Healthy Soils, Healthy Region Workshop Summary

March 12-14, 2019
Pendleton Convention Center, Pendleton, Oregon

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Workshop Summary

The Healthy Soils, Healthy Region multi-state event, was held March 12-14, 2019 in Pendleton Oregon, engaging with stakeholders representing agricultural professionals and others. Despite some weather-related challenges that moved our field session indoors, the **Healthy Soils, Healthy Region Workshop** successfully convened various stakeholders from around the Pacific Northwest and beyond with the following goals:

1. Improve awareness of existing tools that can be used to promote soil health management.
2. Identify regional soil health priorities and strategize about how to address them.
3. Showcase ongoing regional projects that support improved soil health.
4. Explore regional solutions to build climate resilience through managing for soil health.

This document recaps the overall conference structure and participation, describes existing soil health projects across the region that participants were aware of, summarizes the farmer panel, and provides the workshop evaluation results. A companion document highlighting the priority themes of the conference can be found at this link.

Conference Participation and Structure

Though the majority of the 151 participants in the two-and-a-half day event were from Washington, Oregon, or Idaho, they also included participants from Montana, California, Utah, and Washington D.C (Figure 1). The workshop was open to a diverse set of stakeholders but was designed, especially with the needs of agricultural professionals in mind. Accordingly, the affiliations that were represented the most among participants were university (extension and research), NRCS, conservation districts, and private (Figure 2). Participants worked in diverse production systems from the region, with many people working across multiple production systems (Figure 3).

At the workshop, twenty-four presenters shared knowledge on a variety of soil health-related topics in both full group and breakout sessions. Pipa Elias, Soil Health Strategy Manager at the Nature Conservancy, gave the keynote address. Presenters in the poster sessions (17), lightning presentations (9), and tools café (4) shared regional work related to soil health with participants. Facilitated sessions were held to continue to identify regional soil health priorities and strategize about how to move forward on them. Four innovative producers from a diversity of farm types discussed the management of soil health in their operations. The keynote address and several of the breakout sessions and discussions incorporated topics of drought and climate resilience . See the event agenda for more detail.

When asked on the evaluations whether they learned the information they had hoped to learn during the event, 64% of participants responded “yes” while 39% of participants responded “somewhat.” Participants indicated that the most valuable new information learned during the event included the updates in soil health testing, making regional connections, information on soil and root development, and information on dryland cover crops. Participants were inspired to make several changes as a result of this event, including: learn more about soil health, talk with producers about soil health, utilize cover crops, hold field days and step up their collaborations.

A committee consisting of members from Idaho, Oregon, and Washington organized the event. Funding for the event was from Western Sustainable Agriculture Research and Education (SARE), with additional funding from the National Integrated Drought Information System (NIDIS) and numerous other sponsors and supporters. (See the full list here). The attendance of 13 workshop participants was made possible through funding from the Western SARE Professional Development Program, or student scholarships.

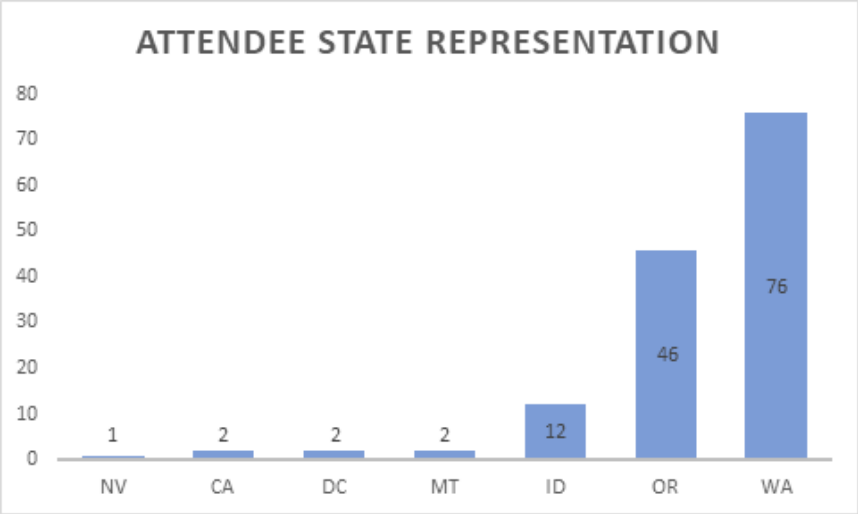

Figure 1. Attendees at the Healthy Soils Healthy, Region Workshop were primarily from the Northwest, but some attendees came from elsewhere throughout the Western U.S. and beyond.

