Part of the "Creeks in Common" initiative, this document serves as a tool to spark collaborative action by students, faculty, agencies, organizations, and campus partners. Many of the lists were generated by ChatGPT, are incomplete and contain errors, and in no way represent commitments by organizations. Working groups will use this document to jumpstart discussions and will update to reflect new priorities and partnerships. Please comment or get involved! Contact: cei.sonoma.edu.

Copeland Creek Sensor Network Projects

The climate network project addresses watershed challenges including limited hydrologic data for effective flood and recharge planning, gaps in understanding surface–groundwater interactions, and a lack of real-time information to support adaptive management and community resilience to climate change.

The Copeland Creek Watershed Sensor Network project emerged from a growing need to better understand the region's hydrology in the face of climate change, increased development, and recurring flood events. Building on a series of existing sensors in the watershed, the project is will explore the deployment of a network of environmental sensors that monitors precipitation, temperature, soil moisture, groundwater infiltration, and streamflow across diverse elevations—from Sonoma Mountain to the valley floor.

This sensor network will also offer hands-on research opportunities for students, faculty, and community members. Designed to complement long-term environmental restoration and stewardship efforts along Copeland Creek, the project fosters collaboration between academic, governmental, and nonprofit partners. It also promotes transparency and accessibility through open data platforms that can inform decision-making by land managers, local agencies, and educators.

Partial List of Existing Efforts in the Watershed

- **SSU Center for Environmental Inquiry (CEI)** has been instrumental in environmental monitoring within the Copeland Creek watershed. They have implemented a wireless sensor network at the Fairfield Osborn Preserve, which includes weather monitoring stations that broadcast real-time data. This network supports research and education on climate and hydrology in the region. Also hosts Wildfire Alert cameras.
- **Weather Tools** is interested in establishing the Copeland Creek Climate Network as a demonstration site for its environmental sensor and predictive software technologies. The project offers opportunities for research collaboration, product testing, and data-driven innovation with Sonoma State University. It also aligns with the company's commitment to climate resilience, education, and community engagement.

- **WATERS Collaborative** (Watershed Academics To Enhance Regional Sustainability) Collaborative is a partnership between CEI and Sonoma Water to involve SSU faculty and students in regional water challenges. They have supported the development of sensor networks and have been involved in projects that integrate environmental monitoring with education and community engagement.
- **Sonoma Water** has collaborated with SSU and other partners to support environmental monitoring and data collection efforts in the Copeland Creek watershed. Their involvement includes providing funding and technical expertise for projects aimed at understanding and managing water resources in the region. Also provides funding and logistical support for the Wildfire Alert camera network, emphasizing the protection of critical watersheds.
- **SSU Engineering Science** faculty and students have developed a cost-effective, low-power wireless sensor network using LoRa and LoRaWAN technologies to support environmental monitoring in remote areas. The system uses custom gateways and peer-to-peer communication to collect and transmit real-time data without relying on commercial infrastructure. This innovative approach enables scalable, resilient sensing for applications like climate, soil, and wildfire monitoring.
- **ALERTWildfire Consortium** - A collaboration among the University of Nevada, Reno; the University of California, San Diego; and the University of Oregon, responsible for the development and maintenance of the camera network. Scripps Institution of Oceanography (UC San Diego): Participates in the technological development and data analysis aspects of the network. Pepperwood Preserve: Hosts additional cameras, contributing to the broader coverage of the region. CAL FIRE and Sonoma County Fire Agencies: Utilize the real-time data from the cameras for rapid response and resource allocation during wildfire events.

Partial List of Potential Additional Partners

- **SSU Faculty and Students** from various departments, have been actively involved in environmental monitoring projects in the Copeland Creek watershed. Their work includes erosion monitoring, flood analysis, and other research activities that contribute to the understanding of the watershed's dynamics.
- **Sonoma Resource Conservation District (RCD)** has conducted watershed assessments, including the Copeland Creek Watershed Assessment, which involves collecting and analyzing environmental data to inform conservation and restoration efforts. Their work supports the development of projects like the Copeland Creek Climate Network by providing baseline data and identifying areas of concern.

