



Southwest
Climate Adaptation
Science Center

External Review Team Final Report

Prepared with and on behalf of the SW CASC External Review Team

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Background Information

About the Review Process

The external review of United States Geological Survey (USGS) Regional Climate Adaptation Science Centers (RCASCs) Host-Universities is designed to gain information about the activities and outcomes emerging from each Host-University, improve their effectiveness, and inform decisions about their future development and administration (this and additional information can be found [here](#)). This report comes at the end of USGS' second cycle of funding RCASCs and performing 5-Year external reviews of the Host University's efforts.

Donna Silverberg Consulting ([DS Consulting](#)) and team are the External Review Managers and process designers selected by the National Climate Adaptation Science Center (NCASC) to coordinate and conduct the structural and operational review component of the external reviews for all eight Host-Universities, including report writing on behalf of the External Review Team (ERT). The DS Consulting team consists of:

- Donna Silverberg, JD (Principal and External Review Team Lead, Facilitator, & Manager)
- Tina Patterson, MA Dispute Resolution, MDR, MCI Arb, CF APMP, CICM (Project Advisor and ERT Facilitation Support)
- Colby Mills, BA Anthropology (Logistics and ERT Facilitation Support)
- Michelle Helman, MA Peace & Conflict Studies (Evaluation Specialist)
- Charles Wiggins, JD, LLM (Final Report Editor)







Purpose of the Review

- 1. Assess the competencies, efficiencies, challenges, and areas for improvement** of each host-university in managing the administrative requirements and terms and conditions of the corresponding host agreement;
- 2. Assess the contribution** by each host-university and associated academic consortium with respect to:
 - a. Scientific achievements on climate impacts and vulnerability science;
 - b. Collaborative efforts with stakeholders to develop adaptation products applicable to priority regional decision-making;
- 3. Assess the contribution** by each host-university and associated academic consortium with respect to:
 - a. Education and Training of early career professionals;
 - b. Outreach and Communication services;
- 4. Review the effectiveness** of each regional host-university and associated academic consortium in meeting the goals established under their current host agreements;
- 5. Aid** the NCASC in developing improved requirements for re-competition of the next university host agreements.

External Review Model Framework

1. What was the Host's proposed approach?
2. What did the Host implement and how did they do it?
3. So what: What did the Host learn? How did they respond and adjust?

External Review Categories and Process Schedule

	March 28	March 29	March 30	March 31
Topic	 Administrative Management 	 Scientific Achievements and Collaborative Efforts 	 Capacity Building and Outreach & Communications 	Overall Effectiveness towards Host's Proposed Goals

External Review Team (ERT)

Review team composition:

ERT members were nominated by USGS administrators and then selected by the ERT Manager based on the following criteria, with a goal of having an ERT that had varying aspects of experience and expertise to suit the CASC. Each member had:



1. Scientific, administrative, and/or stakeholder engagement process knowledge;
2. Working knowledge of the CASC Network;
3. Time, willingness, and support to serve on the ERT;
4. No conflict of interest (e.g., not receiving funding from any CASC at this time, nor expecting to receive funding from the CASC they were reviewing in the next funding cycle).

SW CASC ERT members included:

- Dr. Benét Duncan, Managing Director, Western Water Assessment, Cooperative Institute for Research in Environmental Sciences (CIRES), University of Colorado Boulder
- Dr. Barry Grand, Regional Supervisor, SE Region, USGS-Cooperative Research Unit
- Mr. Al Kuslikis, Senior Associate for Strategic Initiatives, American Indian Higher Education Consortium
- Dr. Cyndy Loftin, Supervisor, Eastern Region, U.S. Geological Survey, Cooperative Research Units Program
- Dr. John Nielsen-Gammon, Regents Professor (Texas A&M University), Texas State Climatologist, Director of the Southern Regional Climate Center

All ERT members signed Conflict of Interest and Non-Disclosure forms prior to participating in the review.

Findings of the ERT – Administrative Management

	<p>Institutional Development <i>Staffing, Leadership Team, and Consortium Members</i></p>		<p>Fiscal Management <i>Budget, awards, and grant management</i></p>
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The Host and Consortium

The ERT’s overall impression of the University of Arizona’s (UArizona; Host) hosting of the SW CASC and the administrative/management systems it has in place is very positive. The SW CASC is one of 15 centers/programs at UArizona’s Arizona Institute for Resilience (AIR), which provides a second level of managerial support by the Host to the SW CASC. AIR is a research institute that, as a whole, “turns science into actionable, community-oriented solutions” and has a focus on the practice of “designing environmental and social systems to anticipate and integrate with ecological, social and economic change”. This similarity in overall focus and mission provides opportunities for the SW CASC to identify synergies among the other AIR programs, potentially helping to support long-term sustainability at this Host.

The Host, in its second round of host funding from USGS for the SW CASC, has been very intentional about meeting the terms and conditions of their Host Agreement from an administrative perspective. The administrative team has worked hard to overcome challenges associated with the USGS CASC administrative structure, a structure different from other federally funded grant and contract programs that the Host manages. Differences include: science priorities being set after the Host proposal and agreement are in place; strategic planning at mid-grant cycle; and the need to navigate university and agency bureaucracies simultaneously to disburse and administer funds.

The Host regularly reaches out to the consortium institutions and also within UArizona to invite scientists and new partners to the “table.” This requires a significant time investment, which is critical for growing the research portfolio and creating and sustaining partnerships that are key to maintaining science relevancy. The practitioner community is knowledgeable of and often engaged in the actionable science/evaluation work the CASC has been doing. This outreach and engagement nurtures the rich relationships of scientists, students, and partners the Host has worked to create during the two cycles of hosting the SW CASC. The Host has also done a good job dealing with challenges associated with the Covid-19 pandemic, which limited engagement and relationship building across the consortium and with partners.

The ERT finds that the Host is fully grasping the administrative and fiscal requirements and is meeting the terms of their agreement with USGS. The ERT finds that the Host is meeting the administrative requirements as specified in the original agreement. The Host institution provides very good direct support to the researchers through the CASC grants management staff and the Host institution’s Research Innovation and Impact (RII) office of sponsored programs/contracts office. The participants are dedicated to producing actionable science and forming rich, sustained partnerships with external communities.

In addition, the Host indicated that they used the ERT feedback from the first cycle (Cycle 1, 2017) to build the proposal and guide activity in the 2nd cycle (Cycle 2). This responsiveness is laudable. In particular, the societal impact and evaluation work, strategic planning, including more stakeholder involvement in committees, enhanced communications planning, and adjustments resulting from suggestions during meetings have evolved and increased, which has enabled the team to be more responsive to emerging issues. Using the focus groups to identify emerging issues and loop back to inform strategic planning helped keep the work the Host is doing at the “front edge” of administering a user-focused CASC. Additional funding reserved in Cycle 3 to explore emerging issues, such as seed grants for developing larger grant proposals for external (non-USGS) funding and for supporting the student fellowship program projects with tuition and livable-wage stipends, would be an area to consider.

Administrative Competencies

As noted above, the Host has:

- Experience in leadership and operating the SW CASC program.
- Highly effective project management support from the Host’s Sponsored Programs office.
 - Research enterprise is well developed and organized.
 - Sponsored Programs is well-staffed and capable of supporting large-scale projects at all phases of implementation (pre- through post-award).
 - Very strong administrative and grants support from UArizona.
- A Host institute (AIR) and university that value hosting the SW CASC and provide strong institutional support due to aligned objectives with AIR such as workforce development, transdisciplinary research, and impact evaluation being done by SW CASC.
- Strong team building skills (particularly in growing external partnerships).
 - The consortium members meet on a regular basis, providing opportunities to review progress on collaborative activities and shared goals.
 - The Host has sustained long-term partner engagement.
- Structured evaluation of co-produced, usable, climate adaptation science.
 - The SW CASC leverages the expertise of the Host’s PI internal evaluator (Alison Meadow) to benefit early career professionals, improve program planning, and advance both the field and science of usable science.
- An awareness of and willingness to find ways to address emerging issues.
- A solid partnership with the USGS on-site management team, which also is very competent and clearly highly motivated to achieve SW CASC goals.

Administrative Efficiencies

The ERT finds the Host’s fiscal management to be very efficient and effective:

- The Host team’s leadership and support staff are thoughtful in their approach and flexible to respond to partner needs, emerging issues, and changing USGS science priorities.

- The shared investment in joint strategic planning has provided a focus to the CASC that appears to be paying off.
- The institutional setting within AIR and alignment with institutional priorities adds another layer of efficiencies that can benefit all partners.
- USGS and Host directors seem to have a very collegial relationship, and the Host leadership is flexible to adapt to challenges with USGS fund disbursement, changes in science priorities, and mid-cycle strategic planning.
 - Overall, communication across the SW CASC partners seems to be very good,
 - The team appears to plan and support workshops, forums, and meetings very effectively.
- The Sponsored Programs support infrastructure is exemplary, with more than adequate support personnel, practices, and procedures set up to ensure financial management and project management in general is supported to the extent needed.
 - Financial management is very well supported by the university, with an impressively organized system that handles fiscal matters.

Administrative Challenges

The administrative challenges the Host is facing are largely outside of the Host institution and these challenges risk affecting the SW CASC work.

- The Covid-19 pandemic limited engagement and relationship building across the consortium and with partners. Finding and offering sufficient venues for continued engagement of partners (remote and in-person to reach different partners) was a challenge that the Host is beginning to overcome.
- The Host's partnership with USGS also seems complicated by structural issues associated with federal agency financial management practices that do not support adaptive management, such as moving funds and other resources to support activities in response to emergent issues. USGS' collaborative agreement seems to unnecessarily complicate the Host's granting process:
 - There are notable challenges with managing sub-recipient contracts, particularly with delays in receiving funds and unclear guidance from the federal contracting office that in some cases is hampering the CASC's ability to do their work.
 - Specifically, uncertain arrival of funds and funding delays present a hardship for external partners who may not be able to absorb the financial burden during the delay (particularly underserved institutions and organizations and students).
 - These delays also affect the timeliness of the research, which could have a significant, negative affect on the usability of research to address emerging and time-sensitive information needs.
 - The Host was challenged by dealing with what seemed to be relatively trivial changes in budgets and expenditures that require a great deal of time and effort for all sides of the partnership.
- Given the significant involvement of students in the research, funding delays may also create a mismatch with academic timelines that could affect a student's ability to complete degree work within their planned academic timeline. Improvements in

efficiencies of the federal contracts and grants office side of the agreement are key to having any sustainable and effective RCASC (including the SWCASC).

- USGS’s SW CASC science priorities were set after the Host Agreement was in place, which means that the Host must put together the consortium team and set university program priorities before knowing NCASC science priorities.
 - When researcher personnel needed to change because the science agenda was completed, this then required an amended cooperative agreement, which took staff time (on all sides) and was inefficient.
 - This also created a challenge for the Host being nimble and flexible in the face of emerging science staffing needs.
- AIR’s strategic planning could be more intentional about leveraging program resources across the AIR, allowing the Host to identify opportunities to leverage resources across AIR programs.
 - For example, the SW CASC Assistant Director, current Director and Tribal Liaison actively participated in a 6-part, 12-hour training offering in 2023 called “Doing Environmental Research with Tribes” Training Series with the Indigenous Resilience Center program (IRES) that could strengthen Tribal community outreach efforts: <https://resilience.arizona.edu/indigenous-correspondents>.
- During Cycle 2, the SW CASC Host team was very UArizona-focused, which could leave consortium partners feeling disconnected and undervalued if not addressed.
 - Not all co-investigators at partner institutions felt that they had a say in the programmatic decisions of the SW CASC.
 - Increased communication and engagement with consortium members and provision of more financial support of consortium work will be needed moving forward.
- Limited research funds means that only those researchers senior enough and well-funded enough can participate in the consortium.
 - If not corrected, this will affect the Host’s ability to bring in new, mid-level consortium members for the long-term and affect the Host’s ability to remain at the forefront of climate science.

ERT members are impressed by the reflectiveness of the Host leadership team and the candid self-assessment of the challenges the Host faced, and may continue to face, if these challenges are not lessened in the future.

Opportunities for Improvement

While Covid-19 and other challenges stopped planned progress, the ERT finds that the Host did a good job pivoting enough to have fulfilled its cooperative agreement terms with USGS.

The ERT also suggests considering the following for future reviews:

- The SW CASC Host and local USGS leadership should reach out to other RCASCs to explore how they have met and overcome timeline and funding challenges;
 - A collective message to the USGS NCASC leadership about the challenges created by USGS’ science priority setting, funding, and payment timelines may be more impactful for positive changes than going it “alone” would be.

- Include annual reporting of unspent funds, actual spending, and budget plans so reviewers can see where money has or has not been used.

RECOMMENDATIONS: Administrative

As noted above, the ERT finds the Host’s administration of the SW CASC to be extremely competent and the internal fiscal management system to be exemplary. With that said, the ERT suggests considering the following for the future:

- 1. Engage in more deliberate discussion with Research Innovation and Impact (RII) to assist with growing the research enterprise, especially as AIR is rethinking and re-imagining itself under the energized leadership of its new Director, Sharon Collinge.**
 - If the relatively limited coordination among the centers and programs within AIR is any indication, there could be significantly more inter-institutional leveraging of program resources that could strengthen the ability of the entire SW CASC partnership to grow and sustain important climate resilience work.
- 2. Increase opportunities for leadership of Host CASC activity and “management” by other consortium members.**
 - Consider including consortium partners as part of a ‘core team’ to encourage closer connection across the consortium.
 - Select activities and collaborations with consortium partners.
 - Use proposal development to expand the research enterprise (e.g., use CASC and other UArizona enterprise development resources to seed proposals for larger external grants).
- 3. Continue to update and refine the overall strategic plan.**
 - Consider seeking external financial and human resources as part of the strategic planning.
 - Ask USGS to revisit timing of its ‘science priorities’ so the Host can strategically build a consortium to meet those priorities and reduce the need for numerous amendments to the Host Agreement.
 - Then, develop an integral science process for determining directions, driving new directions, and sun-setting research priorities.
- 4. Work with consortium institutions to develop a Fellows stipend program that ensures equity in Fellows/graduate student support among all consortium institutions.**
 - Students are critical partners in the CASC work and are at the center of education, training, and capacity building. Depending on where they are located, they may not have resources to support the tuition burden they incur during the Fellows program, particularly those from marginalized communities. They may also face an elevated burden for living expenses, depending on their Host institution’s base stipend support. A more equitable program would provide the

same stipend, tuition, and other benefits support for all Fellows across all the consortium, and the support should match the real costs for the students.

- In addition to providing sufficient financial support for students, the time needed to complete student projects should be evaluated to ensure that the project work does not extend beyond the time they are sponsored by CAS funds. Alternatively, allow the option of extending the stipend period for projects that require more time to complete.
- Note: This may require additional support from the Host and consortium institutions to match funds available through the CASC or fewer Fellowship cohorts, with each cohort equitably paid. Given the value the Host and consortium institutions derive by being part of a CASC, providing complete tuition and stipend support reflective of actual living expenses is a reasonable financial burden for the institutions to assume.

Findings of the ERT – Scientific Achievements



Scientific Achievements

Scientific achievements on climate impacts, vulnerability, and adaptation science

The ERT notes that doing actionable adaptation science is itself an adaptive challenge; it requires changing “cultures” of how science has historically been carried out and accomplished. The Host’s actionable adaptation science starts by working with end-users to understand their needs, then continuing to work with them to do and test the science, and, when possible, evaluate its effects. As such, it requires finding allies to assist in gaining and developing the trust needed to exchange ideas. It also requires a willingness to accept risk and uncertainty. Host leaders repeatedly noted they view Adaptation Science as a blend of “science and social relationships”. ***The ERT finds the Host has been doing foundational work in adaptation science, particularly regarding the partnership-building and evaluation aspects, and this is commendable. The ERT finds the Host is remarkably capable of bringing a focused and deliberative approach to the way they do and evaluate their work. In the future, the ERT recommends more effort be placed on developing strategies for a scalable and broader systemic approach to translating actionable science into action across the stakeholder landscape.***

The Host-University and consortium partners explained to the ERT they consider actionable science to be both “user-inspired” and “request-based” science. ERT members appreciate how the team categorized their work to put these efforts into context. As a result, this variety and the impacts of science products produced through CASC research are notable. The variety makes science more accessible to a diversity of users, which is particularly important when a goal is to inform resource management professionals and the public.

The ERT finds there are many very good examples of actionable science being conducted by the SW CASC partners that demonstrate a high degree of collaboration and trust with stakeholders and elements of participatory design/research. Noted examples include:

- Coastal rocky wetlands field experiment regarding sediment at Seal Beach, CA;
- Downscaling project that produces daily and hourly projection information for users and decision-makers;
- System level understanding about marine layer clouds and their impacts on coastal areas;
- Developing increased understanding of the connections between climate, land use, vegetation, and bird populations and migration;
- Work with Fellows on cultural burning and enhancing Tribal engagement;
- Wildfire synthesis paper (drawing current research together to address confusion within and outside the community);
- Natural Resources Workforce Development Fellowship program as a teaching/learning model with hands-on climate adaptation science and notable scientific impacts; and

- Social science research that helps the entire field refine understanding of what makes collaborative climate science research work and its impacts on how people understand and relate to the climate changes that are effecting their lives.

The ERT finds that the Host’s research portfolio is varied, and includes important advances in actionable climate adaptation science. ERT members find four areas that stand out and exemplify the Host’s strong understanding of the principles of climate science co-production and how to put them into practice. The ERT finds these four to be major contributions to climate adaptation science and management:

1. The Tribal stewardship and cultural burning work is particularly impressive, as it builds both scientific collaborations and is training the next generation of practitioners in a thoughtful and culturally sensitive way;
2. The collaboratively developed synthesis work on California wildfire that is helping decision makers by clarifying and answering questions they have had;
3. The co-produced National Park Service (NPS) decision tool for risk assessment that is being used to determine when and where to relocate species; and
4. The development and continuation of the social science research model and evaluation process that enable partners and other CASC’s to evaluate the effectiveness of their climate adaptation science on decision-makers at every level of society. This model is exceptional and should be part of every CASC’s repertoire.

Factors that Limited Scientific Research

The ERT finds that resource limitations are the primary limiting factor. Funding levels and uncertainty of fund disbursement timing limits the impact and extent of the work that was and can be done. Consortium members were expecting more USGS staffing at member institutions. Difficulty delivering funds to non-governmental and non-academic partners seems to have slowed progress. As a result of these limitations, the centrality and distribution of resources and power in the consortium is understandably centered on the Host. Spreading staffing and resources around could help with deeper consortium connections, though this is limited by funding.

Additionally, the ERT finds that setting scientific priorities after the proposal has been submitted is problematic and a limiting factor for production of actionable science by this (and other) Host-Universities. Because science priorities are set on the USGS-side of the CASC, the process is less transparent for the Host and consortium partners to be able to propose and then do science that responds to those priorities. The dissolution of the Science Advisory Committee (SAC) may also have had a limiting influence.

