

REACCH Management Plan Draft

Adopted May 11, 2011

Overview of the Management Plan

This management plan has been established to promote the scientific excellence, transdisciplinary integration, thematic focus, and successful education, extension, and outreach objectives for the REACCH PNA project. The management structure and approach have been developed to ensure that: 1) overall project and subproject milestones and deliverables are achieved in a timely and coordinated manner, 2) communication is maintained among researchers, educators, stakeholders, research facilities, and institutions throughout the duration of the project, 3) activities and processes within objective teams and cross-cutting themes are effective and function smoothly, 4) implementation of findings is maximized, 5) potential for conflicts among project personnel and stakeholders is minimized.

The plan has been developed and will be executed following established process-based project management protocols for large-scale engineering and development projects (Nokes and Kelly 2008, PMI 2008). Goals and targets and assessment criteria have been set using, to the degree feasible, the S.M.A.R.T. approach, interpreted by us as follows (Specific, Measurable, Attainable, Relevant, Timely) (Doran 1981).

Context

PROJECT MISSION STATEMENT
Enhance the sustainability of Inland Pacific Northwest (IPNW) cereal production systems under ongoing and projected climate change while contributing to climate change mitigation.
Goal Statements
<p>Research</p> <ul style="list-style-type: none"> • 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.
<p>Extension and Outreach</p> <ul style="list-style-type: none"> • Work closely with stakeholders and policymakers to promote science-based agricultural approaches to climate change adaptation and mitigation.
<p>Education</p> <ul style="list-style-type: none"> • Increase the number of scientists, educators, and extension professionals with the skills and knowledge to address climate change and its interactions with agriculture.
<p>Capacity Building</p> <ul style="list-style-type: none"> • Develop the regional capacity for continued, long-term research, education, and extension efforts to mitigate and adapt to climate change
<p>Integration</p> <ul style="list-style-type: none"> • Address climate change effects with a transdisciplinary research, education, extension approach to enable researchers stakeholders, students, the public, and policymakers to acquire a more holistic understanding of how agriculture is interrelated with climate change

Organizational Structure.

Table M.1 lists the entities that comprise the organizational structure of the project with their specific roles. The project involves faculty and facilities from three universities and the ARS. Thus, some project related decisions will require input and communication with representatives of these institutions. The principal governing body of the project will be the REACCH Steering Committee, which will integrate input from the project advisory panel, stakeholder advisory committee and administration. Each project objective (1-9) will be executed by a team led by one or more Leadership members. Each objective team will function as a subproject, meeting to coordinate specific activities as required. Objective teams are also interdependent contributing to four cross-cutting themes. The matrix-like structure of the organizational chart (Fig. M.1) indicates that each of the four cross-cutting themes draws upon and links activities pertaining to each of the project’s principal objectives.

Table M.1. Organizational Elements for the REACCH PNA Project

Entity	Identity, Activities and Responsibilities
<i>Institutional Leadership</i>	The vice presidents for research or their representatives for the University of Idaho, Washington State University, and Oregon State University and the deans of colleges principally engaged in the project will work with project leadership to ensure coordinated execution.
REACCH Project Director (0.4 FTE)	Responsible for overall project management, reporting, meeting project deliverables and milestones, coordinating project activities and meetings, succession plan, works with all project teams to help insure their integration, serves as liaison to other CAP projects, contributes to project-wide creative endeavors, represents the project to NIFA, partner projects, and other entities.
<i>Administrative Manager (1.0 FTE)</i>	Assists the PD in coordinating project activities, communications, reporting, fiscal management, interface with other entities and NIFA. Maintains project records, contributes to maintenance of project website, and Central Desktop environment. Coordinates preparation of annual reporting
REACCH Executive Committee	Includes the PD and one lead from OSU, WSU and ARS respectively: Eigenbrode, Capalbo, Pan, Huggins. These PIs are the primary contacts between their institutions and the project on fiscal and institutional matters. They are responsible for fiscal management of the project as a whole. The Executive Committee meets on an ad hoc basis consistent with its responsibilities.
REACCH Leadership	These are the PIs with leadership roles for each objective and theme. <i>Objective Team</i> leaders are: Antle (1), Lamb (2), Pan (3), Capalbo and Wulfhorst (4), Eigenbrode (5), Johnson-Maynard (6), Petrie and Kruger (7), Gessler (8) and Eigenbrode (9). Leaders of <i>Cross-cutting Themes</i> are: Huggins (AEZ), Stöckle (LCA), Antle (Systems and Policy). The <i>Leadership</i> also includes Walden, representing Climate Sciences and Wulfhorst representing Sociology. This team meets about twice monthly, which schedule includes quarterly all PIs and Key personnel meetings and the annual meeting. Meetings of REACCH leadership
REACCH All PIs and Key Personnel	Formulates project policy, guides and prioritizes project research, extension and education efforts, evaluates proposed research activities, supports integration, approves additional REACCH faculty membership and partners, administers internal grant competitions, and additional activities as needed. The membership includes all PIs and other key faculty and staff participants. It also includes David Brown (WSU’s SSCCF

