

**Maine Water Resources Research Institute
Senator George J. Mitchell Center for Sustainability Solutions
FY22 Water Resources Sustainability Research Grants (USGS 104b)
Request for Proposals**

Critical Dates:

RFP Announcement: Wednesday, June 30, 2021
RFP Information Session: Tuesday, July 13, 2021 at 12PM. Session will be via Zoom. Contact carol.hamel@maine.edu for connection information. *RSVP by Fri., July 9.*
Letter of Intent Due: Monday, August 2, 2021, by 4PM
Concept Paper Due: Monday, August 16, 2021, by 4PM
Proposal Invitations: Wednesday, September 15, 2021
Full Proposals Due: Wednesday, November 3, 2021, by 4PM
See additional deadlines in RFP for UMaine PIs to meet ORA requirements
Award Notification by: Thursday, December 16, 2021
Project Period: Start date: March 1, 2022 End date: February 28, 2023*

* USGS has strict limits on no-cost extensions for WRRI-funded projects. PIs should plan to complete projects by the February 28, 2023 project end date.

An information and discussion session for this RFP will be held on Tuesday, July 13 from noon to 1pm. Potential applicants who are unfamiliar with the Mitchell Center and the WRRI 104b grant program should plan to participate in this meeting. Please let Carol Hamel (carol.hamel@maine.edu) know who will attend from your team so we can provide Zoom connection information.

General Information: With funding from the U.S. Geological Survey's 104b program, the Maine Water Resources Research Institute (WRRI) in the Mitchell Center for Sustainability Solutions supports research and outreach to enhance the capacity for the sustainable management of water resources across the state. We request proposals for solutions-driven projects in which interdisciplinary research teams collaborate closely with stakeholders and provide support for student training.

This request for proposals from the Maine-USGS WRRI, a program of the Mitchell Center, constitutes the FY22 Maine grants program as authorized by the federal Water Resources Research Act of 1984 as amended. Please note that funding for the FY22 WRRI program is dependent on inclusion of the program in the FY22 federal budget.

Grant Period: Research proposals for projects up to 12 months in duration will be considered to occur in a project period of March 1, 2022 through February 28, 2023.

Grant Categories: Three categories of projects may be funded under this program:

- 1) *Research grants* are funded for up to \$40,000, not including required match provided by the PI. A typical grant is approximately \$25,000. There is no minimum award limit.
- 2) *Information transfer or environmental education grants* are typically funded in the range of \$5,000 to \$15,000, not including PI match.
- 3) *Seed grants* are funded for no more than \$5,000, not including PI match. These grants are intended to be pilot projects or incubators for future research ideas or funding.

WRRI 104b PROGRAM OBJECTIVES:

The objectives of this federally sponsored program place special emphasis on the importance of research and education aimed at improving the nation's water supply. This focus is concordant with the Water Science Vision and Mission of the U.S. Geological Survey:

"The USGS will provide unbiased knowledge of the Nation's water resources to support human well-being, healthy ecosystems, economic prosperity, and anticipate and help resolve impending water-resource conflicts and emergencies... The USGS Water Mission Area... will serve society through water-resource monitoring, assessment, modeling, and research to provide tools that managers and policymakers can use... Improvements are needed in the characterization and understanding of water quantity and water quality if we are to maintain our society and quality of life." USGS Circular 1383-G

The 104b program objectives also align with the mission and vision of the Mitchell Center (Attachment C). The Mitchell Center's intent is to foster innovative work to address intersections among the environmental, social, and economic dimensions of sustainability challenges through stakeholder-engaged, solutions-driven, interdisciplinary research.

RFP Objectives and Deliverables:

Concept papers must be related to freshwater resources, and focus on developing strong stakeholder partnerships and interdisciplinary collaboration that accelerate progress in understanding and solving sustainability problems via one or more of the following strategies:

- Identifying and overcoming key barriers in connecting scientific knowledge with societal actions to promote effective water resource management;
- Building upon past research to increase the delivery of decision-support systems and other tools that facilitate real-world problem-solving;
- Tackling sustainability problems that are highly relevant to place-based problems in Maine;
- Pursuing other research strategies to understand and solve sustainability problems in water resources.