The Covid-19 pandemic had a large impact on the ability to meet in person, which may have stifled some of the development of scientific products. Investigators shared that Covid-19 and partner turnover limited their ability to collaborate with each other and with partners. One other limitation the ERT notes is what is described as ‘adaptive management’ of the Hosts’ science adaptation research and work appears, in practice, to be a cyclical trial and error

process without a clear deliberative approach to making project decisions. For example, the work by the cultural burning group is important, yet the overall connection to climate adaptation science was not clearly described and could/should be more explicit.

A final limiting factor for the Host is that USGS CASC leadership took a different approach to its strategic science planning by dissolving the SAC in favor of topic-focused groups. As such, the amount of stakeholder involvement, particularly key end-users of science, in determining science priorities and directions appears to be more limited than it once was. Actionable science is science that informs decisions. More importantly, it is science motivated by decisions. If there is no SAC, who is responsible for articulating what the priority decisions of interest are? The ERT is encouraged that USGS plans to re-establish the SAC, as it is a needed tool for the future Host.

RECOMMENDATIONS: Scientific Achievements

The ERT finds that the Host is committed to producing actionable science. To build on what the Host has begun, the ERT suggests the Host and its team consider the following:

- 1. Bring new people into the research community who are capable of developing partnerships and doing actionable science.**
 - Continue to reach out to consortium partners and others to identify early and mid-career professionals to join the research community to enrich the “cross-generational” depth of the SW CASC community.
 - Work with consortium partners to establish clear criteria and opportunities for new and mid-level researchers who have the skills and ability to join the SW CASC team.
 - Broaden science partnerships to include scientists associated with other CASCs who have the skills and ability to build on and deepen the understanding of user-identified, actionable science.

- 2. Tap into other grant opportunities to broaden the funding base and increase actionable science efforts.**
 - Use existing funds as a seed for larger, on-going grants to help support actionable science efforts being done at a larger scale, and with reliable funds for work with partners.
 - Work with UArizona’s RII administrators to create a competitive seed grant program to support SW CASC proposal-writing for larger external grants to benefit both the SW CASC and the UArizona.
 - Add funding where possible to better support the current staff and allow the Host to bring in new talent who can serve as Co-PIs today so they may carry the Host and SW CASC’s impressive work into the future.

3. Be strategic about how to approach the future to assure the next team understands and can do actionable climate adaptation science.

- Engage in succession planning so that work currently being led by excellent senior, late-career researchers can continue with the next phase of talented researchers;
- Implement center-based capacity building to deepen the bench that can continue to focus on priorities in the future.

4. Encourage USGS Leadership to re-engage partners in a strategic planning process so they can help inform the priorities for actionable science research.

- Engagement of natural resource decision-making partners throughout the research cycle is critical to the relevance of climate adaptation science research products. Given this core contribution:
 - Engage the partners in the Host and CASC's strategic planning process to help identify barriers and opportunities for other issues, partners, and funding that are not necessarily apparent to the current Host or USGS CASC leadership, scientists, and consortium partners;
 - Ensure clear communication to the entire SW CASC team, including consortium investigators, of the partner's recommendations; and
 - Articulate and share a clear strategy for the choice of partners and process for eliciting priorities.


5. Work with USGS to include funding for Emerging Needs in the next funding cycle.

- The ability to expand the climate adaptation research portfolio to address partner-informed emerging needs is critical to the Host and CASC staying relevant and on the leading edge of climate adaptation science.
- The Host and USGS leadership described funding limitations that are hindering the CASC's ability to be responsive to partners' needs. A change is needed in how NCASC specifies budget justifications (e.g., include a section on funds allowed to address emerging needs).

6. Work with the NCASC to bring the evaluation work to the broader CASC network.

- Seek additional NCASC funds to fine-tune the model, then train others in the research model and approaches across the CASC Network.

Findings of the ERT – Collaborative Efforts

	<p>Collaborative Efforts <i>Collaborate with stakeholders to develop and deliver adaptation products applicable to priority decision-making</i></p>
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The ERT finds the Host to be particularly strong in co-production of science through developing partnerships with Indigenous peoples and in capacity building through the Fellows program. As noted above, the Host’s science portfolio is adaptive and overlaps and intersects with the theme ‘collaborative efforts’. As the Director noted, the Host’s co-produced, relationship-based science is the foundation of the work the Host and consortium do. They have worked with natural resource managers and decision-makers to identify core science areas and the Host has expanded to include emerging issues in their work.

As the Host team and consortium have moved through developing adaptation science they noted a continuum of user-requested services that range from contractual (e.g., ‘please do this research for us’) to consultative (‘please talk to us while you do this’) to collaborative (‘work together as requester and researcher’) to collegial (‘work together from start to finish’) to Indigenous-focused (‘work with us to learn what we know, then develop next steps together’) research. Once they began describing this to their partners, they began to realize more engagement and now are more centered on user needs. Through their relationship-based climate adaptation work, they are meeting partner needs, and building the capacity of partners to be resilient in the face of changing climate. ***The ERT finds the Host takes a very thoughtful approach to collaboration, and strives to move beyond co-production to more inclusive and partner-driven models of collaboration.*** This is particularly evident in cultural burning work and evaluation activities in which the Host’s work is enmeshed with sovereignty and cultural values.

Spanning the continuum of approaches listed above, the Host’s science work extends from researcher-based questions to user-based questions. ***The ERT finds this to be a significant strength of the SW CASC and is laudable.*** As a result, the Host’s use-inspired research tends to be consultative, collaborative, and highly leveraged; in many cases it is supported by multiple streams of funding, with SW CASC funding helping to initiate projects or boost research. As noted above, the ERT encourages the CASC to capitalize on the impact of this approach by seeking additional seed grant support from the UArizona and consortium university leadership for proposal writing of large grants from the National Science Foundation, Department of Energy, US Department of Agriculture, and others, to sustain and grow the research enterprise.

For the most part, projects that were presented to the ERT by the SW CASC Host team involved actionable science co-produced by engaging members of the stakeholder community (managers and decision-makers at land-based agencies or Tribes) who use the science to actuate adaptive measures. These projects provide invaluable experience for the team to build upon as they expand their outreach and engagement efforts to include more communities and stakeholder groups. All members of the consortium expressed the high value they placed on

learning from the users and each other, and this has encouraged them to do even more collaborative work.

The Host's collaborative projects involve a number of positive elements that could be included in a general engagement strategy for implementing climate adaptation science. Overall, the projects demonstrated strong and trusting partnerships between CASC personnel and end users/stakeholders that involved agreement about the science and the implications for adaptive decision-making. Work involving teams of investigators across the SW CASC partnership addressing overarching regional topics such as aridity or aquatic systems were more challenging. This is to be expected because: each investigator has their individual areas of expertise and research priorities that they must blend with others; by their very nature, transdisciplinary projects require more time and effort to develop; and gaining broad consensus in prioritizing projects can be cumbersome. ***These are essential components of any effort to engage end users/stakeholders in adaptive decision-making and change management, and the ERT finds the Host did well in these areas.***

Another significant Host contribution to both climate adaptation science and collaborative efforts is the inclusion of multiple social scientists who have developed an impressive, co-produced evaluation of the collaborative/co-production research process itself. This evaluation work, which begins by asking what the users need to know from the evaluation itself, aims to provide needed data that can help scientists improve the utility of both the science and relationships with research partners. ***The ERT finds this work to be a significant strength of the Host and SW CASC that is a relevant cross-category and cross-CASC area on which to continue and expand focus in the next cycle.***

The three primary collaborative initiatives (early warming and aridity, climate justice and Tribal adaptation, and fire consensus) have developed important user-requested science products and partnerships, while also offering rich capacity building opportunities through the partnerships and Fellows training. ***The ERT finds the work to engage partners in the research from the beginning stages of developing questions, to participating in the research process, and contributing to the evaluation is significant and acknowledged.*** The research products are useful to the partners in part owing to their engagement in the work from the start; this should be articulated and continued in the Cycle 3 proposal.

Two primary challenges affected the Host's broader collaboration:

- 1) Lack of resources. As previously noted, there simply is not enough funding to support a more broadly focused collaborative research agenda without dropping important ongoing projects.
 - a. As the Host mentioned, there was not sufficient consensus reached regarding a multi-disciplinary research focus around which to build a longer-term collaborative research program. Building consensus on a comprehensive strategic adaptation research plan is needed, with sufficient funds to support it.
- 2) The Covid-19 pandemic limited in-person relationship building and collaboration for 3 years. While collaboration is possible in the online environment, it is enhanced by

regular, on-going, in-person contact that can help build trusting relationships and enhance overall human connection and communication. The Host did well to keep collaborative efforts moving forward and acknowledged the need to bring more people together again in both smaller and larger group settings.

The ERT finds that the Host has met or exceeded its contributions to collaborative efforts in climate adaptation science and applauds the awareness that overcoming the pandemic restrictions by holding more face-to-face work among and between consortium members and stake- and right-holders will be important moving forward.

RECOMMENDATIONS: Collaborative Efforts

- 1) Capitalize and build upon on the Host’s co-produced, relationship-based collaborative work with partners and Tribes.**
 - As noted above, seek additional seed grant support from the Host and consortium university leadership for proposal writing for larger grants from NSF, DOE, USDA, and others, to sustain and grow the research enterprise.
 - Work with the Bureau of Indian Affairs (BIA) and USGS to develop an administratively easy stream for projects to emerge out of BIA’s recently funded Climate Science initiative.
 - Work with USGS to help develop an easy funding link between Tribes and the CASC Network for funds distribution directly to Tribal researchers and leaders; USGS is well positioned to help Tribes with their climate resiliency efforts without starting an entirely new program.
 - Engage in discussions and relationship building with UArizona’s Indigenous Research Center (IRES), which is the Host’s hub focused on Indigenous Peoples of the Southwest.
 - Center conversations around the broad shared goals each has and ways the two programs could benefit one another.

- 2) Embed partners to do collaborative climate adaptation science at the Host with a goal of building the capacity to do and evaluate such work.**
 - Leverage work that has been or could be done with NOAA, USDA, Extension services, and AIR to help train others to do the work being done internally.
 - Offer mutually beneficial opportunities and support for others within AIR that would support AIR’s broader resilience efforts while adding staff to support collaborative work at the SW CASC.

Findings of the ERT – Capacity Building



Capacity Building

Educate and train to build capacity of early career professionals and others

The CASC and Host are engaged in a variety of activities that both grow their internal capacity and build the capacity of others beyond the core participants at UArizona by providing integrated outreach and communication and learning opportunities. The clearest capacity building program is an excellent Fellows program for students at all consortium universities, the Natural Resources Workforce Development Fellowship (NRWD). Fellows work together to select and then manage a project for the duration of their cohort that is based on USGS-specified science priorities for research solicitations. Fellows learn, practice skills, and develop rules of engagement for doing co-produced, actionable climate science. They then participate side-by-side with mentor scientists, before planning and doing their project. Learning modules include community engaged science, working with Tribal partners, cultural protocols, interviewing and storytelling, research permitting, and how to make products that can be published, such as creating StoryMaps and producing podcasts.

The ERT finds the Host has created an outstanding Natural Resources Workforce Development (NRWD) Fellowship program that leverages an existing program at the Utah State University and represents a major focus of capacity building activities. The ERT feels the Fellows program is an excellent example of the SW CASC Host's capacity-building work and provides a very scalable model that should be adopted not only by the CASC network, but by other agencies and organizations involved in climate resilience/adaptation work. By involving graduate students and post-docs in team projects, and identifying science agenda priorities and user community members to work with, the Fellows project simultaneously builds capacity of early career professionals in not just climate science, but adaptation science. As was expressed by Fellows to the ERT, this provides invaluable experience in both team science and climate adaptation stakeholder engagement. A unique, and uniquely effective, aspect of the Fellowship program is that the Fellows work together as one team to tackle an emerging research question throughout the term of their Fellowship. Fellows expressed to the ERT their appreciation for the Host's mentoring and teaching that was part of the program. They experienced first-hand how vital relationships and time are when engaging in co-produced science. ***The ERT commends the Host for creating a Fellowship program that is designed to understand and meet the needs of the entire team. The ERT encourages the Host and USGS to find additional funds to make the stipend more competitive with other programs.***

In addition to the exemplary NRWD Fellows Program, the Host has thoughtfully combined capacity building and communicating information to a broader audience, serving as an important convener and catalyst for these two areas to occur either simultaneously or sequentially. Tribes, researchers, managers, and other entities in the region are invited and incorporated in both stakeholder engagement projects and capacity building workshops.

The ERT heard that Capacity Building and Communications activities during Cycle 2 funding included: round tables with external partners (both current and future partners); topic-based forums; weekly or monthly meetings with climate and other scientists; outreach to the consortium faculty through meetings, community of practice, and regional meetings; the Fellows program; and outreach to engage new scientists. The ERT heard about specific and noteworthy examples that cross the review categories of Capacity Building and Communications and Outreach.

The ERT finds the Host's creative approaches to sharing, teaching, and engaging partners and colleagues in climate adaptation science is important and commendable. The following stand out to ERT members:

- The California Roundtable on Wildfire Resiliency enables important information to be discussed in a neutral forum. As a result, the conversations remained reflective, current, and built capacity among those managing, studying, and making policy decisions about wildfires. The year-long project was embraced by the SW FireCAP, which utilizes the roundtable model in its dialogue, and is an on-going effort based at Northern Arizona University;
- The California Rocky Intertidal Ecosystems project is a rich engagement of coastal managers who have helped identify information and knowledge needs, followed by Host team members helping to coordinate innovative and collaborative field work;
- The Colorado River Wiki brought together vast amounts of data and makes Colorado River science easily accessible to the public, policy makers, and other scientists. It has been a timely information source for those negotiating the uses of Colorado River water; and
- The Southwest Adaptation Forum (SWAF) has shown strong potential as a means for engaging a broad range of Tribal members throughout the SW CASC service area. The SWAF is a mechanism by which the Host can share information about adaptation strategies, successes and challenges, while supporting a community of resilience practice across SW Tribes. In addition, SWAF has provided training for non-Indigenous groups and agencies wanting to or working with Indigenous members to help them understand issues such as the importance of Tribal data and cultural resource sovereignty.

These are four very good examples of how the Host is effectively growing the foundational capacity of resource management practitioners and the broader public. While it is not clear how these efforts will be continued in Cycle 3, ***the ERT believes it is important for the Host and SW CASC to do what is possible to support continued discussions around these critical, climate-related topics with their variety of science users, even as new topics become the focus of the CASC Cycle 3 work.***

RECOMMENDATIONS: Capacity Building

1. Enhance the excellent NRWD Fellows Program by:

- Providing equitable compensation for students across universities (see Administrative recommendations, #4);
- Compensating partners in and from underserved communities so they can more actively participate in and with the program;
- Strengthening the process for identifying projects the cohort will work on. If relying on students to bring project ideas and connections, make that clear. The ERT suggests, instead of solely relying on individual students to have connections to projects, tap into the CASC network and knowledge bank to provide a variety of projects from which the cohort could select;
- Considering the length of the Fellowship program and projects undertaken to assure that students can either finish within the nine-month period, extend the timeframe so they can finish the projects to which they commit, or hand the project off to students from a subsequent cohort; and
- Scaling up the program to build a professional career pipeline that is more national in scope.

2. Develop a strategically focused actionable climate science training and capacity building program for potential future consortium investigators.

- Multiple consortium investigators expressed the need to look to the next generation of CASC consortium members. Providing trainings, workshops, and other outreach to support learning of assistant professor-level researchers who understand the Host's principles and methods could help do this more strategically.
- Provide training to PIs and partners that mirror what students are learning so they all understand and embrace the model of learning and co-production the Host is teaching and doing.

3. Provide a larger, more supportive stipend for Fellows.

- As noted above, and as is most relevant here, ERT members are aware of several fellowship programs that provide a better stipend. Given the excellent design and relevance of the SW CASC's program to Tribes, do whatever is possible to attract and retain more Fellows. Stipends should be large enough that Native American and other students can participate easily.

4. Create a clear and intentional design and plan to maximize value to the Tribes within the SW CASC's geographic reach.

- Since the SWAF has emerged as a cornerstone of the Host's Tribal engagement strategy, it should be very intentionally designed to optimize value to Tribes,

including Tribal participation in co-designing the agenda, and supporting interactions of SWAF participants year-round.

- Develop a closer partnership with Northern Arizona University's Institute for Tribal Environmental Professionals (ITEP) as a major component of the SW CASC's Tribal outreach and engagement in adaptation work.

5. Continue to support on-going discussions on critical topic areas begun in Cycle 2.

- As noted above, California fires, coastal management, Colorado River, and Tribal engagement will remain pressing needs for well-designed ongoing discussions into the future. The Host and USGS should work together to assure such conversations do not end when the next funding cycle begins.

Findings of the ERT – Outreach and Communications



Outreach & Communications

Manage and transfer information and data related to research activities

As noted above, the Host has integrated collaborative efforts, capacity building, outreach and communications into nearly all aspects of its work. That said, the Host developed a 5-year communications strategy in its 5-Year Plan that focused on delivering: a web-based Gallery of products; a Podcast; Blog posts and webinar services for the consortium; updated Frequently Asked Questions (and answers) documents; and other print media. ***The ERT finds the following noteworthy Outreach and Communication projects, in addition to the many mentioned above in the Capacity Building section:***

- ***The ERT finds the cultural burning work with California Tribes and the Karuk Podcast Collaboration are very good examples of right-holder engagement that has generated strong Tribal involvement by establishing trust and providing the foundation for future adaptation work that could expand to address other adaptation challenges, such as food security and extreme weather events.*** Both projects included a great deal of communication with and about Tribal Nations that was shared with a broad audience.
- The Come Rain or Shine Podcast also is noteworthy as a down-to-earth way of bringing real-time, informal and informative discussions and concerns to a wider audience through a user-friendly format. ***The ERT finds the informal conversational nature of the podcast to be both engaging and informative.***

RECOMMENDATIONS: Outreach and Communications

1. **Work with USGS to enhance strategic communications about the Host’s actionable climate adaptation science work, including the social science evaluation model created by A. Meadow.**
 - As the Host noted, actionable science starts with building relationships so you can ask the questions to do good science that is relevant to end users. The ERT notes that it ends with strategic communications to a variety of audiences. Continued engagement between the Host and USGS on this front will enhance both bodies of work.
 - Develop a comprehensive communication strategy. Allowing a partner institution to take the lead on external communications might also improve internal communications.

Findings of the ERT – Overall Effectiveness Towards Host Agreement

The ERT finds that the Host and consortium effectively met the goals set out in its proposal to, and agreement with, USGS. The SW CASC has been effective over the last five years in conducting meaningful climate science, working creatively with partners in co-producing that science, building capacity of the current and next generation of climate scientists, and effectively communicating its work to a variety of audiences. The Host achieved all of this under challenging local and national circumstances, including a global pandemic. The ERT finds the Host's commitment to the time and effort needed to develop, support, reflect on, and evaluate co-produced climate adaptation science to be meaningful and significant.

