

**Maine Water Resources Research Institute  
Senator George J. Mitchell Center for Sustainability Solutions  
FY20 Water Resources Sustainability Research Grants (USGS 104b)  
Request for Proposals**

**Critical Dates:**

RFP Announcement: Monday, June 24, 2019  
RFP Information Session: Tuesday, July 9, 2019 at 12 PM (Norman Smith Hall). Virtual options for participation are available. Contact carol.hamel@maine.edu.  
*Please RSVP by 9am, Monday, July 8, 2019*  
Concept/Pre-Proposal Due: Wednesday, July 31, 2019 at 4 PM  
Proposal Invitations: Thursday, August 15, 2019  
Full Proposals Due: Thursday, October 17, 2019 at 4 PM  
*See additional deadlines in RFP for UMaine PIs to meet ORA requirements*  
Award Notification by: Monday, December 2, 2019  
Project Period: Start date: March 1, 2020 End date: February 28, 2021\*

\* No-cost extensions **are not** available for projects awarded during the FY20 funding period.

**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 FY20 Maine grants program as authorized by the federal Water Resources Research Act of 1984 as amended. Please note that funding for the FY20 WRI program is dependent on inclusion of the program in the FY20 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, 2020 through February 28, 2021.

**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*

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:**

Pre-proposals 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.
- 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. To ensure sufficient stakeholder engagement, 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 for funding.

### **Proposal & Review Process:**

1. *Pre-Proposal:* All interested applicants must submit a four-page pre-proposal explaining their project idea by July 31, 2019 at 4 PM. Please utilize the format below and email to Ruth Hallsworth at [hallsworth@maine.edu](mailto:hallsworth@maine.edu). We strongly encourage interested researchers to attend the RFP information session on Tuesday, July 9 from noon – 1pm.
2. *Evaluation:* A review committee representing the Mitchell Center, the USGS New England District, and other pertinent experts will evaluate the submitted pre-proposals for relevance to the program's mission, vision and objectives. Invitations for full proposal submission will be announced by August 15. Full proposal format requirements are included below, with full proposals due on October 17, 2019 by 4PM.
3. *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 December 2, 2019.
4. *Award Period:* The award period for these projects begins March 1, 2020 and all project components must be completed by February 28, 2021.
5. *Support level:* It is anticipated that in FY20 \$60,000 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, 2021.

Questions regarding this RFP should be directed to WRI Director David Hart ([david.hart@maine.edu](mailto:david.hart@maine.edu)) or Mitchell Center Strategic Program Manager Ruth Hallsworth ([hallsworth@maine.edu](mailto: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](mailto: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 is \$1,733.33 (\$15,600/9 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.

### **PRE-PROPOSAL FORMAT**

The pre-proposal 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. The following technical document structure is highly recommended as it follows the format for a full proposal:

**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?\*
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)**

Budget outline:

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

## **FULL PROPOSAL FORMAT**

### **Full Proposal Review, Ranking Criteria, and Selection Process**

Invited research proposals will be reviewed by at least three 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	Thursday, August 15
First draft budget, justification, abstract	Wednesday, Sept. 25
Approval of budget, justification. PARS routing initiated.	Wednesday, October 2
Working draft of full application for review	Wednesday, October 9
Final version of application. PARS approval completed.	Friday, October 11
Completed sub-recipient commitment forms	Friday, October 11

**Non-UMaine Researchers:** PIs **must** email the following documents to hallsworth@maine.edu by **4PM, October 17, 2019:**

- 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 **4 PM on October 17, 2019** 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 and benefit stakeholders. (25%)
- Stakeholder involvement (required). (15%)
- Student involvement (required). (10%)
- Total budget request and cost-effectiveness of the project, including leveraging of external dollars. (5%)
- Likelihood of obtaining continued support for the project. (10%)