All proposals must align with the WRRI's program objectives and the Mitchell Center's mission, vision, and approach (Attachment C), and demonstrate significant promise for securing external funding.

Eligibility:

- 1) *Team composition:* Federal guidelines for this USGS program require that principal investigators (PI) be faculty or regular staff of a four-year institution of higher education in Maine. Co-investigators are not required to meet this criterion. Additional credit will be given to proposals led by early career researchers (see evaluation criteria, pg. 5).
- 2) *Interdisciplinarity:* Teams must include sufficiently diverse research expertise to match the multi-faceted nature of the proposed sustainability challenge.
- 3) *Stakeholder engagement:* Proposals will only be accepted for projects that include strong stakeholder participation to maximize the relevance and usability (*sensu* Clark et al. 2016) of research or information transfer products. Examples of active stakeholder participation include: identification of research needs, development of research goals, interpretation and use of research results. Full proposals must describe the plans for stakeholder participation at each stage of the project and include letters from stakeholders describing their commitment to participate.
- 4) *Student training:* A central goal of this program is to help *train the next generation of researchers and leaders*. Accordingly, teams should create opportunities for research by undergraduate and/or graduate students, and to explain how students will be mentored.
- 5) *Project Scope:* Single investigator proposals will not be accepted – only team-based, interdisciplinary projects are eligible.
- 6) All PIs and co-PIs must be current on deliverables from any prior USGS Institute grants.
- 7) Federal employees cannot be PIs but can be included as co-investigators. Federal employees may not be supported by funds from these grants, but are encouraged to provide fiscal support for the project. Federal support cannot be counted as match.
- 8) This program supports water resources-related research. Projects primarily focusing on human health, specific biological organisms or communities (unless to be used as an indicator or wider

application), oceanography, or exclusively marine issues are not eligible for this program under federal rules. Estuarine proposals that directly connect with freshwater flows are eligible.

Proposal & Review Process:

1. *Letter of intent:* To facilitate the process of recruiting reviewers with an appropriate breadth of expertise, all interested applicants must submit a letter of intent (LOI) by 4PM on Monday, August 2. Please utilize the format below and email to Ruth Hallsworth at hallsworth@maine.edu.
2. *Concept paper:* Applicants must submit a four-page concept paper explaining their project idea by 4PM on Monday, August 16. Please utilize the format below and email to Ruth Hallsworth at hallsworth@maine.edu.
3. *Evaluation:* A review committee representing the Mitchell Center, the USGS New England District, and other pertinent experts will evaluate the submitted concept papers for relevance to the program's mission, vision and objectives. Invitations for full proposal submission will be announced by September 15. Full proposal format requirements are included below, with full proposals due by 4PM on Wednesday, November 3.
4. *Selection:* The review committee will evaluate the submitted full proposals. The WRI Director will then consult with members of the Research Advisory Committee to make final award selections. Notification will be made no later than Thursday, December 16.
5. *Award Period:* The award period for these projects begins March 1, 2022 and all project components must be completed by February 28, 2023.
6. *Support level:* It is anticipated that in FY22 \$80,000 will be available for research and information transfer projects. Applicants are encouraged to leverage matching sources of funding whenever possible. Final project reports will be due by April 30, 2023.

Questions regarding this RFP should be directed to WRI Director David Hart (david.hart@maine.edu) or Mitchell Center Strategic Program Manager Ruth Hallsworth (hallsworth@maine.edu).

Fiscal Guidelines:

Proposal budgets must reflect a \$2 non-federal match for each federal dollar requested. This means that a federal request of \$20,000 will result in a research project with at least a \$60,000 total project cost. The match may include fringe benefits and indirect costs, as well as direct costs. Contact Ruth Hallsworth (hallsworth@maine.edu) for specific guidance on match. Overhead (indirect) costs are not permitted to be charged on the federal funding request in this program, although the match may include those indirect costs that are not charged on federal dollars. An Excel budget template is available. Please contact Ruth Hallsworth for a copy of the template.