- **UC Cooperative Extension – Sonoma County)** provides applied research and outreach in agriculture, climate resilience, and water management. Their expertise could help translate weather data into practical tools for landowners, educators, and communities.
- **UC Davis Center for Watershed Sciences** is a leader in watershed-scale research and modeling, UC Davis could contribute to hydrologic forecasting and long-term planning informed by the weather station network.
- **NOAA Regional Integrated Sciences and Assessments (RISA) Programs** supports climate resilience planning through research and data translation. Their regional expertise could connect the project to broader climate adaptation efforts.
- **City of Rohnert Park / City of Cotati / Sonoma County Regional Parks** manage public lands and infrastructure along the watershed and would benefit from improved storm forecasting, flood modeling, and public education tools.
- **Sonoma County Transportation and Public Works** could use data from the network to improve stormwater infrastructure, road safety, and emergency response during extreme weather events.
- **North Bay Watershed Association (NBWA)** facilitates regional collaboration on watershed and water quality issues. They can help align the Copeland Creek network with broader regional planning.
- **California Department of Water Resources (DWR)** supports watershed-scale climate adaptation and offers funding and technical guidance for weather and hydrologic monitoring systems.
- **California Office of Emergency Services (Cal OES)** could use data for real-time decision-making during severe weather events and wildfires, strengthening community readiness.
- **USDA Natural Resources Conservation Service (NRCS)** supports local conservation practices and watershed management; could help align data collection with federal land restoration programs.
- **Pepperwood Foundation** operates an advanced climate and weather monitoring network and could serve as a peer partner in sensor deployment, data calibration, and educational outreach.
- **Laguna de Santa Rosa Foundation** is active in nearby watersheds with experience in monitoring, restoration, and public engagement that could complement efforts in Copeland Creek.
- **Point Blue Conservation Science** provides expertise in climate-smart restoration and works with landowners and schools, making them a valuable partner for both data use and outreach.

- **Federated Indians of Graton Rancheria** are stewards of ancestral lands, and bring critical perspectives and may wish to co-design monitoring that aligns with cultural and ecological values.
- **Sonoma County Farm Bureau** could help engage agricultural stakeholders who benefit from localized weather data for planning and sustainable land management.
- **Local vineyard associations and growers** on and near Sonoma Mountain may use weather data for frost protection, irrigation timing, and adaptive agricultural practices.
- **Private environmental tech companies (e.g., Davis Instruments, Onset HOBO)** could provide sensor hardware, software, and technical support for real-time data collection and network integration.
- **PG&E or other local utilities** could support fire-weather forecasting and grid management, especially in areas prone to public safety power shutoffs (PSPS).
- **Local K–12 school districts and STEM programs** could incorporate weather stations into curricula, engaging students in environmental science, data literacy, and stewardship.
- **Sonoma County Library / SSU Makerspaces** could host public-facing data displays, run workshops on interpreting weather data, and support citizen science engagement.

Partial List of Potential Academic Engagement: *This list provides examples of how various disciplines might engage with the initiative. It is intended to prompt faculty to consider how their own interests and expertise may align.*

College of Science, Technology, and Business

- **Department of Biology**: could assess the ecological impacts of hydrologic changes detected by the sensor network, use real-time data to study habitat conditions for aquatic and riparian species, and engage students in biodiversity monitoring tied to water cycle variability
- **Department of Chemistry**: could monitor changes in water quality in relation to flow and temperature data, integrate chemical sampling protocols with sensor-triggered events, and explore relationships between runoff and pollutant levels
- **Department of Computer Science**: could design the digital infrastructure to collect, store, and visualize sensor data, develop web-based platforms or apps for public and academic use, and support cybersecurity and system reliability
- **Department of Engineering**: could develop, program, and deploy low-power environmental sensor systems, optimize network communication and data transmission, and integrate solar power and remote diagnostics for field-based hardware
- **Department of Geology**: could interpret soil moisture and infiltration data in relation to geological features, analyze how terrain influences groundwater recharge, and support modeling of erosion and sediment transport

- **Department of Kinesiology**: could study the use of sensor data to guide safe outdoor activity in response to weather or air quality, and explore how environmental monitoring supports wellness programming along the creek
- **Department of Mathematics and Statistics**: could analyze large sensor datasets to identify trends and anomalies, develop predictive models for streamflow and recharge, and support uncertainty analysis in climate projections
- **Department of Nursing**: could explore public health implications of changing water and climate conditions, contribute to community health advisories informed by sensor data (e.g., heat, air quality), and support health education in environmental resilience
- **Department of Physics and Astronomy**: could contribute to the design and calibration of sensor technologies (e.g., thermistors, radiometers), model energy balance in climate monitoring stations, and assist with atmospheric data interpretation
- **Department of Business Administration**: could evaluate the economic value of sensor-informed water management, develop business models for maintaining open-access data platforms, and assist with grant and funding proposals
- **Wine Business Institute**: could analyze how climate and soil moisture data influence vineyard management practices, integrate sensor data into sustainable viticulture education, and assess risks to wine production under shifting water availability

College of Education, Counseling, and Ethnic Studies

- **Department of Counseling**: could evelop community resilience strategies that incorporate environmental data, support mental health education around climate impacts, and foster climate-related outreach programs
- **Department of Early Childhood Studies**: could create age-appropriate environmental data exploration tools, develop weather and water-themed early education materials, and promote sensory learning around local climate patterns
- **Department of Education**: could train teachers to use local sensor data in STEM curricula, integrate real-time watershed conditions into K–12 lesson plans, and lead professional development on place-based science education
- **Department of American Multicultural Studies**: could promote data equity by ensuring community access to sensor data, study disparities in climate resilience, and engage underrepresented groups in project participation
- **Department of Chicano and Latino Studies**: could co-create outreach and educational content in Spanish, partner with Latino communities on water justice and resilience planning, and increase participation in sensor-driven citizen science
- **Department of Native American Studies**: incorporate Indigenous knowledge of climate and water cycles into interpretation of sensor data, engage Tribal communities in co-management of monitoring sites, and protect culturally significant areas

