Washington Soil Health Initiative

Diverse solutions for diverse soils

ANNUAL REPORT

2023

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FROM July 1st, 2022 - June 30th, 2023

WASHINGTON SOIL HEALTH INITIATIVE

WWW.WASOILHEALTH.ORG

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Onward and Upward

Though the Washington Soil Health Initiative (WaSHI) is in its fourth biennium, 2022 was the first time that all activities were fully funded. Over the last twelve months, several key milestones were reached:

- The Sustainable Farms and Fields Program launched, distributing $1.8 million dollars to public entities to help producers adopt soil health practices
-
- The State of the Soils Assessment continued collecting soil samples and management surveys to provide a baseline health assessment of Washington's soils. This project has sampled nearly 900 fields, trained nearly 100 professionals on how to soil sample, and distributed over 204 customized soil health reports to producers
-
- WaSHI finalized its investment in long-term soil health research by identifying the remaining research sites. Current and future sites are funded for Mount Vernon, Othello, Prosser, Puyallup, Wenatchee,
-
- SoilCon continued to be a huge success, reaching an audience from diverse backgrounds and agro-ecosystems of over 650 attendees. With big changes coming for next year's events.
-
- Washington joined several other states by launching the Saving Tomorrow's Agriculture Resources (STAR) program to create market-based valuation for landowners to adopt soil health practices.

WaSHI continues to identify ways to increase our support of farmers, Washington residents, and the environment. We solicit feedback during events, and based on the responses, we have implemented your ideas into each of our programs. WaSHI programs have each been created to help Washington improve the soils of working lands. However, it is the integration of these programs places Washington as a national leader in protecting this vital natural resource.

WaSHI by the Numbers

1.5M

people reached with conventional media

A variety of news media agencies pick up and share WaSHI projects and collaborations spreading awaress of soil health and WaSHI.

650

SoilCon attendees

A global soil health conference, SoilCon reaches people from around the world, culviating awaress and improving understanding of current soil

300

people receiving the WaSHI quarterly newsletter

The WaSHI newsletter provides recent updates, upcoming events, and blog posts spreading awareness of soil health.

4

graduate students involved with the LTARE site network

Training the next generation of soil scientists, grad students are learning the ins and outs of long-term soil science research.

200K

people reached on four social media platforms

WaSHI is active on four social media channels sharing

204

producers have received a custom soil health report

Participating producers in the State of the Soils Assessment receive a report comparing their soils to those in the region and across the state.

27

advisory team members guiding WaSHI

The advidory team members provide WaSHI leaders with guidance and insight regarding their priorities, milestones, and goals.

207

producers impacted by Sustainable Farms and Fields funding

This new incentive program encourages farmers, through technical support providers, to adopt climate smart practices.

10M

acres of farmland reprented by the LTARE site network

Six long-term agroecological research and extension sites have been established representing Washington's diverse regions and crops.

8

collaborating agencies creating an interdisciplinary team

Bringing together experts from across the state, WaSHI creates a strong network of interdisciplinary scientists.

WaSHI Goals

Document Soil Health

To measure changes in soil health over time a baseline assessment must be performed.

Cultivate Awareness

The first step to protect and improve soil health across the state is to introduce the concept.

