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RCN: Diadromous Species Restoration Research Network (DSRRN)

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Cover

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Project Title:	RCN: Diadromous Species Restoration Research Network (DSRRN)
PD/PI Name:	David Hart, Principal Investigator Adria A Elskus, Co-Principal Investigator Peter D Vaux, Co-Principal Investigator Karen A Wilson, Co-Principal Investigator
Recipient Organization:	University of Maine
Project/Grant Period:	05/01/2008 - 04/30/2014
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Submitting Official (if other than PD/PI):	Karen A Wilson Co-Principal Investigator
Submission Date:	07/01/2014
Signature of Submitting Official (signature shall be submitted in accordance with agency specific instructions)	Karen A Wilson

Accomplishments

* What are the major goals of the project?

The primary goal of the Diadromous Species Restoration Research Network (DSRRN) was to advance the science of diadromous fish restoration, promote state-of-the-art scientific approaches to multiple-species restoration on a watershed scale, and facilitate interactions among scientists, managers, and stakeholders throughout the North Atlantic region.

This goal was achieved by a series of conferences and workshops over a five-year period between 2008 and 2013. In all, DSRRN organized two multi-day conferences with over 160 participants in attendance and five multi-day workshops with an average of 25 participants. The objective of these workshops was to produce new directions for restoration science by exploring key scientific issues related to interdisciplinary scientific approaches to diadromous species restoration.

* What was accomplished under these goals (you must provide information for at least one of the 4 categories below)?

Major Activities: **DSRRN Stakeholders Workshop (2008)** The "DSRRN Stakeholders Workshop: Expectations & Research Directions" was held in November 2008 at

the University of Maine in Orono. The objective of this stakeholder workshop was to solicit input on restoration goals for the Penobscot River and Bay and to gather observations and questions about the fish, river, and bay that might lead to fruitful and collaborative scientific studies.

DSRRN Science Meeting 2009: Restoration of Diadromous Fishes and Their Ecosystems: Confluence of Science and Restoration Held in July 2009, this meeting was DSRRN's inaugural science meeting and marked the beginning of national and international networking activities. Widely attended, the purpose of this meeting was to shape dialog about the future of diadromous species restoration and research; to convene a growing network of researchers and managers focused on these species and their habitat in the North Atlantic; to explore and learn from restoration research from the ambitious dam removal project on the Penobscot River; and to contribute to the planning of future DSRRN workshops. Plenary speakers included George Pess, NOAA Northwest Fisheries Science Center, Margaret Palmer, University of Maryland, David Montgomery, University of Washington, and Gerald Chaput, Fisheries and Oceans Canada. Three break-out sessions were held to solicit input on future research questions to be investigated in upcoming DSRRN workshops and other activities of the Network. These break-out sessions were (1) Ecosystem Interactions, (2) Restorations as Experiments, and (3) Natural Variability. The input received as a result of the science meeting set the direction of DSRRN for the next 4 years. In addition, information was gathered on the 160 participants including affiliation, region of the country, and contact information for the development of a network database, newsletters, distribution lists, and website.

Workshop I. Resilience of North Atlantic Diadromous Fish Assemblages: A Restoration Perspective (2010) DSRRN held its first specialized workshop in April 2010. The goal of this workshop was to identify and synthesize the abiotic and biotic factors that contribute to the resilience of North Atlantic diadromous fish assemblages in the context of restoration. Factor discussed included life history characteristics, habitat needs, genetic variability, fisheries management strategies, climate change, and interactions with other species.

Workshop II. Variability of North Atlantic Diadromous Fish Populations: Establishing Reference Points for Restoration Assessment Part I and II (2011 and 2012) The goal of this workshop was to bring together fisheries, habitat, and climate specialists to investigate variability in diadromous fish populations over time and among watersheds spanning species' ranges. Unlike classic approaches to species assessment which focus on average population numbers, this workshop focused on variability (e.g., relative standard error, coefficient of variation, quintiles of variability, variograms, proportional variability) of population characteristics (e.g., number, size, run timing, age structure, survival) over time and space. Variability measures were used as response variables for blocks of data (e.g., group of years, group of rivers within a year). We focused on river herring, one Northeast diadromous species for which the most data is available.