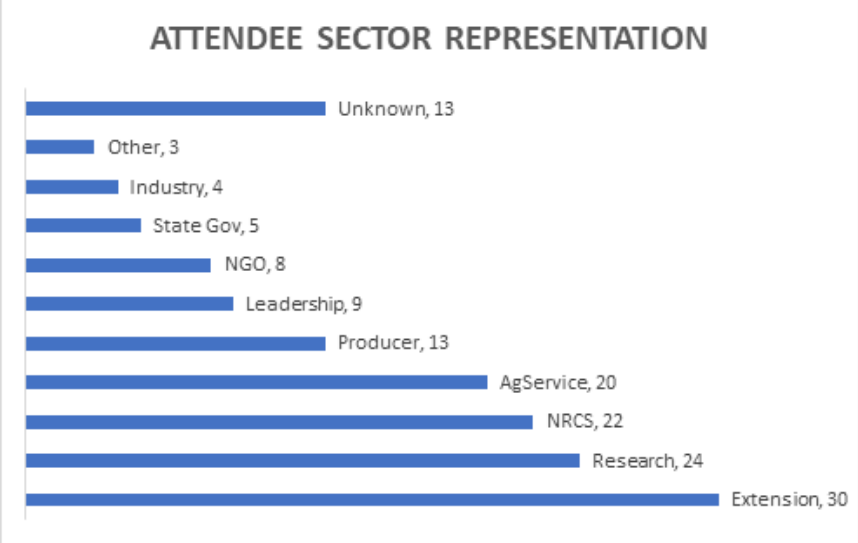

Figure 2. Agricultural professionals, the target audience for the workshop, represented the majority of workshop attendees. However, the workshop also benefitted from a variety of perspectives offered from other stakeholders for soil health.

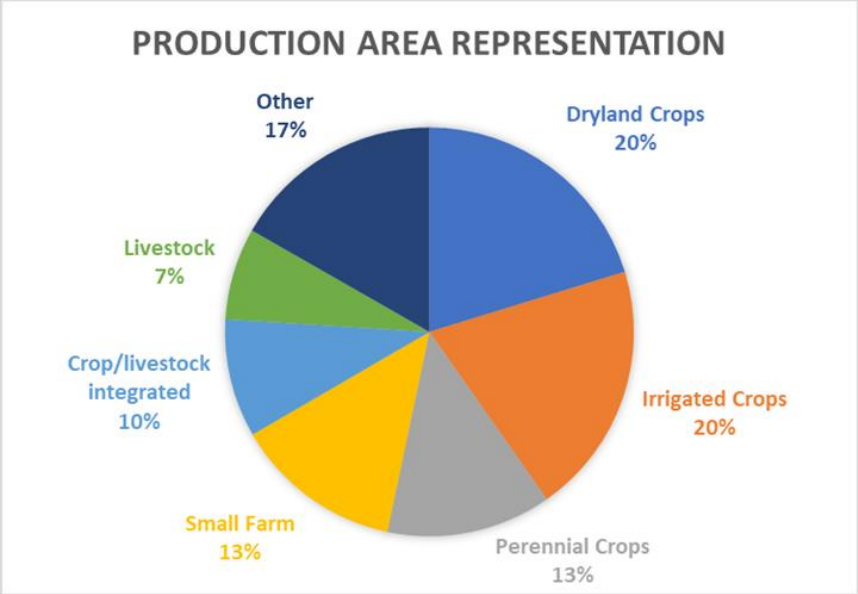

Figure 3. Participants worked in a diversity of agricultural systems.

