



SOUTH CENTRAL CLIMATE ADAPTATION SCIENCE CENTER



2022-2023 Annual Report

August 1, 2022 - July 31, 2023

The South Central Climate Adaptation Science Center (CASC) is one of nine regional Climate Adaptation Science Centers that are managed by the U.S. Geological Survey (USGS). The USGS Climate Science Adaptation Centers are working across regions of the United States to develop and bring critical science results to managers and stakeholders concerning impacts of climate variability, trends, and extremes with the goal of developing strategies to minimize economic, sociological, and ecological consequences. Priority science activities include measurement, modeling, and decision support that are related to the impacts of climate on natural and cultural resources.

**South Central Climate
Adaptation Science Center
Hosting Agreement Term Sheet**

**KEY ELEMENTS OF THE
USGS-UNIVERSITY OF OKLAHOMA (ET AL.)
COOPERATIVE AGREEMENT FOR THE HOSTING OF
THE SOUTH CENTRAL CLIMATE ADAPTATION SCIENCE CENTER**

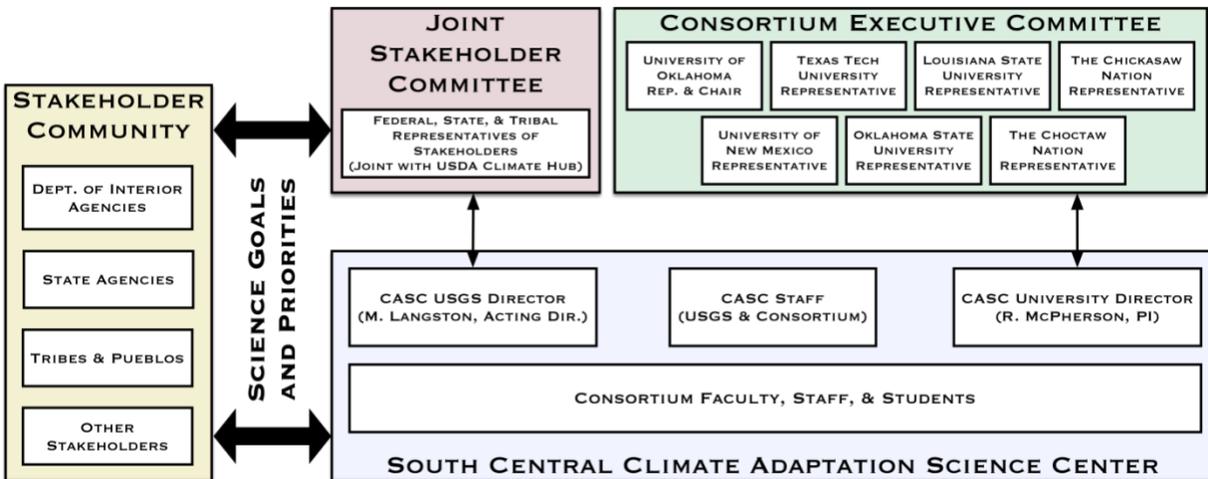
EXPECTATIONS & DELIVERABLES

- In this document, the “Consortium” refers to the University of Oklahoma (OU) and all funded subawardees of the hosting agreement for the South Central Climate Adaptation Science Center (South Central CASC). The “regional USGS office” will refer to those members of the U.S. Geological Survey who work full- or part-time for the South Central CASC. The South Central CASC comprises the Consortium and the regional USGS office.
- The Consortium PIs will pass along the USGS written science priorities to all CASC-funded employees within their respective institution on an annual basis when it becomes available for dissemination.
- The primary roles of OU in this hosting agreement are the following:
 - house the South Central CASC main office,
 - liaise with the full network of regional CASCs (primarily through their university hosts),
 - coordinate with the Regional and National CASC offices,
 - oversee the implementation of the hosting agreement and the South Central CASC strategic plans (e.g., science agenda, Tribal engagement plan, communications plan), and, most importantly,
 - provide leadership in and conduct science and capacity building across the south-central U.S. for the purpose of aiding DOI agencies and their natural and cultural resource partners in adapting to climate variability and change.
- On behalf of the Consortium, OU will provide a stand-alone annual report focused on the hosting agreement activities 60 days prior to the end date of each budget year. The Consortium’s report will include the following elements related to the Consortium’s work for the South Central CASC:
 - Specific examples of actionable science, including quotes, stories, and links to policy- and decision-making; and
 - List of students, staff, faculty, and post-docs; their major accomplishments during their time associated with the South Central CASC (e.g., publications, presentations), and how their work relates to South Central CASC priorities that were disseminated by the regional USGS office.
- The South Central Climate Adaptation Science Center (South Central CASC) will host an annual in-person meeting or videoconference to highlight the past year’s accomplishments in science, regional dialogue, capacity building, and communications.
- All South Central CASC projects will comply with NCASC data management policies [<https://casc.usgs.gov/data-policies-and-guidance>] and USGS Fundamental Science Practices, when appropriate.
- All South Central CASC products that use the USGS logo will comply fully with the CASC Communication Guidelines. Other products may only deviate from the guidelines when the guidelines are unclear, not applicable, or inappropriate for the audience.
- The regional USGS office and the Consortium will work together to help implement recommendations, as relevant, from the five-year review report found in Appendix I.

- Through OU, the Consortium will submit the following communication products to NCASC:
 - During each year of the five-year cooperative agreement:
 - At least six USGS Mission Area Highlights
 - At least three items for the Climate Adaptation Insights Newsletter (or similar)
 - At least one resource management- or climate policy-relevant success story from the CASC, to be used in promoting the CASC's work
- The OU Assistant Director will attend the majority of monthly CASC Network Staff calls. As appropriate and available, other OU employees also will attend the calls.
- At the conclusion of the cooperative agreement, OU will complete the following with the aid of the Consortium:
 - Produce a final report that summarizes actionable science activities, scientific achievements, educational and training accomplishments, and communications highlights from the 5-year period of performance;
 - Host a multi-day, 5-year review of the South Central CASC (Consortium and regional USGS office) that will be coordinated by NCASC; and
 - Archive and deliver all files associated with the Consortium-hosted website to NCASC (in the event of a change in the South Central CASC host at the end of the agreement period).

INSTITUTIONAL ARRANGEMENTS

- **Leadership Team**
 - The diagram below overviews the relationships between USGS and Consortium leadership teams and stakeholders as of August 2019.
 - Consortium institutions include: University of Oklahoma, Texas Tech University, Louisiana State University, The Chickasaw Nation, University of New Mexico, Oklahoma State University, and The Choctaw Nation of Oklahoma
 - The regional USGS office oversees the governance, membership, and execution of the Joint Stakeholder Committee or its successor. Additional definitions of roles and responsibilities of the regional USGS office are outlined in a Memorandum of Understanding (MOU).
 - The Consortium oversees the governance, membership, and execution of the Consortium Executive Committee or its successor. Under bylaws originally established in February 2013 and amended as needed at later dates, the Executive Committee governs the consortium and meets annually to “review past year activities and research and provide recommendations on the future direction of the consortium portion of the South Central CASC.”
 - Membership and voting rights are extended to the PI for each consortium institution. Non-voting members are the Assistant Director, who serves as Secretary, and the USGS South Central CASC Director or their designee. Other voting or non-voting members may be approved by the Executive Committee.



➤ Governance Strategy

- Governance of the South Central Climate Adaptation Science Center is vested in the regional USGS CASC director and her/his supervisor and in the Consortium principal investigator (aka University director). The regional USGS CASC director oversees the South Central CASC budget, USGS funding calls, development of the scientific strategic plan(s), relationships with other federal agencies and the Joint Stakeholder Committee, and other federal responsibilities. The University director oversees the Consortium budget, response to the USGS funding calls, work with tribes and pueblos, input to science and planning activities, relationships with the broad Consortium network to agencies and individuals, and other university responsibilities. An executive board governs the Consortium as detailed above.
- Hiring authority is vested in the future employee's institution, but the USGS CASC Director can assist with candidate interviews. Tribal sovereignty precludes any request from or requirement of USGS or the University of Oklahoma to be involved in their non-USGS-funded positions (e.g., student interns). Employees' supervisors work for the same institution and oversee annual evaluations and professional development goals.
- To facilitate daily coordination, the regional USGS and University CASC directors are co-located in the same office suite at OU. Non-OU consortium members can interact directly with the USGS CASC Director and staff. OU's Assistant Director liaises among consortium researchers and USGS. Except for official USGS business (e.g., RFP info), OU streamlines interactions between the USGS and consortium by collecting annual report data and communications highlights and providing it to USGS staff.
- Open to all consortium and USGS personnel, regular calls update South Central CASC employees on current activities, discuss critical issues from DOI or USGS HQ, highlight science network-wide, report how science funds in the hosting agreement are meeting the South Central CASC mission, and build collegiality across the network. The USGS also oversees stakeholder advisory committee meetings and calls.
- Upon review by the USGS, should a portion of the Consortium hosting agreement be deemed to not fulfill the South Central CASC mission, the regional USGS

CASC director and the university director will work with the Consortium institution to align the work satisfactorily.

➤ **Awareness and Engagement**

- South Central CASC affiliates members are defined as those who belong to a consortium institution, are partners on a CASC proposal, or enhance our strengths in key areas. Interested individuals must apply for Affiliate status and be approved by the Consortium Executive Board. Applications are gathered and presented to the Executive Board on a quarterly basis for approval. Affiliates participate in proposal calls, working groups, science workshops, and other activities through active communication and face-to-face visits.

