



GUIDING PRINCIPLES

NE RISCC
2020

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NE RISCC Team

Pictured with our favorite invasive species:

Audrey Barker-Plotkin
 Michael Nelson
 Bethany Bradley
 Jenica Allen
 Lara Munro
 Brittany Laginhas
 Toni Lyn Morelli
 Sydni Joubran
 Carrie-Brown Lima
 William Coville
 Evelyn Beaury
 Elsa Cousins
 Abby Bezruczyk
 Emily Fusco
 Nancy Olmstead

Not pictured:
 Meghan MacLean
 Ayodele O'Uhuru
 Benjamin Kesler
 Bianca Lopez



What is RISCC?

The Northeast Regional Invasive Species and Climate Change (RISCC) Management Network's mission is to reduce the compounding effects of invasive species and climate change by synthesizing relevant science, communicating the needs of managers to researchers, building stronger scientist-manager communities, and conducting priority research.



RISCC Founders left to right: Toni-Lyn Morelli, Bethany Bradley, and Carrie Brown-Lima

RISCC was founded in 2016 in response to requests from invasive species managers to the New York Invasive Species Research Institute (NYISRI) for more guidance on “how to manage invasive species in light of climate change”. Although it was becoming increasingly apparent that climate change was influencing invasive species’ spread, distribution, and management, there was a lack of synthesized information accessible to managers to guide their decision making.

In response to this request, NYISRI Director Carrie Brown-Lima connected with Dr. Bethany Bradley, a Professor at the University of Massachusetts who had extensively worked on invasive species and climate change, and Dr. Toni Lyn Morelli, a Research Ecologist at the Northeast Climate Adaptation Science Center (NE CASC) to determine the best way to address such a broad issue. Soon after, the three founders hosted an exploratory workshop with managers and

applied researchers from across the Northeast to better understand their needs and to determine a path forward.

As a research group, RISCC conducts original research on invasive species and climate change within the framework of translational invasion ecology (TIE). The TIE framework is designed to incorporate manager input and communication throughout the research process to create actionable research and other manager-focused outreach materials that can be used by the managers who helped create them.

As a bridging organization, we connect invasive species management and research through the process of TIE. By identifying and understanding manager needs and communicating them to researchers, connecting managers and researchers at symposia and conferences, and translating existing research for manager audiences, RISCC activities bridge the research-management divide. By building networks and educating each others, we aim to improve the management of invasive species under climate change.



RISCC Symposia 2017

The goal of this document is to summarize our first four years of activity so as to share our experiences with others who would like to build the RISCC concept in other regions or apply these ideas in the realm of TIE.