The congressional authorizing language in the Water Resources Research Act specifically refers to the “training of future water resource professionals.” Therefore, preference is given to projects for which student participation and training is a substantial part of the effort. All projects must include a training component for students, and typically will fund a graduate assistantship or undergraduate stipend. The recommended minimum monthly graduate stipend rate (Masters) is \$1,778 (\$16,000/9 months). PIs are urged to provide tuition in the ‘other’ budget line. Tuition does not generate IDC match. Please note that partial payment of health insurance premiums is required for UMaine graduate students.

Base-funded faculty PIs should prioritize student support, not their own salary. Rarely are projects funded that request more than one week per year in faculty salary.

LETTER OF INTENT FORMAT

The letter of intent should be submitted as a single page document that includes the following information: 1) proposal title; 2) three sentence outline; 3) list of team members.

CONCEPT PAPER FORMAT

The concept paper has two parts: 1) technical document (3 pages); and 2) sustainability concept document (1 page). It should be set in 12-point type with one-inch margins on all sides. The document must be entirely self-contained and self-explanatory; no cover letter is allowed.

Technical Document (3-page limit)

- Project title
- PIs and affiliations (include contact information for the lead PI)
- Project dates and duration
- Agency funds requested
- Proposed match and source of funds
- Project synopsis (one paragraph – provided in 3rd person, present tense, lay-friendly text)
- Problem Statement
- Objectives (bulleted)
- Methods outline
- Impact of project (one paragraph)
- Expected deliverables (bulleted)
- Qualifications of investigators (one paragraph; no CVs)

Sustainability Concepts (1-page limit)

1. What sustainability problem does the proposed research address?
2. Who are the relevant project stakeholders, what kind of stakeholder engagement has already occurred, and how do you plan to strengthen their participation? How will you address issues of equity, diversity, inclusion and justice in your work? *
3. What is the status of your plans for creating a research team with sufficient interdisciplinary breadth to address the problem?
4. How do you plan to identify and implement a solution to this problem?

* Full proposals will be required to include details on stakeholder participation at each stage of the project. Letters from stakeholders describing their commitment to participation will also be required.

Budget description/justification (one paragraph)

Cost Category	Program Funds	Non-Federal Match
Salaries/Wages		
Students (no fringe benefits)		
Fringe benefits @ (rate)		
Supplies		
Equipment		
Services		
Travel		
Other (e.g. tuition)		
Total Direct Costs		
IDC on Program \$	XXXXXXXXXX	
IDC on Match	XXXXXXXXXX	
Total Request		

FULL PROPOSAL FORMAT

Full Proposal Review, Ranking Criteria, and Selection Process

Invited research proposals will be reviewed by at least six peer reviewers.

The proposal submission procedure for this program is a two-step process:

Step I: Prior to submission to the Mitchell Center, full proposals must be processed through your institution's standard procedure for proposals to be submitted to federal agencies.

UMaine Researchers: PIs **must** follow the Office of Research Administration's Proposal Submission Policy and Timeline. Proposals must be fully approved by ORA and have completed routing through PARS before Step II can be completed. Following is a list of deadlines that follow ORA guidelines:

Intent to submit	Upon invitation
First draft budget, justification, abstract	October 13
Approval of budget, justification. PARS routing initiated.	October 20
Working draft of full application for review	October 27
Completed sub-recipient commitment forms	October 27
Final version of application. PARS approval completed.	October 29

Non-UMaine Researchers: PIs **must** email the following documents to umgmc@maine.edu by November 3, 2021:

- Scanned copy of the signature paperwork that follows your institution's standard procedure for proposals submitted to Federal agencies
- Scanned copy of the completed UMaine sub-recipient commitment form (available from <https://umaine.edu/ora/>)

Step II: The complete electronic copy of the proposal must be submitted by the PI to the Mitchell Center (umgmc@maine.edu) by November 3, 2021 using the format outlined below.

