline of study and location. Physical science students need to take the following course at their home institutions:

1. WSU- Biol/SoilS 544: Nitrogen Cycling in Earth's Systems or Biol/ES/RP 569: Ecosystem Ecology and Global Change
2. UI- Biol/ES/RP 569: Ecosystem Ecology and Global Change
3. All other students may take the courses above or complete the requirement by participating in a REACCH offered webinar/workshop focused on these topics (Fall 2013).

*Note that UI students must "apply" to take courses at WSU. See requirements at http://www.uidaho.edu/registrar/registration/coop

3. Other webinars/workshops
Rationale- In order to provide the required training for students to be successful within the project and beyond, we will offer 1-2 webinars or in-person workshops during each semester.

Topics for year 2 include:
-agroecological zone concept
-communicating with stakeholders
-data management

One week following the webinar/workshop, students will submit a feedback form (provided by the Education Committee). This form will serve as a way for us to evaluate whether or not the webinar/workshop met the learning objectives and include a reflection on how the student may incorporate the new knowledge into their current and future research, teaching and/or extension activities. Students are encouraged to suggest topics of interest throughout the project.

REACCH Interdisciplinary Extension or Education Products

Rationale- It is widely recognized that many of the complex problems facing human societies must be addressed through interdisciplinary collaboration. This understanding is reflected in numerous calls from federal agencies for integrated or interdisciplinary projects, and the trend at universities to establish interdisciplinary programs and curricula. Future scientists will increasingly be expected to possess the skills and capacity to work effectively in interdisciplinary teams. To help meet this need, REACCH graduate students will not only be exposed to the unique and richly collaborative culture within the project, but will be asked to develop interdisciplinary projects as part of their training. REACCH provides several opportunities for students to work together to address aspects of the education and extension dimensions of the project, thereby helping to contribute to project impacts while gaining skills and experience in collaborating across disciplines. The projects are envisioned to involve two or more students working together for several months to generate a product such as a high school curriculum module or exercise, or an extension publication or other product targeting REACCH stakeholders. Some ideas for these projects were explored during the initial graduate student retreat held in Sept. 2012. Other potential ideas for projects are outlined below. Students are encouraged to work together and with their major professors to develop an approach to one of the ideas as outlined or to develop unique project ideas consistent with the objectives of this exercise.

Project proposals- In order to help you prepare and organize your extension or education project, the education objective team requests that each group of students complete a 2-page project description form (located at the end of this document) (Due Friday, March 29, 2013). The project description form will help the education committee assist each student group in developing a product that will be adopted by teachers or other stakeholders. The education objective team will also pair students with project faculty and staff with the expertise they require and help students obtain necessary resources.

Project execution- While interdisciplinary projects may vary in nature and scope, the following are elements of an acceptable and successful project.

Project scope and timeline- The project scope and objective should be based on a perceived or documented (in the literature) need within the stakeholder community. Stakeholders may be farmers, policy makers, K-12 educators, etc. Students should discuss project ideas with faculty mentors and potentially to REACCH stakeholders regarding whether or not their project ideas represent a need. Projects should be designed in a manner that will allow them to be completed within a semester. Deviation from the timeline created as part of the project proposal may occur and is acceptable as long as progress is being made. Projects may be completed at any time prior to a student's graduation.

Communication- Projects should require substantial communication among students and faculty mentors. Students may meet weekly while working on the project. Communication among students at different campuses is encouraged and facilitated through GoToMeeting. Talk to your faculty advisor(s) or members of the education objective team for assistance with distance communication tools.

Interdisciplinary aspects- Projects will be completed in groups of at least two students from different disciplines. Students from each discipline will play a significant and necessary role in designing, carrying out and presenting the final product.

Presentation- Each student group will present progress on their project at REACCH annual meetings and will present their completed projects at either the annual meeting or similar event that includes stakeholders.

Project evaluation – Projects will be evaluated by the REACCH education committee and the students' major professors, using the following rubric. If circumstances prevent a student from carrying out a project as outlined here, alternative activities that provide equivalent experience with integration and communicating with stakeholders or educators can be arranged in consultation with the education committee, but will be evaluated using the following rubric.

