

2024 ITRC Project Proposal Template

Proposed Project Title

SRR-2: Expanding Sustainable & Resilient Remediation Practices for a Changing Climate

State Team Leader

Indicate at least one state team leader committed to serving as the Team Leader for this team:

1. Colorado Department of Public Health and Environment
2. Minnesota
3. California
4. Massachusetts

Proposal Contacts

Evan Madden, Interstate Technology & Regulatory Council, emadden@ecos.org

David Tsao, bp Remediation Management, 331-236-1403, david.tsao@bp.com

Elizabeth Haack, Janeen Tang, Ecometrix, 905-794-2325, ehaack@ecometrix.ca

Abstract

The effects of global warming are becoming increasingly evident today: sea levels are rising, 500- and 1,000-year events are becoming much more prevalent, and different regions across the world are experiencing natural, social, and economic impacts due to unprecedented shifts in climate. In response to this sharp rise in extreme weather events and irregular shifts in climate, it is paramount that regulatory bodies small and large are equipped to best anticipate and plan for the effects of a changing climate. Being equipped means understanding how to put into practice sustainable and resilient practices across our lives and workplaces, and in so doing, ultimately yield financial, physical, and social benefits for local communities and states alike.

The remediation of contaminated sites is one of many areas - such as stormwater management, coastal restoration, urban planning, mine-waste reuse - where implementation and regulation of sustainable and resilient practices is lagging despite availability of good guidance. Practitioners face hurdles in implementing Sustainable Resilient Remediation (SRR) because the work is transdisciplinary - spanning the natural, social and economic sciences. Required is familiarity with language, concepts and methods across disciplines, which is a daunting task in addition to all other conventional measures of project execution that must be met or exceeded. Education and outreach are needed to help standardize SRR while garnering the most value from a sustainability and resilience standpoint for sites with different sizes, contamination levels and local conditions. Practical, real-world tips, tools and case studies are needed to help people engage with multiple disciplines and interested parties, focus on key decisive factors, apply innovative solutions, integrate benefits to society, and report on the overall benefits achieved.

This project will inform federal, state, tribal and local governments, environmental project managers, consultants and community stakeholders of key considerations for successful climate planning, sustainable/resilient project design and implementation, and evaluation metrics for decision-making and

long-term project monitoring and management. This project starts with topics introduced in ITRC's [SRR](#) and [GSR](#) documents, and could expand into stormwater management (Stormwater-1), ecological land-reuse (ECO-1 and ECO-2), managed aquifer recharge (MAR), reuse of solid mining waste (active team), etc. The goal is to mainstream SRR by laying out a practical process for project execution that is focused on climate-change resiliency from selection and design of approach to implementation, maintenance, and monitoring.

Problem Statement & Importance to the States and Broader Environmental Community

The world is changing at an alarming rate; with 1.1 degrees Celsius of global temperature rise, we are currently seeing changes in climate that are unparalleled over centuries or more, happening throughout every region in the world. Beyond political movement aimed at curtailing carbon emissions, it has become increasingly crucial that local, state and regional regulators and project managers adopt and implement remediation projects aimed at promoting climate resiliency, ensuring that localized regions are as prepared as possible to withstand further increases in climate change-related impacts and extreme weather events.

The aim of sustainable resilient remediation (SRR) is to provide a decision-making process that improves the resilience and net benefit achieved across the environmental, social and economic dimensions of a remediation project. Although several guidance documents, standards, tools and case studies exist, implementation of SRR remains a challenge worldwide, and there is currently a gap in information and readily available resources for best practices to face issues that arise specifically from climate change.

The members of the ITRC's original SRR team put forward thoughts on actions that would provide a good springboard to mainstreaming SRR, including:

- *Discuss the tradeoffs and balance between the prongs of sustainability (economic / social / environmental) at the local level;*
- *Implement a risk management approach, bringing in more relevant local information and stakeholder insights where possible to evaluate site actions more thoroughly;*
- *Provide examples of resiliency and adaptive capacity (show value/success, also show less than perfect examples and how to measure partial success);*
- *Develop metrics to track progress on SRR goals; and*
- *Develop further guidance or standardized methods for conducting vulnerability assessments.*

Limitations in regulatory, financial, and social drivers along with lack of resources and data have hindered the implementation of SRR. What is most difficult for practitioners is the path from concepts that are transdisciplinary and complex in nature to an understanding of the value of the approach, and all the intermediary steps to advance an SRR project to the field.

