SmartStart Evaluation Report Brief

2015-16 Trimester 1: August 1 – November 30, 2015

Western Consortium for Watershed Analysis, Visualization, and Exploration (WC-WAVE)

The National Science Foundation (NSF) awarded a Track 2 EPSCoR (Experimental Program to Stimulate Competitive Research) to the states of Idaho, Nevada, and New Mexico for the Western Consortium for Watershed Analysis, Visualization, and Exploration (WC-WAVE) project. The 3-year grant supports the multi-state consortium model, which increases opportunities for scientific collaboration and enhances each state's ability to secure competitive funding and undertake complex watershed science research. The mission of the NSF EPSCoR program is to strengthen research and education in science and engineering throughout the United States and to avoid undue concentration of such research and education.

Project Components

Component 1: **Watershed Sciences -** Advance understanding of hydrologic interactions and their impact on ecosystem services using a virtual watershed (VW) framework.

Component 2: **Cyberinfrastructure (CI) Visualization -** Accelerate collaborative, interdisciplinary watershed research and discovery by creating innovative visualization environments.

Component 3: **Cyberinfrastructure Data -** Accelerate data management systems, visualization, model configuration; enable access to research products and data; and streamline data intensive research.

Component 4: **Workforce Development** - Engage faculty and students in interdisciplinary team-based watershed research.

The table below shows the four major project components and all the activities associated with each component. The activities for both Cyberinfrastructure components are combined into one category.

Watershed Science Research	Cyberinfrastructure Visualization	Cyberinfrastructure Data	Workforce Development/ Education
• Hypothesis driven collaborative research activities • Model runs with students • Experiential field teaching and learning for students and faculty (Snow Camp, Summer Institutes) • Dissemination of findings and products • Planning and discussion about sustainability of research activities	• Ongoing gathering of data and model requirements and user expectations • Analysis of data and feedback to cyberinfrastructure leads on end users' needs • Workshops for faculty and students on effective use of the visualization environment and data management • Planning and discussion about sustainability of CI that is being developed		• Interdisciplinary training of graduate students (GIT) • UVMN Cohort 1 and 2 • UVMN capstone event • Undergraduate modules • Diversity of participation • Planning and discussion about sustainability of activities

Evaluation Overview

Three types of evaluation are being conducted for this project: **a front-end evaluation** to assess program needs and assist with organization and planning**, a formative evaluation** to monitor implementation of the project components and provide feedback, and **a summative evaluation** to assess achievement of project components and broader impacts.

Assessment Development

SmartStart has developed the following assessment instruments for the Tri-State WC-WAVE project:

- Project baseline/post-survey
- Evaluation forms for project activities (e.g. seminars, workshops and meetings), where applicable pretest/posttest assessments related to knowledge gains were included
- Program Sustainability Assessment Tool (PSAT)[1] for understanding the future sustainability potential of the project
- Focus group and interview protocol for deeper understanding of program components

Data Collection and Analysis

All surveys are administered through online survey software platform (www.surveygizmo.com). Qualitative results of focus group and interview responses are analyzed using NVivo software to identify themes. Quantitative results are analyzed using SPSS software. Likert scale results of project baseline/post surveys are analyzed using paired t-tests to measure gains that can be attributed to participation. Results of workshop and meeting evaluations and the baseline survey are analyzed using means and response frequencies. Responses to all open-ended questions are coded for themes.

Comparison Groups

Given the timing of project activities, two slightly varied comparison groups are utilized within this report. The *2013-14 participant* comparison group only consists of the individuals that had joined the WC-WAVE project prior to the 2014-15 cohort. The *project participant's* comparison group includes all members of the WC-WAVE project that have joined since funding was awarded, including the new 2014-15 cohort (i.e. seven new participants).

Evaluation Brief Content

Evaluation results of these project components are included in this Evaluation Brief:

New Participant Baseline Survey
Innovation Working Group
October 2015 Tristate Consortium Annual Meeting

[1] Developed by researchers at Washington University. Retrieved from http://www. sustaintool.org.

New Participant Baseline Survey

October 6, 2014 – June 29, 2015 n=7

The baseline survey assesses new participants' level of knowledge and participation within the four components (i.e. watershed science, cyberinfrastructure-visualization, cyberinfrastructure-data, and workforce development) of the WC-WAVE project.

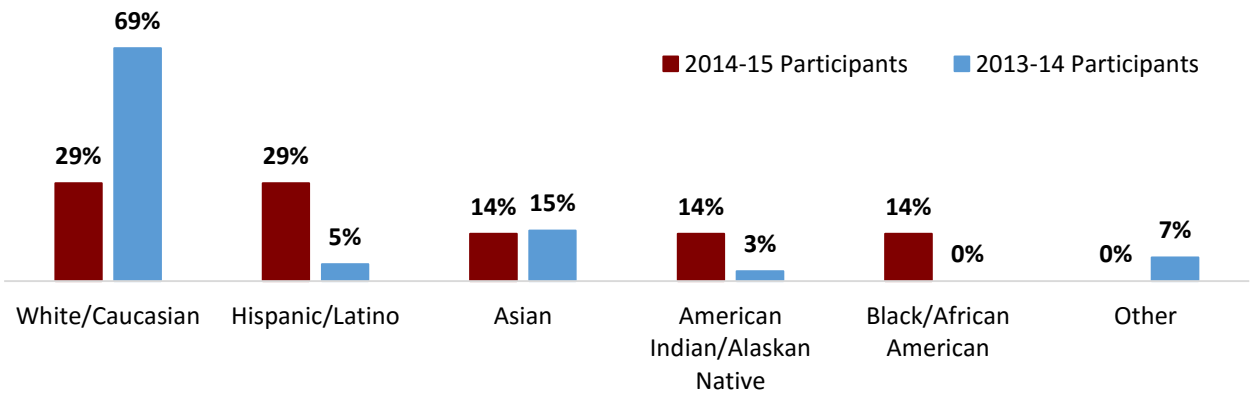
New project participants rated items related to each objective on a 5-point Likert scale, with 1 = *not knowledgeable at all* and 5 = *extremely knowledgeable*. The baseline survey was administered to 11 new WC-WAVE project participants, with seven responding, yielding a 64% response rate. Respondents consists of four participants who joined the project in the Fall of 2014 and three from the Spring of 2015.

Demographics

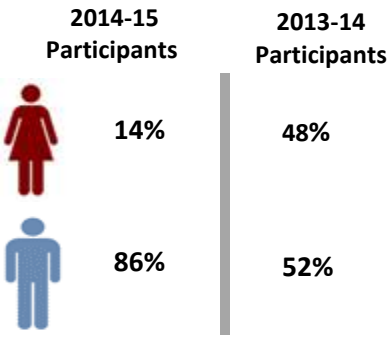
In comparing the 2014-15 participant demographics to the 2013-14 participant population:

- Females are underrepresented.
- Hispanic/Latino, African American, and American Indian/Alaskan Native individuals are well represented.
- Overall, the project is doing very well in recruiting URMs into the project.

Race



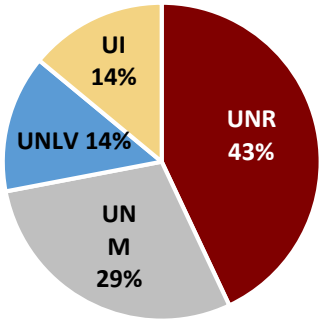
Gender



43% Professional staff

57% Graduate students

Institution

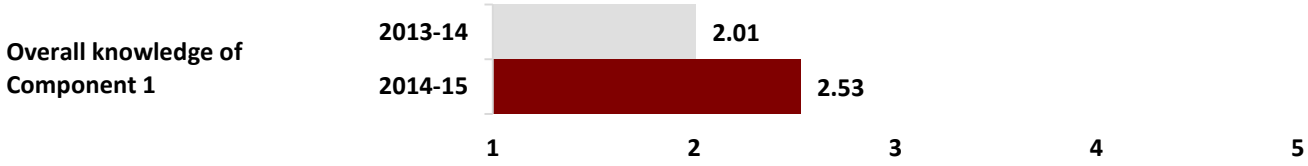


Baseline level of project goal achievement

Baseline ratings of project goals for the seven new participants compared to last years' new participants are presented below. Baseline results should be used by project leaders to inform decision-making so training can be offered to new participants in their lowest-rated areas.