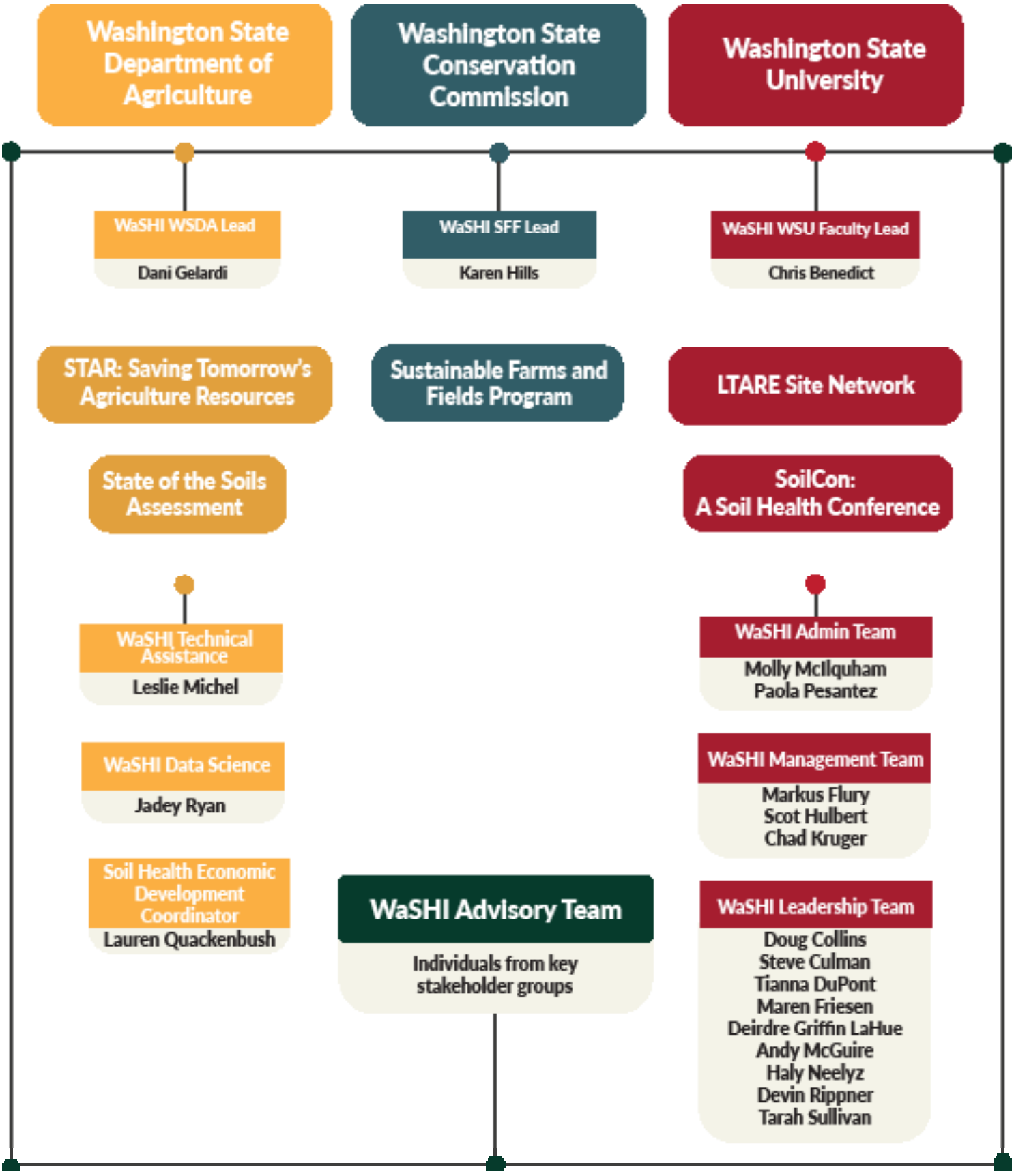
Improve Understanding

WaSHI relies on existing and emerging science to improve the understanding of soil health.

Increase Adoption

WaSHI strives to help producers overcome the large barriers to adopting soil health practices.

Our Team and Projects



Mission and Vision

Our Mission

The mission of the Washington Soil Health Initiative is to promote collaborative research, education, and technical assistance activities that identify, promote, and implement sound soil health stewardship practices. These practices should be economically viable and voluntary for farmers and ranchers across the diverse agricultural communities, climates, and geographies in Washington. We aim to achieve this through demonstration projects and engaging in rigorous long term soil health research. Our ultimate goal is to improve the health of the soil in Washington, creating a more sustainable and resilient agricultural industry that benefits both the environment and the people of our state.

Our Vision

To create a future where healthy soil is the foundation for a resilient agricultural industry, a sustainable environment, and healthy people in Washington through long term agricultural research, driving soil health markets, providing technical support, and providing incentive programs.

WaSHI establishes a coordinated approach to healthy soil in Washington. Partners provide science-based technical assistance and policy support for increasing soil health across Washington's diverse regions and cropping systems. Through research, outreach and education, and funding opportunities, WaSHI offers a win-win-win opportunity for farmers, the environment, and the people of Washington.

Sustainable Farms and Fields

Author: Karen Hills

Adopting new practices can be costly, but the Sustainable Farms and Fields (SFF) Program makes it easier and more affordable. Through SFF, farmers and ranchers can implement climate-smart practices that increase carbon sequestration and reduce greenhouse gas emissions.

Conservation districts and other public entities can apply for Sustainable Farms and Fields grants to deliver grant-eligible activities to interested farmers and ranchers. Management practices that help mitigate climate change can also increase farmer and ranchers' resiliency, provide environmental co-benefits, and increase long-term economic viability.

Hitting the Ground Running

I'm happy to report that a mere four months after the Request for Applications was released in November 2022, all $1.8 million in funding for the 2023 fiscal year has been committed and I'm really excited about some of the great projects that will be taking place – from equipment for rental programs allowing producers to "try before they buy" to innovative cover crop projects to manure separators – applicants came through with a variety of interesting and beneficial projects.

The main goal of Sustainable Farms and Fields is to increase climate-smart practices – or those that increase carbon sequestration and reduce greenhouse gas emissions - on farmland, rangeland, and aquaculture tidelands.

Projects related to cover crops are eligible for SFF funding.

While Sustainable Farms and Fields is open to conservation districts and other public entities, all but one of the 51 funded projects this funding cycle were submitted by conservation districts, with 25 of Washington's 45 districts represented among the funded projects. The non-CD project that was funded was submitted by a county government.

Among the funded projects, 12 conservation districts received funding to offer technical assistance related to climate-smart practices. 12 projects were funded allowing conservation districts (and one county) to add pieces of equipment (e.g., no-till drills, roller crimpers) to their equipment rental programs to help producers to implement climate-smart practices.

Equipment sharing can help landowners who may not be ready purchase.

See a full list of 2023 funded projects on the Sustainable Farms and Fields Website.

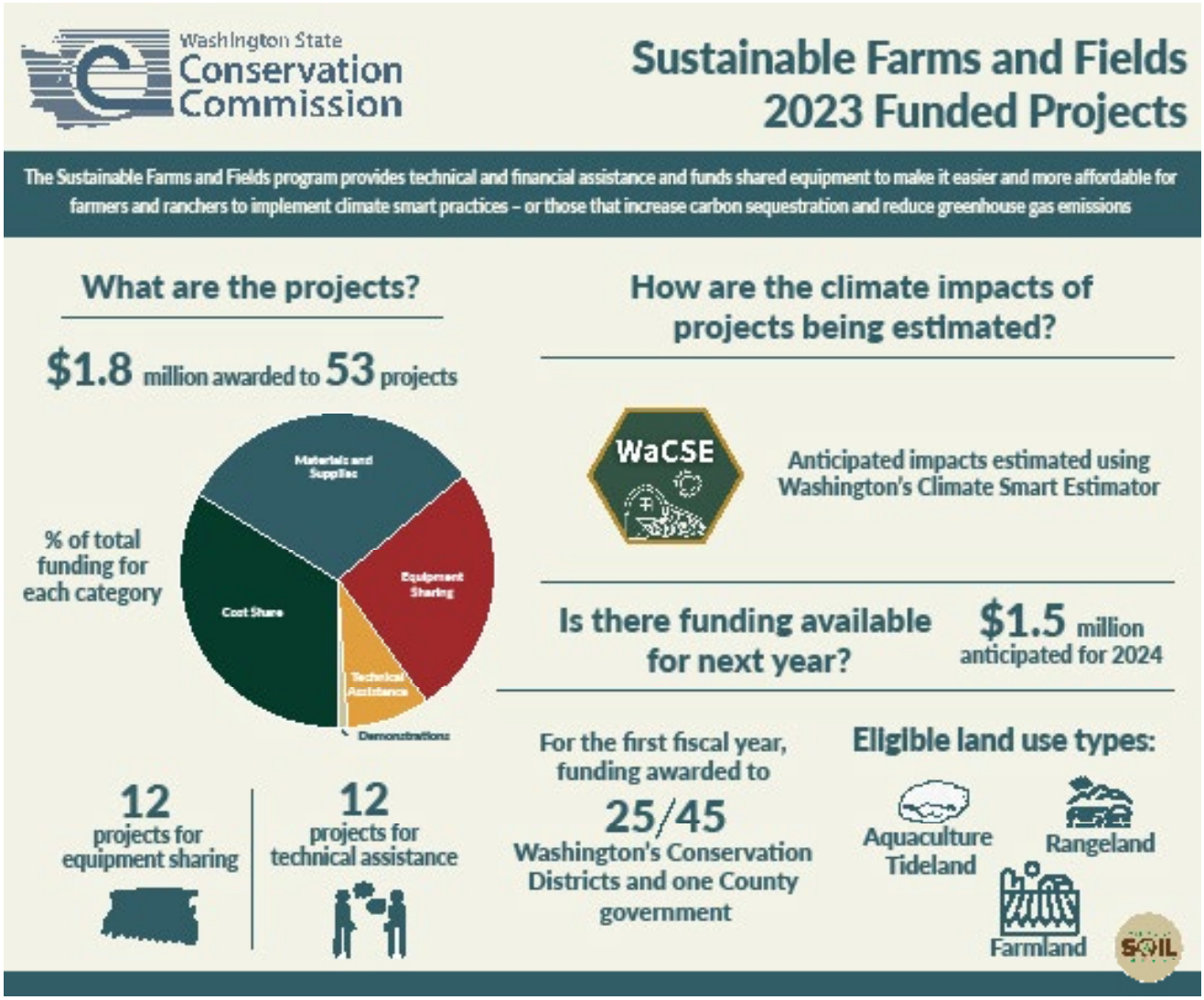
Seeing Familiar Practices through a Climate Lens