How RISCC Works

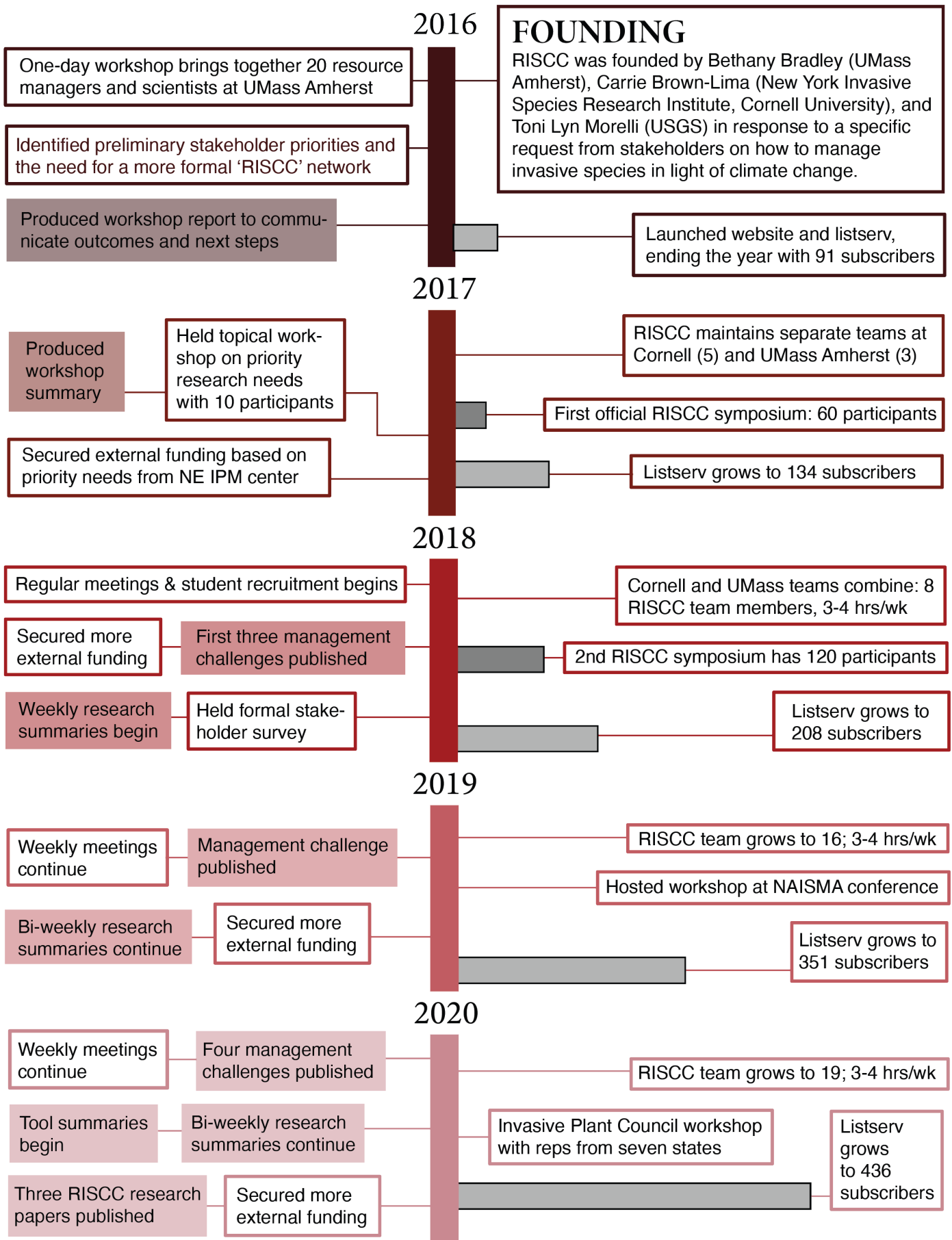
The Northeast RISCC Management Network's leadership team is at the core of the organization. The leadership team includes researchers, boundary-spanners, invasive species management professionals, interns, and students. The group's institutional base is at the University of Massachusetts (NE CASC) and Cornell University (NYISRI). The larger RISCC network is built through cultivating relationships and collaboration during symposia and workshops, and maintained by consistent communications via the e-mail list-serv and website.

While our group is led primarily by researchers, this needn't be the case. Managers have been integral to RISCC from its inception, but we did not have a manager in the leadership team until this year (2020). We suggest including a mix of researchers, boundary-spanners, and managers in the leadership team from the beginning. However, if this isn't possible, the opinions of these stakeholders can still be accessed and integrated into actions through translational ecology, as later discussed.

Researchers • Managers • Interns Boundary Spanners • Students

A key to RISCC's success is sustained commitment from core members. Building the network and RISCC's capacity to create successful outcomes is a multi-year, multi-person effort. We suggest that at least one member of the core team be in a position to make a long-term commitment to the group. From that stable core, other group members can be more fluid, and include short-term staff (e.g. a coordinator), interns, students, and postdoctoral researchers. Responsibility for RISCC activities is increasingly shared by subgroups of the leadership team who take on creating and scheduling research and tool summaries, synthesizing management challenges, conducting research, or organizing symposia, webinars, and workshops, with the ability to distribute responsibility in a flexible way. Another key to sustaining success is to meet consistently, set and revise goals, and define expectations for participation.





What RISCC Does



BOUNDARY SPANNING

(Figure 1 Steps 1 & 2)

Connect managers and researchers at symposia and workshops.