Extension or Education Product Rubric	Does Not Meet Expectation	Meets Expectation	Exceeds Expectation
Multi-disciplinary teams	Works alone or with team members within objective and discipline	Collaborates with an additional student outside of discipline	Collaborates with students and faculty from several different disciplines and objectives
Product addresses a need in the PNW community	Product does not directly address a identified community need or REACCH objective	Product relates to a perceived need within stakeholder community and is directly related to at least one REACCH objective	Product relates to a documented need within the stakeholder community as assessed (formally or informally) by students
Ability to translate scientific data to multiple stakeholder communities	Product is written with scientific jargon and content specific language that is not accessible to a lay audience	Product is written or presented with lay language and visuals, some expert interpretation may be necessary	Product is written or presented with lay language and visuals and can be utilized without the support of expertise of student or faculty
Stakeholder Usabiltiy	Product is produced in a way that is not useful or accessible to stakeholder populations	Demonstrates ability to administer and coordinate as well as provide multiple opportunities for stakeholders to utilize products using a written or web based complement to disseminate information	Demonstrates ability to administer and coordinate as well as provide multiple opportunities for stakeholders to utilize products. Involves an activity or tool that stakeholders can utilize after initial contact
Communication to larger community	Project is in written format and not presented to the larger REACCH or stakeholder community	Project is presented to larger REACCH community including REACCH stakeholders	Project is presented to REACCH community and to stakeholders at a station field day, in a K-12 classroom, at a teacher training workshop or similar activity

Example Products

Students will create extension or education products related to climate change and/or agricultural sustainability. Some projects may be useful for both extension and education audiences. The delivery mode may be varied and creativity is encouraged. Options include, but are not limited to interactive websites, extension publications, downloadable apps, creation of or contributions to a community of practice on eXtension (www.extension.org), or a series of talks or power point lecture slides for teachers on a particular subject. Remember that students will have access to all REACCH resources- faculty time, equipment, cameras, etc. to accomplish the project. A few potential projects include:

1. Translation of scientific data to a general audience through development of an extension based publication or webpage. Specific subject areas of interest include C and N cycling basics, expected impacts of climate change in the Inland Pacific Northwest, nitrous oxide production and measurement overview, etc.

2. Demonstrations of important conservation principles such as infiltration and the behavior of soil water in different textured profiles. Mesocosms could be established to demonstrate the influence of soil texture, compaction or biotic activity on water infiltration in agricultural soils. The mesocoms could be used by K-12 teachers and displayed at field days and other grower meetings. Additional adaptations could include redistribution of weed seeds in soils by burrowing organisms, or the relative ability of different earthworm species to reduce the impact of plow pans.

3. Demonstrations or guides for stakeholders on how to use online resources and data sets on the REACCH website for improved knowledge of climate, soil properties and management and decision making. These demonstrations could be done in person, made into videos for posting on the REACCH website, or developed into HTML guides for integration into the portal.

4. Development and testing of a series of hands-on activities to teach K-12 students important concepts such as: where food comes from, limiting factors (nutrients, water, temperature, etc) to plant growth, or soil as a source of CO_2 and other greenhouse gases.

5. Development of a series of short videos that highlight careers, and career pathways, in Agriculture and Climate Science through interviews with faculty, stakeholders, agency partners etc.

6. Development and dissemination of kits that have materials needed (and instructions) for hands-on activities related to the REACCH K-12 curriculum (ag. ed. 515). Kits may include soil probes for nitrogen testing, soil sieves for use with soil texture lessons, strips for pH testing, soil moisture cans, etc. Contact Dr. Kat Wolf or Troy White for information on specific lessons in Ag.Ed. 515.

7. Creation of a short video illustrating a principle or technique that producers could use in the field (wireworm or aphid sampling, for example), that also incorporates broader context information about regional patterns and potential climate drivers of these patterns.

8. Creation of a fully developed prospectus for an outreach product suitable for development into a mobile application for use by producers or other stakeholders. While the development of such applications is a REACCH goal, effort required to complete the first steps of information gathering and conception of the user interface is estimated to take adequate time and effort to be an acceptable interdisciplinary product.

REACCH Extension/Education Project Description Form

Due March 29, 2013

Proposed Project Title:

Project Investigators (include all participating students):

Project Abstract (not to exceed 250 words)

Analysis of expertise skills (for each project member, list specific skill sets and expertise in education, research and/or extension):

Target audience (brief description of the type of audience your project will target):

Resources (briefly describe any resources that your project will require):

Timeline (provide a start date, major milestones and expected end date for your project):

SECTION 3: MS and Post-doctoral Researchers

Master of Science Students

Students completing MS degrees may be funded through the REACCH project. All MS students are expected to attend required REACCH meetings and graduate student webinars while they are REACCH-funded. Students starting their MS degree as a REACCH student should complete the REACCH required courses. Students entering the program after 1 year of funding through another program are encouraged, but not required to take REACCH-required courses. REACCH MS students should participate in interdisciplinary groups and contribute to the development of extension/education products, but are not expected to take a leading role. All MS students should discuss their specific situation and timeline with the major professor and REACCH Education Committee.