	partner) and others as decided by this group. This group meets quarterly, coincident with a leadership team meeting or annual meetings.
<i>Stakeholder Advisory Committee (SAC)</i>	Includes representatives of growers, agricultural industry, commodities, citizen groups, and state and federal agencies. Communication with this committee is coordinated by PI Steve Petrie. SAC members are invited
<i>REACCH membership</i>	Includes all faculty members, students, postdocs, stakeholders, and other key personnel working within or closely associated with the project.
<i>Information Specialist and Data Manager (1.0 FTE)</i>	Responsible for managing REACCH-related data, ensuring its accessibility and enforcing data policies, ensuring interoperability among nodes within the project and with collaborators. Facilitates cyberinfrastructural aspects of the project including cybercollaboration, remote sensing and sensor networks, and distributed, stakeholder-based data acquisition tools.
<i>Web Designer (1.0 FTE)</i>	Responsible for creating and maintaining all project web-related resources and activities.
<i>Programmer (1.0 FTE)</i>	Performs programming tasks to ensure data are accessible, interoperable, and readily visualized by researchers, stakeholders, and educators.
<i>Directors and superintendents of the research and extension centers</i>	These superintendents have varying appointments and roles across the existing research centers, but are ultimately responsible for their operations. Ensure REACCH research and extension activities at the centers are maintained and coordinated.
<i>Farm managers</i>	Develop and enforce protocols, coordinate timing of farm operations, assist with field days and tours, and ensure long-term plots are properly managed.
<i>External Advisory Panel</i>	Comprised of senior professionals representing key dimensions of the REACCH-PNA. Reviews project activities based on annual reports, attendance at annual project meetings. Candidates (currently being invited): <ul style="list-style-type: none"> • <u>Phil Robertson, KBS Director</u> • Keith Paustian with NREL at Colorado State Univ. Expertise in Soil C modeling, decision support systems • Dr. James W. Jones, Distinguished Professor, Department of Agricultural and Biological Engineering, Univ. of Florida • Richard Howitt, Professor and Department Chair, Agricultural and Resource economics, UC Davis • <u>Hal Collins, ARS Prosser, Microbiologist</u> • Dr. Paul Fixen, International Plant Nutrition Institute Senior Vice President, Americas Group Coordinator, and Director of Research • <u>Matt Baker, Dean of University College, Texas Tech University, Education Focus</u>

Summary of Calendar of Management Related Activities

Regularly Scheduled meetings and events

- Weekly – Meeting of REACCH director, information specialist, web designer, programmer and others as appropriate concerning routine project activities.
- Monthly – *REACCH Leadership*, typically by teleconference (this meeting and agenda to be distributed to all hands, PIs, SAC, others and is open to those wishing to contribute).
- Ad Hoc– *Executive Committee* (separate or part of SC teleconference)

- Quarterly – REACCH *All PIs and Key Personnel*
- Bimonthly (or more frequently as required) Objective team meetings
- Bimonthly (or more frequently as required) Integrative Theme team meetings
- Biannual – SAC is specifically invited to one of the Quarterly *All PIs and Key Personnel* or *Leadership* meetings teleconference and to the All-Project annual meeting.
- Annual – All-project meeting (2 or 3-day retreat with public and private sessions) with research, extension, education presentations and activities, and review and modification of operational procedures.

