

South Central Climate Adaptation Science Center



SOUTH CENTRAL
CLIMATE ADAPTATION SCIENCE CENTER

External Review Team Final Report

5-Year Review

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

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Background Information

The United States Geological Survey (USGS) **National Climate Adaptation Science Center (NCASC)** serves as the national office for the Climate Adaptation Science Center (CASC) network. NCASC provides leadership and guidance on administration, partnerships, information management, and communications. In addition to its management capacities, NCASC conducts research on cross-regional and national science priorities ([USGS NCASC website](#)).

The CASC Network was established in 2010 to develop scientific information focused on climate impacts, adaptation and resilience of plants, fish, wildlife, and their habitats in response to evolving environmental conditions in every state in the nation. The current configuration of the CASC Network involves a central node, NCASC, which manages nine Regional CASCs (RCASCs) that serve as regional hubs. The scientific products and services delivered by the CASC Network support natural and cultural resource managers, primarily at federal, state, and tribal resource management entities, as they address adaptation to climate change. *This content and additional information about the NCASC/RCASC enterprise is sourced from and can be accessed at <https://casc.usgs.gov>.*

The USGS National and the CASC Network is a partnership-driven program that teams USGS and University “Hosts” with scientific researchers, natural and cultural resource managers, local communities, and decision-makers, with the goal of helping fish, wildlife, water, land, and people across the country adapt to changing climate-based conditions ([USGS CASC website](#)). Each regional CASC collaborates with its own set of regional consortium partners ([map website link](#)) and is configured as a Federal-Academic partnership containing both a federal USGS-staffed component and a parallel university-based component located in their respective region. The Host-Universities (and associated consortia of institutions) were selected through a competitive Request for Proposal process and funded through a 5-year cooperative agreement (hereafter referred to as “Host Agreement, or HA”) awarded by the USGS. Two cycles of this funding have been provided since 2010. This review covers Cycle II.

Each Host-University proposed to implement administrative management tasks and a range of activities aligned with the CASC mission, which were accepted and agreed upon in a Hosting Agreement with USGS. These tasks and activities were a central focus of the External Review model.

“The mission of the Climate Adaptation Science Centers (CASCs) is to deliver science to help fish, wildlife, water, land, and people adapt to a changing climate. We work directly with land managers and other partners to create research and tools that can be applied directly to adaptation decisions. Our network is comprised of nine regional CASCs and one National CASC.

The National and Regional CASCs conduct research to provide resource managers, native communities, and other partners with the scientific information and decision-making tools they need to understand and adapt to the effects of climate change on fish, wildlife, water, land, and

people. CASCs collaborate with managers, scientists, and tribal organizations both inside and outside the government to address science needs and inform adaptation planning.

The CASC network places emphasis on generating actionable science, information and products that address identified science needs and are directly usable in supporting resource management decisions, actions, and plans. Development of actionable science requires scientists to work iteratively with the intended end users of the scientific product, such as resource managers and native communities”. [USGS CASC About Us Website](#)

The 5-Year External Review of USGS RCASC Host Universities and their associated consortia is designed to gain information and insights from expert external reviewers about the activities and effectiveness of each RCASC Host-University, and to inform decisions about USGS’s future development and administration of Host-University partnerships. This report and external review relate to the **South Central CASC** and the Host Agreement with the **University of Oklahoma** (OU or Host) and its associated Consortium of regional institutions for Cycle II funding. Additional information about the purpose, value, and record of CASC external reviews can be found [here](#).

About the Review Process

The external review of RCASC Host-Universities is designed to gain information and insights from external reviewers about the activities and effectiveness of each RCASC Host-University, and to inform decisions about USGS's future development and administration of Host-University partnerships.

Donna Silverberg Consulting ([DS Consulting](#)) is the External Review Manager selected by the NCASC through an open solicitation to design, coordinate, and conduct the structural and operational review component of the external reviews for all eight RCASC Host-Universities, including report writing with and on behalf of the External Review Team (ERT). The 2024 DS Consulting team consists of:

Donna Silverberg, JD (Principal and External Review Team Lead, Facilitator, & Manager)
Tina Patterson, MA Dispute Resolution, MCI Arb, CF APMP, CICM (Project Advisor and ERT Facilitation Support)
Nancy Pionk, JD (ERT Facilitation Support)
Emily Stranz, MA Conflict Resolution (ERT Facilitation Support)
Colby Mills, BA Anthropology (Logistics and ERT Facilitation Support)
Charles Wiggins, JD, LLM (Final Report Editor)

Purpose of the Review

1. **Assess the competencies, efficiencies, challenges, and areas for improvement** of each RCASC Host-University in managing the administrative requirements and terms and conditions of the corresponding Host agreement;
2. **Assess the contribution** by each RCASC Host-University and associated 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;
 - c. Education and Training of early career professionals; and
 - d. Outreach and Communication services;
3. **Review the effectiveness** of each RCASC Host-University and associated consortium in meeting the goals established under their current Host agreements;
4. **Aid** the NCASC in developing improved requirements for re-competition of the next university Host agreements. (*USGS agreement with DS Consulting*)

External Review Model Framework:

1. What was the Host's proposed approach described in their Proposal Narrative (PN)?
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

The SC CASC ERT was asked to focus on specific categories stemming from the Host's Proposal Narrative. These categories and the dates devoted to their discussion follows:

	March 4 2024	March 5 2024	March 6 2024	March 7 2024	March 8 2024
Topic	Institutional Development Outreach & Communications	Fiscal Management Scientific Achievements	Scientific Achievements Collaborative Efforts	Collaborative Efforts Capacity Building	90-Min ERT-Only Debrief Session

Daily summaries of the ERT Sessions and a listing of session attendees may be found in Appendix 1 & 2.

External Review Team

Review team composition:

ERT members were nominated by USGS administrators and then selected by the External Review Manager based on the following criteria, with a goal of having an ERT that had varying degrees 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).

SC CASC ERT Members included:

- **Dr. Karen Jenni**, Senior Science Advisor, Energy and Mineral Resources Mission Area, USGS
- **Dr. Victoria Keener**, Research Professor. ASU Global Institute of Sustainability & Innovation, Senior Fellow East-West Center, Co-Lead PI, Pacific RISA
- **Dr. Christine Kirchhoff**, Associate Director, Law, Policy & Engineering, Associate Professor, Penn State University
- **Dr. Meredith Muth**, National Program Manager and Regional Drought Information Coordinator, NOAA National Integrated Drought Information System (NIDIS)
- **Dr. Greg Pederson**, Research Scientist, USGS Northern Rocky Mountain Science Center, Adjunct Faculty at Montana State University
- **Dr. Caiti Steele**, Associate Director for Science, USDA SW Climate Hub, and College Associate Professor, New Mexico State University.

All ERT members signed Conflict of Interest and Non-Disclosure agreement forms prior to participating in the review. These forms are maintained by the External Review Manager.

Host University Background

The SC CASC Host and Consortium include the following institutions:

- **University of Oklahoma (OU)** Principal Investigators (PI)s, who are climate scientists and educators, collectively focus on climate variability and change at multiple scales, downscaling climate projections, climate literacy, the intersection of public policy and climate extremes, the global carbon cycle using remote sensing, physical geography, and stakeholder decision-making/engagement. OU is an R1 university, a term used by the Carnegie Foundation to categorize doctoral granting universities with the highest performance in key areas associated with Research and Development.
- **Texas Tech University (TTU)** adds strength in soil health, biogeochemistry, drylands ecology, biodiversity, conservation, groundwater and surface water modeling, aquatic ecosystems, climate modeling, and stakeholder decision-making/engagement.
- **The Chickasaw Nation** adds expertise in business sustainability, environmental health and safety, water planning, Tribal sovereignty, leadership, governance, engagement and partnerships, as well as environmental resource management, and data and science knowledge in adaptation efforts.
- **The Choctaw Nation of Oklahoma** adds expertise in subsurface mapping, best management practices for watershed sustainability, Tribal sovereignty through natural resource monitoring and management, Tribal governance and partnerships, and water planning.
- **Louisiana State University (LSU)** provides expertise in paleoclimate, coastal paleoecology, coastal/wetland/estuary ecosystems, coastal geomorphology and biochemistry, vulnerability, and sustainability.
- **Oklahoma State University (OSU)** adds expertise in conservation, natural resource management, rangeland ecology, wildlife biology, forestry, fisheries, and hydrology.
- **University of New Mexico (UNM)** adds expertise in hydroclimatology, hydrology, Indigenous planning, climate adaptation in rural and Native communities, and stakeholder decision-making/engagement.

Mission statement:

“Established in 2012, the South Central Climate Adaptation Science Center (SC CASC) provides decision makers with the science, tools, and information they need to address the impacts of climate variability and change on their areas of responsibility. The Center will transform how climate science is conducted and applied in the south-central United States. We support big thinking, including multi-institutional and stakeholder-driven approaches to assessing the impact of climate extremes on natural and cultural resources.” ([SC CASC website](#))

Key Goals, Expectations, and Deliverables:

As noted in the Host’s Proposal Narrative:

“Responsible stewardship of natural resources relies on observations, monitoring, modeling, and understanding the physical, biological, and social processes that govern the behavior of systems and their responses to stressors and management strategies. Our team

conducts science that helps fish, wildlife, ecosystems, and the communities they support adapt to climate change. Shaped by discussions with stakeholders, we identify six priority science themes aligned with the South Central CASC Science Agenda and priorities identified by NCASC or the National Academies:

- Toward Sustainable & Usable Water Resources.
- Toward Resilient Coastal Ecosystems along the Northern Gulf of Mexico.
- Toward Enhancing the Resilience of Indigenous, Rural, & Vulnerable Communities.
- Toward Stakeholder Understanding of Product Sensitivities & Uncertainties.
- Toward Mapping & Predicting Changes in Species Distributions.
- Toward Understanding Teleconnections that Influence Ecosystem Resilience”.

Findings of the ERT – Administrative Management

	Institutional Development <i>Staffing, Leadership Team, and Consortium Members</i>		Fiscal Management <i>Budget, awards, and grant management</i>
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The ERT finds that the host institution appears to have managed the administrative requirements of the Host Agreement (HA) very well, with a small group of NCASC-funded support staff.

ERT members find notable how the Host and Consortium have utilized a small amount of base funding support to leverage funding from other sources (e.g. National Science Foundation (NSF) and the Environmental Protection Agency (EPA)), and spur investment from Tribal Nations and the Bureau of Indian Affairs (BIA). In addition, the Host worked with the USGS-arm of the CASC to integrate input from a USGS-formed Science Advisory Committee (SAC) in actionable science efforts important to managers. Several ERT members also found notable how the Host University used its own funding to work with the U.S. Congress to gain network-wide funding increases during a time when research funding across the USGS had been declining. In addition, they worked with Congressional staff to inform the development of the CASC Act, which, if enacted, would authorize the NCASC in law and provide future stability for addressing the needs of natural and cultural resource managers.

Administration and Management

The ERT finds that, while the Host University has and has been encouraged to interpret their HA narrowly, the Host manages the administrative agreements well within the university fiscal system with limited financial and human resources. OU has been changing its administrative and fiscal systems over the last few years, which has added additional administrative hurdles to the host OU leadership.

The ERT learned that the USGS cooperative agreement is considered to be one of the most administratively demanding awards that many of the Consortium PIs have encountered. Combined with the OU systems, this has created an administrative burden on the Host that they seem to be handling with strong support from the OU fiscal office. The ERT also heard that OU's fiscal office and systems appear to be effective at managing and administering funds under the agreement and providing support to the partner-universities engaged in the Consortium.

The ERT finds that, based on the information presented, OU has competent personnel and effective and efficient administrative operations to manage the SC CASC host agreement. The administrative team understands the USGS funding and grant management process and, over the past ten years of work with USGS/NCASC, have developed a solid program to support the administration of grants and awards.

Leadership & Management Approach and Challenges:

The ERT finds that OU and the Consortium, with over a decade of stability as the Host Institution for the SC CASC, has developed deep and expansive partnerships throughout the region, and are clearly making significant strides in name recognition despite the relatively small budget and staff.

OU Leadership (e.g., the Provost, Dean, and others) appears to strongly support serving as the Host as demonstrated by their willingness to provide significant cost-share and real estate in shared office/facilities space that brings together USGS, the Host's main office, and the Chickasaw Nation. The University's support of the SC CASC University Director to educate the U.S. Congress on behalf of the broader CASC program is seen as an additional demonstration of the Host's support of the CASC program.

ERT members noted that the Consortium comes across as a strong and communicative collaboration. The strength of the Consortium and its structure stems from each of the members having their own partners so that the weight of maintaining a diverse network is shared across the Consortium. The ERT heard that the Consortium (in collaboration with Exaptive, a private company based in Oklahoma City) has started to develop a Network Analysis to document and visually display their network of networks and explore new linkages among academics, researchers, and partners for future efforts. Consortium members spoke of appreciation for the Host and its administrators, noting that the funding for all Consortium members is managed through the Host and serves as part of the "glue" that holds the Consortium together. Some Consortium members specifically mentioned appreciation of the Host's role, noting that it frees up their time to focus on science advancements. Importantly, ERT members heard the Host and Consortium members say that the relatively small amount of funding and staff supported by the HA was absolutely critical to the success of the CASC, calling it "a small, but stable baseload of support" that enables them to leverage additional funds from other sources to do similar climate science work.

Administrative Fiscal Management:

The ERT finds that the Host excels in knowing how to navigate internal (OU), partner-university, and collaborating Tribal Nations' (including BIA) different fiscal management systems. The Host appears to distribute resources effectively amongst project PIs and manages issues related to uncertain federal decisions and budgets, though these aspects lead to personnel stress and inefficiencies. Part of the Host's efficiencies involve a large amount of in-kind project leveraging using university funding and funding from other agencies. The ERT notes that they have done this incredibly well, which has substantially built upon USGS' investment in base funding.

The Host also demonstrated competencies regarding investing in the next generation of scientists, by providing direct climate research opportunities and increasing their exposure to a broad range of partners, individuals, and regional climate research efforts. Notably, many of the Host team members have been brought into and up through the Host university, showing the

actual investment in the next generation of climate and other scientists by including them on the Host's team.

The ERT heard and notes administrative and fiscal challenges included in the 5-year host agreement period: the Host expressed that the limited time frame of the agreement, augmented with annual funds, was highly limiting considering the nature of actionable scientific work, and co-production with stakeholders tends to be a very dynamic, long-term effort in partnership building. Also challenging was the way in which graduate student support funds were allocated on short-term intervals.

One ERT member said,

“What stands out to me was the collective concern about the growth of the administrative requirements. It was clear the Host is at an inflection point now where the administrative burden is equal to, or outstripping, the perceived value of the allocated funding. If the direction of this relationship is not changed, the USGS may find it hard to maintain a stable host university, director, and administrative support staff [at OU]”.

The ERT finds that the Host is managing the administrative and fiscal requirements of their HA with USGS well. The ERT finds that the Host has a solid administrative infrastructure, the pre- and post-award administrators are knowledgeable, and the CASC has had access to administrative leadership and support during transitions at USGS, including the absence of a permanent USGS Regional Administrator.

Administrative Competencies

The ERT finds that the Host has access to a substantial amount of expertise in pre- and post-award administration by virtue of being administratively housed in an R-1 university. The Host has a focused financial and administrative team with experience working on federal cooperative agreements, awards, and contracts.

Other competencies the ERT noted are:

- Great at leveraging very limited assets with a very small full-time (FT) staff to generate larger federal research funds from NSF, the National Aeronautics and Space Administration (NASA), etc. to accomplish the USGS CASC mission;
- An internal multi-institutional coordination call held bi-weekly, with an agenda and summary notes that support collective cohesion;
- Strong institutional network support in a region that can be difficult to engage in climate science and adaptation;
- A promising new permanent USGS Regional Administrator who is committed to building the relationship with and effectiveness of the Host;
- Eagerness to try new programs and strategies to increase effectiveness and reach;
- Financial administrator appears highly competent and detail-oriented;
- Proactive budget management by a fiscal team focused on what's ahead;

- The Host appears effective at allocating money to a diversity of partner institutions and Tribes despite different fiscal management systems.
- The presence of the same, respected CASC University Director (Dr. Renee McPherson) has provided the program a high level of continuity throughout the past decade.

Administrative Efficiencies

The ERT finds the Host's fiscal management to be efficient and effective, including:

- Working within the confines of the HA to generate and leverage additional funds to support Indigenous-led climate adaptation science and practice;
- A committed set of academic partner institutions that understand the CASC;
- Coordination with / working through OU research financial services systems to reduce burden on the Host's financial administrator;
- Active monitoring of spending by university supported PIs and projects, and proactive work on necessary extensions, etc.;
- Ability to recognize and develop "intangible" benefits as the Host, including building up early career scholars with interests in applied and interdisciplinary adaptation work;
- The CASC and Host recognize the diversity of end-user needs and capacity to engage. This allows the CASC to meet the user 'where they are' in terms of the capacity to engage and allows the CASC to better target their engagement efforts;
- A few other notable efficiencies by the host institution were deliberate efforts to build on previous research rather than keeping research efforts as a one-off effort, and investing in a full-time Tribal Liaison position that has since become a model for other agencies and CASCs.

Administrative Challenges

The ERT noted the following challenges:

- The COVID-19 pandemic occurred during this grant cycle, which created delays, cancellations, and inefficiencies at all levels across the university consortium and the USGS. Despite these challenges, the Host nimbly adapted the program.
- A growing university (and possibly USGS) administrative burden for a relatively minor level of USGS base funding;
 - Dual high administrative burden from USGS and OU reduces time for research;
- Lack of a permanent USGS regional administrator (until very recently) and a thin USGS staffing profile made it difficult to get timely administrative requests approved;
- Restrictive interpretation of fundable "science" under the CASC HA;
- Adjusting to / accommodating changes in OU systems and policies:
 - Increases burden on CASC
 - Increases burden on researchers
- Time needed to centrally manage all subawards to Consortium members from Host;
- Award set-up delays, especially for federally funded projects;
- Shifting NCASC and federal administration priorities on timelines inconsistent with adhering to topics outlined in the HA;

- Despite being one of the smaller regions in terms of number of states, this CASC is covering a diverse socio-economic population, diverse climate phenomena and impacts, and a generally low acceptance of anthropogenic driven climate change. The latter point is a particular challenge for a program with the word ‘climate’ in its name, and requires additional education and sensitivities when engaging partners that the Host seems to manage very well;
- Co-production of actionable climate science is very time-consuming, from start to finish; since neither regional users, stakeholders, nor CASC researchers are funded to do additional implementation work beyond the research project, making the leap to actionable science is often a challenge. And, publications that focus on the engagement/coproduction components are secondary to the fundamental science advancements, which hampers broader learning opportunities and advancement of coproduction theory and practice;
- Demonstrating the value of many HA responsibilities is challenging as so many of the projects are built on relationship building that happens over time, or it is difficult to clearly identify the impact of some Host efforts that have less tangible deliverables (e.g. communication, mentoring).

Opportunities for Improvement

While challenges hampered continuous progress, the ERT finds that Host, Host Consortium, and USGS have begun to overcome a variety of administrative challenges that will be supported by developing and maintaining productive working relationships with the new USGS Regional Administrator and working to streamline administrative challenges at the Host University.