This proposal leads practitioners to carry out SRR by providing case studies in which the information presented focuses on the process and outcomes. The intent would be to educate on the:

- **Overarching/Comprehensive Planning Process:** guided by Decision Support Tools (DSTs) that include climate change resilience, vulnerability, social, economic and environmental factors.
- **Actionable Sub-Categories:** define and gather the information needed to feed into the DSTs using tools and concepts that include climate resilient best management practices (BMPs) and specific planning guidance pertinent to extreme weather and other impacts of climate change, as well as methods for evaluating Ecosystem Services (ES) and Social Impact Assessment (SIA).

Available project examples, including both public and private sector projects, would be mined in a consistent and systematic way to develop case study storyboards, that convey the steps for successful framing, design and implementation of climate-resilient projects and guidance on monitoring and evaluating climate resilient projects, including metrics for ES and SIA.

Recent influxes of capital to States from the [Infrastructure Investment and Jobs Act \(IIJA\)](#) and the [Inflation Reduction Act \(IRA\)](#) provide an unprecedented opportunity for coordination between state agencies, municipalities, and communities to identify local needs, leverage resources and streamline resilient project implementation ([RMI 2023](#)). With increased financial resources available at state and local levels, now is a better time than ever to mobilize funding toward projects aimed at combating the increasing threats of extreme weather events linked to climate change.

State and local governments need guidance on specific areas where this new influx of funding can be mobilized toward resilient projects that yield maximum net benefits or ES. Example projects/approaches to be evaluated for inclusion as case studies could include (not exclusively):

- Wetlands restored to pre-commercialization conditions on land in St. Paul Minnesota ([Venema, 2017](#)). The restored wetlands now are an effective part of the local area's stormwater retention system and have created an attractive public space that contributes to local biodiversity.
- Evaluating greening options for brownfields across an entire (Xuhui) district in China. The selection of greening options was demonstrated on a site-by-site basis, in terms of vegetative cover type, impervious surfaces and water bodies enhanced by considering the benefits at the scale of urban needs. ES benefits were shown to come primarily from cultural services (increased supply of recreation and amenities), urban cooling and flood regulation services ([Zhong et al., 2020](#)).
- At a former wood treatment site with creosote residuals requiring remediation, the prevailing thought was that the land was unusable in the near term. Use of a decision support tool allowed the stakeholders to envision the land used as a transportation platform or area for sports and leisure and to mobilize financial resources for re-use from the regional authorities ([Menger et al., 2014](#)).

Planning Process Details

Decision Support Tools (DSTs) are intended to provide a holistic, balanced, transparent, transdisciplinary and collaborative decision-making process for SRR. Decision support tools have been developed in different countries to improve consideration of sustainability and resilience in the remediation process. Additional education and outreach activities about existing resources are needed to help practitioners and organizations apply SRR in practice. Case studies will demonstrate the application of existing tools for remediation projects of different sizes, contamination levels and local conditions.

An example of a DST with proven utility is the Brownfield Opportunity Matrix (BOM) developed under the HOMBRE (Holistic Management of Brownfield Regeneration) project. The Excel spreadsheet-based BOM was applied at 7 case studies spanning small urban sites to legacy mine sites. The following benefits to liability owners and stakeholders from the process were documented by [Menger et al. \(2014\)](#):

1. Effective tool for communication and consensus building during all project stages and especially in the early explorative phases of projects;
2. Substantively expanded the strategies being evaluated for clean-up and facilitated meaningful dialogue between the individuals with different competencies and levels of experience; and