One-time-only meetings

- Project Launch Meeting – Year 1 – Two-day meeting by PIs and participating faculty
- International Conference – Year 4 or 5, a 5-day conference on transdisciplinary projects concerning climate change

Project Culture and Performance Expectations of Participants

Some Rules of Engagement

1. Maintain mutual respect for colleagues throughout the project
2. Employ our best communication skills as presenters, receivers, synthesizers
3. Negotiate on big issues and compromise on lesser ones.
4. Seek solutions to problems collectively
5. Be supportive of one another
6. Stay open and creative

Accountability

All project participants are required to perform project roles and execute project deliverables in a timely manner as listed in tables below. These milestones and deliverables are negotiable and must be realistic, but we also must hold ourselves to achieving them. The Steering Committee, under the leadership of the REACCH Director and with assistance from the project evaluator (David Myer) will review progress on milestones, deliverables, and other activities as listed. Annual reports (typically due in January of each year) are specified for project activities and outputs (Table below). These may be modified during project execution based on progress, contingencies, and changing conditions. The REACCH Director will coordinate preparation of reports to NIFA and other entities as required. Release of subcontract funds and distribution to project budgets within institutions will be conditional on satisfactory performance.

Conflict Resolution

If a conflict arises, the co-PIs will meet and attempt to resolve the dispute as part of the regular Steering Committee meeting, or in an emergency meeting if necessary. If they fail to resolve the dispute, they will attempt to come to a mutual agreement with the aid of the university ombudsman. Failing that, the disagreement shall be referred to an arbitration committee. The structure of the committee will depend upon the nature of the dispute, but typically it will consist of three impartial senior faculty to be appointed, one each, by the Vice Presidents for Research or their designees of the three participating Universities. No members of the arbitration committee will be directly involved in the research grant or disagreement.

Authorship and Intellectual Property Policy For REACCH-PNA (approved Oct. 2011)

1. Authorship and projected rank of authors should be determined as early as possible in the process of conceiving publications and presentations. As a rule, start inclusively.
2. Considerations in determining authorship should include:
 - a. Principles as summarized (Davidoff 2000, Lawrence 2002, Cho and McKee 2002). Specifically, legitimate authors contribute substantively to all stages of article preparation:
 - conception and design, or acquisition of or analysis and interpretation of data;
 - drafting the article or revising it critically for important intellectual content; and
 - final approval of the version to be published
 - b. Authorship customs of disciplines represented in the research team
 - c. Journal authorship guidelines and options for indicating author roles using footnotes (e.g., specifying equal contribution by authors)
 - d. Preserving collegiality among collaborators throughout the process.
3. Once determined, author lists and basis for ranking should be recorded in writing. These documents are subject to modification by the authors as roles shift during project completion.
4. All publications arising from work done in the REACCH project should acknowledge the project as follows:

“This research is part of a Coordinated Agricultural Project (CAP) “Regional Approaches to Climate Change for Pacific Northwest Agriculture” supported by award #2011-68002-30191 from the National Institute for Food and Agriculture, <http://reacchpna.uidaho.edu/reacchpna>.”

References (posted on project CD site)

1. Cho M. , M. McKee 2002. Authorship in Biomedical Research: Realities and Expectations: http://sciencecareers.sciencemag.org/career_magazine/previous_issues/articles/2002_03_01/DOI.1847997411683997393
2. Davidoff F. News from the International Committee of Medical Journal Editors. *Ann Intern Med* 2000; 133:229-23
3. Lawrence, P.A. (2002) Rank injustice. *Nature* 415:835-836

Targets, criteria and metrics, actions and reporting requirements, points of contact and due dates for REACCH PNA project. There is a separate table section for each objective.