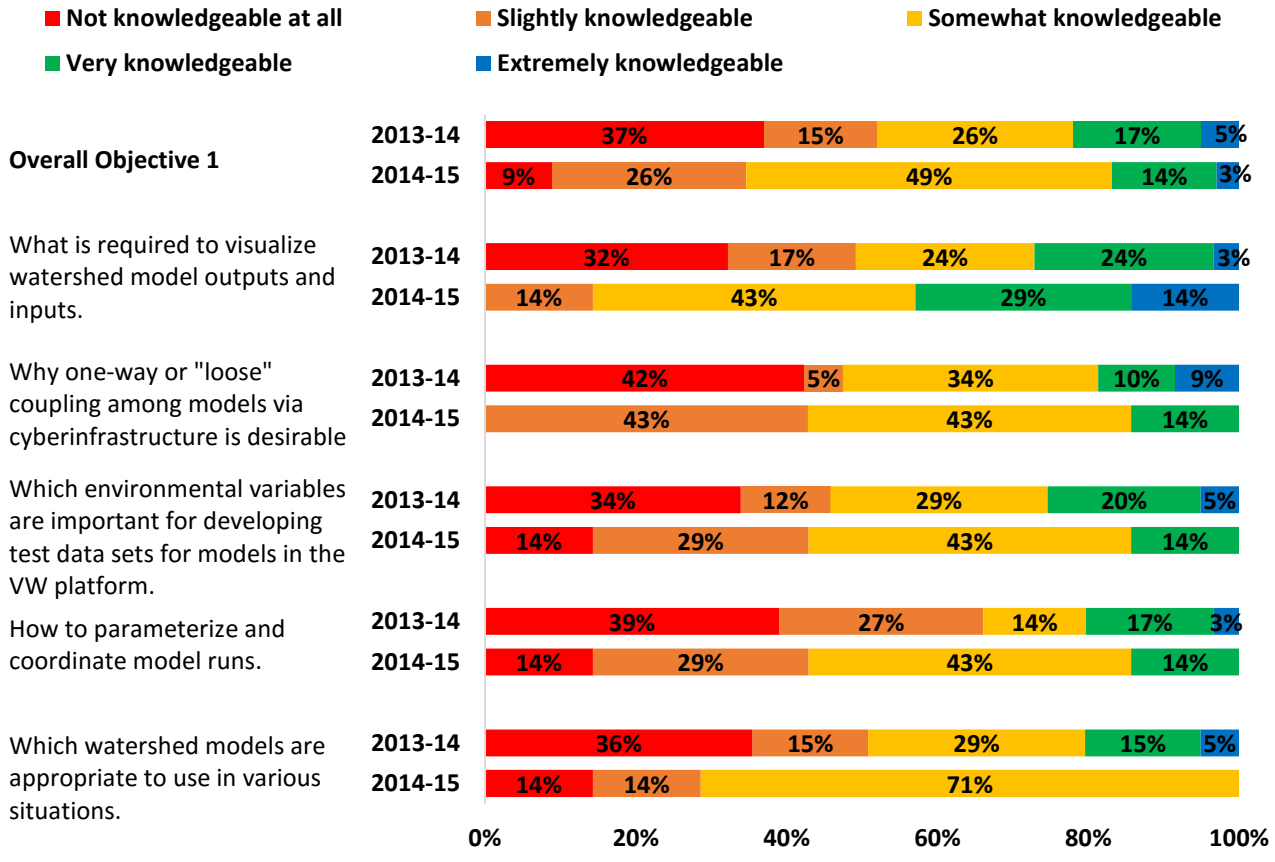
Component 1: Watershed Science

The goal of Component 1 is to advance understanding of hydrologic interactions and their impact on ecosystem services using a virtual watershed (VW) framework. Component 1 has three objectives, rated on a 5-point Likert scale, with 1=*not knowledgeable at all* and 5=*extremely knowledgeable*. Objective scores were aggregated to obtain an overall score for Component 1 (2.53 - *slightly knowledgeable*).



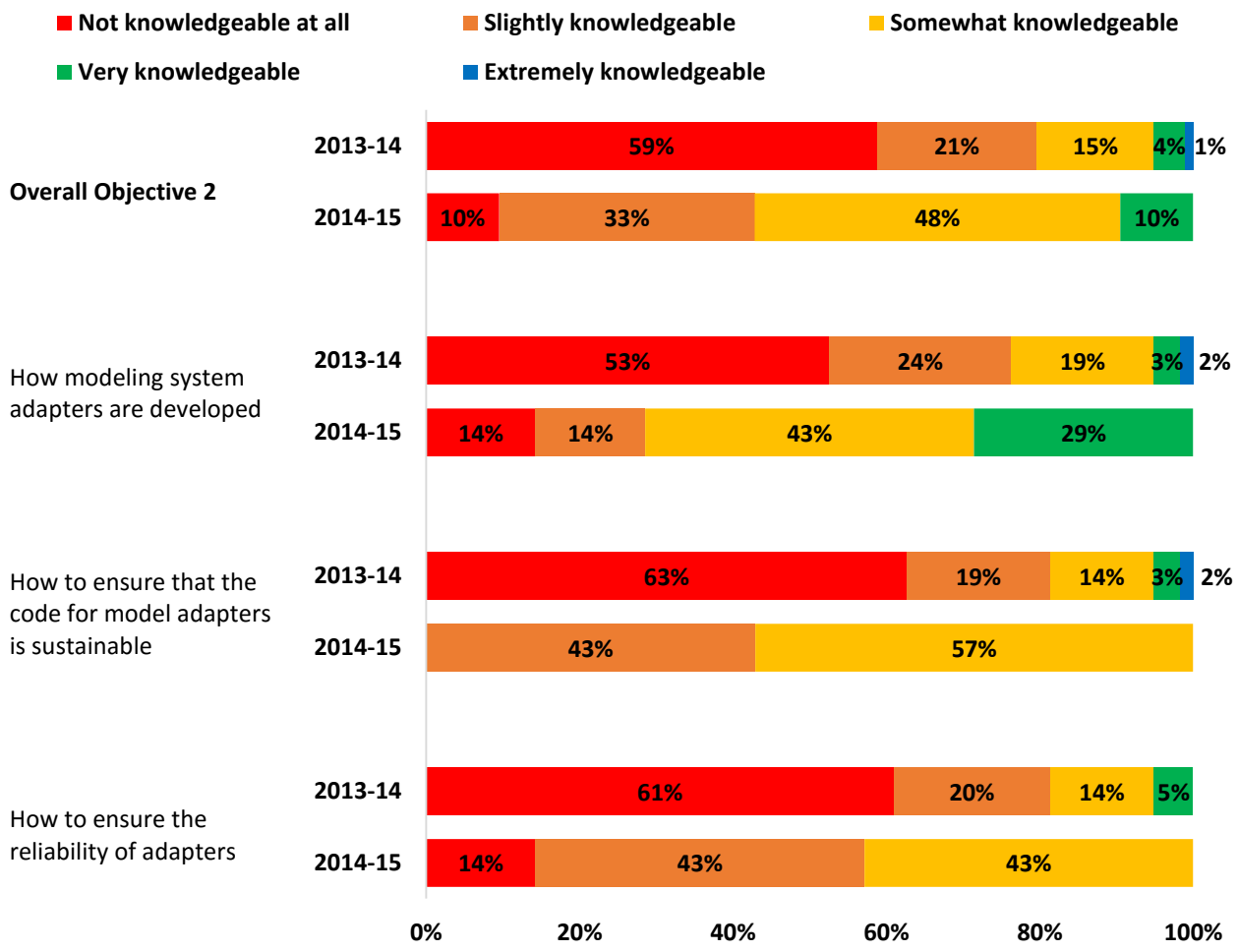
Objective 1: Parameterize and validate watershed models

As shown in the figure below, for Objective 1, the main focuses of training for this year are: '*which environmental variables are important for developing test data sets for models in the VW platform', 'how to parameterize and coordinate model runs',* and *'which watershed models are appropriate to use in various situations',* which differs from last year's recommended focus on '*why one-way of 'loose' coupling among models via cyberinfrastructure is desirable'*.