Survey and synthesize manager needs

Communicate needs to researchers

ORIGINAL RESEARCH

Conduct original research using the TIE framework

Identify problems, discuss with stakeholders, conduct research, produce manager-focused materials, evaluate and improve

RESEARCH TRANSLATION & SYNTHESIS

Summarize information for managers through research and tool summaries

Create management challenges that synthesize the current state of knowledge about a topic

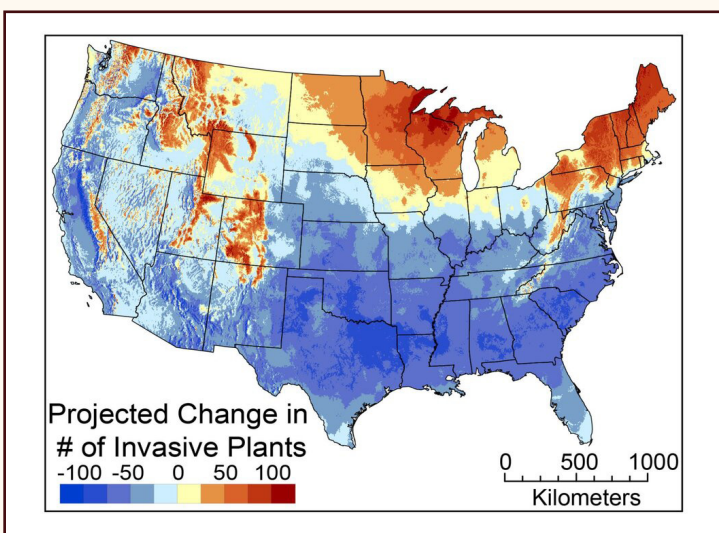
COMMUNICATION & IMPLEMENTATION

Host webinars on invasive species, research, climate change, or RISCC itself

Communicate research summaries and updates over list-serv

Make research and tools accessible

Create tools



BOUNDARY SPANNING

RISCC is a boundary spanning organization, which means that we work at the interface of research and management. We continually try to expand our network with the goal of raising awareness about invasive species and climate change among researchers and managers. Some of the ways we try to accomplish this is through hosting symposia and focused workshops— these work to build connections between managers and researchers and provide a space to discuss needs and identify solutions. Our core team also gives presentations (talks, poster presentations, and information

tables) at conferences (particular region- or management-focused), webinars and workshops, and publishes peer-reviewed research articles. We also seek to inspire the adoption of the TIE approach in our work. Because the voice of managers is necessary in translational ecology, we also actively seek to identify and understand manager needs (for example, via a formal survey) and communicate those needs to the relevant stakeholders, such as researchers outside of the RISCC leadership team.

SYMPOSIA

Objective: Connect people in person to share information on current and emerging issues of invasive species and climate change and grow our network. Symposia also help with relationship building, giving motivation and appreciation for managers and researchers

Audience: Researchers and managers from across the network who can make it to the meeting location (80-100 participants). We have also had additional participants online for presentations

Frequency: ~1/year; Symposia have been held twice at UMass and once in conjunction with NAISMA.

Symposia incorporate a variety of sessions including research talks, management talks, expert panels, and workshops. They also can incorporate brainstorming sessions, informal polling, and one on one conversations to solicit research needs.

Part of our goal has been to make participation low cost so that anyone can attend; participants have to pay to get themselves there, but the symposium is free and we provide coffee/snacks. We create a report after the symposia that we post on the website that outlines what was presented.

Lessons learned: “Build in some unstructured discussion times over symposia lunch and breaks to strengthen the networks.”

NAISMA Workshop 2019



We hosted a workshop at the North American Invasive Species Management Association conference titled “How do we implement climate-smart invasive species management?”. Nearly 400 participants from 49 US states as well as Canada and other countries attended.

This workshop formed the basis of our management challenge ‘Taking Action’, which synthesizes steps that managers are already taking to implement climate-smart invasive species management.

WORKSHOPS

Objective: Connect smaller groups in person to share knowledge or work towards a goal. The specific objective varies with each workshop, but we create and revise discussion questions that will work towards the objective in mind.

We generally create a short report following workshops, although some workshops (e.g., NAISMA 2019) are directly targeted at developing information for RISCC products (the management challenge 'Taking Action')

Audience: depends on the workshop - individuals focused on the stated goal. We often invite workshop participants based on their expertise. For workshops, we try to provide lodging, food and parking to facilitate participation.

Frequency: ~1-2/year



NAISMA RISCC Workshop (2019)

Workshop sessions can focus on brainstorming research needs, as a way to solicit and address manager needs in person. For example, our workshops have focused on such topics as discussing proactive listing of climate shifting invasive species with invasive plant councils in the Northeast and discussing how to communicate climate change and invasive species topics.