SCIENCE

➤ **Nature of Science Required**

- Priority science themes within the hosting agreement are deliberately flexible to adjust as a new CASC Science Agenda is created and to better meet the needs of stakeholders via co-production. Activities outlined below may change as the priorities of our stakeholders evolve over time. As of August 2019, the initial science priorities of the Consortium are as follows:
 - Toward Sustainable and Usable Water Resources – UNM, OU, and TTU will work directly with stakeholders to co-produce knowledge about how to manage water sustainably through wet and dry cycles.
 - Toward Resilient Coastal Ecosystems along the Northern Gulf of Mexico – Led by efforts at LSU, we will develop new observational datasets, examine coastal and wetland dynamics through field work and modeling, and study vulnerability, resilience, and adaptation through interdisciplinary efforts.
 - Toward Enhancing the Resilience of Indigenous, Rural, & Vulnerable Communities – The Tribal Liaison will aid Tribal adaptation projects. In Year 8, the Tribal Liaison will help develop a regional network of climate adaptation professionals for the Tribes to partner with on their planning efforts. The Tribal Liaison will examine best practices for adaptation from work of other Tribes and will determine how to best apply these ideas in our region.
 - Toward Stakeholder Understanding of Product Sensitivities & Uncertainties – Stakeholders and social scientists will collaborate on projects to better understand uncertainties associated with modeling future water demand, land management strategies, human population and migration, etc.
 - Toward Mapping & Predicting Changes in Species Distributions – Led by efforts at OSU and OU, we will identify key species or ecosystems of concern through conversations with our stakeholders and work collaboratively to perform relevant projects that assist our stakeholders in adaptation planning.
 - Toward Understanding Teleconnections that Influence Ecosystem Resilience – Under this theme, OU will team with colleagues at other Climate Adaptation Science Centers to measure, identify, analyze, and adapt to key teleconnections.

- Science conducted under these areas (or what they evolve into during the 5-year project period) will be reported through both regular calls (see Governance Strategy above) and OU's stand-alone annual report (see Expectations and Deliverables above).

REGIONAL DIALOGUE AND INFORMATION SHARING

➤ **Dialogue on Climate Adaptation**

- Regional USGS CASC and Consortium personnel will engage in dialogue about climate adaptation with stakeholders every year using multiple methods, including periodic listening sessions, meetings between working groups and resource managers, national/regional conferences, short courses, and workshops/trainings. In particular, OU will engage in the National Adaptation Forum (or similar) by convening sessions, learning from others, seeking collaboration for, and hosting activities for our partners in Years 9 and 11. OU will host four, online short courses for natural resource managers, introducing them to climate science, climate-related products, impacts of climate change, and adaptation strategies in Years 8, 10, and 12. Consortium members also will serve as climate science/adaptation experts on an as-needed basis.
- Desired outcomes include metrics to evaluate co-produced projects (developed in partnership with USGS and congruent with NCASC metrics), outlines or draft text for future proposal submissions, and draft science translation materials.

➤ **Involvement in Activities Related to Indigenous Peoples**

- In partnership with the regional USGS personnel, the Consortium's ongoing strategies to partner with Indigenous Peoples are as follows:
 - conduct research with Tribes related to Tribal lands, waters, and peoples;
 - provide scientific expertise and relevant inputs for Tribal development of adaptation strategies and plans;
 - include analysis of culturally significant species when appropriate and accepted by Tribes or Pueblos; and
 - provide scientific trainings for Tribal staff and, when asked, for elders, educators, and students.
- Details of our future plans for Years 8-12 are below in Education, Training, and Capacity Building (see *Enhancing the Resilience of Indigenous, Rural, & Vulnerable Communities*).

EDUCATION, TRAINING AND CAPACITY BUILDING

- In Years 8-12, the Consortium will focus our capacity building activities on those consistent with the science themes (see Nature of Science Required), and the Consortium commits to activities that are aligned with DOI's Secretarial Priorities.
- **Capacity Building Efforts for Each Research Area**
 - *Sustainable & Usable Water Resources* – Through the co-production described in the previous section, we will build the capacity of our stakeholders to sustainability manage their water resources.

- *Resilient Coastal Ecosystems along the Northern Gulf of Mexico* – Our LSU members will connect with the strengths of the LA Sea Grant, Center for River Studies, and Center for Coastal Resilience to infuse understanding of the impacts of climate variability and change into these centers’ public outreach programs.
- *Enhancing the Resilience of Indigenous, Rural, & Vulnerable Communities* – Building on the work done in Year 8, the Tribal Liaison will join with climate adaptation experts to conduct 1-2 trainings/year for Tribal staff. The Tribal Liaison will coordinate with our main office on technical assistance/climate services.
- *Stakeholder Understanding of Model Sensitivities & Uncertainties* – OU will distribute accessible historical climate data and future climate projections for our region (GIS-compatible layers and graphics), with factsheets or presentation slides that guide users in the correct application of the data. OU will deliver initial products in Year 8, adding other guidance documents in Years 9-12. Variables, indicators, and formats will result from stakeholder discussions and will be consistent with the National Climate Assessment process, allowing users to incorporate the information directly in their planning and management strategies.
- *Mapping & Predicting Changes in Species Distributions* – OU will conduct 3 “Climate 101” trainings for refuge managers in Years 8-10 to increase their proficiency on climate impacts on flora, fauna, and habitats. In Years 9-11, OSU will provide geo-referenced, observed-population data for refuge planning as related to important species, including both native and invasive plant and animal species. In Years 10-12, OSU will create factsheets for resource managers, highlighting management techniques that enable each species to better adapt to environmental stressors.
- *Understanding Teleconnections that Influence Ecosystem Resilience* – Predictive products may be an output as we learn about how teleconnection patterns influence natural resources. When that occurs, OU will engage DOI managers and OSU and LSU Extension personnel to pilot some products for water, land, or habitat management.

➤ **Cross-Department and Cross-Institution Engagement**

- Working Groups
 - OU will establish 8 thematic working groups that are deliberately selected to cut across institutional barriers and unite expertise. These groups will focus discussion on themes that address key questions across distinct geographic and disciplinary contexts and will seed ideas for further work and joint proposal development. Each group will be co-led by an early-career researcher or practitioner who will be mentored by a senior scientist or administrator (ideally from another institution) to effectively engage across the diverse set of people and interests.
 - Themes will be our 6 science priorities (see Nature of Science Required) plus Project/Program Evaluation and Connecting Research and Engagement, which are aligned with our capacity building priorities. OU will select 3 groups for Year 8 and add another group each year until all are active. Over time, groups may retire and others may begin, as needs arise. OU will recruit members of regional, climate-related boundary organizations to serve on some of the groups.

- OU will host a quarterly, South Central CASC webinar that highlights the efforts and successes of our working groups. On occasion, this webinar may be included as part of the recently established Southern Plains Climate Science Seminar Series.
 - Cross-departmental and Inter-collegial Engagement
 - The Consortium will grow our efforts in cross-departmental and inter-collegial engagement within each of our institutions.
 - At OU, CASC personnel will coordinate research teams across campus, finding interested researchers and connecting them with stakeholders for co-production activities. Post-docs or graduate students will lead a climate-related “journal club” or discussion, mentor students, and conduct a cross-college and multi-institution Severe Weather and Climate Change working group during Years 8–12. Finally, OU will develop a climate adaptation graduate certificate program in Year 10.
 - All universities will host consortium post-docs for a defined period of time to foster cross-member training and research development.
 - At TTU, monthly research meetings and seminars connect new faculty and researchers with stakeholders for co-production, communications, and capacity building. In addition, TTU will lead its popular monthly pub science and movie night events for the local community. Finally, cross-unit seminars and speaker’s series build networks across campus and highlight funding opportunities.
 - LSU will build new climatology and coastal meteorology programs.
 - UNM will create an interdisciplinary, CASC-centered team that crosses the School of Architecture & Planning and College of Arts & Sciences.
 - OSU will re-tool its climate change courses to add sections related to climate change adaptation, expanding content to interests across campus.
 - Tribal Engagement
 - The Tribal Liaison will mentor Chickasaw students at OU during Years 8-12. Also, The Chickasaw Nation will discuss what cultural resources mean to their Tribe, eventually resulting in inter-tribal conversations. The Chickasaw Nation and The Choctaw Nation of Oklahoma will co-convene quarterly discussions on sustainable water planning, engaging staff across multiple departments.
 - Course Development
 - The Consortium will establish co-taught courses across our CASC institutions. For example, learning from an experiment of teaching Managing for a Changing Climate (developed by CASC faculty/staff) at both OU and LSU in Fall 2018, TTU will add into this collaborative learning environment by Fall 2020.
- **Role of USGS CASC Director in Capacity Building Activities**
 - The USGS and University CASC Directors are full and active partners who cooperate to process the many external demands from USGS HQ, collaborators, and stakeholders alike.