Once the peer-review process has been completed, final project selection will be based on consultation with the Mitchell Center's Research Advisory Committee comprised of expert stakeholders. PIs should pay careful attention to the proposal evaluation criteria used by reviewers and the selection panel:

- Degree to which the proposed research addresses a key challenge for the sustainable management of water resources in Maine (15%)
- Scientific and technical merit as judged by peer reviews (20%)
- Impact – the potential of the project to deliver progress towards solutions, benefit stakeholders and address issues of equity, inclusion and justice (25%)
- Stakeholder involvement (required) (15%)
- Student involvement (required) (10%)
- Interdisciplinary team (5%)
- Total budget request and cost-effectiveness, including leveraging of external dollars (5%)
- Likelihood of obtaining continued support for the project (5%)
- *Proposals led by early career researchers will receive additional points equivalent to 5% of the overall score. We define early career researchers as investigators with tenure-track or tenure-track-equivalent appointments who have held their graduate degrees (Ph.D. or equivalent) for fewer than five years.*

Please refer to the fiscal guidelines for information on prioritizing student support.

Reviewers

Reviewers will be selected by the Director of the Maine WRRI.

Research proposal

The following information should be sent as a single pdf document to umgmc@maine.edu. Text should be formatted in 12-point type with one-inch margins on all sides.

Required Sections:

1. **Title**. Concise but descriptive
2. **Project Type**. Research, Information Transfer, Information Management System, Education, or Other (please specify).
3. **Focus categories**. Choose a maximum of three categories from the list provided (Attachment A), with the most preferred focus category first.
4. **Research Category**. Choose from the following the one category that most closely applies: Water Scarcity and Availability, Water Hazards and Climate Variability, Water Quality, Water Policy, Planning, and Socioeconomics, Watershed and Ecosystem Function, Water Technology and Innovation, or Workforce Development and Water Literacy.
5. **Keywords**. Enter keywords of your choice descriptive of the work.
6. **Start Date**. As indicated in the Request for Proposals.
7. **End Date**. As indicated in the Request for Proposals.
8. **Principal Investigators**. Provide name, academic rank, university, email address and phone number of the principal investigators.
9. **Congressional district**. First or second Maine
10. **Abstract**. Provide a brief (one-page) description of the problem, methods, and objectives
11. **Statement of regional or State water problem**. Include an explanation of the need for the project, who wants it, and why. The following questions should also be addressed: a) What real-world problem does the proposed research address? b) Who are the relevant project stakeholders, what kind of stakeholder engagement has already occurred, and how do you plan to strengthen their participation? How will you address issues of equity, diversity, inclusion and justice?
12. **Statement of results and benefits**. Specify the type of information that is to be gained and how it will be used. The following question should also be addressed: What is your strategy for identifying and implementing a solution (or solutions) to this problem?
13. **Nature, scope and objectives of the project, including a timeline of activities**
14. **Methods, procedures and facilities**. Provide enough information to permit evaluation of the technical adequacy of the approach to satisfy the objectives. The following question should also be addressed: What is your plan for creating a research team with sufficient interdisciplinary breadth to address the problem?
15. **Related research** (Research projects only). Show by literature and communication citations the similarities and dissimilarities of the proposed project to completed or on-going work on the same topic.
16. **Training potential**. Estimate the number of graduate and undergraduate students, by degree level, who are expected to receive training in the project.

Sections 1 through 16 must fit on 9 pages.

17. **Budget breakdown**. Excel template available: <https://tinyurl.com/d5kpysvu>
18. **Budget justification**. Acrobat template available: <https://tinyurl.com/m76xspkd>
19. **Investigator qualifications**. Include resumes of the principal investigators. No resume shall exceed two pages or list more than 15 pertinent publications.
20. **References**
21. **Letters of participation from stakeholders** (not just letters of support). Letters must include a

commitment by the stakeholder to participate actively in the project. Examples of participation include: identification of research needs, development of research goals, interpretation and use of research results.

We strongly recommend that PIs read the fiscal guidelines before preparing proposal budgets.