Research		
Objective 1		
<i>Create a theoretical framework that integrates biophysical and socioeconomic aspects of regional cereal production systems under current and projected climate scenarios.</i>		
Targets (Milestones and Deliverables from Table Q6.1)		
<ul style="list-style-type: none"> ○ M1.1a - Downscaled climate scenarios incorporated into transdisciplinary framework ○ M1.1b - Ag census and other data identified and prepared for economic analysis ○ M1.2a - GCMs selected and different scenarios evaluated ○ M1.2b - Current and adapted cropping systems characterized for economic modeling, current systems parameterized ○ D1.2 - GCM output translated to scales needed for agroecological modeling ○ M1.3a - Calibrated CropSyst model linked to climate and economic models ○ M1.3b - Adapted cropping systems characterized for economic models ○ M1.4a - Estimation of TOA-MD model and presentation of tradeoffs ○ D1.4a - Simulation of cropping system performance in a GIS framework ○ D1.4b - Parameterization of TOA-MD model for current and adapted systems ○ D1.4c – Empirical analysis of tradeoffs from the economic impact technology assessment framework 		
Criteria and Metrics (listed for each Milestone and Deliverable)		
<ul style="list-style-type: none"> ○ M1.1a - M1.1b, M1.2a, M1.2b, D1.2. Internal reports, presentations to stakeholders ○ D1.2. - Peer-reviewed publication, presentations to stakeholders, at scientific meetings ○ M1.3a - and b. Internal reports, presentations to stakeholders ○ D1.4a. - Report to stakeholders, publication, report to REACCH website ○ D1.4b. - Report to stakeholders, publication, report to REACCH website ○ D1.4c. - Report to stakeholders, peer reviewed publications on framework and results, presentations at scientific meetings and policy workshops 		
Actions and Reporting Requirements	Points of Contact	Due Dates
M1.1a and M1.1b. Conduct required analyses and reporting	Walden, Antle	Jan. 2012
M1.1a and M1.1b. Publications	Walden, Abatzoglou, Antle	Jan. 2013
M1.2a and M1.2b. Conduct required analyses and reporting	Stockle, Antle	Jan. 2013
M1.1a and M1.1b. Publications	Walden, Abatzoglou, Antle	Jan. 2013
M1.1-M1.3. Hiring schedule for students, postdocs	Several	Varies
D1.2. Conduct analyses, deliver presentations, submit manuscript	Walden	Jan. 2014
M1.3. Conduct required analyses, deliver presentations, prepare manuscripts	Stöckle, Antle	Jan. 2015
D1.4a, D1.4b D1.4c. Prepare reports, publications, web delivery of materials	Antle, Walden, Stockle, Capalbo	Jan 2014 Jan. 2015
Cross-project Integration Activities	Points of Contact	Due Dates
Incorporate downscaled climate scenarios and spatially explicit economic model into AEZ analysis and systems model	Huggins et al.	Jan. 2014

Research		
Objective 2		
<i>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</i>		
Targets (Milestones and Deliverables from Table Q6.1)		
<ul style="list-style-type: none"> ○ M2.1. GHG field monitoring network initiated and continued ○ M2.4. GHG field monitoring and analyses completed ○ D2.5. GHG emission regional baseline completed, alternative scenarios assessed 		
Criteria and Metrics (listed for each Milestone and Deliverable)		
<ul style="list-style-type: none"> ○ M2.1. Flux systems deployed and in operation; number of fields monitored; data completeness and quality assurance ○ M2.4. Analysis of initial results for flux validity and flux magnitudes and patterns; preliminary analysis report/paper on flux results; final analysis report/paper on fluxes from multiple zones and treatments ○ D2.5. GHG emission regional baseline completed, alternative scenarios assessed ○ D2.5. Systems are ranked for GHG emissions to determine relative agroecological benefits of cropping systems 		
Actions and Reporting Requirements	Points of Contact	Due Dates
M2.1. Build, install, operate and monitor systems	Lamb	Nov. 2011
M2.1. Record and report data	Lamb	Jan. 2012, yearly thereafter
M2.4. Conduct analyses	Lamb	Jan. 2012
M2.4. Prepare report on flux results	Lamb	Jan. 2014
D2.5. Prepare reports, communicate with stakeholders via web site and other mechanisms, scholarly publications	Lamb	Jan. 2014
Cross-project Integration Activities	Points of Contact	Due Dates
Incorporate flux data into AEZ characterization and analysis and Systems model	Huggins et al.	Jan. 2014
Incorporate these data and models into education and extension components	Johnson-Maynard, Pan,	Jan. 2012

