

**Maine Water Resources Research Institute
Senator George J. Mitchell Center for Sustainability Solutions
FY24 Water Resources Sustainability Research Grants (USGS 104b)
Request for Proposals**

Critical Dates:

| | |
|-----------------------------|---|
| Friday, October 6, 2023 | RFP announcement |
| October 18, 2023 at 12PM | Information session via Zoom or 111 Norman Smith Hall. RSVP by Tuesday, October 17 to carol.hamel@maine.edu |
| Oct. 10 through Nov. 10 | Exploratory meetings with Director David Hart to discuss ideas for potential WRI proposals. Contact hallsworth@maine.edu or 207.581.3196 to schedule a meeting. |
| Monday, November 13, 2023 | Letter of Intent (optional) |
| Thursday, December 7, 2023 | Concept paper due |
| Tuesday, January 16, 2024 | Proposal invitations issued |
| Thursday, February 22, 2024 | Full proposals due. <i>UMaine PIs must also meet ORA deadline requirements</i> |
| Friday, March 29, 2024 | Award notification |
| Project Period: | Start date: September 1, 2024 End date: August 31, 2025* |

*USGS has strict limits on no-cost extensions for WRI-funded projects. PIs should plan to complete projects by the August 31, 2025 project end date.

An information and discussion session for this RFP will be held on Wednesday, October 18 from noon to 1PM. Potential applicants who are unfamiliar with the Mitchell Center and the WRI 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 and to receive Zoom connection information. Mitchell Center Director David Hart is also available to meet with teams who are interested in exploring ideas for WRI proposal topics. Contact Ruth Hallsworth (hallsworth@maine.edu) to schedule a meeting.

General Information: With funding from the U.S. Geological Survey’s 104b program, the Maine Water Resources Research Institute (WRI) 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 WRI, a program of the Mitchell Center, constitutes the FY24 Maine grants program as authorized by the federal Water Resources Research Act of 1984 as amended. Please note that funding for the FY24 WRI program is dependent on inclusion of the program in the FY24 federal budget.

The Maine WRI seeks to improve collaborative efforts aimed at enhancing the preparation, increasing the participation, and ensuring the contributions of individuals from groups that have been historically underrepresented and underserved in the STEM enterprise such as African Americans, Alaska Natives, Hispanics, Native Americans, Native Hawaiians, Native Pacific Islanders and persons with disabilities (see NSF’s Broadening participation in STEM principles).

As such, we strongly encourage proposals from researchers in these historically underrepresented and underserved groups. Additionally, proposals are encouraged that increase diversity, equity, inclusion, and justice by examining the causes and impacts of water-related disparities, including the development and/or evaluation of tools or strategies to improve water equity, and/or the co-development of scientific information to benefit historically underrepresented and underserved communities.

Grant Period: Research proposals for projects up to 12 months in duration will be considered to occur in a project period of September 1, 2024 through August 31, 2025.

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.

WRI 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

Section 104b of the Water Resources Research Act of 1984 requires Institutes to:

1. plan, conduct, or otherwise arrange for competent applied and peer reviewed research that fosters—
 1. improvements in water supply reliability;
 2. the exploration of new ideas that—
 - address water problems; or
 - expand understanding of water and water-related phenomena;
 3. the entry of new research scientists, engineers, and technicians into water resources fields; and
 4. the dissemination of research results to water managers and the public.
2. cooperate closely with other colleges and universities in the State that have demonstrated capabilities for research, information dissemination, and graduate training in order to develop a statewide program designed to resolve State and regional water and related land problems.

The 104b program objectives also align with the mission and vision of the Mitchell Center (Attachment 4). 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
- Examining the causes and impacts of water-related disparities, including the development and/or evaluation of tools or strategies to improve water equity, and/or the co-development of scientific

information to benefit historically underrepresented and underserved communities

- Pursuing other research strategies to understand and solve sustainability problems in water resources.

All proposals must align with the WRI's program objectives and the Mitchell Center's mission, vision, and approach (Attachment 4), 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 and those led by researchers from underrepresented groups in STEM (see evaluation criteria, pg. 6).
- 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. The concepts of *salience* and *legitimacy* discussed in Cash et al. are particularly important determinants of success in efforts to link knowledge with action. Efforts to achieve legitimacy require a commitment to justice, fairness and impartiality, which in turn are essential for enhancing equity, diversity and inclusion (Clark and Harley 2020). 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. The following are **not eligible** for funding:
 - Research on health effects involving human subjects.
 - Research involving oceanography (estuarine research applications are acceptable).
 - Applications for research that do not meet WRI 104b Program Objectives (pg.2).

Proposal & Review Process:

1. *Letter of intent:* To facilitate the process of recruiting reviewers with an appropriate breadth of expertise, we request that applicants submit a letter of intent (LOI) by Monday, November 13, 2023. Please utilize the format below and email to hallsworth@maine.edu.
2. *Concept paper:* Applicants must submit a concept paper explaining their project idea by Thu., December 7, 2023. Please utilize the format below and email to hallsworth@maine.edu.
3. *Evaluation:* A review committee 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 January 16, 2024. Full proposal format requirements are included below, with full proposals due by Thursday, February 22, 2024.
4. *Selection:* The review committee will evaluate the submitted full proposals. If necessary, the WRI Director will have additional consultations with members of the review committee to make final award selections. Notification will be made no later than Friday, March 29, 2024.