Existing Soil Health Projects

WASHINGTON

East Side

- Aaron Esser, Washingon State University
    - Soil Acidification study (Wilke, Lincoln Co.)
    - Whole farm management that includes nutrient application (based on removal)
    - Compost study rotation work (Wilke) with Ian Burke
    - Diversified cropping system to improve weed control and soil health
- Allen Casey, NRCS - Plant Materials, Pullman, WA:
    - Cover crop variety trials
    - Cover crop advanced line breeding program
- Katherine Naasko, Graduate Student, Washington State University
    - Management and precipitation effects on soil health in the Palouse; Enzymes
- Gudrun Mahrt, Agriculture Sales & Development Manager, gmahrt@carbonates.com (Spokane, WA):
    - Soil pH/liming long term study - Triticale/canola/wheat crop yield, soil infiltration, etc.
- Jodi Johnson-Maynard, Landscape in Transitions (University of Idaho)- climate change induced increase in fallow rotations (demonstrations in Ritzville, St. John, Genesee)
- Shannon Capellizzi, Bill Pan (WSU), Haiying Tao (WSU), Bill Schillinger (WSU), Katherine Naasko (WSU)
    - Soil Health Institute Initiative- long term wheat-fallow
- Doug Collins – dpcollins@wsu.edu:
    - Cover crops in organic wheat, onion production & carrot seed in Columbia Basin
- Wilbur Ellis Co. - psackett@wilburellis.com
    - Mow & Blow - Reverse brush rake
- Amanda Ward, Foster Creek CD
    - Direct seed cost-share since 2015, almost 7000 new DS acres. (Douglas County)
- Leslie Michel, Okanogan CD, leslie@okanogancd.org
    - Cover crops in dryland wheat (North-Central WA)

West Side

- April Thatcher, April Joy Farm
    - Carbon footprint & soil health roadmap (Ridgefield, WA)
- Soil Health Community, Soilhealthwa.org
    - Nisqually Community Forest Project – forest soils
- Lewis CD, 360-748-0083 ext 5
    - No-Till Drill (Chehalis, WA)
- Nabil Khadduri, nabil.khadduri@dnr.wa.gov
    - Brassica soil fumigation as an alternative to methyl bromide. WA DNR Webster forest nursery.
- Thurston CD, nwarren@thurstoncd.com
    - Soil nutrient and soil health testing program

- Doug Collins, WSU, dpcollins@wsu.edu
    - Co-composted biochar effects on soil health in strawberry and potato (WSU Puyallup & Mt. Vernon)
    - Winter & summer cover crop variety and management trials (WSU Puyallup)
    - Biochar for manure handling and co-compost (San Juan Islands & Thurston County)
- WA State Soil Healthy Committee (soilhealthwa.org)
    - Biochar Project (Mason County)
    - Cover crop trail
- Deirdre Griffin LaHue, WSU Mt. Vernon, d.griffin@wsu.edu
    - Impacts of cover crops in red potato systems
    - Impacts of alley way tillage in red raspberry
- Chad Kruger, Chris Benedict, and Georgine Yorgey, WSU
    - Manure derivatives in red raspberry and blueberry
- Mike@ sjicd.org
    - No till project on island pastures
- Andrew @naturalplantsolutions.com
    - Biochar application to pasture using no till
    - Biochar use in veg production and landscaping
    - Compost tea production and application

OREGON

- Adams OR, hartley@sbcc .edu
    - Organic transition biochar etc w/ OSU extension
- Stephen Machado, OSU, Pendleton OR
    - Cover crops
    - Mixed cropping rotations
    - Conservation tillage long-term
- Aaron Roth, Aaron.roth@or.wsda.gov
    - "Soil your Undies Challenge"- 22 pairs will go out in Grant County range, pasture, forestland
- David Myrold (OSU)
    - Oregon soil health & microbial communities. 113 sites statewide
    - Soil health microbial community in benchmark Willamette Valley soils
- Mylen Bohle, OSU Extension
    - Organic Alfalfa fertility trials, 3 & 4 years. (Fort Rock, OR)
    - Irrigated grass field – "Bend" Tilled and non-tilled lime rate trial, 4 years
    - Potassium source & rate effect on grass hay beef feedlot manure vs. KCL (3 years) "Bend"
- Clare Sullivan, OSU, clare.sullivan @oregonstate.edu
    - Soil health testing in overwintering cover crops
- Garrett Duyck, NRCS, The Dalles
    - Dryland cover crop trial – replacing fallow
    - Trying mulching and cover cropping in orchards
- Oregon State University Parke Lab (https://cropandsoil.oregonstate.edu/users/jennifer-parke)