The ERT suggests considering the following administrative opportunities to strengthen the longevity of the SC CASC:

- Clarify expectations of project coordinators (the Host mentioned that there are communication challenges that could be assisted by this);
- Determine how USGS can more equally share administrative burdens stemming from limited human and financial capacity;
 - Reduce administrative burdens and reporting requirements from both the USGS and the host institution.
 - Recognize the implications of pay disparities between USGS and university staff and work to minimize their potential to negatively affect USGS - Academic collaborations.
- At the leadership/administrative level: assist with integration of specific climate-adaptation related research projects not just amongst Consortium members, but also for resource manager partners and students;
- At the leadership/administrative level: assure that the emphasis on the ‘actionable’ component of climate adaptation science is included in all stories/reports/presentations

from the Consortium PIs, postdoctoral fellows, and their students (see Scientific Achievements section below);

- Actively integrate expertise from social science PIs into the research methods used, communications strategy, and program-wide strategy of the CASC team. These currently appear to be disconnected from each other: integrate research projects, outreach, communication, and collaboration so all four are working together and informing each other as they move towards one clear goal. Utilize this approach for telling the story of CASC impacts.

RECOMMENDATIONS: Administrative

As noted above, the ERT finds that the Host has a solid institutional structure in place to support the SC CASC and develop the future workforce in all aspects of the Host's endeavors.

The ERT offers the following recommendations as areas that could continue to strengthen the Host's administrative capabilities:

- 1) **Prioritize the Host program to support more in-depth work** with the amount of funds you receive from NCASC/USGS, even if that requires a narrower scope of focus.
 - a. Focus on fewer topics to build a unique Center and more clearly identify the value it is adding in the region.
 - i. The focused work with Tribal Nations, Tribal colleges, and intertribal organizations is exemplary and could be highlighted even more.
 - ii. The focused scholarship efforts are also noteworthy, including the exceptional engagement, empowerment/shared governance structure, coproduced research, and advancement of fundamental and applied research.
- 2) **Put the Network Analysis to work** as a potentially valuable tool to understand how your research is utilized, to help prioritize partnerships, including new ones, and to tell your story more clearly.
 - a. The Network Analysis was briefly introduced as a recent internal research effort. The Host Director acknowledged plans to better analyze and utilize this work; the ERT encourages assessing the worthiness of this effort and, if appropriate, using this information as an internal and external guide for the Host and Consortium moving forward together.

Findings of the ERT – Outreach and Communications



Outreach & Communications

Manage and transfer information and data related to research activities

The ERT notes that the Host University seems to be taking a broad-brush approach of communicating climate science and related research internally and externally through the traditional and modern platforms (e.g. fact sheets, Twitter/X, websites, press releases) and in-person outreach via booths at public facing events. While there may be a process to target this information based upon stakeholder requests, the science advisory groups, or funded university research efforts, the ERT found this aspect of the communications program to be unclear in the presentation. The ERT recognizes that there is only one FT person on the HA in place to support CASC communications. ***The ERT finds that more attention is needed to effectively communicate the general, CASC-wide story and specific climate adaptation science successes to external audiences, including program reviewers. The ERT suggests providing professional development opportunities for the Science Translator and Communications’ Specialist focused on communicating about actionable climate adaptation science.***

The ERT finds the Host’s Tribal outreach and communication efforts to be an area of excellence and strength for the communications teams. The products created are broadly applicable across the CASC network (and for anyone seeking to work with Tribes), and the communications team should be recognized for this major contribution. ‘Shifting Landscapes: A Guide to Developing Academic and Research Relationships in Oklahoma Indian Country’, (2020) was a remarkably helpful tool to catalyze conversations and relationships between Tribes and CASC researchers, and it should be both applauded and shared widely. The Host should continue investing effort and time on these important Tribal engagement products in the future.

Though general climate science communication is both difficult and certainly needed, the ERT urges the Host to put further effort into helping CASC-funded researchers communicate climate adaptation science products and co-production methods with stakeholders from the start of the work (including the first discussions with decision maker(s) for whom the research will be done) and throughout the entire research process, including the implementation stage. The communication planning questionnaire, in development from NCASC and the regional Communications teams, may be a step in the right direction. (However, ERT members note it is quite long and more paperwork in an already paperwork-burdened proposal and reporting process. There also was concern about whether the Host has time to follow-up with researchers to ensure that the questionnaire content is utilized). ERT members think more intentional communication and engagement throughout the research process is needed to see and understand the application and impact of all the research being done with and for stakeholder groups. ERT members note that research scientists are tasked with describing the importance

and application of their research; the same should be true for CASC-wide science communication efforts.

The ERT finds that the Communities of Practice (CoP) model, established by the host in 2020, is a substantive project that has produced both research, collaboration, and communication outputs in this award cycle (<https://southcentralclimate.org/science/communities-of-practice>).

Led by Consortium staff, postdocs, and other personnel and linked to the six science priorities of the CASC, products from the different CoPs include funded proposals, synthesis papers, webinar series, and research that is intended to eventually lead directly to adaptation guidelines for managers. The CoPs appear to be a productive model for leveraging different kinds of products and activities under the HA. They also aid capacity building (see below section) through networking and knowledge exchange.

The ERT heard that communication about the climate adaptation science being done by the Consortium falls mainly on the Consortium partners; much of that was not presented for the ERT review. There did not appear to be any formal processes or structure for SC CASC external communications, and some of what the ERT heard concerned them. The ERT notes that the Host is not tracking the effectiveness of their external communications beyond page hits, and a key part of the external story they use to tell via ArcGIS has been disabled due to changes at the Environmental Systems Research Institute (ESRI) and has not been brought back.

Communication Challenges

The Host was upfront about a number of challenges in outreach and communications, from a specific institutional challenge such as different computer systems used by different Consortium partners, to a broader challenge of talking about climate science and adaptation to a public audience that does not accept that climate change is happening. The ERT noted the following challenges the Host also faces:

- Limited human and financial resources;
- ArcGIS discontinued the template the Host was using for their project Storymap and they have not had the staff/time to update this;
- A lack of integrated thinking and communication about SC CASC-wide opportunities and strategy;
- Some of the website has been updated, some of the website is quite out of date.
- Consortium members' websites are variable; some do not mention the CASC or the work they are doing for the CASC as Consortium members, which is a disservice to the broader SC CASC.

The factor ERT members see as most limiting the Host and associated academic Consortium on Outreach and Communication is that there does not appear to be a strategy on how to focus limited resources, in particular staff time around external communications and especially around engagement with partners. ERT members expressed that the presentation focused on Partnerships during the review came across as ad-hoc; instead, ERT members suggest that

telling a clear story of partnerships around a few common science themes or thematic areas in order to show the impact of the outreach and partnerships might be more compelling.

Mitigation Strategies to overcome these challenges

The ERT notes that the Host and Consortium sought to overcome these challenges by:

- Leveraging a part-time student to help the HA full-time Communications Specialist;
- Engaging with a cross-CASC communications team;
- Holding cross-Consortium coordination meetings to increase internal strategy;
- Utilizing CoPs as a clear communication and outreach tool and method;
- Attending and leading many public-facing events;
- Adapting communication styles to specific audiences; and
- Developing a protocol to connect better with CASC-funded researchers early in the process to understand their science communication needs.

Despite the barriers and limitations of the SC CASC for outreach and communication, the ERT heard that the Host seems to be transitioning to a more thoughtful, deliberate, and proactive approach for communication. They have pivoted where needed in terms of their communication efforts. They have targeted gaps and are working to address them, and the ERT encourages them to continue this effort.

Some promising examples ERT members noted:

- They identified issues related to internal communications and targeted efforts to improve the efficiencies, awareness, and utilization of collaboration across the SC CASC Consortium. The added value of these internal communications in providing mentorship across the Consortium is a bonus.
- They are now meeting with researchers at the beginning of their research process to more efficiently improve communication support, and are providing tailored science communication training for researchers. This has proven to be a great way to ‘teach the teacher’, so that the burden of communication does not fall on just the Host. In addition, they are building a community of science communicators.
- Regarding the challenge of talking about climate change in this region, Texas Tech University spoke about successes they have had approaching the issue with landowners (although ERT members were surprised that there was so much emphasis on managed croplands, as it seems to align more with USDA Climate Hub mission versus USGS CASC mission).
- Finally, the Host clearly recognizes that communication with Tribes starts with relationship-building and respectfully maintaining those relationships, and that Tribal communication and outreach must be handled individually and with care. The Host is planning to leverage the recent Tribal Engagement Program review to inform future communication approaches.

The ERT finds that internal communications are relatively strong, as are some of the Consortium-member led external outreach activities. The internal communications and activities (some of which might be considered “institutional development” and some of which was presented under “partnerships”) seem very strong and useful in solidifying the Consortium.

The ERT finds that a thorough, thoughtful evaluation of existing communication and outreach channels may lead to more focused implementation with notable impacts. This could include utilizing partners more effectively to cross-share and leverage their communication networks, and vice versa. In addition, for future reviews, the ERT suggests that internal communications may fit better under the ‘administration’ roles and responsibilities rather than ‘communications’ as it is a core structural component in the Consortium, key to keeping the CASC mission consistent across Consortium partners.

Finally, the ERT also notes and appreciates that, while few example outreach products were provided, the Host and the Consortium leads all spoke about the challenges of communicating climate change and climate adaptation in this region where the socio-political environment and beliefs lean against recognizing these as issues. The CASC communications tend to be more focused on adaptations as best management practices, rather than climate adaptations. ***The ERT finds that this focus seems appropriate and useful in the region.***

RECOMMENDATIONS: Outreach and Communications

- **Conduct a thorough, thoughtful evaluation of existing communication and outreach to develop a focused communication and outreach implementation strategy.**
 - a. Improve outward-facing communications by telling your story around a few focused themes that highlight the impacts of the Host and CASCs efforts.
 - *Shifting Landscapes: A Guide to Developing Academic and Research Relationships in Oklahoma Indian Country*, (2020) is an exemplary outreach, communication, and capacity building product; mirror it in other key areas.
 - b. Consider adding different types of ‘meaningful outcome’ metrics to your communications that demonstrate transformative changes in climate adaptation science in the region.
 - Examples could be policies or plans in which CASC documents or PIs are cited, or numbers of graduate students who have gone to and stayed in public service like water management, local government, or conservation.
 - c. Consider (or continue) reaching out to communications personnel in other institutions, CASCs, Climate Hubs, NIDIS, CAPs to learn about and share best practice in communications, and leverage each other’s communication efforts where appropriate.

- **Bolster your communication and outreach strategy** by focusing your limited resources, staff time in particular, around external communications and especially around climate adaptation engagement with partners.
 - a. More clearly link the work of your team and CoPs to all your key areas of focus so you and others can see the big picture and impacts of your efforts.
 - b. Connect the dots to the actions being done in communication and outreach with the science you are producing (i.e., show the actionable and co-produced work better).
 - c. Educate all Consortium members in telling a good story. The science communication “And, But, Therefore” Framework would be useful for creating compelling narrative, if not already in use. See <https://www.laseagrant.org/wp-content/uploads/LaDIA-Katrina-blog-AC.pdf>
- **Demonstrate actionable climate adaptation science in all you communicate, showing consistency with the approach you use throughout your materials.**
 - a. In future reviews, ensure that students and partners address the process they used to manage their **actionable climate adaptation science** work, without being prompted by external reviewers.
 - How was the engagement begun?
 - With and for whom?
 - For what desired outcome or information?
 - How did they do the work and deliver the final results or product?
 - b. Ensure that external communications are communicating how the science is being used. Much of what is reported on the website (even under resources for managers) is in the format of “this is what we are going to do” or “this is what we did”.
 - For example, a useful resource for managers would emphasize how they can take CASC science and use it to reduce vulnerability in the systems they are managing.
 - A useful resource for review teams and funders is clarity about what difference your science has made.
 - c. Monitor, document and communicate more of the **impact** of your climate adaptation science, using narrative descriptions, if other metrics are not available.
- **Get your good work seen and known by a broader public more regularly.**
 - a. If finances are an issue, consider partnering with USGS scientists and USGS-funded SC CASC projects to help disseminate products and outputs.
- **Update your Strategic Communications Management Plan**
 - a. Add additional questions under Audience:
 - “Has your audience been involved in developing your research questions?”
 - If so, “What communications products has your audience asked for?” and in what format?

Findings of the ERT – Scientific Achievements

	Scientific Achievements <i>Scientific Achievements on climate impacts, vulnerability, and adaptation science</i>
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The ERT finds that the Host has been successful in developing a climate science program supported by the Host University which is informed, in part, by their outreach and education program and is directed by their science advisory group and partner Tribal organizations. However, the ERT remains concerned that the review did not adequately demonstrate the link from the climate science to actionable science and the adaptation responses.

The ERT heard that the Host contributes to climate adaptation science in a variety of ways through its role as the coordinating university and CASC host institution. The ERT also heard that scientific directions emerge from feedback gathered at climate change workshops, within CASC supported communities of practice, and from direct input from state, federal, and Tribal resource managers. Questions about the role of managing species, water resources and croplands with increasing flooding, drought, and heat stress appear of central concern. CASC-related science work funded by the USGS through annual calls for proposals, as well as the Host “leveraged” funds that are managed by SC CASC but provided by other agencies, appear to include some actionable science development in each of the science priority areas identified in the host agreement and proposal. However, the ERT was not provided with enough information to comment on what is and is not working well.

The ERT notes that the Host chose to present to the ERT relatively small projects as examples of their scientific achievements that the Host considered to be supported by the HA. While these projects illustrated strong climate science research, consideration of adaptation and of the actionability of the science produced were not considered directly in the research design or communicated when the science was summarized for the ERT. In addition, the presentations given by the graduate students and postdocs did not clearly address the ‘actionability’ focus, which is central to the NCASC and CASC mission. Here the ERT is referring to “actionable science” as described by the NASC program (page 2, Purpose of the Review) to mean information and products that address identified science needs and are directly usable in supporting resource management decisions, actions, and plans, and did not hear a clear connection between the work being done and the applicability and use of that science by decision-makers, without prompts from the ERT.

As such, ERT members noted from the presentations and materials, that funding graduate students and postdoctoral fellows to do the scientific work appears to be the primary method of accomplishing scientific objectives under the HA. The ERT notes that this is fantastic for capacity building, early career development, and focused research efforts; however, ERT members also thought that the ability of student and postdoc fellows to progress a scientific product or dataset to the application stage may be limited due by a lack of strong relationships

with stakeholders related to students' temporary employment. The strong stakeholder relationships, and the additional work needed to apply scientific products and datasets to management problems, usually required a Consortium PI or USGS scientist who managed the long-term relationships and drove the final product production. Except for a handful of water-focused and agricultural no-till soil conservation projects, it was unclear to ERT members exactly how research results and datasets are supporting management decisions and policies. ***The ERT finds the Host should put effort into developing and reporting on climate adaptation science applications and focus more directly on actionable science.***

The ERT commends the Host's climate adaptation science contributions in the following areas:

- They are making a space to say the word "climate" in the region. Doing this, and opening additional doors and collaborations to do any sort of climate adaptation, seems to be a large achievement in this political climate and region.
- Successfully engaging with Indigenous communities to co-produce actionable, innovative climate adaptation science and on-the-ground restoration of climate affected species.
- The CoPs are a positive framework by which the Consortium is advancing climate science through collaboration and synthesis. These initiatives may produce more adaptation science in the long-term as they are in initial/varying stages of determining their roles.
- The major Consortium contribution to climate adaptation science may be their (as self-described) success statements regarding more intangible items: training future climate adaptation professionals and educating the public, resource managers, and Tribal Nations. There was ample positive feedback and program assessment that supported this assertion.
- Leading and publishing a regional chapter in the 5th National Climate Assessment, and including the next generation of climate scientists in the project.

The ERT finds the history of having OU serve as the SC CASC Host university is resulting in a high level of Center cohesion and cross-disciplinary climate scientific collaboration that has taken years to establish and would take time to recreate. The ERT specifically applauds the Host's work with Tribes. The ERT saw notable patterns emerge in Cycle II, including a strong focus on building Tribal relationships and guidance for others who wish to do the same.

What factors limited the Host's scientific achievement results?

- The COVID-19 pandemic significantly limited travel, face-to-face efforts, and funding progress at the SC CASC and at institutions across the globe. This challenge should not be forgotten.
- Changes in key personnel across the Consortium limited progress in some cases, or changed key deliverables from research to synthesis products.
 - Staff turnover, web site redesign, loss of the Storymap, and a challenging social / political environment all limited results in this area.

- The ERT heard a clear message from the Host that the HA itself is not sufficient to directly support climate adaptation science. As such, scientific achievements by the SC CASC are primarily through work funded either through the USGS in response to annual calls for proposals or through other funding mechanisms.
 - Focusing only on the HA funded projects during this review underrepresented the full breadth of the SC CASC in scientific advancement. It also did not bring in the other Host activities that are directly and indirectly linked to scientific achievements (capacity building, collaborative efforts, communications, etc.) leveraged off of the HA.
- A lack of meaningful integration of projects and partners across the Consortium (i.e., integrating climate adaptation research projects with collaboration and communication tracts).
- Lack of engagement with stakeholders on the front-end and throughout projects limited actionable adaptation science achievements.
- Funding levels reduced the capacity for stakeholders to engage in co-development of some projects. Consequently the impact of scientific results may have been less than the HA anticipated.
- Evaluating the effectiveness and impact of the science was recognized by all as a challenge. The SC CASC identified this as an area they are thinking about, while also recognizing that resources are not currently available to conduct a full evaluation of the program and its components.
- A lack of demonstrated integration of social science, social scientists, and social science methods on climate adaptation science research projects may have limited actionable scientific achievements and co-development.

What factors mitigated these challenges? (i.e., what did they do instead?):

- The general shift of the Host to focus more on capacity-building, workforce development, and equity issues recognizes that these are essential, but often missing pieces in the actionable climate science landscape that are not easily supported in some of the larger funding bodies (e.g., NASA).
 - This is indeed a unique value of the CASC that could be much more visible.
- For future mitigation by NCASC, the Host and ERT discussed whether any research should be funded directly under the HA; this was specifically in the context of how to best to utilize the Host's unique location, role, and institutional strengths to focus on capacity building, workforce development, education, communication, and research integration across the Consortium.
 - The ERT supports this recommendation, but only if it is still directly linked to informing and being informed by the actionable Tribal and DOI focused climate adaptation science research being undertaken by Consortium members.
- The ERT thought the CoP framework seemed to be a creative and effective way to increase engagement along different research priorities, guide product development,

leverage support from the Host institution, and provide a flexible strategy to handle personnel changes in the Consortium.

- It would have been useful to hear more details, perhaps focusing on one CoP, and the role it plays in advancing and connecting to a specific theme or actionable climate science (rather than focusing on outputs such as fact sheets).

The ERT finds that the Host-funded research projects and recent publications indicate high-value climate-related science for water resources, species, and coastal/marine ecosystems is being conducted and published by the Host and Consortium institutions. Their leadership in writing the Southern Great Plains chapter of the National Climate Assessment was a major contribution to national-level policy making and understanding of the risks and impacts of a changing climate. As noted above, it is unclear to ERT members exactly how, for whom, for what, and where individual Consortium/university PI-lead research and data is being applied in a way that informs policy, management, or desired resource outcomes. This may be the next major area for growth and improvement in the next host agreement, and should be incorporated in the next review cycle.

RECOMMENDATIONS: Scientific Achievement

To build on what the Host has accomplished so far, the ERT suggests the Host and its team consider the following:

- 1) **Ensure the emphasis on both the adaptation and the ‘actionable’ component of climate adaptation science research projects is prominently included in all projects and in the stories/reports/presentations from the Host, Consortium and students.** In all areas, clarify:
 - a. For whom and how are projects begun?
 - b. For what intended purpose (policy development, management actions, or intended resource outcomes)? And, when possible,
 - c. What actual outcomes have been realized?
- 2) **Encourage (and, if necessary, train) project lead scientists to organize and facilitate the production of actionable climate adaptation science in the future.**
 - a. Increase your capacities to produce actionable science by adding scientists experienced in integrated research and boundary spanning to your team who can help to build your efforts, with an emphasis on the actionable portion of your portfolio.
 - b. Work with USGS to ensure that work is organized and well-coordinated among those who request the science, and scientists and students who work with decision-makers to produce practical and feasible climate adaptation solutions.