- As USGS full-time researchers join the CASC team, they are invited to participate in research projects, to lead a CASC working group, to be guest speakers in classes, to help mentor early-career researchers, and to participate in other capacity building efforts.
- **Alignment of Activities with CASC Mission**
- The proposed activities of the South Central CASC in Years 8-12 directly address our mission to provide natural and cultural resource managers with the science, tools, and information they need to address the impacts of climate variability and change on their areas of responsibility. Our science themes, working groups, and overall priorities shall further this mission and effectively serve stakeholders throughout our region. To ensure this emphasis remains consistent throughout our activities, the Consortium will develop outcomes that inform management and evaluate the extent to which these outcomes are successful. In this manner, the CASC can maximize the time researchers conduct their studies and the relevance of their reported tasks.
 - OU will report each project according to the themes listed in the CASC's most recent Strategic Science Plan to ensure alignment with USGS priorities. As metrics for each science theme and capacity building activity are developed, we also will report those metrics annually to aid in the evaluation process.
- **Engagement in Indian Country and of Underrepresented Communities**
- The Consortium will continue our engagement with Native professionals and Tribal employees through climate adaptation-related trainings and other activities. Also see sections above on Involvement in Activities Related to Indigenous Peoples, Enhancing the Resilience of Indigenous, Rural, & Vulnerable Communities (under Education, Training and Capacity Building), and Tribal Engagement (under Cross-Department and Cross-Institution Engagement).
 - The Consortium main office in Norman, OK, has been successful in recruiting, hiring, and retaining members of a diverse team, especially those who have been underrepresented traditionally in science, technology, engineering, and mathematics fields. The Consortium will track demographics of its workforce to average 50 percent females and 40 percent non-Caucasians in its employees (both permanent and temporary). The regional USGS office and Consortium institutions will work together to engage marginalized communities of stakeholders in the science and communications activities that result from the CASC.
- **Adjunct Faculty Appointments for USGS Personnel**
- USGS personnel may serve as adjunct faculty at the discretion of the specific institution and department. In most cases, a Federal employee expresses interest in adjunct status within a given department and is nominated at a regular faculty meeting. Most departments require the individual to hold a Ph.D. in that discipline (or closely related field), submit a CV and letter of interest, and present a colloquium prior to a vote. Departments expect adjunct faculty to be in active service, either serving on graduate committees, teaching a course, guest lecturing, assisting a departmental committee, or other activity to enhance the program.

COMMUNICATIONS AND DATA MANAGEMENT

➤ **Communications Plan**

- A Communications Plan for the South Central CASC has been developed by the regional USGS office and personnel at OU. The Plan features the use of online tools, social media, and in-person events to:
 - promote, facilitate, and improve the use of climate science in resource management decisions;
 - empower science producers and users with resources and spaces for collaboration;
 - strengthen partnerships to broaden the reach of our work.
- The Plan includes specific objectives to achieve these goals and suggests messaging tactics for reaching these audiences.
- In compliance with the Plan, CASC staff and students at OU maintain our website at <https://southcentralclimate.org>.
Communications staff consistently consult the plan when selecting projects and prioritizing partnership opportunities. Refer to the Communications Plan for details.

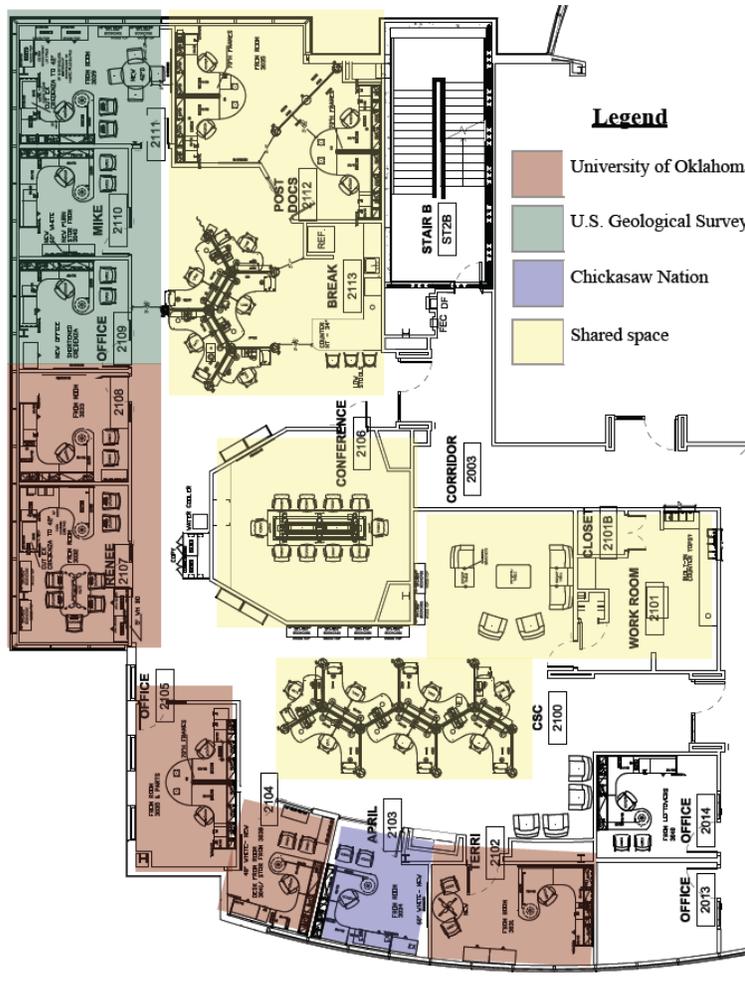
➤ **Compliance**

- OU communications and administrative personnel will coordinate press releases, use appropriate logos, report highlights of future activities, and distribute information from USGS HQ to our network. Our Style Guide, with guidance on color schemes, grammar/style, logo use, etc., was developed to complement (not supersede) NCASC's guidelines.
- OU works with our USGS Data Steward to establish metadata and provide project datasets to ScienceBase for distribution.
- The Communications Specialist in our hosting agreement will complement the work of the USGS CASC Research Coordinator.
- Our Communications Plan will evolve as NCASC guidelines change.

➤ **Additional Activities and Coordination**

- OU will develop a survey in Year 8 and administer it in Years 9 & 11 to measure the value of our Tribal engagement efforts and use of climate science in Tribal projects. USGS CASC personnel will review survey questions and analyses. Summaries results will be publicly available.

SPACE



➤ **Main Office of the South Central CASC**

- The South Central CASC’s main office is 6,629 square feet of contiguous space (layout displayed above) with conference and break rooms, lounge, high-speed internet, and color copier/printer. Reconfigurable to grow, the space facilitates mentoring students and collaborating as a multi-institutional organization. This space (or similar) will be provided for the South Central CASC main office during the entirety of the grant award (Years 8-12).
- See Institutional Commitment (below) for cost of space.
- The regional USGS Director’s budget covers materials and supplies used by regional USGS staff; the University Director’s budget covers normal maintenance costs for the space.
- OU provides central mail service and oversees a scheduling calendar for conference and workshop room needs.
- USGS supports their specific clerical needs.

ADMINISTRATIVE

➤ **University Director/Principal Investigator**

- Dr. Renee McPherson is the University Director and Principal Investigator for the South Central CASC. In her CASC role, she manages and oversees the

consortium activities and budget under the hosting agreement and supervises OU employees.

- Ms. Emma Kuster will serve as the Assistant Director. In her role, she will direct daily operations, engage with stakeholders, coordinate with regional USGS personnel, interact with all Consortium institutions, and conduct scientific activities that promote climate change adaptation across the region.
- OU's Financial Administrator will maintain OU's payroll; handle invoices, purchases, and travel; prepare budget projections; reconcile financial records; and ensure compliance.
- The Communications Specialist will be responsible for implementing our communications plan, including updating website content and social media, writing scientific highlights and newsletter items for DOI, summarizing discussions from scientific meetings, interacting with stakeholders, and communicating their needs to the broader network.

➤ **Institutional-level Commitment**

- OU commits \$2.2 million, including \$600K of unrecovered facilities and administrative (F&A) from the hosting agreement; \$90K/year for host expenses (e.g., printing, telecommunications); and \$100K/year for office suite rent (for USGS, OU, Chickasaw Nation employees). Also, OU will retain our status as a University Strategic Organization (USO), with \$100K/year to aid CASC activities.
- OU continues three hard-funded positions created for the Center in 2012 and filled by Dr. McPherson (PI, 9-mo), Dr. Martin (Co-PI, 9-mo), and Ms. Sarsycki (Financial Administrator, 12-mo). Responding to the external review, OU also adds \$28K per academic year as a salary/fringe supplement for the University Director.
- LSU cost shares \$82,340 for PI D'Elia to provide oversight and coordination on the LSU research associated with the hosting agreement.

➤ **Award Processing**

- Within OU's Office of Research Services (ORS), 5-6 experts handle proposal development, contract administration, and subaward management, and several hold Certified Research Administrator certificates. All receive annual financial training through OU, including updates on new Federal regulations.
- As of August 2019, Ms. Susan Cates serves as the "CASC Awards Manager," and OU will keep a single point-of-contact.

DIRECT & INDIRECT COSTS

➤ **Indirect Costs and Pass-Through Funds**

- Indirect costs (IDC) are research support costs incurred by the Consortium and include the cost of facilities usage, building maintenance, utilities, grant administration, and other services. Rates are clearly identified in our Budget Justification and are computed at an institutionally negotiated rate.
- If the cooperative agreement between the USGS and OU is simply modified yearly, OU will charge IDC on up to \$25K of subawards in the hosting agreement. Once charged, OU will waive its IDC for consortium member

subawardees (and thus USGS) on USGS funding outside of the hosting agreement (e.g., annual CASC science funding). Institutional IDC for each subawardee always will be collected.

