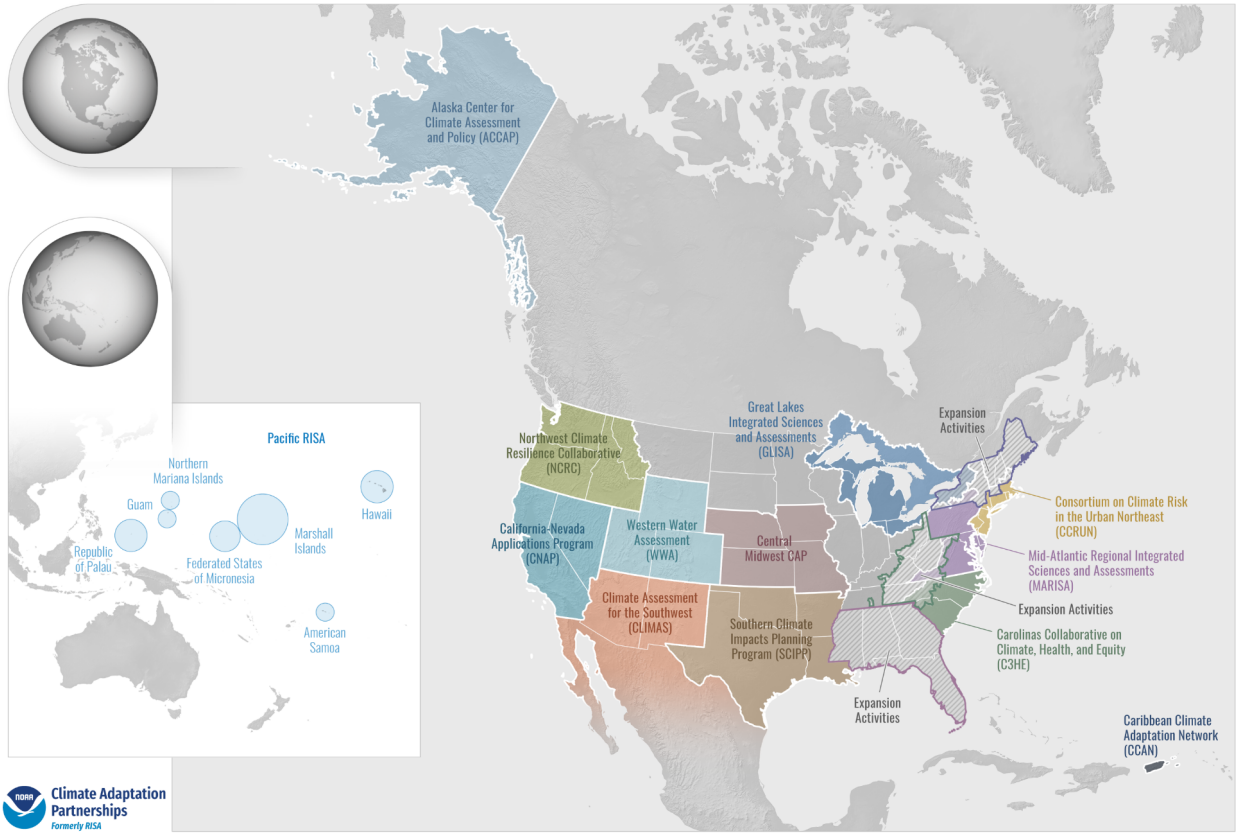
Guide to the CAP/RISA Teams

The NOAA Climate Program Office's Climate Adaptation Partnerships (CAP) program, formerly known as the Regional Integrated Sciences and Assessments (RISA) program invests in research and engagement that expands regional capacity to adapt to climate change in the U.S. The CAP/RISA regional teams build sustained relationships between decision makers and researchers that support collaborative and equitable adaptation to climate risks.

The CAP/RISA program launched nine new 5-year CAP/RISA team awards in Fiscal Year 2021, three new team awards in Fiscal Year 2022, and one new team award in Fiscal Year 2023. This document is a guide to the teams based on the major themes and projects in their initial proposal. Please note that some details may have changed as teams developed relationships with partners and responded to regional needs. Each team's website is a great place to find the most recent updates on the work to build adaptive capacity.

You can find more information at https://cpo.noaa.gov/cap-risa.

Currently Funded CAP/RISA Teams and Expansion Activities



The 13 CAP/RISA teams include all regions that are labeled with a team name and acronym. CAP/RISA expansion activities are shorter, one-year initiatives to develop new collaborative relationships and planning activities in regions without full CAP/RISA team coverage.

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Alaska

Alaska Center for Climate Assessment and Policy (ACCAP)

Title: Building Healthy and Thriving Alaskan Communities, Economies, and Ecosystems in a Changing Climate
Geography: Alaska
Institution: University of Alaska Fairbanks

Core Themes:

- Extreme events and impacts
- Capacity building in support of Tribal resilience

Leadership Team:

- Sarah Trainor, Director, University of Alaska Fairbanks and Alaska Fire Science Consortium
- Nathan Kettle, Deputy Director Experimental Arctic Prediction Initiative at the University of Alaska Fairbanks
- Alison Hayden, Program Manager

Website: https://uaf-accap.org/

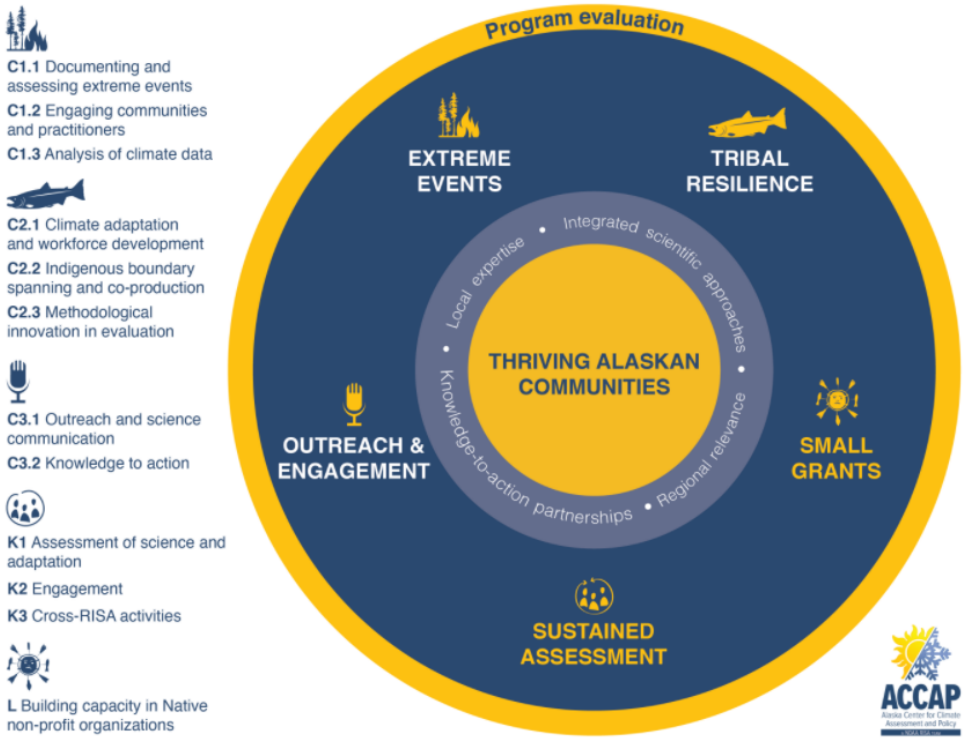


Fig 1. Overview of Proposed ACCAP Activities
Our vision of thriving Alaskan communities is supported through the three integrated activities: extreme events, tribal resilience, and outreach & engagement as well as by the sustained assessment and small-grants supplements. Central to achieving these activities are: local expertise, integrated scientific approaches, regional relevance, and knowledge to action partnerships. Our proposed program evaluation will encompass all funded activities.[48]

Abstract: This team's portfolio of interwoven research and engagement in Alaska will support the underlying vision of building healthy and thriving Alaskan communities. **Core themes include extreme events and impacts and capacity building in support of Tribal resilience.** In the **extreme events** work, the team will use an integrated scientific approach that brings together social science, climate science, and local expertise to: **a)** document socio-economic impacts of extreme climate and weather events in Alaska; **b)** engage practitioners to determine and meet information needs; and **c)** analyze historical and projected changes in extreme event occurrences to inform policy and decision-making. The work will support **Tribal resilience** by: **a)** bridging community-level climate adaptation planning and implementation with workforce and economic development; **b)** investigating and supporting boundary spanning and knowledge co-production between Alaska Native communities and climate and related researchers; **c)** innovating evaluation methodology and elevating Indigenous evaluation of climate-related knowledge co-production and climate adaptation. Hallmarks of new outreach and engagement activities in this project include assessment products that encompass societal impacts and adaptation, training for students and postdoctoral fellows, online course development, and enhanced convening activities with a focus on serving the needs of policy-makers, Alaska Native Peoples, tribes, and organizations throughout the state. This team includes a **sustained assessment specialist** and **small-grant competition**, which like the core portfolio, aims to fulfill ACCAP's vision of thriving Alaskan communities, economies, and ecosystems.