The ERT finds that the Host has been particularly effective in the following areas and encourages sharing its experience with the CASC Network, if it has not done so already:

1. The well-designed and well-regarded Natural Resources Workforce Development Fellowship program that provides early career professionals with interactive learning experiences as they learn to lead collaboratively co-produced climate adaptation science focused on relationship building and user needs;
2. The Tribal stewardship and cultural burning work, as it builds scientific collaborations and trains the next generation of climate adaptation practitioners in a thoughtful and culturally sensitive way;
3. The collaboratively developed synthesis and roundtable work on California wildfire resiliency that is helping decision makers by clarifying and answering their questions;
4. The co-produced National Park Service (NPS) decision tool for risk assessment that is being used to determine when and where to relocate species; and
5. The social science research model and evaluation processes that enable partners and other CASCs to evaluate the effectiveness of their climate adaptation science with decision-makers at every level of society. This model is exceptional and should be part of every CASC's repertoire.

In addition, the ERT wishes to thank the Host team for its candor, reflective and thoughtful approach to the review process, its preparation for the review, and its willingness to step away from the sessions to support candid conversations with students, partners, and consortium members.

OVERALL ERT RECOMMENDATIONS

The ERT makes the following summary recommendations about the review process and suggested approach for the Host, SW CASC, and consideration by NCASC with the entire CASC Network:

For this Host and Future Hosts:

- **To have the biggest impact on climate adaptation science, be strategic with projects moving forward.** Opportunities are important, but taking them in the context of a strategic plan will be important for both program relevance and resiliency. Specifically, focus on:
 - succession planning,
 - communications, and
 - center-based capacity building (deepen the knowledge and skills of future researchers to continue the climate adaptation science work and priorities).
- **Include research grant writing retreats in Host strategic planning,** to engage scientists supported by CASC research funds in growing the research portfolio of the CASC. The scientists supported by CASC funds likely already do this in their research programs (because they must find external funds to support their research).
- **Utilize an evaluation model such as that developed by A. Meadow to assess the Host's overall project work.**
 - Her work is exemplary and the local Host should be working closely with her.

For USGS:

- **It appears the SW CASC would be greatly enhanced by filling USGS' three vacant employee spots;** this would support the Host and the work it does for USGS. USGS administrative turnover has made it difficult for the Host to get questions answered and work done in a timely manner, which slows the overall progress of the work the CASC is or could be doing.
 - Consider reaching out to HR servicing offices for other USGS Centers to assist with training the incoming human resources team as a way to speed the learning curve.
 - Reach out to other CASCs who face these challenges, to learn from and help each other.
- **The work being done by the CASCs is important, relevant, and can offer robust learning at a broader scale.**
 - Develop a single model by which to learn and evaluate not just the science, but the co-production process being developed and refined by CASCs.
 - The ERT recommends using a model such as that applied by A. Meadow for evaluating the success of CASC projects and the overall NCASC program as a way of measuring and tracking successes.
- If USGS has not been thinking this way already, the ERT respectfully suggests **it is time to begin thinking about climate adaptation science and resilience at scale.**

- How can USGS connect the CASCs to address the big climate adaptation questions?
 - Consider requesting NSF funds to support a CASC-wide approach to designing and supporting community-based science on climate adaptation and resiliency.
 - As noted above, use USGS funds to seed bigger projects that have long-term, existentially meaningful components.

For NCASC regarding future Host Agreements and agreement processes:

- The sequencing of USGS’s science agenda and strategic planning, and a Host’s proposal and consortium development, are off-phase.
 - The ERT recommends that USGS develop its science agenda and strategic planning earlier in the process, so Hosts have the benefit of creating consortiums that maximize the funding by matching national goals and priorities.

REGARDING THE EXTERNAL REVIEW PROCESS

The following is direct input from ERT members about the ERT process. They also received a subsequent survey asking for additional information.

- ***The ERT finds that the review process was:***
 - Well organized, with sufficient time allocated to presentations and discussion.
 - More information about the activities/projects to be discussed provided in advance of the review sessions would have been helpful for guiding the focus of the ERT’s questions.
 - Efficiently managed by the facilitation team and the Host team.
 - Not overly burdensome to understand the process and the CASC’s work; Pre-work adequately reflected the Host’s work.
 - Sufficient time was given for ERT members to understand the accomplishments and challenges of the Host without requiring too much of a time commitment of the ERT for the review.
 - Well presented. Presentations by the Host were excellent; they did a great job distilling a lot of information into comprehensive presentations and thoughtful discussions.
 - Daily end of day debriefs and pre-briefs were important for providing comprehensive summaries of the day’s work.
 - A MUCH preferred format of sharing notes and summary with the review project management team for them to compile, review and edit the report, rather than ERT members having to compose the document (as was done in Cycle 1).
 - Effective online. Spending time at a CASC during the review would have provided informal time for 1-on-1 conversations to learn more deeply about the work,

challenges, etc. That does not happen in a remote format. However, the benefits may not be worth the cost in time and money.

➤ **For future ERT reviews, the ERT recommends:**

- Structure the USGS required annual reports and cooperator meetings so the information in those reports can easily be rolled into a Host Overview for the 5-year review.
- Do a review of the 5-year review to be sure the process is less burdensome to the RCASCs, while being most helpful to NCASC.
 - Is the information being provided to USGS helpful to NCASC? To the RCASC? If yes, continue as is. If not, revise the process; it takes a lot of effort from many people (e.g., Host and USGS staff, consortium members, ERT members, NCASC staff, observers, and the evaluation process team).

END OF REPORT CONTENT

Scrivener's Note: This report was compiled by Donna Silverberg Consulting in active coordination with the ERT members listed on page 2. The ERT members reviewed and refined a number of drafts until all members could support having their names acknowledged on this ERT Review Final Report.

APPENDICES & ATTACHMENTS

Appendix 1 – Attendees

Attendees for all or part of the sessions, alphabetical by last name (affiliations included).

ERT Members: Benét Duncan (WWA-CAP/RISA), Barry Grand (USGS-CRU), Al Kuslikis (AIHEC), Cyndy Loftin (USGS-CRU), and John Nielsen-Gammon (TAMU/SRCC).

Host, Consortium and SW CASC Presenters: Rich Ambrose (UCLA), Skye Aney (SW Climate Hub), Michelle Baker (USU), Rob Billerbeck (NPS), Dan Cayan (UCSD-Scripps), Elliot Cheu (UA), Sharon Collinge (UA), Veronica Chu (UA), Dianne Daley-Laursen (PCTA), Sonia Delphin-Perez (UA), Carolyn Enquist (SW CASC-USGS), Elizabeth Fard (ECCC), Erica Fleishman (CSU), Gregg Garfin (SW CASC-UA), Sasha Gershunov (UCSD-Scripps), Lisa Gilbane (BOEM), Chairman Ron Goode (North Fork Mono Tribe), Anita Govert (SW CASC-UA), Cat Hawkins Hoffman (NPS), Nancy Huntly (USU), Aviv Karasov-Olson (UC-Davis), Sarah LeRoy (UA), Glen MacDonald (UCLA), Alison Meadow (UA), Beth Rose Middleton Manning (UC-Davis), Will Munger (USU), Anna Murveit (UA), Hugh Safford (UC-Davis/Vibrant Planet), Gregor Schuurman (NPS), Mark Schwartz (UC-Davis), Brad Udall (CSU), Marcel Villalobos (UA), Tamara Wall (DRI).

Observers: Gus Bisbal (USGS/NCASC), Kristen Donahue (USGS/NCASC), Emily Fort (USGS/NCASC), Corrina Gil (SW CASC/UA), Addie Rose Holland (NE CASC), Jia Hu (SW CASC/UA), Will Kazmier (NE CASC).

Facilitation Team: Colby Mills, Tina Patterson, and Donna Silverberg (DSC).

Appendix 2 – Daily Review Session Agendas and Summaries

Day 1: Administrative & Fiscal Management

DAY 1	Tuesday, March 28, 2023: Administrative Management Purpose: Reflect on the Competencies, Efficiencies, Challenges, and Areas for Improvement of the Host-University in managing the <u>administrative requirements and terms and conditions</u> of the corresponding host agreement, with a focus on Institutional Development and Fiscal Management review categories.	
Time PDT	Activity	Participants and Affiliation
9:00-9:15a	External Review Team – Closed Door <ul style="list-style-type: none"> Get settled and focused on task for the week and the day 	Facilitation Team & ERT Members
9:15-9:30a	Welcome, Introductions, & Role Clarification <ul style="list-style-type: none"> Brief welcome, round of introductions of ERT members, SW CASC team, and USGS team, and clarify roles 	Donna Silverberg, ERT Manager/facilitator, DS Consulting
9:30-9:45	The Southwest CASC: Roles and Responsibilities	Carolyn Enquist, USGS Director, SW CASC
9:45-10:45a	<i>Institutional Development: Organizational Management and Leadership, Staffing, and Terms & Conditions</i> <ul style="list-style-type: none"> Overview of the SW CASC’s administration, structure, host institution, & consortium Introduction to SW CASC investigators <ul style="list-style-type: none"> Resource: Recorded introductions to SW CASC investigators <p><i>Facilitated dialogue and discussion with ERT, and Q & A regarding Administration, Leadership and the SW CASC Consortium Structure</i></p>	Gregg Garfin, UA Director, SW CASC Sharon Collinge, UA Director, AIR Elliott Cheu, UA Associate VP for Research Institutes, Innovation & Impact (RII) Facilitation Team SW CASC Core Team ERT members
10:45-11:00a	Break To avoid zoom fatigue: Please turn off and step away from your computer screen if AT ALL possible!	
11:00a-12:00p	<i>Review of Fiscal Management</i>	Anita Govert, UA Assistant Director, SW CASC Veronica Chu, Research, Innovation & Impact (RII Business Office) Marcel Villalobos, UA Sponsored Programs, Postaward Services
12:00-12:30p	Break To avoid zoom fatigue: Please turn off and step away from your computer screen if AT ALL possible!	

12:30-1:30p	<p>Facilitated dialogue and discussion with ERT, and Q & A regarding Fiscal Management</p> <ul style="list-style-type: none"> • <i>What are the host's Competencies, Efficiencies, Challenges, and Areas for Improvement?</i> 	<p>Facilitation Team SW CASC Core Team ERT members Veronica Chu, Research, Innovation & Impact (RII Business Office) Marcel Villalobos, UA Sponsored Programs, Postaward Services</p>
1:30-2:00	<p>External Review Team – Closed Door Initial reflections on the day: questions, concerns, and insights</p>	<p>Facilitation Team ERT Members</p>

DAY 1: Facilitator's Summary
March 28, 2022, 9:00am – 2:00pm PT
Topic: Administrative & Fiscal Management

Prepared by DS Consulting Facilitation Team

The following summary is intended to capture basic discussion, reflections, concerns, and insights from the session. It is not a verbatim transcript. Presentation slides are available for the ERT.

Attendees present for all or part of the meeting (in alphabetical order):

ERT Members: Benét Duncan (WWA-CAP/RISA), Barry Grand (USGS-CRU), Al Kuslikis (AIHEC), Cyndy Loftin (USGS-CRU), and John Nielsen-Gammon (TAMU/SRCC).

Host, Consortium and CASC Presenters: Elliot Cheu (UA), Sharon Collinge (UA), Carolyn Enquist (SW CASC/USGS), Gregg Garfin (SW CASC/UA), Veronica Chu (UA), Anita Govert (SW CASC/UA), Alison Meadow (UA), Marcel Villalobos (UA).

Observers: Gus Bisbal (USGS/NCASC), Emily Fort (USGS/NCASC), Corrina Gil (SW CASC/UA), Jia Hu (SW CASC/UA), Will Kazmier (NE CASC).

DS Consulting Team: Facilitator: Donna Silverberg, Reporting and Support: Tina Patterson, Colby Mills.

Purpose for Day 1: To reflect on the competencies, efficiencies, challenges, and areas for improvement of the Host-University in managing the administrative requirements and terms and conditions of the corresponding Host Agreement, with a focus on institutional development and fiscal management review categories.

Welcome, Introductions & Role Clarification

Facilitator and ERT Process Manager, Donna Silverberg, welcomed the group and conducted a round of introductions that included SW CASC ERT Members, University of Arizona, SW CASC Host, USGS and session observers.

The SW CASC: Roles and Responsibilities

SW CASC USGS Acting Director, Carolyn Enquist, presented on the SW CASC's roles and responsibilities, noting the unique partnership for actionable climate adaptation science between USGS and the SW CASC Host-University, the University of Arizona (UA).

The SW CASC was established in 2011, in partnership with USGS, the American Indian Higher Education Consortium (AIHEC), and a current CASC Consortium of partner institutions that include: UA (Host), Colorado State University (legacy from Cycle 1), Desert Research Institute, Scripps Institute of Oceanography (at UCSD), Utah State University, University of California, Davis, and University of California, Los Angeles (*Admin Presentation Slide 4*). UA and the consortium are in a second cycle of funding and partnership with USGS.

After the onset of Covid-19, the SW CASC created a new strategic framework through an interactive process with Consortium Partners (CPs). The SW CASC functions under the vision that the Southwest's ecosystems, communities and cultures are resilient and thriving as the climate changes, and that resource management decisions are informed by evidence-based climate adaptation science (*Slide 10*).

The mission of the SW CASC is "to develop actionable science and implementable climate adaptation solutions in partnership with natural and cultural resource managers, policy makers, Native Nations, and researchers across the Southwest". The CASC approaches its mission by focusing on actionable adaptation science, science translation, partnership building, and workforce development. Carolyn noted that the SW CASC's core values demonstrate how they work with their CPs, stakeholders and rightsholders, specifically through: respect, authentic collaboration and reciprocal relationships, co-production, a lens of justice, diversity, equity and inclusion, scientific foundation, and commitment (*Slides 10-12*).

Carolyn expanded on the USGS Science Agenda as it relates to university proposals by clarifying that, during Cycle 2, the SW CASC developed a formal Science Agenda for a 5-year period. The CASC's USGS-side led the process with their yearly discretionary funding. Funds are distributed through a competitive process, semi-competitive process or directed funding. Based on USGS-set priorities, the CASC receives input on the Science Agenda from stakeholders and partners, often through an Advisory Committee. The SW CASC shifted from using an Advisory Committee after Cycle 1, and has since used Focal Groups for Cycle 2. In preparing for Cycle 3, the SW CASC is reconstituting a new committee to inform science priorities via Focal Groups through a structured process that stems from the new strategic framework constructed by the entire SW CASC over the past 2 years. She noted that the "strategic framework shapes all we do as a CASC".

Institutional Development: Organizational Management and Leadership, Staffing, and Terms & Conditions

Overview of the SW CASC's Administration, Structure, Host Institution, & Consortium

Gregg Garfin, former SW CASC Host-University Director, provided an overview of the SW CASC Host and Consortium program over the last five years, touching on the current status of the CASC, the SW CASC Team, how the CASC works and implements the Host Agreement (HA), and challenges the CASC has managed due to Covid-19.

Gregg highlighted the SW CASC as a partnership between USGS, AIHEC, the Host-University and Consortium Partners (CPs). He noted that Colorado State University was invited as a CP in acknowledgement of the influence of the Colorado River in the region (*Slide 4*). He introduced the SW CASC's Investigative Team, noting newly added Principal Investigators added in Cycle 2 who build on the

existing strengths from Cycle 1, including: coastal restoration, environmental health, conservation biology, aquatic and ecosystem ecology, climate impacts and adaptation, ecology and human ecology, anthropology, climate information evaluation, and social science (*Slides 5-8*). This group serves as the Leadership Team.

Alongside the SW CASC Host leadership, the core team at UA includes a Consortium Coordinator, Tribal Climate Resilience Liaison, Science Communications & Program Associate, and Science Applications & Communications Coordinator (full-time USGS contractors), and two student assistants. Gregg reiterated the CASC's vision, mission, and core values that serve as the foundation of all they do: being inclusive and respectful, doing work of mutual benefit with a strong science foundation, and co-producing that science so it can be easily adopted (*Slides 9, 11*).

The Host receives funding from USGS (allocated by Congress) that passes through UA and is distributed by subawards to all CPs. Competitive proposals and other directed funding opportunities also passed through UA, present a significant administrative task for the SW CASC. He noted that relatively small amounts of funding get out to CPs, which significantly influences the way the SW CASC works (*Slides 13-14*). Gregg provided a snapshot of SW CASC personnel over the years, noting that the team was fleshed out with more part-time and full-time staff by 2020, and that fluctuations and decreases in personnel on the USGS-side has come with transitional costs (*Slides 15-17*).

Gregg reviewed the changes the SW CASC has made in program implementation over the years, noting that it started with "lots of littles" in terms of amount of funding for projects (regional meetings, student fellows, practitioner fellows, roundtables, working groups, summit). The CASC realigned in the fall of 2019 to put more focus on its work with Tribes, developing SW Adaptation Forum (SWAF), aligning the Natural Resources Workforce Development (NRWD) Fellowship Program with new science questions, and transitioning working groups to Initiatives developed from the ground up by researchers. During Covid-19, the CASC went through a strategic planning process to develop precise roles and objectives, a new identity, and stronger team to enter into the Cycle 3 competitive process (*Slide 18*).

To implement the program, the Host submitted a proposal outlining USGS' expectations and resulting deliverables that fell into the categories of consortium interactions; science; education, training and capacity building; communications; administration; and in-kind and related support. From those proposal expectations, the Host developed their Key Elements (aka Term Sheet) that serves as a sort of "bible" for program implementation. The key elements are the deliverables the Host promised to do. Gregg noted the various pivots that the CASC had to manage following the 2019 Investigators' Meeting, with the added complications from Covid-19 and the resulting hugely beneficial strategic planning transformations. Gregg also reviewed the timelines for various program team meetings, stakeholder meetings, and communications media, proposed leadership and implementation team roles and responsibilities, and implemented collaborative initiatives (*Slides 19-29*). It was noted that due to Covid-19, many meetings were held virtually, and have continued in a virtual or hybrid format. The pandemic affected CASC productivity, particularly by limiting valuable in-person interactions. With strong program implementation adjustments, Gregg believes the CASC has come out stronger.

UA's Arizona Institutes for Resilience (AIR) Director, Sharon Collinge, reviewed the Host's administrative structure within the Institute, as well as AIR's support and commitment to the SW CASC. AIR is comprised of 15 different centers and programs (of which, SW CASC is one), and they provide space, HR support, and partial salary funds for the SW CASC. The CASC's mission and focus align with AIR's goal to reach across the campus and engage natural and social scientists, in addition to other fields of practice,

to understand and promote societal and environmental resilience. Key features of AIR's work include supporting community engaged work and actionable science. Sharon noted appreciation for the leadership that the SW CASC Host brings to AIR, as an embodiment of their goal for use-inspired actionable science. The CASC's focus on co-design and co-produced science, inter-and trans-disciplinary research, and their capacity building to train early career researchers (in over 80 different environmental degree programs) on this kind of work fosters a sound partnership for the University and AIR; a partnership that is built on shared goals, values and aspirations, and the Host's commitment to working closely with SW Tribes and Tribal communities.