Though most of the conservation practices eligible for SFF funding are not new practices to conservation district staff (e.g., cover crops, reduced tillage, tree and shrub establishment), considering their climate impact is a new spin on some familiar practices (many of which also improve soil health!). For example, hedgerow plantings have long been used to serve as windbreaks and provide pollinator habitat, but they also have the potential to provide an on-farm carbon sink.

One of the criteria by which applications were ranked was their expected impact in terms of carbon sequestration and reduction in greenhouse gas emissions. In most cases, applicants calculated the anticipated impact of projects by using a new tool created by WSDA specifically for this purpose called the Washington Climate Smart Estimator. Project managers will continue to fine tune those estimates at the reporting phase of each project and will be compiled into a report to the legislature this fall.

Next Steps

There are always a few kinks to get worked out in the first year of any program and SFF is no exception. However, we are excited to follow the great projects that are getting implemented through SFF funding. Many voluntary conservation practices offer a win for climate change mitigation, but also provide benefits for soil health and climate resilience of working lands which continue to be better understood through efforts of WaSHI partners and others working in this space.



State of the Soils Assessment

Author: Dani Gelardi

Hundreds of soil samples and management surveys have been collected to measure the state of the soils in Washington's diverse regions and cropping systems as a part of the State of the Soils Assessment (SOS).

Soil Health Report

Participating farmers received ta custom soil health report. View an example report on the WaSHI website.

In addition to collecting samples, WaSHI partners have trained nearly 100 technical advisors how to soil sample, and distributed tailored soil health reports to more than 200 producers. This project builds soil health capacity by engaging diverse agricultural communities across Washington.

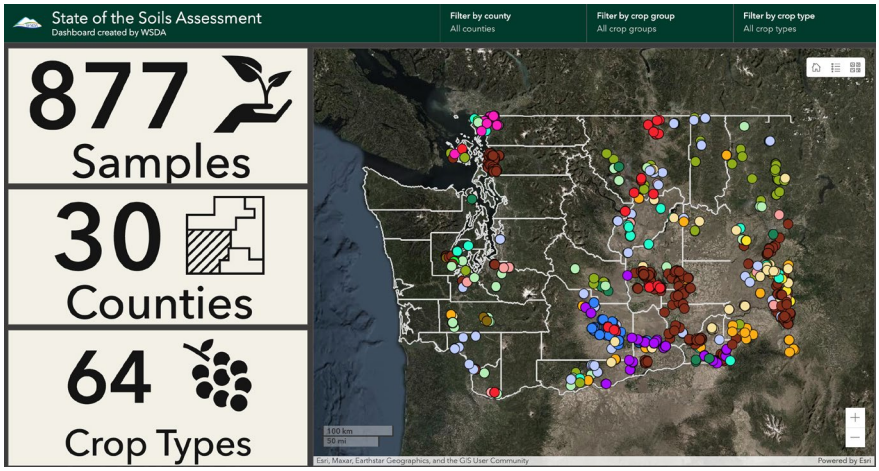
Four Primary Goals of the State of the Soils Assessment

- Assess baseline soil health in Washington
- Understand how climate, crop type, and management impact soil health
- Develop cost-effective ways for producers to assess their own soil health
- Develop crop-specific decision support tools

This year, WSDA staff and collaborators at conservation districts across the state collected 175 soil samples from 4 counties and 17 different cropping systems. The fields sampled were from 71 growers and 15 agricultural professionals were trained how to soil sample.

SOS Dashboard

WSDA data scientist, Jadey Ryan, gathers the data and adds it to a user friendly dashboard. View the dashboard WaSHI website.



Long-Term Agroecological Research and Extension Site Network

Author: Chris Benedict

Long-term research is needed to measure the effects of agricultural management on soil health, crop productivity, and economic outcomes over time and in a changing climate.

Six long-term agroecological research and extension (LTARE) sites have been funded through WaSHI, representing key agroecological regions in the state. Each site strives to provide producers with regionally specific best management practices and to measure soil health relative to each unique cropping system.

Two of six funded LTARE sites were just funded in November of 2022, where a team of experts evaluated proposals created by LTARE investigators.

During the proposal development process, LTARE investigators reached out to associated industries and received input on what practices should be investigated The review panel decided to fund two additional sites on top of the four approved in 2021. The two new sites include a potato rotation experiment at the research facility at WSU Othello and a dryland systems experiment at the WSU Wilke Farm. These two sites not only add to the geographic diversity of the LTARE network but will also add diversity to the questions asked and the solutions evaluated. The other four sites include: WSU Mount Vernon focused on potato rotations, WSU Puyallup focused on organic vegetable production with integrated livestock, WSU Prosser focused on wine grapes, and WSU Wenatchee focused on tree fruit.