Projects:

- 1: Extreme events and impacts
  - 1.1: Documenting and assessing extreme event impacts in Alaska
  - 1.2: Engage in knowledge to action partnerships to meet extreme event information needs
    - 1.2.1: Seasonal to sub-seasonal climate prediction needs for economic vitality and food security in western Alaska
    - 1.2.2: Assessing and predicting avalanche and landslide hazards
    - 1.2.3: Partnering with wildfire managers to specify and meet climate research needs
  - 1.3: Analysis of climate data
- 2: Capacity building in support of tribal resilience
  - 2.1: Investigating the intersection of workforce development, economic development, and climate change adaptation in Alaska Native and rural communities
  - 2.2: Analysis of boundary spanning and knowledge co-production with Indigenous communities in Alaska
  - 2.3: Methodological innovation in evaluation of knowledge co-production and climate adaptation capacity building
    - Case 1: Evaluation of climate impacts on traditional food security in Kake
    - Case 2: Evaluation of Community Partnership for Self-Resilience
    - Case 3: Evaluation of Tribal climate adaptation planning trainings

Carolinas

Carolinas Collaborative on Climate, Health, and Equity (C3HE)

Title: Innovating a Community-Based Resilience Model on Climate and Health Equity in the Carolinas
Geography: North Carolina (NC) and South Carolina (SC)
Institutions: NC State University, the NC State Climate Office, UNC Chapel Hill, Furman University, NC Central University, NC Sea Grant, SC State University, and the NC Museum of Life and Science

Core Themes:

- Climate, Health, and Equity
- Compounding & Concurrent Climate Hazards
- Community-Level Climate Literacy
- Knowledge to Action
- Community-Owned Resilience Collaboratives

Leadership Team:

- Kathie Dello, Climate Science and Operations Lead, North Carolina State Climate Office & North Carolina State University
- Louie Rivers, Equity Lead, Environmental Protection Agency
- Jennifer Runkle, Health Lead, North Carolina Institute for Climate Studies
- Kalyn Rosenberg, Senior Program Manager

Website: https://climate.ncsu.edu/c3he/

Figure 2. Conceptual framework for our proposed plan of work.

Abstract: This team will build upon years of regional work on climate science, tools and assessments to move into a new phase that **centers Justice, Equity, Diversity, and Inclusion (JEDI) principles** at the forefront of NOAA-funded climate research and to deliver climate futures to more communities than have been previously served. They will apply a bottom-up participatory action approach to develop a transferable model for end-to-end co-production of actionable and equitable climate resilience solutions in at-risk communities in the Carolinas. The team's aims include: **Aim 0.** Demonstrate our commitment to address the climate reality in a just and equitable way, while ensuring the inclusivity and diversity of all voices are represented in every aspect of our work in the Carolinas; **Aim 1.** Build and enhance local partnerships in underserved communities across the Carolinas to identify, test, and refine equitable solutions for climate resilience; **Aim 2.** Understand and predict how co-occurring and consecutive hazards interact with exposure and vulnerability to shape climate risk; **Aim 3.** Identify and connect the complex linkages between structures of power, intersecting social positions, and climate-health inequities in vulnerable communities; and **Aim 4.** Design and implement community-sciences programs to track physical and social science metrics and build community-level climate resiliency literacy.

Central Midwest

Central Midwest CAP/RISA Team (official team name forthcoming)

Title: Co-LEARN: A Midwestern Community of Learning for Empowerment, Climate Adaptation, and Resilience for the Next Generation
Geography: Iowa, Missouri, Kansas, and Nebraska
Institutions: University of Iowa, Iowa State University, University of Nebraska Lincoln, Princeton University, Sac & Fox Nation, High Plains Regional Climate Center, Nebraska Indian Community College

Core Themes:

- Community of learning centered on local stakeholders' needs, strengths, and knowledge
- Outcomes that empower the communities to take community-devised action steps
- Diverse workforce of future climate professionals and leaders

Leadership Team

- Brandi Janssen, University of Iowa
- Linda Shenk, Iowa State University
- Martha Dunn, University of Nebraska Lincoln
- Gabriele Villarini, University of Iowa/Princeton University

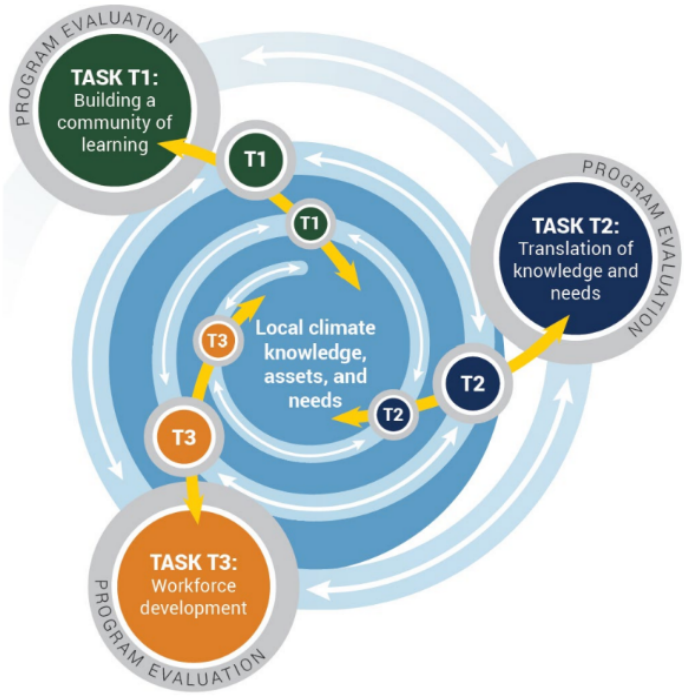


Figure 2. Schematic of Co-LEARN tasks and approaches. The three tasks are not static, but rather evolve throughout Co-LEARN's lifetime based on the insights and knowledge gained from the communities.

Abstract: As climate-related hazards and extremes increase across the U.S. Central Midwest,

marginalized rural communities and tribal groups often bear the brunt of these crises. Further, their extensive local knowledge, which could lead to more equitable, resilient systems, is rarely collected or used to develop climate adaptation and mitigation strategies. The Central Midwest team addresses this systemic oversight by engaging two populations - tribal nations and women farmland owners - to develop a community of learning where stakeholders and researchers are equal partners. Inclusive and equitable collaboration is critical to solving climate-related challenges, particularly in situations where local power relations, gaps in knowledge, lack of trust, or lack of cultural connection impede community participation and empowerment. The team will create “a community of learning” in which members learn from and adapt to each other’s needs, constraints, and knowledge. They will connect social and natural scientists, humanists, community members, and decision-makers at different scales through an iterative “learning from and adapting to” process: all parties are simultaneously learners and collaborating experts. The team will use the principles of Participatory Action Research, a mixed-methods iterative approach that engages community members as full partners. The team will involve a Community Advisory Board, which will be fully involved in the development of community engagement activities for empowerment, data interpretation, translation for community resources, expansion of partnerships, and evaluation of meaningful outcomes. This project will produce strategies and tools to support sustainable and resilient decision- making driven by the needs and knowledge of stakeholders in our region. The many broader impacts include benefits for communities that have been historically marginalized. By taking a “community of learning-to-action” approach, these communities will become more climate-resilient via tangible action, policy change, increased climate literacy, increased access to climate services, and enhanced workforce development.

Projects:

- Task 1: Develop a community of learning centered on local stakeholders’ needs, strengths, and knowledge.
    - Research Question 1: What are the focal communities’ current capacities, barriers, and strengths to address climate change; how can understanding these contexts foster new partnerships across diverse under-served and under-represented groups that have not previously worked together?
    - Research Question 2: What is the relative importance of immediate vs. future issues, challenges, and problems (i.e., weather vs. climate response and capability to adapt)?
    - Research Question 3: How can climate services directly support relationship building and trust that leads to collaborative action?
    - Research Question 4: How do answers to these questions vary by location, socioeconomic status, urban/rural divides, ideological divides, etc.?
    - Research Question 6: How does engaging under-served and under-represented populations as equal partners in a community of learning open new avenues for co-creating new formats and types of outcomes for climate-resilience?
- Task 2: Co-produce and translate insights gained from Task 1 into outcomes that empower the communities to take community-devised action steps.
    - Answers Research Questions 3-4, 6

- Task 3: Develop a diverse workforce of future climate professionals and leaders.
    - Research Question 5: How do we train, mentor, and educate a diverse workforce of future professionals and leaders in the climate arena?