UA Associate VP for Research Institutes, Innovation & Impact (RII) Elliot Cheu, provided an overview on how the CASC fits into RII and how their support helps benefit the SW CASC program, noting that his role is newly created at UA starting in January 2022. RII is divided into 3 divisions: Research Development, Centers and Institutes, and Research Support (Sponsored Programs & compliance). The purpose of Elliot's role was to help with the strategic positioning of research at UA, and to provide collaboration between centers and institutes. RII has 16 centrally managed centers and institutes, and nearly 100 total across UA. During UA's 2018 strategic planning process, they identified 5 top areas of research (health, data, space, environment, and liberal arts), so the environment has played a key role at UA and the SW CASC helps embody this research priority. Within the Centers and Institutes division, priorities are defined by maximizing research, developing collaboration trends to support collaboration across UA, and impacting dissemination; all work that the SW CASC does. RII works to facilitate trans-disciplinary science and encourages this kind of collaboration. Elliot's office provides many support mechanisms for the SW CASC (and AIR). Elliot concluded by noting that the state of Arizona has created the Technology and Research Initiative Fund (TRIF) via sales tax, of which \$4 million is administered by AIR on environment and energy systems, which facilitates their support for environmental-related issues funded through the state.

Facilitated Dialogue and Discussion with the ERT, and Q & A Regarding Administration, Leadership and the SW CASC Consortium Structure:

- *Question:* How does the Host see the SW CASC stand out from other institutes at UA?
 - *Response:* The SW CASC focuses on looking at actionable adaptation science and has an expanded network further than Arizona, spanning across areas fed by the Colorado River; as such, they have a strong legacy in understanding the impacts of Colorado River. Also, their direct engagement with natural resource managers and biologists, strong engagement with Tribal leaders and communities, and the Fellowship program all make the CASC unique.
- *Question:* For Sharon and Elliot, what are you looking for from the SW CASC? Do you have performance objectives to determine worthiness of more support from UA?
 - *Response:* We're seeing activities and metrics that are translatable, and actions that showcase what the CASC is working on. The CASC is building capacity for early career researchers, which is something that RII is looking for, rather than just the amount of money spent on researchers.
 - *Response:* Additional value the SW CASC brings include: expertise in trans-disciplinary research, opportunities to share practices, skills and competencies, and invaluable evaluation work on societal impacts of climate change.
- *Question:* Within the large network in which it resides, how do the mechanisms in place at the Host University promote or restrict agility and ability to shift with changes?
 - *Response:* The Host began the program with simple Working Groups, which later morphed into Investigators developing important bottom-up initiatives on emerging issues (increasing aridity of region, devastating fire regime, etc.), and the emergence and leadership of Native

- Tribes as adaptation leaders and leaders in the climate justice movement. The combination of AIR and USGS funding and researchers' labors of love have been key ways to address emerging issues.
- *Response:* University structures can be rigid, and the goal is to have agility to respond to emerging issues, the UA and Host structure is not so rigid that it doesn't allow for agility. This is an issue to keep in mind.
 - *Response:* A TRIF fund allows for agility in separate funding streams focused on environment and energy solutions. This is meant to provide initial seed funding for a range of activities to explore opportunities that may (or may not) turn into a bigger project or program.
 - *Response:* Seed funding program has been taken advantage of in the past; the Host advised the rest of the CASC network to do the same.
 - *Question:* Can you share some best practices for stakeholder engagement?
 - *Response:* Carolyn, Gregg, and former USGS Director, Steve Jackson, led an effort to summarize this as Translation Ecology. Best practices include: Being a good and respectful listener, engaging early and often with partners, watching societal interactions, developing a long-term commitment, and understanding how partners operate are key. The partnership process's include watching social interactions (both formal and informal inter-personal interactions) to establish a good foundation, commitment to long-term authentic partnership, understanding how partners operate (under their own constraints and opportunities), and taking the time to understand partner's context. We're seeing more attention in the funding world to this kind of engaged research. Carolyn posted the following link for the group: <https://www.swcasc.arizona.edu/translational-ecology>.

Gregg noted that the administrative piece of these partnerships has been the most challenging, and it hasn't stopped the SW CASC in any regard. They've overcome barriers and challenges like Federal Government funding and timelines. Efforts to streamline and improve are ongoing, and are aided by the Host's vast competencies in administration and the assistance of UA Sponsored Programs.

Review of Fiscal Management

SW CASC Host Deputy Director, Anita Govert, noted that UA is a research institute (top 20 in the US), and the SW CASC as a result, succeeds in huge part because of the research support staff and faculty at the institution. People bring their experiences and understanding of how processes at the university have morphed over the years and become a very solid support system.

Director for RII Business Services, Veronica Chu, reported that her team of roughly 15 people supports just over 30 departments within RII, managing hundreds of accounts, grants and non-grants. Director of Postaward Services at the Sponsored Programs at UA, Marcel Villalobos, works with projects after awards are made, seeing them through the entire financial lifecycle. Marcel and Veronica presented an overview on UA as a research enterprise, central SPS Postaward and RII Business Services roles and responsibilities, and the research administration topics including: proposal to award process, award management, sub-awarding, and compliance.

Recent significant highlights of UA as a research enterprise include: \$770,031K total expenditures in FY21; 3,537 total proposals submitted (74.5% new) in FY22; 2,321 active sponsored awards, and 27.8% with multidisciplinary involvement in FY22. Marcel and Veronica reviewed the RII research organizational chart, the Sponsored Projects Lifecycle (award administration), and the following selected research administration topics: campus training and outreach; sub-awarding; effort reporting; cost sharing; tracking cost share; reporting and closeout; closeout report process; and compliance. There is

close collaboration between Veronica and Marcel's teams, and, in turn, with the Host core staff (*SPS & RII Presentation*).

Questions & Answers Regarding RII and Sponsored Programs:

- *Question:* With such a strong set of practices established for pre- and post-award accounting, do management complications ever arise with USGS awards? What is the level of complexity added?
 - *Response:* This will be covered more in-depth on Day 4. Grants are different from USGS Cooperative Agreements. Since the cooperative agreement is only for \$5 million, without the administrative support of UA, the Host staff would not be able to manage the administrative load and paperwork. Internal checks and balances provide a good audit trail, and 10 people/month are reviewing the \$5m grant. This is labor intensive for UA, and over the course of 8 years, organizational changes have occurred in the research administration.
- *Question:* Do you have standard agreements in place with the participating universities within the SW CASC?
 - *Response:* Yes, UA is part of a group of universities called the Federal Demonstration Partnership (FDP). For awards issued under those terms and conditions, they use a standard template between the consortium institutions to reduce administrative burden. For federal awards not issued under the terms and conditions they have a template to use as a starting point that are recognized by the recipient.

Facilitated Dialogue and Discussion with the ERT, and Q & A Regarding Fiscal Management:

- *Comment:* Anita noted that the Host Agreement has enabled UA to work with USGS and Carolyn for other direct-funded projects beyond the CASC funding. With the estimated 50 transactions (on a good 5-year cycle) that need to be modified on the subawards, the Host has also been managing about \$12M/year from USGS awards that were awarded for other research at UA that were not part of the Host Agreement, but were leveraged because of it. She noted that this creates even more fiscal administrative work for Veronica and Marcel's departments. The HA is just the tip of a great amount of federal dollar accountability and transactions that UA has been entrusted with, and there are a lot of behind the scenes work and expenses.
- *Question:* Are any accommodations needed, given the level of complexity with USGS partnership? Or is this an easy fit with how the Host operates anyway?
 - *Response:* The Host will dive more into this on Day 4. There have been big shifts in dealing with conflicts of interests, and Veronica and staff have helped develop stop gap measures. Working with Tribes and Tribal entities has taxed the accommodation, and the Host has had to ask for accommodation because UA changed their policy on how to process conflicts of interest, as well as charging a fee for review service. With the USGS being a collaborative cooperative agreement, the Host must justify any adjustment in money.
- *Question:* Can you expand more on the term "emerging issues"? How do you make new PIs aware of the opportunities and how do you decide what to support anew?
 - *Response:* Gregg noted that, with emerging issues, the new USGS leadership of Carolyn, the Host has aimed to be more intentional and strategic with their work, and less opportunistic. Many on the research team are quite senior in experience and reputation, and people will reach out to work with them; the Host had fostered an opportunistic culture. However, this means core PIs get relatively small slices of funding, so many try to leverage other work in actionable science, some of which is directly requested by stakeholders. As a result, PIs decide if they have the passion and the capacity to engage. Also, new researchers are brought in through solicitations from the USGS-side.

- For example, researchers at UCLA, from the start of Cycle 2, designed a program to elicit emerging issues in partnership with coastal natural resources managers, developing new proposal ideas for SW CASC or other entities.
- *Question:* With respect to bringing new investigators into the fold, how does the Host outreach their proposal opportunities?
 - *Response:* There are a few opportunities: though discretionary funding opportunities that the USGS-side or the NCASC provides. The Host/UA has visited partner campuses to hold information meetings and interviewed administrators and researchers to learn about their work and how it could fit with the SW CASC. They have worked with Pis and their networks to promote funding opportunities. The Host's communications team does multiple blasts in different media formats. And finally, they cultivate relationships with investigators at other institutions.
 - *Response:* There also are other opportunities through CPs projects, if there's enough funding to bring on an affiliated faculty member with disciplinary experience. For example, Scripps has brought on part-time researchers to flesh out projects.
 - *Response:* This has evolved a great deal mostly by necessity. USGS will have Q&A sessions when soliciting proposals, and the SW CASC has a robust communications team to reach more people. Social media has expanded their reach. The Host noted that as they draft the proposal for Cycle 3, they realize they need to triple the travel budget because the best way to build is to get out and meet people. The Host has 2 upcoming site visits to meet faculty in other departments. Round tables have morphed into larger gatherings. Carolyn does a lot of travel to meet people and outreach, which requires capital. That said, the Host does not want to overpromise and underdeliver opportunities for awards: The intent is to sell the collaborative nature of the work, and send a message that this is an opportunity to learn how to do co-production and do actionable science. Fellows have been great advertisers of this message.
- *Question:* How do you mentor (particularly new Investigators) through the grants process?
 - *Response:* Carolyn established a process with orientation meetings with new project teams being funded, as a way to introduce Investigators to the fundamentals of how the CASC works. They then work closely with Anita on the nitty gritty details.
- *Question:* Does the Host distribute funds that are just seed money?
 - *Response:* The budget for Cycle 2 Host and Consortium was built with some flexible funding. The Host recommends that future proposals should build this in to create a way for more funding to address emerging issues more robustly. Carolyn noted some PI meetings provide opportunities for talking science, not just logistics. As Pis collaborate more, opportunities arise. This was the case for the MegaFire science initiative the ERT will hear more about later this week.
- *Question:* When do you decide to sunset or continue supporting projects?
 - *Response:* Some projects have a certain lifecycle and don't get revived or passed on to other entities or researchers. Others haven't reached that point and we continue them.
- *Question:* Outside of USGS, how many larger collaboration projects have been funded by other means (e.g., NSF or NIH)? Is the Host building out larger initiatives that build on a relationship with the SW CASC?
 - *Response:* The Host has tossed some ideas around, but have not yet done this. The Early Warning and the Aridity Project are two discussed, and will be addressed on Day 2.
- *Question:* Regarding budget and spending, where did the remaining money from Year 1 go?

- *Response:* The format of USGS Annual Reports doesn't ask for this particular data so it isn't tracked in those reports. We do report to OAG. Remaining funds mostly have been used for hiring and salaries; the USGS award allows for carry over. Some delayed spending was the result of the time it took to get all 6 subawards out.
- *Question:* Did the time involved getting things set up have detrimental long-term impacts?
 - *Response:* Biggest impact with subaward pieces (30-40% of total award) and Covid-19. They missed entire field seasons or opportunities to hire post-doctorates, and working with Tribes during Covid-19. The realignment after December 2019 was crucial. The Host has learned to spend government funds while they're available. Covid-19 affected hiring and the Fellowship program lagged, and this resulted in pivoting and making different choices.
- *Question:* Regarding actionable science, what is the Host's process to engage with end users, and their capacity to evaluate?
 - *Response:* This will be addressed on Day 2. The SW CASC engages with people in multiple ways, and there are different meanings of "actionable". Sometimes the nature of collaboration can be more consultative; close partnerships involve building capacities, and the Host builds capacity among scientists on how to work with partners to do actionable science.
 - *Response:* Alison noted that agencies come to SW CASC Pis with questions they want to pursue. They have examples of established partnerships and also brand-new projects & collaborations.
- *Question:* With limited funding pots for CPs subawards, has this ever been a challenge at the SW CASC? How does the Host get everyone on the same ship moving consistently?
 - *Response:* Yes, there have been challenges on the research side. In terms of investigators working together, honing in on an exciting emerging and important issue (part of public discourse) has been key. A lot of ideas from the Investigator team that exemplify good team work have been a push of science, and the Host has created a mechanism for people to work in a multi-disciplinary way on overarching topics, with a few exceptions. There is a collection of individual projects that have multiple team members from different CPs, or just single institutions. Gregg would recommend explicitly including the teamwork element for a portion of projects, if not all. Investigators have brought in external partners based on science discussions from monthly meetings.
 - *Response:* Carolyn has seeded some projects that were to explicitly bringing together contrasting researchers and topics to investigate and make explicit the connections between different areas. For example, to display how some coastal effects relate to processes that occur in the interior of the region.
- *Question:* Is there a structured ideation process that leads to projects developing from researchers with common interest brainstorming ideas?
 - *Response:* Gregg will take time to prepare more a more detailed answer tomorrow. In monthly meetings and annual investigative retreats, there are opportunities to brainstorm ideas and discuss science questions through the stakeholder needs assessment, as well as issues emerging in project-based discussions from partners that the CASC works with. The process is not formally structured.
 - *Response:* The amount of funding to CPs and Pis and Co-Pis is quite small. The ability to pivot quickly and ideate and consider what a new project looks will like is essential. Some discussions are catalysts for finding more funds and leading to bigger projects. When resources are small, there is limited ability to maneuver. The USGS funding rules makes this challenging.

- *Question:* Regarding a deliberate team science approach, is the Host including other scientists like engineers etc.; How do you invite people in who aren't going to get money, and bring in project-based learning?
 - *Response:* The Host will speak to this on Days 2 & 3. This is part of Alison Meadow's SW CASC evaluation work.
- *Question:* The research enterprise is very well organized and managed. How much of this success and knowledge filters out to the CPs? Does the UA Sponsored Programs work with CPs to provide training on how to work best through RII and Postaward Services?
 - *Response:* Nothing is regularly scheduled with CPs, but UA does participate in many National research administration consortiums that hold conferences and outreach which provides an opportunity to compare practices.
 - *Response:* Anita noted that, when she moved to full-time, she began to travel more. At UCLA and UCSD she met administrators of those institutions to establish relationships; People stay with the Consortium because of the relationships they form. The SW CASC is different from the industry standard in volume and process. Meeting virtually, while not ideal, has helped forge and keep connections.
- *Question:* What is the outcome of the SW CASCs science and efforts?
 - *Response:* To be answered later in the sessions!

Donna thanked the ERT, CASC Members, and Observers for their participation, engagement and attendance at the session.

ERT Reflections on the Day

The ERT met in closed session to discuss what they had heard. The ERT asked clarifying substantive questions for the Host to answer at some point during the remaining sessions:

1. ERT members are still curious about how you identify new people to join your consortium and how you prioritize what you work on. Do you have a process that is externally accessible or is it mostly internal?
2. CSU – can you clarify the relationship? They understand the connection to the Colorado River, but also heard you say something about the first cycle legacy.
3. Can you clarify where the unspent funds went? Did they rollover or...?

This session summary is respectfully submitted by the DS Consulting Facilitation Team. Edits are welcome and should be sent to your Day 1 Scribe: Colby Mills (colby@dsconsult.co).

Day 2: Progress in Adaptation Science and Collaborative Efforts

DAY 2	<p style="text-align: center;">Wednesday, March 29, 2023: Scientific Achievements and Collaborative Efforts</p> <p style="text-align: center;">Purpose: Reflect on the Host-University and associated academic consortium’s contributions with respect to: Scientific Achievement and Collaborative Efforts.</p>	
Time PDT	Activity	Participants and Affiliation
9:00- 9:15a	External Review Team – Closed Door	Facilitation Team & ERT Members
9:15- 9:30a	Brief Daily Introductions and Setting the Day	Facilitation Team, SW CASC Core Team, ERT Members
9:30- 10:00a	<p><i>Scientific Achievements on climate impacts, vulnerability, and adaptation science:</i></p> <ul style="list-style-type: none"> • Overview and introduction to presentations 	Gregg Garfin, UA Director, SW CASC
10:00- 10:45a	<p><i>Science Achievement and Collaborations: Part 1</i></p> <ul style="list-style-type: none"> • NPS decision tool for managed relocation (15 min) • Cultural burning (15 min) 	<p>Mark Schwartz (UC Davis) + Cat Hawkins-Hoffman (NPS)</p> <p>Beth Rose Middleton (UC Davis) + Chairman Ron Goode (North Fork Mono Tribe)</p>
10:45- 11:00a	<p>Break</p> <p>To avoid zoom fatigue: Please turn off and step away from your computer screen if AT ALL possible!</p>	
11:00a- 12:15p	<p><i>Science Achievement and Collaborations + Co-production Research and Evaluation</i></p> <ul style="list-style-type: none"> • Fire Consensus (15min) • Co-production Evaluation and Recommendations (15min) • Pacific Crest Trail Association (15min) 	<p>Gregg Garfin, UA Director, SW CASC</p> <p>Glen MacDonald (UCLA) + Hugh Safford (USDA-FS, retired)</p> <p>Alison Meadow, UA Investigator, SW CASC</p> <p>D. Cayan (UCSD-Scripps) + Dianne Daley-Laursen (Pacific Crest Trail Association)</p>
12:15- 12:45p	<p>Break</p> <p>To avoid zoom fatigue: Please turn off and step away from your computer screen if AT ALL possible!</p>	

12:45-1:45p	<p><i>Facilitated dialogue and discussion with ERT, and Q & A regarding Scientific Achievements and Collaborative Efforts:</i></p> <ul style="list-style-type: none"> <i>How is the host university managing their program and doing Actionable Science; what is the process? What patterns have emerged? What is/is not working well?</i> <i>What are the host university and its academic consortium contributions to climate adaptation science?</i> <i>How effective is the Host at engaging others in these activities? How do the Host's collaborative efforts enhance the Host's overall effectiveness?</i> 	Facilitation Team SW CASC Core Team and Investigators ERT Members
1:45-2:00	<p>External Review Team – Closed Door Initial reflections on the day: questions, concerns, and insights</p>	Facilitation Team & ERT Members

DAY 2: Facilitator's Summary
March 29, 2022, 9:00am – 2:00pm PT
 Topic: Scientific Achievements and Collaborative Efforts

Prepared by DS Consulting Facilitation Team

The following summary is intended to capture basic discussion, reflections, concerns, and insights from the session. It is not a verbatim transcript. Presentation slides are available for the ERT.