Mount Vernon

Authors: Deirdre Griffin LaHue and Gabe LaHue

Two Years In

In the 2022-2023 fiscal year, the Mount Vernon LTARE completed its second cropping season, including the harvest and yield analysis of all crops in the four-year rotation, and began the third cropping season. Soil sampling and analysis for baseline bulk density measurements were completed in fall 2022 on plots that were not sampled in 2021 (bulk density is sampled after harvest during the grain phase of the rotation). All baseline samples have been analyzed for soil health parameters, except for aggregate stability, which is being held until analysis equipment arrives.

Graduate student Paul Martinez has been analyzing intact soil cores to measure soil water holding capacity, through soil moisture release curves, and soil saturated hydraulic conductivity, a proxy for water infiltration. Soils have also been analyzed for carbon pools, microbial biomass through phospholipid fatty acid analysis, and soil pH and nutrient levels. All baseline measurements will allow us to assess change over time.

We have continued to iterate and improve our record keeping protocols to track all inputs to the systems that will then be used for partial enterprise budget development.

In early spring of 2023, a series of three meetings were held with key groups interacting with the LTARE: the field management team, collaborating researchers, and the stakeholder advisory committee. The first meeting (February 20, 2023) discussed the timelines, protocols, and record keeping for key field management and sampling operations that would happen during the 2023 season.

Barley Harvest, August 2022

Building Capacity

On March 27, 2023, current and new collaborating researchers representing weed science, entomology, plant pathology, soil science, and economics, came together to discuss systematic research questions and plans for the coming year.

On March 31, 2023, a meeting of the stakeholder advisory committee, representing the potato, dairy, bulb,

Blog post

Read, "What does it take to start a long-term experiment?"

Blog post

Read, "How can we improve soil health in potato cropping systems?" in the Soils Matter blog by the ASA-CSSA-SSSA.

Audience reach: 189,935 (Mar 2023)

vegetable seed, and agronomic consulting industries, was held to discuss outcomes from the 2022 season and to get feedback on priorities for satellite "sandbox" trials, which are short-term experiments that will feed into for the main long-term experiment. Based on the feedback of this committee, a laboratory incubation was initiated to quantify nitrogen mineralization from soil organic matter in the plots that are planted to a perennial grass-clover cover crop between potato crops.

Plots were sampled in June 2023 for analysis of soil microarthropods, nematodes, and microbial communities, to assess the impacts of the systematic treatments on soil biological diversity and community composition.

In May 2023, a $10 million grant proposal was submitted to the USDA NIFA Specialty Crops Research Initiative program with Deirdre Griffin LaHue as co-PI that will leverage the Mount Vernon LTARE to be able to more thoroughly investigate the impacts of potato cropping system management on soil health functions, potato yield and quality, and economic outcomes.

Field Days and Tours

- Tour to participants in the annual meeting of the USDA NIFA Soil to Society project including the members of the stakeholder advisory team and project research team. The LTARE is being leveraged for additional research conducted under this grant. ~20 participants. June 30, 2022

- Tour to WSU Crop and Soil Science graduate students as part of a statewide agricultural tour. 15 participants. May 25, 2023

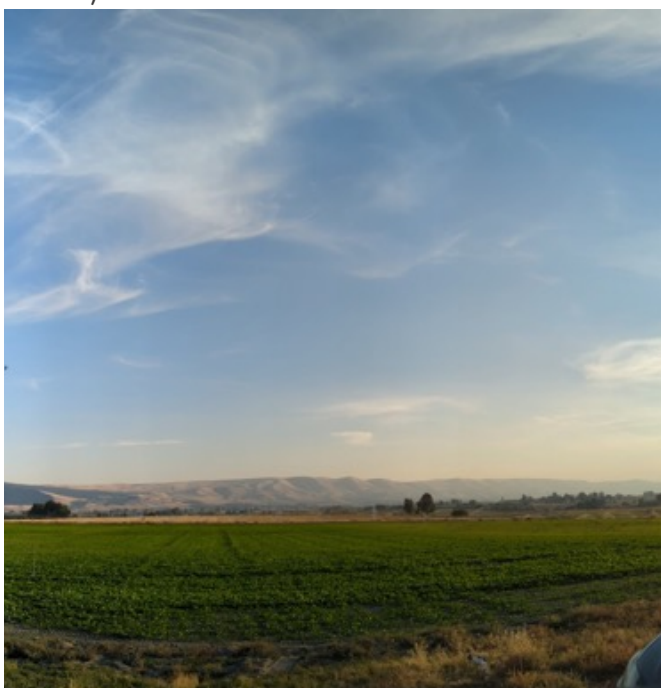
This site in Mount Vernon was the first WaSHI LTARE site to be established.

Prosser

Author: Devin Rippner

Site Description

Vineyard Soil Health LTARE experiment was implemented at a ~4.3 acre orchard block at the Washington State University Irrigate Agriculture Research and Extension Center in Prosser, WA in June of 2023. The soil was Warden Silt Loam, 2 to 5 percent Slopes (Coarse-silty, mixed, superactive, mesic Xeric Haplocambids) (Soil Survey Staff, 2014).



Prior to planting the vines in June 2023, a forage radish cover crop was planted.

Experimental Design

The vineyard has a randomized complete block design with five treatments replicated 4 times. In the fall of 2022, the vineyard was disked and planted with forage radish.

Chardonnay (L) and Cabernet Sauvignon (R) vines patiently awaiting for their long-term location in the LTARE site.

The forage radish cover crop was frost terminated. In the spring the vineyard was disked than was deep ripped repeatedly (4x) prior to mechanical planting. Preliminary soil bulk density analysis after deep ripping from 0-15, 15-30, 30-60, and 60-90 cm depths was measured in duplicate from each treatment block (40 cores). A preliminary soil health panel from soil depths of 0-15, 15-30, 30-60, and 60-90 cm was measured in duplicate with each replicate composed of 7 composite core sections (280 cores).