    - Soil solarization & biosolarization effects on weeds, soil-borne plant pathogens, and microbial communities (includes field work in Thurston Co, WA)
- Oregon State University and USDA Climate Hubs, Contact Amy Garrett (amy.garrett@oregonstate.edu)
    - Soil suitability testing with dry farming in Willamette Valley
- NRCS-EQIP
    - Soil health in hazelnut orchards (Polk, Yamhill, Marion counties)
- NRCS
    - Pollinator plantings between rows in vineyards (CSP-Polk Co.)
- NRCS Plant Materials Center, Corvallis, Annie Young-Mathews
    - Cover crop variety trials (Cool Season and warm season-irrigated and dryland)

WASHINGTON & IDAHO

Pullman, WA/Moscow, ID

- ARS, UI, Climate Hubs, contact Dave Huggins (dhuggins@wsu.edu)
    - Prevent plant insurance and erosion prevention
- Landscape in Transitions- Study impacts of cover crop, winter pea & grazing impacts in soil health (Jodi Johnson-Maynard, University of Idaho)

IDAHO

- Steve Schuyler
    - Soil tests on 30 fields for 5 years in 8 counties.
- Doug Finkelnburg
    - N. Idaho soil pH & other characteristics. Survey.
    - Soil acidity mitigation with Nez Perce Tribe
    - With Ken Hart – Cover crops in dryland rotation
- Jodi Johnson-Maynard
    - Integration of cover crops and grazing and new winter pea var. into typical Palouse rotations.
- Climate Hubs/ARS/Latah Soil & Water, contact Tabitha Brown (tbrown@latahswcd.org)
    - Soil testing- practices, interpretation, case studies,

OREGON, WASHINGTON & IDAHO

- OSU- Markus Kleber and David Myrold
    - Disease suppression in potato (OR, ID & WA)

Farmer Panel Summary

Farmer Panel: April Thatcher (April Joy Farm, Ridgefield, WA), Eric Williamson (Williamson Farms, Quincy, WA), Russ Zenner (Zenner Family Farms, Genesee, ID), Jim Dunlop (Orchard View Farms, The Dalles, OR)

Takeaway messages:

- Farmers shared innovations for improving soil health, such as soil amendments, livestock integration, inter-seeding, multi-species cover crops, no-till, strip-tillage, and increasing crop diversity.
- Commonalities between these innovative farmers include willingness to experiment and thinking about their production systems differently (e.g., focus on preventing erosion, focus on functional diversity on the farm)
- Relationships are critical for success – with other innovative growers, agencies, extension, and university researchers.
- Cost-share programs that help reduce the risk of experimentation are critical. Especially, programs that offer direct payment for building soil organic matter.
- Innovative growers are often ahead of university researchers. Some of the best work that Extension can do is facilitating interaction with and between innovative growers.
- Universities are the main source of plant pathology information for growers. Some specific areas in which these growers would like more information include weed issues (specifically mentioned were weeds associated with compacted soils in orchards), testing of biological products on the market, understanding antagonistic and synergistic relationships between plant nutrients, interpretation of soil health test results.

Soil Health and Benefits/Challenges Experienced

Jim Dunlop

- Brought in 1000s of yards of compost, wood chips and sawdust from poplar plantation in Boardman; Bringing in fish, crab overs, 500-1000 yards of compost each year; Fungal propagation: Liquid culture, grain culture, agar; Sprayed liquid mycelium and grain culture extract; Big believers in worms – red worms, nightcrawlers. Fertigation with fish hydrolysate, micronutrients, soluble gypsum; Foliar feeding (up to 14 times throughout the season) based on leaf analysis; Cover cropping ground pulled out of orchard; Was running miniature Hereford cattle between time in orchards.