- 3) **Conduct an evaluation of your research portfolio in terms of production, impact, and actionability.**
 - a. Request additional funding to support this effort.
 - b. Encourage scientists to retain ties with stakeholders through the application phase after the initial research is completed. This often leads to new project development and a better understanding of how the research is being applied, and could also be an opportunity to share evaluation approaches with other regional CASCs.
- 4) **More effectively integrate Consortium social scientists and methods into research design and processes.** ERT members suggest including social scientists and specialists who can help to make information more accessible and meaningful to broader audiences, as well as crafting more inter- and transdisciplinary research projects.

Findings of the ERT – Collaborative Efforts

	Collaborative Efforts <i>Collaborate with stakeholders to develop and deliver adaptation products applicable to priority decision-making</i>
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The ERT finds that the Host and Consortium’s collaborative efforts is an area in which they have excelled. The suite of collaborative efforts engaged in by the SC CASC is impressive and fully supports the overall goals of the CASC. Many of the collaborative efforts appear to be driven and critically supported by the Host and HA (e.g., the revamped Affiliate Program, the Ideation sessions, and the regional and DOI partnerships discussed). Many of the “beyond DOI” partnerships appear to come from the Consortium member activities, including from USGS-funded research projects.

The collaborative Tribal Engagement Program is a critical program with key deliverables under the HA. The ERT finds the Tribal Engagement Program to be a standout project within the Consortium that not only is an example of how to do engagement within the SC CASC, but also can be used as a model for other CASCs and climate boundary organizations and research groups. They have thoughtfully created a meaningful and collaborative program, by leveraging resources to expand it across the region, by evaluating its effectiveness, and by creating resources to guide others to implement similar programs. This is an exemplary project demonstrating what a CASC can achieve with limited resources. While Tribal engagement was presented in this category, ERT members noted that the program intersects with several elements of the SC CASC. This unique level of engagement with Tribal entities contributes to the science achievements (e.g., the Indigenous science workshop), capacity building (both the youth-oriented workforce development and the support for Indigenous scholarship at the university level and beyond), and the outreach and communications goals (e.g., webinars and outreach).

The ERT finds the Host and Consortium’s contributions in the area of Collaborative Efforts take the following forms:

- The Consortium’s ‘network of networks’, a model created of all Consortium members combined networks, is one of the strongest assets of collaborative efforts toward actionable climate adaptation science. Each Consortium member supports its own collaborative efforts to support and build their own networks and stakeholders.
- The Host’s ‘spearheading’ of collaborative efforts, such as Ideation sessions (sessions where Consortium researchers and both Consortium and USGS staff are brought together to brainstorm new ideas and projects) builds on and connects these networks of networks. The Ideation sessions appear to be an innovative way to enhance new ideas and collaborations around specific climate adaptation science themes. More specifically, the outcomes directly contribute to the USGS annual project solicitations,

and have been shown to be a creative and effective way to build collaborations within the community (not just CASC-to-partner).

- The Host's Affiliate Program was showcased as a flagship collaborative effort led under the HA. An Affiliate of the SC CASC "is a person whose professional activity, including research or education, contributes to the goals and mission of the Center and who is actively engaging with the Center throughout the year" (see southcentralclimate.org/about-us/partners-stakeholders/). Changes were made to this Program based on experience, including more clarification on benefits and responsibilities of a member of the Program. It was not clear to the ERT whether time invested in creating and managing this program is worth the value in enhancing the Center's overall effectiveness.
- The evaluation of the Tribal Engagement Program is a model and method that could be used to evaluate and iteratively improve the SC CASC's actionable climate adaptation science as a whole program. This work would ideally be done before the next application for CASC Host and able to demonstrate effectiveness, iterative growth, and actionable science outcomes, all of which appear thin at this point.

The ERT noted a few factors which limited the process and results of the Host's collaborative efforts:

- The main limitation identified is the lack of staff time to dedicate to collaborative efforts beyond work with Tribes and Indigenous communities. The Consortium appeared to struggle with this work and lacked a strategy to link Consortium and stakeholder partners to specific science themes or actionable science.
- Real or perceived limitations on what the HA funding could support.
 - Limited funding and staff availability give the perception that building collaborations with stakeholders beyond Tribes and Indigenous communities is a lower priority than is obtaining science funding and doing science work.
- The presentations and discussion led ERT members to perceive that:
 - The original Affiliate Program was taking more effort than it was returning in benefit, with many inactive members.
 - Consortium members were finding it challenging to identify strong collaborative climate adaptation research ideas that were suitable to submit as research proposals.

The ERT finds that the Host overcame some of these challenges by revamping the Affiliate program and hosting Ideation sessions, which were responses to the last two challenges listed above – and were quite successful at addressing those limitations.

RECOMMENDATIONS: Collaborative Efforts

- 1) **Use the Tribal engagement and collaboration-building strategies SC CASC wide.** The Tribal Engagement Program (and evaluation) are superb. Glean as much as possible from this effort and apply it throughout all your climate adaptation science projects.
- 2) **Utilize the Network of Networks.** This, and more strategic engagement with regional partners to leverage capacity and networks, are opportunities for improvement in the area of actionable and co-produced climate adaptation science work.
- 3) **Grow collaborative efforts with care.** Good collaborative efforts take time, resources, and constant relationship building. The ERT recommends focusing with your Consortium members on key efforts that you all can support. The CASC will need to balance the regional needs you identify with the resources you have on hand to address them. Consider whether you would be better served to develop a few strong partnerships than many partnerships that are weak.

Findings of the ERT – Capacity Building

	Capacity Building <i>Educate and train to build capacity of early career professionals and others</i>
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The ERT finds that the Host and the academic Consortium have done an excellent job when it comes to capacity building; the Host’s Capacity Building activities are impressive. They have completed this aspect of the work on all fronts: through outreach to communities (such as agricultural and marine communities), Tribal Nations and organizations (through workshops and Tribal engagement), and students (through curriculum development and associated degree and certificate programs). Since 2019 they have conducted over 60 trainings and workshops.

What emerged from these efforts was an awareness of the continued need for climate adaptation capacity building at all levels in the region. The ERT heard that this includes building the next generation of future employees with a climate adaptation background, training of current employees on issues associated with climate change and the types of tools that can be applied in mitigating the effects of climate change, and mentoring students and practitioners whenever possible. The Host has captured the attention of a very large and receptive audience, and this attention has subsequently supported outreach and capacity building efforts.

Within the SC CASC’s definition of capacity building, they have pursued an impressively broad set of activities. Most of what they focus on under the umbrella of capacity building falls into the category of education and includes: support for students, post-docs, and early-career professionals; curriculum development of university Consortium members; education at all levels with the Tribal Consortium members; and online and other trainings that are made widely available.

Additional effective capacity building has been and is being supported by the SC CASC through their extensive Tribal Engagement Strategy (see: <https://pubs.usgs.gov/circ/1396/>) and associated activities. The capacity building happening through this avenue includes and goes far beyond student support and training delivery: this program builds Tribal capacity through workforce development, Native youth outreach, mentoring Native interns, and connecting Tribes to subject matter experts to help them understand specific issues and needs. Presentations about the Keepers of Turtle Island and the New Mexico Tribal Resilience Action Network stood out for ERT members, as did the intentional engagement of Native students to help develop new training materials, conduct research with Tribes, and deliver Tribal capacity building workshops. The Host implemented an excellent, formal evaluation of this program that is due to be published in the coming months.

The ERT finds that the formal evaluation of the Tribal Engagement activities is an outstanding example of critical evaluation of capacity building (and other) efforts. The evaluation could serve as a model for the Host’s overall program evaluation and for other CASCs. ERT members

also see Shifting Landscapes: A Guide to Developing Academic and Research Relationships in Oklahoma Indian Country, (2020) as a very valuable capacity building source and guide for numbers of academics, researchers, resource agencies, and managers, and urge the SC CASC to share this widely.

The Host Director mentioned that some of the specific educational focuses and efforts are driven by the passions of the individuals involved, within the constraints and bounds of the HA and the SC CASC mission. ERT members noted that this “internally driven” education agenda appears to be highly successful in also meeting stakeholder and student interest needs, based on the utilization of those educational resources. That said, ERT members recommend that the Host and Consortium make time to think strategically about how sustainable this approach is. Consider: if you lose an individual or a cohort of students whose interests drive the work, does the work stop and the fiscal and human investments get lost?

The ERT finds that, overall, the Host and Consortium are running a strong capacity building program. The Consortium is building capacity in many successful ways, including:

- Through their CoP initiatives;
- Engaging early-career researchers and graduate students in the language of actionable science and co-development of research;
- Tribal climate trainings and mentorship,
- Ecosystem-based, management-relevant trainings to provide practitioners with knowledge to introduce climate adaptation research and solutions into their work (e.g., training for grassland practitioners and others);
- Participating and including students in the NCA5 chapter development; and
- Developing online short courses for resource managers.

The ERT finds that the Host and Consortium have been very effective designing, implementing, and evaluating their capacity building and have contributed the following to the field:

- Capacity building activities were heavily supported by social science and participant testimony, all suggesting they were being very successful in this activity.
- They have helped to develop a large cadre of future professionals with a background in climate adaptation science, and helped current agencies and employees develop the skills they need to manage species and resources more effectively under changing climate conditions.
- They have contributed valuable Tribal climate adaptation guides/workbooks and university-level curriculum, including degree and certificate programs.

Challenges the ERT notes for the Host in this area:

- The requests coming for Capacity Building support are far greater than the capacity the SC CASC Host staff can provide, such as in developing one-off training for partners. It also was recognized that there are additional needs not being met, especially in overburdened communities. All of these limitations are due to funding and staffing availability.
 - ERT members expressed concern that the limited funding and staff availability relative to the demand for capacity building may lead to staff burnout.
- To some degree, the lack of a clear strategy for how and where to build capacity has led to an opportunistic approach – ERT members found this has been effective in building capacity, but perhaps less effective in advancing an overall vision for the SC CASC and may spread the CASC too thin given the few resources they have, possibly limiting success in other areas.
- COVID-19-related shutdowns made inter-institution collaborations more difficult and forced cancellations of some in-person activities, which were postponed to later in the year.

Factors the ERT saw that did or may mitigate these challenges:

- Partnerships, collaboration, and careful funds management have supported more extensive capacity building than the Host could support with CASC funding alone.
- The Host is able to leverage the other four university Consortium partners when requests for capacity building comes in. This wisely allows the Host staff to coordinate, rather than be responsible for all of the implementation.
- The opportunistic, passion-driven approach to capacity building has led to strong successes, especially with respect to support for minoritized students, staff, and communities.
- The Host and Consortium worked incredibly hard to meet as many of the requests as possible, and it sounded to the ERT as though they were able to address most or many of them with a high level of satisfaction from partners and attendees.

The ERT finds that the capacity building projects in the Consortium are among the most successful of their projects, being both innovative, effective, and reaching a large number of people.

RECOMMENDATIONS: Capacity Building

1. **Analyze and evaluate your Capacity Building efforts and impacts holistically** with program-wide evaluation metrics and indicators of change in adaptation practices and perception of climate change impacts regionally. Current evaluation metrics in this area are mostly through traditional means (number of registrants, number of courses, etc.) and would benefit from expansion to focus on impacts of capacity building efforts.

2. **Clarify which part of the Consortium contributes what to your capacity building efforts.** For future reviews, as part of your capacity building story, tell of the pieces that make the whole: What percentage of the many excellent examples falls on the Host versus a Consortium institution? For example, one question that remained in ERT members minds was: what role does the Host and/or others have in developing and implementing the 'Managing for Changing Climate' course?
3. **Once published, share your Tribal Engagement Evaluation with a broad audience** so others can learn from and employ the model you have developed.
4. **As a Consortium, be intentional with the approach you take with courses, trainings, and other capacity building efforts (including opportunities to 'practice' actionable climate adaptation science alongside researchers) to balance individual researcher/student passion-driven projects with actionable and sustainable projects.**
 - a. Recognize that this is a choice that potentially affects the work of the CASC, then be more intentional and strategic by explicitly weaving your approach into the fabric of the CASC.
 - i. Consider: if you lose an individual or a cohort of students whose passions drive the work, does the work stop and the fiscal and human investments get lost? Is there work that would meet longer-term interests that can be done simultaneously with shorter-term, passion-driven work to ensure the larger CASC mission is advanced?

Findings of the ERT – Overall Effectiveness towards Host Agreement

The ERT agrees that the Host and Consortium met the goals set out in their Cycle II Proposal to USGS. The Host and Consortium have worked hard to support the development of the next generation of climate scientists, to cross boundaries and bridge gaps in knowledge and acceptance of the need for climate adaptation, and to work collaboratively with others to do this.

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

- The SC CASC Host and Consortium partners have excelled at building climate adaptation capacity, engagement, and relationships that help meet the needs of Tribal Nations and organizations. Their efforts and expertise here, including their *Shifting Landscapes Guide*, will be beneficial if shared across the CASC network, the academic university Consortium, and as broadly as possible.

The Host's consistent struggle throughout the review sessions to describe their strict reading of the HA, combined with a lack of clear outreach and communications strategy regarding actionable climate adaptation science, leads the ERT to note for the Host and Consortium:

- Being able to tell strong and concise stories about the successful application of climate adaptation science research products in species and/or resource management decision making, planning, or policy is a critical part of explaining the societal value of the CASC. External communications is an opportunity all members of the ERT view as an area for Host growth and attention.

OVERALL ERT RECOMMENDATIONS

In addition to the recommendations noted above, the ERT makes the following recommendations about the review process and suggested approach for the Host, SC CASC, and consideration by NCASC with the entire CASC Network:

For this Host:

- Work on your story about the Host and CASCs combined, leveraged efforts:
 - a. Work to improve your outward communications to help tell this story;
 - b. Clearly link the work of the Host, Consortium, and CoPs in all areas so you and others can connect how stakeholder needs/issues are being addressed in the science being contemplated, and whether actionable science is leading to management actions, planning efforts, and/or policy changes from the science you are producing (i.e., show the co-produced work better).

- c. Tell the story of the impacts of your work. Go beyond the “what”, to communicate the ‘so what?’. **What changed** because of the science you are doing?
- You have fully embraced the Indigenous component of your program. The presentation was holistic in its inclusion of whole enterprise efforts.
 - a. Use this approach/model in future reviews and storytelling about the broader enterprise and Consortium.
- Take a deliberate step on monitoring the work the Consortium is doing and evaluate its effectiveness so you can document and communicate the impacts of the Host’s efforts; in particular, focus/highlight the ‘intangibles’ (e.g., building the next generation of climate adaption scientists and strengthening career capacities) for future reporting and reviews.
 - a. This also could provide an opportunity to share lessons and approaches across the different CASCs or even other federal partners that have been exploring this topic.
- As you look to re-do your webpage, provide up-to-date links to your Consortium member’s work and webpages with the CASC, and ask them to do the same.
 - a. Also, more clearly brand your CASC on the website. Focus and tell your story in a clear executive summary: why, where, for whom, and what you are doing?
 - b. Ask Consortium members to host a webpage on their institution’s website that clearly communicates the work they are doing with the CASC (and the impacts of their work). If they are already doing this, ensure that web links and content are current.
- Work collectively to assess the actual capacity of your Consortium and staff to prioritize your efforts strategically and avoid burnout, spreading the work too thinly, and reducing the overall impact your work could have for the region.

For the SC CASC

- Continue to build the culture you have developed in the Tribal Program and expand it throughout the Center.
- Encourage (or train) project lead scientists to work with each other to organize and facilitate the production of actionable climate adaptation science in the future.
 - a. Consider bringing in a ‘boundary spanner’ who can see and manage the connections needed for the effective integration of actionable climate adaptation science into resource management planning, policy, or actions.
 - b. Ensure that project lead scientists integrate students into the co-development of research by including them in early discussions with managers and stakeholders.
- The USGS should do what it can to reduce the administrative burden of the Host by providing similar staff at the USGS office.
- Now that you have a new Regional Administrator, continue to build on the cooperativeness of the relationship between the Host and USGS.

- a. Consider bringing in/job sharing people from other CASCs to help you all better integrate the Consortium partners, Host institution, and USGS.

For Future Hosts:

- Increase focus on attracting Consortium members to address known DOI-focused, geographic, and substantive science needs (e.g., mitigating water supply risks, and drought and flood management planning at Reclamation and for Tribal Nations; predicting and reducing climate change risks to species and infrastructure of the NPS, BLM, and FWS; adaptation to coastal sea level rise for communities and national marine estuaries/ reserves).
- Clarify and communicate the meaning and process of actionable science consistently.
 - a. Place focus on relationship-building practices as a core of the actionable science you do/support.
 - b. Ensure that all communications about the work you do includes clear examples of actionable climate adaptation science.
- Provide a range of intergenerational equity in leadership – ask for and allow the next generation to take leadership roles alongside those with more experience.
- Clarify the roles of PIs at Consortium institutions (for them and for future external reviews)
- Continue the Tribal program and integrate what was learned in the Tribal program evaluation throughout the entire enterprise.
 - a. This program is excellent, consider making it one of the prime identity traits or a main pillar of the SC CASC, especially given the regional make-up.

For USGS:

- If the goal of the CASC network is to build a network of actionable climate science and scientists, the HA's must include the latitude to support projects that cover the spectrum of actionable science activities across co-development, research, implementation, communication, and evaluation.
- One of the main messages the ERT heard from the Host's presentations and discussions was that they feel constrained and burdened by the Host agreement. The ERT suggests that NCASC and the USGS look into this further and, if needed, work with Hosts to carefully review the structure of each agreement with the intent of reducing real and perceived constraints on the Host and ensuring clarity of communication about requirements and expectations.
 - a. Review and update the level of resources provided to and the expectations of the Host university.
 - b. Future HAs should ensure there is some flexibility in the implementation of the HA to respond to new developments and needs, changing Administration priorities, and leveraging opportunities.
 - c. Future HAs should consider funding critical aspects of the actionable science adaptation process that the NCASC expects but does not directly support, such as

- capacity building, stakeholder engagement (especially overburdened communities), and communications.
- d. Focusing the 5-year review only on HA funded projects may underrepresent the full breadth of the CASCs scientific advancement because other Host activities that are directly and indirectly linked to scientific achievements (such as capacity building, collaborative efforts, communications, etc.) are leveraged off of the HA.
 - i. USGS may wish to focus future 5-year reviews to address the Host's holistic work, not just the HA.
- Continue to develop longer-term relationships with Hosts that look more like cooperative partnerships and less like 'grantor/grantee' relationships.
- a. Support the entire network by hosting regular (monthly or more frequently) meetings with university and RCASC directors.