Objective 2: Develop CSDMS (Community Surface Dynamics Modeling System) adapters for models

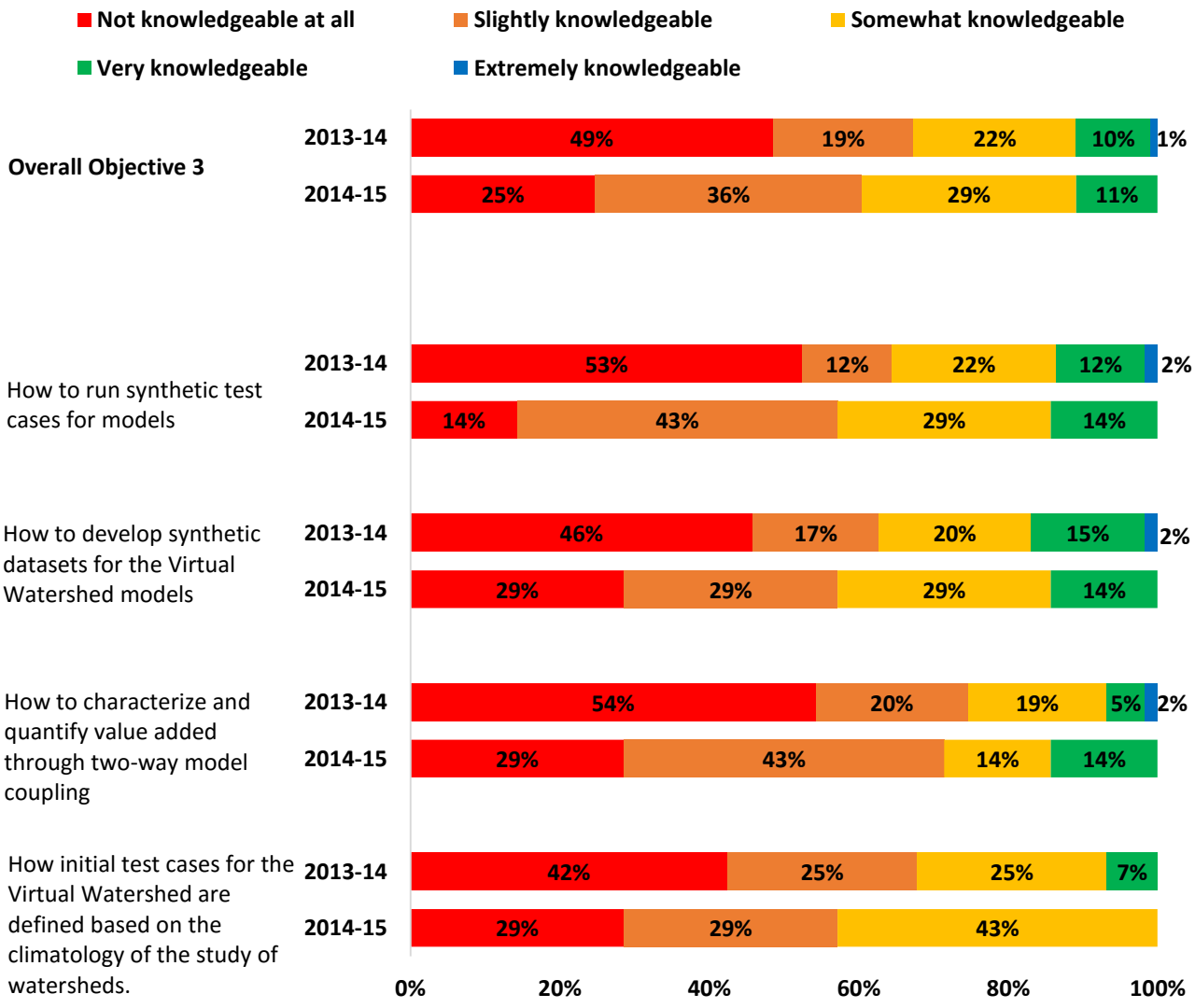
As shown in the figure below, for Objective 2, the main focus for training this year is '*how to ensure the reliability of adapters'*, which differs from last year's recommended focus on '*how to ensure that the code for model adapters is sustainable'*.



Reynolds Creek Experimental Watershed, ID

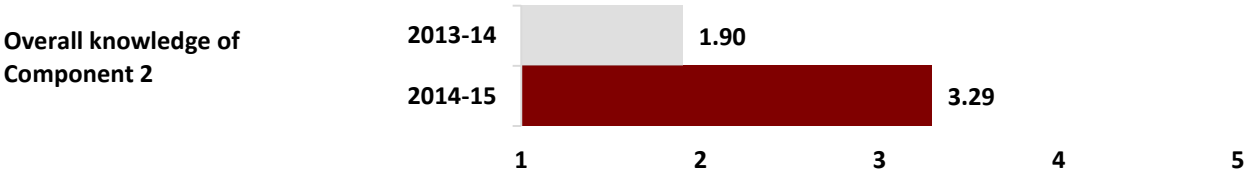
Objective 3: Test VW applications and answer research questions using the VW platforms to investigate watershed ecosystem services

As shown in the figure below, for Objective 3, the main of focus for training for this year is: '*how initial test cases for the Virtual Watershed are defined based on the climatology of the study of watersheds'*, which differs from last year's recommended focus on '*characterizing and quantifying value added through two-way model coupling'*.

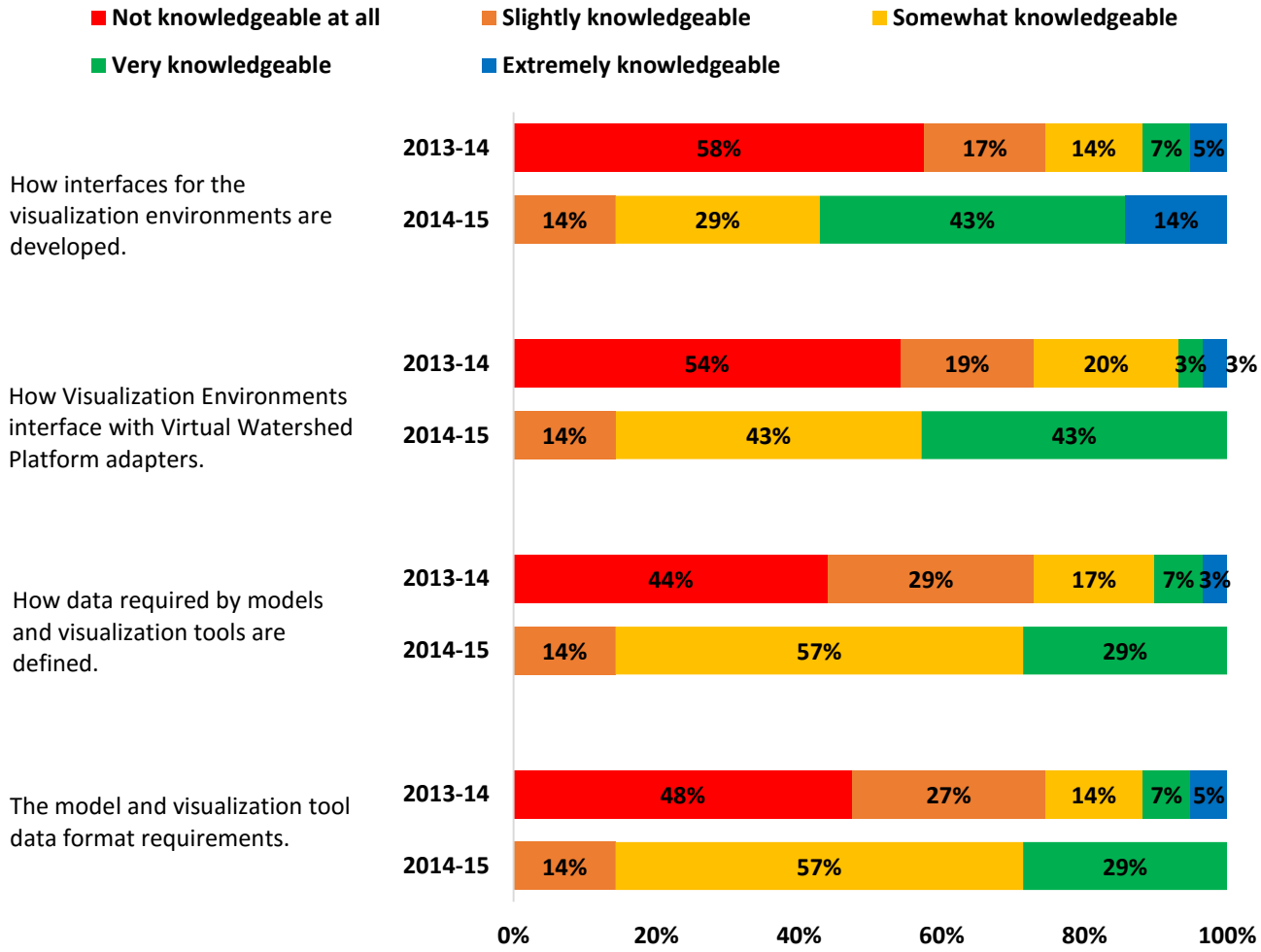


Component 2: Cyberinfrastructure – Visualization

The goal of Component 2 is to accelerate collaborative, interdisciplinary watershed research and discovery by creating innovative visualization environments. New project participants rated items related to the component on a 5-point Likert scale, with 1 = *not knowledgeable at all* and 5 = *extremely knowledgeable*. Objective scores were aggregated to obtain an overall score for Component 2 (3.29 - *somewhat knowledgeable*).