Workshops can be stand-alone or incorporated into symposia and have a smaller participant list (10~30) with a narrower focus



Invasive Plant Council Small Group Discussion

FORMAL SURVEY OF MANAGER NEEDS

Objective: Understand current status of incorporating climate change in to invasive species management and what managers need to do this more effectively

Audience: Regional managers, state agency staff, and plant council members, with some researchers also participating in the survey. Distributed to RISCC list-serv, and other state invasive species networks including NY and FL.

We published the survey results in Biological Invasions to ensure researchers outside the RISCC network would be aware of the issue and managers needs.

Lessons Learned:

“Look at papers such as Matsek et al. 2015 and others to inform your survey design, and serve as inspiration for using surveys to understand manager needs”

RESEARCH

With our core team of collaborative researchers, RISCC has been able to publish original research papers on invasive species and climate change over the years. Our main guiding framework in conducting this research is

that of translational invasion ecology (TIE). TIE involves pairing managers' research needs and existing research gaps to come to research outcomes together. Our team's interests and capabilities also guides us in the finer details: selecting a project, attaining funding, finding partners, and conducting research itself.

Prioritizing Research

- We use the stakeholder needs gathered from connection efforts such as surveys, workshops, and symposia (outlined in Boundary Spanning section) to identify research directions and projects
- We also synthesize scientific research as prompted by knowledge gaps identified by review papers, journal articles, communication with researchers within RISCC and other networks
- We pursue manager priority research needs that leverage the expertise of the RISCC research group
- Through our RISCC network, we identify interested and appropriate partners to engage in research projects based on our existing relationships with researchers and with managers.
- An opportunity for improvement is to engage research researchers with expertise outside of the core group to conduct research on additional topics.

Connecting research needs to funding sources

- Once research needs are identified and prioritized, we form working groups to identify appropriate funding sources and develop proposals to apply for those funding opportunities. Through this process we engage managers and researchers from the RISCC network as well as outside collaborators.
- We find funding for / hire new postdocs and graduate students to address priority research topics

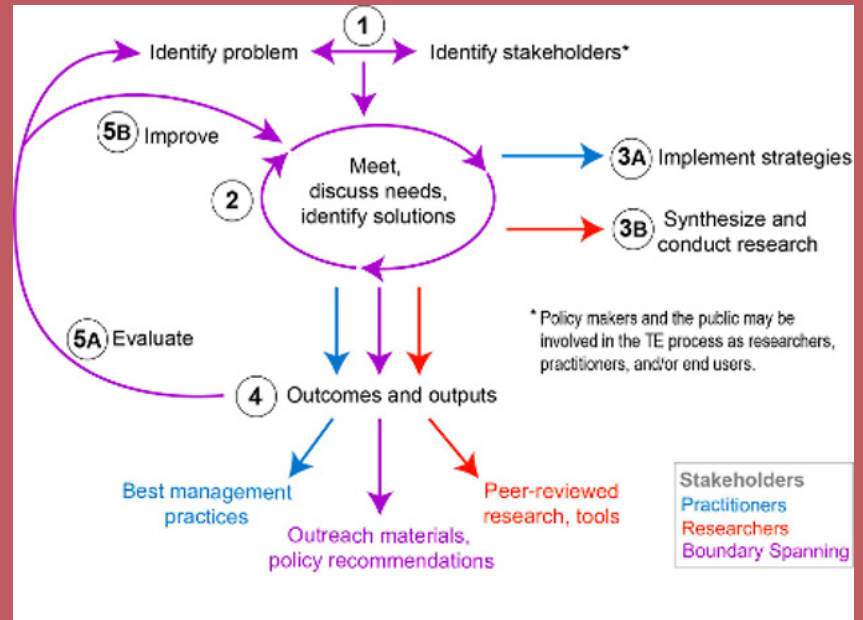
Some examples of successfully funded projects include:

- Seed funding to bring together a working group consisting of half managers and half researchers that resulted in two grants from the NE Invasive Plant Management Center.
- Funding from the NE CASC to address two of the top research priorities identified in our survey (modelling vulnerable areas to invasive species and developing climate smart management strategies and engaging managers to test those strategies in these areas).
- Graduate student and postdoc funding from the NE CASC, NSF, and other sources to work on RISCC initiatives.
- At present, the core RISCC leadership team is not funded to coordinate most RISCC activities. Ideally, future RISCC's would have core funding and this core group could apply for additional grants to address specific research needs.
- We have often had stakeholders involved in attaining funding by writing letters of support. In both of those cases (where the agencies care a lot about the science being relevant to stakeholders), those letters of support were critical for our success.
- See Funding Appendix for further details

RESEARCH WITH TRANSLATIONAL ECOLOGY

We conduct research through the method of Translational Invasion Ecology (TIE), in which research and practice work together through boundary spanning. The TIE framework (Fig. 1) outlines the steps of research conducted through TIE. The TIE steps can be non-linear, often revisited, and the starting point will depend on the context of the problem. We recommend reading our article on the TIE framework for more information.

Figure 1: Translational Invasion Ecology (TIE) framework that RISCC developed and uses for conducting original research.



Publishing Research Articles in Academic Journals

- The core leadership team communicates their original research and reviews in peer-reviewed journals, such as Nature Climate Change and Biological Invasions. Please see Appendix I and our website for a complete listing of RISCC's published research.
- To ensure that RISCC's research is available to everyone, we publish in open-access journals or deposit in institutional repositories that allow free downloads.
- For each publication, we also produce a companion Management Challenge to summarize the actionable findings (see the Synthesis section for details)

Lessons learned: "Not all the steps of TIE are perfectly executed when trying to do management-relevant research, especially at the beginning!"

Evaluate and Improve

- After research projects are complete, we return to conversations with RISCC stakeholders to discuss the utility of the outcomes and outputs, gather feedback on potential improvements, and develop new projects to address those suggestions
- The NE RISCC is about 4 years old and we are just starting to evaluate our research products.



Manager and researcher discussing swallow-wort control options

SYNTHESIS

As a bridging organization, one of our aims is to translate the cutting edge research being done on invasive species in an applicable way for those on the ground. Over the years, we've developed a variety of ways to tackle this goal. Shorter research summaries take research papers and condense the findings to

a short paragraph with relevant management implications. Fact-sheet-like "Management Challenges" synthesize the current state of knowledge on an invasive species and climate change topic in a 2 page handout. While there are many other science communication strategies to explore, we've found that both of these efforts to be successful, and a valuable way to share our knowledge.

RESEARCH SUMMARIES

Objective: Make invasive species and climate change research easily accessible and relevant to managers through short summaries of peer-reviewed literature with bulleted take-home points and synthesized management implications (different from the published abstract). The summaries translate research that may not be action-focused into useful and accessible information.

Communication: Research summaries are shared via our email list-serv every other week, and a short description of the summary is also sent over twitter. Summaries are archived on the RISCC website with searchable keywords.

Frequency: Bi-weekly

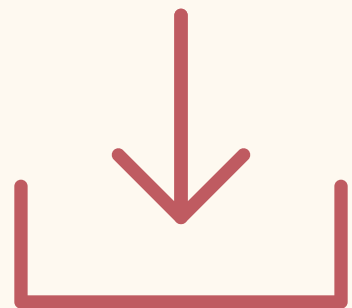
Format: A 4-5 sentence summary of the study that functions as an abstract with a focus on management-relevant information, summarized management implications (2-3 bullets that may

summarize management implications described in the study, or that we have synthesized from the science), take home points (2-3 bullets)

Research summaries may follow a theme determined by group interest or that provides background information for an upcoming management challenge, publication, or other product from RISCC.

One person (usually from the leadership team) writes the summary and another person edits. Occasionally, we invite the author of the publication to summarize their own research through a management lens.

Summaries are organized in a Google spreadsheet that keeps track of the date that each summary is scheduled to go out over email, authors, and editors.



TOOL SUMMARIES

This is a new initiative from RISCC in an effort to raise awareness of useful online tools and data products that managers can use to inform their decision-making. Tool summaries follow a similar format to research summaries and are communicated through the same channels (email, website). They are published in lieu of the research summary for that week. In contrast to the research summaries, they also incorporate youtube video demonstrations made by the author of the summary.