Great Lakes

Great Lakes Integrated Sciences and Assessments (GLISA)

Title: Great Lakes Integrated Sciences and Assessments (GLISA)
Geography: Great Lakes basin, including parts of Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, Wisconsin, and Ontario
Institutions: University of Michigan, Michigan State University, College of the Menominee Nation, and University of Wisconsin-Madison

Core Themes:
- Acceleration and scaling-up the impact of climate knowledge
- Informing sustainable and equitable development

Leadership Team:
- Jenna Jorns, Co-Director, University of Michigan
- Jeffrey Andresen, Michigan State University

Website: https://glisa.umich.edu/

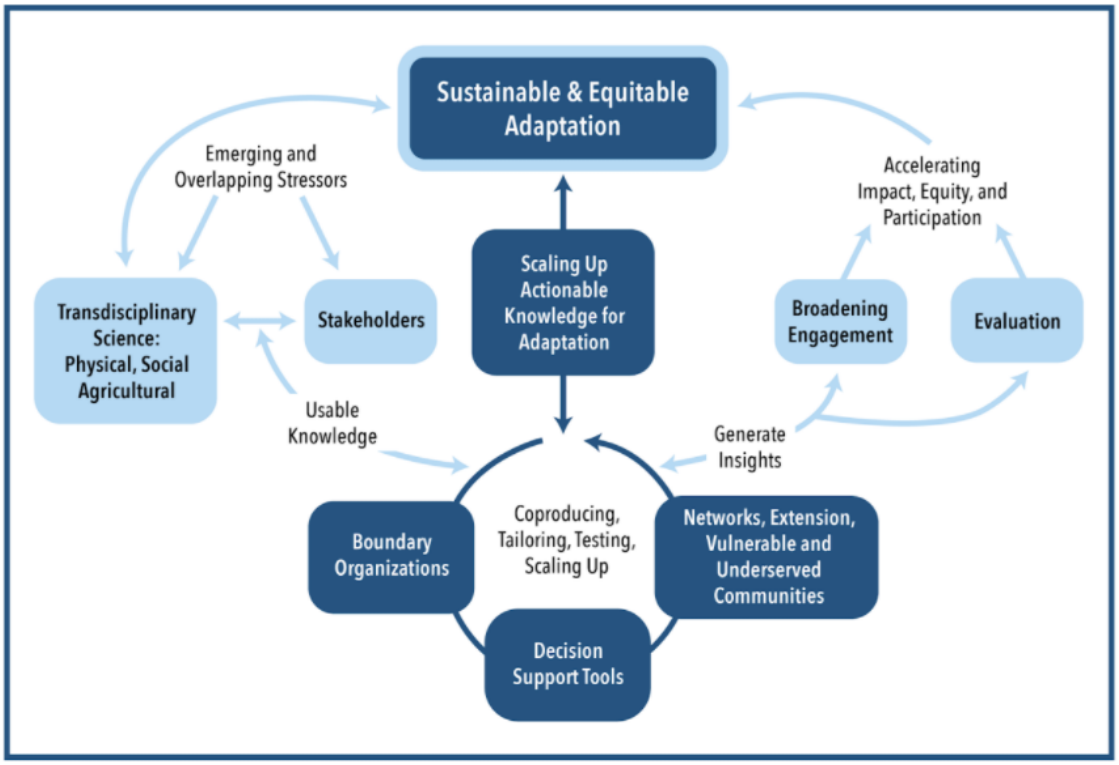


Figure 3 depicts the conceptual framework for GLISA's Phase III, across and integrating these four goals to contribute to the overall outcome of sustainable and equitable adaptation. The center lower circle (dark blue) functions as GLISA's 'engine' for accelerating boundary work (e.g., organizations, decision support tools, and people) to scale up actionable knowledge. New transdisciplinary research, interaction with stakeholders to co-produce usable knowledge, broadening participation and evaluation are new Phase III 'inputs' that will further foster GLISA's boundary work and impact (see also GLISA Phase III logic model, Figure 10).

Abstract: The organizing theme for GLISA's next five years (Phase III) is how to **accelerate and scale-up** the impact of climate knowledge in the Great Lakes region to inform **sustainable and equitable adaptation action**. The team will realize this aspiration by fostering four main goals. **First,** GLISA will explore action-driven foundational research focusing on new and emerging issues in the Great Lakes region to better understand, assess, and co-produce actionable adaptation knowledge. This includes: **a)** modeling multiple stressors and opportunities (climatic and non-climatic) to simulate future scenarios to inform urban planning through time; **b)** exploring the role of diverse participation in shaping scenario outcomes and participants' perception of adaptive capacity, and assessing adaptive capacity longitudinally in small- and mid-sized Great Lakes cities; **c)** exploring how tensions in the relationship of tribes with water may shape plans and solutions for adaptation; **d)** expanding GLISA's Great Lakes Ensemble by focusing on extreme precipitation, evaluating new datasets, and generating new state-of-the-art climate simulations using a convection-permitting regional climate model coupled to a 3D lake model; and **e)** co-developing and demonstrating adaptive management strategies to reduce weather- and climate-related risks in agricultural production systems. **Second,** GLISA will actively build upon their ten-year experience of co-producing knowledge to scale-up their existing engagement, tools, and approaches. They will particularly focus on vulnerable urban and other traditionally under-resourced communities in the Great Lakes region through their Small Grants Program, transdisciplinary research, and new partnerships with the College of Menominee Nation (CMN) and Extension Programs in Wisconsin, Minnesota, New

York, and Michigan. **Third,** GLISA will actively broaden participation in their research, engagement, and training, especially tending to issues of Justice, Equity, Diversity, and Inclusion (JEDI). And **fourth**, GLISA will design and implement an integrated and adaptive external evaluation program for the five years of GLISA's Phase III.

Projects:

- Goal 1: GLISA will explore action-driven foundational research focusing on new and emerging issues in the GL region to better understand, assess, and co-produce actionable adaptation knowledge.
    - Project 1A: Development of an Extreme Precipitation Data Resource & Guidance
    - Project 2A: Generation and Application of the Next Generation High-Resolution Climate Projections for the Great Lakes Region
    - Project 3A: Evaluation of New Datasets & Breakthrough Identification
    - Project 4A: Simulating Multiple and Emerging Stressors for Adaptation Planning
    - Project 5A: Understanding the Role of Stakeholder Diversity on Fit, Legitimacy, and Equity of Co-Produced, Climate-Driven Knowledge
    - Project 6A: Assessing the Role of Co-produced Knowledge in Building Adaptive Capacity
    - Project 7A: Accounting for Tensions and Impacts of Tribal Relationships within Water Development and Implementation of Climate Change Adaptation Solutions & Strategies
    - Project 8A: Cropping Shifts as an Adaptation Strategy
    - Project 9A: Evaluation of Frost Protection as an Adaptation Strategy
    - Project 10A: Estimate Within-field Climate-related Production Risks for a Major Row Crop
- Goal 2: GLISA will actively build upon their ten-year experience of co-producing knowledge to scale-up their existing engagement, tools, and approaches. They will particularly focus on vulnerable urban and other traditionally under-resourced communities in the GL region through their Small Grants Program, transdisciplinary research, and new partnerships.
    - Project 1B: Small Grants Program Fourth Generation
    - Project 2B: Pilot & Implement Cross-RISA Floodwise Communities
    - Project 3B: Pilot & Implement Cross-RISA Hazard Mitigation Planning Portal
    - Project 4B: Implement Tribal Adaptation Menu with GLISA's Scenario Planning Approach
    - Project 5B: Improving the Use of Climate Scenarios for Planning
    - Project 6B: Packaging GLISA's Scenario Planning Approach and Scenarios for Usability
    - Project 7B: Evaluation & Guidance for Existing Climate and Weather Tools
    - Project 8B: Develop Decision Support Tool for Cities Pursuing Adaptation
- Goal 3: GLISA will actively broaden participation in their research, engagement, and training, especially tending to issues of Justice, Equity, Diversity, and Inclusion (JEDI)
- Goal 4: GLISA will design and implement an integrated and adaptive external evaluation program for the five years of GLISA's Phase III.

Intermountain West

Western Water Assessment (WWA)

Title: Building Resilience to Compound Hazards in the Intermountain West
Geography: Colorado, Utah, Wyoming
Institutions: University of Colorado Boulder, the Cooperative Institute for Research in Environmental Sciences (CIRES), the University of Wyoming, and the University of Utah

Core Themes:

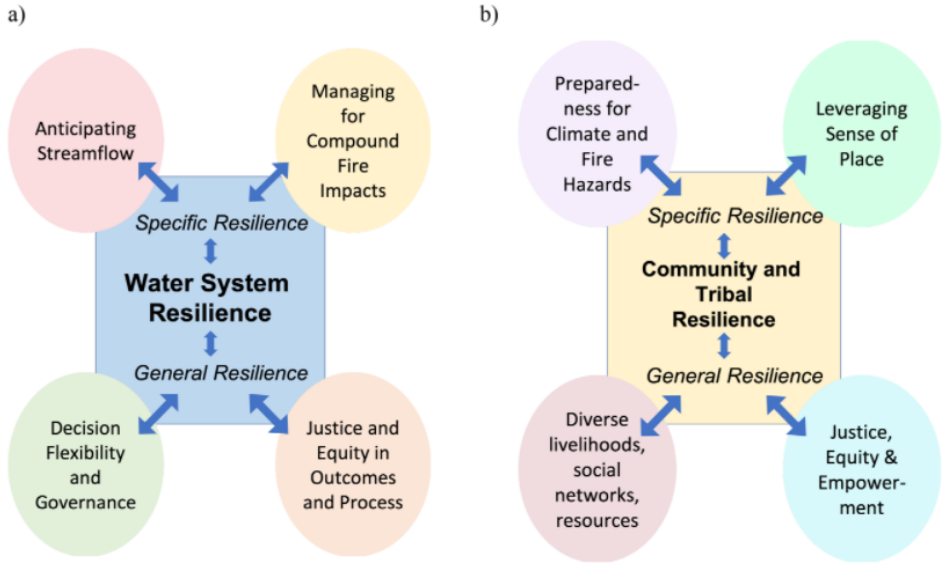
- Resilient water systems
- Resilient communities

Leadership Team:

- Ben Livneh, Director, University of Colorado Boulder
- Benét Duncan, Managing Director, University of Colorado Boulder

Website: https://wwa.colorado.edu/

Figure 3: Specific and General Resilience
This conceptualizes specific and general resilience for a) water systems, and b) communities and tribes, in the context of the WWA program.