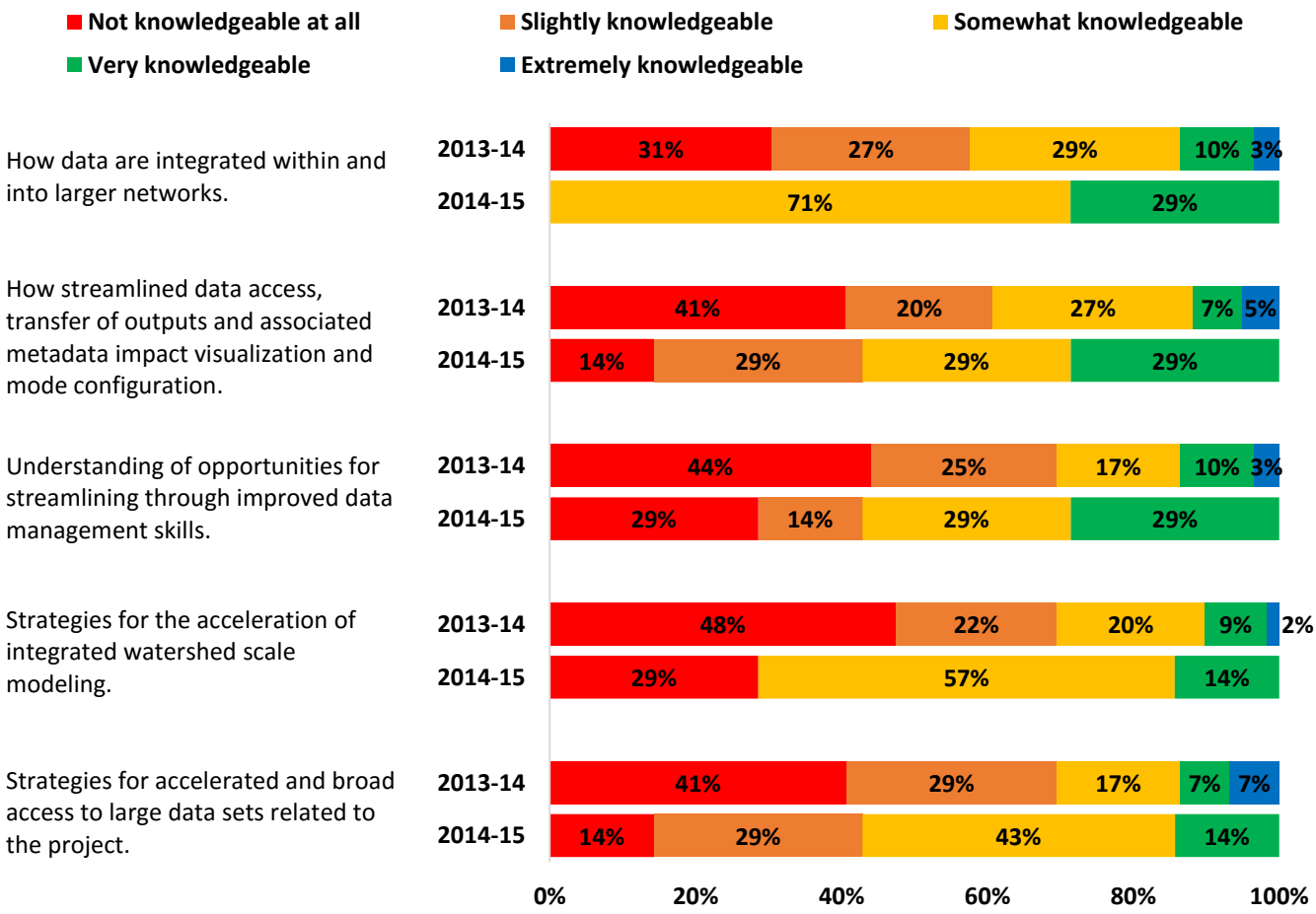
As shown in the figure below, for Component 2, the main of focuses for training for this year are: '*how data required by models and visualization tools are defined'* and *'the model can visualization tool data format requirements',* which differ from last year's focus on *'how interfaces for the visualization environments are developed'*.



Component 3: Cyberinfrastructure – Data

The goals of Component 3 are to: 1) accelerate integrated watershed scale modeling through streamlined data access, transfer of outputs and associated metadata to data management systems, visualization, model configuration, 2) enable accelerated and broad access to research products, data and metadata through integration with national networks through interoperable data services, and 3) streamline data intensive research through improved data management skills. Objective scores were aggregated to obtain an average, overall score for Component 3 (2.53 – *slightly knowledgeable*).

As shown in the figure below, for Component 3, the main of focus for training for this year is: '*strategies for accelerated and broad access to large data sets related to the project'*, which differs from last year's focus on *'strategies for acceleration of integrated watershed scale modeling'*.



Component 4: Workforce Development

The Workforce Development goal is to engage university faculty and graduate students in interdisciplinary team-based watershed research, and broaden undergraduate student participation in STEM through modeling and visualization. The seven new participants indicated their baseline levels of participation across four main activities in *check-all-that-apply* questions. Results show that the new participants do not have substantial levels of participation in activities, outside of those related interdisciplinary training and pre-meeting camps.

Collaborative fieldwork activities involving students and faculty	Graduate Inter-Disciplinary Training	Capstone and Leadership Institute	Undergraduate Visualization Modeling Network
• Attended pre-meeting camps (4) • Contacting students directly with information and opportunities (1) • **No participation (3)**	• Taking part in interdisciplinary training (4) • Interdisciplinary Modeling Course (3) • Contributing at Tri-State meetings (2) • CSDMS training (1) • **No participation (2)**	• Taking part in cyber seminars (1) • Attending face-to-face summer institutes (1) • **No participation (5)**	• **No participation (7)**

Key Findings

- Hispanic/Latino, African American, and American Indian/Alaskan Native individuals were represented when compared to the 2013-14 cohort of participants. Females are underrepresented when compared to the 2013-14 cohort.
- On average, new participants identified as being as *slightly knowledgeable* (2.78/5) of all WC-WAVE goals and objectives. Participation in project components outside of research was low. This level of knowledge and participation is to be expected at the time of participant's entry into the WC-WAVE project, with the assumption that knowledge in in each of the research areas and participation in project components will increase over time. Project leaders can use these baseline knowledge and participation levels to inform the support offered to new participants in weaker areas and to encourage them to participate any relevant, upcoming project activities.

Recommendations

- Continue existing outreach and education efforts on newly entering participants, given its current effectiveness.
- Combine current outreach strategies with more systemic strategies to address diversity (e.g. recruitment strategies for new faculty, GPA requirements for incoming students).

2015 WC-WAVE Innovation Working Group

July 21 – 24, 2015 Sagehen Creek Field Station, CA & DRI, Las Vegas, NV n=5

Innovation Working Groups (IWGs) provide a setting for scientists and educators, along with key nationally and internationally recognized experts, to address complex challenges that can transform science and education. The Innovative Working Group program supports activities that are modeled after those hosted by the highly successful NSF-supported National Center for Ecological Analysis and Synthesis (NCEAS). The long-term outcome of the IWGs is for researchers to submit proposals that target NSF cross-cutting programs and/or publish synthesis papers in peer reviewed journals.

IWG program objectives are to increase participants' ability to:

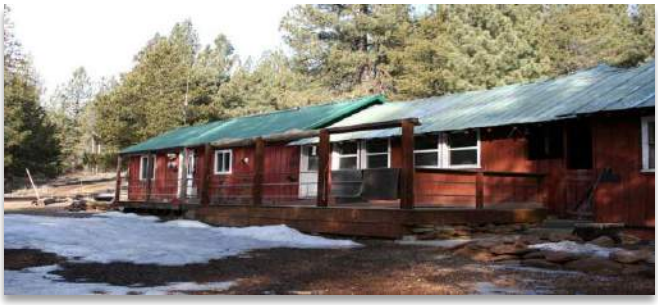
- Identify open research areas related to snow-rain transitions.
- Isolate a specific research question tractable for a focused analysis.
- Unite different data sets in an analysis framework to answer research questions.
- Outline a related journal article and develop figures.
- Discuss ways to progress these ideas into interdisciplinary research proposals.

Background of the Sagehen Creek Field Station IWG

- The name of this IWG was *Improving Predictions of Snow to Rain Transitions by Synthesizing Observations and Models at Sites across the Western U.S.*.
- This IWG was conducted as a four-day workshop with the intent to increase understanding of the current scientific capabilities to estimate snow-rain transition and identify gaps in the research.
- The first day was held at Sagehen Creek Field Station in Truckee, CA and had the objective to define the goal and outcomes for the IWG. The other days were held at the Desert Research Institute in Reno, NV.