NOTIFICATION AND AWARD PERIOD

Proposed projects may be up to 12 months in duration and may begin as early as March 1, 2022. Projects must be completed by February 28, 2023. Final funding decisions will be announced by December 16, 2021, and are dependent upon federal budget completion.

No-cost Extensions

USGS has strict limits on no-cost extensions for WRRRI projects. PIs should plan to complete projects by the February 28, 2023 project end date.

Award Requirements

Projects receiving WRRRI funding are required to provide the following items:

1. Final report (due April 30, 2023).
2. Oral or poster presentation at Maine Sustainability & Water Conference.
3. One-page summary of proposed project for lay audience (due March 2022).
4. One-page report of project results for lay audience (due April 2023).
5. Completion of pre- and post-project survey instrument by research team participants and stakeholders.

Attachment A
Focus Categories

ACID DEPOSITION	ACD
AGRICULTURE	AG
CLIMATOLOGICAL PROCESSES	CP
CONSERVATION	COV
DROUGHT	DROU
ECOLOGY	ECL
ECONOMICS	ECON
EDUCATION	EDU
FLOODS	FL
GEOMORPHOLOGICAL PROCESSES	GEOMOR
GEOCHEMICAL PROCESSES	GEOCHE
GROUNDWATER	GW
HYDROGEOCHEMISTRY	HYDROGEO
HYDROLOGY	HYDROL
INVASIVE SPECIES	INV
IRRIGATION	IG
LAW, INSTITUTIONS, AND POLICY	LIP
MANAGEMENT AND PLANNING	M&P
METHODS	MET
MODELS	MOD
NITRATE CONTAMINATION	NC
NON POINT POLLUTION	NPP
NUTRIENTS	NU
RADIOACTIVE SUBSTANCES	RAD
RECREATION	REC
SEDIMENTS	SED
SOLUTE TRANSPORT	ST
SURFACE WATER	SW
TOXIC SUBSTANCES	TS
TREATMENT	TRT
WASTEWATER	WW
WATER QUALITY	WQL
WATER QUANTITY	WQN
WATER SUPPLY	WS
WETLANDS	WET

Attachment B
Federal Authorization Requirements

The Water Resources Research Act Amendments of 2006 (42 USC §§10301-10309) reauthorized the Water Resources Research Institutes' program through 2011. Special emphasis was placed on the importance of research and education aimed at improving the nation's water supply. This new focus suggests that the Water Research Institutes should ensure that their assessments of performance provide evidence that the Institutes are accomplishing statutory purposes.

Under this reauthorization each institute shall-

- (1) plan, conduct, or otherwise arrange for competent applied and peer-reviewed research that fosters
 - (A) improvements in water supply reliability;
 - (B) the exploration of new ideas that
 - (i) address water problems or
 - (ii) expand understanding of water and water-related phenomena;
 - (C) the entry of new research scientists, engineers, and technicians into water resources fields; and
 - (D) the dissemination of research results to water managers and the public.

(2) Reports

The Secretary shall report to Congress annually on coordination efforts with other Federal departments, agencies, and instrumentalities under paragraph (1). As part of the annual budget submission to Congress, the Secretary shall also provide a crosscut budget detailing the expenditures on activities listed under subsection (a)(1) and a report which details the level of applied research and the results of the activities authorized by this Act, including potential and actual –

- (A) increases in annual water supplies;
- (B) increases in annual water yields;
- (C) advances in water infrastructure and water quality improvements; and
- (D) methods for identifying, and determining the effectiveness of, treatment technologies and efficiencies.