Abstract: The Western Water Assessment team's vision is to build water sector and community resilience to compound hazards in the Intermountain West, with a particular focus on underserved Indigenous and small rural communities and utilities. By carefully constructing their

activities, WWA will also advance resilience science from theory to practice. The team has developed an integrative set of 10 projects and other research and integration activities that draw on their 20-year history of climate adaptation research and activities in the region, and the deep interdisciplinary social and natural science expertise in their team. Their research projects fit within **two themes**: **resilient water systems and resilient communities**, and they will integrate tracking of resilience metrics to identify needs and opportunities and evaluate their success in building resilience. This award includes a **small-grant competition** to develop a network in Wyoming to build resilience of underserved communities and leverage successes to inspire other communities to engage in climate adaptation actions.

Projects:

- Theme A: Resilient Water Systems
    - Project 1: Supporting Resilient Planning Among Regional Water Providers
    - Project 2: Usability of medium-range forecasting for water system reliability
    - Project 3: Building understanding for water system resilience to changing streamflow
    - Project 4: Building resilience to compounding impacts of wildfire and snowpack declines
    - Project 5: After the fire: Informing water systems management in burned landscapes
    - Project 6: Building cross-scale understanding and collaboration to support wildfire-resilient water systems
- Theme B: Resilient Communities
    - Project 7: Assessing Current and Future Research Needs Among Vulnerable Communities in Wyoming
    - Project 8: Sense of Place and Adaptive Capacity in the Intermountain West
    - Project 9: Understanding Social Networks to Facilitate Resilience
    - Project 10: Building climate resilience in rural gateway communities

Mid-Atlantic

Mid-Atlantic Regional Integrated Sciences and Assessments (MARISA)

Title: Continuity and Expansion of Community-Based Engagement and Support
Geography: Virginia, Maryland, the District of Columbia, Pennsylvania, Delaware, and parts of West Virginia
Institutions: RAND Corporation, Pennsylvania State University, Johns Hopkins University, Cornell University, Virginia Institute of Marine Science, Morgan State University, and Carnegie Mellon University

Core Themes:

- Addressing climate-sensitive needs of vulnerable communities
- Advancing capabilities for community adaptation planning through co-production of data, information, and tools
- Building workforce capacity through robust engagement of diverse students and partners
- Evaluate program impacts, particularly in socially vulnerable communities

Leadership Team:

- Krista Romita Grocholski, Lead-Principal Investigator, RAND Corporation
- Lena Easton-Calabria, Program Manager, RAND Corporation

Website: https://www.midatlanticrisa.org/

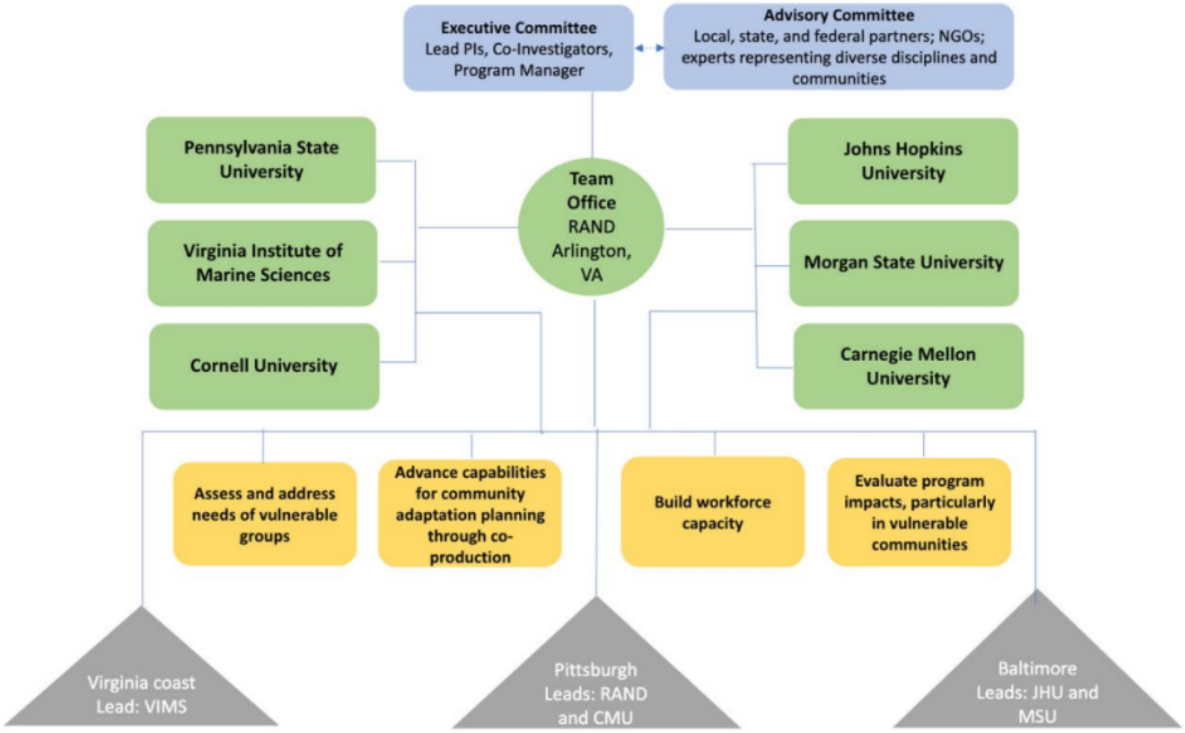


Figure 2. MARISA's Organizational and Management Structure

Abstract: This team will address the **following question**: How can we best support communities in the Mid-Atlantic region in their efforts to leverage actionable climate science to make informed decisions about adapting and building resilience to a changing climate? MARISA 2.0 builds on experience gained, partnerships forged, progress made, and lessons learned over the course of MARISA's first five years. MARISA's objectives are to: **(1)** assess and address the climate-sensitive needs of vulnerable communities in the region; **(2)** advance capabilities for community adaptation planning through co-production of data, information, and tools; **(3)** build workforce capacity through robust engagement of diverse students and partners; and **(4)** evaluate program impacts, particularly in socially vulnerable communities. MARISA 2.0's support for regional climate adaptation activities will be complemented with research and outreach focused in **three geographic areas**: Baltimore, MD, Pittsburgh, PA, and the rural coastal communities of Virginia. Stormwater management remains a primary focus in the region as communities struggle to cope with extreme precipitation events. In coastal communities, tidal flooding compounded by sea-level rise (SLR) and extreme precipitation is a growing concern. In urban areas, mitigating the emerging public health threats posed by extreme heat will require a range of responses. The greatest impacts of these changing climate forces often fall disproportionately on low-income communities and communities of color. MARISA 2.0's proposed work is built on meaningful engagement with community-based organizations and local governments to improve understanding of vulnerabilities and response actions and to help relieve the disproportionate burden.

Projects:

- Objective 1: Assess and address the climate-sensitive needs of vulnerable communities in the region
    - Project 1.1: Baltimore: Equity-informed Multi-Objective Analysis and Planning for Green Infrastructure
    - Project 1.2: Pittsburgh: Integrating Modeling and Decision Support for Stormwater Managers
    - Project 1.3: Climate Adaptation in Disinvested Urban Areas: Assessing and Addressing Health and Social Impacts of Flooding
    - Project 1.4: Coastal Flooding: Primary and Secondary Impacts in Rural Communities
- Objective 2: Advance capabilities for community adaptation planning through co-production of data, information, and tools
    - Project 2.1: Hazard Mitigation Planning Portal
    - Project 2.2: Regional Data Sets and Future Integration of MARISA's Data Portals
    - Project 2.3: Seasonal Climate Summaries and Climate Data Tools
    - Project 2.4: Updating MARISA's Model Inventory and Selection Tool (MIST)
    - Project 2.5: Updating and Expanding Community Climate Outlooks
    - Project 2.6. Improving Stakeholder-Relevance of Climate Hazard Information
- Objective 3: Build workforce capacity through robust engagement of diverse students and partners
    - Project 3.1: Development of a Cross-RISA Summer School
    - Project 3.2: Other Training for Students
- Objective 4: Evaluate program impacts, particularly in socially vulnerable communities
    - Project 4.1: Evaluation of MARISA Impacts

Pacific Islands

Pacific Research on Island Solutions for Adaptation (Pacific RISA)