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](mailto: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, or Education.
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: Social Sciences, Ground-water Flow and Transport, Water Quality, Biological Sciences, Engineering, or Climate and Hydrologic Processes.
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.
12. **Statement of results and benefits**. Specify the type of information that is to be gained and how it will be used.
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.
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 spreadsheet template available at: [umaine.edu/mitchellcenter/resource/wrri-fy20-budget-template/](http://umaine.edu/mitchellcenter/resource/wrri-fy20-budget-template/)
18. **Budget justification**. Acrobat template available at: [umaine.edu/mitchellcenter/resource/wrri-fy20-budget-justification-template/](http://umaine.edu/mitchellcenter/resource/wrri-fy20-budget-justification-template/)
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, 2020. Projects must be completed by February 28, 2021. Final funding decisions will be announced by December 2, 2019, and are dependent upon federal budget completion.

### **No-cost Extensions**

No-cost extensions **are not** available for FY20 WRRRI projects.

### **Award Requirements**

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

1. Final report (due April 30, 2021).
2. Oral or poster presentation at Maine Sustainability & Water Conference.
3. One-page summary of proposed project for lay audience (due March 2020).
4. One-page report of project results for lay audience (due April 2021).
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., 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. et al. (2016). Mobilizing the power of higher education to tackle the grand challenge of sustainability: Lessons from novel initiatives. *Elementa: Science of the Anthropocene*, 4  
<https://www.elementascience.org/articles/10.12952/journal.elementa.000090/>

Kates, R. W., Clark, W. C., Corell, R., Hall, J. M., Jaeger, C. C., Lowe, I., ... & Faucheux, S. (2001). Sustainability science. *Science*, 292(5517), 641-642.

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

Bednarek, A. T., et al. 2018. Boundary spanning at the science–policy interface: the practitioners' perspectives. *Sustainability Science* 13.4: 1175-1183. Boundary spanning at the science–policy interface: the practitioners' perspectives. <https://link.springer.com/content/pdf/10.1007%2Fs11625-018-0550-9.pdf>

- 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>
- Hart, D. D., K. P. Bell, L. A. Lindenfeld, S. Jain, T. R. Johnson, D. Ranco, and B. McGill. 2015. Strengthening the role of universities in addressing sustainability challenges: the Mitchell Center for Sustainability Solutions as an institutional experiment. *Ecology and Society* 20(2):4.  
<http://dx.doi.org/10.5751/ES-07283-200204>
- 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](http://leopoldleadership.stanford.edu/sites/default/files/Jacobs_2001-02_Connecting.Science.Decisionmaking.pdf)
- Kapelan, Z., Savic, D. A., & Walters, G. A. (2005, September). Decision-support tools for sustainable urban development. In *Proceedings of the Institution of Civil Engineers-Engineering Sustainability* (Vol. 158, No. 3, pp. 135-142). Thomas Telford Ltd.
- Lang, D. J., Wiek, A., Bergmann, M., Stauffacher, M., Martens, P., Moll, P., ... & Thomas, C. J. (2012). Transdisciplinary research in sustainability science: practice, principles, and challenges. *Sustainability science*, 7(1),
- McNie, E. C., Parris, A., & Sarewitz, D. (2016). Improving the public value of science: A typology to inform discussion, design and implementation of research. *Research Policy*, 45(4), 884-895.
- 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](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](http://www.packard.org/wp-content/uploads/2013/05/LinkingKnowledgeWithAction_ScienceCS2013.pdf)
- Smith, L. T. (2013). *Decolonizing methodologies: Research and indigenous peoples*. Zed Books Ltd.
- van Kerkhoff, L. and L. Lebel. 2006. Linking knowledge and action for sustainable development. *Annu. Rev. Environ. Resource* 31: 445-477.  
<http://arjournals.annualreviews.org.proxy4.ursus.maine.edu/doi/pdf/10.1146/annurev.energy.31.102405.170850>
- Wyborn, C. et al. 2018. Doing science differently: Co-producing conservation outcomes. Luc Hoffmann Institute. <https://luchoffmanninstitute.org/wp-content/uploads/2018/09/Co-producing-conservation-outcomes.pdf>