For the entire NCASC Network

- As a network, be more intentional about your cross-CASC efforts to enhance and advance actionable climate adaptation science:
- a. Provide networking and ongoing skill building for communications specialists;
 - b. Help each RCASC focus on and build the skills it is best at, then make time for them to share their skills in the practice of actionable science and substantive knowledge with the others (for this CASC, it would be the Tribal Engagement Program);
 - c. Work to build the Network's science portfolio together by leveraging the expertise of all more clearly and intentionally, including creating cross-CASC opportunities for advancing the science and practice of actionable knowledge production and impact evaluation;
 - d. Prioritize a holistic evaluation of the work the Network does and engage social science in research and evaluation. Agree on the goals for impact/evaluation.
 - Provide additional capacity for each RCASC to evaluate their program's impacts (having jointly identified measurable indicators, shared across RCASCs) and partnership management approaches/methods (e.g., identify good practices, software support, etc.)
- ***The ERT recommends that the NCASC office lead and facilitate the Network so that all CASCs can work together to build the science of actionable knowledge and the science portfolio of adaptation science, more specifically.***

REGARDING THE EXTERNAL REVIEW PROCESS

- The ERT finds that the review process was....
 - Highly informative, but could have benefited from a more logical progression of agenda topics.
 - Starting from a clear overview of the mission and goals of the CASC, then moving into the subcomponents highlighting how each of those parts contributed to the goals built around applied science for Tribes and DOI agencies would be helpful for the ERT.
 - Also, directly addressing in presentations the central questions the ERT is tasked with answering for each category in the review would be helpful.
 - Very well run and organized by the DS Consulting team, which made effective use of everyone's time and input.

- For future external reviews, the ERT recommends:
 - The formal addition of focused, one-on-one ERT discussion sessions with the USGS, Host Institution, and the Consortium institution PIs. These break-out discussions were very helpful.
 - Encourage the CASC Host to demonstrate progress in addressing issues highlighted by prior external reviews.

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 Final Report.

APPENDICES

Appendix 1 – Attendees

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

ERT Members: Karen Jenni (USGS), Victoria Keener (East-West Center), Christine Kirchhoff (Penn State), Meredith Muth (NOAA), Greg Pederson (USGS), Caiti Steele (USDA/NMSU);

Host, Consortium and CASC Presenters: Jim Ansley (OSU), Robert Bradley (TTU), Brennan Davis (UNM), Amelia Cook (SC CASC-CN), Chris D’Ella (SC CASC-LSU), Kristine DeLong (SC CASC-LSU), Renia Ehrenfeucht (SC CASC-UNM), Leslie Flenniken Kelly (OU), Melissa Foster (OU), Gianna Hansen, (SC CASC-USGS), Noetta Harjo (SCCASC-OU), Sharon Hausam (SC CASC-OU), Jenifer Henslee Peck (SC CASC-OU), Emma Kuster (SC CASC-OU), Kindra Lenzmeier (OU), Irene Lodangco (SC CASC-OU), Scott Loss (SC CASC-OSU), Chris McNabb (OU), Renee McPherson (SC CASC-OU), Joel Miller (OU), Jenny Mosely (SC CASC-CN), Dolly Na-Yemeh (SC CASC-OU), Kyle Oler (SC CASC-OU), Jake Palazzi (SC CASC-OU), Kylie Palmer (LSU), Michael Purcell (OU), Hasnat Rasa (SC CASC-OU), Marissa Ratcliff (OU), Emma Roberts (TTU), Ellen Robertson (OSU/USGS), Derek Rosendahl (SC CASC-OU), Donald Smith (OU), Nick Smith (SC CASC-TTU), Marina Tomer (SC CASC-USGS), Suzanne Van Cooten (SC CASC-USGS), Bonnie VanWinkle (OU), Yvette Wiley (SC CASC-OU), Walker Williamson (UNM), Codie Winn (SCCASC-USGS), Adrienne Wooten (SC CASC-OU), John Zak (SC CASC-TTU);

USGS Observers: Gustavo Bisbal (USGS-NCASC); Stephanie Mladinich (USGS);

Donna Silverberg Consulting Facilitation Team: Facilitator, Donna Silverberg; Reporting and Support, Colby Mills, Tina Patterson, Nancy Pionk, and Emily Stranz.

Appendix 2 – Daily Review Session Agendas and Summaries

Day 1 – Institutional Development and Outreach & Communications

DAY 1	Monday, March 4, 2024: Institutional Development and Outreach & Communications Purpose: - Reflect on the Competencies, Efficiencies, Challenges and Areas for Improvement of the Host University in managing the administrative requirements and terms and conditions of their Host Agreement, with a focus on <u>Institutional Development</u>. - Reflect on the Host University and associated academic consortium’s contributions with respect to <u>Outreach and Communications</u>.	
Time (CT)	Sessions and Main Points	Presenters and Affiliation
11:00 am CT	External Review Team (ERT) – Closed Door	Facilitation Team External Review Team ONLY
11:15 am CT	Welcome & Introductions Review Agenda	Donna Silverberg, ERT Manager/Facilitator, DS Consulting External Review Team SC CASC Team (OU and USGS) National CASC (NCASC)
11:30 am CT 15 min (+15 min for dialog)	Getting Grounded: South Central CASC: Federal Roles & Responsibilities - Mission statement - Federal team members - Science Advisory Committee - Annual project solicitation - Research coordination	Suzanne Van Cooten, Regional Administrator, South Central CASC, USGS
12:00 pm CT	Break (10 min) <i>To avoid Zoom fatigue: Please turn off and step away from your computer screen if possible</i>	
12:10 pm CT 15 min (+15 min for dialog)	Getting Grounded: South Central CASC: Consortium Roles & Responsibilities - Six science themes of the host agreement - Organizational structure, consortium - Host institution team members - Office space - Past challenges & looking forward	Renee McPherson, University Director, South Central CASC, OU
12:40 pm CT	Questions, Answers and Facilitated Dialogue	SC CASC Team External Review Team Facilitator

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1:00 pm CT	Lunch Break (60 min) <i>To avoid Zoom fatigue: Please turn off and step away from your computer screen if possible</i>	
2:00 pm CT 30 min (+30 min for dialog)	How the CASC Works: Outreach & Communications - Communications Plan - o Major partners - Internal communications - Cross-CASC engagement - External communications - Past challenges & looking forward	Jenifer Henslee-Peck, Communications Specialist and Science Translator, South Central CASC, OU
3:00 pm CT	Questions, Answers and Facilitated Dialogue	SC CASC Team External Review Team Facilitator
3:30 pm CT	External Review Team – Closed Door Initial reflections on the day: questions, concerns, insights	Facilitation Team External Review Team
4:00 pm CT	Adjourn	

DAY 1: Facilitator's Summary

March 4, 2024, 11:00am – 4:00pm Central Time

Topic: Institutional Development 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, but has links to the presentation.

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

ERT Members: Karen Jenni (USGS), Victoria Keener (East-West Center RISA), Christine Kirchoff (Penn State), Meredith Muth (NOAA), Greg Pederson (USGS), Caiti Steele (USDA-NMSU);

Host, CASC and Consortium Presenters: Amelia Cook (SC CASC-CN), Kristine DeLong (SC CASC-LSU), Renia Ehrenfeucht (SC CASC-UNM), Gianna Hansen, (SC CASC-USGS), Noetta Harjo (SC CASC-OU), Jenifer Henslee Peck (SC CASC-OU), Emma Kuster (SC CASC-OU), Renee McPherson (SC CASC-OU), Jenny Mosely (SC CASC-CN), Dolly Na-Yemeh (SC CASC-OU), Derek Rosendahl (SC CASC-OU), Nick Smith (SC CASC-TTU), Marina Tomer (SC CASC-USGS), Suzanne Van Cooten (SC CASC-USGS), Yvette Wiley (SC CASC-OU), Codie Winn (SC CASC-USGS), Adrienne Wooten (SC CASC-OU), and John Zak (SC CASC-TTU);

Session Observers: Gustavo Bisbal (USGS-NCASC);

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

Purpose: Reflect on the Competencies, Efficiencies, Challenges and Areas for Improvement of the Host University in managing the administrative requirements and terms and conditions of their Host Agreement (HA), with a focus on Institutional Development. Reflect on the Host University and associated academic consortium's contributions with respect to Outreach and Communications...

Welcome, Introductions & Role Clarification:

Facilitator and External Review Process Manager, Donna Silverberg, welcomed the group and conducted a round of introductions that included: SC CASC ERT Members; SC CASC Host, University of Oklahoma (OU), leadership and team; SC CASC USGS leadership, SC CASC Consortium Members; and USGS-NCASC observers. Donna noted that this review is intended as a review of the Host and their efforts implementing the SC CASC Host Agreement. Today's focus is on institutional development, outreach and communications.

Getting Grounded: South Central CASC: Federal Roles & Responsibilities

SC CASC Federal Regional Administrator, Suzanne Van Cooten (USGS), provided an overview of SC CASC and the Federal roles and responsibilities within the Center. Presentation slides are available [here](#). USGS is the federal provider and University of Oklahoma is the University Host, supporting efforts of the broader Consortium members. From the USGS side, the role is to “deliver science to help fish, wildlife, water, land, and people adapt to a changing climate”. The USGS manages the USGS CASC budget and provides support for the Science Advisory Committee (SAC), high-level research direction, connection to other federal funding and partnership opportunities, and oversight support for the CASC. Suzanne noted that SC CASC is unique in that it relies heavily on the SAC, which is made up of natural and cultural resource managers from the region. The SAC subcommittees (Cultural, Rio Grande, Coastal, and Agro-ecosystems) engage with end-users (resource managers and agencies) to draft science priorities for each year, aiming to identify science needs for the region with a focus on creating actionable (usable) science.

Questions and Comments from the ERT

- *Question/Comment:* I love the intentionality of the SAC subcommittees. There seems to be a heavy emphasis on the resource management side to steer the science agenda, where does federal and academic climate research fit into the production of the CASC science priorities?
 - *Response:* It is woven throughout the process. The SAC includes end-users as well as federal and university researchers and experts working in climate science. As research moves forward, more questions stem from the research and application, which in turn informs additional science priorities and applicability.
- *Question/Comment:* How many of the basic federal roles and responsibilities described are standard across all the CASCs? Where is there capability to expand at the SC CASC?
 - *Response:* Each CASC is different and there are some standards across the CASCs, including management of the federal core budget, final allocation, project solicitation, and awards for the CASCs. Areas that vary among the CASCs include research competition (not all CASCs have the same emphasis or involvement of the SAC), listening sessions, and webinars. Regarding the heavy engagement of the SAC, SC CASC finds that it is a lot of work; however, involving so many end-users provides unbiased recommendations and diversity of perspectives in developing the priorities.
- *Question/Comment:* Can you say more about the composition of the SAC and the process for determining the science priorities? How does SC CASC balance perspectives and prioritize competing priorities?
 - *Response:* It is complicated; at a high-level, the SAC committees each have specific science priorities assigned by topic area. The SAC committees receive calls for science

within the topic area and then whittle down to the research that will best address the specific topic priority. Then, there is another layer of review to consider the projects from a science perspective, answering questions such as is this the right way to address the questions? Is this the right group of people to address it, etc.? Usually, there is sufficient funding available to fund at least one project in each priority area. Further, SC CASC always is considering who is participating and then work to diversify the groups to help inform the perspectives and priorities around the table.

- *Question/Comment:* There seems to be a lot of trust in the SAC for developing the science topics. How does SC CASC address narrow priority areas versus longer-term or broader priorities? For instance, if the topics are the same over years, how does SC CASC develop a portfolio within each topic area to advance the science?
 - *Response:* SC CASC works with the SAC to build off the funded research efforts to inform what comes next and to create that connectivity over the years. Research results in a particular area feed into what comes next, which evolves over time to create the portfolio. Adjustments are made over the years, based on needs heard from the resource managers.
 - *Response:* One strength of this approach is that it is flexible as issues come up. For example, if atmospheric rivers are important one year, the science priorities can flex to address this, while contributing to building a broader portfolio. Also, when the SC CASC looks back at investments, we ask what science/questions have been funded, what questions have not been addressed that need to be, and then the CASC works with researchers and those in the field to adjust as needed.
- *Question:* Do the SAC priorities feed into the university priorities?
 - *Response:* There is a crosswalk between the SAC and university priorities, however, they are separate. The annual USGS solicitation priorities are separate, and there is a broader university science priority effort that helps ensure that all the priorities are lined up well. University priorities will be discussed more throughout the week.

Getting Grounded: South Central CASC: Consortium Roles & Responsibilities

SC CASC Host University Director, Renee McPherson (OU), provided an overview of SC CASC and the consortium's roles and responsibilities within the Center. Presentation slides are available [here](#). The SC CASC works with a wide variety of federal, state, and Tribal governments, as well as non-profits and resource managers. Within SC CASC's region, there is a broad diversity of people, climate, ecosystems, and awareness and understanding of climate change. The SC CASC at OU was established in 2012.

Renee noted that the presentations this week will focus on the non-federal arm of the SC CASC, hosted by OU, and in collaboration with 2 Tribal nations and 4 other universities (the Consortium) (see slides for more detail). The SC CASC's mission is to provide decision makers with science, tools, and information to address climate impacts and to support the USGS science priorities, CASC partners, and mission, while also expanding reach through other funding sources. SC CASC guides research efforts under the specific themes relevant at the time of the HA, which are broad enough to flex as needed to be responsive to regional needs. OU implements the HA which, in part, funds personnel; OU also provides cost-share for

communication, team building, and professional development, as well as office space for USGS, Chickasaw Nation, and OU students/staff.

The SC CASC stakeholder community drives much of the SC CASC's work and includes the US Department of Interior agencies, state agencies, Tribes and Pueblos, and others. USGS does not fully fund all the SC CASC staff, however, they do fully fund a Tribal Liaison (as well as the university assistant director, and communication specialist, and much of the Lead PI's summer salary), which SC CASC has had since 2012. The Tribal Liaison's work has been so successful that the US Bureau of Indian Affairs (BIA) began funding Tribal liaisons for other CASCs. SC CASC now has 2 additional Tribal liaisons working with them.

Renee provided information on the CASC funded positions, as well as [broader categories](#) of funding used to help partners and elevate climate adaptation resources in the region. Although this External Review focuses on the HA funded efforts, Renee noted that those funds help leverage other funding opportunities, emphasizing that sometimes the boundaries are fuzzy (for example, cost share included in the HA fills gaps in funding for soft-funded employees, new positions, and office overhead). The longstanding relationships, which go back to 2012 onward, show the intangible outcomes of longer-term funding – those relationships could not come from short-term funding, and have a big impact on the work accomplished. Other examples of using other OU funds to leverage efforts include furthering education goals of staff (many of whom have gone on to get advanced degrees through the program) and efforts on Capitol Hill to garner support from Congress (which has resulted in more than doubling the CASC's congressional budget from 2016 to 2024).

Renee reviewed the SC CASC's science themes, noting that all start with "towards" because not all questions can be answered within a 5-year host award. Much of the Host's work is to determine what research is needed from the cultural and scientific communities in the region, and then to conduct actionable science that is used by resource managers. Co-production is the method used to achieve actionable science, and different strategies can lead to actionable science. The SC CASC process uses multiple methods for transferring knowledge to decision makers, including the community engagement model (Bamzai-Dobson et al.) of inform, consult, participate, and empower.

Dialogue and Discussion with the ERT Regarding Federal and Consortium Roles and Responsibilities within the SC CASC

- *Question/Comment:* Monitoring, evaluating, and documenting intangible benefits is very difficult; it is good that the presentation touched on this. It is so important to somehow document the value of intangibles.
 - *Response:* Yes, when Amelia Cook presents on Tribal engagement, they will talk on value of the engagement program evaluation; the evaluation captured a lot of intangibles, and that effort is helping to inform broader evaluation of the whole program.
- *Question/Comment:* Co-production is challenging because there is so much time and investment in process. Can you talk about the balance between the different mechanisms of co-production used [*"to translate scientific knowledge to users" added in summary edits by Host*] (e.g., inform, consult, participate, empower) and what drives that balance? How do you balance the investments of addressing the different audiences?

- *Response:* Most of it is a result of what the stakeholders and rights-holders are asking for. For example, the communication and education programs, which in many cases are one-way information (inform), reach a larger more diverse audience. When we create a specific educational program for a specific group of stakeholders, this is more “consult”. In part, the audience drives the mechanism; the people we work with on multiple projects develop trust and relationships, and those efforts develop into more of a co-production model of research. What we don’t want to do is burden already busy people in their decision world – if they don’t have time to invest in the empower approach. We try to infuse as many pieces of “empower” as we can into the research as possible.
- *Question/Comment:* Funding in general is moving towards more co-production and involvement with stakeholders, have you noticed more difficulties, or challenges with this shift?
 - *Response:* In some sense, it is getting less challenging because more people have heard of co-production and actionable science and understand the benefits. This makes coordination and alignment of research efforts easier. In terms of funding, it is somewhat of a struggle because, in many cases, the stakeholders are not funded to do this work. The Host can provide funding through some grants, including some USGS science grants (for workshops, Tribal travel for meetings, etc.), but when it comes to producing a climate adaptation plan, stakeholders have to find other funding sources because USGS funds focus on research and not implementation. SC CASC works to facilitate the connections so that the co-produced research isn’t the end, and the work can flow into implementation. Sometimes it is difficult to connect to other funding opportunities.
- *Question/Comment:* Regarding the categories of funding and the web of work (see slides 16 and 18), how much of the CASC is derived from the Host Agreement? And, where can the ERT’s review and comment be most helpful to the Host?
 - *Response:* The National CASC (NCASC) asks for this review to focus on the USGS HA: did we do as we proposed to do? With the rebid process coming up, SC CASC wants to make sure to do its due diligence prior to rebid. If you count the fuzzy boundaries of the CASC – those not funded by, but regularly working with the CASC, and post-docs that are under the CASC umbrella – there are around 3 dozen people. Of those, the HA fully funds 3 positions. As a foundation, it is not a wide one; the SC CASC HA is a narrow part of the broader effort. However, the value of the HA is tremendous because it offers the longer-term stability necessary for people to build other proposals through the annual science call, or other grants. Regarding what can be most helpful from the ERT, after each presentation, SC CASC will provide a list of challenges and opportunities – some of which SC CASC has good ideas and solutions, and some of the challenges could benefit from the ERT’s areas of expertise. A broader challenge is that the annual science funding only funds research/data collection, which means that education/outreach, workforce development, etc. fall under the HA, but we do not necessarily know needs throughout the 5-year period. For example, the current HA was written under the last Administration, which was not funding climate research. The current Administration has more climate funding than ever before. The agencies need support from climate scientists, so we are thinking about how to be more flexible within the HA to respond to the current needs and are interested in the ERT’s ideas in this area as well.

- *Comment:* Thinking about the connection between co-production and mitigation: there is a divergence between Climate Hubs and CASCs. It would be good to have a conversation on overlaps and opportunities given the different focus and funding.
 - *Response:* Under the CASC, the focus is on adaptation, not mitigation.
- *Comment:* The SC CASC's work with Tribal partners is really impressive; a huge accomplishment that BIA is now funding the Tribal Liaison program more broadly. Along with that, SC CASC efforts with Congress to expand the CASC budget is notable and contributed to program expansion and opportunity to build out. These are stark, major, accomplishments.
 - *Response:* We appreciate that. Yes, and we learned yesterday from OU Government Affairs, that the House approved level funding for the CASCs, which we see as a win.
- *Comment – Echo* the acknowledgment of the significant accomplishments noted already. A lot of things presented today resonate, specifically with regards to the implementation handoff. There are similar challenges in other federal programs and locations.

How the CASC Works: Outreach & Communications

Communications Specialist and Science Translator, Jenifer Henslee-Peck (SC CASC-OU), presented the Host's outreach and communications plans, including the Host's past challenges and next steps. Presentation slides are available [here](#). SC CASC communications efforts span throughout the entirety of the program. SC CASC has a strategic communications plan document, which was developed under the previous HA and has been revised for this cycle to include branding (consistent look and presentation), an audience outline (who are we trying to reach?), and evaluation metrics (per recommendation of the previous ERT). There are three main goals of the communications plan:

- 1) **Strengthen internal communications** and partnerships via improved coordination for meetings, regular consortium and Host staff meetings to share information, support connections, etc.
- 2) **Enhance external communications** via effective strategies to communicate climate science, using tools and project outlets, skill-building conferences, learning from others, and engaging a diversity of audiences effectively.
- 3) **Outreach** via public STEM events, university career fairs, and community outreach such as "Science by the Glass" which shares science and research with communities (adapted during Covid-19 to be online, resulting in a broader reach).