Each block was mechanically planted and contains three rows of cabernet sauvignon (#33) and three rows of chardonnay (#15) grafted to 1103P rootstock on a 5”x9” spacing. Treatments are business as usual (herbicide+fertilizer), no herbicide/low till (fertilizer, no herbicide), no herbicide/ low till + legume cover crop in vine row (fertilizer, no herbicide), no herbicide/low till + compost (no herbicide, no fertilizer), no herbicide/low till + legume cover crop in vine row + perennial wheat in the alley

+ compost (no herbicide and no fertilizer). In collaboration with the Washington Department of Ecology (Melanie Redding) to study nutrient and carbon flux to ground water using monitoring wells located above and below the gradient of the vineyard. This will enable us to study vineyard contributions to groundwater nutrient and carbonate pools. These are rarely studied, but crucial to measure.

Site Establishment

June 2nd, 2023 was an exciting day as the vines were mechanically planted with a VinoMatos planter. Planting perennial crops is labor intensive, but a mechanical planting system can build much of the infrastructure in one pass. The machinery can pull the drip line and wire, drive in posts, and plant the vines.

Other Milestones

In spring of 2023, Liz Gillespie was brought on as the Senioir Scientist Assistant/Vineyard Manager to lead the charge of the day to day duties of

Video

See why researchers are jazzed about the establishment of the Prosser LTARE site.
Watch on WaSHI's YouTube channel

A happy group bulk density sampling prior to planting. From L to R, Dr. Collins Wakholi, Dr. Devin Rippner, Dr. Katherine East, Brandon Peterson, Dr. Elizabeth Gillispie.

The newly planted vineyard with tube covers to protect the vines.

Puyallup

Author: Doug Collins

Building on Existing Research

The Puyallup Long-Term Agricultural Research and Extension (LTARE) site is located on certified organic land at the WSU Puyallup Research and Extension Center. The specific site was the location of a different long-term organic farming systems experiment that ran from 2003-2015. The land was maintained as pasture for the intervening years and transitioned to the new experiment during the summer of 2022. As part of the transition, plots were located, tilled, and planted to a summer cover crop of sudangrass in late June 2022.

The experiment focuses on maritime northwest organic fresh vegetable systems. The design of the Puyallup LTARE was strongly influenced by the previous organic farming experiment as well as a different multi-year organic reduced tillage experiment. The design is a split-split plot, randomized complete block with four replications. Main plots include an intensive tillage, reduced tillage, and animal integrated system. To manage residue and prepare beds for planting, the intensive tillage treatment utilizes a rotary spader which tills to approximately 30 cm. The reduced tillage treatment utilizes a no-till transplanter, no-till drill, strip tillage, and a power harrow operated at 2.5-7.5 cm. The animal-integrated treatment also uses the power harrow and strip tillage and additionally reduces tillage over the 3-year rotation by establishing a pasture for 18 months. The experiment utilizes a 3-year crop rotation and subplots are the year of the rotation. Sub-sub plots include compost application where compost is applied at a relatively high rate (20-30 dry tons) once every three years.

Before initiating treatments for the Puyallup LTARE, soil was sampled for baseline physical and chemical parameters. Baseline soil sampling occurred in 72 plots at four different depths (0-15 cm, 15-30 cm, 30-60 cm, and 60-90 cm). Analyses at the 0-15 cm and 15-30 cm included bulk density, weed seed bank, phospholipid fatty acid, total C and N, pH, texture, autoclavable extractable protein, POX Carbon, fertility (pH, EC, CEC, NO3-N, NH4-N, P, OM, Ca, Mg, K, Na, Zn, Mn, Cu, Fe). Analyses at the 30-60 cm and 60-90 cm included total C and N, pH, and texture.

Strip tillage, pictured below, is being used at the Puyallup LTARE site.

A cover crop at the Puyallup Research and Extension Center.

Additionally, at the 0-15 cm depth, soil microbiome was sampled.

Overcoming Challenges

In fall 2022 treatments for the LTARE were initiated by preparing soil with a spader (full till treatment), with just mowing (reduced till treatment) and with the power harrow (animal integrated). Following ground preparation, either cover crop, winter wheat, or pasture were planted. No irrigation was used for the cover crops and a lack of substantial fall rain resulted in poor crop stands. In spring 2023, we mowed all plots to reduce weed growth. Surprisingly, the winter wheat and cover crops rebounded well, and substantial biomass accumulated. Cover crop biomass was sampled prior to termination. Often, fall rains are sufficient to establish over-wintering cover crops. In the future, we irrigate cover crops.

The major cropping systems activity in spring and early summer of 2023 was to establish winter squash. Squash plots were prepared with a spader (intensive tillage) mowing and strip tilling (reduced tillage) and mowing, power harrow, and strip tillage (animal-integrated). Plots were fertilized with a feathermeal fertilizer and squash was transplanted on June 15th, 2023. Drip irrigation was setup and plants are progressing well and looking healthy. In the other years of the rotation (sub-plots) winter wheat (intensive and reduced tillage) and pasture (animal-integrated) continue to grow and a summer cover crop (intensive and reduced tillage) will be established after compost is applied to half of those plots. Mid-July soil

Cover crop field day attendees learning about a compact super seeder.

Wenatchee

Author: Tianna DuPont

Site description

The Tree Fruit LTARE1 experiment is located at a 2.5 acre orchard block at Washington State University Sunrise Research Orchard at Rock Island, WA (47.31988, -120.0663747) initiated spring 2023. The soil type is a Pogue fine sandy loam (Aridic Haploxerolls).

Experimental Design

The LTARE1 experiment is designed in a randomized complete block with six replicated blocks containing five treatment plots each: mulch, integrated organic, high carbon, standard, and standard plus. Experimental plots are 2820 ft^2 (three 94 ft tree rows; 108 trees per plot). Ten-foot-wide planted buffers divide each replicate.

Site Establishment

We installed irrigation submains designed to accommodate micro-sprinklers, drip, and overhead cooling to be automated separately for each of five treatments in the 2.5 acre planting.