Workshop III. Paradox of the Dammed: An American Shad Workshop (2012) Experts in American shad research from both the Pacific and Atlantic coasts of the US met along the Connecticut River at the S.O. Conte

Anadromous Fish Laboratory in Turner's Falls, MA, to understand how American shad can persist in the presence of mainstem dams in Pacific coastal watersheds while such structures are often cited as a major source of population decline in their native range (i.e., the paradox). As an introduced species, American shad on the west coast are often reviled or ignored completely, while regarded as a heritage species on the verge of extirpation in original east coast watersheds. A series of presentations and round table discussions were used to highlight the issues that surround American shad decline and restoration efforts along the east coast, and how restoration can be informed and improved upon using information from shad research in the species' introduced range. The group highlighted gaps in our collective understanding of American shad biology, and identified research questions of primary importance if future restoration of the species is to succeed. The meeting emphasized to the west coast biologists how differently American shad are regarded in their native range, and suggested that cultural attitudes can also play a role in the "paradox." The workshop was proposed and organized by DSRRN members and supported by DSRRN.

Workshop IV. Adaptive Management for Habitat Restoration: An Introductory Workshop for Natural Resource Managers (2013) Adaptive management is an iterative learning and decision process that results in improved understanding and management over time. Well executed adaptive management is particularly important for diadromous species restoration as the reproductive success of these fish is impacted by management decisions ranging from daily or hourly changes in flow at dams and fish passage facilities to fishing restrictions in the open ocean. This one-day workshop offered an introduction to the principles and practices of adaptive management and how this structured decision-making approach could be applied to diadromous species restoration in the northeastern U.S. The workshop was attended by 52 researchers and resource managers from state and federal agencies, conservation organizations, and academic institutions. It was facilitated by Elise R. Irwin, Michael L. Jones, and Mitchell Eaton.

DSRRN Science Meeting 2013: Migration, Habitat, Species interactions, and Management of Diadromous Species This final Science Meeting was held in January 2013 and was an opportunity for managers, biologists, ecologists, hydrogeologists, and conservation planners to share their approaches to a common goal and leave with newly forged collaborations and an informed view of the future of diadromous fish restoration science. DSRRN Core Partners and collaborators organized three scientific sessions on migrations and movements of diadromous fishes, multi-species interactions in a restoration context, and freshwater habitat and restoration for diadromous fishes. Each session featured invited short synthesis talks and interactive discussions focused on linking research, management, and future research directions. Over 170 fisheries specialists attended from all over the U.S. and central and eastern Canada. Keynote speakers John Waldman, Trevor Avery, and Rory Saunders presented findings from previous DSRRN workshops and outcomes from the Penobscot River Restoration Project.

Local Networking: Penobscot Science Exchange (2009-2011) One strength of DSRRN was its integration with the Penobscot River Restoration Project in Maine, one of the most ambitious river restoration efforts ever proposed for the Eastern U.S. The Penobscot River represents a laboratory for diadromous species restoration. DSRRN formed the Penobscot Science Exchange (PSE) in an effort to improve coordination of diadromous species restoration efforts between academic, government, and conservation organizations working on the river by providing administrative structure and by supporting information management and outreach. The group met twice a year, once in the spring to discuss upcoming research and again in the fall to discuss the previous field season. DSRRN staff distributed a newsletter with research briefs and maintained a research and monitoring database.

Specific Objectives:

Key Outcomes

Significant Results:

1. Funding opportunities

Key outcomes or

Other achievements:

After two years of effort developing the network and facilitating restoration research, DSRRN and its academic, government, tribal, and NGO partners successfully leveraged over \$1 million in American Recovery and Reinvestment Act funding in 2010. The funding has allowed university researchers to conduct studies and environmental monitoring on the Penobscot River in conjunction with the proposed removal of two hydroelectric dams and the renovation of a third. Pre-dam removal projects included water quality monitoring by the Penobscot Indian Nation, geomorphic monitoring, fish movement studies and assessment of pre-dam removal food web structure and function using stable isotopes

(http://www.penobscotriver.org/assets/FINAL_PRRNewsletter_January_2013.pdf).