Additionally, the Host engages with other CASCs via regular meetings and opportunities to connect on what is working, challenges, and new ideas. The Host's partnerships and engagement focus on empowering researchers, managers, and end-users with tools and resources (e.g., funding sources, information, research, job postings, etc.). This broad-based information sharing supports the broader goal of furthering climate science work across the CASCs.

Partnerships are key to the work the Host is doing and the SC CASC keeps an intentional focus on how to support thriving partnerships. They are interested in expanding to other audience groups as much as possible and are doing so strategically, so as not to negatively impact existing partnerships. One way that Host has expanded partnerships is by hosting OU student interns that are co-supervised with USFWS staff; the interns work to communicate science to the public. Additionally, the Host is working with other CASCs and USFWS to provide basic climate training and to address specific ecosystem impacts.

Partnerships also help the SC CASC provide more holistic services, filling gaps where Host resources are not available.

Tribal engagement efforts are important to the Host and the SC CASC. Given their long term work in this area, they developed a [guide on developing research relationships with Tribes and Pueblos](#) and have resources dedicated specifically to Native Nations available on their recently over-hauled public website. Jenifer provided specifics on how many people they reach via email, presentations, newsletters, social media, YouTube, and other various publications (see slides for details).

Regarding communications and outreach challenges, Jenifer noted that the three entities (Federal, Chickasaw Nation, and OU) all use different computer systems, which can make it challenging to share information. Reporting also has been challenging and the Host is working to improve the reporting schedule to get information needed on a timely basis. The Host is also facing challenges with changing points of contact and implementing ways to reach a broader audience. Moving forward, the Host's communications efforts will focus on strengthening communications internally and externally, ongoing re-evaluation of the communications plan, and enhancing accessibility.

Questions and Comments from the ERT

- *Question:* Is there an approval process for posting on social media?
 - *Response:* The communication position is on the Host side instead of on the federal side because there are a lot of restrictions on federal communications. The Host communicates on social media regarding climate science and adaptation and, but for areas that have been excluded, (e.g. TikTok) has some flexibility in how they do that.
- *Question/Comment:* The SC CASC highlighted evaluation of communication channels; what are you learning regarding impacts or use of information in communications materials? For example, the Shifting Landscapes document (link above), how are people using it and what are you learning from that for future communications strategies?
 - *Response:* There are opportunities to improve how we track the use of the materials, which currently does not include what you are asking. There is an effort underway now to investigate how people are using information on the website, which should be interesting information for us all. Currently, we can see which pages are getting the most views, for example the sage brush training and other targeted information get a lot of attention. Moving forward, this is an area to learn and expand.
 - *Comment:* Information use is hard to assess – who is using these products and how – there is a community of people thinking on this that the Host could both work with and pull from.
 - *Response:* The Tribal engagement evaluation process provided a lot of new insights and will inform how the Host moves forward; we also would like to hear of resources/ideas from the ERT.
- *Question/Comment:* The range of communications and partnerships, such as the Tribal engagement and student internships, is impressive. How much of the communication training is dedicated to the Host's communication staff, and how much to other consortium partners and staff who are thinking about how to improve science communications?

- *Response:* One thing that came out of the cross-CASC work is a document on how to be more proactive with communications to external groups, the “Communications Management Plan” (CMP). As a result, we are now meeting with researchers up front to plan communications, support communication efforts, and learn from researchers who have good communication practices and tools. The Host is talking about doing a “science communication training for researchers” and has already provided mini-workshops on communication to researchers, per their request.
- *Question /Comment:* Researchers often do not know what CASC support is available other than funding – in your CMP do you provide a menu of roles or services that you can provide researchers?
 - *Response:* Yes, that is in the CMP. It describes the tools, approaches, and opportunities to engage with the cross-CASC communications group. It is brand new this year, and it will be rolled out to researchers at the beginning of their research efforts. SC CASC will tailor the CMP to their specific CASC.
- *Comment:* SC CASC is a mature CASC after 12 years of funding. It would be very valuable for the SC CASC and broader community of practice, to do a longitudinal look at your research, within a framework, to understand the ways in which you are transforming, or impacting management, policy, Tribal engagement, etc., to get a better understanding of how your stakeholders see you and your role.
 - *Response:* Yes, we are working towards that follow-up.
- *Question:* What does the cross-CASC communications and meetings look like and how valuable have you found that work to be?
 - *Response:* Regarding communications it has been valuable as people from all CASCs meet monthly, talk about trends in communication, communicating research, funding calls, training needs, and other universal challenges and lessons learned. The CMP was co-produced through these cross-CASC communication calls.
 - *Response:* There also are regular cross-CASC discussions with university directors, with NCASC, and the assistant university directors meet monthly to discuss different topics. There are a lot of meetings to hear from other CASCs about what they/we are doing and to siphon off what SC CASC can use and learn.
- *Question:* Many of the challenges noted were focused on internal communications, are there any challenges to highlight on external communications?
 - *Response:* The Host’s external communications are largely focused on communicating with an audience that is aware of the SC CASC, but we are also working to expand that audience. Getting out to a broader audience is challenging, it takes time and resources and is complex given the communication needs across the region. One challenge is that there are a lot of people within the region that do not believe that climate change is happening and, in some areas, communication about “climate change” is actively discouraged. As such, SC CASC has to communicate to people and agencies in a way that fits into the regional culture and systems.

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- *Response:* At Texas Technical University (TTU), one success is that we approach with the intent of communicating information without an agenda attached. TTU works with landowners to build capacity so that people understand the climate science information, and then lets them take the next steps on how they use that information; often landowners reach out for more information.
- *Response:* Communications with Tribes is important to SC CASC's work and can create challenges if not done well. In communicating with the Tribes and building relationships, it is important to remember that: each Tribe is a sovereign; there are protocols for communication within the Tribe; and communication culture is unique to each Tribe, specifically with Tribal leaders or elders. Do not assume that their communication style is going to be similar to other cultures (i.e. the "professional" style of speaking succinctly). It is important to try to understand that Tribe's culture and history, including past harms from working with researchers. There is no one way to communicate to Tribes/Tribal staff or elders, and seeking to understand each Tribe's experience is vital.
 - *Comment:* You mentioned needing to update the Tribal Nations portion of the website, what are you thinking in terms of two-way communication and what is the space for a website communication of this information – any thoughts on updating the Tribal communication portfolio?
 - *Response:* SC CASC is still thinking on this from a technical and communications perspective. There are other ways to communicate that need to be considered, and accessibility is important. For example, not everyone in the region has high-speed internet so we need multiple communication formats.
- *Question/Comment:* SC CASC is a standout with regards to Tribal engagement, what kinds of resources are available to have end-to-end engagement with Tribes?
 - *Response:* A lot of what the Host tries to do with USGS is fit the right pieces of the puzzle together. USGS has funding for Tribes via the annual science call. When a Tribe knows what data, research, and training they want, the Host will help support the development of a proposal and provide insight on how to be successful within the USGS system. Building up to that point, the Tribal liaisons take time to listen to the Tribes to find out what they are interested in and try to align it with the SC CASC work. If it is not well aligned, we work to connect the Tribes to others, such as EPA, who may be able to provide funding/resources. Tribal youth engagement is not in the current HA, so the Host does this work based on people's time and interest. Hopefully, this work will be allowed under the next HA. Additionally, the Host actively connects Tribal partners with other potential external partners who may or may not have experience working directly with Tribes, to ensure that the communication is respectful and appropriate.

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

ERT Reflections on the Day

The ERT met in closed session to discuss what they had heard throughout the day. Clarifying questions for the Host to answer during the remaining sessions included:

1. *Question/Comment:* The CASC/University relationship/partnership is quite unique in the science/research world. What are you doing with that ‘unique’ set up and how does it help move the needle of climate adaptation science?
2. *Question/Comment:* Where/how do you see that you ARE you helping to move the needle with regards to climate adaptation science, capacity building, and outreach/communications?
3. *Question/Comment:* Today you mentioned that you and your team are working to ‘develop, maintain, and build relationships’ (you mentioned it in the context of work with Tribes): given the small team and big footprint, how specifically are you doing this? (e.g., is there a strategy or something you can point to that is guiding your work?)

*This session summary was respectfully submitted by the DS Consulting Facilitation Team.
Edits were welcome and sent to the Day 1 Scribe: Emily Stranz (emily@dsconsult.co)*

Day 2 – Fiscal Management and Scientific Achievements

DAY 2	Tuesday, March 5, 2024: Fiscal Management and Scientific Achievements Purpose: - Reflect on the Competencies, Efficiencies, Challenges and Areas for Improvement of the Host University in managing the administrative requirements and terms and conditions of their Host Agreement, with a focus on <u>Fiscal Management</u>. - Reflect on the Host University and associated academic consortium’s contributions with respect to <u>Scientific Achievements</u>.	
Time (CT)	Sessions and Main Points	Presenters and Affiliation
11:00 am CT	External Review Team – Closed Door	Facilitation & External Review Team ONLY
11:15 am CT	Daily Intros Review Agenda	Facilitator, External Review Team SC CASC Team (OU & USGS) NCASC
11:30 am CT 40 min (+30 min for dialog)	How the CASC Works: Review of Fiscal Management - Fiscal management team (pre award, post award, & tracking) - Management of awarded USGS projects - Budget and cost share for host agreement - Leveraged funding - Past challenges & looking forward	Noetta Harjo, Financial Administrator and Office Manager, South Central CASC, OU
12:40 pm CT	Overview of Scientific Achievements Lightning Talks	Emma Kuster, University Assistant Director, South Central CASC, OU
12:45 pm CT	Lunch Break (60 min) <i>To avoid Zoom fatigue: Please turn off and step away from your computer screen if possible</i>	
1:45 pm CT 45 min	How the CASC Works: Scientific Achievements - 1:45 pm CT: Brennan Davis, UNM Graduate Student, Sustainable & Usable Water Resources - 2:00 pm CT: Walker Williamson, UNM Graduate Student, Sustainable & Usable Water Resources - 2:15 pm CT: Kylie Palmer, LSU Graduate Student, Resilient Coastal Ecosystems	Lightning talks (5 min talks w/ 10 min for Q&A) from graduate students and postdocs on the host agreement
2:30 pm CT	Break (15 min): <i>Please turn off and step away from your computer screen if possible</i>	
2:45 pm CT 45 min	How the CASC Works: Scientific Achievements - 2:45 pm CT: Emma Roberts, TTU Postdoc, Mapping & Predicting Changes in Species Distributions - 3:00 pm CT: Ellen Robertson, formerly OSU Postdoc, Mapping & Predicting Changes in Species Distributions - 3:15 pm CT: Renee McPherson, OU University Director, Teleconnections that Influence Ecosystem Resilience	Lightning talks (5 min talks w/ 10 min for Q&A) from graduate students and postdocs on the host agreement

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3:30 pm CT	External Review Team – Closed Door Initial reflections on the day: questions, concerns, insights	Facilitation Team External Review Team
4:00 pm CT	Adjourn	

DAY 2: Facilitator's Summary

March 5, 2024, 11:00am – 4:00pm Central Time

Topic: Fiscal Management and Scientific Achievements

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, but has links to the presentation.

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

ERT Members: Karen Jenni (USGS), Victoria Keener (East-West Center, Pacific RISA), Christine Kirchoff (Penn State), Meredith Muth (NOAA/NIDIS), Greg Pederson (USGS), Caitriana Steele (NMSU/USDA);

Host, CASC and Consortium Presenters: Jim Ansley (OSU), Robert Bradley (TTU), Brennan Davis (UNM), Renia Ehrenfeucht (SC CASC-UNM), Leslie Flenniken Kelly (OU), Melissa Foster (OU), Noetta Harjo (SCCASC-OU), Jenifer Henslee Peck (SC CASC-OU), Emma Kuster (SC CASC-OU), Kindra Lenzmeier (OU), Irene Lodangco (SC CASC-OU), Scott Loss (SC CASC-OSU), Chris McNabb (OU), Renee McPherson (SC CASC-OU), Joel Miller (OU), Dolly Na-Yemeh (SC CASC-OU), Kyle Oler (SC CASC-OU), Kylie Palmer (LSU), Michael Purcell (OU), Hasnat Rasa (SC CASC-OU), Marissa Ratcliff (OU), Emma Roberts (TTU), Ellen Robertson (OSU/USGS), Derek Rosendahl (SC CASC-OU), Donald Smith (OU), Nick Smith (SC CASC-TTU), Suzanne Van Cooten (SC CASC-USGS), Bonnie VanWinkle (OU), Walker Williamson (UNM), Codie Winn (SCCASC-USGS), Adrienne Wooten (SC CASC-OU), John Zak (SC CASC-TTU);

Session Observers: Gustavo Bisbal (USGS-NCASC);

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

Purpose: Reflect on the Competencies, Efficiencies, Challenges, and Areas for Improvement of the Host University in managing the administrative requirements and terms and conditions of their Host Agreement, with a focus on Fiscal Management. Reflect on the Host University and associated consortium member's contributions with respect to Scientific Achievements.

Welcome, Introductions & Agenda Review

Facilitator and External Review Process Manager, Donna Silverberg, welcomed the group to Day 2 of the External Review of the University Oklahoma (OU) as Host University of the South Central Climate Adaptation Science Center (SC CASC). She conducted a round of introductions that included: SC CASC ERT Members; SC CASC Host leadership and team; SC CASC USGS leadership; SC CASC Consortium Members; and session observers.

How the CASC Works: Review of Fiscal Management

External Review Team 5-Year Review Report South Central Climate Adaptation Science Center

SC CASC Financial Administrator and Office Manager, Noetta Harjo (OU), provided an overview of the SC CASC's fiscal management processes, including awarded USGS projects, budget, and cost sharing for the Host Agreement (HA), leveraged funding, past challenges, and next steps. Her presentation can be found [here](#).

In addition to fiscal management, Noetta also handles HR processes, office management, and logistics for meetings and workshops related to grants. She reviewed the current accounts and scholarship programs. OU currently manages 40 sponsored awards - 32 are USGS' Awards and include the HA. Other awards are sponsored by BIA, NASA, USFWS, EPA and the Office of the Vice President for Research and Partnerships.

Noetta reviewed the pre-award process, post-award, and modification process for awards.

Pre-Award: For USGS-sponsored awards, SC CASC deputy director Emma Kuster assists by submitting OU's required information sheet, and then reviews the proposal and draft budget in collaboration with the OU Office of Research Services. The Principal investigator/Project Coordinator ultimately writes the proposal, finalizes the budget, and submits the proposals to USGS for review. It can take several months to a year for approval (as the award may be dependent upon congressional funding).

Post-Award: This process includes identification of a chart field spread, which is a set of codes within OU for every sponsored and non-sponsored account by budget year. The OU team reviews accounts regularly to ensure correct accounting.

Many of USGS' Awards include subcontracts with institutions outside of OU. The Host Agreement has a subcontract with each Consortium Institution except the Choctaw Nation of Oklahoma (as the shared Tribal Liaison is funded through the Chickasaw Nation). Some subcontracts may have an OU component to cover salary and other operations costs at OU, but most are flow-through awards. OU's HA Cost Share contribution to the CASC is funded by the Office of the Vice President for Research and Partnerships and covers office space rent, salary, travel not covered by Host Agreement, publications, sponsorships, and other operations costs not covered in the Host Agreement. Research Financial Services requests a purchase order for every subcontract. OU developed a subrecipient invoice review checklist, which is used to ensure proper stewardship of funds.

Noetta also administrates the Payroll and HR processes for the Center which includes the hiring process, payroll distribution and change, and annual evaluations. OU also has policies for remote workers which must be updated annually for each worker (currently, 4 SC CASC staff work remotely, none on the HA).

OU award maintenance includes a monthly budget review process with the financial coordinator and SC CASC directors. Research Financial Services provides project status reports and labor confirmations and performs a monthly reconciliation. OU has multiple signature requirements and uses internal reports to track funding milestones. Consortium Reports are provided to Directors to help track spending rates by Consortium Institution. The University Director or Assistant Director will contact the Consortium PI if spending rates are too low, as it may affect the entire Consortium's ability to receive the next year's funding from USGS.

Award Modifications: These can include administrative changes, new budget year funding, budget year extensions and no cost extensions. When changes are made, Noetta receives and processes modification paperwork. Project closeout begins 3-4 months before the project ends, and budget year and no-cost extensions are submitted to the OU Office of Research Services by Emma on behalf of the Principal

Investigator/Project Coordinator if needed. Those are then submitted to USGS for review and approval. If there are no extensions, Research Financial Services manages the financial closeout.

Noetta noted there are several challenges affecting fiscal management. The Covid-19 pandemic affected travel budgets, which were then modified to fund salaries and hiring support. They also experienced project set-up delays resulting from multiple OU system changes, including new financial, payroll/HR and procurement systems which created some confusion. Policy changes at the Research Financial Services have also added to the workload. The campus is in the process changing to a biweekly payroll system which will affect the day-to-day management, especially for researchers working on multiple accounts. HR Policies regarding remote employees also delay hiring those employees. In short, there are growing administrative burdens on PIs and project coordinators. They are working to take more proactive action where they are able, including reallocating award budgets and constant communication from project coordinators, especially when there is an invoicing lag. Also, project expense tracking helps alert the team if an extension is necessary. There are regular monthly meetings among university partner departments and quarterly meetings with the Financial Director for the College of Atmospheric and Geographic Services (AGS).

Questions and Comments from the ERT

- *Question/Comment:* Are the growing administrative burdens that the PI/PC face based on University or USGS requirements? What kind of burdens are they (reporting/budgetary)?
 - *Response:* The burdens are mainly related to University financial, HR, and procurement requirements for review and signature. USGS has been responsive and proactive in working to reduce the administrative burden. The USGS Office of Acquisitions and Grants process has improved over the years. On the other hand, OU has been impacted by leadership changes, organizational shifts, and centralization of services. There is increased paperwork and budget scrutiny. Personnel evaluation and raise processes have changed and negatively affected staff morale. As a result, the PIs began including more flexible language in award budget justifications. There is current concern that it will be difficult to recruit a future Host PI due to the administrative burden.
 - *Response:* On receipt of the grant, fiscal management is required to review numerous terms and conditions related to federal regulations (e.g., many sponsored awards are tied to regulations in the Code of Federal Register) and may have to involve other university offices such as legal. Each project is different and must be reviewed individually for compliance. OU Research Financial Services is looking at ways to reduce the burdens to the CASC and its consortium members.
- *Question/Comment:* Is there anything about this that is CASC-specific or is this experience universal across the university?
 - *Response:* The administrative burden is not CASC-specific. The HA and science awards funds under the CASC umbrella all go through OU, so the Host University serves as the buffer for USGS and the sub-awardees regarding administration requirements.
- *Question/Comment:* If you had the capacity to address the solutions, would that solve all challenges? Are there any solutions that you are not comfortable addressing?