3. The transparency of the tool significantly sped up decision on and approval of a final option.

Actionable Sub-Categories

Climate Resilient Project Design Guidance

While ITRC's 2021 SRR-1 guidance introduces key topics and considerations aimed at bolstering resiliency to common extreme weather linked to climate change (e.g., floods, wildfires, sea-level rise, etc), specific implementation guidance beyond concise BMPs is not provided. With lands experiencing the effects of climate change in unique ways – along with the increases in funding opportunities - there is a demonstrable need for comprehensive guidance detailing how to best anticipate and plan remediation projects and infrastructure around diverse weather events. This proposed guidance will expand on each of the climate-related concerns addressed in ITRC's SRR-1 guidance, detailing design and implementation strategies for management strategies attributed to each on local to regional levels. Project design and implementation guidance will be issued focusing on key impacts from climate change and assisting project managers in the design and implementation of projects aimed at promoting climate resiliency.

Ecosystem Services Assessment is intended to improve sustainability and resilience by integrating the value of nature into decision-making and governance processes. Ecosystem Services (ES) are the human-derived benefits from ecosystems. ES assessment in the remediation process results in more expansive remediation end points, encompassing the protection of human and ecological health with the provision of enhanced human well-being by functional ecosystems. The ES assessment process can help to put a dollar value to ecosystem services, such that the contribution of ES to the overall benefits yielded from site management/clean up options can be directly compared in the decision-making process.

What continues to be lacking in guidance documents on ES (e.g., [Newcomer-Johnson et al., 2023](#)), the ITRC introduction to ES within SRR-1 (2021) and publications such as [Harwell et al., \(2021\)](#) is: a) case studies, as recommended by Slack (2010) “spanning ecosystems” and b) practical experiences, lessons learned, and benefits/outcomes of integration of ES, including valuation, into site cleanup.

Social Impact Assessment (SIA) is intended to promote justice, equity, diversity and inclusion (JEDI) in the practice of SRR. Social metrics are mostly absent from remediation projects, with remediation practitioners often struggling with the ill-defined social component of SRR and confused about the social indicators and methodologies which lie outside of the practitioner's experience and education ([Favara et al., 2019](#)). To maximize benefits to society from remediation projects, better integration of societal impacts (Favara et al., 2019) is needed, including comprehensive and transparent methods of evaluating the social dimension ([Harclerode et al., 2015](#)). Techniques for evaluating the social dimension of remediation are available but challenges and knowledge gaps remain in selecting and applying appropriate tools, engaging stakeholders meaningfully, addressing risk perceptions and balancing trade-offs (Harclerode et al., 2015).

Relationship building through engagement activities can shape the remediation process and provide a “creative opportunity to negotiate how the space will be remembered, valued and cared for in the future” ([Beckett, 2017](#)). As described by Beckett (2017), the integration of local and Indigenous knowledge systems, equity, reconciliation and reciprocity in the remediation process is vital, particularly in marginalized communities living with a legacy of environmental degradation in perpetuity.

Building on the SRR-1 guidance for advancing the practice related to the social and economic dimension of sustainability and resilience, training in the use of tools and case studies illustrating their use and lessons learned from the engagement process will be provided. The intention is to: a) help practitioners develop an

engagement strategy early in the process; b) define the purpose and scale of engagement; and c) engage with interested parties to shape the identification of indicators, the understanding of the relative importance of different indicators, the development and selection of objectives and options, and the creation of value during the development of future land uses.

Project Deliverables

Document Products:

- ❖ **Updates and expansion on ITRC's Sustainable Resilient Remediation (SRR-1) Document** to facilitate the mobilization of funds, design and implementation of remedial projects, including localized approaches to improving sustainability and resiliency.
- ❖ **Fact Sheets** detailing implementation guidance on specific climate-change associated weather events (e.g., sea-level rise, wildfires, etc.), community resiliency, ES assessment, SIA and DSTs.
- ❖ **Case Studies** depicting implementation of small to large scale SRR projects, including details on the process, tools and lessons learned.
- ❖ **Interactive Web-Tools** designed to assist regulators and project managers in finding relevant case studies and selecting and using appropriate tools during the option selection and design stage.