MANAGEMENT CHALLENGES

Objective: Synthesize research to create a 2-page document that informs managers (or other stakeholders, such as policymakers or the public) on an emerging theme in invasive species and climate change research. Like research summaries, the aim is to translate research that may not be action-focused to provide stakeholders with a synthesis of a scientific theme, an explanation for why the research is regionally relevant, case studies, and management recommendations. Several of the research summaries typically feed into the larger theme synthesized in a Management Challenge.

Communication: Challenges are distributed over email (list-serv) in lieu of research summaries, published on our website, uploaded to an open-source institutional archive where users can download a PDF version, and printed for sharing at in-person events, such as talks, conferences, and workshops.

Frequency: It depends on group size and interest, but we typically produce a management challenge every 4-5 months (in the early stages, it took longer to develop the template that we now use for all challenges). We often develop, and time the release of, management challenges to supplement the publication of original research.

Lessons Learned:

“Tool summaries are a greater time investment than the research summaries, so keep that in mind when scheduling. You can easily create videos from screen recordings with zoom! And if you are new to recording videos, budget some time for extra takes.”

Topics are selected based on group input/interests, papers (e.g., recently published journal articles), manager input, or requests for more information about particular topics from the network (e.g., survey results)

One member of the RISCC group typically takes the lead and identifies other members interested in participating in a core group to work on content. The size of the core group may depend on group size, but for us this has typically involved delegating tasks among 4-5 people. This group works together to read relevant papers, find case studies, and write/edit content.

Using Adobe Illustrator, we add content to a template that was developed for the first Management Challenge and that is now updated to fit content for subsequent challenges. The exact layout depends on the particular document, but most include a brief overview of the content, a section describing how the science themes apply to your region, case studies, a box for management implications, and references in small text.

Finished products (PDFs) are posted online in an institutional archive. The archive tracks downloads and ensures long-term accessibility.

Lessons Learned: “If you are new to Illustrator, take some time to learn the basics of it or other vector editing software; Inkscape is a good open source alternative.”

COMMUNICATION & IMPLEMENTATION

RISCC communicates and implements its own and other invasive species and climate change research through webinars and an email list (list-serv), as well as through the workshops and symposia described in the Information

section. We also make our research, presentations, and other products publicly available whenever possible, including via web-accessible tools.

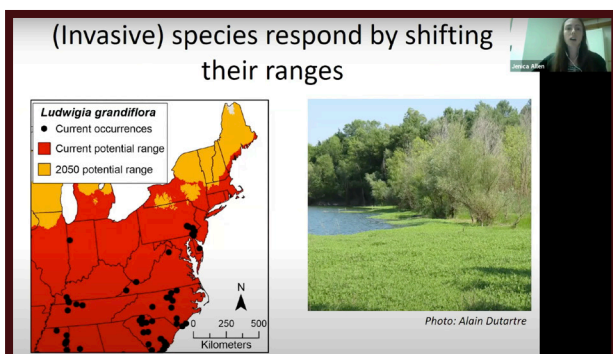
RESEARCH COMMUNICATION

Webinars

Webinars range in topics and audience. All are publicized through the RISCC email listserv and published on our website through links to Youtube.

Manager/ Researcher Paired Webinars:

- Objective: Provide information exchange about management of emerging invasive species through a paired researcher/manager webinar
- We choose an invasive species to highlight based on results from our 2018 survey that asked managers which species they cared about, as well as conversations on emerging species with managers and scientists. We ask the scientist and manager to each talk for 10-15 minutes about management of the target species and how they think climate change might affect its management. We have ~30 min of discussion time for the audience to ask questions of the speakers.
- Audience: mainly managers
- Frequency: 1-2 times/year



Jenica Allen presenting in *New tools for identifying and prioritizing range shifting invasive plants* (2019)

Promoting Relevant Research Webinars from RISCC Affiliates:

- Objective: Provide new information about invasive species and climate change through more of a standard 'research' seminar (for example, Tony D'Amato's talk). We ask speakers to tune their talks for a manager audience.
- Audience: mainly managers
- Frequency: 1-2 times/year

RISCC Original Research Webinars

- Objective: Promote new RISCC research while emphasizing relevance for the manager community and providing an opportunity for direct feedback
- Audience: mainly managers
- Frequency: Dependent on research output, webinars may be given multiple times to different audiences.