Research		
Objective 3		
<i>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</i>		
Targets (Milestones and Deliverables from Table Q6.1)		
<ul style="list-style-type: none"> ○ M3.1. Cropping alternatives and associated C, N, water measurements initiated, cont. Y1-4 ○ M3.2. Analyses of NUE, WUE, C, energy and delivery of initial inputs for modeling, Y2-5 ○ D3.4. Alternatives assessed, linked to biophysical and socio-economic modeling, Y4-5 		
Criteria and Metrics (listed for each Milestone and Deliverable)		
<ul style="list-style-type: none"> ○ M3.1. Established sampling protocol and infrastructure for existing and new cropping system experiments ○ M3.1. Data collection, storage successful ○ M3.1. Data sets complete for comparison of alternative cropping systems ○ M3.2. Relevant component analytical approaches and efficiency models selected to evaluating these agroecological indicators ○ M3.2. Data collected from M3.1 appropriately satisfies models to generate efficiency assessments ○ M3.2. Completed assessment of NUE, WUE, C and energy balances as affected by zone, climate and treatment ○ M3.2. Systems ranked for NUE, WUE and C and energy balance ○ D3.4. Agronomic, crop and socioeconomic modelers develop alternative approaches for making integrated assessments in developing win-win scenarios ○ D3.4. Best approaches for integrated assessments identified ○ D3.4. Cropping system indicators incorporated into integrated assessment (see other deliverables) ○ D3.4. Win-win cropping system scenarios are identified for achieving economic, sociological, and environmental goals. ○ D3.4. Evidence of stakeholder response to recommendations 		
Actions and Reporting Requirements	Points of Contact	Due Dates
M3.1a. Conduct required analyses and reporting	Pan	Jan. 2012
M3.1b. Conduct required analyses and reporting	Pan	Jan. 2013
M3.1b. Data sets completed and preliminary comparison carried out for reports or manuscript	Pan	Jan. 2014
M3.1a, b – Recruitment completed for students, etc.		Aug. 2013
M3.2. Data summarized and communicated to appropriate team members and evaluated	Pan	Jan. 2014
M3.2. Assessments of NUE, WUE, and C energy balances summarized in report or manuscript; systems ranked in this report.	Pan	Jan. 2015
D3.4. Approach for integrating agronomic, crop and socioeconomic parameters into alternative cropping systems developed in report or manuscript	Pan, with others	Jan. 2013
D3.4. Win-win cropping systems scenarios described and made available to stakeholders	Pan, with others	Jan. 2015
D3.4. Grower survey (see Objectives 4 and 7)	Pan, with others	Jan. 2016
Cross-project Integration Activities	Points of Contact	Due Dates
Grower survey	Pan, with others	
Integration into AEZ characterization and Systems model, Extension, Education activities	Pan, Antle, Huggins, Johnson-Maynard	

Research		
Objective 4		
<i>Determine social and economic factors influencing agricultural management, technology adoption, and development of policy to improve production efficiency while mitigating greenhouse gas emissions</i>		
Targets (Milestones and Deliverables from Table Q6.1)		
<ul style="list-style-type: none"> ○ M4.1. Longitudinal and key informant interviews following AEZ strata conducted, Y1-5 ○ D4.5a. Spatial representation of adoption likelihood incorporating socioeconomic variability ○ D4.5b. Socio-geographic functions for N, water, energy use shifts due to crop, policy, climate 		
Criteria and Metrics (listed for each Milestone and Deliverable)		
<ul style="list-style-type: none"> ○ M4.1. Subjects identified, interview design finalized, each round of interviews completed, data analyzed, report generated and communicated to Extension team and others ○ D4.5a. Surveys designed, populations identified, surveys administered, surveys analyzed, maps generated from survey data, layer available for integration into synthetic models ○ D4.5b. Successful strategies for optimal GHG mitigation identified by strata 		
Actions and Reporting Requirements	Points of Contact	Due Dates
M4.1. Initial round of key informant interviews completed	Painter	Jan. 2012
M4.1. Additional rounds completed	Painter	Jan. 2013-2015
M4.1. Analysis of longitudinal surveys completed and published; data communicated to other team members	Painter	
M4.5a. Surveys designed and administered	Wulfhorst	Jan. 2013
D4.5a Manuscript on adoption likelihood by strategy and strata	Painter and Wulfhorst	Jan. 2015
D5.4b. Manuscript, document for producers and stakeholders	Pan, with others (see)	Jan. 2015
All. Hiring personnel completed		Aug. 2011?
All. Graduate student recruited		
Cross-project Integration Activities	Points of Contact	Due Dates
Regional assessment of socioeconomic barriers and drivers of adoption of climate adaptation and mitigation, incorporating AEZ and LCA	Painter, Wulfhorst, Capalbo, Huggins, Stockle	Jan. 2015
Graduate students recruited and integrated with those associated with other objectives	Wulfhorst, Johnson-Maynard, other PIs	Sept. 2012