- *Response:* It is a matter of finding what works for the team, better communication with the entities that are adding requirements, and finding ways to work with them. Time and communication are what will help to make sure we and our university partners are all on same page.
- *Question/Comment:* Where does the administrative burden primarily fall and does it impact the PI's for the project or the PI's for the consortium institution?
 - *Response:* Emma traditionally works directly with each PI on the proposal (as opposed to the consortium member's listed HA PI). OU only contacts the lead HA PI if they need help with communication. Most of the administrative burden falls on Noetta and Emma and less so on consortium PIs. Instead, the PIs are helpful in getting word out, connecting new researchers, and participating a bi-monthly call.
- *Question/Comment:* Is there a peer network where Noetta can connect and share information across university or cross-CASC?
 - *Response:* The College of Financial Administrators has quarterly meetings with the AGS director which provide an opportunity to discuss challenges, solutions and provide peer support. Noetta has not met with other cross-CASC financial representatives; each university CASC is set up uniquely and may not have a similar administrator.
- *Question/Comment:* How are the funding categories (A-D) incorporated in this process and how do they affect fiscal management? Are the different funds managed or tracked differently?
 - *Response:* Noetta is paid through Cost-Share for the HA (Category D on the Funds Category list). She manages all Category A and C funds, and D funds where Renee is the PI. Noetta does not have additional tracking systems for these categories. Emma leads the reporting back to USGS. In project reporting and annual reporting, leveraged funds are separated from the funds received from USGS.
 - *Written Chat Response from Consortium member:* The efforts of the OU fiscal management group helps the university members address project goals each year as part of the hosting agreement. They are important to the larger mission.
 - *Response from Consortium member:* The fiscal group at OU helps us work through issues and try to address the issues so we can focus on science.
- *Question/Comment:* When you reflect upon OU's tenure as the Host University, are there aspects that have been uniquely helpful or challenging?
 - *Response:* There were a number of Host University directors in the past, who advocated to NCASC for direct distribution of USGS funds to consortium members. One of the many benefits of the CASC is the regular communication among the consortium members. The SC CASC has a biweekly call. Having one institution that the PIs can connect to helps to bind the consortium together. There is value in having a connected consortium.
 - *Response from Consortium Member:* Despite our different locations, our consortium team is more innovation through the structure we have and agree with Renee that the structure is the glue that helps us keep interactions going. We strive to look for ways to increase those interactions.

Overview of Scientific Achievements Lightning Talks

SC CASC Host University Deputy Director, Emma Kuster (OU), introduced a series of Lightning Talks to demonstrate the Host's scientific achievements.

How the CASC Works: Scientific Achievements

Heat Mitigation Impacts of Agriculture, Riverside Forest, & Greenspace in Albuquerque, NM

Brennan Davis, UNM Graduate Student in Water Resources, the presentation is available [here](#). Brennan's work addresses SC CASC's 'Toward Sustainable & Usable Water Resources' science theme.

Questions and Comments from the ERT

- *Question: Were you able to connect with Rio Grande soil and water conservation projects?*
 - Yes, had discussions before and after. The feedback was used for study design and helped narrow it down to riverside forest.
- *Question: Any indications about other projects based on your work?*
 - Not as of yet
- *Question: Have you tried CropScape?*
 - No, I'm using MRGC Record (comment: Good!)
- *Question/Comment: So, different crop leads to different ET mitigation. Did you look at the crop type for cooling and/or linkage to property uses?*
 - That wasn't incorporated into the research. Instead, Brennan hopes to get more granular with heat modeling using more refined modeling tools.

Flower Garden Banks Coral Geochemistry as a Monitor of Past and Current Environmental Conditions

Kylie Palmer, LSU Graduate Student, the presentation is available [here](#). Kylie's work addresses SC CASC's 'Toward Resilient Coastal Ecosystems' science theme.

Questions and Comments from the ERT

- *Question: With δ^{18} proxy, when you say 'drier weather in the ocean' is that reflective of the entire Upstream Missouri River basin or is that over the coral site?*
 - In general the ocean is getting wetter versus drier and has a lot of precipitation influences, so it could have some implications of what's going on in the United States and what that means for Mississippi River output. In general, the precipitation and coral site are pretty far offshore, it's probably more reflective of ocean circulations.
- *Question: In working with either resource or ecosystem or species managers in this study, what kind of managers have you engaged when you're communicating the relevance and importance of your work?*
 - We worked a lot with the National Marine Sanctuary and, more recently, have been working with NGOs who are finding the study to be informative. More recently I have been talking to people outside my field who could benefit. Last week attended a Gulf of

Mexico conference and that audience was more non-profit people who are interested in using this type of work for monitoring.

- *Question: How much consulting happened early on? How many of the questions that you're asking in your research were or are driven by management questions?*
 - We covered a lot of different locations. As just one example of the coral, when writing the proposals and doing the research, we were definitely in contact with different stakeholders. In my experience, maybe this is just because I was brought on as a PhD student for the CASC, but I think throughout the whole process they're definitely in contact and we include them in the questions that we are going to ask.

Consumptive Use Uncertainty in Santa Fe Water Banking

Walker Williamson, UNM Graduate Student in Water Resources, the presentation is available [here](#). Walker's work addresses SC CASC's 'Toward Sustainable & Usable Water Resources' science theme.

Questions and Comments from the ERT

- *Question: I want to ask a little more about one of your final takeaways about reducing uncertainty and that resulting in increased cooperation amongst water managers; can you discuss any evidence you have of the work having that impact, or is it more a "take it on faith argument" that better information reduces friction?*
 - I take it on faith. I used to work for the City of Santa Fe where there are protests from the Middle Santa Fe Conservancy. These protests can prolong water right transfers and can reduce flexibility. There can be multiple parties in these protests and they're not fully understanding the numbers or, in their minds, there is a different figure. The ambiguity in the water bank numbers look like a different volume of water than what actually is the case. So, just that ambiguity around the actual quantities involved perpetuate misunderstanding and distrust between these parties. The cooperation comes from people being provided clarity about how much water there is, where it comes from, and where it goes.
- *Question: Was the question specific to Santa Fe ground water management resources or does it also include allocations from the Bureau of Reclamation (and others)?*
 - Santa Fe has four sources of supply. The study question catered to Santa Fe's water.
- *Question: Was the research designed to help to balance the water supply versus deficit bank account or is this also being used to plan and buffer community water supply from drought?*
 - The study provides both information about how to buffer and how to balance water use.

Assessing Impacts of Climate Change on Species Pathogens

Emma Roberts, TTU Postdoc, the presentation is available [here](#). Emma's work addresses SC CASC's 'Toward Mapping & Predicting Changes in Species Distributions' science theme.

Questions and Comments from the ERT

- *Question: How is climate change changing the emerging species pathogens? What is unique or emerging?*

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- The geospatial aspect of the project plays into climate observations most clearly (and this wasn't part of the brief presentation). We are seeing pathogens move northward as climate changes.
- *Question/comment: This is very interesting work. Who are the people that might be using your data to make decisions?*
 - We will be publishing our research soon and hope to help public health and pathway sequencers with what we found from the data.

Decoupling of Bird Migration from the Changing Phenology of Spring Green-Up

Ellen Robertson, former OSU Postdoc, now working at USGS, the presentation is available [here](#). Ellen's work also addresses SC CASC's 'Toward Mapping & Predicting Changes in Species Distributions' science theme.

Questions and Comments from the ERT

- *Question: When you were in your postdoc position how was being in the CASC helpful for trying to connect the work that you are doing with policy and decision-makers?*
 - I thought it was incredibly helpful. I didn't have a lot of connections doing my master's or PhD with managers and so didn't have access. I didn't know what 'co-producing science' was until I came to the South Central CASC, for example. This presentation was just one of three research topics that I worked on and might not have been the best example of actionable science. I was also able to work with several groups, as a postdoc, where we did co-produce science from the ground up, from the beginning. For example, developing ideas on Shorebirds and Wetland management. We had another project that we worked on with managers where we co-produced a proposal with about 10 people from US Fish and Wildlife Service. It was a proposal literally coming up with ideas from the very start with managers and writing a proposal altogether. It ultimately wasn't funded. Yet, we might be able to put it back in and hopefully learn how to work with managers on how to co-produce science starting from the very beginning of asking questions and writing proposals through to the end.
- *Comment: You mentioned several ideas of next-steps for research that were science-focused. When thinking about how to prioritize these next steps, think about the connections to and the value of the information for decision-makers.*
- *Question: Out of the 150 specified, how many were endangered?*
 - Many are birds that are not endangered/threatened per se, but several have experienced massive declines, including some species that have been identified as tipping point species in the recent Road to Recovery effort (an effort sparked by the big "North American bird decline" paper published in 2019).
- *Question/Comment: That was a very interesting and good use of the community data and linking it to climate work.*
 - I usually put a lot more shout-outs to the volunteer birders who collected the data. It is a great example of how the public can connect to science. The eBird collection has amazing

data that can help science. It's not perfect data, but it's getting people involved in birding and appreciating the natural world. In terms of choosing the species, we did try to focus on migratory birds in general and also birds that we had enough data for in the eBird data set. I think this information can be useful in terms of habitat prioritization for the '30 by 30' initiatives and for habitat conservation plans for migratory birds. There's really rich data here on what areas birds are using during migration and different groups of birds and so I think that might be when future angle where this could be useful as trying to identify those important areas and habitats that migratory species are using. I'm hoping to talk with some of the joint ventures and the Fish and Wildlife Service to get their thoughts on it too.

- *Comment about the presentations: I would love to have heard more stories about co-production.*

Teleconnections that Influence Ecosystem Resilience: Teleconnections for Drought Predictions.

Renee McPherson, OU University SC CASC Director, the presentation is available [here](#). Renee and Irene's work addresses 'SC CASC's 'Toward Teleconnections that Influence Ecosystem Resilience' science theme.

Questions and Comments from the ERT

- *Question/Comment: How do you anticipate artificial intelligence (AI) improving your model?*
 - Our problem now is we need to better predict the predictors, and that's where artificial intelligence may be useful.
- *Question/Comment: There are obviously a number of other regional efforts, entities, and initiatives that touch on drought in the South Central area. How does the CASC leverage these other efforts to amplify your and their work for transferability via external communication?*
 - It turns out that each different project has a group of people that they are already well networked with, and those tend to be the groups that they communicate with fairly regularly. Those groups hear most about the research. It has been a challenge, in such a large interdisciplinary team that's across a large landscape, to make those connections within similar groups across the different states and different Tribes. We are trying to figure out, how do we take that information and then make sure we cross disciplines and get it through all of the various networks that we have? I can honestly say we don't have a definitive solution at this point.

One of the things that we are trying to do is to gather the information about people's networks and collect them in one place. So we've started internally, within our office, in terms of gathering networks. For example, Dr. Dolly Na-Yemeh is one of our climate adaptation specialists; we've taken information about who is in her network, brought that into a database, and started to see the overlap with who's in my network and who's in other networks. We are going to try to figure out ways that we can find nodes of key people. It is almost like a social network analysis, with nodes of where some of the key people or places are and where information travels most readily to a broader network. We have not done that in the past and I think it has become complicated with so many projects, so many results, and so many managers. We really need to transition to help answer that concern that you and I have about getting this information out to the people who need it.

- *Comment: A brief comment noting other drought and streamflow forecasting efforts being done in other CASC regions that face similar predictive challenges. Some resources related to methods were pointed out that have been useful in producing skillful 3-9 month drought/streamflow forecasts that would augment their work using teleconnections.*
 - *Response:* Project scientists and ERT Member will plan to discuss these approaches at a later time.

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

Donna led a facilitated discussion between ERT Members and the SC CASC and Consortium on the CASC's fiscal management and scientific achievement efforts.

- *Question/Comment: Did the follow-up tracking and monitoring you have done identify projects that actually changed anything? How can we evaluate the value of the actionable science?*
 - *Response:* What has been evaluated thus far points to the place-based value of the type of science that our partners want. We are hoping to work with social scientists to see if there are ways we might be able to evaluate the usefulness. We are open to other suggestions.
- *Question/Comment: There are not a lot of longitudinal ways of evaluating the training of individuals and partners to see if the outcomes are better. I'm not really sure of different kinds of approaches. You could try to link up with other evaluation efforts with the intent of trying not only to improve the action-ability of the projects, but also advancing the science of actual knowledge production.*
 - That's a really great idea. I might either ask Emma Kuster to talk about this now or make sure that she includes it in when she does her talk tomorrow. But, one of the things that we think about is when we do workshops, for example, when people leave: is there a way that we can either track the collaborations that result from their involvement or, if it's not a new collaboration, can we track what they do with the knowledge they gained? How did that change the way they do their job or the way that their organization does their work?
 - Emma: I agree with what has been said so far: it is challenging to evaluate these things and it is something we are thinking about. As Renee mentioned yesterday, I'm going to be starting a PhD in the fall. This might be one of the questions that I pursue. I have been really passionate about, and you'll hear me talk about it on Thursday, these issues with the capacity building section: making sure that we're not just doing webinars or workshops for the sake of doing a webinar or workshops. We want to have long-term impact. I know there's a whole world in education and evaluating education programs around long-term behavior change or long-term return on investment. There are different ways that folks are thinking about it, so I would say I appreciate everybody's input and love hearing these ideas.
 - Renee: The idea I think we've all struggled with is exactly what you have been talking about. Many of the Departments that we work with, and many of the professional

organizations that we're connected to, have a lot of momentum in terms of how science, engineering, or research has been done in the past. I feel like we have still a lot left to do to get this actionable science infused into departments and colleges and then include some evaluation expectations there. I know within my own Department, it's been a real struggle for me to explain to folks that working together with people on research is PART of the research process and it isn't part of my university 'service'. They say, "Oh, you do a lot of service because you work with a lot of people on the outside." We need to see more publications come out in the standard journals. I think what I would say is, we aren't there yet. We're kind of on a journey together.

- *Comment about the science presentations: I would love to have heard more stories about co-production.*
- *We heard a lot of great climate science today and I can see application and implementation. I would love to see more decision-relevant work, rather than research that seems more driven by science questions than by actionability. How can you make the projects more about the connections?*
 - We focused here only on the HA funded projects. Had we been able to pick from the broader suite of CASC projects, you would have seen more of the work looking very much more actionable on the on front end. I am not a statistical climatologist. Yet, the project that I discussed and am doing is because the Chickasaw Nation and their partners wanted this drought product to see if we could produce it. So, the fact that we've been working on it for a number of years is totally a result of stakeholders and, in their case, rightsholders input into what we do as a science organization. I think that we see that less in the Host Agreement projects mostly because our emphasis in the Host Agreement is on building capacity to do this type of actionable science work across a broader network. It's not just with the graduate students and postdocs and early career researchers that are funded through the Host Agreement, but a lot of our Host Agreement's focus is to broadly expand the idea of actionable science across our network.
- *Comment: Looking forward to seeing how projects and products are leading to "transformative climate science."*

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

ERT Reflections on the Day

The ERT met in closed session to discuss what they had heard throughout the day. Clarifying substantive questions for the Host to answer during the remaining sessions, and/or comments included:

- How are your consortium PIs working with you and grad students to design and deliver their actionable science? What is their process? Could the ERT hear from/talk to a couple of them in the next two days? They also would be interested in hearing from land/water managers who have been involved in and used your work, if possible.

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- The ERT is hoping you can help tie to some of the broader questions outlined in the worksheet as you continue with day 3 and 4 discussions.

*This session summary was respectfully submitted by the DS Consulting Facilitation Team.
Edits were welcome and sent to Day 2 Scribes: Tina Patterson (tina.patterson@jadeitesolutions.com) and
Nancy Pionk (nancy@dsconsult.co)*

Day 3 – Scientific Achievements and Collaborative Efforts

DAY 3	Wednesday, March 6, 2024: Scientific Achievements and Collaborative Efforts Purpose: Reflect on the Host University and associated academic consortium's contributions with respect to <u>Scientific Achievements</u> and <u>Collaborative Efforts</u> .	
Time (CT)	Sessions and Main Points	Presenters and Affiliation
11:00 am CT	External Review Team – Closed Door	Facilitation & External Review Team ONLY
11:15 am CT	Daily Intros Review Agenda	Facilitator, External Review Team SC CASC Team (OU & USGS), NCASC
11:30 am CT 30 min (+30 min for dialog)	How the CASC Works: Scientific Achievements (cont.) - National Climate Assessment - Fall Science Meeting - Communities of Practice - Past challenges & looking forward	Renee McPherson, University Director, South Central CASC, OU
12:30 pm CT	Lunch Break (60 min) <i>To avoid Zoom fatigue: Please turn off and step away from your computer screen if possible</i>	
1:30 pm CT 45 min (+30 min for dialog)	How the CASC Works: Collaborative Efforts - Partnerships with regional climate organizations - Partnerships with DOI agencies - Engagement in listening sessions - Ideation events - Past challenges & looking forward	Emma Kuster, University Assistant Director, South Central CASC, OU
2:45 pm CT	Break (15 min) <i>To avoid Zoom fatigue: Please turn off and step away from your computer screen if possible</i>	
3:00 pm CT	Questions, Answers and Facilitated Dialogue	Facilitator SC CASC Team External Review Team
3:30 pm CT	External Review Team – Closed Door Initial reflections on the day: questions, concerns, insights	Facilitation Team External Review Team
4:00 pm CT	Adjourn	

DAY 3: Facilitator's Summary

March 6, 2024, 11:00am – 4:00pm Central Time

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, but has links to the presentation.

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

ERT Members: Karen Jenni (USGS), Victoria Keener (East-West Center), Christine Kirchoff (Penn State), Meredith Muth (NOAA/NIDIS), Greg Pederson (USGS), Caitriana Steele (NMSU/USDA);

Host, CASC and Consortium Presenters: Jim Ansley, (SC CASC-OSU), Amelia Cook (SC CASC-CN), Chris D'Ella (SC CASC-LSU), Kristine DeLong (SC CASC-LSU), Renia Ehrenfeucht (SC CASC-UNM), Noetta Harjo (SC CASC-OU), Jenifer Henslee Peck (SC CASC-OU), Emma Kuster (SC CASC-OU), Renee McPherson (SC CASC-OU), Dolly Na-Yemeh (SC CASC-OU), Kyle Oler, (OU), Hasnat Rasa (SC CASC-OU), Derek Rosendahl (SC CASC-OU), Nick Smith (SC CASC-TTU), Marina Tomer (SC CASC-USGS), Suzanne Van Cooten (SC CASC-USGS), Codie Winn (SC CASC-USGS), Adrienne Wooten (SC CASC-OU), John Zak (SC CASC-TTU);

Session Observer: Gustavo Bisbal (USGS-NCASC);

DS Consulting Team: Facilitator: Donna Silverberg, Reporting and Support: Tina Patterson, Nancy Pionk.

Purpose: Reflect on the Host University and associated academic consortium's contributions with respect to Scientific Achievements and Collaborative Efforts.

Welcome, Introductions & Agenda Review

Facilitator and External Review Process Manager, Donna Silverberg, welcomed the group to Day 3 of the External Review of the University Oklahoma (OU) as Host University of the South Central Climate Adaptation Science Center (SC CASC). She conducted a round of introductions that included: SC CASC ERT Members; SC CASC Host leadership and team; SC CASC USGS leadership; SC CASC Consortium Members; and NCASC session observers.

How the CASC Works: Scientific Achievements (cont.)

SC CASC Host University Director, Renee McPherson (OU), continued the Host's overview of their scientific achievements, highlighting Communities of Practice, the Fall Science Meeting, and the National Climate Assessment, as well as challenges and opportunities. Her presentation can be found [here](#).

Renee highlighted examples under the HA that helped SC CASC achieve success in climate adaptation across the region. She reviewed the Bamzai-Dodson et al (2021) 'Actionable Science Approach' model and noted that the focus under the HA was to build the capacity for researchers to conduct actionable science and to inform partners through education and communications. Projects outside of the HA use the 'inform, consult, participate, and empower' approaches, as appropriate. [ERT Member noted in summary edits that the 'Actionable Science Approach' model referred to by SC CASC Host is not called as such by its creators, rather it is a model of the spectrum of community engagement. The 'wheel' shows modes of participation / engagement.]