Title: Building Equitable and Just Climate Solutions for Pacific Island Resilience to Compound Disasters and Extreme Events
Geography: Hawai'i, Guam, American Samoa, the Commonwealth of the Northern Marianas Islands, Republic of Palau, Republic of the Marshall Islands, and the Federated States of Micronesia
Institutions: Arizona State University Global Institute of Sustainability and Innovation, East-West Center, University of Hawai'i at Manoa, NOAA/NCEI's Center for Weather and Climate (CWC), and the NOAA Joint Institute for Marine and Atmospheric Research (JIMAR)

Core Themes:

- Building resilience to compound extremes
- Recovery, nature-based solutions, and environmental security
- Transferability
- Equity and environmental justice

Leadership Team:

- Victoria Keener, Lead-Principal Investigator, Arizona State University & East-West Center
- Laura Brewington, Lead-Principal Investigator Arizona State University & East-West Center
- Mari Ching, Program Manager, Arizona State University

Website: https://www.pacificrisa.org/

	Stakeholder Need Known &/or Specific	Stakeholder Need Unknown &/or Generic
Policy/Management Solution Known and Adequate	**Being Responsive** – Pacific RISA elicits, or helps stakeholders identify, their own goals and resource needs and then works to meet those needs with specific, requested outputs (e.g., certain types of information to fill data gaps or training)	**Being Supportive** – Pacific RISA supports the advancement of policy and management solutions and the creation of political will (e.g., through creating forums for dialog, public education, training of specific users, or by connecting stakeholder groups with each other)
Policy/Management Solution Unknown or Inadequate	**Being Generative** – Pacific RISA opens the decision space to novel ideas and approaches (e.g., by identifying new policy options, new implementation strategies, creating new data/models/analysis/insights, synthesizing documents, or producing papers, reports or videos) in ways that generate new or different conversations	**Being Critical** – Pacific RISA advances policy and management debates by being a constructively critical, credible, outside voice on existing or missing approaches (e.g., by providing commentary, evaluating implementation and outcomes)

Figure 3. The Pacific RISA Program Theory is based around our functions as a climate science boundary organization. Source: Moser[113].

Abstract: This team will address the **overarching question**: How can we support and develop sustainable, equitable, and just climate solutions that increase Pacific Island resilience to compound disasters and extreme events? **Project objectives** are integrated and build upon Pacific RISA's progress for more than a decade, as they: **1)** conduct baseline evaluative research to identify factors that inhibit equitable climate adaptation and integrate metrics programmatically; **2)** identify new technical linkages between data, models, and projections for Hawai'i and the US-Affiliated Pacific Islands (USAPI); **3)** utilize project outputs to inform adaptation strategies and quantify the costs of extreme scenarios through the creation of an integrated exposure and risk mapping tool; and **4)** coordinate peer-to-peer exchanges across sectors, islands, and regions to enhance the scalability and transferability of project outputs. Underpinning all projects are commitments to environmental and climate justice, transparency, and the inclusion of communities that are vulnerable as a result of social and physical conditions. Tracking these objectives will be the focus of ongoing and iterative **program evaluation**. A dedicated Program Manager will integrate the efforts of staff and PIs, and liaise with partners and other regional climate programs. The **Sustained Assessment Specialist** position will support the U.S. National Climate Assessment (NCA) and, beginning with the networks involved in recent Pacific Islands Regional Climate Assessment (PIRCA) reports, engage additional groups and identify specific needs for in-depth regional assessments.

Projects:

- 1: Describing Compound Events in Hawai‘i and the USAPI and Implications for Hazard Prediction, Impact Assessment, and Adaptation Planning
- 2: Enhancing Pacific Ecological Security through Research, Outreach, and Exchange
- 3: Tracking and Communicating Sea Level Conditions for Coastal Disturbances in Hawai‘i and the USAPI
- 4: Peer-to-peer Exchanges on Resilience Planning for Compound and Correlated Climate Hazards and Extreme Events
- 5: Past and Future Changes in Extreme Rainfall and Associated Weather Patterns in Hawai’i
- 6: Natural Capital-informed Decision Making to Guide Climate Adaptation
- 7: Integrating Physical Drivers and Social Vulnerabilities to Assess Compounded Climate Exposure to Extreme, Climate-driven Events
- 8: Internal and External Program Evaluation

Pacific Northwest

Northwest Climate Resilience Collaborative (NCRC)

Title: Centering Frontline Communities in Climate Adaptation Science, Assessments, and Solutions
Geography: Washington, Oregon, Idaho, and parts of Montana
Institutions: University of Washington, Portland State University, Washington Sea Grant, Front and Centered, American Farmland Trust, and the Affiliated Tribes of Northwest Indians

Core Themes:

- Significant advances in the theory and practice of advancing climate resilience in frontline communities
- Evidence and models for effectively elevating community-driven approaches to climate resilience
- Centering climate justice and frontline communities within the scientific enterprise
- Enhanced diversity and inclusion in regional climate sciences and services

Core Team:

- Jason Vogel, Interim Director and Deputy Director, Climate Impacts Group at the University of Washington
- Zack Thill, Program Manager, Climate Impacts Group at the University of Washington

Website: https://cig.uw.edu/

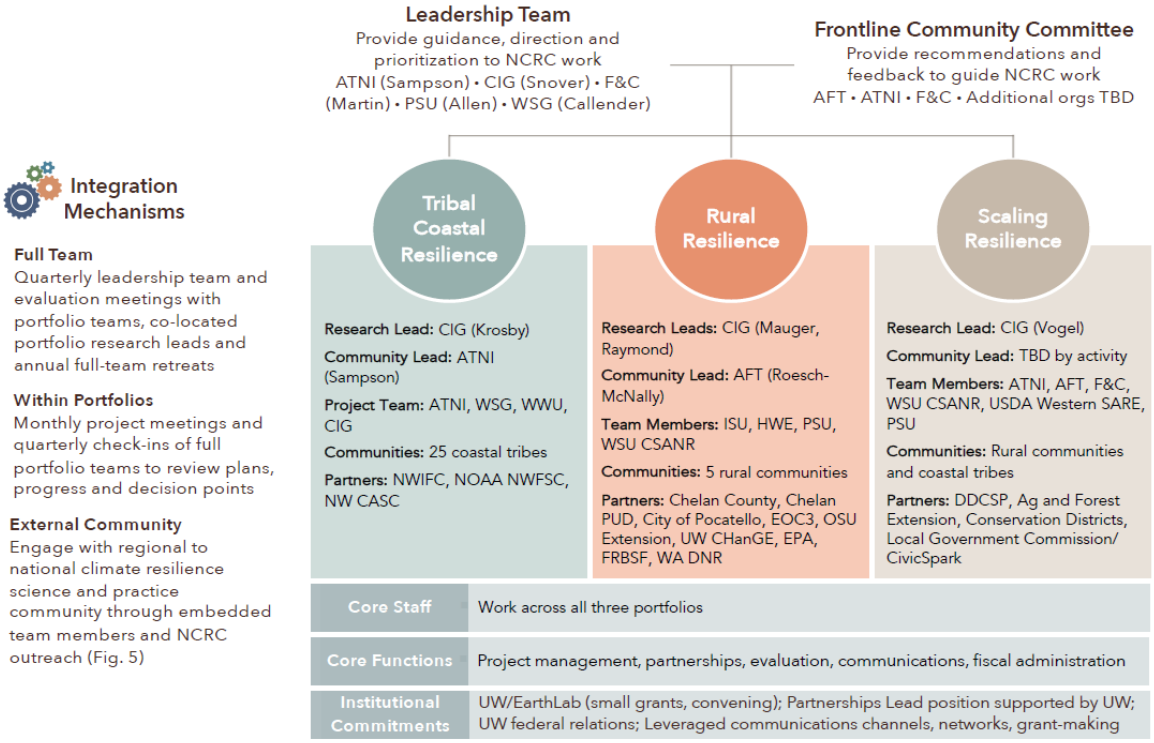


Figure 4. Organizational structure and integration mechanisms for the Northwest Climate Resilience Collaborative.

Abstract: This team will **assist communities on the frontlines of climate change** in pursuing their own resilience objectives, while ensuring that local-scale and place-based innovations are scaled out and up to support broader resilience in the Northwest, across the CAP/RISA network and in state and federal climate resilience efforts. Frontline communities are centered in this team: they participate on the Leadership Team, help shape and implement the research agenda and connect NCRC efforts with community-based resilience efforts across the nation. The NCRC team brings unmatched experience and proven success in co-developing applied research in partnership with public and private entities, and facilitating the use of science in complex climate adaptation and resilience challenges. NCRC's work **will lead to: (1)** significant advances in the theory and practice of advancing climate resilience in frontline communities; **(2)** evidence and models for effectively elevating community-driven approaches to climate resilience; **(3)** centering climate justice and frontline communities within the scientific enterprise; and **(4)** enhanced diversity and inclusion in regional climate sciences and services. This award includes a **small-grant competition**, which will support frontline community resilience initiatives through a participatory grant process, establish representative communities of practice, and scale local solutions up to decision-makers and out for regional learning.