Attendees present for all or part of the meeting (in alphabetical order):

ERT Members: Benét Duncan (WWA-CAP/RISA), Barry Grand (USGS-CRU), Al Kuslikis (AIHEC), Cyndy Loftin (USGS-CRU), John Nielsen-Gammon (TAMU/SRCC).

Host, Consortium and CASC Presenters: Rich Ambrose (UCLA), Michelle Baker (USU), Dan Cayan (UCSD-Scripps), Dianne Daley-Laursen (PCTA), Carolyn Enquist (SW CASC-USGS), Erica Fleishman (CSU), Gregg Garfin (SW CASC-UA), Sasha Gershunov (UCSD-Scripps), Chairman Ron Goode (North Fork Mono Tribe), Anita Govert (SW CASC-UA), Cat Hawkins Hoffman (NPS), Nancy Huntly (USU), Aviv Karasov-Olson (UC-Davis), Glen MacDonald (UCLA), Alison Meadow (UA), Beth Rose Middleton Manning (UC-Davis), Hugh Safford (UC-Davis/Vibrant Planet), Gregor Schuurman (NPS), Mark Schwartz (UC-Davis), Tamara Wall (DRI).

Observers: Gus Bisbal (USGS-NCASC), Kristen Donahue (USGS-NCASC), Emily Fort (USGS-NCASC), Corrina Gil (SW CASC-UA), Addie Rose Holland (NE CASC), Jia Hu (SW CASC-UA).

DS Consulting Team: Facilitator: Donna Silverberg, Reporting and Support: Tina Patterson, Colby Mills.

Purpose for Day 2: Reflect on the Host-University and associated academic consortium's contributions with respect to: Scientific Achievement and Collaborative Efforts.

Welcome and Setting the Day

Facilitator and ERT Process Manager, Donna Silverberg, welcomed the group and conducted a round of introductions that included SW CASC ERT Members, University of Arizona, SW CASC Host, USGS and session observers.

Scientific Achievements on Climate Impacts, Vulnerability, and Adaptation Science

Overview and Introduction to Presentations

Former SW CASC University Director, Gregg Garfin, provided an overview of the Host-University's adaptation science achievements, highlighting SW CASC 's ability to: implement best practices in collaborative science research, evaluate for outcomes and impacts, address stakeholder questions that emerge, and align Fellows' research with SW CASC strategic plan (*Scientific Achievements Presentation Slide 2*).

Regarding the out-of-date Science Agenda, SW CASC opted to take the approach of developing an overarching strategic framework tiered off of the broader CASC strategic framing documents. Gregg noted that this was partially because development of the agenda is typically the job of a Research Coordinator; however, during the course of the SW CASC's existence, they have had a full-time Research Coordinator only for 1 year (last year). Instead, SW CASC's focal groups and stakeholder assessments informed the development of science priorities between 2019-until the current year. USGS is currently in the process of reconstituting an advisory committee, drawing upon representatives from the current focal groups. As a result, the development of a formal Science Agenda has become lower priority, allowing the Host and consortium to be nimbler at responding to the needs of stakeholders, partners, and rights-holders.

Gregg presented a comparison of the 2017 and 2022 mission statements to the ERT (*Slide 3*). By 2022 the SW CASC's focus shifted to the partnership aspect of actionable science. Elements that were implicit in the 2017 mission statement were explicit in the 2022 mission statement.

Gregg defined actionable science as information to support decisions in natural resources management and discussed the Host's view of co-production (*Slides 4-5*). He discussed modes of engagement and collaboration (*Slide 6*) that start with contractual engagement and move to consultation, collaboration, collegial, to Indigenous engagement modes as a framework for later discussion. Gregg noted that there's "greater agency on the part of the partner as one moves from left to the right on the continuum".

Gregg also provided a graphic about Translational Ecology and its application to actionable science. Part of translational ecology involves developing institutions; implicit is thinking about modes of collaboration and aspirational thinking of partners' needs in the process (*Slide 7*). Further, Gregg shared that there is substantive overlap in the way SW CASC has developed its science (*Slide 11*).

Gregg explained that the Host's original proposal started out with topical working groups (*Slide 12*) which didn't motivate folks to collaborate. To adjust, SW CASC moved to focus on emerging issues – issues of decision makers, and the broad public, not a specific end user. The result was three collaborative initiatives: Early Warming & Aridity, Climate Justice and Tribal Adaptation, and Fire Consensus (*Slides 13-14*). With the Fire Consensus Collaborative Initiative, the hope was to create a better baseline of public understanding for action by leveraging the gravitas of the CASC and consortium. The Natural Resources Workforce Development (NRWD) Fellows have been motivated by the issues related to the Climate Justice and Tribal Adaptation Initiative. Gregg also asked the ERT to consider thinking about the programs in other ways (*Slide 15*).

Regarding the Science Portfolio, Gregg noted how the projects represent different parts of the modes engagement and collaboration continuum and promised that the ERT would hear about science and collaboration several times today. Gregg reminded the ERT they would also hear about explicitly collaborative efforts, how investigators obtain funding, and reminded that ERT that they are evaluating the Host's performance of the hosting agreement (*Slide 24*).

Questions & Answers Regarding Scientific Achievements:

- **Question:** In the mission you said you develop solutions; do you mean actual policies and procedures or software?
 - **Response:** In the very best case, solutions would be application of policies and practices that stem from our science. We have also invested to develop tools and they are part of the portfolio.
- **Question:** The subject of aridity is huge. How would you scale up?
 - **Response:** The focus has been on the science, less on the community of practitioners. The work has been done primarily with no funding. NOAA has integrated into the design of their call for proposals to ask proposers to describe how they would integrate the products of their research with the public. That might be an idea for USGS as well.

Science Achievement and Collaborations: Part 1

NPS Decision Tool for Managed Relocation

UC-Davis Investigator, Mark Schwartz, and Cat Hawkins-Hoffman (NPS) along with Gregor Schuurman (NPS), and Aviv Karasov-Olson (SW CASC-UC-Davis) presented on their work to design and develop the National Park Service's (NPS) Decision Tool to assist with decisions related to species relocation (*NPS Decision Tool Presentation*). Mark shared an overview of the big question in ecosystem adaptation to climate change (*Slide 1*) and explained that most of the presentation would focus on the 2021 risk assessment tool. Cat explained that NPS has recognized the need to move species to habitats in which they have not existed historically. However, this is not a NPS operational practice and there is no shared decision framework for risk assessments. Agencies needed a framework that is transparent and enables agencies to be aware of and understand each other's work; they developed the tool together with a team of scientists and managers. The framework is being used by NPS and the USFS. Mark closed by noting that Region 1 has received feedback from non-governmental organizations (NGOs) that they like this tool.

Cultural Burning

Professor of Native American Studies at UC-Davis and PI, Beth Rose Middleton Manning, and North Fork Mono Tribe Chairman, Ron Goode, presented "Centering Tribal Collaboration in Climate Adaptation" (*Cultural Burning Presentation*). Beth Rose began the presentation with a description of the images on the title slide and transitioned to an overview of the collaborative projects Chairman Goode and would be discussing (*Slide 2*). Beth Rose added that the Cultural Burning project engaged Indigenous students, four of whom were first generation college students.

Chairman Goode discussed the Cultural Burning context, noting its historical significance and that 12- 15 agencies, numerous universities and Tribes participated in the cultural burnings. Overall, 70 burnings took place in four days. In addition, Chairman Goode and his team worked with *Conservation X-* a worldwide program that brought representatives from the Amazon, Indonesia, and Washington, DC to participate in the cultural burning. In May 2023, Chairman Goode will return to Mariposa with UC Davis

students to help them complete their studies. A part of the grant they received is for work with Cultural Burning and agricultural resources, and the program is slated to end in April 2023. Beth Rose reiterated to the ERT the importance of cultural burning (*slide 5*) and noted there has been collaboration with the California Indian Basket weavers Association (CIBA).

The presentation transitioned to collaboration of 14 to 15 agencies regarding Tribal allotments in California. The agencies and Tribes discussed water, fire, resiliency, and drought in relation to California's allotments, vegetation types, climate change definitions, and precipitation levels (see slides 6 to 10). They also noted that from September to April, Chairman Goode has been involved in seven articles. Beth Rose concluded the presentation with a list of a recent publications with which the team has been involved (*Slide 12*).

Questions & Answers Regarding NPS Tool and Cultural Burning:

- **Question:** Did decision makers initiate these projects or did you?
 - **Response:** NPS managers along with USFS asked that a team discuss species relocation in response to climate changes. The team had four case studies they took to the Invasive Species Council and that body requested a risk assessment framework that could assist decision making. The team did the work and put together a white paper.
 - **Response:** Chairman Goode is a long-term leader and UC Davis was invited assist with the Cultural Burning work.
 - **Response:** The California domain allotment approached Beth Rose and UC Davis for their assistance.
- **Question:** Is co-production and relocation informed by ecological forecasting? Does it move a species from a location to a location that is more amendable?
 - **Response:** The NPS had to make a decision: sustain this species or has this event moved on? This is where the risk assessment comes in to help them decide whether and then selecting a location that would sustainable in the future. The risk assessment tool was used in conjunction with RAD.
 - The ERT was provided a link to the NPS site about the Resist Accept Direct (RAD) process <https://www.nps.gov/subjects/climatechange/resistacceptdirect.htm>
- **Question:** What's the next step?
 - **Response:** The Cultural Burning project has included work with cultural fire practitioners to assess and overcome barriers they have faced. It continues and includes training on all sides (e.g., awareness, safety, and stewardship). Next steps include the policy level (making certain the practice may continue), continued training, and assisting personnel.
 - **Response:** NPS needed to solve a problem and led by example. Managers need living breathing examples of the application. There was a proximal need and we documented our work for others.
 - **Response:** Using risk assessment tool with the RAD framework to manage lands under climate change is another great example of expanding the framework to other agencies.
 - **Response:** With the Karner (butterfly) we examined, "do you go with the flow or change it?". Timescales, return on investment were considered
 - **Response:** Working worldwide on a prescribed fire and whether it's effective and efficient.

Science Achievement and Collaborations Part 2: Co-Production Research and Evaluation

Gregg introduced the next round of presentations focused on co-production research and evaluation.

Fire Consensus

UCLA Investigator, Glen MacDonald, and UC-Davis Investigator, Hugh Safford, presented “California Wildfire Synthesis Study” (*Fire Synthesis Presentation*). At the time of the study Glen was a partner within the U.S. Forest Service. The study is a synthesis of 19 authors associated with the SW CASC and have an array of expertise from USGS and academia. Wildfire is a policy question which has become a political question. There was a great deal of public misinformation and the team wanted to approach the topic in a policy context. The paper was peer reviewed and sent to the International Association of Wildland Fire (IAWF).

Glen also noted the history of the synthesis – it came about from a SW CASC meeting where attendees determined they needed to examine more than climate (in the context of wildfires), they also needed to look at other drivers. It’s a large paper. Hugh shared with the ERT questions addressed in the paper (*Slide 4*) and explained that 1980 is considered a good starting point for measurement of fire activity in CA. Hugh presented a slide with the type of data analyzed in the paper (*Slide 5*) and Glen shared a new infographic to explain the drivers of change in Western Wildfires (*Slide 7*). The hope is the graphic will appear in popular media soon.

Questions & Answers Regarding Co-Production:

- *Question:* What might be the recommendation for CASC in general for broad emerging issues?
 - *Response:* This one came from discussion between CASC people: The topic was politicized. People were motivated. Scientific information was needed.
 - *Response:* This synthesis wouldn’t have happened without the SW CASC providing encouragement and coordination. Everyone donated time. NW and SW CASC are good at identifying topics that could use independent assessment. We tried to approach the topic in a dispassionate manner.

Co-Production Evaluation and Recommendations

UA CASC Investigator, Alison Meadow, presented “SW CASC Evaluation for Learning: Understanding our Societal Impacts” (*SI Evaluation Presentation*). Alison shared with the ERT an evaluation overview as a frame of reference (*Slide 2*). She continued with a presentation of the SW CASC logic model and its inputs, activities, outputs, immediate impact, and long-term impacts (*Slide 4*). Alison explained societal impacts dimensions – impact goals and impact descriptors and the United Nations Sustainable Development Goals (UN SDGs) and an example of how the dimensions co-exist (*Slide 5*). Alison outlined the impacts of SW CASC research examples: Citizen Science and Climate Information, Decision Support for NPS, Cultural Burning, and Building a California Coastal Managers Network. Societal impacts also include training a new generation of researchers (*Slide 11*). Alison presented a cross table mapping SW CASC projects to societal dimensions and UN SDGs (*Slide 12*). In addition, the ERT saw examples of how the CASC’s work is connecting with policy, as well as the numbers of organizations referencing SW CASC’s PI work from 2018 to 2022 (*Slides 14-15*). Alison concluded her presentation with Lessons Learned and Next Steps.

Pacific Crest Trail Association (PCTA)

UCSD-Scripps Investigator, Dan Cayan, and Pacific Crest Trail Association (PCTA) Board Member, Dianne Daley-Laursen, presented on the Pacific Crest Trail Association (*PCTA Presentation*). Dianne explained that the PCTA has a staff of 30 people. Most of the work is done by volunteer organizations. The PCT is known for being one the best hiking experiences worldwide. Dianne presented the numbers of followers and subscribers on various PCTA communication vehicles. The communications are relevant to PCT users. In addition, the PCTA is getting recognition for its Diversity, Equity, and Inclusion (DEI) work. Dan shared with the ERT the relevance of graphics regarding segments along PCT most prone to snow to rain

shifts, projected heat stress along the PCT, and PCT weather sampling. The project included a citizen science component using small weather detectors that hikers would take with them. This part of the project has been slowest to take off. Dianne concluded the presentation with thoughts about building the collaborative effort with PCTA.

Questions & Answers Regarding Co-Production and Evaluation:

- *Comment:* The current iteration of the National Climate Assessment was interested in using the fire graphic Glen showed, but unfortunately since the graphic has not yet been published, the SW CASC USGS Director had to tell them no.
- *Comment:* Hugh was the primary visionary of another CASC funded project that has recently received a lot of attention in southern CA: A Climate-Adapted Conservation Strategy for SoCal Montane Forests.
- *Comment:* UA has an exciting emerging Indigenous Resilience Center led by Karletta Chief that we are building partnerships with [missed final words]
- *Question:* What is the degree to which these projects were supported by the CASC? Host or USGS?
 - *Response:* The synthesis didn't get funding. USGS personnel were involved – specifically Steve Jackson and Carolyn Enquist. Sarah Leroy was instrumental with in kind support and she is now supported by USGS through an Intergovernmental Personnel Act (IPA). Carolyn Enquist supervised Sarah and ensured supporting the Fire Consensus work was one of her top priorities.
 - *Response:* PCTA mostly received personnel support through the Host Agreement. PCTA also has a team of people.
 - *Response:* Alison is a soft money funded UA researcher, SW CASC funds 10% of her time.
- *Question:* Each project has been different and successful. What kind of things were not successful or didn't work as well as you had hoped?
 - *Response:* Not realizing the internal politics of their own organization (PCTA). Too much optimism. Now that is sanctioned by both organizations, they have all the right elements to be successful moving forward.
 - Getting people engaged and volunteers to help requires more time than initially thought.
 - *Response:* We have to do this work in a measured way.
 - *Response:* It took longer than we thought (re: wildfire synthesis). As we began digging into the questions, they changed. CASC was the center place for us all and provided critical stability.
 - *Response:* Adaptive management is also part of the work. Let the users guide the team. The result is more user and stakeholder centric.
- *Question:* have Dianne and Dan reached out to UC Davis Citizen Science?
 - *Response:* Kind of in the early stage. Dan will contact Ryan at UC Davis
 - *Response:* Dianne will add it PCTA Board's "to-do" list
- *Comment:* This type of work is time consuming, rewarding, but Tier 1 universities do not reward researchers for this type of work.
- *Comment:* As a "lesson learned", for an initial version of Alison's work, the Host Agreement also funded a tiny part of a postdoc to help; the Southern Montane project that Hugh mentioned is funded by USGS allocation from Carolyn; authentic adaptation at all levels!
- *Question:* What else could you have done with more money? What would have changed?
 - *Response:* More funding would have gotten PCTA board's attention earlier
 - *Response:* Could have supported more outreach faster.

- *Question:* What are the future plans for Tribal engagement? What other plans in regards to aridity and irrigation issues?
 - *Response:* Mentioned on day 1 the shift from science focus to science as a mechanism to garner Tribal input on research training. The CASC had challenges with hiring a Tribal liaison when their first one left. Looking to hire senior liaison to mentor AI's local person and hope to bring aboard a Tribal coordinator to facilitate the Tribal menu and developing the agenda process by work with Tribal Action Network (TRAN). We also are focusing the SWAF on Tribal needs and ideas. We want to ensure that we're meeting the needs of Tribal partners.
 - *Response:* SW CASC has a regular Tribal focused webinar series. In addition, SW CASC has worked with NPS on a Tribal cultural resources project.
- *Comment:* Dianne helps with Tribal community camps. She uses SW and SC CASC materials to reinforce Tribal matters.

Facilitated Dialogue and Discussion with ERT, and Q & A Regarding Scientific Achievements and Collaborative Efforts:

- *Question:* What scientific achievement are you most proud of in this cycle?
 - *Responses:* We've been working with extreme weather. Dan's downscaling of climate models to daily 6km resolution and hourly updates has been very helpful.
 - Sea level rise and coastline loss all along the Pacific coast, but specifically in California. The work done to develop adaption strategies to main coastline along California, including the experiment at Seal Beach adding soil to raise marshes so they don't disappear.
 - The work Sasha's team has done in marine layer clouds.
 - The work Erica's group does to understand the connections in climate, bird migration, and land use in the Great Basin. Talking with other agencies and coalescing at the system level.
 - Beth Rose Middleton's work with Tribes and Cultural Burning.
 - Paper on the drivers of wildfire (19 authors). It will be a highly used paper.
 - The Fire Consensus effort. It provided clarity to a not well-informed discussion.
 - The Fellow Program because it's a program that has lasting impact.
 - Collective conversations across discipline such as Wildfire consensus, Climate Fellows, and Tribal engagements.
 - Growing early career scholars, including Indigenous and partner engagement on cultural burning.
 - Adapting Tribal knowledge into many disciplines.
 - Erica's group effort on warming and drought in the SW that helped us better understand aridity in the area.
 - Cross CASC efforts on how to evaluate social science efforts to inform broader work. The science of how we do our work.
- *Comment:* It's been a tremendous pleasure to work with each of the CASC investigators, all of which are international leaders in their respective fields, in addition to being active implementers of actionable science! Thanks to you all!!
- *Question:* What has worked best for facilitating collaborative science? What would you add to like to see done differently (other than money)?
 - *Responses:* Finding the time to collaborate and funding the efforts.
 - In the first cycle there were more in person meetings. Covid-19 put a big ding in that. It was a bit of a problem, the group pivoted, and now we need to re-boost the in-person opportunities.
 - Stability; there's been significant turnover.