Demographics

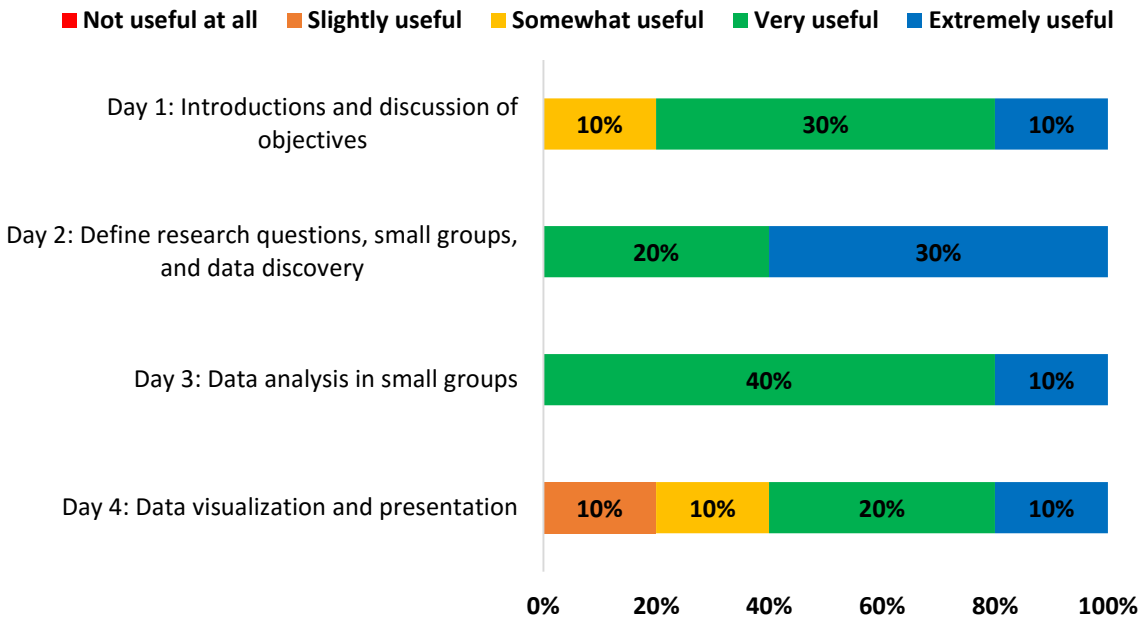
- Three of the participants were male and two were female. Women were well-represented among the participants, with the percentage of women on parity with the project (41%).
- Four of the participants were white; one was Asian.
- No underrepresented minorities were represented in the IWG.



Sagehen Creek Field Station, CA

Sessions

Workshop participants rated the usefulness of sessions on a 5-point Likert scale, with 1 = *not useful at all* and 5 = *extremely useful*. The highest rated session was Day 2 (*define research questions, small groups and data discovery*), while Day 4 (*data visualization and presentation*) was the lowest rated session by the participants. Both Day 2 and Day 4 involved small group interactions and were also rated highest among participants. Given this, including group work in future IWG meetings would be beneficial.



Workshop logistics

Participants rated their satisfaction with workshop logistics on a 5-point Likert scale, ranging from 1 = *not at all satisfied* to 5 = *extremely satisfied*. Participants were either *very satisfied or extremely satisfied* with all aspects of the logistics. Given the high scores that were reported by the participants, it is suggested that IWG meeting organizers replicate existing practices and processes related to: registration, atmosphere, accommodations, food and technology at future meetings.

Logistics	Composite Rating
Registration process	4.60
Atmosphere	4.60
Accommodations	4.60
Food	4.60
Technology	4.40

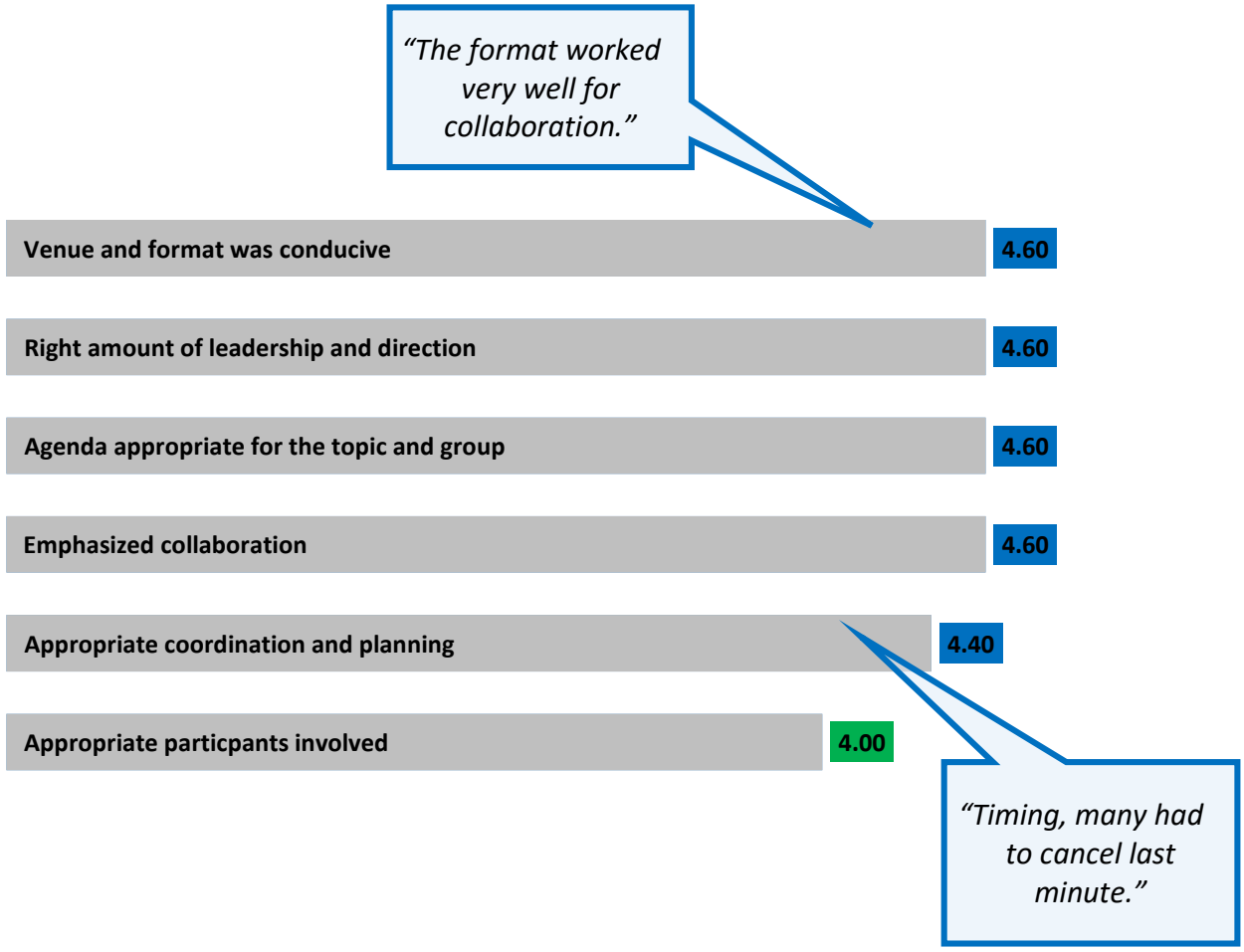
Usefulness of the Innovation Working Group sessions

Innovative Working Group participants rated their satisfaction with the organization of the meetings and the usefulness of the session content on a 5-point Likert scale, with 1 = *not at all* and 5 = *extremely*.

Extremely	4.21 – 5.00
Very	3.41 – 4.20
Somewhat	2.61 – 3.40
Slightly	1.81 – 2.60
Not at all	1.00 – 1.80

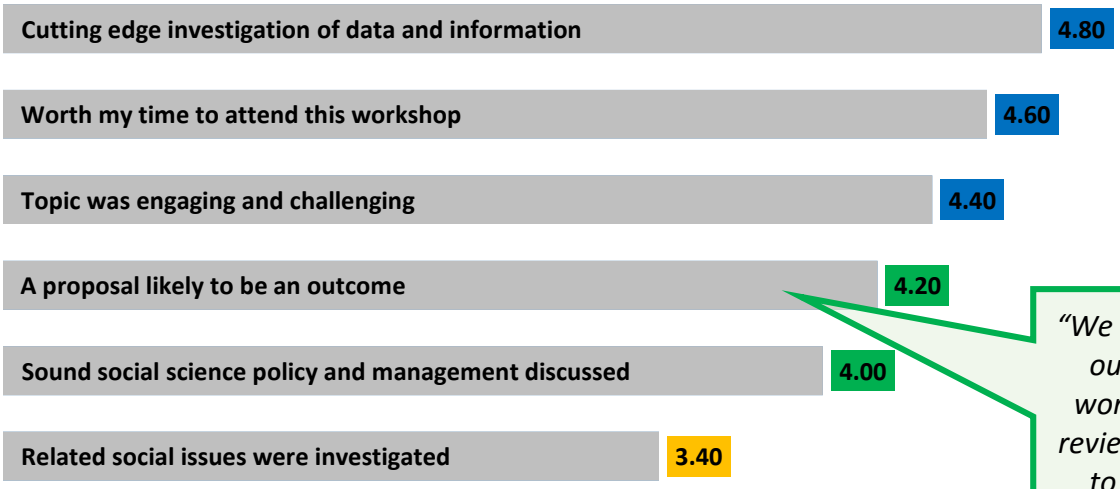
Meeting organization

Participants rated the various aspects of the meeting organization at *very* or *extremely satisfied*. The only organizational aspect that was not rated *extremely satisfied* was that *the appropriate participants were involved*. Given the high scores that were reported by the participants, it is suggested that IWG meeting organizers replicate existing practices and processes related to meeting organization.