Projects funded by the Maine Water Resources Research Institute must produce results that coincide with one or more of these performance metrics:

Applied and Practical Research

- 4) “applied water supply research”
- 5) “applied and peer-reviewed research”
- 6) “quality and relevance of its water research”
- 7) “address water problems”

8) “effectiveness at producing measured results”

Education

9) “entry of new research scientists, engineers, and technicians into water resources fields”

Outreach

10) “dissemination of research results to water managers and the public”

11) “potential and actual increases in annual water supplies”

Water Supply (Quantity)

12) “applied water supply research”

13) “potential and actual increases in annual water yields”

14) “expand understanding of water and water related phenomena”

Water Quality

15) “potential and actual advances in water quality improvements”

Water Supply Reliability

16) “improvements in water supply reliability”

Water Infrastructure and Technology

14. “potential and actual advances in water infrastructure improvements”

15. “methods for identifying and determining the effectiveness of treatment technologies and efficiencies”

Attachment C
Senator George J. Mitchell Center for Sustainability Solutions
Maine Water Resources Research Institute

Mission, Vision, and Approach

Mitchell Center Mission:

The mission of the Mitchell Center is to be a leader and valued partner in understanding and solving societal problems related to the growing challenge of sustainable development (i.e. improving human well-being while protecting the environment).

Mitchell Center Vision:

The vision of the Mitchell Center is to connect knowledge with action to create a brighter economic, environmental, social, and environmental economic future in and beyond Maine.

Mitchell Center Approach:

The Mitchell Center's general approach to sustainability science: (i) is problem-driven and focused on deriving and testing solutions based on scientific knowledge; (ii) uses interdisciplinary research teams to analyze the dynamic, coupled interactions between natural and human systems; and (iii) stresses early, active and ongoing engagement with diverse stakeholders.

Key Publications and other Resources for Preparing Effective Research Proposals

General Sustainability Science Resources

Clark, W. C., & Harley, A. G. (2020). Sustainability Science: Toward a Synthesis. *Annual Review of Environment and Resources*, 45, 331-386. <https://www.annualreviews.org/doi/pdf/10.1146/annurev-environ-012420-043621>

Clark, W. C., van Kerkhoff, L., Lebel, L., & Gallopin, G. C. (2016). Crafting usable knowledge for sustainable development. *Proceedings of the National Academy of Sciences*, 113(17), 4570-4578. <https://www.pnas.org/content/113/17/4570>

Hart, D. D., & Silka, L. (2020). Rebuilding the ivory tower: A bottom-up experiment in aligning research with societal needs. *Issues in Science and Technology*, 36(3), 64-70. <https://issues.org/aligning-research-with-societal-needs/>

Matson, P., Clark, W. C., & Andersson, K. (2016). *Pursuing sustainability: a guide to the science and practice*. Princeton University Press.

Miller TR. 2015. *Reconstructing sustainability science: Knowledge and action for a sustainable future*. New York: Routledge.

PNAS Sustainability Science Web Page: Access to PNAS publications and links to other relevant websites - <http://sustainability.pnas.org/>

Understanding and strengthening connections between knowledge and action

Clark, W. C., Tomich, T. P., Van Noordwijk, M., Guston, D., Catacutan, D., Dickson, N. M., & McNie, E. (2016). Boundary work for sustainable development: Natural resource management at the Consultative Group on International Agricultural Research (CGIAR). *Proceedings of the National Academy of Sciences*, 113(17), 4615-4622.

<https://www.pnas.org/content/pnas/early/2011/08/11/0900231108.full.pdf>

Jacobs, K. et al. 2002. Connecting Science, Policy, and Decision-making: Agencies. NOAA Climate Program Office. http://leopoldleadership.stanford.edu/sites/default/files/Jacobs_2001-02_Connecting.Science.Decisionmaking.pdf

Pielke Jr, R. A. (2007). *The honest broker: making sense of science in policy and politics*. Cambridge University Press. (for a brief overview, see: <http://rogerpielkejr.blogspot.com/2015/01/five-modes-of-science-engagement.html>)

Pielke, R. et al. 2010. Usable Science: A Handbook for Science Policy Decision Makers. Science Policy Assessment and Research on Climate.

http://cstpr.colorado.edu/sparc/outreach/sparc_handbook/brochure.pdf

Rowe, A. and K. Lee. 2012. Linking knowledge with action. A report to the Packard Foundation.

http://www.packard.org/wp-content/uploads/2013/05/LinkingKnowledgewithAction_ScienceCS2013.pdf