Research		
Objective 5		
<i>Anticipate and develop approaches to climate-related changes in crop protection requirements and the effects of beneficial biota within cropping systems</i>		
Targets (Milestones and Deliverables from Table Q6.1)		
<ul style="list-style-type: none"> ○ M5.1. Assess climate related vulnerabilities to pests and beneficials ○ M5.2. Predictions of climate related changes in pests, diseases, weeds and beneficials ○ D5.5a. Assessment of climate adaptation and mitigation on selected pests and beneficials ○ D5.5b. Recommendations for climate-related changes in biota to producers and scientists 		
Criteria and Metrics (listed for each Milestone and Deliverable)		
<ul style="list-style-type: none"> ○ M5.1. Monitoring on experimental farms initiated. First year data from controls and treatments recorded and analyzed. To include information on principal pest insects, key natural enemies, pathogens, earthworms and weeds. ○ M5.2. Predictions of climate related changes in pests, diseases, weeds, monitored based on downscaled climate models of the PNW region (M1.1), literature reviews, experimental studies ○ M5.5a. Comparative analysis of pressure from key insects, pathogens and weeds in alternative cropping systems in progress or completed. ○ M5.5b. Recommendations formulated and disseminated. ○ M5.5b. Evidence of stakeholder response to these recommendations. Assessment of climate adaptation and mitigation practices on pests, diseases, weeds, beneficials. ○ M5.5b. Recommendations for climate-related changes in biota to producers via presentations to producers, web site. ○ M5.2. Predictions of climate related changes in pests, diseases, weeds and beneficials ○ D5.5a. Assessment of climate adaptation and mitigation on selected pests and beneficials ○ D5.5b. Recommendations for climate-related changes in biota to producers and scientists 		
Actions and Reporting Requirements	Points of Contact	Due Dates
M5.1a. Collect data, conduct required analyses and reporting	Eigenbrode, Johnson-Maynard, Paulitz, Burke	Jan. 2012 Jan. 2013
M5.1. Recruit graduate students (2 entomology, 1 macroinvertebrates, 1 pathogens, 1 weed science)	Eigenbrode, Johnson-Maynard, Paulitz, Burke	Aug. 2013
M5.2. Complete report. Submit at least one manuscript to journal(s), reports to stakeholders via various media	Eigenbrode, Johnson-Maynard, Paulitz, Burke	Jan. 2014
D5.5a. Complete report. Submit at least one manuscript to journal(s), reports to stakeholders via various media	Eigenbrode, with others	Jan. 2016
D5.5b. Grower survey conducted and analyzed	Eigenbrode, with others	Jan. 2016
Cross-project Integration Activities	Points of Contact	Due Dates
Materials generated integrated into K-12 activities for teachers and students.	Wolf and Johnson-Maynard	Years 3-5
Experiential education of REU students working with faculty in the field and laboratory.	Eigenbrode and others	Years 2-5
Quantitative information on the impact of beneficials on nutrient cycling and soil physical properties incorporated into models	Johnson-Maynard, Stockle and others	Year 5

Education		
Objective 6 (K-12)		
<i>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</i>		
Targets (Milestones and Deliverables from Table Q6.1)		
<ul style="list-style-type: none"> ○ D6.1. K-12 teacher survey analyzed and professional, classroom materials developed ○ M6.2. K-12 teacher training, Y2-5 		
Criteria and Metrics (listed for each Milestone and Deliverable)		
<ul style="list-style-type: none"> ○ D6.1. Response rate of at least 30% on survey; teachers who indicated interest in further participating in project development are contacted ○ D6.1. Presentations regarding survey results at local, regional and national meetings; data analyzed to indicate what professional development and classroom activities are needed; data used to determine which grade(s) to target ○ D6.1. Publication regarding teachers' attitudes towards agriculture and climate change integration; professional development materials/activities developed; classroom activities and lesson plans available to teachers ○ D6.1. Number of teachers accessing website and utilizing lesson plans; number of teachers participating in professional development activities developed; changes in student knowledge level regarding agriculture and climate change ○ M6.2 Survey results used to determine what professional development materials will be developed ○ M6.2. Materials reviewed by steering committee and small group of teachers participating in program development; development of assessment materials for professional development activities ○ M6.2 Teachers participate in professional development activities at each institution; publications focusing on the success of professional development activities ○ M6.2 Number of teachers participating in professional development activities; results of follow up surveys designed to determine how/if teachers implement what they learned 		
Actions and Reporting Requirements	Points of Contact	Due Dates
D6.1 Survey conducted and report completed, including conclusions about planning implications	Johnson-Maynard, Wolf	May. 2011
D6.1. Presentations at meetings	Johnson-Maynard, Wolf	May 2011, ff
D6.1. Scholarly publication	Johnson-Maynard, Wolf	Jan. 2012
D6.1. Web survey conducted and assessed.	Johnson-Maynard, Wolf	Jan. 2012
M6.2. Teacher activities conducted and assessed	Johnson-Maynard	Aug. 2012 and ff
Cross-project Integration Activities	Points of Contact	Due Dates
K-12 teachers introduced to overall project activities during trainings	Johnson-Maynard, Eigenbrode	
GIS based maps generated in project incorporated into teacher materials for workshop or for classroom	Johnson-Maynard, Eigenbrode	