Content of the Innovation Working Group

The participants rated the usefulness of the content of the IWG on a 5-point Likert scale, with 1 = *not at all useful* and 5 = *extremely useful*. All but one topic was rated as *very* or *extremely useful*. The one topic that was rated as *somewhat useful* was the investigation of social issues related to the IWG. Coordinators of the IWG should focus on making connections between the topics being discussed and explored during the IWG and how they relate to contemporary issues.



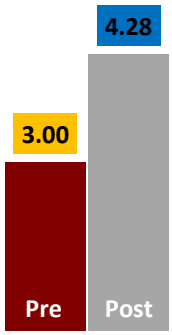
"We intend that the output from this working group ([a] review paper) is used to anchor future research/grant seeking activity."

Impact on participants

Participants rated their knowledge in the objective areas using a 5-point Likert scale with 1 = *no knowledge* and 5 = *extremely knowledgeable* before and after participating in the Innovation Working Group. Participants experienced a considerable increase in all knowledge areas, with '*my ability to identify open research areas related to snow-rain transitions'* increasing the most. A t-test for significance was not conducted, due to the small sample size of the participants.

Extensive knowledge	4.21 – 5.00
Good knowledge	3.41 – 4.20
Some knowledge	2.61 – 3.40
A little knowledge	1.81 – 2.60
No knowledge	1.00 – 1.80

Overall Impact



IWG objectives	Pre	Post
My ability to identify open research areas related to snow-rain transitions.	3.00	4.80
My ability to isolate a specific research question tractable for a focused analysis.	2.80	4.20
My ability to unite different datasets in an analysis framework to answer the research questions.	3.00	4.00
My ability to outline a related journal article and develop figures.	3.20	4.60
My ability to discuss ways to progress these ideas into interdisciplinary research proposals.	3.00	3.80

Key Findings

- This Innovation Working Group was identified as an effective format for cross-state collaboration, as well as a medium to conduct cutting-edge investigation of data and information.
- The *meeting organization* was well received by the participants, with no components receiving a rating lower than *very satisfied* (4/5).
- Meeting content was well rated by participants, with all aspects receiving a rating of 4.0 or higher, with the exception of '*the investigation of social issues related to the IWG'* (3.40).
- All participants indicated their knowledge and skills increased from *some knowledge* to *good* or *extensive knowledge*.

Recommendations

- Combine current outreach strategies with more systemic strategies to address diversity (e.g. recruitment strategies for new faculty).
- Ensure future IWGs continue to incorporating small group activities.
- In future meetings devote more time to the *'investigation of social issues related to the IWG'*, possibly through small group discussion of related issues.
- Devise strategies to mobilize and implement ideas generated at the Innovation Working Group.

Sagehen Creek, CA

October 2015 Tri-state Consortium Annual Meeting

October 6-8, 2015 UNLV n=56

The October 2015 Tri-state Consortium Annual Meeting occurred from October 6-8, 2015 and was an opportunity for members of the project to discuss progress made on major projects within and between the states, as well as an opportunity for the External Advisory Board (EAB) to learn about the project, discuss updates, and provide feedback to the leads. An evaluation form was emailed to 72 attendees of the meeting, with 56 responding, yielding a 78% response rate.

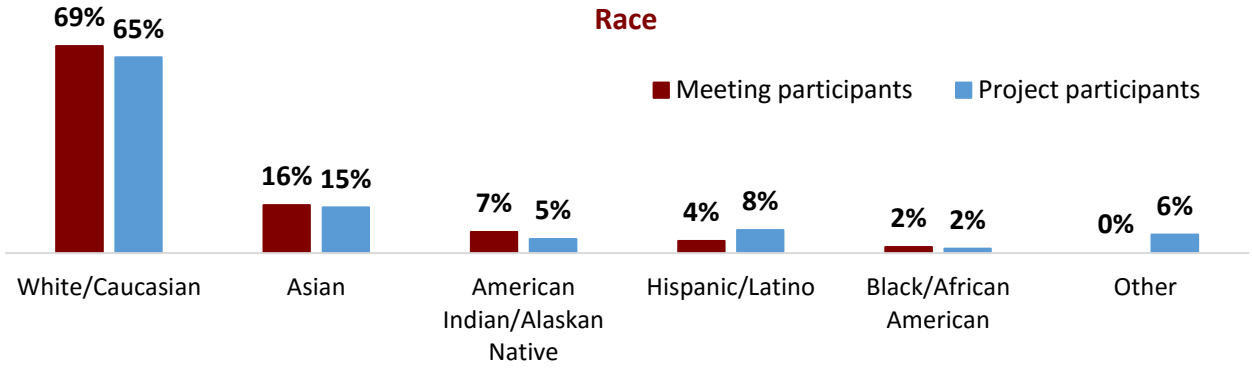
Objectives are to increase:

- Awareness of the virtual watershed platform.
- Ability to interact with virtual watershed platform in a way that is beneficial to me.
- Understanding of the science being conducted as part of the WC-WAVE project.
- Ability to join with a team to develop new proposals and publications based on WC-WAVE results.
- Ability to create strategies that will increase results of the WC-WAVE project.

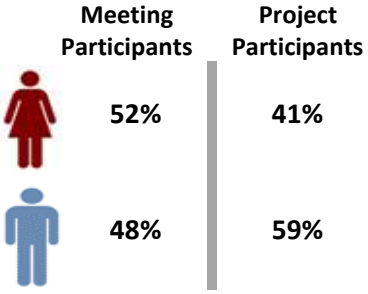
Demographics

Compared to the entire WC-WAVE project participants:

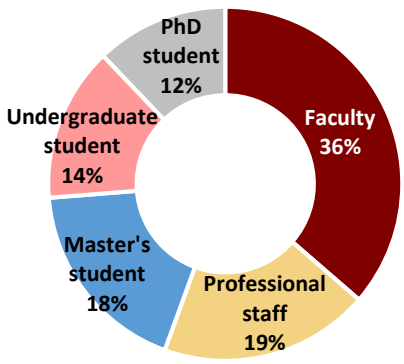
- Females, American Indians, and African Americans were well-represented.
- Hispanics/Latinos were slightly underrepresented.
- Individuals of other racial backgrounds (such as American Indian and Pacific Islander) were not represented.