- The funds available for partners has been positive. And the process of moving subawards to Tribal partners has been a challenge. This is a university issue dealing with USGS agreements.
- Meeting with people has been a challenge.
- It would be helpful to have a regular, continuing meeting forum.
- *Question:* Top three societal impacts of SW CASC? Wouldn't have happened but for the CASC partnership?
 - *Responses:* Built important relationships that support other work (such as climate impacts on human health).
 - Connectivity and trust building has a long-term impact as partners trust the science.
 - Exposing the next generation to actionable science at early stage in their career.
 - Thinking more analytically and clearly about actionable science.
 - Thinking more clearly about how I engage with the Tribal partners.
 - Thinking more clearly about climate projections due to Sasha's work.
 - Fellows growing post doc program with Tribal engagement.
 - The work done on fire will be impactful.
 - The issue of water in the West; changing patterns and aridification.
 - To see the way in which students are motivated and moving up.
 - NRWD Fellows – seeing the Fellows getting their work out in publications and podcasts.
 - Meeting with people who we might not meet otherwise (e.g., the CASC's focus on tribes).
 - Building bridges/network.
 - What comes to mind first is Beth Rose's work with Indigenous students/scholars—I don't think that cohort would have manifested without the CASC network/support. The cohort aspect seems very important to me—that it was more than a single student or two.
 - The collaborative fire paper led by Tamara and incorporating many collaborators will have a societal impact. It clarifies issues and brings a multidisciplinary lens to a problem we are facing throughout the region.
- *Question:* Is there anything that would help moving strategic plans forward in the next three to five years?
 - *Responses:* In person, informal opportunities to share ideas with each other and the CASC.
 - Looking forward to continuing the impactful Fellows Program.
 - Strategic planning came late in this round and was kind of weird. Could come sooner and be improved.
 - There are a lot of senior scientists in the consortium. Discussions about succession and new blood are needed. May want to think about how to attract younger scientists to serve as 'the next' PI. Succession planning for the entire consortium.
 - Collaborative research takes additional time and energy – it's just a fact! Our current science funding model (not at all unique to USGS) does not support these efforts.

Donna thanked the ERT, CASC Members, and Observers for their participation, engagement and attendance at the session.

*This session summary is respectfully submitted by the DS Consulting Facilitation Team.
Edits are welcome and should be sent to your Day 2 Scribe: Tina Patterson
(tina.patterson@jadeitesolutions.com).*

Day 3: Capacity Building & Outreach and Communications

DAY 3	<p style="text-align: center;">Thursday, March 30, 2023: Capacity Building & Outreach and Communications</p> <p style="text-align: center;">Purpose: Reflect on the Host-University and associated academic consortium’s contributions with respect to Capacity Building and Outreach & Communications.</p>	
Time PDT	Activity	Participants and Affiliation
9:00-9:15a	External Review Team – Closed Door	Facilitation Team & ERT Members
9:15-9:30a	Brief Daily Introductions and Setting the Day	Facilitation Team, SW CASC Core Team, ERT Members
9:30-10:00a	<p><i>Capacity Building: Educate and train to build capacity of early career professionals and others</i></p> <ul style="list-style-type: none"> • SW CASC NRWD Fellows Program 	<p>Gregg Garfin, UA Director, SW CASC</p> <p>Nancy Huntly (USU), Michelle Baker (USU) NRWD Fellowship Directors, SW CASC</p>
10:00-11:00a	<p><i>Capacity Building: The Next Generation</i></p> <ul style="list-style-type: none"> • Karuk Podcast Collaboration (30 min) • Other cohorts – brief presentations (10 min) and private discussion with ERT (20 min) 	<p>Anna Murveit (UA), Sonia Delphin (UA), + Shawn Bourque (Karuk Tribe), Vikki Preston (Karuk Tribe)</p> <p>Julie Scamardo (CSU), Will Munger, USU</p>
11:00-11:30a	<p>Break</p> <p>To avoid zoom fatigue: Please turn off and step away from your computer screen if AT ALL possible!</p>	
11:30a-12:15p	<p><i>Capacity Building for Coastal Resources and Tribal Research</i></p> <ul style="list-style-type: none"> • Coastal Managers and Research Group (15 min) • Southwest Adaptation Forum (15 min) 	<p>E. Fard, R. Ambrose (UCLA) + Lisa Gilbane (Bureau of Ocean Energy Management)</p> <p>Anita Govert (SW CASC), Carolyn Enquist (USGS)</p>
12:15-12:45p	<p><i>Communication tools</i></p> <ul style="list-style-type: none"> • Come Rain or Shine Podcast (15 min) • Colorado River Science Wiki (15 min) <p>Break, as needed</p>	<p>S. LeRoy (UA) + Emile Elias (USDA SW Climate Hub)</p> <p>B. Udall (CSU) + Rob Billerbeck (NPS)</p>

12:45-1:30p	<p><i>Facilitated dialogue and discussion with ERT, regarding Capacity Building & Outreach and Communications</i></p> <ul style="list-style-type: none"> • <i>How is the Host-University and associated academic consortium doing their <u>Capacity Building</u>; How effective are they? What is the process? What patterns have emerged? What is/not working well? What is the Host-University and associated academic consortium's contribution to <u>Capacity Building</u>? What were their limitations and how were they mitigated?</i> • <i>What is the Host-University and associated academic consortium's <u>Outreach & Communications</u> contribution for climate adaptation?</i> • <i>What factors limited outreach and comms and how were they mitigated?</i> 	Facilitation Team SW CASC Core Team S. LeRoy, B. Udall, and partners ERT Members
1:30-2:00p	<p>External Review Team – Closed Door</p> <p>Initial reflections on the day: questions, concerns, and insights</p>	Facilitation Team & ERT Members

DAY 3: Facilitator’s Summary
March 30, 2023, 9:00a – 2:00p PT
Topic: Capacity Building and Outreach & Communications

Prepared by DS Consulting Facilitation Team

The following summary is intended to capture basic discussion, reflections, concerns, and insights from the session. It is not a verbatim transcript. Presentation slides are available for the ERT.

Attendees present for all or part of the meeting (in alphabetical order):

ERT Members: Benét Duncan (WWA-CAP/RISA), Barry Grand (USGS-CRU), Al Kuslikis (AIHEC), Cyndy Loftin (USGS-CRU), John Nielsen-Gammon (TAMU/SRCC).

Host, Consortium and CASC Presenters: Rich Ambrose (UCLA), Skye Aney (SW Climate Hub), Michelle Baker (USU), Rob Billerbeck (NPS), Sonia Delphin-Perez (UA), Carolyn Enquist (SW CASC-USGS), Elizabeth Fard (ECCC), Gregg Garfin (SW CASC-UA), Lisa Gilbane (BOEM), Anita Govert (SW CASC-UA), Nancy Huntly (USU), Sarah LeRoy (UA), Alison Meadow (UA), Will Munger (USU), Anna Murveit (UA), Brad Udall (CSU).

Observers: Doug Beard (USGS-NCASC), Emily Fort (USGS-NCASC), Corrina Gil (SW CASC-UA), Jia Hu (SW CASC-UA).

DS Consulting Team: Facilitator: Donna Silverberg, Reporting and Support: Tina Patterson, Colby Mills.

Purpose for Day 3: To reflect on the Host-University and associated academic consortium’s contributions with respect to their capacity building, and outreach and communications.

Welcome and Setting the Day

Facilitator, Donna Silverberg, welcomed the group and conducted a round of introductions that included SW CASC ERT Members, USGS and University of Arizona, SW CASC Host, and session observers.

Capacity Building: Educate and Train to Build Capacity of Early Career Professionals and Others

Former SW CASC University Director, Gregg Garfin, provided an overview of the Host-University's capacity building and outreach and communications (*Capacity Building and Outreach & Communications Overview Presentation*). Gregg noted that today's presentations would help demonstrate the differences between what the Host proposed they would do and what was executed. As per the Key Elements of the Host Agreement, the Host's capacity building focused on regional dialogue and information sharing, and skills development in students and professionals. Within communications and data management, the Host proposed to develop a communications plan with flexibility for changes, building on existing website and social media platforms, hiring a communication specialist, developing an evaluation strategy, and engaging with core-funded projects on communications.

Gregg noted that the SW CASC's Significant Capacity building initiatives include: The California Roundtable on Wildfire Resiliency (has since been adopted into a regional USGS initiative), that examines factors impacting community and ecosystem resilience to wildfire and expands technical advice on fire risk forecasts to include a wider range of fields; Roundtables that have utilized graphic facilitation to focus on strategies for easily implementable or high impact infrastructure solutions; a Coastal Managers effort (multi-year and ongoing process) to identify research needs for coastal management along the California coast, develop a synthesis and proposals for future research funding; The Colorado River Science Wiki, a vast information resource effort to assist negotiations on water shortage sharing in the Colorado River Basin; and the Southwest Adaptation Forum (SWAF), a regional forum of the National Adaptation Forum that facilitates region-wide dialogue (and training for non-Indigenous people) emphasizing authentic collaborative work with regional Tribes and Native Nations.

Gregg said he believes the Host has succeeded in its communications efforts. The communications strategy is a broad set of guidelines, updated yearly to reflect current goals. It identifies the Host's target audiences' goals and objectives, articulates key messages and strategies directly and interactively, and enacts an annual evaluation strategy (in collaboration with UA PI Alison Meadow) that seeks to determine if the Host is doing what they proposed, and how they are making an impact. Gregg reviewed the Communications Plan's gallery of products and media that includes an updated website, SW CASC newsletter, blog posts, podcasts, themed webinar series, fact sheets and other print media.

SW CASC Natural Resource Workforce Development (NRWD) Fellows Program

NRWD Fellowship Directors from Utah State University, Nancy Huntly and Michelle Baker, reviewed the one-year program design, how it currently operates, program history, and what Fellows have been able to achieve through the Fellows program. Nancy noted that their experience in developing USU's Climate Adaptation Science (CAS) minor informed the design of the SW CASC's NRWD Fellows Program, especially the essential support structure and offered opportunities.

The purpose of the Fellows Program is to provide graduate students with opportunities for skills development and practice in developing use-inspired and actionable science to inform natural resource management, through a team science approach and a collaborative cohort structure. Years 2-5 cohorts had 8 Fellows, one from each of the SW CASC Consortium Partner institutions and one Tribal fellow sponsored by UA. Next year's cohort will have 7 Fellows from CPs. Each year's cohort has a research project theme derived from the USGS-specified science priorities for research solicitations.

Fellowships begin with a 4-day meeting at USU that includes specific training, informal introductions, and brainstorming to explore project ideas and plan the year. Nancy noted that this kick-off meeting includes a 2-day AIBS Interdisciplinary Team Science Workshop and a Science Management Policy Exchange hosted by USU's CAS graduate program. Fellows receive Collaborative IRB Training Initiative (CITI) training for working with human subjects, and includes working with tribal partners and community science modules, as well as additional support and guidance on effective community partner work from Alison Meadow.

Fellows' end products emphasize development of specific products for community partners and other information users, which allows for a wide range of community partnership, informed through co-production by the end users. Cohort research end projects have included: survey-based reports, a Story Map, Intentional Fire podcasts, publication of the podcast collaborative process, informational 2-pagers, and a technical report for publication that SW CASC personnel have drawn upon for discussions on a community-partnered Watershed initiative. Cohort Year 4 is in progress now, and looks at climate-informed management of natural resources in aquatic ecosystems to support effective climate adaptation. Cohort Year 5 will look at increasing aridity in the western US and strategies to address water quality challenges. Fellows Program projects are posted on or linked to the SW CASC website. It was noted in the Host's upcoming FY24 project solicitation that the most recent NRWD fellowship solicitation was used to inform their suite of priorities.

Questions & Answers Regarding Capacity Building Through Education and Training:

- *Question:* With Year 5, is the Host being deliberate about offering different kinds of team-based science experiences in the next cycle?
 - *Response:* Offering a range of engagement opportunities with stakeholder partners was deliberate. Collaboration with those outside of academia and producing actionable science products for them has been thoughtfully considered, and can be challenging to engage. The Program has worked to be flexible in accommodating external partner needs and making co-produced, useful products.
 - *Response:* An early draft of the 'Stories as Data' paper was linked for ERT members to review:
https://journals.sagepub.com/doi/full/10.1177/26349825221142293?casa_token=gCZyCGoi8dkAAAAA%3AQq24fR07cA-RVJh95uJAu9mSCjI1Vme8kyJRT32LzU6DukhhhhluvR5Hd5ruocDfiV5IpHmcPJAgdEg.
- *Question:* This program may be the flagship activity of the SW CASC and is really exciting! Has the Host thought about scaling it up to build a professional career pipeline more nationally?
 - *Response:* This would be interesting. We have discussed this, especially working with Tribal leaders post-Covid. In addition to the SW CASC, USU is launching a program based on this idea; it is easy to manage for the high yield we get from our investment.
- *Question:* With some students having graduated, has the Program seen any career-type ripple effects for workforce development?
 - *Response:* Yes, absolutely. One post-doc is working with Colorado River Basin; another working for a climate adaptation organization in Canada; another is a regional Program Director for American Rivers; one is a Data Analyst for a consulting firm in their field; another has a position with USGS working on aquatic issues. Many MA students have gone into municipal employment.
 - *Response:* This Fellowship has a relatively small amount of money to provide to their students as they work for 12 months in the Program. The Host would like to increase these

funds in the future. Many Pis have helped their students move into this Team Science program.

- *Question:* What do you regard as your measures of success for the Fellows Program?
 - *Response:* Student satisfaction and successful products that partners and end users value.
- *Question:* How do Fellows Program students get credit? How does this count towards their degree?
 - *Response:* The program is offered as a 1 year add on to their university education, which can help avoid credit complications; it's a sort of an honorarium to put on their resume, with the small stipend of \$5k (increasing to \$8k).
- *Question:* What would you do differently within the Fellows Program heading into the future?
 - *Response:* Give the students more money! Also accommodate/build capacity to include more students; it would be interesting to have parallel tracts/themes running between the student research teams and post-doctoral program with opportunities for collaboration and perspectives sharing. CASC-wide post-docs could be a natural match for this kind of initiative. Nancy noted that she would like to explore options to work more with Beth Rose Middleton Manning (UC-Davis), to have through their links at AIHEC, a Tribally run program with more Tribal mentors and students involved. There would be logistical constraints at the end of a funding period and personnel turnover, but this would be a good thing to pursue, and can be done in other places for cross-CASC science.
- *Comment:* NCASC Post-doc program: <https://www.usgs.gov/programs/climate-adaptation-science-centers/casc-network-climate-adaptation-postdoctoral-fellows>.

Capacity Building: The Next Generation

Nancy introduced Fellows Program Cohort 2 graduates from UA, Anna Murveit, and Sonia Delphin-Perez, to present their research project, a podcast covering intentional fire that was co-developed and fully co-produced with members of the Karuk Tribe, specifically Shawn Bourque and Vikki Preston. A resulting paper was published on the process of the unique and authentic co-production with respect to Tribal sovereignty. Both Fellows studied the human dimensions of natural resources.

Karuk Podcast Collaboration

Anna introduced their Fellowship research project; an interdisciplinary study presented in a StoryMap, called "Improving Our Relationship with Fire," of which the podcast was one major aspect (*see Karuk Podcast Collaboration Presentation*). The podcast was a collaborative effort between the Department of Natural Resources of the Karuk Tribe and the SW CASC. It records stories and perspectives related to cultural prescribed burning, and was built off a recent report commissioned by the Karuk Tribe called "Good Fire." The podcast's interviews and stories build off of previous work describing barriers to indigenous burning practices and identifying solutions for further implementation, by amplifying the voices of those impacted by fire suppression and fire exclusion. It was noted that the Fellows committed to finishing the project, even as the timeline extended beyond their Fellowship year and funds.

Anna and Sonia discussed the process of the podcast from idea to final product, the challenges that arose, the lessons learned, and resulting recommendations they have for future Fellows Program implementation. The process began by building on a past relationship and trust that Anna had cultivated with the Karuk Tribe, which was critical to the project success. The project included full co-production throughout the entire process (including research topic, methods and products), and led to an understanding of cultural protocols and research permitting. They noted that co-production is very important and this collaboration with the Karuk Tribe was challenging (e.g., navigating misunderstandings about Tribal sovereignty) and rewarding. A decision-factor in selecting the research theme were the needs and interests of the Tribe, as well as the skills and interests of the cohort. The

Fellows received support from Alison Meadow on navigating the Institutional Review Board (IRB) process with the Tribe, as well as support from other institutions at UA. Interviews and data collection were implemented through “Storywork” to preserve conversations in the words of Karuk Tribal Members and spotlight their perspectives without much interpretation or analysis. Importantly, the podcast production sought to ensure data sovereignty for the Tribe, and they had final control and review over the product for final presentation.

Sonia noted key project impacts: hands-on experience for graduate students; two-way learning to take to future work and careers and within the end user communities (specifically, project management, building relationships, and podcast development); NRWD Fellows and practicing Pikyav (Karuk Tribe framework for responsible research); development and sharing of IRB recommendations; and interdisciplinary science without boundaries (i.e., having an impact beyond the US) to adapt into Fellows’ own individual contexts. The podcast is available on many different platforms for anyone to access and learn about cultural burning through the Karuk Tribe stories. Recommendations to consider for future Fellowship work included: consider partnerships with pre-existing contacts between Fellows and the SW CASC, as well as continued relationships with partners, include Indigenous and international students, and expand training to include Tribal sovereignty and the IRB process.

Questions & Answers Regarding Capacity Building:

- *Question:* what ideas do you have for building a mechanism to make the Fellows Program a more scalable and community-connecting program?
 - *Response:* building on past personal connections is key. Identifying the needs of partners and Fellows to find alignment of skills and interests could jumpstart relationships and build partnerships.
 - *Response:* Nancy noted the benefits of a series of smaller continued meetings throughout the year which are easier to attend and foster relationship-building.
- *Question:* Is there potential for future Fellowship programs to offer opportunities for continued funding to wrap up work past Cohort Years or facilitate the transitioning of relationships?
 - *Response:* The Host has been able to raise the stipend up to \$8K; taking care of Fellowship students is high on their list of priorities moving forward. This program may be another casualty of the initial “Lots of Littles” strategy; it didn’t get the amount of funding it deserved and the hope is to remedy this in the next cycle.
 - *StoryMap:* <https://storymaps.arcgis.com/stories/6ed94127e5e64bee8564019fd8e933c4>
 - *Podcast:* <https://podcasters.spotify.com/pod/show/intentionalfirekaruk>
 - *Article:* <https://doi.org/10.1177/26349825221142293>

Other Cohorts & Discussion with ERT and Fellows

Ph.D. student at Utah State University, Will Munger, presented on his Fellows Program research project, “Restoring Endangered Streams: The Science, Practice and Law of Instream Process-Based Restoration Amid Climate Change” (see *Will Munger Presentation*). The project revolves around the concept of Processed-Based Restoration (PBR) looked at through multiple disciplinary perspectives. The topic is an important issue in the SW due to waterways and watersheds being at risk of losing critical services to habitat, biodiversity and water quantity/quality due to land use, policy, and climate change.