Projects:

- Tribal Coastal Resilience Project 1: Assess the Climate Adaptation Needs of Tribal Coastal Communities
- Tribal Coastal Resilience Project 2: Conduct “Deep Dives” into Priority Adaptation Opportunities and Barriers
- Rural Resilience Project 1: Advancing Resilience in Under-Resourced Communities
- Rural Resilience Project 2: Improve the Climate Resilience of Farmworkers in the
- Specialty Fruit and Vegetable Crop Industry
- Scaling Resilience Project 1: Scaling Out - Building Knowledge-to-Action Networks
- Scaling Resilience Project 2: Scaling Up - Policy to Support Resilience
- Scaling Resilience Project 3: Scaling Deep - Staffing Communities

South Central

Southern Climate Impacts Planning Program (SCIPP)

Title: Planning for Long Term Change in a Short Term World
Geography: Oklahoma, Louisiana, Arkansas, and Texas
Institutions: University of Oklahoma, Louisiana State University, Texas A&M University, and Texas Sea Grant

Core Themes:

- Climate-informed planning
- Developing governance and collaborative capacity
- Extreme events in a changing climate
- Climate justice

Leadership Team:

- Rachel Riley, Director, University of Oklahoma
- Caylah Cruickshank, Program Manager, University of Oklahoma

Website: http://www.southernclimate.org/

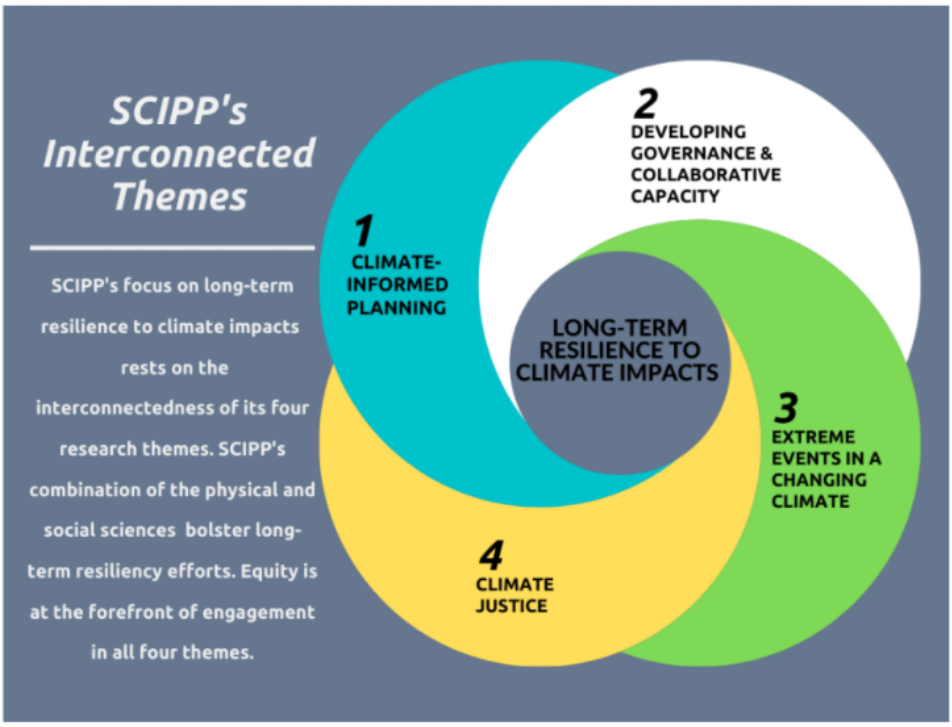


Figure 3. Interconnectivity of research themes in SCIPP Phase IV.

Abstract: This team will examine communities through multiple lenses: **climate-informed planning, developing governance and collaborative capacity, extreme events in a changing climate, and climate justice**. Together, these are designed to help them become more resilient. Learning how to incorporate climate information effectively into long-term plans opens opportunities for mitigating climate impacts. Recognizing the financial and policy levers available to communities reveals how disasters can become sources of future resilience. Understanding how climate change is and may affect the frequency and intensity of events equips communities with foresight and preparedness. Climate justice assures that all members of communities have a voice and are represented in policies and activities taken to lessen the impacts of future events. These research themes are supported by a core office that coordinates individual research projects, collaborates with stakeholders, synthesizes information for distribution through networks across the region, and assesses progress toward reducing climate risks and impacts. The **project team includes expertise** in climatology, meteorology, climate adaptation, political science, public administration, geography, engineering, sustainability, and environmental justice. The core office is advised by regional stakeholders and national experts participating in an advisory committee. The core office also connects closely with other **regional climate services partners**, including the USGS South Central Climate Adaptation Science Center, USDA Southern Plains Climate Hub, NOAA Southern Regional Climate Center, and State Climate Offices.

Projects:

- Theme 1: Climate-informed planning
    - Project 1A: Building Capacity for Hazard Mitigation Planning in Under-Resourced Communities
    - Project 1B: Regional Expansion and Evaluation of the Simple Planning Tool for Climate Hazards
    - Project 1C: Climate-Informed Planning Support to Small- and Medium-Size Water Utilities Along the Central Gulf Coast
    - Project 1D: Incorporating Climate-Informed Planning into Species Best Practices
    - Project 1E: Additional Engagement Involving this Theme

- Theme 2: Developing governance and collaborative capacity
    - Project 2A: Identify Potential Fiscal, Economic, and Financial Levers
    - Project 2B: Facilitate Stakeholder Engagement to Identify Preferences
    - Project 2C: Communicate Community Preferences and Willingness to Pay
- Theme 3: Extreme events in a changing climate
    - Project 3A: Reduction in Freezing Temperatures and Tropicalization of Temperate Climates
    - Project 3B: Assessing and Promoting Awareness of Heat Stress through Wet Bulb Globe Temperature
    - Project 3C: Quantifying Extreme Rainfall using the Storm Precipitation Analysis System
    - Project 3D: Sea-Level Rise Engagement Along the U.S. Gulf Coast
    - Project 3E: Forced Retreat of Coastal Populations
- Theme 4: Climate justice
    - Project 4A: Flood Risk and Community Resilience
    - Project 4B: Heat Stress and Vulnerability
    - Project 4C: Additional Engagement Involving this Theme

Southwest

Climate Assessment for the Southwest (CLIMAS)

Title: Cultivating Equitable Responses to Increased Aridity in the US Southwest: The Climate Assessment for the Southwest
Geography: Arizona and New Mexico
Institutions: University of Arizona, New Mexico State University, Inter Tribal Council of Arizona

Core Themes:

- Aridity
- Water
- Heat
- Health
- Capacity Building
- Climate Services

Leadership Team:

- Daniel Ferguson, Lead-Principal Investigator, University of Arizona
- Stacie Reese, Program Manager, University of Arizona

Website: https://climas.arizona.edu/

Figure 2 Relationships between program elements

Abstract: The CLIMAS team addresses the pressing challenges of the Southwest such as looming surface water shortages, increasing aridity that directly impacts the region's working

lands, and more frequent and persistent extreme heat events. The first objective of the team is to implement a program-wide strategy of structured engagement processes across the region designed to identify: new partners, specific climate equity issues we have expertise to address, and a refined set of research questions. The second objective is to carry out integrated inter- and transdisciplinary research projects focused on the three most pressing climate adaptation issues in the region: water availability, increasing aridity, and extreme heat events. Because human health and well being are inextricably woven through climate research in these three areas, the team will leverage the engagements, partnerships, and research being done within each project to formally assess how a health lens might further support ongoing projects which do not explicitly consider health impacts at present. Finally, through formal trainings, informal "learning-by-doing" approaches, ongoing outreach activities, and development of climate services to more effectively share climate information throughout the region, the team will increase the capacity of Southwest researchers and practitioners—at all career stages but with a focus on the next generation—to work collaboratively on community-focused, problem-oriented, equity-centered climate research. To ensure progress on goals and accountability, the team has designed a set of new structures and processes to: systematically assess and evaluate project and program progress; identify connections between research projects; and make strategic decisions about both course corrections and new opportunities. This integrative learning agenda will support internal decision making to improve programmatic outcomes, provide opportunities for social learning within the team's extended networks, and help ensure progress on addressing societal problems.

Projects:

- Water Availability in a Changing Climate
    - Objective 1: to carry out initial engagements in Arizona and New Mexico with Indigenous community members, farmers, ranchers, and other water users, planners, and resource managers who rely on water from the Gila River and Rio Grande systems to gather a broad range of concerns, topics, and issues related to climate variability, seasonality of precipitation, and water supplies.
    - Objective 2: to investigate the relationships between cool season (October-March) and monsoon season (June-September) precipitation.
    - Objective 3: to analyze the relationships between monthly and seasonal precipitation and temperature and Rio Grande streamflow, along with trends in climate and implications for changing surface water supplies.
    - Objective 4: to evaluate economic impacts of changings in water availability and assess potential for different adaptive responses.
    - Objective 5: to assess the societal and environmental impacts of hydroclimatic variability and changes in water availability in the Gila River and Rio Grande regions.
- Increasing Aridity and Impacts to Rural Landscapes across the Southwest
    - Objective 1: to carry out initial engagements in Arizona and New Mexico with rural and Indigenous communities, resource managers (land and wildfire), livestock producers, and recreation providers to gather a broad range of concerns, topics, and challenges related to aridity and landscape changes on rural landscapes.