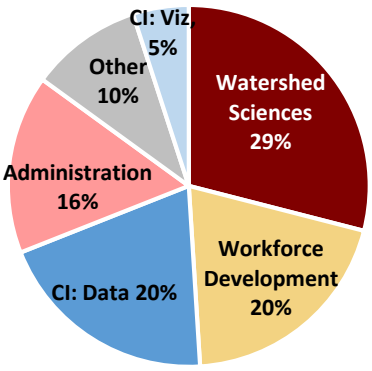
Gender



Position

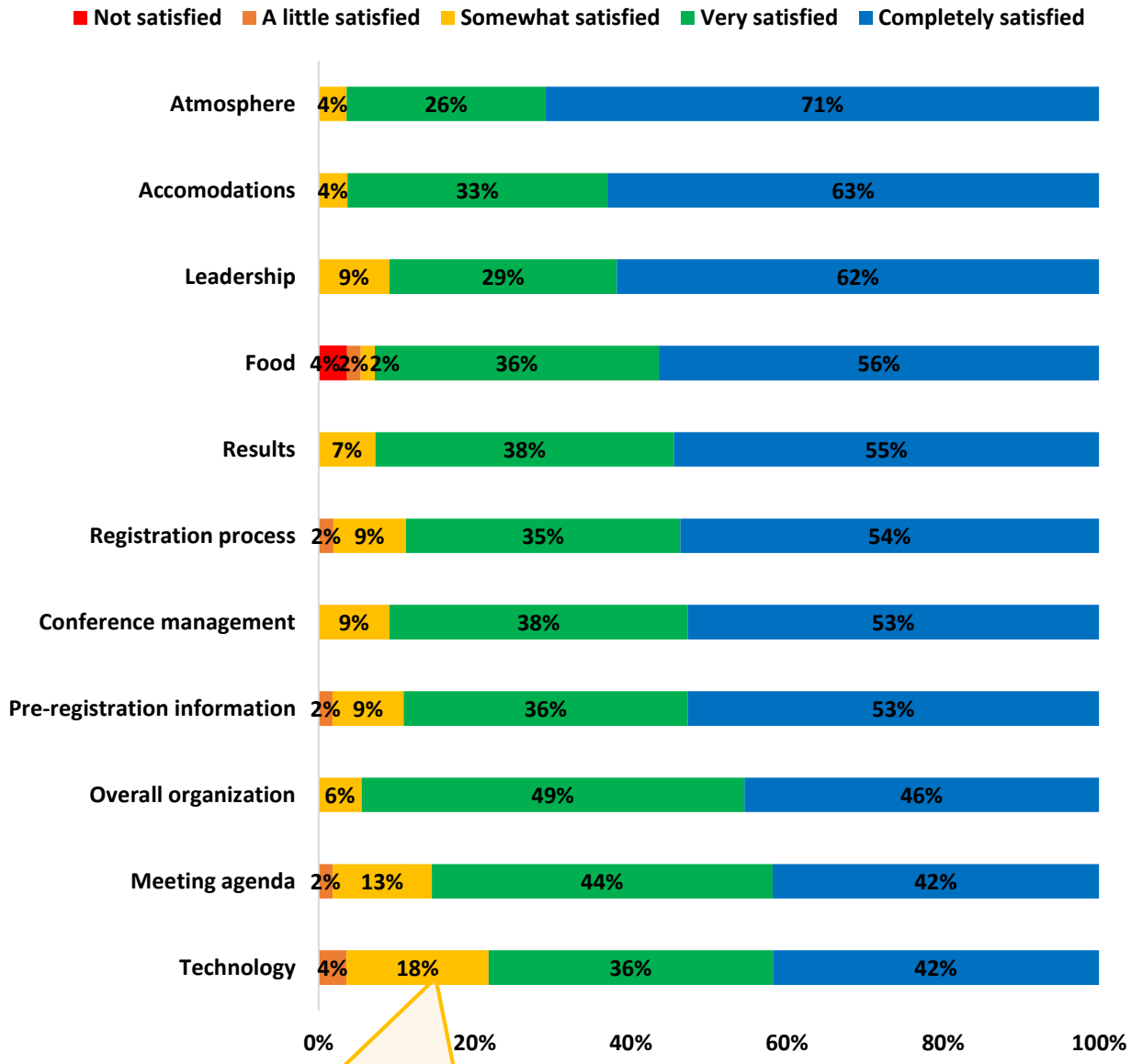


Project Team



Meeting logistics

Participants rated their satisfaction with meeting logistics on a 5-point Likert scale, with 1 = *not satisfied* and 5 = *completely satisfied*. Participants were either *very* or *extremely satisfied* with all logistics. Technology was the lowest rated logistic, but it was still rated as *very satisfied*. There was feedback about the internet not working appropriately during the virtual watershed training, which contributed to why the technology logistics are rated lower.



"Virtual watershed platform training had a lot of glitches."

"During the virtual watershed platform training, the internet connection wasn't communicating with me."

Usefulness of sessions

Meeting participants rated the usefulness of session content on a 5-point Likert scale, with 1 = *not at all useful* and 5 = *extremely useful*. All sessions were rated *very* or *extremely useful with the* exception of the virtual watershed platform training. In addition to the technological issues that were occurring during the virtual watershed platform training, many noted this session was not well planned, too complicated and rushed.

Extremely useful	4.21 – 5.00
Very useful	3.41 – 4.20
Somewhat useful	2.61 – 3.40
Slightly useful	1.81 – 2.60
Not at all useful	1.00 – 1.80

Session	Rating
Tuesday, October 6, 2015	
Overview of progress on objectives	3.91
Dry Creek Virtual Watershed Platform presentation and discussion	3.95
Reynolds Creek Virtual Watershed Platform presentation and discussion	3.98
Lehman Creek Virtual Watershed Platform presentation and discussion	3.93
Jemez Virtual Watershed Platform presentation and discussion	3.94
Review of results from June Brainstorming Meeting	3.91
Undergraduate Visualization and Modeling Network presentations	3.96
Working Groups	4.51
Reception and Poster Session	4.26
All Break & Lunch Networking Opportunities	4.37
Wednesday October 7, 2015	
Report out on progress from Monday	3.80
Next steps: brainstorming on proposals and publication and forming working groups to continue	3.93
Virtual watershed platform training for all	3.16
External Advisory Board reports to whole group	4.04

"The virtual watershed platform training was a little hard to follow along with. If a better explanation was given in the beginning about its application that would have been helpful."

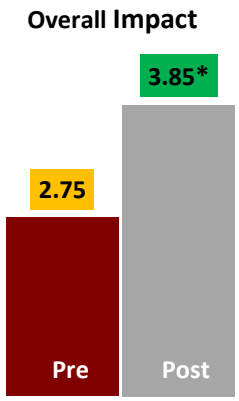
"The virtual watershed platform training was very unclear - we ran through a bunch of steps that were not well explained, and I have no idea what we actually did to get the end result."

"Between the technical issues and the sheer number of steps involved, the presenter(s) had to speed through things to finish the training in the time allotted. Not enough time could be spent at each step to really explain what was happening in any significant depth."

Impact on participants

Meeting attendees rated their level of knowledge of the Consortium Annual Meeting objectives on a 5-point Likert scale, with 1= *minimal* and 5=*extensive*, before and after attendance. Attendees' responses showed a statistically significant increase in all objectives. The virtual watershed platform session was the lowest rated objective (pre and post). This post rating is to be expected, given the low rating the VWP received in relation to its logistics and overall usefulness.

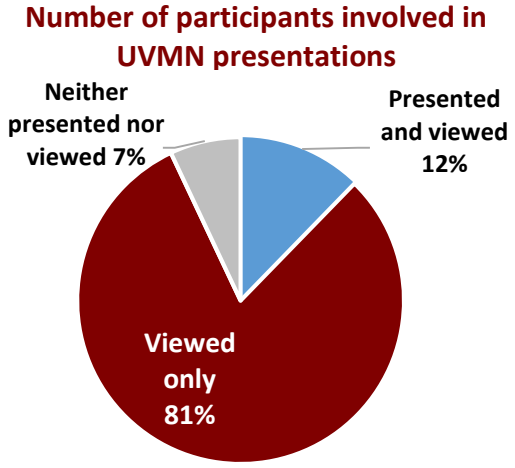
Extensive knowledge	4.21 – 5.00
Good knowledge	3.41 – 4.20
Some knowledge	2.61 – 3.40
A little knowledge	1.81 – 2.60
Minimal knowledge	1.00 – 1.80

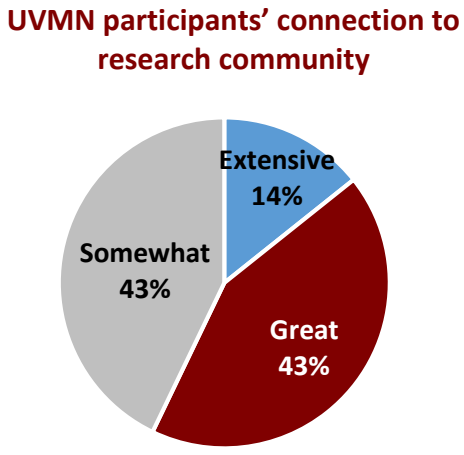


Meeting objectives	Pre	Post	Significant
My awareness of the virtual research platform.	3.00	4.00	✓
My ability to interact with the virtual watershed platform in a way that is beneficial to me.	2.20	3.13	✓
My understanding of the science being conducted as part of the WC-WAVE project.	3.07	4.19	✓
My ability to join with a team to develop new proposals and publications based on WC-WAVE results.	2.70	3.91	✓
My ability to create strategies that will increase results of the WC-WAVE project.	2.73	3.93	✓
My ability to increase the potential for sustainability of WC-WAVE project activities and research.	2.75	3.82	✓

Undergraduate Visualization and Modeling Network (UVMN) Presentations

UVMN presentations were held during the Consortium's Annual Meeting. Students and faculty teams showcased work they had completed in modeling and visualization. Seven survey respondents indicated they had conducted presentations, while 46 viewed presentations. Seven presenters rated their '*connection to the research community'* through their participation in UVMN activities, the majority describing their connection as *great* or *extensive*.





Meeting attendees noted the benefits they gained while presenting and/or viewing the UVMN presentations and made suggestions for improvement. Attendees' responses were analyzed qualitatively and categorized into sub-themes. Below are sub-theme descriptions followed by a comprehensive overview of qualitative responses, which are categorized by themes.