Regarding Western Water Law, appropriated water rights must be put to a beneficial use, which historically has not included environmental purposes. PBR aims to restore processes in a river corridor that support river health, while being low-cost and low-tech. Will’s Cohort posed the question, “Can PBR be used to restore endangered streams in the context of climate change?” The interdisciplinary nature

of the project was very useful when it came time to analyze PBR data across projects, and conduct virtual interviews with practitioners and water experts that were informed by restoration and climate adaptation literature.

Will reviewed the opportunities and needs practitioners identified in their interviews, the most important being building relationships with stakeholders. The cohort hopes that while building regional climate adaption capacity in the SW, PBR can be combined with a suite of practitioner-identified techniques. Cohort recommendations include coordinating monitoring efforts, storytelling and communication of restoration benefits, restoration workforce recruitment and development, and continued transdisciplinary research, especially in best practices for stakeholder engagement.

Participating in the Fellowship Program led to mentorship on an interdisciplinary team and training in collaborative team science that enabled the cohort to consider identified needs, and address questions through scientific literature and policy changes. Will noted that the opportunities to do team science and address stakeholder needs was very beneficial. The Cohort was invited to USGS' Early Career Workshop that coincided with SWAF; this provided opportunities to connect with other young scientists around the country working on similar issues. Also, they recently hosted a workshop at the Spring Runoff Conference and engaged with practitioners to consider how to build practitioner knowledge exchange networks to build regional capacity.

Collaboration takes time and relationships; support for graduate students is sometimes mismatched with graduation and publication timelines. This is a challenge that many Fellows are working to address.

Questions & Answers Regarding Fellowship Program:

- *Question:* Within your PBR work, this is a multi-year process that evolves; do you have partners in place in the user community that are continuing to do the work you've initiated?
 - *Response:* Yes, Will has a prior project that has turned into an ongoing collaboration in this restoration work; this will be a multi-year process which has raised discussion on how student projects could pass the baton to others and involve them in ongoing collaborations. Local anchor institutions with continuity can help students pass those projects along.
 - *Response:* Canyonlands Research Center has inspirational structures in place; example of how Federal agencies are considering how to co-manage and better collaborate with Indigenous partners. The training and collaboration skill-building that institutions and Fellowships are doing helps new natural resource professionals prepare for the challenges they are addressing in the real world. Long-term relationship building is also very important.
- *Question:* What kinds of monitoring instrumentation are you using to continue providing data?
 - *Response:* From the Spring Runoff Conference; heard that the question around stream monitoring is a big deal; questions around water shepherding. Need more collaboration on instrumentation, gauging and modeling, and data interfaces, and how can it be adaptively managed. Consider how to bring stakeholders asking for instrumentation assistance to the available data and science.
- *Question:* is the Cohort group size right for the problems you're tackling?
 - *Response:* Anna noted that the size is good; not too big to make decisions, while involving a broad skill-set, and allowing for people to engage at different levels depending on life expectations.
 - *Response:* Will also thought it was a good size that brought a lot of good skills to the table. A challenge remains that, when the fellowship ends, some of the work continues or begins. The Program has committed, motivated people that understand the big picture.

- *Response:* Sonia added that having people from different universities and nationalities expands the network to build future opportunities and develop interdisciplinary project ideas, which takes time.
- *Question:* How are faculty identified as mentors once Cohorts are confirmed? Is there a deliberate step from the CASC principals in making sure these projects don't sunset? How do you build on this?
 - *Response:* within the framework of Cycle 3 preparation, we are considering small local meetings to get local networks and building connections through CPs to grow connections students have built.
 - *Response:* Timeline is big for Fellowships. Central USGS headquarters has developed a post-doc fellowship. Keeping themes united with the science initiatives and listening across the CASC network. The CASC organization is still young and there are opportunities for growth.
 - *Response:* If the Fellows Program were set up with sufficient funding to bring Fellows back, there could be overlap and connections between past and current cohorts.
 - *Response:* Mentorship was incredible. For my cohort, this was primarily Nancy, Gregg, and Alison. Both personal, professional, and academic support, they were generous with their time and knowledge. Anita was also incredible at helping navigate and find funding.

Capacity Building for Coastal Resources and Tribal Research

The SW CASC's capacity building is broader than its work with university students, spanning to managers, researchers, and Tribal partners.

Coastal Managers and Research Group

UCLA PI, Rich Ambrose, presented his activities at UCLA dealing with coastal management (*Coastal Managers & Research Group Presentation, Slides 1-10*). The UCLA Coastal Group's goals are to facilitate informed coastal management, co-production of knowledge, and work with coastal managers. Rich reviewed this Cycle's Coastal Managers Workshop #1 in 2019 (to understand managers' needs for coastal climate research) and #2 in 2021 (to identify research needs related to rocky intertidal habitats and climate change). In focusing their work with coastal managers, the aim was first to listen and hear their important issues via this series of workshops that included a wide range of managers representing agencies and organizations that manage resources on the coast. Rich noted the extensive participant list for Workshop #1, and summarized manager-identified needs, barriers and opportunities. Workshop #1 was met with positive feedback and provided an opportunity for resources managers to network and receive feedback on their needs.

Workshop #2 outcomes pivoted from the original goals due to Covid-19, and transitioned into Zoom as the Workshop became a Working Group with periodic meetings. A White Paper was drafted on research priorities to be used as a basis for future funding opportunities and changes in policy. The Workshop produced 4 proposal concepts (more will be developed) and new projects have been funded.

Former NRWD Fellow at UCLA, Elizabeth (Elly) Fard (now with Environment and Climate Change Canada), reviewed current papers their team is working on, the first, "The Politics and Economies of Coproduction: Assessing the Climate Science Policy Interface in California," that builds on previous work outside of the grant and has been expanded with their work (*Slides 11-13*). The paper assesses efforts to implement science co-production models to manage natural resources in the context of climate change and to examine the unintended consequences of the politics of the production and circulation of useful science.

Also reviewed was another paper in progress, “Climate Science–Policy in California and the Southwest CASC,” that aims to provide an analysis on knowledge co-production efforts in management settings to understand what makes knowledge relevant in those settings and in policy contexts. More recently, the collaboration with the SW CASC was used as a case study to examine their approaches and results of integration in science to policy through initiatives and educational training efforts. Elly highlighted her current work at Environment and Climate Change Canada that supports the development and delivery of training materials to increase climate literacy and facilitate the effective use of climate data and information for climate change adaptation decision-making. She noted that her experiences working with the SW CASC supported and prepared her well for this role, and the Report made with her NRWD Fellowship contributed to her acquiring the job and entering the actionable science workforce.

Acting Regional Supervisor, Pacific Region, of the Bureau of Ocean Energy Management (BOEM), Lisa Gilbane, presented on BOEM and its collaborative partner, Multi-Agency Rocky Intertidal Network (MARINe) (*Slides 14-15*). BOEM manages the development of the US Outer Continental Shelf energy and mineral resources in an environmentally and economically responsible way. Their work has expanded in the last 20 years from an oil and gas focus to work with energy leasing and development across the US Exclusive Economic Zone and some US territories, including renewable energy, carbon sequestration (online this year), critical minerals & sand (baseline studies).

MARINe is a collection of partner groups (including 20 long-term monitoring groups) that works to develop publicly accessible and scientifically robust assessments of rocky intertidal habitat health. Partners collect data, provide funding, access to sites, and or promote ways to work together. They use a standardized set of protocols to collect the same information in one database and one message of producing results. Looking to the future, possible collaborations with the SW CASC could consider how best to link offshore impacts of climate change to coastal processes and to communicate to the public and stakeholders about what it means to their shoreline. Also, better integration of Tribal and Indigenous knowledge and Tribal members as more active voices in managing their own coastal resources, and flexible funding mechanisms to offer a continued point for different groups. Lisa noted that she has gotten a lot of value out of her participation with the SW CASC, and appreciates the focus that Pis have given to what resource managers need and practical solutions.

Southwest Adaptation Forum (SWAF)

SW CASC Host Deputy Director, Anita Govert, and SW CASC USGS Director, Carolyn Enquist, presented on the Southwest Adaptation Forum (SWAF) (*SWAF Presentation*). The SWAF’s goal is to strengthen existing relationships and build among the climate adaptation assessment practitioners in the region. The Forum first started in the fall of 2018, and aimed to identify gaps in the existing stakeholder and practitioner networks, and to generate synergy and momentum for future engagements amongst partners and stakeholders. 2020’s Forum was cancelled due to Covid-19, 2021 pivoted to a virtual-only setting, and 2022 was in-person, in New Mexico.

Carolyn reviewed statistics from the 2021 virtual SWAF, providing a breakdown of the sectors represented and types of individuals they represented. The Host was able to pivot effectively during Covid-19, and dig into creating authentic partnerships with Tribes. Three virtual days included actionable science products, conversations around different forms of sovereignty, and the type of work/principles and processes to use when working with Tribes. The 2022 in-person SWAF was developed with Tribes and featured four emerging Tribal Indigenous leaders. SWAF 2024’s implementation team is in the planning phase, and hopes to make it an even bigger event while maintaining diversity, inclusiveness, justice, and equity throughout the programming. The Host is very proud of this flagship initiative.

Feedback from attendees and partners has been overwhelmingly positive, and despite of the work effort and resources, holding the event in-person was requested and worth it.

Questions & Answers Regarding Capacity Building for Coastal Managers and Tribal Research:

- *Question:* Regarding SWAF, and resources from the 2021 event: how could your approach to working with Indigenous partners be a resource for an engaged climate workforce? Any consideration for making session recordings online for folks to access?
 - *Response:* There is discussion and, in the meantime, a UA program (Indigenous Resilience Center) has taken the torch and created a hybrid workshop to address this. NCASC also plans to run a webinar series on this. While it is not well-integrated, people are inspired by one another and there will be convergence. Indigenous participants from 2021 were very generous in imparting their knowledge, and this is a sensitive early-emergent initiative. The CASC is navigating the complexities while working with key partners and rights holders.
- *Question:* For a SWAF coproduction theme, is there a vehicle for what the Coastal Managers group is doing?
 - *Response:* SWAF has interactive and practitioner-oriented sessions, to bring together regional practitioners in the SW to listen and learn, and foster knowledge exchange and coproduction. Identifying needs evolved to start with the user needs, not just research needs. Designed in a bigger space to bring practitioners across multiple sectors to discuss what's needed in the context of adaptation solutions. Practitioners co-develop the agenda, with Indigenous partners at the center.
- *Question:* What's the plan moving forward to ensure accessibility with a hybrid approach so as not to hinder participation?
 - *Response:* UA has become a bit Zoom-focused. The Host has learned from advisory groups and surveys that people really want to meet in-person and gather on Tribal Lands. There likely will be a little of both. They are approaching conversations differently, and figuring out a way to please certain sectors through rotation between hybrid and in-person.
 - *Response:* SWAF is able to record almost every session to offer access to participants unable to join in-person. Participants have pre-recorded presentations as well as live virtual presentations.
 - *Response:* Elizabeth noted that her Fellowship started in person then went hybrid. She thought long-term relationships and product evolution was enhanced by having in-person interactions in the beginning. Accountability and relationship-building were key.

SW CASC Communication Tools

Rain or Shine Podcast

SW CASC Science Applications Coordinator & Podcast Co-Host, Sarah LeRoy, presented on the "Rain or Shine," podcast, which started a couple years ago in collaboration with the SW Climate Hub (*Comms Podcast Presentation & Video*). She reviewed the project team, including Co-Host from the SW Climate Hub, Emile Elias, and Production Crew Members from the SW Climate Hub, NMSU, Skye Aney and Reanna Burnett.

Sarah shared soundbites from past podcast episodes, and a video created with Emilie that explained how the podcast came about. The podcast wouldn't be possible without the production crew, and the Team learned that maintaining good audio quality is a key to success.

In 2020, the Host considered other/new mediums for sharing work at the SW CASC. This collaboration arose as a way to leverage partner projects, work efforts, and advance climate resilience in the region

via a mutually desired medium of podcasting. The podcast is valuable to the Hub because it provides listeners with opportunities to learn about the most recent scientific advancements, hear talk with scientists, gain a level of understanding, and make connections with other climate services partners in the region. It also allows for connections with a climate science audience and the general public, while fostering a tangible partnership with SW CASC.

The podcast format allows for easy listening and engagement with users. The podcast has had 5,700 downloads, and people are listening from as far away as Germany. Most popular episodes include: “Climate Hope,” “Adaptive Silviculture for Climate Change,” and “Assessing Climate change Vulnerability of Navajo Nation Forests”. Due to its popularity, every episode now ends with a “climate hope” message.

Podcast: <https://www.buzzsprout.com/1136681>

Colorado River Science Wiki

Senior Water and Climate Research Scientist and PI at CSU, Brad Udall, presented on the Colorado River Science Wiki, a web-based platform for the sharing of scientific and technical information relevant to the Colorado River Basin and the management of its water resources and related natural resources. It is intended for use by managers, decision-makers, researchers, the media, and the general public. 7 states, 2 Nations, and 30 Tribes are invested in the river’s resources. 40 million people rely on it. There has been a 20% decline in flows since 2000, with half of that attributed to human-caused climate change. The current operational rules for the river expire in 2026, making the Colorado Science Wiki a timely and important product for current and on-going negotiations about future operations.

Product goals include: building a platform for the newest research to be summarized and shared; make activities of the research committee more visible; make data sets and tools more widely accessible; give context to advances in science; and to support continuous climate assessment. Brad reviewed the team behind the product, noting collaborative links with the Aspen Global Change Institute (AGCI). The Wiki is organized using open-source software platform called MediaWiki. Before the site was implemented, interviews with managers and an initial survey identified 6 main topical areas within science and applications that have expanded to include cross-cutting reports, weather and climate, hydrology and water availability, seasonal streamflow forecasts, water operations and planning, water use, water quality, geomorphology and sediment, ecosystems and environment, and societal and economic issues. Other pages are dedicated to data and tools, a regularly updated new research section, water law and policy, a who’s who of organizations conducting research relevant to the basin, and background on the river.

The Wiki team and contributors continue to update the site regularly with publications, and maintain regular contact with their stakeholder list to seek input and share what’s new. The Wiki recently secured long-term funding from the US Bureau of Reclamation to keep efforts going, and is in the process of talking to major water providers for smaller increments of funding. Brad noted there still are areas that need to be filled out and added to moving forward.

Colorado River Coordinator for the NPS, Rob Billerbeck, noted that NPS interfaces with various agencies, states, Tribes and other partners on water issues on the Colorado River to ensure management of the river takes into account the NPS’ units, resources, and recreation. NPS discovered the Wiki when they had started to consider implementing a similar idea. Rob noted that resource staff at regional parks are experiencing great change, especially in the way that the Colorado River is managed, which significantly impacts NPS’ resources and recreation. Staying up to date on the changing science and the implications

of the water changes to their resources and recreation, via the Wiki is critical. For reference, the regional economic impact from just the three big park units (visitors to Grand Canyon, Glen Canyon, Lake Mead) is 1.8 billion on the region and the Service is looking to invest hundreds of millions of dollars into the recreation infrastructure of those parks.

The Wiki is a one-stop-shop for NPS to find the latest science papers on key issues and impacts, the latest data and tools, new information, and up to date graphics needed to relay important issues to leadership. Rob noted that it is very hard to convey the complexities on the Colorado River without these resources readily available and easy to access. The NPS wants to see this expanded and continued, especially with the intense time scales with the change in the Colorado River. Colorado River Science Wiki: www.coloradoriverscience.org

Facilitated Discussion with the ERT & Questions Regarding Capacity Building and Outreach & Communications

The ERT was asked to consider the following questions regarding the Host-University's capacity building and outreach & communications:

1. *How is the Host University and associated academic consortium doing their Capacity Building?*
 2. *How effective are they? What is the process? What patterns have emerged? What is/not working well?*
 3. *What is the Host-University and associated academic consortium's contribution to capacity building? What were their limitations and how were they mitigated?*
 4. *What is the Host-University and associated academic consortium's outreach & communications contribution to climate adaptation? What factors limited outreach and comms and how were they mitigated?*
- *Question:* The Colorado River Science Wiki is state of the art science communications, and is following the lead of where digital media is going. Are there data gaps are within the product? Are there plans for filling in gaps as changes are managed in the river?
 - *Response:* Yes, within the different data & tools; one area that has attracted a lot of recent interest is soil moisture. The list of tools highlights information and shortages of information.
 - *Question:* How do you decide on podcast topics?
 - *Response:* The team holds a monthly planning meeting to coordinate topics and discuss what cool things are happening; they also receive submissions for topics. They then discuss what is most beneficial and aligned with the CASC goal of sharing adaptation science They try to keep topics broad and varied, as well as timely. One topic on the horizon is "climate anxiety."
 - *Question:* What kind of tools/data are used to determine who is listening to the podcasts?
 - *Response:* Use a podcast hosting service called Buzzsprout that offers general analytics like listener areas and numbers of downloads. They have a google form for easy submission of feedback & suggestions that is linked in every podcast episode description, although not many people offer feedback (sometimes on Apple podcasts). Most feedback is received via talking in-person at conferences and forums.
 - *Question:* Is it intentional that these communications efforts are accessible to individuals and organized groups/agencies? Or is the primary outreach to the general population?
 - *Response:* Communications are talked about a lot at the Host, and has been a high priority since Sarah became full-time. They work with a USGS contractor who helped them promote through links, social media accounts, SW CASC newsletter, and special announcements.

They routinely review and build the communications strategy throughout the year. The communications strategy lists target audiences, and each communication method works to target a specific audience. The podcast highlights research projects for a wider audience. A fundamental aspect of communications is to coordinate across different media, including in-person meetings. What happens at conferences gets woven into online and social media platforms that can reach everyone.

- *Question:* How does the Host build capacity for the next set of PIs? Are there challenges in considering incoming PIs in the future? Has the Host considered activities to train assistant professors or pre-tenured professors that might not have university incentives to participate in this collaboration?
 - *Response:* In small subtle ways. The Fellowship application is circulating, and Fellows are good promoters. Current and past PIs share via their networks and institutions. RFPs within 6 CPs have served as a way for faculty to know of the CASC existence. Mailing lists announce opportunities. SWAF is a large network for sharing, and PI's bring promotional materials with them to scientific presentations. It's a soft sell, but word is getting out on the adaptation work being done.
 - *Response:* Haven't done training for new faculty on actionable science methods (yes with grad students and post-docs), and this is a good suggestion.
- *Question:* Climate change can be political and polarizing, especially with the addition of water allocations. How is the Host positioning the SW CASC as an apolitical provider of information?
 - *Response:* When the previous administration didn't align with the prevailing scientific consensus on climate change, scientists and practitioners had to justify their work when speaking with members of Congress. The approach has been to connect it personally to their localities. Every SW district has issues connected to water, wildlife and multiple uses for natural resources, so you talk about climate change and adaptation with the lens of natural resource use. Water allocation is a charged topic.
 - *Response:* In the Colorado River community, climate change is front and center. For states within the basin, human caused climate change isn't a hot topic, despite that it's discussed all the time. There are complexities to what people can do and say publicly, and what they can act on.
- *Question:* Does the water issue come down to California vs the other states in the SW CASC region?
 - *Response:* it's definitely a tricky topic, and depending on the political climate (being federally funded) you have to be very careful about material outputs especially on social media. Avoid talking in terms of mitigation or energy, and reframe to talk in terms of climate adaptation and resource management. It's easy to talk about climate change without saying "climate change," this is a communications focus.