    - Objective 2: to assess how increasing aridity may be driving landscape changes on rural lands across the Southwest.
- Supporting Heat Resilience in Frontline Communities
    - Objective 1: to carry out a regional heat assessment and develop prototype heat information tools relevant to participating communities.
    - Objective 2: to support the development of effective, equitable, and sustainable heat governance across scales of local government in partnership with rural and Indigenous communities by expanding understanding of heat governance.
    - Objective 3: to identify opportunities in heat mitigation infrastructure development in Indigenous, rural, and border communities that can help advance heat resilience equity.
- Health and Wellness Cross-Cut: Does a Health Lens Add Value?
    - Objective 1: Develop health and wellness profiles for projects amenable to a health and wellness lens.
    - Objective 2: Provide health information that can support CLIMAS engagement with the potential health impacts of climate change.
    - Objective 3: Assess how stakeholders think a health and wellness lens might enhance (or hinder) their projects as well as their engagement with additional partners and stakeholders.

Urban Northeast

Consortium for Climate Risk in the Urban Northeast (CCRUN)

Title: Supporting Regional Implementation of Integrated Climate Resilience
Geography: the urban corridor from Philadelphia to New York City to Boston, which includes New Jersey, Connecticut, Rhode Island, Massachusetts, and some counties of Pennsylvania, New York, New Hampshire, and Maine
Institutions: Columbia University, Boston University, Rutgers University, Drexel University, Stevens Institute of Technology, and City University of New York - Hunter College

Core Themes:
- Climate science
- Coasts and floods
- Public health
- Engineering and urban design
- Equity
- Social, behavioral, and economic science
- Compound extreme events
- Adaptation to coastal and inland flooding
- Urban-rural linkages and regional adaptation
- Alignment of sustainability, adaptation, and emissions reductions goals in resilience planning

Core Team:

- Radley Horton, Lead Principal-Investigator, Columbia University
- Daniel Bader, Program Manager, Columbia University

Website: http://www.ccrun.org/

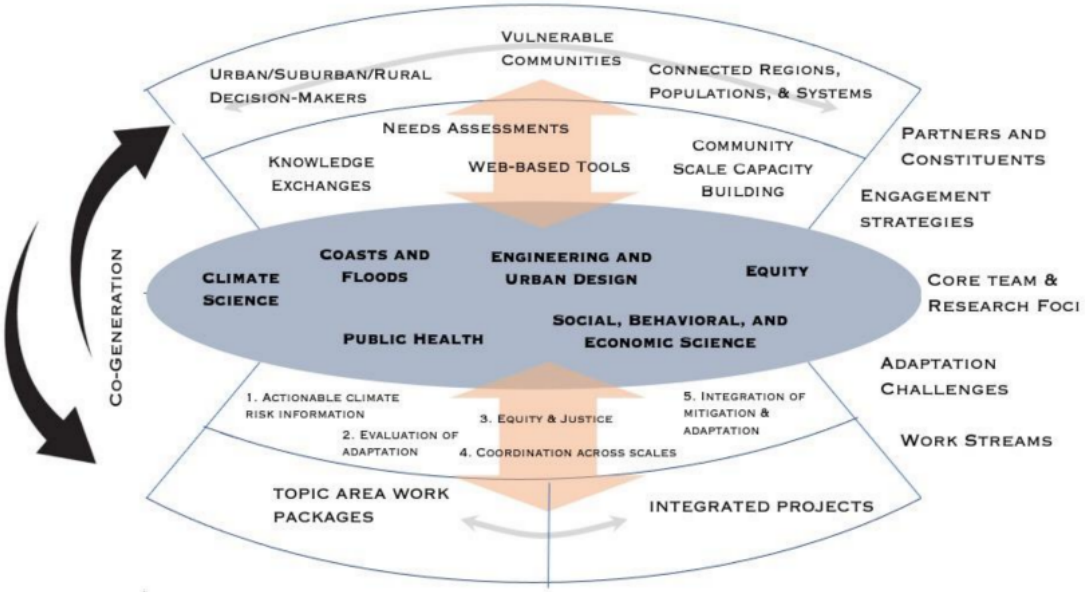


Figure 1. CCRUN Phase III Structure

Abstract: This team consists of natural, applied, and social scientists with deep stakeholder relationships and core competencies in the **topic areas** of climate science, coasts and floods, public health, engineering and urban design, equity, and social, behavioral, and economic science. CCRUN will conduct collaborative research in these topic areas to provide the consistency and continuity of information that underlay the region's adaptation advances in CCRUN Phases I and II. Additionally, CCRUN will manage **integrated projects** focused on: **1)** Compound extreme events; **2)** Coastal and inland flooding; **3)** Urban-rural linkages;and **4)** Alignment of sustainability, adaptation, and emissions reductions goals in resilience planning. While each project employs context-specific methodologies, several overarching approaches will guide CCRUN's engagement with decision-makers: knowledge exchange, needs assessment, community-scale capacity building, and web-based tools. The **outcomes** of CCRUN's work embody solution-based science driven by the needs of our partners and stakeholders and include: **1)** advancement of the climate science of emergent risks, **2)** enhanced understanding of the intersection of climate risk and vulnerability at new scales, and **3)** development of integrative adaptation science linking urban climate risk management and other community challenges. Emergent benefits include advancing the sustainability, scalability, and evidence-base of adaptation efforts. This award includes a **small-grant competition**

targeting organizations working with socially vulnerable populations in communities that are exposed to climate risks.

Projects:

- Topic Area 1: Climate Science
    - Developing downscaled climate projections
    - Engaging stakeholders in the emerging science of climate attribution
    - Continuing applied research on climate extremes:
- Topic Area 2: Coasts and Floods
    - Provide on-demand climate risk information and research
    - Study climate and urbanization impacts on inland, coastal, and compound flooding
    - Quantify climate attribution for coastal flooding
    - Expand forecasting
- Topic Area 3: Public Health
    - Quantifying health impacts of compound events and associated vulnerable communities, with an explicit disparities lens
    - Characterizing heat exposure, vulnerability and adaptation in environmental justice communities
- Topic Area 4: Engineering and urban design
    - The impacts of climate change on urban drainage systems
    - Nature-based Strategies for Building Urban Sustainability and Resilience
- Topic Area 5: Equity
    - Co-production of vulnerability and resiliency indicators and metrics
    - Assessment of the impacts of climate decisions on underserved populations and communities
    - Build inclusive local and regional processes for equitable engagement in adaptation planning
- Topic Area 6: Social, behavioral, and economic science
    - Adoption of adaptations among different types of decision makers
    - Learning across contexts
    - Indicators of vulnerability and adaptation
    - Decision-Support Tools to Accelerate Regional, Multi-Scalar Adaptation
    - Enabling and Measuring Community Adaptation Success: A Framework for Analysis and Engagement
- CCRUN-Wide Integrated Projects
    - Integrated Project 1: Compound Extreme Events
    - Integrated Project 2: Adaptation to Coastal and Inland Flooding - A framework that deepens integration across disciplines and broadens assessed outcomes
    - Integrated Project 3: Urban-Rural Linkages and Regional Adaptation
    - Integrated Project 4: Alignment of Sustainability, Adaptation, and Emissions Reductions Goals in Resilience Planning

U.S. Caribbean

Caribbean Climate Adaptation Network (CCAN)

Title: Caribbean Climate Adaptation Network: Building equitable adaptive capacities of the U.S. Virgin Islands and Puerto Rico
Geography: U.S. Virgin Islands and Puerto Rico
Institutions: University of Puerto Rico-Medical Sciences Campus, USDA-Forest Service International Institute of Tropical Forestry, Worcester Polytechnic Institute, University of the Virgin Islands, City College of New York, UT-Austin, UPR-Mayaguez, University of South Florida, New York University, Caribbean Coastal Ocean Observing System

Core Themes:

- Governance and decision-making
- Social, Ecological, and Technological Systems (SETS) hazards and vulnerabilities
- Designing and fostering adaptive strategies

Core Team:

- Pablo Méndez-Lázaro, Lead-Principal Investigator, University of Puerto Rico Medical Sciences Campus
- Manuel Heredia Morales, Program Manager, University of Puerto Rico Medical Sciences Campus

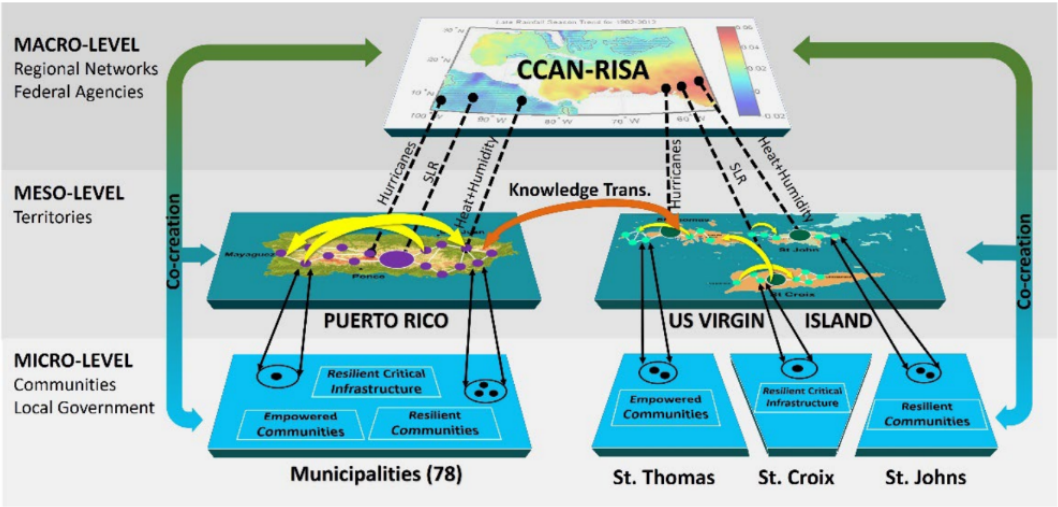


Figure 1. Illustration of the networked approach to engage actors at multiple levels of governance in the co-production of community adaptive capacities in the USVI and PR.