Tree Establishment and Maintenance

At LTARE1 soil preparation for panting included two passes ripping soil to a depth of 24 in E-W and N-S before fumigation. Soil was fumigated with 1-3 dichloropropene and chloropicrin the fall before planting. Spring soil preparation included two passes of discing to a depth of 6 in, one pass with a rototiller in tree rows followed by one pass with a cultipacker (Table 1). All plots received an application of gypsum at 2000 lb acre-1. Apple cv. Honeycrisp Firestorm grafted on G.214 rootstock trees were hand-planted on April 25 to 26, 2023 at 2.5 ft between trees and 10 ft between rows. Best management practices for tree

> *In the high carbon and integrated organic treatments, compost was applied pre-plant*

Tree planting on April 25th, 2023

maintenance were employed using standard methods (Tables 1).

Description of Treatments

In the mulch treatment, we applied a 2 to 3 in deep layer of apple wood chips (aged at 131° F for 15 days, turning 3 times) at approximately 200 yd^{-3} $acre^{-1}$ three weeks after planting. In high carbon and integrated organic treatments, we applied compost (19.0% C, 1.7% N, 0.81% P, 2.02% K) applied using a Whatcom mulch spreader at 10 ton $acre^{-1}$.

Press release

Read two press releases about the LTARE site planting.
The Wenatchee World
Good Fruit Grower

Measurements

Bulk soil. We conducted baseline soil sampling May 9 to 12, 2023. Soil was sampled 1 ft from trees (edge of root zone) using a 2 in diameter core. Sampling included 12 subsamples per plot for depths 0-15 cm and 15-30 cm and 6 subsamples per plot for depths 30-60 cm and 60-90 cm.

Soil was sent out for analysis of total organic carbon, pH, texture, mineralizable carbon, POXC Carbon, ACE protein, EC, CEC, macro and micro-nutrients, available water capacity (0-15 cm, 15-30 cm), and nematodes (0-15 cm) (Soiltest Farm Consultants, Inc., Moses Lake, WA) PLFA (University of Missouri), and nematodes (AgriFood Canada). Additional soil was stored for archive, metals, and bioassay measurements.

Tree growth

For each treatment plot, ten trees were designated as measurement trees. We marked trees at 20 cm above the graft union and measured initial trunk diameter using a tree caliper (two perpendicular measurements) on May 23, 2023. Rhizosphere soil. We designated one of the ten measured trees per plot for root and rhizosphere soil sampling. For each tree, two to four sections of fine roots containing root-adhering rhizosphere soil (approximately 1 to 3 g) were sampled at a depth of 5 to 20 cm and a distance of 20 to 40 cm from the tree base using sanitized tools on June 6th, 2023. Samples were immediately placed on ice and later stored at -80°C.

Reserachers, including co-PI Somera were excited to see the trees planted.

Wilke

Author: Haly Neely

An Addition to the Wilke Farm

The Dryland LTARE will officially begin on July 1, 2023. However, we were able to make significant progress before the start date. Our activities include hiring key personnel, building infrastructure, performing baseline soil sampling, and initiating the soil health trial. Dr. Shikha Singh joined the project on April 3, 2023 and has been working on all aspects of the project.

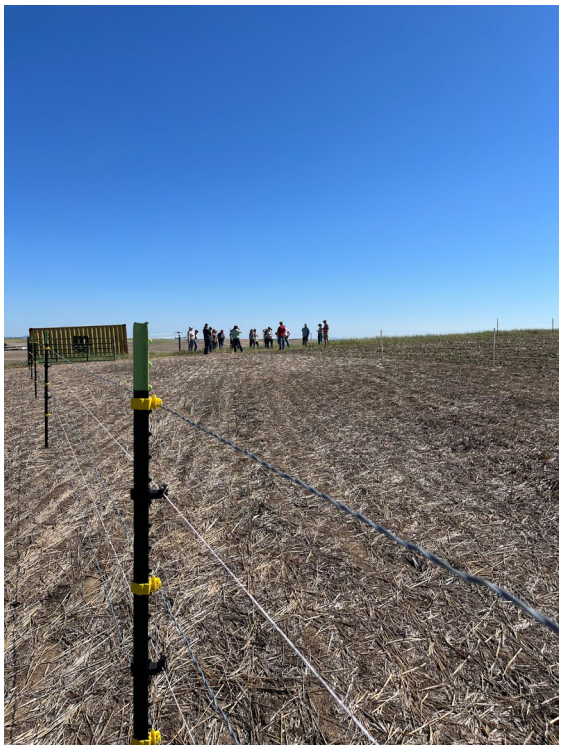
We have also built the fence and additional infrastructure for the livestock integration treatments. On June 14, 2023, baseline soil samples were collected from the new soil health trial. All soil samples were collected using Giddings hydraulic soil probe with sampling depths 0-15, 15-30, 30-60, 60-90 and 90-120 cm.

Directly following sample collection, the multi-function crop mix plots were planted (see Figure 1). This mix includes proso millet, Horizon Spring forage peas, forage barley, blackoil sunflowers, and purple top turnip. The soil samples collected are pending analyses.

Video

See why researchers are jazzed about the establishment of the Wilke LTARE site.
Watch on WaSHI's YouTube channel

CSANR advisory team members visiting the newly established LTARE site at the WSU Wilke Farm.



A Big Audience

We presented our initial activities at the Wilke Farm Field Day on June 29, 2023, and the CSANR Summer Advisory Committee meeting on June 30, 2023, which was also held at the Wilke Farm. Attendance for the Wilke Farm Field Day is usually over 100 participants.

Researchers carefully built fence to ensure the safety of cattle and highway drivers.

Another set of soil samples were collected from the existing long-term rotations at the Wilke Research and Extension Farm as well as the neighboring grower's field for a suite of soil health parameters analyses.

This LTARE takes advantage of the long-term (25 year) crop rotations and various management practices that occur on each individual field. In addition to that, weed seed bank sampling was also conducted in these long-term fields. The soil samples are pending analyses.