Webinars about RISCC:

- Objective: Provide an overview of how invasive species interact with climate change and/or information about the objectives and products of the RISCC network, both online and in person. Often those two topics are combined.
- Audience: dependent on invitation
- Frequency: Often (up to ~1/month) - these days we have a large enough membership of the RISCC leadership team that we can divide and conquer these requests

List-Serv

The list-serv is one of our main means of communication with our network, and anyone can join (info on the website). The RISCC listserv is hosted through Cornell. We use the listserv to send out products (management challenges, research summaries, tool summaries) and advertise for events (symposia, webinars, workshops). The listserv generally features us sending out information. We have not had success in getting stakeholders to post to the listserv.

Website

We developed our first website in 2017. In 2019, we decided that our website needed an upgrade, especially to include the ability to link all of our products (research summaries, management challenges, original research, webinar recordings, etc.) from one site. The leadership team worked on the structure and content of the website intermittently over the period of a few months, and much of the programming and layout was completed by an intern.

Product Accessibility

We strive to make all our content publicly available to reach as many people as possible. All research and RISCC products are available on the RISCC website. When we publish our original research, the papers are open access if funding is available. If not, we add the paper to an institutional archive so that it can be freely downloaded after embargo (if any). When

“We strive to make all our content publicly available to reach as many people as possible.”

uploaded to our website, we link to a free copy of the paper. Research summaries are emailed to listserv with links to original research papers. Management challenges are made publicly available and stored in an institutional archive. Presentations and workshop summaries are available on the website as video links and/or pdfs.



images (from upper left): Emerald ash borer (credit: USDA), Oriental bittersweet (credit: Jay Cross), Asian longhorned beetle damage (credit: USDA), Purple loosestrife (credit: Liz West), Japanese barberry (credit: USDA), Gypsy moth caterpillar (credit: James Appleby).

RESEARCH IMPLEMENTATION

Tools

Objective: incorporate feedback and take direction from stakeholders to develop interactive, research driven tools relevant to manager needs. Our work identifies gaps in available resources that aid in management predictions, connecting managers directly to research outcomes and results

Example of successful tools that came out of RISCC: Eddmaps range shifters, a map/GIS based tool was developed as a result of RISCC research on range shifting invasive species (Allen and Bradley 2016). This tool allows managers to create custom lists of potential range-shifting invasive species within their management area.



APPENDIX I. PUBLISHED RESEARCH

Allen, J.M. and Bradley, B.A. Out of the weeds? Reduced plant invasion risk with climate change in the continental United States. *Biol Cons* 203, 306-312 (2016).

Beaury, E.M., Fusco, E.J., Jackson, M.R. et al. Incorporating climate change into invasive species management: insights from managers. *Biol Invasions* 22, 233–252 (2020). <https://doi.org/10.1007/s10530-019-02087-6>

TIE paper [in review]

Reactive and inconsistent state regulations do little to prevent plant invasions [aiming to submit in September]

Wallingford, P.D., Morelli, T.L., Allen, J.M. et al. (2020). Adjusting the lens of invasion biology to focus on the impacts of climate-driven range shifts. *Nature Climate Change*. 10, 398–405. <https://doi.org/10.1038/s41558-020-0768-2>.

Rockwell-Postel, M., Laginhas, B.B. & Bradley, B.A. Supporting proactive management in the context of climate change: prioritizing range-shifting invasive plants based on impact. *Biol Invasions* 22, 2371–2383 (2020). <https://doi.org/10.1007/s10530-020-02261-1>

APPENDIX II. FUNDING

From 2016-2017 we did not have any direct funding in support of RISCC activities. We leveraged existing research funding (on related topics) supporting students and staff and used volunteer time to make progress on activities. During this time, one postdoc was supported by NE CASC on research related to invasive species & climate change - we did some internal horse trading to justify participation of additional students and staff not directly supported by NE CASC

In 2018, we received direct funding from NE CASC to support one graduate student fellow for the 2018-2019 academic year

In 2017, we applied for and received funding from the Northeast IPM Center for a communications grant (to support development of the range shift list tool with EDDMapS) as well as a research grant (to support research for EICAT impact assessments of range-shifting invasive species)

In 2019, we received support (\$5000) for participant support associated with the broader impacts portion of a successful NSF grant (associated with invasive species risk assessments)

Beginning in 2019, we have had continued support for one graduate student fellow through NE CASC

Beginning in 2020, we have support for one postdoctoral researcher through NE CASC

Symposia we have run on the cheap, using UMass meeting space (free) and providing coffee (with NYISRI support), but asking participants to fund their own travel/parking and buy themselves lunch on campus

We have made great use of USGS interns through the Virtual Student Federal Service (VSFS) program - one or more have joined us every year to help out with whatever projects we're working on.