Theme	Sub-theme	Description of theme
Benefits	**Celebration of successes**	Pertains to how well the UVMN attendees were doing or how the presentations went. These comments were overwhelmingly positive.
	General opportunity to learn	Contains comments that were about positive learning from the presentations, but did not have a placement in the other larger categories. Dealt with benefits of watching the presentations or what information was gained from watching them.
	Learn/understand more about project	Concerns how viewing the presentations helps the individual learn about what is going on in the project or how they presentations help to illustrate projects and activities occurring.
	Idea generation, discussion & collaboration	Connects to how the presentations help individuals use the information to influence or modify their own projects or how to use the information to view ideas.
	Presenters	Comes from the presenters and how the experience impacted them, such as presentation practice.
Areas for improvement	**Technology**	Contains comments on what could be improved and description of what was not working during presentations.
	Presentation logistics and content	Suggests what could have made presentations better, such as shorter times, more time, and content suggestions.

Benefits

General opportunity to learn

- *As a UVMN-er, it helped to see what will be expected of me next year when I present*
- *Beneficial to hear directly from UVMN participants about their approach and experience*
- *Concrete examples of people's work*
- *Gave my student the opportunity to view other student's research*
- *They all gave perspective on projects of interest with different focuses*
- *They had some cool things that were being done such as the sandbox*
- *I also got a better idea of how virtual watershed platforms can be applied*
- *Seeing how people are using different watershed science tools*
- *Learn more about Navajo area*
- *Impressed to see links between drought and fishing concerns within Navajo Nation*
- *Lesson plan for sandbox was helpful*
- *It was also useful for students to get the opportunity and experience in presenting*
- *I took this opportunity to learn how to interact with people. The communication is the interdisciplinary nature I will continued to focus and improve*

Learn/understand more about project

- *Good to learn what they are doing*
- *It was great to learn what is being done*
- *Understand what other work is being done*
- *As a viewer they were helpful as I learned a great deal about other group's projects*
- *It was useful to see what the other teams were doing*
- *It was helpful to see what undergraduate students and faculty were focusing on*
- *I got a chance to see more of what the UVMN teams are working on*
- *Informed me of project progress and challenges*
- *Understanding what this component of the project is about*

Idea generation, discussion & collaboration

- *Gave some idea about incorporating educational activities in my undergrad classes*
- *Helpful in coming up with new ideas for education and outreach*
- *I got good ideas on how to design a poster for my project as well*
- *I feel the sand box project could benefit me in my personal research*
- *Compare ideas and projects we are working on*
- *Feedback and discussion were useful*
- *Presentations were beneficial since it allowed us to collaborate*
- *Informed me of areas for collaboration*
- *The presentations were beneficial to provide directions for potential broader impact collaborations*

Celebration of successes

- *Got to see the terrific work being done by the undergraduate students*
- *Great to see what the UVMNers have accomplished*
- *Let me know the current progress of the UVMN*
- *Great to see students/mentors talking about the successes of their projects*
- *I thought it was great to see the interest and involvement of students in the program*
- *It was good to see that this outreach program has been successful*
- *It was great to see the projects the UVMN are working on*
- *I like seeing what the students are doing, how their work contributes to the project, and how the project contributes to their experience*
- *I thought the presentations were done well, we had plenty of time to view them and almost everyone seemed prepared to present*
- *I saw some of the incredible challenged faced by undergraduates at some institutions and what great work they have done to overcome those challenges and be a part of this project*
- *It is nice to see how this project brings science to community colleges*

Presenters

- *For me, I was nervous to present to a room full of professional but I overcome that feeling before it came out in words. I was encouraged, motivated, and have several positive feedback coming from professional of WC-WAVE*
- *They were beneficial as a presenter since preparing for the presentation helped me to learn more about the digital sandbox, its uses, and benefits*
- *For me as a presenter, it gave me more experience in talking in front of a group. I enjoying showing this information to the UVMN and the other graduate programs*
- *I am very thankful for the opportunity to present, it opened the door to many informal conversations later in the day and more resource sharing*

Areas for improvement

Technology

- *One of the projectors was inadequate, esp. for visualizations*
- *Avoid technical difficulties*

Presentation logistics and content

- *More presentations and time available*
- *Maybe a little more time allowed for each*
- *The shorter format (10 minutes) I found useful*
- *Shorter time; more succinct presentations*
- *I think it would have helped to have advisors present, but let students talk more*
- *More info on impact of participation would have been interesting*
- *Presentations could have been briefer. One presenter rambled about things that were irrelevant*
- *Practice. This section generally felt the most haphazardly assembled, though there were high points*
- *The "Next Steps" were far off next steps*
- *An overall theme for the entire event would have been good*

Key Findings

- Females, American Indians, and African Americans were well-represented at the Consortium Annual Meeting. Hispanics/Latinos were underrepresented. Pacific Islanders/Native Hawaiians were not represented.
- All aspects of the Consortium's Annual Meeting were perceived by attendees as beneficial. The highest rated session was the *Working Groups*, while the *Virtual Watershed Presentation* training session was the lowest rated.
- In comparing pre-post scores related to knowledge, attendees reported significant gains in all areas. The lowest scored item in both the pre (2.20/5.00) and post (3.13/5.00) scores was the knowledge item '*my ability to interact with the virtual watershed platform in a way this is beneficial to me'*.
- Attendees cited opportunities to celebrate success, learn, generate new ideas, as well as discuss and collaborate with other attendees, as benefits of the Consortium's Annual Meeting.
- Of those who participated in the survey, 92% indicated that they have viewed (or viewed/ presented) the UVMN presentations featured at the Consortium's Annual Meeting. All meeting attendees stated their experiences, both as presenters and/or viewers, as beneficial.

Recommendations

- Build on existing strengths, and formulate new strategies, in efforts toward recruiting, retaining, and supporting the advancement of URM and females.
- Build on the success of the Consortium Annual Meeting, including the UVMN presentations, as an effective format to foster cross-team and cross-state collaboration.
- Explore other mediums to educate WC-WAVE participants about the virtual watershed platform.
- Devise strategies to mobilize and implement paper and proposal ideas and collaborations proposed at the Consortium Annual Meeting.
- Ensure there are formalized mechanisms in place to follow through on next steps established by working groups at the Consortium's Annual Meeting.

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Overall Project Key Findings

Demographics

- Compared to the WC-WAVE 2013-14 participants, 2014-15 participants: Hispanic/Latino, African American, and American Indian/Alaskan Native individuals are well represented. Females are underrepresented. The percentage of African Americans, Hispanics/Latinos, and American Indians/Alaskan Natives in the 2014-15 participants increased compared to 2013-14, possibly due to the program's focus on recruitment of URMs.
- The Innovation Working Group was attended by no URMs, as the group was exclusively white or Asian participants.
- The Consortium's Annual Meeting was fairly representative of the projects participants, with the exception that American Indians/Alaskan Natives who were more represented and Hispanics/Latinos who were underrepresented.

Effectiveness of program implementation

- Almost all aspects of all activities were rated high by participants, apart from technology (rated lowest in at Innovation Working Group and the Consortium's Annual Meeting) and presentations (the virtual watershed platform at the Consortium's Annual Meeting and the presentations at the Innovation Working Group).

Achievement of program objectives and impact on participants

- New participants rated their average knowledge of and participation in project activities fairly low. This level of knowledge and participation is to be expected at the time of entry, with the assumption that it will increase over time. The baseline participant survey is a tool that can be used to inform what knowledge areas should be targeted for future education and training efforts.
- In regards to Innovation Working Group and the Consortium's Annual Meeting, participants reported considerable gains in objectives and areas of intended impact. All programs achieved their objectives and attained intended impact.

Overall Project Recommendations

- Continue to actively recruit diverse participants by combining current outreach and recruitment strategies with more systemic strategies to address diversity (e.g. university-wide recruitment strategies for new faculty, modifying GPA requirements for incoming students, university-wide mentorship programs to support URM populations).
- The project's breadth of impact would be enhanced with continued recruitment for programs and activities. Further, critical consideration of what existing programs should be continued in their current form, discontinued, modified, or scaled-up should be done based on a consideration of both depth (*how much* impact on individual participants) and breadth of impact (*how many* participants are impacted).
- Learn from and leverage success of meetings and working groups that bring people together to share knowledge and collaborate (Consortium Annual Meeting and Innovation Working Group). Embed plans in meeting and group infrastructure to ensure momentum is not lost after brainstorming/idea generation.
- Create implementation plans for the recommendations provided by the Advisory Committee's final report.
- Explore methods for evaluators and the Advisory Committee to collaborate on findings and recommendations

Upcoming Project activities and evaluations

Innovation Working Group
Virtual State Meeting
Monthly Leadership Meetings