Post-Doctoral Researchers

Post-doctoral researchers are required to attend all REACCH annual meetings as well as their objective team and integration meetings. Post-doctoral researchers are strongly encouraged to participate in the development of interdisciplinary education and extension meetings. These interactions will provide valuable mentoring experience for post-doctoral researchers. Post-doctoral mentors will also be listed as co-authors on any extension and education product that they help develop. Post-doctoral researchers are also encouraged to attend all graduate student workshops and webinars, which will provide skills in multiple areas as well as in interdisciplinary research and communication.

SECTION 4: REACCH Faculty Mentors

Advising a REACCH student provides an excellent experience to advance your disciplinary research, train top-notch students, and to participate in cross disciplinary research. Requirements of REACCH faculty mentors include the following:

1. Become familiar with the REACCH requirements for graduate students covered in this handbook.
2. Support your graduate student in completing these requirements by allowing time to complete interdisciplinary products and attending REACCH meetings.
3. Cover required travel to REACCH annual meetings and other required events.
4. Attend education objective team meetings relative to graduate student training.
5. Look for Education objective team meeting minutes and emails sent from the REACCH education coordinator and/or objective team lead.
6. Send items of interest such as job opportunities, trainings, etc. to REACCH education coordinator to pass on to all students.
7. Communicate any concerns you have regarding your student to the REACCH education objective team immediately.
8. Refer to the REACCH mentor checklist below as a guide.

REACCH Graduate Mentor Checklist

Requirement	Date completed	Notes
1. Committee including an additional REACCH faculty member formed		
2. Study plan (including REACCH required course(s) submitted to Education Objective team lead		
3. Webinars attended (1-2 per year)		
4. Student presented at annual meeting		
5. Student working as part of interdisciplinary group on education/extension product		
6. Student's group submitted Interdisciplinary project description to REACCH Education Objective Team		
7. Student attended REACCH graduate student retreat		

The following rubric is to be used as a general assessment tool in determining whether your student is achieving project goals.

REACCH Graduate Student Learning Outcomes	Does Not Meet Expectation	Meets Expectation	Exceeds Expectation
Communication Skills within project	Maintains communication within discipline group. Does not communicate across objective teams or institutions.	Communicates across disciplines within the REACCH research group with ease and efficiency. Able to empathize and understand various viewpoints and identities within the scientific community.	Facilitates communication across objectives and institutions when need and opportunity arises. Comfortable communicating with other students and other faculty.
Content expertise	Exhibits competence in studied discipline but is unable to make content connections to	Exhibits expertise in studied discipline (passes preliminary exams) and makes connections across one or	Exhibits expertise in studied discipline and seeks out content connections across REACCH content areas.

	other disciplines.	more REACCH content areas.	
External Communication with Stakeholders	Does not communicate with community members and stakeholders.	Communicates on behalf of REACCH with community members and stakeholders to contribute to the development of stakeholder educational materials/activities.	Facilitates communication and connections with external community members. Integrates multiple stakeholder points of view in their work.
Awareness of disciplinary connections	Awareness of content related aspects of their field. Has not taken coursework in supporting content areas: GIS, AEZ and Carbon and Nitrogen Cycling	Awareness of supporting functions of field such as teaching, administration, project management and outreach. Has taken coursework in supporting content areas: GIS, AEZ, and Carbon and Nitrogen Cycling.	Participation in multiple aspects of field including teaching, administration, project management and outreach. Has taken coursework in supporting content areas: GIS/AEZ, and Carbon and Nitrogen Cycling; demonstrates expertise in integrating the information into their work.
Collaboration across disciplines	Does not collaborate with REACCH graduate students and researchers outside objective or content team.	Collaborates across REACCH objective teams and institutions to produce shared research efforts, outreach materials, or other products that benefit the research community or the greater REACCH community.	Initiates efforts to collaborate with students and researchers to produce shared research efforts, outreach materials, or other products that benefit the research community or the greater REACCH community.

SECTION 5: CONTACT INFORMATION AND RESOURCES

REACCH Faculty List

Name	Email	Phone	Objective Team
Jodi Johnson-Maynard	jmaynard@uidaho.edu	(208)885-9245	Objectives 5,6
John Abatzoglou	jabatzoglou@uidaho.edu	(208)885-6239	Objective 1
John Antle	john.antle@oregonstate.edu	(541)737-1425	Objective 4
Jonathan Velez	jonathan.velez@oregonstate.edu	(541)737-1336	Objective 6
Kate Painter	kpainter@uidaho.edu	(208)885-6041	Objective 4
Kattlyn Wolf	kwolf@uidaho.edu	(208)885-6358	Objective 6
Paul Gessler	paulg@uidaho.edu	(208)885-2595	Objective 8
Philip Mote	pmote@coas.oregonstate.edu	(541)737-5694	Objective 1
Sanford Eigenbrode	sanforde@uidaho.edu	(208)885-2972	REACCH Project Director, Objective 5
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