- **Hutchins School of Liberal Studies**: could coordinate interdisciplinary student research using sensor data, support collaborative projects that combine science and storytelling, and explore the human dimensions of climate data use

College of Humanities, Social Sciences, and the Arts

- **Department of Anthropology**: could study community perceptions and cultural practices related to water and climate, evaluate how technology changes environmental engagement, and support participatory research on resilience
- **Department of Art and Art History**: could visualize sensor data through public art installations or exhibitions, create infographics and data-driven artwork, and help communicate watershed trends creatively
- **Department of Communication and Media Studies**: could develop public outreach strategies using live data, produce video and digital media to explain sensor network findings, and improve science communication for diverse audiences
- **Department of English**: could support writing and storytelling that humanize climate data, develop creative nonfiction and place-based narratives using real-time observations, and contribute to science literacy through literature
- **Department of History**: could contextualize contemporary data with historical climate patterns and land use changes, archive the evolution of community water management, and integrate watershed history into interpretive materials
- **Department of Music**: could explore the use of environmental data to inspire or shape compositions, create soundscapes based on water and weather sensor inputs, and integrate climate themes into music education
- **Department of Philosophy**: could engage with ethical questions about data use, environmental monitoring, and surveillance, and promote discussion on justice and responsibility in climate adaptation
- **Department of Political Science**: could analyze the role of environmental data in shaping local policy, support advocacy for science-informed decision-making, and study governance frameworks for data transparency
- **Department of Psychology**: could research emotional and cognitive responses to environmental change and data exposure, explore climate anxiety and its mitigation through data access, and design interventions that promote resilience
- **Department of Sociology**: could examine the social implications of climate monitoring, study public trust in data systems, and assess how data influences community behavior and environmental stewardship
- **Department of Theatre Arts and Dance**: could create performances that interpret climate data through movement, explore community stories of water and resilience, and use the arts to engage audiences with scientific findings

- **Department of Women's and Gender Studies**: could examine how climate impacts intersect with gender and caregiving, promote inclusive approaches to resilience and adaptation, and ensure diverse voices in data-driven planning

Partial List of Potential Funding Sources

- **California Natural Resources Agency – Climate Resilience Program** funds climate adaptation infrastructure, including monitoring networks that support watershed planning and public resilience.
- **California Department of Water Resources (DWR) – Integrated Regional Water Management (IRWM) Grants** supports multi-benefit water and climate projects, including real-time data systems for flood management, groundwater recharge, and habitat restoration.
- **National Oceanic and Atmospheric Administration (NOAA) – Climate Program Office / Environmental Literacy Program** funds projects that link climate science with public engagement and resilience-building at the watershed scale.
- **Federal Emergency Management Agency (FEMA) – Building Resilient Infrastructure and Communities (BRIC) Program** supports projects that enhance community resilience through data-driven hazard mitigation, such as flood modeling and climate-informed planning.
- **U.S. Geological Survey (USGS) – Cooperative Research Units / Water Mission Area** Offers technical and financial support for hydrologic monitoring and climate resilience research.
- **EPA Environmental Education Grants Program** supports projects that use environmental monitoring and data collection for education, especially in underserved communities.
- **National Science Foundation (NSF) – Advancing Informal STEM Learning (AISL)** can fund educational integration of weather station data into citizen science or K–12/college outreach programs.
- **Sonoma County Water Agency (Sonoma Water)** may offer funding or in-kind technical support for watershed-scale monitoring that supports flood management and planning
- **Rose Foundation for Communities and the Environment** funds grassroots environmental monitoring, community science, and watershed literacy projects—especially those with a climate justice lens.
- **Strong Foundation for Environmental Values** is a Sonoma County-based funder supporting youth-centered climate education and place-based learning.
- **Community Foundation Sonoma County** provides grantmaking in environment, youth development, and community resilience; could support infrastructure or programming aspects.

- **Tides Foundation** supports environmental justice and community-led climate initiatives, including real-time monitoring and education.
- **Gordon and Betty Moore Foundation** is interested in ecosystem health, environmental data systems, and science education—well-aligned with the climate network's goals.
- **Kresge Foundation – Environment Program** funds climate resilience and data equity projects that support vulnerable communities through local adaptation infrastructure.
- **PG&E Better Together Resilient Communities Grant** funds climate resilience efforts that improve community preparedness and environmental awareness.
- **Davis Instruments / Onset HOBO / other sensor manufacturers** could offer in-kind support, discounts, or pilot partnerships for educational weather station deployment.
- **Google.org or Microsoft AI for Earth** may be interested in data-driven environmental monitoring networks, particularly if tied to open data platforms or educational applications.
- **ESRI or GIS tech companies** may support geospatial education and real-time data visualization tools as part of educational partnerships.