Additional Information

- Subject matter experts who may be interested in joining this project team:
 - ITRC SRR team members
 - Lis Nelis – Ramboll
 - Joel Burken – Missouri University of Science and Technology
 - Ian Hers – Hers Environmental Consulting Inc.
 - Stanford University - InVEST
 - Others TBD
- Similar work done by other organizations that could be leveraged:
 - Federal and state agencies as referenced in GSR-1,2 and SRR-1
 - [USGS Ecosystem Services Assessment and Valuation](#)
 - SURF groups and partners; SuRF UK Tier 1 Sustainability Assessment Tool
 - European projects such as HOMBRE (Zero Brownfields), GREENLAND (gentle remediation options) and TIMBRE (megasite regeneration)
 - [NICOLE Land Stewardship Program: Investing in The Natural, Social and Economic Capital of Industrial Land](#)
 - UK Tools: Biodiversity Metric, Environmental Benefits from Nature (EBN) Tool, Nature Assessment Tool for Urban and Rural Environments (NATURE Tool)
 - [British Columbia Contaminated Sites Approved Professionals Society Remediation Toolkits](#)
 - [SURE decision analysis and communication tool for sustainable remediation assessment](#)
- Examples of ecosystem services, nature-based solutions, biodiversity and remediation projects:
 - Silver Bow Creek Conservation Area – Butte, Montana, USA
 - Colorado Front Range Flood Restoration – Boulder County, Colorado, USA
 - Rigs to Reef (decommissioning) – Gulf of Thailand

- Artificial Reef Development – Santa Barbara Channel, California, USA
- Inoculated Poplar Plantation for Phytoremediation – Southern California, USA
- Pollinator Garden, Solar Energy, and Treatment Wetlands – France
- Bank Stabilization with Nature-based Solutions to Contain Contamination – Midwest, USA
- Passive Biochemical Reactor to Treat Acid Mine Drainage – Redding, California, USA

Note: ITRC is considering a separate climate proposal (climate action planning). Should both projects move forward, the teams will collaborate to account for any potential overlap and ensure consistency in terminology where necessary. The other climate proposal will focus on climate action grant procurement, planning and implementation for air and water media. This proposal will focus on land remediation and the expansion [SRR-1](#), [GSR-1](#) and [GSR-2](#).

2024 ITRC Project Proposal Template

Proposed Project Title

Successful Climate Action Planning for Greenhouse Gas Reductions, Ecosystem Restoration, and Multi-jurisdictional Cooperation

State Team Leader

1. Interim: Virginia DEQ
2. TBD: No later than 7/14/2023

Proposal Contacts

Derick Winn, 804-304-5222, dwinn@ecos.org

Abstract

Many communities in the U.S. recognize the importance of addressing climate change and have taken steps toward climate action through the adoption of various planning frameworks that include renewable energy plans and climate resiliency plans, and participation in greenhouse gas (GHG) cap and trade programs, and the efforts of proactive communities should be applauded. However, we must also recognize that many other communities have not taken initial steps in climate action planning due to lack of financial resources and technical expertise while also still fully realizing the importance of addressing climate change. Through the support of the Biden administration with [Executive Order 13990](#) and congressional legislation of the [Inflation Reduction Act](#) and the [Infrastructure Investment and Jobs Act](#), communities now have more opportunity than ever to develop climate action plans. These financial resources are crucial for addressing climate change, but without the tools necessary for successful navigation of grant application processes and the expertise needed to develop and implement climate action plans, many communities may be left behind at this crucial point in time. ITRC has a unique opportunity to provide expertise and services to communities struggling to navigate complexities of grant application and successful climate action planning needed to usher in a new age of climate action. While the importance of initial grant funding should not be understated, we must also recognize the limitations available funds needed to fully realize net-zero GHG emissions and climate resiliency goals by also exploring innovative financial strategies and public private partnerships (P3) that incentivize private-sector investment in climate action. The intent of this proposed 2024 ITRC Climate Action Planning Team is to provide states, tribes, and local governments with the guidance, tools, and training necessary to develop and successfully implement climate action plans with nine climate action measures outlined below.

