BioEarth All Hand Meeting, Stakeholder Engagement Session
Friday Feb. 26, 2016

What, When & Where	BioEarth Researchers Present	Stakeholders Present	"Take-aways" about what stakeholders want
Carbon and Nitrogen Management February 2013 *Seattle*	Serena, Dave, Jenny, Liz, Chad, John H., Chad, Fok, Andy, Jennie, Georgine	ODA, WORC, OSU, UI and WSU Forestry and Tribal Liaison Extension, diversified irrigated farmer, EPA, County Conservation District, WSDA, NRCS, WA DNR, SEI, Climate Solutions, McGregor, Soc. Am. Foresters, NPS, American Farmland Trust	Compare beneficial uses of incentive dollars, address how forest thinning affects C storage, model impacts of fertilizer tax and fertilizer price fluctuations, test impacts of aggressive climate mitigation, model impacts of biomass-based energy on nutrients in waterways, incorporate land use change
Water Supply February 2013 *Seattle*	Serena, Dave, Jenny, Liz, Chad, Chad, Fok, Andy, Jennie, Georgine, Mike	ODA, OSU and UI and WSU Forestry and Tribal Liaison Extension, producer, EPA, Whatcom Conservation District, WSDA, NRCS, WA DNR, Climate Solutions, Soc. Am. Foresters, NPS, American Farmland Trust, American Rivers	Model how development of water markets would affect availability for irrigation, municipal use and instream flows, compare different energy scenarios, look explicitly at streamflow impact on salmonids under climate change, model impacts of increasing efficiency in irrigation systems and distribution
Rangeland Management February 2013 *Richland*	Justin, Julian, Jenny, Liz, Chad, Jennie, Georgine	UI ARS, Holistic management ranchers (Managing Change NW), BLM, UI and WSU Extension, WA DNR	Look at erosion linked to timing and amount of precipitation, forage quality impacts, invasive species ranges, impacts of different kinds of grazing, changing stocking rates and turn-out dates, effects of riparian protection policies, changing hay process, vegetation interactions in forested rangelands
Atmospheric Issues/ Air Quality February 2014 *Seattle*	Georgine, Liz, Chad, Jennie, Jason Williams, Serena*, Dave*, Brian*, Justin*, Joe*	OR and ID DEQ, NPS, regional Clean Air Agencies, EPA, Conservation District, Nez Perce Tribe, 3TIER renewable energy, WA Ecology, WSU Dryland Research Station, Idaho Division of Public Health	Develop tools to understand air quality impacts on human health, look at impacts of changing regulatory limits, incorporate pollutant transport from Asia, capture sources and formation of ultrafine particulate matter, model impacts of biofuel production on air quality, consider unintended consequences of anaerobic digester systems
Forest Management June 2014 *Olympia*	Elizabeth Garcia, Sarah, Liz, Chad, Andy, Georgine	WA DNR, UI and WSU Extension, WA State Rep., small and mid-size family foresters, WA Ecology, WA DNR, NRCS, Climate Solutions, EPA, USFS	Model impacts of longer summer drought, changing storm intensity, changing wildfire regimes, pest and disease pressures, parcelization and changing land use, impacts of thinning on fires, water catchment, potential for ecosystem services markets, impacts of policies to bring back small mills, look explicitly at how climate change will affect species ranges
Water Quality March 2015 *Vancouver*	Jenny, Liz, Will, John H., Chad, Tung, Min	USGS, Freshwater Trust, EPA, WSDA, Conservation District, Wild Fish Conservancy Northwest, Lower Columbia River Estuary Partnership, Columbia River Inter-Tribal Fish Commission, Clean Water Services, OR DEQ, EPA, Willamette Partnership	Look at interactions between water supply and quality, model P and N loading under different land use futures, model impacts of temperature changes on native species, effects of changing precipitation patterns on erosion, changing fertilizer application practices, consider impacts of comprehensive agricultural practices act, consider changing consumer demand, test impacts of reductions in food waste on nutrient loading

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TOP 10 STAKEHOLDERS' INFORMATION NEEDS WE MAY BE ABLE TO ADDRESS

How close are we to providing answers around these questions? What did we leave out? Who is working on these questions? Who are the primary stakeholders for each question?

1. How might changes in irrigation efficiency impact downstream water availability? What are the direct crop-level impacts of changing irrigation technology? How would land-atmosphere feedbacks in agricultural systems change under climate change and changing irrigation regimes?

2. How could development of water markets affect water availability for agriculture? Instream flows?

3. How would forest thinning, changes in harvest cycles or changes in land use impact C sequestration? How might thinning impact snowpack, soil moisture and wildfire dynamics? (*Underlying question relates to understanding regional C storage potential*.)

4. What are the impacts of transitioning to no tillage systems (or reduced tillage) on C storage in agricultural soils? Is there a potential to coordinate with REACCH RAPS scenarios to look at environmental and economic impacts of changing agricultural management practices?

5. Define metrics for identifying vulnerable ecosystems (Above ground biomass? N concentration/ Forage quality? Soil quality?) Identify where vulnerable zones occur in the region.

6. How will climate change impact crop yields? Producers and industry stakeholders consider accounting for new crop varieties/ genetic development to be critically important. (One idea is to assume 2% improvement per year because of variety development?)

7. How would transitioning to greater use of cover crops affect soil quality? For example, consider mustard green manures in vegetable production (which is currently being used on more acres than onion production). Are there unintended consequences of using cover crops that use N and have water requirements in irrigated systems at a high-demand time of year?

8. How would precision N application technology impact nutrient runoff? How would changing crop mixtures affect the timing and amount of N application? How would changes in State-level agricultural policies affect fertilizer use? How would changes in laws concerning riparian buffers affect agricultural runoff? How would this affect N and P loading in waterways?

9. How will future N deposition affect species diversity in high alpine ecosystems? What can models tell us about the sources of atmospheric N deposition?

10. How will conversion of forestlands and croplands to urban/ suburban uses affect vegetation, soil quality, and water resources? How might development, global and regional policies, social changes and economic conditions affect consumer demand? How will regional agriculture change in response to consumer demands for local produce and grass fed beef, for example?

Across-the-board recommendation:
Many stakeholders expressed strong interest model outputs that quantify the likelihood of future environmental changes. Where it is possible, we should seek to can communicate confidence intervals and present ranges of possible futures graphically. Approaches such as displaying a "most likely scenario" in combination with the 20th percentile and 80th percentile scenarios would be logical and intelligible for most resource management-savvy stakeholders. We should make an effort to share initial results with stakeholders and get feedback on how data is presented. The better we communicate uncertainties-- through graphs and visuals and in written and spoken communication-- the more relevant and "trustworthy" results will be for stakeholders.