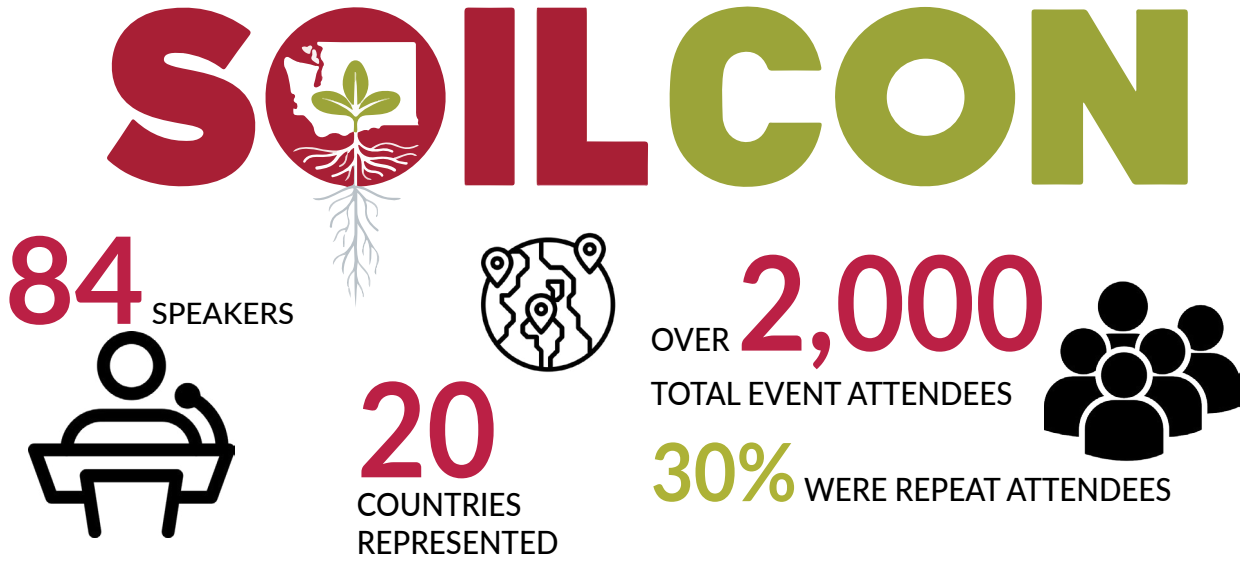
Baseline soil samples were collected down to 120 cm.

On June 14th, 2023, the multi-function crop was planted.

SoilCon

Author: Molly McIlquham

During a listening session held across Washington state, a seemingly simple question was posed: where can one find regionally specific information about soil health? However, the answer turned out to be much more complex than expected. Due to the diversity of cropping systems and agroecosystems across the state, general soil health improvement guidance falls short. So, to find commonalities and clarify differences in soil health in different regions and to fulfill a primary goal of the Washington Soil Health Initiative (WaSHI) of increasing awareness of soil health, SoilCon was born.



SoilCon has been an incredible resource for those interested in improving soil health across the globe. Over the past three years, the event has brought together 84 experts across the globe to share their expertise on a range of topics, including long-term research, soil biology, and Native American perspectives of soil health. Over three years, SoilCon has covered many subjects, providing something for everyone.

Thanks to generous sponsorship from Western SARE, SoilCon has been available to all attendees for free. The organizers from various Washington-based organizations invested countless hours in surveying the interests of agricultural professionals to ensure that the conference covered the most relevant topics. SoilCon has successfully featured various soil health-related topics, including policy updates, farmer perspectives, and research findings shared through concise lightning talks.

Read the SoilCon Resource Roundup at wasoilhealth.org/soilcon/

SOILCON23

545 TOTAL EVENT ATTENDEES

27 SPEAKERS FROM **11** INSTITUTIONS

30% FIRST TIME ATTENDEES

17 COUNTRIES REPRESENTED

60 % OF ATTENDEES REPORT AN **INCREASE** IN KNOWLEDGE IN **SOIL HEALTH BUILDING PRACTICES**

>10 CROPPING SYSTEMS REPRESENTED

SoilCon has been a valuable resource for agricultural professionals, providing them with up-to-date information on soil health topics for free.

And SoilCon23 itself was no different, where the focus was taking soil health basic principles to practice with the most popular sessions, including the highly anticipated producer panel, the cover cropping academic roundtable, and University of Wisconsin's Randy Jacksons talk titled "Climate-Smart Agriculture and Healthy Soil Comes From Agroecosystems That Regenerate Soil Carbon Over Time."

If you missed any year of SoilCon, don't worry. All sessions were recorded, and you can access them on WSU CSANR's YouTube channel (you can subscribe, too). And if you're overwhelmed by all the information in the videos, don't worry! The SoilCon23 resource roundup is here to save the day summarizing key talking points and providing links to resources mentioned in each talk.

SoilCon has become a valuable resource for those seeking regionally specific information about soil health. The event's broad range of topics and diverse speakers have provided attendees with a wealth of knowledge to apply to their agroecosystems. If you're interested in improving soil health in your region, tune in for SoilCon 2024!

While SoilCon24 may look different than years past, the organizers hope to host both in-person and virtual events to provide regionally specific information to attendees across the state.

Watch recorded sessions of SoilCon on CSANR's YouTube Channel.

New Chapter in the WaSHI Roadmap

Author: Molly McIlquham

In April 2022, a focus group of raspberry growers and researchers from Washington State University, USDA, and private companies met to discuss the soil health concerns in raspberry systems. A follow-up survey and one-on-one discussions with raspberry growers were held in the Summer of 2022. These events were used to inform the new chapter of the WaSHI roadmap and catalyze future research and outreach efforts on soil health in raspberry systems.

Read the full version of the new red raspberry chapter on page 80 of the WaSHI roadmap, but here is a quick summary:

Northwest Washington produces most of the processed raspberries in the US, comprising 99% of Washington's raspberry production. With 62 growers cultivating raspberries on 8,800 acres, the industry is concentrated in Whatcom County.

The industry identified three primary goals related to soil health:

- Improved control methods for soilborne pathogens that maintain or improve soil health
- Adopt strategies to reduce soil compaction
- Implement practices that improve or maintain soil fertility.

The Washington raspberry industry's 10-year strategic plan aims to build healthier soils free from economically destructive soilborne pathogens, leading to less reliance on current fumigation practices, which is one of the large barriers to adopting soil health-building practices.