Appendix I: Five Year Review Report Recommendations

American Fisheries Society. 2018. Five-year external reviews of the eight Department of Interior Climate Science Centers: South Central Climate Science Center. American Fisheries Society, Bethesda, Maryland. <https://casc.usgs.gov/content/annual-reports-reviews>

Institutional Coordination:

- The SRT recommends that funding and staffing to the SC CSC be increased or expectations for operations and productivity be adjusted accordingly.
- The SRT is concerned about maintaining the ability of Dr. McPherson, or any successor, to be successful in the role of SC CSC university director while being obligated to meet the multiple demands of the university and the SC CSC. The USGS and OU should develop a strategy or incentives to ensure retention of the current leadership and encourage others to serve in CSC university leadership positions.
- The SRT supports the SC CSC's intention to establish a joint advisory committee with the Southern Plains Climate Hub to improve efficiencies and coordination between programs and avoid overtaxing current and future advisory committee members.
- The SC CSC should consider further integrating New Mexico institutions into programs and projects.
- The SC CSC should consider strategies to continue to proactively engage multiple resource agencies toward common climate adaptation goals in the event that LCCs are dismantled.

Tribal Engagement:

- The SC CSC should use the trust and partnerships that they have developed with tribal partnerships as a foundation to expand their engagement with tribes and pueblos in New Mexico, Texas, and Louisiana, although the SRT recognizes the limitations of budgets. The SRT recognizes that these efforts are already underway and encourages continued attention to this issue.
- The SC CSC should evaluate how to shift tribal engagement from the start-up phase to long-term support, information distribution, education, and training. A challenge will be to identify which activities fit within the CSC mission and budget.
- The SC CSC should continue efforts to identify activities that support tribal empowerment, planning, decision making, adaptation, and management and refine approaches to further strengthen tribal engagement. Building tribal capacity through workshops may provide greater benefits than adding more tribes and pueblos to the consortium.
- The SRT suggests the development of a strategy for assessing tribal interests, concerns, and needs to determine an appropriate level of engagement and communication with potential stakeholders and partners.
- The SC CSC should continue building tribal technical capacity to work with climate data for use in vulnerability assessment and planning. Guidance from tribal technical experts will define what climate information would be useful to tribes and the appropriate communication tools to disseminate this information.
- The success of developing tribal technical expertise for using climate data for tribal planning should be evaluated.

Actionable Science:

- The SC CSC will benefit by conducting an evaluation that will help to decide how, and to what extent, to focus or prioritize science efforts in coming years.
- The use of directed grants and targeted grants is an agile way of addressing emergent stakeholder needs, and it may be instructive for the SC CSC to review the degree to which projects funded through these means are reflected in the priorities identified in the Strategic Science Plan (Winton et al. 2013);
- The SC CSC consortium has excelled in leveraging funds with other efforts, and it would be helpful to understand and map these projects to the SC CSC priorities and themes.
- Clearly articulating the processes that are in place to coordinate among funding streams would be helpful to all SC CSC partners, stakeholders, and future strategic planning efforts.
- The SC CSC is positioned to continue fostering coproduction of actionable science. The program would be strengthened by working with PIs to demonstrate the extent to which projects build on previous work related to applied climate science;
- Stakeholders strongly supported SC CSC-developed science products, and the SRT suggests continuing to emphasize to investigators the need to demonstrate meaningful coproduction in all funding requests.
- Partners and stakeholders reached during this review expressed a desire for the SC CSC to provide increased assistance with appropriate application and use of CSC data and products.

Communications:

- The SRT applauds and encourages continued development of the Strategic Communications Plan.
- The SRT suggests making the communication goals more central to the document and fleshing out the Implementation section by explicitly stating what constitutes success for their communications program and then developing metrics to evaluate progress towards that success.
- The SRT applauds the development of, the strategic communications plan and encourages many of the proposed refinements, including a Web site overhaul and communications management plans for funded projects.
- The SC CSC would extend the use of their products by exploring avenues to make data, tools, and information accessible to those who were not directly involved in particular projects (i.e., increase the applicability and accessibility of SC CSC-funded science to the larger SC CSC region beyond simply posting data to ScienceBase).
- The SRT agrees with the provision of the Strategic Communications Plan to multiply the SC CSC's impact by utilizing existing trusted messengers rather than attempting to cultivate and maintain its own relationships with multiple individual end-users. However, care should be taken to ensure appropriate branding and credit to the SC CSC for its materials and resources so that the ultimate users of that information are aware of the ultimate source of information they value.
- Because “[s]takeholders and staff have expressed a need for a better representation of how the CSC is unique in the landscape of similar boundary institutions” (SC CSC 2017:4), the SC CSC should work with other climate-focused boundary organizations in

the region to identify and clearly communicate what each of them SC CSC uniquely offers and to whom.

- Explore ways to make data, tools, and information accessible to those who were not directly involved in a particular funded project so as to increase the applicability and accessibility of SC CSC-funded science to the larger SC CSC region.
- Consider Science Communication training workshops for investigators and staff (Baron 2010).

Tactical:

- Conduct an overhaul of the SC CSC Web site (SC CSC staff affirmed that this is a high priority)
- Ensure that public access to SC CSC data meets standards for publicly funded data and SC CSC objectives for improving end-user and partner access to SC CSC science and tools (Kuster et al. 2017).
- Revisit whether (and, if so, when) data delivery is restricted behind a firewall (e.g., for the climate change projections developed by the 35 project).
- Continue promoting the online course Managing for a Changing Climate. This is a stellar example of a successful and impactful communications product and could be held up as a best practice for other CSCs to use or develop in their regions.
- Expand the Messaging Guidance for Primary Audiences section (SC CSC 2017:12) to include researchers/scientists as a primary audience.
- Refine SC CSC's and member scientists' communication of climate change uncertainty, clearly distinguishing uncertainty about society's future choices from uncertainty about the climate system response.
- In other words, take care not to conflate policy uncertainty with climate variability with model uncertainty.

**South Central Climate
Adaptation Science Center
Annual Report**



Administrative

Award Recipient:

University of Oklahoma
201 Stephenson Parkway, Suite 2100
Norman, OK 73019

Contact Information:

Renee McPherson, PhD
University Director, South Central Climate Adaptation Science Center
Email: renee@ou.edu
Phone: 405-325-1272



Photo taken in 2023

Project Title:

Hosting the Department of the Interior's South Central Climate Adaptation Science Center

Award Agreement Number:

G19AC00086

Report Date:

May 31, 2023

Reporting Period:

August 1, 2022 – July 31, 2023

Purpose and Objectives

The South Central Climate Adaptation Science Center (CASC) is a research collaboration between the USGS, University of Oklahoma (host institution), Texas Tech University, Chickasaw Nation, Choctaw Nation of Oklahoma, Louisiana State University, Oklahoma State University, and the University of New Mexico. Our team conducts science that helps fish, wildlife, ecosystems, and the communities they support adapt to climate change. The South Central CASC collaborates with a wide range of researchers and decision-makers in tribes, state and Federal agencies, universities, and non-governmental organizations. Our Center has existed since March 2012, but in this report we refer to Year 4 since it is the fourth year in our current Host Agreement.

This report provides a summary of the South Central CASC Consortium activities for Year 4 (August 1, 2022 – July 31, 2023). The Consortium accomplished the agreed-upon deliverables for this year outlined in our Term Sheet document, and these are discussed throughout this report. In Year 4, the South Central CASC:

- Redesigned our online short-course series and plan to re-release them in the fall of 2023;
- Conducted stakeholder-driven science related to our six science priorities;
- Engaged with stakeholders and built capacity through trainings and workshops (e.g., climate 101s, climate projection trainings, tribal resilience, etc.);
- Promoted cross-departmental and inter-collegial engagement at each institution and across the Consortium through ideating events and our Communities of Practice;
- Redesigned our Affiliate Member program;
- Conducted Tribal Engagement program evaluation;
- Maintained our online presence through our website, social media, and webinars;
- Hosted a hybrid Science Meeting in Fall 2022;
- Engaged in cross-network collaborations in research, DEI, and climate training efforts; and
- Submitted the required communications products to the National CASC.



Organization & Approach

Personnel Financially Supported on the Host Agreement

The table below highlights CASC employees at our consortium institutions supported on our host agreement.

Personnel	Affiliation	Role	FTE on Host Agreement
Renee McPherson	University of Oklahoma	Consortium PI & University Director	0.41 FTE for 1 month, 0.25 FTE for 2 months, 0.66 FTE for 1 month, 0.6 FTE for 1 month
Emma Kuster	University of Oklahoma	Consortium Co-PI & University Assistant Director	1 FTE for 6 months, 0.9 FTE for 6 months
Jenifer Henslee Peck	University of Oklahoma	Science Translator	1 FTE for 12 months
Yvette Wiley	University of Oklahoma	Tribal Liaison & Research Associate	0.1 FTE for 2 months
Derek Rosendahl	University of Oklahoma	Research Scientist	0.85 FTE for 4 months
Adrienne Wootten	University of Oklahoma	Research Scientist	~0.5FTE for 3 months
Ellen Robertson	Oklahoma State University	Postdoctoral Associate	1 FTE for 12 months
Emma Roberts	Texas Tech University	Postdoctoral Associate	1 FTE for 12 months
Kathryn Tiedmann	Texas Tech University	Undergraduate Student	20 hours per week (Aug - present)
Kristine DeLong	Louisiana State University	Consortium Co-PI	1 FTE for 1 month
Victor Rivera-Monroy	Louisiana State University	Consortium Co-PI	1 FTE for 1 month
Kylie Palmer	Louisiana State University	Graduate Student	0.5 FTE for 12 months
Xioachen Zhao	Louisiana State University	Graduate Student	0.5 FTE for 4 months
Ivan A. Vargas-Lopez	Louisiana State University	Graduate Student	0.5 FTE for 12 months
Renia Ehrenfeucht	University of New Mexico	Consortium Co-PI	0.01 FTE for 9 months
Lani Tsinnajinnie	University of New Mexico	Consortium Co-PI	0.01 FTE for 9 months
John Fleck	University of New Mexico	Consortium Co-PI	0.01 FTE for 9 months
Brennan Davis	University of New Mexico	Graduate Student	0.5 FTE for 12 months
Maximiliano Trujillo	University of New Mexico	Graduate Student	0.5 FTE for 12 months
Walker Williamson	University of New Mexico	Graduate Student	0.25 FTE for 12 months
Emily Arasim	University of New Mexico	Graduate Student	0.375 FTE for 7 months
Claire Jordy	University of New Mexico	Graduate Student	0.25 FTE for 10 months
Roman Aragon	University of New Mexico	Graduate Student	0.25 FTE for 3 months
April Taylor	Chickasaw Nation	Consortium Co-PI & Tribal Liaison	1 FTE for 11 months