Education		
Objective 6 (undergraduate and graduate)		
<i>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</i>		
Targets (Milestones and Deliverables from Table Q6.1)		
<ul style="list-style-type: none"> ○ D6.2. Multi-institutional course materials on agriculture and climate change prepared, Y2-5 ○ D6.3. Exchange programs with CAP and LTER sites, undergrad. Summer research experiences ○ D6.2b. Formation of interdisciplinary teams based on research themes, Y2 ○ D6.4. Graduate level course on spatial statistics that covers AEZ concept, Y2 ○ D6.5. Graduate level course on agriculture and climate change adaptation/mitigation, Y3 		
Criteria and Metrics (listed for each Milestone and Deliverable)		
<ul style="list-style-type: none"> ○ D6.2. Learning outcomes and drafted for new courses ○ D6.2. Outlines for new courses drafted by faculty; approval of course by curriculum committees at each institution; assessment tools generated to judge student learning ○ D6.2. Courses taught; results of assessment analyzed; course structure revised based on assessment results ○ D6.2. Numbers of students taught in multi-institutional course; improved knowledge of the link between agriculture and climate change ○ D6.3. Contact among PIs and education leads at other CAP and LTER sites; faculty recruited to develop and offer summer research experiences for undergraduates ○ D6.3. Numbers of students recruited from Columbia Basin College; assessment tools for student learning during summer experiences; Publications and presentations regarding student experiential learning; Number of students participating in summer research program; positions gained by students participating in summer research 		
Actions and Reporting Requirements	Points of Contact	Due Dates
D6.2. Course outlines, syllabi, learning goals developed	Johnson-Maynard and others	Jan. 2012
D6.2. Courses taught and evaluated	TBD	Jan. 2013
D6.2. Courses modified and taught annually	TBD	Jan. 2014ff
D6.3 Partners identified and plans developed	Eigenbrode and Johnson Maynard	Jan. 2013
D6.3 Recruitment for REU, assessed based on responses	Pan	July 2013-2016
D6.3 Summer REU programs completed	Pan	July 2013-2016
Cross-project Integration Activities	Points of Contact	Due Dates
Integration of concepts behind AEZ research into spatial statistics course	Huggins working with D. Brown, WSU	Sept. 2013
Undergraduates learning basic and advanced research skills by working directly with faculty in the summer research experience for undergraduate program	Johnson-Maynard, Eigenbrode	June 2012 and subsequent
Research outputs directly incorporated into new undergraduate and graduate level courses	Johnson-Manard, others	Sep. 2012
Graduate student recruitment across the project coordinated to allow team formation	Eigenbrode	Sep. 2012
Toolbox exercises on collaboration	Eigenbrode	Sep. 2012 and annually

Extension		
Objective 7		
<i>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</i>		
Targets (Milestones and Deliverables from Table Q6.1)		
<ul style="list-style-type: none"> ○ M7.1. Stakeholder communication plan, interactive website, CoP within eXtension ○ D7.2. Extension faculty lead hired; develop virtual community of stakeholders ○ D7.3. Extension publications, presentation, tools to disseminate preliminary results to stakeholders, Y3-5 ○ D7.5. Stakeholder evaluations 		
Criteria and Metrics (listed for each Milestone and Deliverable)		
<ul style="list-style-type: none"> ○ M7.1. Interactive website posted, data on website use, online feedback from users ○ M7.1. Community of Practice established within eXtension ○ D7.2. Successful hire of extension faculty ○ D7.3. Numbers and types of publications, presentations, access records and feedback from stakeholders ○ D7.5. Pre and post project surveys conducted, response rates 		
Actions and Reporting Requirements	Points of Contact	Due Dates
M7.1. Coordination of SAC meetings, develop products and report.	Kruger, Petrie	Jan. 2011
D7.2 Report on successful hire of Extension faculty	Kruger, Petrie	Jan. 2012
D7.3 Develop, catalogue and report on Extension products.	Kruger, Petrie	Jan. 2013
D7.5. Pre, during and post-project survey of stakeholders	Kruger, Petrie	May. 2011; Jan. 2016
Cross-project Integration Activities	Points of Contact	Due Dates
AEZ concept, LCA and mapping incorporated into extension education materials	Huggins	Jan. 20