Russ Zenner

- We've got to eliminate or drastically reduce wind and water erosion in our region; Clint (farm successor) has more challenges than I had; Even the best no-till systems in our region are very slowly compacting the soil, compromising soil structure in that seed zone; There's more spring planting than there used to be; Last 10-15 years have had wetter spring planting seasons; No-till drills can make it easy to plant ground that is too wet; With conventional tillage there was a cost to planting ground too wet; Pull up garbanzo, pig weed, or brassica crops and look at tap root configuration for indication of compaction; Have recently added 100 cattle to the operation as

well as multi-species cover crop formulations - struggling to provide significant forage value and running out of moisture often in early July; It's challenging for the summer crops to provide the forage value because of the moisture issues; Have been involved in REACCH (Regional Approaches to Climate Change for the Pacific Northwest) and LIT (Landscapes in Transition); Some very intensive monitoring is going on with three fields with Jodi Johnson-Maynard; We've done a very good job of limiting or even eliminating topsoil loss through our no-till system, but we're not improving the nutrient cycling; Soil structure might be part of it, the biology is part of it. We're trying to improve this. Got together in a group of 5 guys who got together in a partnership (2 in WA and 3 in ID; all annual cropping) who all share a passion for preserving topsoil; Have added alfalfa to rotation; Have tried to interseed clover with garbanzos, but challenges with herbicides killing clover and other broadleaves; Multiple fall seeded crops in succession, looking into perennial crops.

Eric Williamson

- We farm very sandy ground and approach the problem from the perspective of "how can we keep this sand from blowing around?"; We got interested in cover cropping after potatoes; In our area, the goal is to have potatoes every fourth year; Hard to totally eliminate tillage because potatoes require it; Has experimented with all kinds of cover crops; Direct seeded buckwheat into pea residue; Plant cover crops in strips and plant peppers in between them; Planting lima beans into a killed cover crop; We had to adapt some means of cover cropping to save soil; We graze cattle in summer and fall; Strip tillage for planting sweet corn; partnership with neighbor who has potatoes; 10-15 tons of compost per acre (every 4th year); Benefits: less wind erosion, increase in SOM, very rarely have any blowing soil anymore; Native SOM in area was 0.6-0.9 % and for years in cropping rotation, it didn't change much; We are happy when we see over a 1 (and sometimes even a 2). The water-holding capacity is the most important benefit.

April Thatcher

- For my farm it boils down to functional diversity; This includes things like livestock, accepting weeds as part of the system that includes ecosystem services; We are low input to no input (trying not to import fertility); We are certified organic; Trying to improve soil organic matter.
- *Soil Health Planning*: I have a lot of questions relating to soil health; I asked my local conservation district partner whether I should apply manure directly to my fields or compost it; This led to a long road toward learning about soil health; CD partner helped apply for grant through soil health committee; Has developed a "soil plan" (soil health roadmap) for 40+ crop families, hay, livestock, perennial crops; Instead of taking generalized recommendations, she tried to look at how to translate that into specific actions for her operation. Roadmap includes baseline soil tests, nutrient budget, the plan with goals and actions for any time she is touching the soil. Also trying to identify carbon footprint of the farm (was part of OFOOT program). Roadmap has been posted on soil health committee website.

What resources or tools have helped you with your soil health effort? What would be helpful to have moving forward?

April Thatcher

- Have mostly used NRCS EQIP & Conservation District;
- *What would be helpful in the future:* farmers are taking a lot of risk and need to be supported in that risk and make sure that it's adequately shared; So both funding farmers to figure out what the right thing is to do as well as direct payments for SOM.

Eric Williamson

- Local WSU Extension (Andy McGuire); SARE book on cover crops; Grant from NRCS for strip-till adoption.
- *What would be helpful in the future:* We get inundated with people trying to sell biological products, and it's hard for growers to make informed decisions about this type of product; This is an area where peer-reviewed research would be helpful.