Personnel Who Contribute Time/Service to the Host Agreement

The table below highlights the CASC employees at our consortium institutions that are supported by other means but contribute time/service to the host agreement mission. In addition, the CASC has over 95 Research Affiliates across the consortium and at partner institutions. A redesigned affiliate program will be released in August 2023.

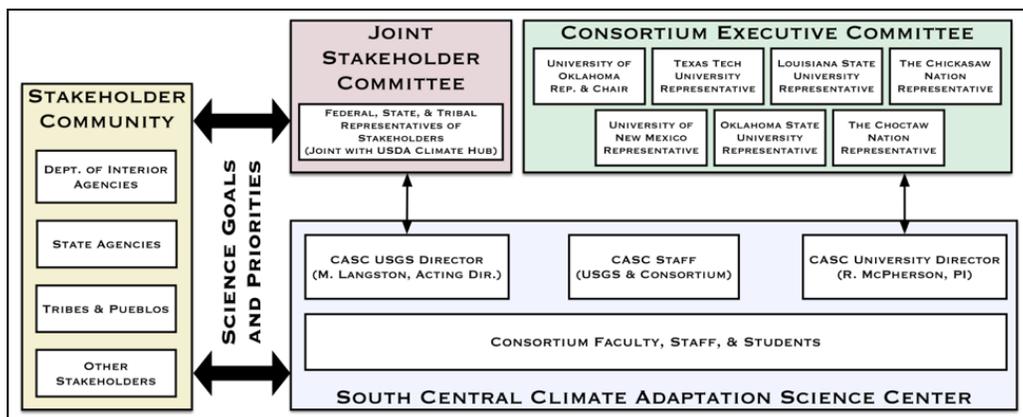
Affiliation	Personnel (Role at CASC)
University of Oklahoma	Elinor Martin (Consortium Co-PI); Mark Shafer (Consortium Co-PI); Berrien Moore (Consortium Co-PI); Jake Palazzi (NM Tribal Liaison - started May 2023); Noetta Harjo (Financial Administrator); Sharon Hausam (Climate Adaptation Planner); Iirena Lodangco (Research Scientist); Caitlin Rottler (Research Scientist); Dolly Na Yemeh (Postdoctoral Associate); Laura Bray (Postdoctoral Associate); Paulina Cwik (Graduate Student); Ebone Smith (Graduate Student); Carrie Leslie (Graduate Student); Luke Kerr (Student Office Assistant); Rachel Koch (Student Office Assistant); Kyle Over (Student Office Assistant); Alondra Perez (Social Media Coordinator); Matt Davies (Undergraduate Research Assistant); Tsali Smith (Undergraduate Research Assistant); Asa Samuels (Undergraduate Research Assistant); Patrick Painter (Undergraduate Research Assistant); Rayle Blevins-Odle (Undergraduate Research Assistant); Liam Thompson (CART Summer Intern); Haylee Kraker (CART Summer Intern); Jack Carter (CART Summer Intern)
Oklahoma State University	Jim Ansley (Consortium Co-PI); Scott Loss (Postdoc Supervisor)
Texas Tech University	John Zak (Consortium Co-PI); Katharine Hayhoe (Consortium Co-PI); Natasja van Gestel (Consortium Co-PI); Ian Scott-Fleming (Research Associate); Kerry Griffis-Kyle (Faculty); Nick Smith (Faculty); Tirhas Hailu (Postdoctoral Associate); Amin Ferdous (Graduate Student); Garrett Huddleston (Graduate Student); Erin Stukenholtz (Graduate Student)
Louisiana State University	Chris D'Elia (Consortium Co-PI)
University of New Mexico	Dave Gutzler (Retired Faculty); Mollie Hantulla (Graduate Student)
Chickasaw Nation	Kara Berst (Consortium Co-PI); Krisopher Patton (Researcher); Newakis Webber (Researcher); Chaylum Hogue (Researcher); Taylor Broadbent (BIA Intern), CJ McLemore (BIA Intern); Clarissa Dixon (BIA Intern); Kiona Tinney (BIA Intern); Landon Eck (School to Work Intern); Sariah Beckham (School to Work Intern); Tamera Nealy (School to Work Intern)
Choctaw Nation	Ethan Schuth (Consortium Co-PI); Tye Baker (Consortium Co-PI)



Organization & Approach

Organizational Structure & Communication

The University Director and University Assistant Director oversee the Consortium budget and provide guidance on science and planning activities conducted through the host agreement. The diagram shown overviews the relationship between USGS and Consortium leadership teams and stakeholders as of August 2019.



The Consortium Executive

Committee (EC) meets annually to discuss progress-to-date in a given year and begin planning for the following year. In Year 4, the EC met virtually on May 16th to discuss future research and capacity building opportunities, the 2023 Fall Science Meeting, revisions to the Affiliate Program, and the External Review of the current host agreement.

To facilitate regular communication across the Consortium, we have scheduled bi-monthly Zoom calls to discuss general updates, critical issues, and the science being conducted by students and postdocs. In Year 4, we modified our consortium calls such that one is focused on sharing relevant research updates and the other on strategic discussions for the Center.

USGS interviewed for a new Federal Regional Administrator in the spring of 2023 for the South Central CASC.

Personnel Achievements

Ms. Adrienne Wooten was the Editor’s Award Winner in *Weather, Climate, and Society* for “insightful, thoughtful, and professional critiques on numerous manuscripts and their revisions”. She was presented this award during the opening session of the 2023 American Meteorological Society’s 103rd Annual Meeting in Denver, CO.

Ms. Taylor Broadbent was awarded a Fulbright Scholarship where she will be pursuing a Master’s in Public Policy with an emphasis on Global Indigenous Studies.

Ms. Rachel Koch was invited to membership in Phi Beta Kappa Honor Society.

Host Agreement Challenges

We continued to face a few challenges in Year 4, but were able to overcome and adjust accordingly:

Administrative: Due to new financial systems at OU and reduced research administration staff across our consortium, we have experienced delays in getting awards set up and modifications completed in a timely manner. We continue to streamline our processes at the CASC office to help offset the administrative delays that are out of our control.

Travel: Despite travel starting to return to normal, our team is still facing unspent travel on several awards resulting from the pandemic over the past few years. Regarding host agreement travel, we have requested to reallocate much of our remaining travel funds to salary and fringe for our research team this summer.

Capacity Building: As the need for our research and data continues to rise, we are quickly reaching capacity for what we are able to address. Over the last year, our two Climate Adaptation Specialists have helped us to keep up with current demands for our services. Moving forward, we may need to look at increasing our staffing or reducing the number of requests that we take on in a given year.

Research Capacity: Due to changes in personnel across the consortium, some planned activities in the host agreement have had to be modified. One such example is the plan to model climate change effects on species, which became a detailed synthesis review of several foundational species in our region.



Results

Partnerships

Our goal is to respond to high priority natural and cultural resource management challenges and foster substantive, sustained engagement between scientists and managers. In Year 4, the South Central CASC focused on building new partnerships and strengthening existing partnerships.

We have continued to strengthen our connection with U.S. Fish and Wildlife Refuge Managers across our region through regular engagement. In Year 4, we have continued to refine project ideas with three wildlife refuges in our region. Additionally, our team has been working with the U.S. Fish and Wildlife Service (USFWS) to provide climate-based capacity building for grassland and sage brush ecosystem management.

The South Central CASC hosted a hybrid Science Workshop in Fall 2022 that brought together over 90 scientists and resource managers from across our region to discuss research opportunities related to climate adaptation. Participants were invited to join one of our Communities of Practice (CoPs). The science being conducted by each group is further discussed in the *Science* section. The presentations from this workshop were recorded and are available on our website for further review (<https://southcentralclimate.org/fall-2022-science-meeting/>).

South Central CASC staff has been building new partnerships with the National Park Service (NPS), in particular with the Climate Change Response Program team and the Intermountain West Region climate coordination team. Over the last year Mrs. Kuster participated in two Planning for Climate Change workshops put on by the NPS for Casa Grande and Chaco Canyon. She represented the South Central CASC and built new partnerships with cultural resource managers at these locations. Mrs. Kuster also provided feedback to help streamline the workshop planning process and identified opportunities for the CASCs to partner on future workshops.