Donna thanked the ERT, Consortium & CASC Members, and Observers for their participation, engagement and attendance at the session. The meeting was adjourned.

ERT Reflections on the Day

The ERT was very impressed by today's showing and look forward to more reflections with the Host tomorrow. The work you have done is impressive, laudable, and serves as a model for others (which questions about scale-ability reflect). The Host was asked to consider the following questions for Day 4:

- 1) How do you interact with other CASC's and USGS programs (like CRU, which also is nested in universities) to share and learn from each other?
- 2) Do you coordinate with other like-minded federal centers (such as the Climate Hubs, CAP-RISAs, Western Regional Climate Center, etc.)? If so how and how often?
- 3) Can you share the methods you use for communicating within your consortium network (e.g., do you use a share drive? Google docs? Etc)?
- 4) Have you been intentional growing the Center's two main areas of co-produced/relationship-based science with climate science?
 - a. How do you determine success of these two?
 - b. How do you avoid spreading yourselves too thin?
- 5) Does the work you do with Alison allow you to be reflective of your own work or is it more outward facing?

*This session summary is respectfully submitted by the DS Consulting Facilitation Team.
Edits are welcome and can be sent to your Day 3 Scribe: Colby Mills (colby@dsconsult.co).*

Day 4: Overall Effectiveness Towards Host Agreement

DAY 4	Friday, March 31, 2023: Overall Effectiveness Towards Host Agreement ❖ Review the <u>overall effectiveness</u> of the Host-University and associated academic consortium in meeting the goals established under their current host agreements; ❖ Aid the NCASC in developing improved requirements for re-competition of the next university hosting agreements; and ❖ What recommendations does the ERT have for cross-CASC & NCASC learning from this Host?	
Time PDT	Activity	Participants and Affiliation
9:00-9:15	External Review Team - Closed Door	Facilitation Team & ERT Members
9:15-9:30a	Brief Daily Introductions and Setting the Day	Facilitation Team, SW CASC Core Team & ERT Members
9:30-10:30a	Review and Recap <ul style="list-style-type: none"> • The SW CASC: Successes, Effectiveness, and Next Steps • Clarifying questions from ERT members 	Gregg Garfin, UA Director, SW CASC Anita Govert, UA Assistant Director, SW CASC
10:30-10:45a	Break To avoid zoom fatigue: Please turn off and step away from your computer screen if AT ALL possible!	
10:45a-12:00p	Facilitated Dialogue and discussion with ERT regarding the Overall Effectiveness Towards Host Agreement Open dialogue and discussion between ERT and SW CASC team regarding the Overall Effectiveness and any questions left over from prior days	Facilitation Team SW CASC Core Team ERT Members
12:00-12:15p	Closing Remarks & Adjourn	Facilitation Team SW CASC Core Team ERT Members
12:15-1:00p	Break for ERT To avoid zoom fatigue: Please turn off and step away from your computer screen if AT ALL possible!	
1:00 - 2:00p	External Review Team - Closed Door Discuss ideas and insights gleaned from the four days: <ul style="list-style-type: none"> • What stands out? What needs comment in the ERT report? What are your thoughts about the overall effectiveness of this Host about its work in all areas? What recommendations come to mind for inclusion in your report? Clarify next steps in the process: <ul style="list-style-type: none"> • What is due and when? • Follow-up Zoom on April 10, 9:00-10:30 pm PDT 	Facilitation Team & ERT Members

DAY 4: Facilitator's Summary

March 30, 2023, 9:00a – 2:00p PT

Topic: Overall Effectiveness Towards Host Agreement

Prepared by DS Consulting Facilitation Team

The following summary is intended to capture basic discussion, reflections, concerns, and insights from the session. It is not a verbatim transcript. Presentation slides are available for the ERT.

Attendees present for all or part of the meeting (in alphabetical order):

ERT Members: Benét Duncan (WWA-CAP/RISA), Barry Grand (USGS-CRU), Al Kuslikis (AIHEC), Cyndy Loftin (USGS-CRU), John Nielsen-Gammon (TAMU/SRCC).

Host, Consortium and CASC Presenters: Gregg Garfin (SW CASC-UA) Anita Govert (SW CASC-UA), Nancy Huntly (USU), Alison Meadow (UA).

Observers: Gus Bisbal (USGS-NCASC), Addie Rose Holland (NE CASC).

DS Consulting Team: Facilitator: Donna Silverberg; Reporting and Support: Tina Patterson, Colby Mills.

Purpose for Day 4: Purpose: Review the overall effectiveness of the Host-University and associated academic consortium in meeting the goals established under their current Host Agreements; aid the NCASC in developing improved requirements for re-competition of the next university hosting agreements; and what recommendations does the ERT have for cross-CASC & NCASC learning from this Host.

Brief Daily Introductions and Setting the Day

Facilitator, Donna Silverberg, welcomed the group and reminded them of the purpose of the day's session (noted above). In addition to the day's purpose, Donna asked the ERT and SW CASC to share feedback, today or in the future, on the ERT process to help her team and NCASC improve in the future.

Review and Recap

Former SW CASC University Director, Gregg Garfin, provided an overview of the Host-University's weaknesses, opportunities, and growth in "Overall Effectiveness Review" (*Overall Effectiveness Presentation*). Gregg articulated several weaknesses including lack of flexibility and funding to respond to emerging issues as a result of the contract/agreement type that USGS uses for CASC hosts, no strategy for prioritizing projects, lack of core science staff, and extension capacity (*Slide 2*). He noted the importance of noting the tension between USGS processes and getting secure funding. Gregg also outlined internal opportunities (e.g., allocate more resources to developmental evaluation) (*Slide 3*), growth (including the Fellowship program, Indigenous engagement, and providing internal professional development opportunities) (*Slide 4*). Gregg concluded the presentation by outlining areas of external opportunities (e.g., embedding partners, leveraging funds with similarly focused external partners, such as USDA, NOAA Extension, and within AIR), team proposals to and with CASC and USGS (e.g., to get large NSF grants, and to support smaller, more specifically targeted working groups, and aligning with external planning processes of partners) (*Slide 5*).

The SW CASC university team found that preparing for the ERT Review helped them reflect, quantify their work, and develop areas for consideration for their Round 3 proposal. Gregg said the current generation of lead PIs has not been trained in team science and transdisciplinary research and collaborative research – it’s a gap he hopes they will fill, noting there are growing initiatives to provide professional development opportunities.

Facilitated Dialogue and Discussion with ERT Regarding the Overall Effectiveness Towards Host Agreement:

- *Question:* What was hindering the strategic planning process or finalizing the community engagement strategy? Is there something that needs to be improved organizationally to make that stuff happen more smoothly, in a timelier way?
 - *Response:* Both items are USGS responsibilities. They were initiated and funded by USGS. The Host could pick up the ball and hand it back and say “we did a little work on this, what do you think?”. However, it is a delicate matter.
 - *Comment:* As has been noted (and acknowledged) before, there are process and flow items that could be improved at the USGS level.
- *Question:* You’re not just navigating agency bureaucracy from a funding disbursement perspective, but from an activity’s perspective, is that fair to say?
 - *Response:* In the best cases we’re bicameral, with a corpus callosum providing communication between the spheres of our mutual brain. In the worst cases, we diverge because something gets hung up on the federal side and goes to the back burner and never gets to the front burner.
 - *Response:* We have similar challenges within the consortium as well.
- *Question:* Regarding the flexibility to pursue emerging issues. Is part of that because the Host Agreement has specific deliverables and they’re checking off the box that it was complete?
 - *Responses:* That’s true (re: Host Agreement specific deliverables).
 - Do have flexible funding for Tribes and travel.
 - By and large lack that flexibility.
 - The scope of work is defined at the onset.
- *Comment:* It’s similar to a CAP-RISA program that sets aside funding in the form of GRA salaries in the later years of the budget for the current 5-year award, with the intent of holding an internal ‘mini-grants’ competition to support its investigators in pursuing work that meets emerging issues or priorities that require more progress.
- *Question:* What happened to the money savings? Is it possible to reallocate that?
 - *Response:* It was not on the USGS side and continues to be an issue. At the outset, we wrote a proposal and assumed there would be standard support on the USGS side. However, due to federal cuts, Director Steve Jackson got assigned two CASCs to run (SW and SC CASCs). He now is directing just the SC CASC and Carolyn is doing three jobs: acting director, deputy director, and research coordinator. They've only been able to hire people on detail for 90 or 120 days just to get some basic stuff, like proposals, processed. We hope this will change.
- *Question from Facilitator:* Are there ideas the ERT can offer, given lessons you have learned, for the SW CASC to consider?
 - *Response:* Our USGS Co-op Research Units have headquarters’ staff who only deals with contracts; they are the people who communicate with the universities (now 43 universities). We have a very small admin staff who has a lot of experience. We don't have one Co-op unit doing subrecipient contracts, so it's managed a little bit different from what you're

describing. The hiring-related issues that you're talking about creating slowdowns is familiar, but we involve committees that have University and state and federal representation on them to hire the scientists. Our program is much smaller, and it's still a problem. We rely on the folks at the unit leader level at the University.

- *Question:* How much have you worked with Arizona CRU? Are they able to help in some way with the federal communications issues?
 - *Response:* We have worked with a few Arizona CRU units – once or twice, in the last six years, it has been focused on CASC.
 - *Response:* Also have worked with Western Geographic Science Center and the Arizona Water Science Center.
 - *Comment:* It seems like CASC is a scaled-up version of the CRUs.

- *Comment:* The Bureau of Indian Affairs (BIA) Tribal Climate Resilience office got something like a \$200 or 250 million-dollar increase in their budget specifically to support Tribal climate resilience projects. It seems like there's some huge opportunities there to tie more directly the resources of all the CASCs to the funding the Tribes are getting where they do need the science support and other ways that you could bring collaborative transdisciplinary science to bear on their issues. Perhaps a conversation with folks at a higher policy level at the BIA and CASC or somebody at USGS. A model is the Department of Energy's Minority Serving Institution (MSI) Partnership Program. It funds partnerships between MSIs and the National Labs. For example, if an MSI needs somebody from Sandia National Labs, the funding comes there and they're assigned to work with the MSI. The lab personnel aren't assigned, they volunteer. There could be something similar for CASCs, instead of project resilience budgeted up front, to help with faster contracting. It fulfills the mission of the CASC and certainly furthers the goals of the climate adaptation program. USGS is well positioned to help Tribes with their resiliency efforts without starting something new.
 - That model would solve getting money to Tribal partners, across the CASC. It's been a struggle to do the subawards. Funding Tribal nations also brings up sovereignty issues. That said, the SW CASC Host has been evolving its approach to respond more directly to meet Tribal needs while protecting their sovereignty.

- *Comment:* Currently, the BIA's climate resilience program is undergoing a leadership transition. It is curbing the flow of a tremendous amount of money set aside for Tribes.
 - AIHEC has people on the Hill doing advocacy. It's a nonpartisan issue. This is a good time to advocate especially with a Native American woman as Secretary of Interior. This true for USDA and Department of Energy too.

- *Comment:* Additional funding mechanisms that CASCs might use:
 - NSF Technology Innovation and Partnership grants as a means for NCASC to build the current model at a much bigger level. They are looking for new ideas that have social and environmental linkages <https://beta.nsf.gov/tip/latest>
 - BIA Climate Resiliency Program's funds for working with Tribes.

- *Question:* re: Communications: are you able to work with consortium partner PIs to get additional resources?
 - *Response:* Communications is one of the areas SW CASC does well as a team.
 - The UC Davis Cultural Burning project is an example. In 2019, when Anita went to the Mariposa Cultural Burn with Ron Goode, their public TV station was there doing a video and special issue on it.

- UCLA has a communication team that promotes research. SW CASC has been the beneficiary of some of these larger standing communication initiatives that those two schools today.
 - *Response:* USU’s Karuk podcast support happened behind the scenes (it wasn’t spotlighted in the presentation to the ERT); there was an individual already at USU who knew how to edit the videos. As such, Nancy made that connection happen and USU paid for the production costs.
 - *Response:* In addition, USU has done some publicity through their statewide initiative. There are 45 students that support podcasts statewide. In addition, USU supports the BIA Climate Resiliency program, funds the science policy exchange and is engaged in the watershed initiative.
- *Question:* Is it correct that only UA Fellows get full tuition reimbursed?
 - *Response:* Yes. In 2017, Gregg was able to get UA’s graduate college to give SW CASC two full-time tuition stipends for the full five-years. However, they were only able to get it from the UA side. What they since learned is they only used half a semester of one space within 5 years for a Tribal scholar because the Sloan Foundation and other funding sources give Tribal students much better options for tuition and stipends.
- *Question:* Is there a mechanism in the CASC for funds to flow from the Host to consortium members to fund, e.g., fellows or communications efforts, as was discussed earlier?
 - *Response:* Yes, this could be specified through subawards. That said, each subaward reduces the overall money, due to overhead costs so we need to balance this.
 - *Response:* We did investigate with other institutions whether they could get any sort of managing funds. There isn’t much incentive to go after small amounts of money (a few hundred thousand dollars).
- *Comment:* The Indigenous Resilience Center (IRC) at UA has a project called Indigenous Correspondents where undergrad students are recruited from Native communities all over the country to develop digital media projects around a local climate or environmental issue. This could be another mechanism to bring in more Tribal students and integrate with the SW CASC’s work within Tribes.
 - Maybe that’s a good opportunity for future work with UA’s Indigenous Resilience Center (IRes), and their Indigenous Correspondents Program. See <https://resilience.arizona.edu/news/launching-iliiaitchik-planet-forward-and-ires-indigenous-correspondents-program>.
- *Question:* How have Alison’s research questions and work been integrated into the CASC? How is it operationalized?
 - There has not been much traction operationalizing that sort of reflection and learning internally. It is time consuming, difficult work, and the team got splintered up during Covid-19. Instead, Alison has been able to contribute to the broader CASC network and the NW CASC.
 - Gregg noted that if he could do it again, he would allocate a fifth of the budget to evaluation.
- *Comment:* What you’re describing about Alison’s work is an adaptive challenge in itself. It’s really requiring basically a “cultural shift” for people to recognize the importance of evaluation and that takes a long time.

- It's a process and we just do it one step at a time. I think we are going to see what Gregg talked about: a major cultural transition is happening with students entering the academy already attuned to the need for evaluation.
- *Question:* Do you coordinate with other like-minded federal centers (such as the Climate Hubs, CAP-RISAs, Western Regional Climate Center, etc.)? If so, how often?
 - *Response:* Gregg, Carolyn, Sarah and Investigators are very engaged with Hubs and meet regularly with them; Five SW CASC members are CAP-RISA members. We were meeting quarterly, with an annual big meeting. However, interests diverged and now we stay connected through our CPs or if there is an interest overlap (such as aridity).
- *Question:* Has there been a discussion about how to make this all more synergistic?
 - *Response:* A lot of that happens at the national level. Within our region we have gone with partnerships that flow most easily, so we tend to work most closely with USDA, USFS, FWS on grasslands, and with the SW Fire Adaptation Program. The CAP-RISA Program has some overlap, although their focus is urban areas, while ours is more natural resource and land use.
- *Question:* Can you share the methods you use for communicating within your consortium network (e.g., do you use a share drive? Google docs? Etc.)?
 - *Responses:* We share information via Box.
 - Some use Teams, but we have to be careful because USGS cannot use some applications (e.g., Google, so they use Sharepoint and that isn't accessible by the universities).
 - Our NRWD Fellows use Slack.
 - The Comms team has used Trello and Notion (but, we ran into a licensing issue with Notion).
 - The Regional CASC consortium directors use Slack.
 - We have used Miro for group meetings.
- *Question:* Have you been intentional growing the Center's two main areas of co-produced/relationship-based science with climate science?
 - *Response:* We look for the sweet spot between advancing science, meeting our partners' needs, and making an impact. Think about that continuum I mentioned on Day 2 (see Day 2 slides on Modes of Engagement); some of the work is simply providing information or data like a consultant might do. In other cases, developing the relationship leads to bigger research opportunities. Developing the relationship is key to how we operate. We report on the science, but we DO all of our science in a co-production manner with partners: we work with partners to understand the question and then how to answer that question.
- *Question:* How do you determine success?
 - *Response:* Success is measured in couple of ways: peer reviews (is the science rigorous and credible?), 'impact' metrics (is the research being adopted and being put into plans and decisions? is it building capacity? Is it contributing to changes in awareness or policies?)
 - *Response:* In some cases, we do process work. In many cases, we see our role as stimulating thought. We convene discussions, kick off the group, then they continue to work with each other on water resources, species ranges, and other issues. In many cases there are organizations where the left hand doesn't know what the right hand is doing; by bringing the members together we help them carry the ball forward.
- *Question:* How do you avoid spreading yourselves too thin?
 - *Responses:* Being more strategic and less opportunistic.
 - By expanding the operation and garnering external funds
 - By leveraging partnerships (e.g., USDA)

- Looking to the future, we will get respite when USGS hires people. You can tell the difference with convenings or collaborations.
- *Question:* What more would you want from AIR to avoid spreading yourselves too thin? (The following were suggestions from ERT members):
 - With NWRD, possibly ask AIR to contribute more funding to support tuition.
 - Also, ask AIR for 0.5 FTE student for 5 years to provide support with convening, writing a proposal, or other extension-type work.
 - The School of Natural Resources also benefits from the CASC being at the university; perhaps they could provide funding and human resources to help.
 - As AIR is being rebuilt and Sharon working is to rebuild the capacity, focus on mutually beneficial and supportive ways you both might help each other to grow (without spreading yourselves to thin!). For example, perhaps AIR could add a position/person who knows how to integrate programs.
- *Question:* Is there any deliberate effort to have a cascading mentoring model where students teach other?
 - *Response:* Maybe at the individual investigator level, but not programmatically. It's a wonderful suggestion that is being considered for the new proposal

ERT Ideas for the SW CASC:

- UVA's IRC program focuses on food, energy, and water career pathways, especially. With the BIA funding, it is a perfect opportunity to get CASC involved in the discussion.
- There's a program with STEM Learning at UA that'll be experimenting with societal impact groups. It might be another pipeline. It's just start, they don't have a cohort yet.
- ERT members can review past ERT reports via:
 - USGS Website for Past Cycle External Review Reports: <https://www.usgs.gov/programs/climate-adaptation-science-centers/program-evaluation>.

Donna thanked the ERT, Consortium & CASC Members, and Observers for their participation, engagement and attendance at the session. The meeting was adjourned.

This session summary was respectfully submitted by the DS Consulting Facilitation Team. Edits were welcome and sent to Day 4 Scribe: Tina Patterson (tina.patterson@jadeitesolutions.com).

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