Russ Zenner

- Have taken advantage of NRCS cost-share programs. Got in on Conservation Stewardship Program (CSP) cost-share to integrate direct seeding into different areas of the farms; That helped take some of the risk out; Clint (farm successor) is doing Haney testing as part of CSP contract; Still struggling to make sense out of results; Clint is using N stabilizer on his fall N application, variable rate fertilization, nozzles to prevent drift; Trying to get water piped to some fields that are being grazed to facilitate mob-type grazing; We are close to 2 land grant universities and I have served on research committee; Partnerships with other farmers are important and we have bought equipment together; Now sharing information on all sorts of management practices and human resource issues; Working with a bunch of guys who are passionate, love farming and are all trying to push the envelope collectively; Going to no-till conferences including those in other regions; Being with a group of like-minded people who are passionate about farming sustainability is helpful.

Jim Dunlop

- Weeds are the biggest problem, especially weeds of compaction -We could get away from fungicides and insecticides, but weeds were a problem; Biggest key to success was leaf sap analysis to determine nutrient status; It was common in orchards to have calcium deficiencies.
- *What would be helpful in the future:* Agree that there's not much peer review information on microbial products and that would be helpful. This is the new way to farm. This is the cutting edge. Looking at these synergistic and antagonistic relationships between plant nutrients.

[Comment: Co-chair of the WA Soil Health Committee commended April on the work she's done on the soil health roadmap.]

Where have you been getting the message about soil health and who has been motivating you to do this work?

April Thatcher

- Soil health is human health; Dogged about being a steward to the soil; Don't underestimate what one conversation with one farmer can do because of the ripple effect.

Russ Zenner

- It's very difficult for researchers to stay ahead of the farmer/rancher leaders; Most effort has been to keep the middle of the pack moving forward; Research funding is generally directed at the majority of the growers; Extension is an important component - former extension agent started direct seed breakfast club and facilitated interaction between farmers that are innovators.

Eric Williamson

- There's a big component of peers helping out; Depend on knowledge coming from universities on the topic of plant pathology.

Jim Dunlop

- Tree fruit guys rely on research more than anyone else; The best farmers that we deal with aren't looking to universities for their information.

Workshop Evaluations

N=72 out of 150 (48% response)

1. **Do you feel that by attending this event you learned the information you had hoped to learn regarding soil health?**

Yes (46)
Made contacts/networking**; great conference**; learned from others on SH efforts*; good content*; engaging producers*; breakouts were great*; basic foundational soil health knowledge; and well organized; adaptive process; great balance of research and outreach; good mix of tech knowledge and assessment of where we are at; linking climate solutions to SH and nutritional foods soil biology and their efforts; learning other perspectives

No (2)
Expected to learn parameters for SH testing; walking away with not knowing what healthy soil is and was too touchy feeling not research based in info

Somewhat (28)
More from producers**; breakouts awesome* but too short, lots of great research info relaying lots of unknowns*; good info but event best for networking*; left with

more questions than answers; wanted more about testing; good info but what are we working towards; producer comments were most interesting; no rep from municipal organic producers and forestry biomass it biased the discussion; still a long way to go; need more farmers and policy makers; more producer info; breakouts on Wed were too biased; major opp missed to eval with producers; more about NW ag instead of mid-west and cornell; target audience was unclear in promotion and not consistent in breakouts; needed more on the ground info but was humbling to know lack of knowledge; too scientific

2. **Were there specific speakers or workshops that stood out for you (either good or bad)? Why?**

Good- Kleber******* (ability to push the limit/concise new info); Jenn MK***** (good info and dynamic, especially interpretation); engaging producers session*****; facilitated sessions****; Pipa*** was insightful on national scale work; producer panel***; Garrett Duyck***; Thursday large group discussion***; poster session**; Cory**; dryland cover crops**; breakouts**; tools café**; lightning talks*; soil testing talk*; good mix and liked the resilience aspect*; cover crops; speakers high quality; Allen Casey; Jodi JM; Gabrielle is a great facilitator; field day talk; speaker diversity

Bad- topic repetition****; wed sessions***; afternoon large group discussion***; will breakouts were longer*; speakers needed to be on the stage and info on slides too small; keynote too long; too much out of region info