Capacity Building

Our goal is to build a community of researchers and managers and foster their leadership in science-based resource management. In Year 4, we focused building capacity through workshops and training events, and webinars. The South Central CASC team hosted 15 training or workshop events for resource managers, including our tribal partners. Additional information on these efforts is located in the Appendix.

South Central CASC researchers contributed to the 5th National Climate Assessment (NCA5), to be made public in Fall 2023. During Year 4 of this award, extensive development work and writing occurred. Dr. McPherson (CASC lead PI) serves as lead author to the Southern Great Plains (SGP) chapter, with April Taylor and Taylor Broadbent as author-team members. Drs. Hausam and Wootten serve as technical contributors on the Adaptation and SGP chapters, respectively. This work is important not only to envelope the CASC-related research into an important Federal report, but also for the CASC to exhibit national leadership in concert with the NRCASC. During summer 2023, NCA5 authors will work to prepare CASC audiences for the release of the report, including webinars and summary materials.

Strategic Planning & Tribal Engagement Evaluation

Our team continues to work toward sharing knowledge and lessons learned about evaluating climate services, as well as learning best practices to do so. The team was able to conduct interviews to assess tribal needs and challenges. They are currently working with the evaluation team to go through the results and workshop to provide recommendations on how to improve and guide the strategic planning focus for the next 5 years. Our Evaluation Committee includes representation from the US Dept. of Agriculture Climate Hubs, the Southern Plains Drought Early Warning System group (through NIDIS), the Climate Assessment for the Southwest group (a NOAA RISA), and the Southern Climate Impacts Planning Program (a NOAA RISA).

The South Central CASC staff are currently focusing on strategic planning to help guide the next 5+ years of the Center. Four of the five goals are being led by the consortium staff including Communications, DEIA, Education, and Consortium Science.



Results

Science

Our goal is to advance the understanding of the impacts of climate change and variability on fish, wildlife, water, land, and people to support sound resource management and adaptation. Below are research highlights from our Community of Practice (CoP) members and our South Central CASC host agreement efforts:

- *Sustainable & Usable Water Resources*: The Water Resources CoP has been idle this year. However, there is ongoing work related to this topic outside of an official community group such as case studies on precipitation events and flooding in the Mississippi River basin.
- *Enhancing the Resilience of Indigenous, Rural, & Vulnerable Communities*: At the 2022 CASC Fall Science Meeting our CoP presented an “interactive” poster which stated the CoP’s purpose, and asked four questions, geared towards research. The questions help remind us and our colleagues about community contributions to knowledge and adaptation. They have also discussed themes in how people are adapting and preserving their cultural life-ways in the face of climate change and environmental change, to contribute to a literature review coordinated by one of our CoP members. We are continuing our efforts to learn from and amplify work that is happening from the ground up through citizen efforts, projects hosted by NGOs, and other non-state solutions. We began with a webinar on “How Communities Contend with Climate: Rainwater Harvesting and Restoration,” on October 18, 2022. In summer 2023 we will be exploring the potential for in-depth interviews presented as podcasts.
- *Mapping & Predicting Changes in Species and Ecosystems*: Team members in this CoP have been working on five focus areas. One of these areas includes creating species fact sheets for four different species. In addition to the work done by this CoP, Dr. Ellen Robertson at OSU has continued her work with e-bird to understand how changes in spring green up are impacting the migration patterns of migratory birds in the Central Flyway.
- *Understanding Teleconnections that Influence Ecosystem Resilience*: CoP members are submitting an article titled *Impacts of Atmosphere-Ocean Teleconnections on the South-Central United States* to the journal *Frontiers in Earth Science*. Moving forward, this group will be continuing a literature review on the use of telecoupling to support progress in integrated climate science. They are also working to develop a first draft manuscript on the use of teleconnection concepts in human-environment systems research.
- *Understanding Uncertainty*: This Community of Practice has been busy in the 2022-2023 time period. The CoP meets once a month and has done so since the 2021-2022 report. In preparation for the annual meeting in 2022, the CoP met in August and September to complete final edits on the Understanding Uncertainty survey for stakeholders. The group built and presented a poster at the annual meeting in Baton Rouge, Louisiana where a QR code was included for people to gain easy access to the survey. We also recorded preliminary interviews with stakeholders to test out our interview process for future individuals. Since the annual meeting, we have collected 35 survey responses and are in the process of analysis. In the coming months, we will reach out to those who are interested in interviewing and begin the process of collecting interviews in preparation for the upcoming annual meeting in Fall 2023. By then, we hope to have a mock website built to house the information within the CASC portal for stakeholder consumption.
- *Resilient Coastal Systems*: A new CoP group, Resilient Coastal Ecosystems was established at the Fall 2021 Science meeting and they are continuing the process of setting goals and gaining new members.
- *Extreme Weather and Climate Change*: This group was established at the Fall 2021 Science meeting and has established a central research theme *to address how changes in extreme weather impact our National and State Parks and National Wildlife Refuges*. Progress toward this mission is strong and the National Park Service is currently identifying a few specific parks which are experiencing significant and immediate issues with climate change and extreme weather for the team to begin pilot projects with over the next year.



Communications & Outreach Efforts

Our goal is to understand and respond to information needs and support the integration of climate adaptation in resource management through usable, useful products and tools. Below is a brief description of our outreach, products, and tools resulting from efforts directly funded by the host agreement.

Communications & Outreach

In Year 4, we submitted over 13 highlights to the National CASC that included publications from our researchers, virtual events, and presentations. We maintained and expanded our online presence through our website (<https://southcentralclimate.org/>), social media platforms (Facebook [1009 followers], Twitter [833 followers], LinkedIn [693 followers], YouTube [1357 followers], and Instagram [253 followers]), monthly newsletters [731 subscribers], and webinars from partners and Affiliates. Since August 2022, we have had over 10,000 visitors, resulting in over 24,000 page-views on our website.

In a joint effort with the USDA Southern Plains Climate Hub and the Southern Plains Climate Impacts Planning Program, we continued to host our bi-monthly Southern Plains Climate Science Webinar to accommodate for virtual overload and as a result created a quarterly webinar series with varying style approaches for more active audience engagement. We had over 135 registrants for the entire webinar series. Webinars that are recorded are made available for viewing on our website (<https://southcentralclimate.org/resources/webinars-workshops/>).

Now in its 11th year, the TTU-Climate Center continued to host virtual monthly Science by the Glass Events that facilitate climate related research presentations and discussions. Participants attended from around the U.S. and internationally. The events averaged around 40 attendants each. This format has also fostered more cross-consortium interaction, with Dr. Mike Langston as an invited speaker for the series as well as speakers from LSU, TTU, local stakeholders, and the state climatologist of Texas. The TTU team plans to transition back to face-to-face events in the fall of 2023.

Engagement with Regional & Local Decision-Makers

The South Central CASC, in partnership with the US FWS Science Applications Program, is providing an introductory, online course for ecosystem conservation practitioners interested in learning about climate change. Being out in nature, natural resource managers directly see the effects of climate change through extreme events like floods and droughts and through changes in ecosystem composition. In order to effectively and efficiently manage natural resources moving forward, managers need to have a foundational knowledge of climate change on which they can continue to build upon in the years to come. This course will serve as a starting point for obtaining foundational knowledge.

We conducted a vulnerability assessment workshop at Sac and Fox Nation on May 18-19, 2023. We walked through the steps to do a vulnerability assessment including assessing exposure, developing scenarios, assessing sensitivity, and adaptive capacity. This workshop hosted 53 attendees representing 21 tribes.

Tools & Products

Several staff members are creating a four-page set of flyers for a Climate Adaptation Series which focuses on the topics of climate adaptation, seed banking, prescribed fire, and soil health. Our native intern Rayle Blevins-Odle drafted outreach materials related to cultural resources and how they are being impacted by climate change, featuring South Central CASC cultural resource research projects and adaptation options.

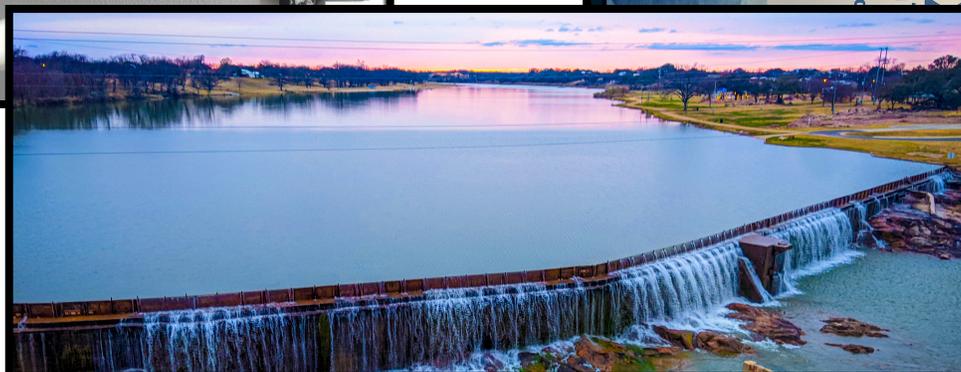
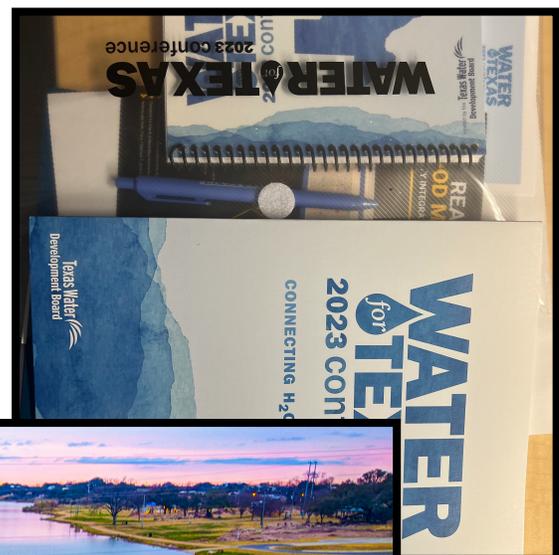
Over this past year, the South Central CASC team submitted over 35 publications and presented over 100 presentations at conferences, workshops, and webinars across our region. A list of selected publications and presentations are highlighted in the appendix.