Capacity Building		
Objective 8		
<i>Develop the regional capacity for continued, long-term research, education, and extension efforts to mitigate and adapt to climate change</i>		
Targets (Milestones and Deliverables from Table Q6.1)		
<ul style="list-style-type: none"> ○ D8.1. Cyberinfrastructure assessment, legacy data migration, data mgmt policy created, followed ○ D8.2. Interface for researchers and stakeholders created ○ D8.3. Investigate, improve, and maintain cybercollaborative support, Y3-5 		
Criteria and Metrics		
<ul style="list-style-type: none"> ○ D8.1. Amount of data and number of data sets migrated ○ D8.1. Data policy in place and communicated to REACCH membership. ○ D8.1. Data system successfully interfacing with partner databases (e.g., LTER) ○ D8.2. Interface characteristics and needs assessed through stakeholder, researcher survey ○ D8.2. Cybercollaborative standard support established and utilized ○ D8.2. Numbers of interface-dependent products and publications ○ D8.2. Interface for researchers and stakeholders improved based on feedback ○ D8.3. Investigate, improve, and maintain cybercollaborative support, Y3-5 		
Actions and Reporting Requirements	Points of Contact	Due Dates
D8.1. CI interface operational	Gessler	Jan. 2012
D8.1. Data policy approved and in place	Gessler/Eigenbrode	June. 2011
D8.2. Interoperability with partners (LTER others) demonstrated	Gessler	Jan. 2013
D8.2. CI user interface surveys	Gessler	Jan. 2013 and annual
Cross-project Integration Activities	Points of Contact	Due Dates
CI employed for generation of cross-cutting themes: AEZ, Systems, LCA	Theme leads	Jan. 2012 and ff.
CI employed for interfaces with producers and other stakeholders	Gessler, Extension leads	Jan
CI integrated into coursework	Education leads	
CI employed for generation of cross-cutting themes: AEZ, Systems, LCA	Theme leads	

Project-wide Integration		
Objective 9		
<i>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</i>		
Targets (Milestones and Deliverables from Table Q6.1)		
<ul style="list-style-type: none"> ○ D9.1. Annual project meetings, Y1-5 ○ D9.2. Cross-cutting themes ○ D9.2a. Systems modeling: TOA-MD performance outcomes for climate scenarios, AEZ ○ D9.2b. LCA theme: global warming potential of current and projected cereal systems in IPNW ○ D9.2c. AEZ: Climate change and adaptation and mitigation technology impacts on AEZ ○ D9.2d. Policy theme: interaction with policy makers and development of science-based policy ○ D9.4. International conference held 		
Criteria and Metrics		
<ul style="list-style-type: none"> ○ D9.1. Annual meetings convened, meeting proceedings prepared and distributed ○ D9.2. Required biophysical and socio-economic databases defined; database availability and quality assessed. Raster surfaces of biophysical and socio-economic variables generated for PNW cropland. ○ D9.2c. Spatial framework of AEZ generated by integrating raster themes to represent current and future agroecological conditions. ○ 9.2c. AEZ framework used as synthesis tool for evaluating biophysical and socioeconomic responses to climate change. 		
Actions and Reporting Requirements	Points of Contact	Due Dates
D9.1 Project meetings organized, etc.	Eigenbrode	Jan. 2011 and annually
D9.2a-d Theme teams organized and agendas developed	Team leaders	Mar. 2011
D9.4. Conference organized	Eigenbrode	Oct. 2014; Jan. 2013; Jan. 2014
Annual survey of project researchers using validated four-factor measure (satisfaction with the collaboration, impact of collaboration, trust & respect, and transdisciplinary integration) of interdisciplinarity and transdisciplinary skills and thinking.	Meyer	Jan. 2012 and annually
Open-ended survey questions, observations, and interviews to collect recommendations for collaboration improvements across project PIs, K-12 teachers, growers, and SAC members	Meyer	Jan. 2012
Cross-project Integration Activities	Points of Contact	
All cross-project activities listed in previous tables coordinated during monthly SC meetings, annual meetings and other activities.	Eigenbrode and Steering Committee	Dates vary