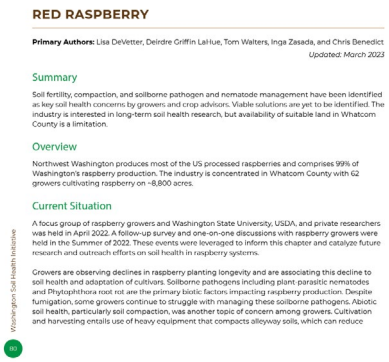
Other barriers include:

- Lack of economically sustainable rotational crops
- Reliance on soil fumigation
- High cost of production makes growers risk averse

Longterm research has been identified as a core investment area to address soil health issues. In addition, this new chapter to the WaSHI Roadmap is a significant step towards outlining and achieving the goals of the Washington raspberry industry.

> *The roadmap is a living document with updates and new chapters added over time.*

Photo: DeVetter



RED RASPBERRY

Primary Authors: Lisa DeVetter, Deirdre Griffin LaHue, Tom Walters, Inga Zasada, and Chris Benedict

Updated: March 2023

Summary

Soil fertility, compaction, and soilborne pathogen and nematode management have been identified as key soil health concerns by growers and crop advisors. Viable solutions are yet to be identified. The industry is interested in long-term soil health research, but availability of suitable land in Whatcom County is a limitation.

Overview

Northwest Washington produces most of the US processed raspberries and comprises 99% of Washington's raspberry production. The industry is concentrated in Whatcom County with 62 growers cultivating raspberry on ~8,800 acres.

Current Situation

A focus group of raspberry growers and Washington State University, USDA, and private researchers was held in April 2022. A follow-up survey and one-on-one discussions with raspberry growers were held in the Summer of 2022. These events were leveraged to inform this chapter and catalyze future research and outreach efforts on soil health in raspberry systems.

Growers are observing declines in raspberry planting longevity and are associating this decline to soil health and adaptation of cultivars. Soilborne pathogens including plant-parasitic nematodes and Phytophthora root rot are the primary biotic factors impacting raspberry production. Despite fumigation, some growers continue to struggle with managing these soilborne pathogens. Abiotic soil health, particularly soil compaction, was another topic of concern among growers. Cultivation and harvesting entails use of heavy equipment that compacts alleyway soils, which can reduce

Washington Soil Health Initiative

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WaSHI's Open letter to USDA

Author: Dani Gelardi

In the Fall of 2022, the United States Department of Agriculture (USDA) requested public input on how to allocate over $19 billion for conservation programs across the United States.

WaSHI submitted the below recommendations:

1. Increased hiring of economists, social scientists, and data scientists
2. The creation of programs to attract and train multidisciplinary practitioners to soil science, agriculture, and land management
3. The distribution of state-specific funds to improve COMET or climate impact estimation tools
4. The creation of a program to fund experimental, "high risk high reward" soil health practice research and implementation
5. The creation of a unified, nationally-recognized soil health grower certification program
6. Crop insurance reform and the creation of climate-smart financial tools
7. Increased funding for technical assistance
8. The creation of toolkits and best management practices for statewide soil health initiatives
9. Increased coordination, communication, and collaboration

To learn more about WaSHI recommendations and guiding principles for promoting soil health, read the open letter here.

Stay up to date on WaSHI projects by subscribing to the WaSHI newsletter and following WaSHI on your favorite social media platform.

Subscribe at wasoilhealth.org

STAR: Saving Tomorrow's Agriculture Resources

Author: Dani Gelardi

The Washington legislature has funded a new program at WSDA intended to generate economic valuation for on-farm soil health management. Saving Tomorrow's Agriculture Resources (STAR) was created by Illinois farmers in 2017. It is now used in four states, with an additional seven receiving STAR funding through the USDA Climate Smart Commodities Program.

This free and voluntary program allows participants to answer simple, production-specific questions about their rotation, tillage, nutrient applications, and conservation practices. Answers are converted to a score of 1 to 5 STARs. STAR scoring relies on the expertise of local science committees made up of university researchers, conservation professionals, and farmers.

STAR is intended to provide farmers:

- A clear pathway to conservation adoption and free, unbiased technical support;
- Public recognition for environmental stewardship;
- Access to branding materials that can generate a market signal with consumers and supply chain partners; and
- A consistent scale for evaluating progress across regions and systems

Creating market-based valuation for farmers

WSDA asked the legislature for STAR funding in direct response to lessons learned in the Washington Soil Health Roadmap. Washington producers overwhelmingly reported interest in using conservation practices and improving soil health. However, many growers cited economic barriers to experimenting with new techniques. Incentive programs like Sustainable Farms and Fields and NRCS EQIP are essential to assist growers with startup and transition costs. However, growers also asked WaSHI to develop market-based valuation, to sustain soil health practices after a grant cycle is complete.

STAR enrollment in Washington begins in summer 2024, for producers from approximately 10 cropping systems. WSDA is currently hiring an Economic Development Coordinator to launch the program, recruit crop-specific science committees, and develop individual field forms. For an example of region- and crop-specific field forms, visit the Colorado Department of Agriculture's STAR webpage. In the meantime, stay tuned for more information about this exciting new opportunity for Washington producers.

WaSHI Blog Posts

Watching the Waltz: Weed Seeds and Tillage
Author: Chris Benedict

Monitoring the Mambo Between Soil Biology and Tillage
Author: Teal Potter

Bathroom Reading: Connecting Biosolids to Soil Health
Author: Madeline Desjardins

What Does it Take to Start a Long-Term Experiment?
Author: Deirdre Griffin LaHue and Gabe LaHue

What Makes a Good Soil Health Indicator?
Author: Steve Culman

How is Biodegradable Mulch Treating Soil?
Author: Srijana Shrestha

Read WaSHI blog posts at wasoilhealth.org

Soil Compaction: An Inevitable Part of Modern Agriculture or a Symptom of Poor Soil Health?
Author: Natalie Strum

Building System Resilience Through Diversification: Livestock Integration
Author: Katherine Smith

Growing Interest in Soil Health: An Appreiciation-Based STEM Curriculum for Kids
Authors: Tarah Sullivan and Molly McIlquham

Soil Management in Washington's Dryland Wheat: Survey Responses
Author: Dani Gelardi

A Slice of Soil Organic Matter Pie
Author: Katherine Smith and Rachel Breslauer

Science-Informed Soil Carbon Policies in Washington and Beyond
Author: Dani Gelardi

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WASHINGTON SOIL HEALTH INITIATIVE