Activities Planned for Year 5

In Year 5 of this host agreement, we plan to continue to develop new products and tools, offer trainings and workshops, and engage in actionable science that will assist our stakeholders in adapting to a changing climate. Moving forward, we plan to:

- Continue to grow existing Communities of Practice and establish additional CoPs to synthesize and identify gaps in stakeholder-driven science priorities;
- Implement our Tribal Engagement evaluation plan and use the results to strengthen our efforts;
- Host our updated online climate education short course series, and co-teach climate adaptation courses across our CASC institutions (including Managing for a Changing Climate);
- Continue developing a training approach rooted in adult education practice for providing climate adaptation training to resource managers across our region;
- Continue taking our new projection to DOI agencies and partner agencies to infuse climate information into adaptation and conservation plans (e.g. SSAs, Habitat Plans, and SWAPs, etc.);
- Engage stakeholders directly through listening sessions and workshops to understand priority science needs and provide scientific expertise as requested;
- Support Tribal engagement and capacity building across the region, including hosting Tribal workshops and pursuing funding opportunities in collaboration with Tribal partners;
- Develop an evaluation plan to evaluate other CASC activities;
- Further enhance partnerships with Tribes and Tribal organizations, National Wildlife Refuges, National Park Service, and other State and Federal agencies across our region; and,
- Strategically develop large-scale inter-institutional and inter-disciplinary regional proposals to establish a broader funding base.





South Central CASC Host Agreement Budget

As we still face some of the lingering effects of the pandemic, many of our institutions have had difficulty in spending from their travel and supply lines. We will be submitting a request to carryover remaining Year 4 funds into Year 5 for OU, CN, OSU, TTU, and UNM. Remaining carryover is primarily associated with unspent travel funds in Year 4.

Leveraged Funding

In 2014, there was an anonymous donation of \$330,000 provided to the South Central CASC, which has been set up as a Foundation Account at OU. Each year we use that funding to provide at least three study abroad scholarships and two academic scholarships. This year, we offered three study abroad scholarships and six Department of Geography and Environmental Sustainability academic scholarships.

In 2018, the South Central CASC became a consortium member of the Oklahoma NASA Space Grant Consortium. The funding we continue to receive through this partnership has been used to support several postdocs and students at the South Central CASC working on climate-related projects. This past year, we supported two native students on our NASA funding. Mr. Asa Samuels has been assisting our Species and Ecosystem CoP on a climate adaptation factsheet for the Arkansas River Shiner and, Mr. Tsali Smith continued work on our first 3D printed weather station.

Our NM Tribal Liaison receives funding through a separate grant from the Bureau of Indian Affairs (BIA). We have been able to secure funding for this position through grants since June 2017. Last year, we began a new cooperative agreement with the BIA to fully support our New Mexico Tribal Liaison and partially support and additional Tribal Liaison focusing on the Tribes of Western Oklahoma.

Climate Science Center Support for Tribal Resilience Planning

Renee McPherson (OU), PI – ongoing, BIA, Start Date: 8/24/2022

South Central CASC Consortium researchers were successfully awarded 2 projects through the FY23 USGS awards competition. In addition, our team also was awarded 3 projects through directed funding. As of May 2023, final decisions have not been made regarding some submitted proposals, so these numbers may change in the coming months.

The research team of the South Central CASC successfully submitted 5 additional proposals to other federal agencies, totaling in an additional \$3,560,516 of leveraged funds for CASC-related projects since August 1, 2022. We have additional proposals submitted and currently under review, so this dollar amount may continue to grow for Year 4. Many of these projects are awarded to our PIs because of the expertise built through the South Central CASC network.



Appendix: Additional Achievements & Efforts

NASA Earth to Sky Program

In October 2019, April Taylor and Emma Kuster participated in the NASA Earth to Sky Academy to become regional leaders for the Earth to Sky Program. In July of Year 4 we held our second in-person workshop for tribal educators, led by April Taylor.

Diversity, Equity, & Inclusion Efforts

As part of its overall strategic planning effort, a team comprised of our members of the core office staff has drafted a revised goal for diversity, equity, and inclusion. The plan's draft objectives focus on DEIA in the workforce and on meeting the climate adaptation needs of Indigenous and Tribal communities and historically-marginalized and underserved populations with CASC products and services.

Supporting our Communities of Practice

Through additional funding opportunities, we were able to support two students at the University of Oklahoma to work on projects with our Building Resilient Communities CoP. These students have been helping the teams with their ongoing work described above in the *Science* section. We also provided salary support for two staff members and one student to assist the Species and Ecosystems CoP with species adaptation factsheets.

CART (formerly known as CCAST) Partnership

Over the last year, our team has been developing a partnership with the Conservation Adaptation Resources Toolbox (CART) team directed by the U.S. Fish and Wildlife Service and Bureau of Land Management. This summer we are hosting three CART interns who are working on developing new case-studies related to climate adaptation across our region.

New CASC Employees

The South Central CASC added Jay Wimhurst as the Climate Adaptation Fellow through the USGS CAP Program in April 2023, working with Dr. Jennifer Koch on the Future of Aquatic Flows theme. We also brought on Jake Palazzi as the New Mexico Tribal Liaison in May 2023.

Sabbatical CASC Employee

Dr. Jennifer Koch is on a sabbatical from their professorship at OU for portions of Year 4. During their sabbatical they have been working on research efforts that are benefiting the larger CASC network.

Climate Adaptation Scientists of Tomorrow

LSU was selected as one of the host sites for the Climate Adaptation Scientists of Tomorrow program funded by the National CASC. Students will return for their second year of this program in the summer of 2023 at LSU in partnership with Auburn University, Savannah State University, and Jackson State University. This program aims to 1) increase diversity, equity, and inclusion in STEM; 2) cultivate the next generation of climate scientists; and 3) foster climate science programs at Minority Serving Institutions. During their first year the students participated in field trips and interacted with LSU faculty. They also participated in *Developing a Diverse Research Workforce with Expertise in Hydrological Climate Events in the Upland Watersheds of the Northern Gulf of Mexico* workshop.

Time to Restore

We continued to support the South Central CASC funded research project, Time to Restore, by conducting presentations at the National Tribal and Indigenous Climate Conference and the Tribal Alliance for Pollinators during their Keeping our past, protecting our future - Indigenous Resilience During the age of a changing planet event.



Appendix: Additional Achievements & Efforts

Climate Projections and Grasslands Trainings

This year we hosted several trainings on how to use our climate projections for adaptation planning. We presented at the National Adaptation Forum in Baltimore, MD as a training session at the conference for approximately 40 professionals and as a result of this we have had several follow up requests to provide additional climate projections trainings across different organizations. Another workshop we hosted that included climate projections training was an online climate modeling workshop for the U.S. Forest Service (USFS) in partnership with the USFS Southern Region and the Southeast CASC with 115 attendees including USFS and tribal staff.

We played a major role in the Grasslands and Climate Change Training Series and Workshop. This series was put together for the USFWS's Grasslands Ecosystem Team. The program has resulted in additional follow-ups to provide similar workshops in other areas of interest. More about this event, and training materials can be found on our website (<https://southcentralclimate.org/resources/webinars-workshops/training-for-grasslands/>)

Technical Assistance for Tribes

This year we conducted technical assistance for several tribes including developing climate information for their plans including Otoe-Missouria Tribe of Indians and Coushatta Tribe of Louisiana. Dolly Na-Yemah, Climate Adaptation Specialist, and Matt Davies, a student intern, helped the tribal liaisons provide this technical assistance to the Tribes and Pueblos across our region.

New Mexico Tribal Resilience Action Network

The South Central CASC supported the New Mexico Tribal Resilience Action Network's (NM TRAN) work to develop a pathway for creating a Southwest Tribal Climate Adaptation Menu (SWTCAM). NM TRAN is an ad-hoc committee with a mission to improve tribal resilience to climate change by collectively examining anticipated changes, raising awareness about impacts, sharing information about adaptation and mitigation tools, and supporting tribal planning and implementation. The SWTCAM, informed by a Tribal adaptation menu developed for the Great Lakes region, will provide a selection of climate change adaptation strategies, incorporating relevant case studies and existing resources that are appropriate and valid for Southwest Tribes. It will reflect Southwest ecology and address Tribes' regional climate concerns. It will also provide information on the benefits, consequences, and methodologies for the optional integration of Indigenous and traditional knowledge, culture, language, and history. South Central CASC staff helped lead regular NM TRAN meetings, contributed to discussions, and reviewed and commented on documents defining the purpose and scope of the SWTCAM.

Southern Plains Transportation Center

The United States Department of Transportation has provided \$3 million in funding for the Southern Plains Transportation Center, a regional university transportation center in which the University of Oklahoma is a member and serving as the host institution, and our own University Director, Dr. Renee McPherson, is a Principal Investigator.