Abstract: Recent extreme weather events in the Caribbean highlight the importance of the interdependencies of the critical infrastructure systems, which often lead to catastrophic failures of physical assets followed by severe adverse impacts on the health and wellbeing of their inhabitants. Island communities such as the US Territories of the Virgin Islands (USVI) and Puerto Rico (PR) are profoundly impacted by climate extremes, which are compounded by their

geographic isolation that disrupts supply chains and emergency responses. These communities are also hindered by a complex governance structure composed of layers of federal and Territorial bureaucracies frequently leading to ineffective decisions. The US Caribbean project team seeks to address these issues by bringing together a multidisciplinary team of universities, agencies, and non-governmental organizations based out of the Caribbean region and the US. The team will enhance and expand partnerships through the development and convening of stakeholders in Puerto Rico and USVI. The project will utilize a human-centered design, bringing together impacted community and government stakeholders, and multidisciplinary scientists to develop and co-produce community climate adaptation capacities, strategies, and actions that build on collectively produced insights and realistic locally grounded scenarios. The proposed knowledge-action network is designed to help build adaptive capacities for future climate extremes, plan responses to cascading climate hazards and governance crises. The proposed work will focus on enhancing program management and leadership through the building of internal capacity. The team's goal is to enable effective decision-making that supports building just and equitable resilience in the USVI and PR. The focus will be to address climate hazards related to extreme rainfall, extreme heat, drought, landslides, and coastal and riverine flooding. By utilizing a human-centered design approach, the network will develop effective and scalable climate actions. This project will utilize NOAA and other data products and tools to increase local climate adaptive capacity and resilience in underserved communities. It will increase the capacity at both PR and UVI (Minority Serving Institutions) and their partners to support and sustain education, research and professional development in NOAA mission areas. The project will engage communities that are typically underrepresented in the US STEM workforce, in policymaking and in decision-making. The team will implement a series of diverse data-gathering projects and community and government collaboration interventions. The team will explore different modalities, co-producing and providing clear and actionable information on climate extremes, and engaging communities, practitioners, and stakeholders, in an effective social co-design process to better manage and support equitable climate adaptation. The transdisciplinary depth and cross-institutional team that has been assembled, is well-equipped to develop workable strategies to address gaps in decision-making planning and implementation of actions required to address climate extreme challenges in the Caribbean US territories.

Projects:

- Working Group 1: Governance and decision-making
    - This working group will use social science and co-development approaches to understand governance and decision-making networks that affect climate adaptation in both territories at multiple levels, will track changes in these networks between the start (Y1) and end (Y4-5) of the project, and co-develop mechanisms for the community to continue such review after Y5 of this project.
- Working Group 2: Social, Ecological, and Technological Systems (SETS) hazards and vulnerabilities
    - This WG uses the Vulnerability, Consequences, and Adaptation Planning Scenarios (VCAPS) methodology, joining social and natural scientists to generate the information and co-learning required for local decision makers to assess

social, economic, health, and other consequences of climate change hazards in their community.

- Working Group 3: Designing and fostering adaptive strategies
    - This WG will focus on the applied social science aspects of designing and fostering adaptive capacities. It will work with working groups 1 and 2 to use networks of co-learning to jointly improve adaptive capacities through human-centered design projects, and will evaluate and compare project outcomes and best practices, for example, those which may be transferable or lead to greater empowerment of marginalized communities.

West

California-Nevada Applications Program (CNAP)

Title: The California Nevada Adaptation Program (CNAP): Building Capacity for Near- and Long-Term Resiliency in California and Nevada
Geography: California and Nevada
Institutions: Scripps Institution of Oceanography, UC San Diego; Desert Research Institute - Western Regional Climate Center; UC Merced; UC Los Angeles; UC Santa Barbara

Core Themes:

- Knowledge-to-action partnerships
- Mental & physical health
- JEDI principles
- Climate literacy
- Community resiliency

Leadership Team:

- Tamara Wall, Lead Principal Investigator, Desert Research Institute
- Ariel Choinard, Program Manager, Desert Research Institute

Website: https://cnap.ucsd.edu/

FIGURE 1. THE THREE PATHWAYS OF CNAP'S LOGIC MODEL

Abstract: California and Nevada have made significant progress in addressing climate variability and climate change impacts to their state and local communities, but both states remain vulnerable to climate change impacts. Among these are public health threats from extreme heat and wildfire smoke, impacts on water resources from extended drought, reduced snowpack, and extreme precipitation events, and in California, flooding, beach erosion and degradation of coastal infrastructure and communities. CNAP, in response to these challenges, proposes a community-focused portfolio of research, engagement, and workforce development to be conducted by a renewed team of California and Nevada social and physical scientists. The work proposed emphasizes partnerships and supporting frontline communities that have been and are impacted by social and environmental inequities. CNAP is based on three pathways — convening and connecting, co-produced research, and catalyzing solutions. These pathways

are supported by five core tenets: knowledge-to-action partnerships, mental/physical heath, JEDI principles (Justice, Diversity, Equity and Inclusion), climate literacy, and community resiliency. Six core research projects involve a multidisciplinary research team that will work with community partners to leverage local knowledge to promote equitable adaptation approaches. The research projects address: (1) extreme heat impacts in urban low income, unhoused, and vulnerable populations in Southern Nevada; (2) the impact of changing hydroclimatic conditions and water use policy on water availability in California's southern San Joaquin Valley, a key agricultural region in the midst of water and energy transitions; (3) integrated scientific approaches to address uncertainty in coastal planning in Southern California; (4) public health impacts on Northern California and Nevada communities from compound climate hazards of wildfire smoke and heat on under-resourced households; (5) the mental health challenges of climate change professionals, directed through the *Adaptive Mind* project — a set of skills and capacities designed to support practitioners in the adaption sciences; and (6) supporting climate assessment activities in both states though research and data customization. Climate justice will be addressed through (1) reciprocity with partners in the research process; (2) embracing local and traditional knowledge in our research and engagement strategies; and (3) supporting diversification and inclusion of climate adaptation researchers and engagement specialists that more closely reflect our diverse communities. As part of the team's diversification efforts, they will train future practitioners by integrating information and tools into community college curricula, preparing a workforce to address climate impacts, and by piloting a mentoring program. The mentoring program will involve students and faculty and integrate with the small grants program, *Building Capacity through Reciprocity with Tribal Communities*. The small grants program focuses on advancing tribally-led solutions to tribally-identified needs by supporting a Leaders Indigenous Climate Fellowship program. Working with an evaluation expert, each project will develop a reflexive evaluation plan based on societal impact indicators to evaluate effectiveness and outcomes. Collectively, through the six core projects, the mentoring program, and the small grants program, CNAP is designed to connect, convene, and catalyze climate adaptation solutions that have broad societal impacts across the region.

Projects:

- Project 1: Southern Nevada Heat Resilience Lab
    - Mapping real-time air temperatures using a microgrid to understand extreme heat experiences
    - Behavioral responses to extreme heat among vulnerable and inadequately housed populations
    - Assessing community heat concerns and information needs
- Project 2: Building Water Resiliency through Climate Information and Workforce Development in the San Joaquin Valley (SJV)
    - Data equity and workforce development in SJV
    - Research to support Water Resiliency in SJV
- Project 3: Evaluating Nature-Based Solutions for Coastal Adaptation in Southern California
    - Updating physical and economic information to support coastal adaptation pathway planning

    - Evaluating the constraints and limitations of nature-based solutions
    - Integrating Indigenous stewardship in nature-based coastal adaptation strategies
- Project 4: Supporting Household Health Adaptation to the Compound Events of Extreme Heat and Wildfire Smoke
    - Identifying physical and mental health impacts associated with compound events
    - Generating recommendations for improving existing household cooling instruments
    - Developing and evaluating compound events education and risk communication materials
- Project 5: Adaptive Mind
    - Improved understanding of the skills and capacities constituting an “adaptive mind”
    - Greater capacities among “climate first responders” to cope with and lead in the face of climate change
    - Networked cohorts of people with adaptive mind capacities, offering mutual support to each other and bringing more effective help to their communities
    - A greater acceptance that adaptive mind skills are central to a well-trained adaptation professional community
- Project 6: Climate Assessments: Nevada and California