SC CASC has established 8 Communities of Practice (CoPs) that engage people with shared interests and a desire for knowledge exchange. The CoPs have coalesced around seven research themes and one capacity-building theme. The current CoPs include Resilient Communities, Ecosystems and Species, Understanding Uncertainty, Extreme Events and Climate Change, Teleconnections, Water Resources, Evaluation, and Resilient Coasts (new). Funding can be provided through the OU Cost Share to support the CoPs and is most often used as seed funding for synthesis products with help from funded students. Outcomes from CoPs include fact sheets, surveys, publications, and webinars. Some CoPs have built relationships that led to proposal writing and successful funding awards. The CoPs also serve as professional development for early career scientists.

Some lessons learned from CoPs include: allowing time for groups to form and define success in a manner that is meaningful to the participants; seed funding has helped keep teams motivated; it is important to have diversity of both research managers and researchers for meaningful knowledge exchange; it is normal for groups to wax and wane; and it is important to allow teams to restart organically.

Through the Host, the SC CASC offers opportunities for in-person meeting time at the Fall Science Meeting, which is open to anyone working in or interested in climate change impacts and adaptation across the region. It creates opportunities for participants to learn about CoPs, share climate adaptation research, meet future employees, and identify potential new consortium members. The focus of the science meeting includes CoP work, expert panels, and poster sessions that highlight the work of students and experts across the CASC.

Renee and her team also have been involved in the National Climate Assessment (NCA) which fulfills part of the mission of the US Global Change Research Act. CASC consortium members participate at various levels. The text of the assessment is framed around risks to people and important resources. SC CASC was involved in the NCA 3, 4, and 5. For the NCA5, Renee served as lead author for the Southern Great Plains chapter. Other CASC personnel served as chapter authors or technical contributors. After NCA5's release in November 2023, SC CASC began highlighting key messages to partners through presentations and social media.

Renee reviewed the challenges and opportunities involved in these efforts which include access to people's time and the increasing administrative burdens associated with funding agencies (which means people might disengage). She also noted that agreed-upon methods to conduct a meaningful evaluation of the effectiveness of the broader CASC program do not exist (but are being developed). Over time, the USGS Office of Acquisitions and Grants has narrowed the types of projects funded under the National Science Program as research and data collection, with a constricting definition of these terms. For the next HA, Renee and team are questioning whether any science should be funded under their rebid proposal, as it is very straightforward to request science funding through the annual science call. Funding for capacity building, workforce development, education, Tribal engagement, equity, and climate justice projects can only be funded through host agreements. This is why the presentations on climate adaptation science research in this external review have been limited; research is not a key element of the current HA.

Current opportunities include developing greater connectivity between federal agencies and partners to better understand the overarching questions that partners have and need help with; utilizing the Host's capacity-building efforts to spur more actionable science and develop a SC CASC curriculum that develops skills and knowledge in how to conduct an actionable science program; and learning from the evaluation of the Tribal Engagement Program to develop a CASC program-wide evaluation.

Questions and Comments from the ERT

- *Question:* Can you give an example of one CoP that has strong stakeholder/decision-maker participation and how that was developed?
 - *Response:* One example is the Arkansas River fact sheets that were co-developed with the New Mexico Department of Game and Fish. A Department employee was engaged in the Ecosystems and Species CoP and was interested in developing fact sheets around adaptation measures for six species of concern. The Extreme Events and Climate Change CoP is another example where Emma worked to build a connection with the National Parks Service in the region and the National Climate Change Response Program Office.
- *Question/Comment:* Glad to hear about the COPs as a good method for sharing and increasing engagement. How has the HA narrowed your focus as a Host University?
 - *Response:* This has evolved over time. In the first HA, our proposal focused on the capacity of the consortium to answer research questions as they arose. As we matured, we found we needed to coordinate our research projects better across the large landscape. The second HA came after the CASC-wide review by the DOI Inspector General. The Inspector General thought the Office of Acquisition and Grants was being too broad in their approach to non-competitive proposals to universities. Now, non-competitive proposals (i.e., USGS' annual science competition for USGS and consortium members) can only be for research and data collection, with those terms narrowly and traditionally defined by USGS. However, creating actionable science also requires capacity building, communications and outreach, workforce development, etc. which are very difficult to fund through the annual science competition. This means that the HA is the only place to fund those items. This shift is pushing more science out of the HA because science can be funded through the USGS Category C Funding. We are working with Congress to pass the CASC Act, which is an authorization bill for the CASCs that would include non-competitive funding of these other elements of actionable science in the HA.
- *Question:* For the university PIs who are working and funded by the CASC, how are you best able to leverage the partnership, funding, Tribal engagement, CoPs, of the CASC? How is this helping you do adaptation science with your partners at your universities?
 - *Consortium Member Response:* The CASC is helping a lot. The CoP sparked a group of us to jointly develop an urban ecology project proposal for funding from the National Science Foundation; we could not have done that without the CoP. There are funding opportunities across federal and state agencies and, because of this underpinning of assistance, we have collaborators/funding in places that we would not develop otherwise.
 - *Consortium Member Response:* In the initial plan, we used funding from CASC to support graduate students. However, it was challenging to use those funds for graduate students because it was delivered in a piecemeal fashion (under short Congressional continuing resolutions). With the new five-year plan, we are focused on a post-doc who published a paper on temperature change effects on turtle species, for example. This new plan has

shifted into actionable science (i.e., publishing and collecting data related to climate change). The literature review paper developed in the CoP was totally unfunded and was the result of collaboration among multiple agencies. For specific fact sheets, we are still in the data collection mode, as they need to be well-rooted in scientific literature.

- *Consortium Member Response:* My primary involvement in the CASC has been related to concerns about the lack of diversity in the field and I saw the SC CASC as a good partner for this work. I have put a lot of effort trying to recruit students from under-represented groups. Out of all the federal agencies, USGS has been the most difficult to work with, due to bureaucratic practices and reporting requirements. My role as a lead PI has been to deal with administrative issues, while allowing the researchers to do the science.
- *Question:* Given the regional culture and relationship to climate change issues, when you approach local or state resource management agencies, how are you received?
 - *Consortium Member Responses:* There are a lot of messages that resonate with various interest groups such as extended drought, high heat, invasive species, and tick-borne diseases. People in the region recognize that changes are occurring because the region goes through extremes and they can see the changes (e.g., Mississippi River changes). Coastal land loss is a premier environmental issue in Louisiana and information about this is included in planning efforts.
- *Question:* Regarding types of engagement and types of outcomes the CASC is hoping to achieve and, considering the limited resources that are available, where do you think they could be best applied?
 - *Response:* Emma will be sharing examples in her presentation of different ways that we have engaged people based on the type of audience and their needs. Thinking more broadly, in the strategic planning process initiated under USGS and the Consortium – to think about where we are going forward, USGS clearly recognizes that their funding stream is small, compared to NASA or DOD science funding. As a Host, the SC CASC tries to give people the tools, skills, and knowledge to do actionable science work throughout their careers. Our intent is that this knowledge be infused in future generations of researchers and resource managers. As such, we have shifted to thinking more about capacity-building, workforce development, and equity and justice issues.
 - *USGS Response:* USGS' intent is to infuse funding toward workforce development and early career researchers' to intentionally develop a cadre of climate science researchers. This requires managing expectations about what we can and cannot fund. There is a delicate balance of wanting to work with CASC on actionable research. One of the most positive vehicles is getting scientists, PIs, and student researchers affiliated with the CASC and growing it from there.
- *Comment:* If the main thrust is capacity-building, I am more curious about the content of the training (i.e. how do you actually train to engage in actionable science?) and may be a missed opportunity to engage in the science in actionable knowledge production.
 - *Response:* Actionable science wasn't the thrust of the first HA. After the first five years, actionable science and co-production became more prevalent. We've seen NCASC morph

over the last several years and place much more emphasis on justice and equity issues. The question becomes how we can be flexible with the HA portfolio and ensure that we can adjust nimbly to changes.

- *USGS Response:* When NCASC first started, we didn't have 'adaptation' in our name; we were climate science centers. In addition, USGS now has a very deliberate focus on environmental justice and equity and to reach out to groups/communities that had not been traditionally involved in developing adaptation strategies. This is a valuable focus to look at as we move forward into the next HA.

How the CASC Works: Collaborative Efforts

SC CASC Host University Deputy Director, Emma Kuster (OU), provided an overview of the Host's collaborative efforts including the Center's Affiliate Program, partnerships with regional climate organizations and DOI agencies, engagement in listening sessions, ideation events, as well as past challenges and future opportunities. Her presentation can be found [here](#).

The Host's Affiliate Program currently has 56 Research Affiliates – individuals whose professional activities contribute to the goals and mission of the Center. To participate, members must be affiliated with a consortium institution, be a partner in the HA, lead a CASC-funded project, or enhance CASC strengths in key areas. The Program was updated in 2023 to clarify benefits and responsibilities.

The Host's Ideation events are an opportunity to generate new ideas and collaborations around climate adaptation science in the network. The Center has hosted several events, with other events planned to occur just before the USGS annual project solicitation. The Center also has engaged in informal collaboration through the efforts of the climate adaptation specialists (who are not funded by the HA).

Emma emphasized the value of building long-term partnerships with federal and state agencies, Tribes, and non-profits. The Consortium also participates in USGS' formal listening sessions and conducts their own informal listening sessions, which are opportunities to hear from resource managers directly. Emma outlined a list of key regional partnerships and efforts involved with those partners. The ERT also heard information about Derek Rosendahl's efforts to build a virtual network with a database of partners and their connectivity to the CASC.

Emma outlined the challenges the Host faces with collaborative efforts including: limited staff time and capacity to address partner needs; turnover in Tribes, agencies, and NGOs; and missing partners who work with underserved communities. Opportunities for the future include generating new ideas for the HA and exploring ways to use AI in building collaborations (such as the virtual network).

Questions and Comments from the ERT

- *Question:* This information has been very helpful. You put a lot of effort out, what do you get back? What are some of the benefits for OU in their efforts with partnerships?
 - *Response:* Being able to see climate adaptation advance in this region is very rewarding. Being able to build these partnerships, and then knowing that are learning how to talk about climate change and adaptations with their partners and spreading the conversation.

- *Question/Comment:* How much time is it taking to create, nurture, and sustain these collaborations? I hope you are able to capture the value of these collaborations and capacity building efforts.
 - *Consortium Member Response:* Staff capacity is a perpetual challenge. The Edwards Aquifer Authority is a prime example of how the SC CASC was able to build capacity. Before we started interacting, they did not have anyone with expertise in climate science. They learned a lot from me and now the primary contact is teaching people. They now come back to us for more technical questions.
 - *Host Response:* Time devoted to this is hard to quantify because relationship building is time consuming; the effort with Wildlife Refuges initially began with cold-calling, which took several hours in a week and, once the relationship was established, less time was involved to maintain the partnership. Partnerships are a high priority for us.
 - *Consortium Member Comment:* One of the strengths of the consortium structure is that each of the members has their own network that is supported by the collective efforts and rolls into one BIG network. The network is blessed to have this kind of functioning central office.
- *Question/Comment:* The message received over the last few days is that the HA is under-resourced. In thinking about challenges of being “unable to meet urgent needs of partners,” how do you prioritize those needs with your staffing constraints? And where will you apply new resources when you get them?
 - *Response:* Setting priorities is done in collaboration with USGS. Having climate adaptation specialists and Tribal liaisons in their roles is integral in helping prioritize needs. The primary audience is DOI agencies and Tribes, and then state agencies and NGOs. We are using the priority ranking of stakeholders by USGS to determine what we can do now. With additional staff capacity, we can do more state and NGO work.
 - *USGS Response:* One vehicle is to utilize interagency agreements to increase capacity. USGS’ priority is to fully staff on the USGS side (which has been lean for some time now), including a research-grade ecologist, project scientist, and a program analyst.
- *Question:* Does USGS have the budget/ability to hire for these positions? Can the individual CASC decide how to allocate budget?
 - *USGS Response:* Yes, we have the funding and there is flexibility. Approximately 20% is allocated to salaries.
- *Question/Comment:* Leaning in more on capacity building and knowledge exchange requires additional staffing or a pivot in staffing skills. One message we have heard is that a unique value the Host can provide moving forward is capacity building and workforce development. How do you balance a long-term staffing plan with changes in strategic focus for the CASC? Would the staffing portfolio in the CASC change to address changes in priority?
 - *Response:* We are already seeing CASC go in that direction. Emma and Amelia are taking more of an education perspective with the next generation and with resource managers, and we see that response to change continuing to grow in the next HA.

- *Comment:* Reflecting on all the partnerships, they are so dependent on relationships, turnover and changes are common problems.
 - *Response:* The Exaptive Tool created by Derek is trying to make sure there is more than 1 contact at an organization, which helps with transitions. We are creating a “digital twin” of the SC CASC relationship network. The goal is to have that information collected and stored so when person leaves, the connections are tied to the position, not the person. We are working to use data-mining and AI to seek unique connections and build more robustness into the human system.
- *Comment:* We’ve had similar experiences. One approach we are exploring is to contract with a community organization to embed a person within the organization, which creates capacity for both partners.
- *Comment:* I appreciated seeing the connections with different agencies, priorities, and how the projects fit.
- *Written comment from chat:* The transition from individual-to-individual relationships to institution-to-institution relationships is a universally difficult problem!
- *Written comment from chat:* It's so hard because it's not just money - it's the very existence of the right people to take these demanding positions that require technical, social, and strategic expertise.
- *Question:* Is any other CASC exploring an Affiliate Program? [Facilitator’s response: yes, others have Affiliate programs]. How strongly do you define ‘climate-related research’?
 - *Response:* We define it liberally. There has to be a climate-change or adaptation element. We haven’t declined anyone. Most people have interacted with us in some capacity.
 - *Question:* Are there people who work with the CASC who aren’t affiliates?
 - *Response:* Yes, there are people who are not official affiliates, but are PI or research scientists. We are reviewing whether to include them as affiliates because they are already performing similar responsibilities.

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

Donna led a broad facilitated discussion between ERT Members and the SC CASC and Consortium in regards to the Host’s scientific achievements and collaborative efforts.

- *Question/Comment:* The SC CASC mission is to “transform the way climate adaption science is done in region”. How do you think you are doing – where do you see that transformation happening – and how could NCASC help you on the journey?
 - *Response:* In a region where climate change was not a major topic when the HA started, just beginning those conversations was transformational. The relationship and trust building are a transformational way of looking at science, as are Amelia’s and Emma’s educational work. Additional funds to support the work would help.

- *Question:* How has being in the consortium changed the way climate adaptation science is being conducted in your institution?
 - *Consortium Member Response:* The consortium has given us capacity to talk to the larger community in a way that we would not be able to otherwise. Information gets to both urban and rural communities. We have been part of the Texas No-Till program and have 300-500 producers looking at climate impacts, which was not the case in the 1990s. We just finished an update on climate impacts on cotton for cotton producers. The CASC provides groundwork and a larger voice.
 - *Consortium Member Response:* The consortium has helped a little due to the small budget each member receives, but this does help to leverage other funds. The consortium also has brought universities together that might not otherwise come together for research projects.
 - *Consortium Member Response:* Being in the consortium has elevated conversations about climate change in our region and raised our visibility. It has solidified our relationships across states, allowing us to look at things comparatively and explore commonalities. The consortium has strengthened those relationships and allowed for new thinking.
 - *Consortium Member Response:* The consortium has helped to build bridges among members and also across campuses and with students. It has helped to broaden students' research questions and their future careers.
- *Question:* We heard what everyone sees as transformational aspects; what are the biggest wins and successes of the SC CASC in progressing regional adaptation?
 - *Response:* The main success is the paradigm shift in how faculty think about their research and connecting to decision-makers, stakeholders, or rightsholders at the start of their work.
 - *Consortium Member response:* We coordinate a producer-led citizen science group irrespective of the form of agriculture. They realize they need to consider adaptation. We have seen shifts in discussion with their own network and one producer holds workshops dealing with climate.
 - *Consortium Member Response:* Our grad students and alumni are intending to become professionals primarily and are intending to be part of research projects. They are seeing actionable science research as critical to the work they want to do as professionals.
- *Question/Comment:* All of these successes are fantastic and laudable. They are mostly about cultural and institutional paradigm changes. How is the CASC at-large making progress with NCASC science priorities?
 - *Response:* There have been many projects funded and completed, but there hasn't been a synthesis of how they connect to each other. Since 2012, there have been 5 USGS directors/acting directors before Suzanne but none focused on this synthesis, and we haven't had the capacity in the HA to do synthesis ourselves. The hope is that, with USGS funding a research-grade scientist, this position could focus on research and synthesis. We don't have the story synthesized because we haven't had the opportunity to do that.

- *USGS Response:* USGS, with Gianna's help, has put together a portfolio analysis which will be presented to other CASC members soon. The Portfolio analysis and gaps we are seeing will inform hiring decisions.
- *Comment ERT:* Build in all aspects of the work you do, not just science, into the analysis.
- *Question:* When you are dreaming about budgets, what amount would allow you to significantly tackle some big problems? What would those problems be?
 - *Response:* The university CASC directors across the network have agreed that the CASC Enterprise itself should be \$100 Million, with \$10 Million per region and \$10 Million for the National CASC. For OU now, \$1.5 to \$2 Million in the HA would help us to be more strategic. At times, OU has given money from its own budget to consortium members who were stressed. With the current HA funding level, this would not be sustainable.
- *Question:* The Host Overview Narrative noted that you discussed increasing social science capacity within the team. What projects/capabilities have you added? Can you fund research and data gathering in social climate science under the USGS requirements?
 - *Response:* There is some funding under the HA that goes to UNM for social science funding. There is very little social science that we fund under the HA. Emma is working with communication scholars who are interested in working with the CASC regarding community resilience. Renee works with anthropologists regarding climate change in public health. Outside the HA, there has also been work in the Rio Grande Basin looking at integrative modeling with qualitative and quantitative social science data sets. Most of the social science work we have done is not funded under the HA.

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

ERT Reflections on the Day

The ERT met in closed session to discuss what they had heard throughout the day. Clarifying substantive questions for the Host to answer during the remaining sessions, and/or comments included:

- *Question/Comment:* The ERT would like time on Day 4 to meet with USGS (Suzanne) and OU (Renee and Emma) in separate conversations.