3. **What was the most valuable new information that you learned during this event?**

Updates in testing****; regional connections***; soil and root development***; dryland cover crops**; Jen MK connection with Dan Manter's work*; soil microbial connection*; value of soil carbon*; producer panel*; climate tools sections* and toolbox*; how an event like this runs and how to teach SH to producers and professionals; collaboration among three states; defining SH; applicable to work in CD; economic for producers; need buy in from all parties producer to consumer; nitrogen behavior in soil; field day tips; challenging road ahead; mapping tools; new directions for research and changes to ongoing research; maps of soil health projects; tools to implement case studies related to cover crops and no till; tools café and field day session; want to gain more knowledge and get more involved in SH; OSU soil health lab testing for the regions; all info was good for me

4. **Did knowledge you gained in this event inspire you to make any changes regarding soil health? Please explain:**

To learn more about SH and talk with my producers******; implement cover crops***; step up my collaborations***; implement field day**; more info to share on CC**; commit to being SH advocate in my work*; good tips for adaptive management and resilience planning*; new ideas for implementing SH strategies*; find ways to adapt mid-west style to NW; continue field trials and make ccs pay in short term; each state needs working groups and OR needs to step it up;

guidance on developing new programs in regions; try new things on my land; sparked ideas; make soil health a focus of research projects; continue research and programming in SH focusing on cover cropping and soil amendments; livestock integration; tools café gave great ideas and the field day session; growing season changes

5. **Do you feel this workshop achieved the goal of identifying regional priorities for soil health?**
   Yes (37)
   No (6)
   Somewhat (22)

   Comments: Conversation is started but unclear where to go***; facilitation breakouts were great**; should be based on similarities and not state boundaries*; identify next steps and priorities is essential*; identified opps but not priorities; heck of a lot of metrics to develop; can't wait for the outcomes; the lumping left out the social justice issues; great baseline; technical workshops for conservation planners; not much in animal husbandry or things that relate to small producers; its complicated; did not narrow down to priorities enough to inform future work; conclusions from facilitated session are too high level to be useful or more the needle; good start but more to do; days too long; wed conversation style of workshops were great; great mix of people from different fields; wanted more science and information; need group to lead process; group too large; missing economic benefits

6. **What type of regional soil health efforts would you like to see moving forward?**

   Stay connected regionally and collaborate******* with stakeholders; testing protocol***; listserv or communication strategy***; more producers and policy makers***; field days**; guidance documents**; SH priories identified by region**; to keep regions up to date*; guidelines*; annual state meeting* and joint state every 3-5 years; collation of data similar to Cornell; integrated culture in PNW with range of people and perspectives; more cooperative face to face opportunities; more diverse involvement and start with educational outreach; determining how to make it work in certain rotations and weed concerns for livestock; develop equipment that can harvest hazelnuts when perennial grass is growing in the aisles; develop economic methods to control slugs in long term non till wheat/seed crops west of cascades; roadmap; interactive web map of projects; science dictates policy not the other way around; state based information hubs; less emphasis on individual practices and more on variety of ways to improve SH; more funding for soil health related projects; accessible info; a soil health center of excellence (SHCE); success story examples; CC research; economic returns demonstrated; regional steering committee; more microbe education

7. **Do you have any comments on the workshop logistics that you would like to pass on to the event organizers?**

   Great job**********; lots of topic repetition*****; timing was good****; more producers****; needed to be shorter****; make annual event***; networking

opportunities**; would like copies of presentations* or at least the recs from them i.e. cover crop rotations; add more success stories; speaker changes were disappointing; have an upbeat tone to start conference off; not a fan of the large group sessions; more livestock management info needed; panel too long; sessions focusing on a different challenge (i.e. dryland cover crops, irrigated cc, no till, soil testing) then have panel focused on each with a stakeholder rep; not educational enough; need more consistency in level of presenters; very well organized; more info geared toward moist west side soils; send summaries to big retailers; make presentations available

Comments related to facility: lighting on stage and sound need improvement****; food and location excellent*; big screens, more wandering mics; nice facility and food