5. *Award Period:* The award period for these projects begins September 1, 2024 and all project components must be completed by August 31, 2025.
6. *Support level:* It is anticipated that in FY24 \$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 September 30, 2025.

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 \$1 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 \$40,000 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 \$1,889 (\$17,000/9 months). PIs are urged to provide tuition in the ‘other’ budget line. Tuition does not generate IDC match. 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 optional 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 (maximum 3 pages); and 2) sustainability concept document (maximum 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 (maximum 3-pages)

- Project title
- PIs and affiliations (include contact information for the lead PI)
- Agency funds requested
- Proposed match and potential sources of matching funds
- Project synopsis (one paragraph –3rd person, present tense, lay-friendly)
- Problem statement
- Objectives (bulleted)
- Methods outline
- Impact of project (one paragraph)
- Expected deliverables (bulleted)

Sustainability Concepts (maximum 1-page)

1. What sustainability problem does the proposed research address?
2. Who are the relevant project stakeholders, how do you plan to strengthen their participation?*

3. How will you address issues of equity, diversity, inclusion and justice in your work?
4. What is the status of your plans for creating a research team with sufficient interdisciplinary breadth to address the problem?
5. 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* (which is different from traditional letters of support) are also 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 | | |
| Graduate health insurance | | |
| 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 a peer review committee.

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. All proposals must include David Hart as an approver in PARS. Proposals must be fully approved by ORA and have completed routing through PARS before Step II can be completed.

Non-UMaine Researchers: PIs **must** email the following documents to umgmc@maine.edu by February 22, 2024:

- 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 February 22, 2024, using the format outlined below.

Evaluation Criteria

Project selection will be based on scoring of proposals by the review committee using the following evaluation criteria. If necessary, the WRRI Director will have additional consultations with members of the committee to make final award selections.

- 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 and benefit community partners and other stakeholders (20%)
- Equity impact – the potential of the project to address issues of equity, inclusion, diversity and justice (5%)
- 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 or those led by researchers from historically underrepresented groups (see criteria, pg. 1) will receive additional points equivalent to 5% of the overall score for each of the two criteria. 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:

Sections 1 through 19 must fit on 9 pages.

1. Title. Concise but descriptive
2. Principal Investigator. Provide name, academic rank, university, and full contact information.
3. Project Title
4. Project Type. Choose from the following: Research, Information Transfer, Education, or Other (please specify).
5. Congressional district. First or second Maine
6. WRRI Science Priorities. 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; Workforce Development and Water Literacy.
7. USGS Cross-Discipline Landscapes and Science Topics. Choose from the lists in Attachment 1.
8. Keywords. Choose a maximum of three keywords from the provided list (Attachment 2), with the most preferred keyword first.
9. Training potential. Estimate the number of graduate and undergraduate students, by degree level, who are expected to receive training in the project.
10. Principal Investigators. Provide name, academic rank, university, and email addresses for all

investigators

11. Start Date. September 1, 2024
12. End Date. August 31, 2025
13. Abstract. Provide a brief (300 word) description of the problem, methods, and objectives
14. Plain-language summary. Provide a brief (150 word) description of the study that could be understandable by the public.
15. 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?
16. 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?
17. Nature, scope and objectives of the project, including a timeline of activities.
18. 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?
19. Related research (Research projects only). Provide context for the proposed work in terms of previous and ongoing research, including citations.
20. Investigator qualifications. Include short (no more than two pages) biographical sketches of the principal investigators.
21. Budget table and budget justification. Templates are available
22. References
23. 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 September 1, 2024. Projects must be completed by August 31, 2025. Final funding decisions will be announced by Friday, March 29, 2024, 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 August 31, 2025 project end date.

Award Requirements

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

1. Final report (due September 30, 2025).
2. Oral or poster presentation at Maine Sustainability & Water Conference.
3. One-page summary of proposed project for lay audience (due October 1, 2024).

Attachment 1

USGS Cross-Discipline Landscapes

Choose from the following list:

- Arctic
- California Bay – Delta
- Chesapeake Bay
- Columbia River
- Everglades
- Great Lakes
- Gulf Coast
- Klamath
- Puget Sound
- Salton Sea
- Upper Mississippi River
- None of the Above

USGS Cross-Discipline Science Topics

Choose primary and secondary (if applicable) from the following list:

- Climate
- Energy
- HABs
- Indian Water Rights
- Natural Hazards
- Oceans/Coastal/Great Lakes
- STEM
- Water Challenges
- Other

Attachment 2

Keywords

Choose primary, secondary, and tertiary (if applicable) from the following list.

| | |
|-------------------------------|----------|
| 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 3
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 4
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