Appendix: Selected Publications

- Ansley, R. J., Rivera-Monroy, V. H., Griffis-Kyle, K.,** Hoagland, B., Emert, A., Fagin, T., **Loss, S. R.,** McCarthy, H. R., Smith, N. G., and Waring, E. F. 2023. “Assessing Impacts of Climate Change on Selected Foundation Species and Ecosystem Services in the South-Central USA.” *Ecosphere* 14(2): e4412. <https://doi.org/10.1002/ecs2.4412>
- DeLong, K. L., Palmer, K.,** Wagner, A. J., Weerabaddana, M. M., Slowey, N., Herrmann, A. D., Duprey, N., Martínez-García, A., Jung, J., Hajdas, I., Rose, N. L., Roberts, S. L., Roberts, L. R., Cundy, A. B., Gaca, P., Milton, J. A., Yang, H., Turner, S. D., Huang, C.-Y., ... Zinke, J. (2023). The Flower Garden Banks *Siderastrea siderea* coral as a candidate Global boundary Stratotype Section and Point for the Anthropocene series. *The Anthropocene Review*, 10(1), 225–250. <https://doi.org/10.1177/20530196221147616>
- Dunbar, N.W., **Gutzler, D.S.,** Pearthree, K.S., Phillips, F.M., Bauer, P.W., Allen, C.D., DuBois, D., Harvey, M.D., King, J.P., McFadden, L.D., Thomson, B.M., and Tillery, A.C., 2022, Climate change in New Mexico over the next 50 years: Impacts on water resources: New Mexico Bureau of Geology and Mineral Resources, Bulletin 164, 218 p. https://geoinfo.nmt.edu/publications/monographs/bulletins/downloads/164/B-164_web.pdf
- Enabulele, E. E., Le Clec’h, W., **Roberts, E. K.,** Thompson, C. W., McDonough, M. M., Ferguson, A. W., Bradley, R. D., Anderson, T. J. C., Platt II, R. N.. Prospecting for zoonotic pathogens using targeted DNA enrichment. bioRxiv 2022.12.06.519193; doi: <https://doi.org/10.1101/2022.12.06.519193>
- Ehrenfeucht, R.,** & Nelson, M. (2022). Towards Transformative Climate Relocation Initiatives. *Journal of Planning Literature*, 0(0). <https://doi.org/10.1177/08854122221130287>
- Londe, D.W.,** Dvoretz, D., Davis, C.A. *et al.* Inundation of depression wetlands declines under a changing climate. *Climatic Change* **172**, 27 (2022). <https://doi.org/10.1007/s10584-022-03386-z>
- Londe, D.W.,** Joshi, O., York, B.C. *et al.* Climate Change and Wetlands in the Southern Great Plains: How are Managers Dealing with an Uncertain Future?. *Environmental Management* 71, 379-392 (2023) <https://doi.org/10.1007/s00267-022-01758-w>
- McPherson, R. A., Corporal-Lodangco, I. L.,** & Richman, M. B. (2022). A place-based approach to drought forecasting in south-central Oklahoma. *Earth and Space Science*, 9, e2022EA002315. <https://doi.org/10.1029/2022EA002315>
- Rohli R. V., Snedden G. A., **Martin E. R., DeLong K. L.** (2022). Impacts of ocean-atmosphere teleconnection patterns on the south-central United States. *Frontiers in Earth Science*, 10. <https://10.3389/feart.2022.934654>
- Wootten, A. M., Martin, E.,** Randklev, C. R., and Smith, R.. 2023: Projected Changes to Streamflow and Stream Temperature in Central Texas: How Much Will the River Flow?. *Earth Interact.*, <https://doi.org/10.1175/EI-D-22-0021.1>, in press.



Appendix: Selected Presentations and Other Media

Amin Ferdous, **John Zak**, August 2022: “A Step Towards Personalized Crop Management Strategy for better Crop Yield and Soil Health” - American Society of Microbiology, Washington, D.C.

Anna Stebbins, **Jacob Warner, Kristine DeLong**, May 2023: Can Freshwater Flooding be Detected in Eastern Oysters (*crassostrea virginica*) Using Shell Barium to Calcium as an Environmental Proxy - 6th International Sclerochronology, Tokyo, Japan.

Bobby Sanukeh, May 2023: “Tribal Policies around Indigenous Knowledges” - USGS Indigenous Knowledges Webinar Series, Virtual.

David Londe, Craig Davis, Scott Loss, Ellen Robertson, November 2022: “Evaluating the effects of climate change densities of wetlands in the Central Great Plains”, 3rd Playa Research Symposium, Kearney, NE.

Ellen Robertson, November 2022: “Bird migration is not responding to recent changes in spring green-up.” - South Central CASC Cooperator’s Meeting, Virtual.

Emma Kuster, January 2023: “Success and Challenges with Initiating Climate-Focused Communities of Practice” - American Meteorological Society Annual Conference, Denver, CO.

John Fleck, November 2022: “Science Be Dammed: The Negotiation of the Colorado River Compact” - Dividing the Waters Judicial Conference: The Colorado River: Is the Law of the River Relevant to the Emerging Crisis? Santa Fe, New Mexico.

John Zak, February 2023: “Mindfulness: Do we Actually Know How Soil Microbes Respond to Changing Conditions and What Happens Next.” - No-Till Texas Soil Health Symposium, Lubbock, TX.

Hakan Basagaoglu, **Adrienne Wootten**, Paul Bertetti, Chad Furl, April 2023: “Statistical Downscaling of Climate Data from Global Climate Models for the Edwards Aquifer Region” - Edwards Aquifer Habitat Conservation Planning Science Committee, San Marcos, TX.

Kristine L. DeLong, Kylie Palmer, Amy J. Wagner, Mudith M. Weerabaddana, Niall Slowey, Achim D. Herrmann, Nicolas Duprey, Alfredo Martínez-García, Jonathan Jung, Irka Hajdas, Neil L. Rose, Sarah L. Roberts, Lucy R. Roberts, Andrew B. Cundy, Pawel Gaca, J. Andrew Milton, Handong Yang, Simon D. Turner, Chun-Yuan Huang, Chuan-Chou Shen, and Jens Zinke, May 2023: “A *Siderastrea siderea* Coral from Flower Garden Banks Records Human Impacts as a Candidate for the Global Boundary Stratotype Point for the Anthropocene” - 6th International Sclerochronology, Tokyo, Japan.

Renia Ehrenfeucht, August 2022: “Whose Interests? What Outcomes? Tensions and Contradiction in Climate Adaptation Policy” - Geography of Governance; Governance in Times of Emergencies, Mexico City.

Sharon Hausam, April 2023: “South Central Climate Adaptation Science Center Tribal Engagement” - Pueblo of Laguna Drought Summit, Laguna, NM.

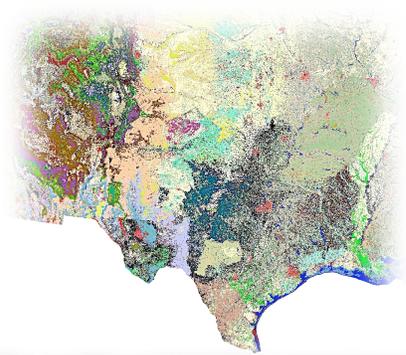
Yvette Wiley, March 2023: “The Role of Climate Change in the Proliferation of Freshwater Algal Blooms in Inland Waterbodies of the U.S.” - Oklahoma Clean Lakes and Watersheds Association Conference, Stillwater, OK.



Helping to solve real problems in a variable and changing climate

Our region

Water, energy, agriculture, native peoples, and rapidly growing metropolitan areas intersect with a highly variable and changing climate to frame many of the risks, challenges, and opportunities for natural and cultural resources in the south-central United States. National parks, scenic waterways, tribal and trust lands, and other protected areas are prevalent across the region. Spatial and temporal changes in the south-central's climate are linked to changes in biodiversity; key wildlife habitats; wetlands quality and extent; stream sedimentation and flow; range and density of heritage and invasive species; cultural and natural landscapes; water quality; pathogen outbreaks; and health of ecosystem services. Changes in the region also result from other stressors; hence, responses to climate change must be examined in combination with land cover/use change, habitat fragmentation, increasing population, pollution, invasive species, increasing demand for natural resources, and other stressors.



The south-central U.S. encompasses 20 ecoregions, resulting from a significant gradient in annual average precipitation, from 60 inches in coastal areas to 6 inches in the deserts.

Visit our website at southcentralclimate.org

Contact Information

Renee A. McPherson, Ph.D.
University Director
The University of Oklahoma
renee@ou.edu

Mike Langston, Ph.D.
USGS Acting Director
U.S. Geological Survey
milangston@usgs.gov

Emma Kuster
University Assistant Director
The University of Oklahoma
emmakuster@ou.edu

April Taylor, M.E.E.R.M., G.I.S.P.
Sustainability Science Manager
The Chickasaw Nation
april.taylor@chickasaw.net

Jenifer Henslee Peck
Science Translator &
Communications Specialist
The University of Oklahoma
jhensleepeck@ou.edu

Marina Tomer
USGS Research Coordinator
U.S. Geological Survey
mcucuzza@usgs.gov

Genevive Allen
New Mexico Project Manager
Bureau of Reclamation
gallan@usbr.gov

Noetta Harjo
Financial Administrator
The University of Oklahoma
noetta@ou.edu

201 Stephenson Parkway
Suite 2100
Norman, OK 73019
Phone: 405-325-1272
Fax: 405-325-1122