APPENDIX III. OUTPUTS

Management Challenges

Nuisance Neonatives: Guidelines for Assessing Range-Shifting Species, Laginhas et al., 2020, https://scholarworks.umass.edu/eco_ed_materials/9/

Prioritizing Range-Shifting Invasive Plants: High-Impact Species Coming to the Northeast, Bradley et al., 2020, https://scholarworks.umass.edu/eco_ed_materials/7/

Gardening with Climate-Smart Native Plants in the Northeast, Bradley et al., 2020, https://scholarworks.umass.edu/eco_ed_materials/8/

Taking Action: Managing Invasive Species in the Context of Climate Change, Beaury et al., 2020, https://scholarworks.umass.edu/eco_ed_materials/6/

Double Trouble: Understanding Risks from Invasive Species + Climate Change, Bradley et al., 2019, https://scholarworks.umass.edu/eco_ed_materials/5/

Why Native? Benefits of Planting Native Species in a Changing Climate, Fusco et al., 2018, https://scholarworks.umass.edu/eco_ed_materials/3/

Preparing for Sleeper Species: Climate Change Could Awaken Some Naturalized Species, Bradley et al., 2018, https://scholarworks.umass.edu/eco_ed_materials/2/

Warming Waters: Implications for Invasive Species in the Northeast, Price-Tack et al., 2018, https://ecommons.cornell.edu/bitstream/handle/1813/57590/NYIS-RI%20Warming%20Waters%20_Price%20Tack%20et%20al..pdf?isAllowed=y&sequence=3

Research Summaries: Selected recent works of 135 summaries in 7 categories

Novel Introduction Pathways: Hulme (2017). Climate change and biological invasions: evidence, expectations and response options. *Biological Reviews*, 92(3), 1297-12313.

Climate Extremes: Alba et. al. (2019) Global change stressors alter resources and shift plant interactions from facilitation to competition over time. *Ecology*, e02859.

Shifting Seasons (Phenology): Duan et. al. (2018) Host utilization, reproductive biology, and development

of the larval parasitoid *Tetrastichus planipennis* as influenced by temperature: Implications for biological control of the emerald ash borer in North America. *Biological Control*, 125, 50-56.

Range Expansion: Rockwell-Postel, et. al. (2020) Supporting proactive management in the context of climate change: prioritizing range-shifting invasive plants based on impact. *Biol Invasions*.

Changing Biotic Interactions (Competitiveness): Beaury et al. (2020) Biotic resistance to invasion is ubiquitous across ecosystems of the United States. *Ecol Lett*, 23: 476-482.

Management Efficacy: Sun et. al. (2020). Bio-control of invasive weeds under climate change: progress, challenges and management. *Current Opinion in Insect Science*, 38:72-78.

Impact Studies: Rockwell-Postel, et. al. (2020) Supporting proactive management in the context of climate change: prioritizing range-shifting invasive plants based on impact. *Biol Invasions*.

Tool Summaries

Climate Voyager: An online tool developed by the State Climate Office of North Carolina for visualizing model-based future climate scenarios.

- Summary: <https://www.risccnetwork.org/climate-voyager>
- Tool: <http://climate.ncsu.edu/voyager/index.php>

Resilient Land Mapping Tool: An tool created by The Nature Conservancy to help decision-making in the face of climate change.

- Summary: <https://www.risccnetwork.org/resilient-land>
- Tool: <http://maps.tnc.org/resilientland/>

Don't Move Firewood: An online outreach resource created by The Nature Conservancy to prevent the spread of forest pests.

- Summary: <https://www.risccnetwork.org/dont-move-firewood>
- Tool: <https://www.dontmovefirewood.org/>