*This session summary was respectfully submitted by the DS Consulting Facilitation Team.
Edits were welcome and sent to Day 3 Scribe: Nancy Pionk (nancy@dsconsult.co)*

Day 4 – Collaborative Efforts and Capacity Building

DAY 4	Thursday, March 7, 2024: Collaborative Efforts and Capacity Building Purpose: Reflect on the Host University and associated academic consortium's contributions with respect to <u>Collaborative Efforts</u> and <u>Capacity Building</u> .	
Time (CT)	Sessions and Main Points	Presenters and Affiliation
11:00 am CT	External Review Team – Closed Door	Facilitation Team External Review Team ONLY
11:15 am CT	Daily Intros Review Agenda	Facilitator External Review Team SC CASC Team (OU & USGS) NCASC
11:30 am CT 45 min (+30 min for dialog)	How the CASC Works: Collaborative Efforts (cont.) Tribal Engagement Program - Program description & evaluation - Success stories - Tribal Training - o Partnership w/ FS to host 1-2 events per year - o Standalone training (e.g., HABs) - Student mentoring - Past challenges & looking forward	Amelia Cook, Sustainability Science Manager and Tribal Liaison, South Central CASC, Chickasaw Nation
12:45 pm CT	Lunch Break (60 min) <i>To avoid Zoom fatigue: Please turn off and step away from your computer screen if possible</i>	
1:45 pm CT 45 min (+30 min for dialog)	How the CASC Works: Capacity Building - Early Career Professionals - o Graduate Students & Postdocs on Host Agreement - o Managing for a Changing Climate (consortium courses) - o New Graduate Student Certificates/Programs - o Student mentoring - Working Professionals - o Managing for a Changing Climate (online courses) - o Training series w/ FWS (grassland, sagebrush) - Past challenges & looking forward	Emma Kuster, University Assistant Director, South Central CASC, OU
3:00 pm CT	Questions, Answers and Facilitated Dialogue - Open dialogue and discussion between ERT and SC CASC team regarding the Host's Overall Effectiveness towards their Host Agreement and any questions left over from prior days	SC CASC Team External Review Team Facilitator

External Review Team 5-Year Review Report
South Central Climate Adaptation Science Center

3:30 pm CT	External Review Team – Closed Door Discuss ideas and insights gleaned from the four days: - What stands out? What needs comment in the ERT report? What are your thoughts about the overall effectiveness of this Host’s work in all areas? What recommendations come to mind for inclusion in your report? Clarify next steps in the process: - What is due and when?	Facilitation Team External Review Team
4:00 pm CT	Adjourn	

DAY 4: Facilitator’s Summary
March 7, 2024, 11:00am – 4:00pm Central Time
Topic: Collaborative Efforts and Capacity Building

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, but has links to the presentation.

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

ERT Members: Karen Jenni (USGS), Victoria Keener (Pacific RISA, East-West Center), Christine Kirchoff (Penn State), Meredith Muth (NOAA/NIDIS), Greg Pederson (USGS), Caitriana Steele (NMSU/USDA);

Host, CASC and Consortium Presenters: Amelia Cook (SC CASC-CN), Noetta Harjo (SC CASC-OU), Sharon Hausam (SC CASC-OU), Jenifer Henslee Peck (SC CASC-OU), Emma Kuster (SC CASC-OU), Renee McPherson (SC CASC-OU), Jennie Mosely (SC CASC-CN), Dolly Na-Yemeh (SC CASC-OU), Kyle Oler (SC CASC-OU), Jake Palazzi (SC CASC-OU), Derek Rosendahl (SC CASC-OU), Nick Smith (SC CASC-TTU), Marina Tomer (SC CASC-USGS), Suzanne Van Cooten (SC CASC-USGS), Yvette Wiley (SC CASC-OU), Codie Winn (SC CASC-USGS), Adrienne Wootten (SC CASC-OU), John Zak (SC CASC-TTU);

Session Observers: Stephanie Mladinich (USGS);

DS Consulting Team: Facilitator: Donna Silverberg, Reporting and Support: Colby Mills, Emily Stranz.

Purpose: Reflect on the Host University and associated academic consortium’s contributions with respect to Collaborative Efforts and Capacity Building.

Welcome, Introductions & Agenda Review

Facilitator and External Review Process Manager, Donna Silverberg, welcomed the group to Day 4 of the External Review of the University of Oklahoma (OU) as Host University of the South Central Climate Adaptation Science Center (SC CASC). She conducted a round of introductions that included: SC CASC ERT Members; SC CASC Host leadership and team; SC CASC USGS leadership; SC CASC Consortium Members; and session observers.

How the CASC Works: Collaborative Efforts (cont.)

SC CASC Sustainability Science Manager and Tribal Liaison, Amelia Cook (Chickasaw Nation), continued the Host's overview of their collaborative efforts, highlighting the Tribal Engagement Program and Native student mentoring, as well as past challenges and next steps. The presentation is available [here](#). Amelia explained that it is a SC CASC priority to work with Tribes and Pueblos, of which there are over 80 in the region (inclusive of state- or non-recognized Tribes), all with diverse cultures and experience with climate change and adaptation. She said it is critical that the Tribes are involved with SC CASC in part due to their generational experience and knowledge of climate change and their Tribal treaty water rights. The SC CASC is the only CASC with two sovereign Tribal nations in the consortium, the Chickasaw Nation and Choctaw Nation of Oklahoma.

SC CASC's Tribal engagement strategy does not have a set, prescriptive process for engagement. Instead, engagements are relationship-based and intended to increase Tribal and researcher capacity over time, through co-production, listening to understand needs, and working towards independent Tribal research and science integration into plans. Amelia reiterated the importance of relationships and trust, noting that understanding histories, ethical relationships in research, and taking time to allow partnerships to develop is led primarily by the three CASC Tribal Liaison (TLs) and one Climate Adaptation Planner (One TL is funded under the HA).

There are four areas of focus in the SC CASC Tribal Engagement Program:

1. Workforce development efforts include youth outreach efforts, mentoring of interns, Native youth outreach, and the Bureau of Indian Affairs (BIA) Pathways Internship program, which connects youth to natural resources professionals.
2. Building Tribal capacity efforts include outreach (youth and professionals in environmental and other Tribal departments), workshops, Climate 101 course, and conducting vulnerability assessments.
3. Research efforts that build bridges for two-way sharing of knowledge, assisting with funding proposals, and training on ethical engagement with Tribes.
4. Adaptation planning efforts include supporting Tribes with development of vulnerability assessments, providing data/reports, and connecting Tribes with funding opportunities to continue their work.

Amelia shared examples of efforts within each area of focus (see slides 8-22), including a culturally significant plant symposium and other STEM opportunities for career advancement, stories of student's efforts and achievements, K-12 experiential learning and intergenerational transfer of knowledge, and ongoing studies and tool development for decision makers.

SC CASC conducted an evaluation of their Tribal engagement program, "Supporting Tribal Adaptation Through Climate Services," as part of the Host Agreement (HA). Details on the evaluation process and results are available in the presentation slides (see slides 23-27). The evaluation considered the challenges, needs, and priorities of Tribal nations and how the SC CASC has worked to address them. Participants in the SC CASC Tribal engagement program were interviewed for their input. Part of the evaluation considered how Tribal partners have applied climate research and engaged in climate science. The results will allow the SC CASC to better tailor their efforts to Tribal and other partners moving forward. Amelia noted that the evaluation is an ongoing effort that evolves with Tribal needs and challenges, and that SC CASC will continue to collect feedback on a regular basis to inform their engagement. Jenni Mosely, CASC PI for the Chickasaw Nation, shared that the SC CASC supports

relationship building and fostering connections between Tribal people and subject matter experts, which they have found to be very valuable.

Questions and Comments from the ERT

- *Question/Comment:* Great presentation, thank you. Over the years have you received formal or informal critique or feedback on this program and, if so, how have you learned and improved from that input?
 - *Response:* Yes, we are in constant communication with Tribal partners, and TLs are encouraged to be in continuous communication with Tribal environmental staff to solicit feedback on issues, adjustments needed, and CASC direction. This input has resulted in a shift to nearly all our Tribal workshops to being by request of the Tribes, such as the grant workshop that led to the creation of the Tribal Adaptation Menu workshop.
- *Comment:* Thank you, I've learned a lot from this presentation. In previous days, the CASC has made the point that the Tribal program is a real strength of the program, this presentation really helped demonstrate that strength.
- *Question/Comment:* The CASC mission statement includes 'transforming the way climate adaptation science is done', which is exemplified in this work. How have Tribal engagement efforts and learnings bled over into other programs and CASC efforts more broadly?
 - *Response:* Great question. As a science educator, it is important to think of science as a noun and verb. We have a role in interpreting and translating information to communities, and learning how different communities approach science, understand connection to environment, and build relationships to each other. There is room for exploring and contributing to research related to the questions and tools of inquiry that come up in these settings.
 - *Response:* In collaboration with the Office of the OU Vice President for Research, the Host developed the "[Shifting Landscapes](#)" document which focused on increasing OU researchers' cultural understanding of working with Tribes in OK. Introductory and advanced training sessions were provided for researchers, many who had never worked with Tribes, on how to interact respectfully and work ethically with Tribes and Tribal information. Many went on to develop relationships with one or more Tribes in the state.
 - *Response:* Another example is within the CASC itself, and within the main office; we have two (hopefully soon to be four) Native PhDs, multiple Masters- and Bachelors-degreed staff, and over 50 Native students in the program since 2012. They are involved in all the conversations on workshops, research projects with PIs, conducting their own research, mentoring, etc. It helps everyone think more broadly about what research entails.
 - *Response:* Sharon Hausam, SC CASC-OU, is conducting research focused on how climate information -- both from Western science and Indigenous knowledges -- is incorporated into planning processes and documents.
 - *Response:* At SC CASC, Indigenous knowledge is on the same plane as Western knowledge, so the learning and capacity building goes both ways. There is recognition that there are multiple ways of knowing. More and more, federal agencies are

incorporating Indigenous approaches in their science, for example, regarding fire work, seed banks, etc.

- *Question/Comment:* Was the Shifting Landscapes document/training/outcomes included in the Tribal program evaluation report?
 - *Response:* It was referred to, but was not a formal part of the process.
- *Question/Comment:* The agility of the Tribal engagement program is very nice to see, as well as how the broader CASC network is utilized in this program. When the Host talked about evaluation over the last couple of days, you've called out Tribal evaluation as something to build on for evaluation of rest of the overall CASC program. What have you learned from this process, which was narrow in scope, which can be utilized and scaled up for broader evaluation of the CASC program?
 - *Response:* Stories and storytelling are important and valuable ways of learning and teaching. Also, connecting with others in an iterative process to incorporate intangible outcomes of work we do.
 - *Response:* We have told stories about how we work together a lot across the network, to reviewers, to Congress, and it helps to create the culture of the CASC itself and to share impacts. However, we have not used stories as a method for evaluation; instead, evaluation historically has focused on numbers. Using feedback and learning from our work with Indigenous peoples and Tribes, we've really grown to see the value of storytelling in the evaluation process. It is a natural thing that we can take more broadly across evaluation of the program. At this point, everyone at SC CASC has long term story arc, from things done early on and how that has evolved into work overtime that we could tell more.
 - *Response:* Also, having an outsider who is familiar with the CASC conduct the evaluation was important.
- *Question/Comment:* You mentioned building tools to assess future climate impacts. How do you think about and handle sustaining tools, in particular with Tribal communities who may not have the extra capacity need to maintain tools?
 - *Response:* We work very closely with the Tribes to understand their communities and oral histories, knowledge of place, and try to expand into different departments of Tribes, to access more diverse partnership and to understand what data they need. This helps develop internal Tribal capacity so they can do this work on their own.
 - *Response:* SC CASC has been careful to not develop tools that do not have resources to sustain them. Unless it is someone's job to maintain the tool, we try not to host tools ourselves. One approach has been to work with the Tribes to incorporate examples into a community of practice or something like the Tribal Adaptation Menu. Having a specific tool or community of practice that helps guide things like grant writing for example, or the Conservation and Adaptation Resources Toolbox (CART) program, can be helpful. These are community-built tools that provide access to examples that are relevant. We also rely on partners to create and maintain tools, and the SC CASC focuses on CASC-

specific tools, such as the online climate projections. However, OU does not have a data manager in the CASC who could help with online tools and information to feed into them.

- *Question/Comment:* This is very impressive work and is exciting. The learning from this will be a long process; it will be interesting to see over time how learning from Indigenous engagement infuses the rest of the enterprise. Great to see that there are ways to deliver science to inform action in a ‘fair and caring’ way. Loved the logo you created on this!
- *Question/Comment:* The evaluation document will be very useful for others outside of the SC CASC that work with Tribal communities. Well done! Will it be publicly accessible?
 - *Response:* Yes, it has been distributed within OU, and will be shared out more broadly and posted on the SC CASC website.
- *Question/Comment:* The SC CASC is working on how to tell their story via a StoryMap, in the meantime, all the USGS CASC funded projects are listed on the [CASC project explorer website](#).

How the CASC Works: Capacity Building

SC CASC Host University Deputy Director, Emma Kuster (OU), provided an overview of the Host’s efforts to build capacity through supporting early-career professionals and working professionals, as well as past challenges and next steps. The presentation is available [here](#). Capacity building is a high priority of SC CASC and, under the current HA, the focus is on providing support for undergrad and graduate students (previous HAs allowed for funding of graduate field experience, however, the current HA did not), and leveraging opportunities to do more. Emma provided her personal story of being hired as a CASC grad student, returning to work for the CASC as a full-time staff member, and soon starting her PhD in fall 2024. She noted the support and opportunities that came from being engaged with the SC CASC.

Emma also provided details on the postdocs, graduate students, and undergrads that SC CASC has hosted, both fully and partially funded by the HA, since 2019 (see slides 4-5 for details). Some students have progressed from the SC CASC to professional careers with federal, state, and private organizations focused on climate sciences and applications.

In their capacity building efforts, SC CASC continues to adapt and offer the “Managing for Changing Climate” course at OU and some other universities (and also offered annually as an [online short-course](#)). The in-person undergraduate course includes a mock United Nations Framework Convention on Climate Change that many find valuable. At Oklahoma State University they offer the “Global Change” course which is required for all students in the Natural Resource Ecology and Management Department. Also, SC CASC collaborated to establish new academic programs such as a climate adaptation minor and pending graduate certification program at OU, and a coastal meteorology concentration at Louisiana State University.

Further, they provide early-career development opportunities such as annual workshops, facilitation/dialogue training, engaging with diverse audiences, mentoring, conference attendance, poster sessions, and team bonding. For careered professionals, SC CASC offers science workshops, ecosystem-based training, webinars, case studies, and furthering stakeholder understanding on model projections and research. The CASC has adapted their approaches over time to ensure accessibility and engagement in their capacity building, for example, providing short-courses and online options, as well as reframing offerings to clarify expectations.

Moving forward, the SC CASC seeks to address challenges in funding and staffing limitations, for example when asked to develop one-off training for partners, and to enhance climate literacy research and building capacity in overburdened communities.

Questions and Comments from the ERT

- *Question/Comment:* What do you see as the role of the CASC in capacity building for climate science at community level?
 - *Response:* The CAP RISA is out of OU (Southern Climate Impacts Planning Program), and they work at the community level on projects such as infrastructure planning. The SC CASC defers to them for workshops and planning at that level. SC CASC is a partner, but generally does not lead community work, as it would generally be an add-on to the SC CASC mission. That said, Tribal communities are fully under the SC CASC umbrella.
 - *Response:* There is a tendency for the larger cities to be the focus of community-based climate work. John Zak is working with the ecosystem and species distribution CoP to assess and collect data on population densities and resource use in the areas surrounding medium and smaller cities and communities. They are seeking to better understand the urban ecology framework as well as social and social justice dynamics.
 - *Response:* SC CASC is also considering how to incorporate social justice and climate justice into its future efforts.
- *Question/Comment:* Is there an identity you are seeking to develop for the CASC from all your work? How do you balance responsiveness to stakeholder requests with your desire to create that identity?
 - *Response:* One thing that SC CASC reinforces with staff is that there is way more work that can be done than there is time to do it. If someone on staff has a passion and it aligns with one of the many directions that the CASC can move forward and be useful in, then they are encouraged to focus on it in their portfolio. Aligned with the USGS CASC mission, the SC CASC looks for direction based on the passion of the people in CASC positions and tries to support their work.
 - *Response:* This CASC is made of 5 universities, each that has expertise to address various issues. Many requests come in that one university may not have time or expertise for, so they work within the consortium to see if the need can be addressed. OU coordinates the network of expertise; however, the work is spread across the whole consortium.
- *Question/Comment:* Regarding the capacity building you have been doing with state and federal managers, when you develop those programs, are there a suite of consistent responses you are hearing from them that they need help with?
 - *Response:* We hear a mix of responses regarding needs. One thing that we hear most frequently is the desire for a common language between researchers and practitioners. Having them all in the same room to build literacy has helped identify and address this need.

- *Question/Comment:* Are your capacity building efforts identifying additional climate science research needs/opportunities that you can also link back to your science themes (capacity informs science and science informs capacity)?
 - *Response:* Yes, SC CASC has had and will continue to have conversations in leadership meetings about what we are learning from what we hear in the capacity building and science themes. There is some discontinuity because of differences between the Consortium and USGS processes, but we try to make it flow together as best we can.
 - *Response:* We are working to better connect the Science Advisory Committee (SAC) and the USGS arm. The CASCs came out of same legislation as the USFWS Landscape Conservation Cooperatives (LCCs) and at first there was a lot of connectivity with these groups and the SACs, which influenced the way the SACs guided the CASC. Since the LCCs were dissolved, those connections are not as strong these days, but the need for connection has been identified and is being addressed.

Facilitated Dialogue and Discussion with the ERT, and Q & A Regarding Collaborative Efforts (Tribal Engagement) and Capacity Building; Overall Effectiveness towards the Host Agreement

Donna led a facilitated discussion between ERT Members and the SC CASC and Consortium in regards to the Host's collaborative efforts and capacity building, as well as the Host's overall effectiveness towards their Host Agreement.

- *Question/Comment:* Is the Tribal engagement program meant to be separate from the other parts of the program or is there an opportunity for integration between them all?
 - *Response:* The CASC started under a Western-science, siloed programmatic approach. As the program evolved and matured, awareness of the importance of Tribal involvement increased. SC CASC started talking to the Tribes to figure out what Tribal involvement could look like. Now the SC CASC is working to actively infuse Tribal perspectives and experiences throughout the entire program. For example, the "National Climate Assessment" chapter on the Southern Great Plains includes Tribal impacts and efforts in every section, as does the SC CASC draft strategic plan. It has taken time to learn this and mature, but that is the way we are heading now.
 - *Response:* There is so much opportunity for synergy and collaboration going forward.
 - *Response:* Over the years, there has been a shift from talking about, or for the Tribes, to talking with Indigenous nations. In the beginning, interdisciplinary and multi-organizational work did not have Tribes and sovereign nations involved in formulating those frameworks; moving forward the CASC believes that real engagement and shared learning are integral.
- *Question/Comment:* There are specific areas where this CASC excels, for example in Tribal engagement and capacity building, and there may be other areas where you are spread thin. How do you connect with other CASCs to learn from their work on similar efforts, and share your lessons with them? Are there opportunities to work better together as a national network of regional CASCs?

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- *Response:* This is part of the opportunities going forward, and part of challenges in the past. The NCASC office's science program has not resulted in great cross-CASC efforts until recently (for example, the CAP postdoc program which has postdocs at multiple CASCs doing individual research and also connect together on a national synthesis project to develop the Future of...reports for NCASC, career development opportunities, etc.). Other than that CAP program, NCASC does not do a lot of cross-CASC synthesis or research. This is the first time in nearly a decade that all USGS CASC director positions are filled (and not acting or interim directors), and directors just began meeting regularly. The framework is evolving, and the group is developing relationships that hopefully will provide opportunities to continue to improve and learn from each other.

Before closing the 4-day review, Donna asked that each person present mention one thing they appreciated from the time together. Comments included: the opportunity to see the whole program through fresh eyes; having an opportunity to see and appreciate the work of colleagues; taking time to reflect on the growth of the program over time; having a chance to get to know each other better to do future work; appreciating the time, energy, and passion that everyone has for the work they are doing (even if the financial reward isn't huge); learning the degree to which everyone is 'hustling' to get the work done; and seeing the breadth of regional and cultural problems coupled with the passion of the team to try to solve them by building capacity at and from all levels. It was noted that the opportunity to reflect and hear the questions being asked has spurred new thinking and new ideas.

Donna thanked the ERT, CASC & Consortium Members, and Observers for their hard work, patience, engagement, and attendance at all of the sessions. With that, the meeting and review session was adjourned.

*This session summary was respectfully submitted by the DS Consulting Facilitation Team.
Edits were welcome and sent to Day 4 Scribe: Emily Stranz (emily@dsconsult.co)*

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