Problem Statement & Importance to the States and Broader Environmental Community

- Climate change is the single most important environmental issue of this generation and lack of action to prevent the most detrimental impacts of climate change will have severe repercussions for many generations to come unless necessary actions are taken now. Many communities recognize the long-term threat of climate change and can observe today the increasing severity and impacts of sea-level rise, damaging storm events, flooding, drought, wild-fire frequency, aquifer depletion, and saltwater intrusion. Many states, tribes, and local governments have struggled to enact climate action plans and many other jurisdictions have adopted plans to address climate change that can be improved upon with available grant funding to address missing components in a comprehensive manner ensuring successful implementation of measurable goals.
- This project will provide resources and strategies for developing climate action plans that consist of the following nine climate action measures:
 1. Identifying the needs of disadvantaged and climate vulnerable communities for climate action implementation.
 2. Navigating climate grant opportunity application processes for climate grants such as the EPA administered [Climate Pollution Reduction Grants](#) available to states, tribes, and local governments.
 3. Meeting grant condition data needs and the establishment of a GHG inventory for sources and sinks.
 4. Identifying GHG reduction practices and quantifying GHG reductions achieved through implementation.
 5. Promoting natural carbon sink restoration and green infrastructure (i.e., reforestation, submerged aquatic vegetation restoration, and low-impact development practices). See [VA DEQ NPS Trading Program](#) for pollution reduction banking and trading principles ([9VAC25-900](#)).
 6. Promoting public private partnerships (P3) through pay-for-performance strategies to incentivize private-sector investment in climate resilient stormwater best management practices and ecosystem restoration practices that mitigate climate change impacts such as stream, floodplain, and shore-line restoration.
 7. Enhancing public engagement through demonstrating community impacts of climate change today and soliciting public involvement in climate action planning and implementation.
 8. Establishing a process for adaptive management through periodic review of climate action implementation and measurable goals achieved and mechanisms to ensure plan revisions to achieve unrealized goals.
 9. Coordinating with neighboring states, tribes, and localities to share success stories and lessons learned to drive innovation.
- These nine climate action measures will provide states, tribes, and local governments with a consistent framework and the tools necessary to develop climate action plans tailored to jurisdictional specific needs while also facilitating multi-jurisdictional coordination to meet shared goals and drive innovation to ensure successful implementation.

Project Deliverables

24 Month Project Products include:

- ❖ Web-based Guidance Document
- ❖ Templates for each of the nine climate action measures
- ❖ GIS story map for case studies on climate action and resiliency plans
- ❖ Recorded training on web-based guidance use and each of the nine climate action measure

Additional Information

Describe any additional information that might be relevant to this proposal. Additional information could include:

- **Additional Resources and Similar Work:**
 - [State Resilience Offices](#)
 - [U.S. State Climate Action Plans](#)
 - [State Climate Policy mapsResource State Resilience Offices](#)
 - [State Adaptation Progress Tracker](#)
 - [State Energy/Climate Plans](#)
 - [U.S. Climate Alliance, Enabling Industrial Decarbonization](#)
 - [U.S. Water Alliance, Water's Net Zero Plus](#)
 - [Center for Climate and Energy Solutions, Reaching for 2030: Climate and Energy Policy Priorities](#)
 - [World Resources Institute, How Nature-based Solutions Can Protect Businesses from Water Risks](#)
 - [Instituting Resilience: Recommendations for Governors and Legislatures on Establishing and Supporting Chief Resilience Officers](#)
 - [AdaptVA Climate Adaptation Story Maps](#)
- **Additional Contacts for Team Membership and Leads on State Contacts:**
 - [ECOS STEP Meeting: Climate & Water Nexus](#)
 - [RGGI State Contacts](#)

Note: ITRC is considering a separate climate proposal (SRR-2). Should both projects move forward, the teams will collaborate to account for any potential overlap and ensure consistency in terminology where necessary. The SRR-2 proposal is more focused on land remediation and the expansion [SRR-1](#), [GSR-1](#), and [GSR-2](#). This proposal's scope will focus on climate action grant procurement, planning, and implementation for air and water media.