The Penobscot River Restoration Project is a \$50+ million collaboration that is working to restore nearly 1,000 miles of sea-run fish habitat that has been inaccessible due to the dams.

2. Publications and Outreach

We continue to work on peer-reviewed products that have arisen from DSRRN workshops and networking opportunities. In the spring of 2014, DSRRN participants (J. Waldman, K. Wilson, M. Mather, N. Snyder) submitted an article titled "Can Resilience Theory Help Guide Restoration of Anadromous Fishes?" to Fisheries. This article is a direct result of the first DSRRN workshop (Resilience of North Atlantic Diadromous Fish Assemblages: A Restoration Perspective 2010). At the 2014 American Fisheries Society Annual Meeting (August 2014), DSRRN participants will present outcomes from the second DSRRN workshop (Variability of North Atlantic Diadromous Fish Populations: Establishing Reference Points for Restoration Assessment Part I and II) in a presentation titled "Natural Variability in Alewife Abundances on the East Coast of North America: Long-Term Trends and Links with Climatic and Biological Indices" (T. Avery, A. Jordaan, D. Quinn, J. Trial, K. Wilson).

We have produced a Final Report that will be available at our website and archived at the University of Maine. This report is also attached to this report.

3. Continued Networking

An active DSRRN Listserv currently with 414 subscribers is being used to share publications, research and granting opportunities, calls for abstracts and other information of interest to the diadromous fish research community. The subscribers include the full range of DSRRN participants, from academia, management and practitioners, making the list particularly useful for information exchange across traditional boundaries.

At the end of the final DSRRN Science Meeting (2013) it was agreed that similar meetings should continue and that they should remain multidisciplinary and multi-species focused. It was agreed to meet again as part of the Atlantic Salmon Ecosystems Forum, a biannual "Salmon and their Ecosystem" meeting held for participants from Northern New England states and Maritime Canada (see <http://atlanticsalmonforum.org/>). This meeting was held January 8-9, 2014 at the University of Maine, Orono, Maine with over 160 participants. DSRRN, along with NOAA and SHARE, sponsored the meeting, and DSRRN network participants helped plan many of the sessions, including a session on Diadromous Species Ecology. DSRRN also sponsored the keynote speaker, Dr. Daniel Schindler, University of Washington, who presented the talk entitled: "Myths about Pacific salmon on the west coast: which ones are supported by science?"

DSRRN participants have also been active in organizing and presenting at symposia at the American Fisheries Society, including a two-day session titled "*River herring: towards a holistic understanding*" at the AFS Annual Meeting in Quebec City, Quebec, in August 2014.

*** What opportunities for training and professional development has the project provided?**

DSRRN has contributed monitarily toward the direct training and development of four graduate students and one undergraduate student who have worked closely with DSRRN's Research Coordinator and Science Information Coordinator to prepare for, execute and summarize several DSRRN-sponsored meetings. These students have been trained in technical writing, gained experience in interacting with scientists from universities as well as federal and state agencies, and gained an understanding of the issues involved in linking science with decision-making. DSRRN graduate students have helped with meeting planning and execution, as well as post-meeting summary efforts. In addition, undergraduate and graduate students (not supported by DSRRN) attended DSRRN workshops and Science meetings as note-takers and general helpers, which gave them opportunities to interact with scientists, managers, and other stakeholders from a variety of backgrounds.

*** How have the results been disseminated to communities of interest?**

Results of this project have been disseminated in an on-going manner to communities of interest in several ways, including an easy-to-use website and the DSRRN listserv. Results of DSRRN workshops are in the process of being published (i.e., Waldman et al. *Can Resilience Theory Help Guide Restoration of Anadromous Fishes?* Fisheries. In review.) and a version of this final report will be available to the public via the DSRRN website.

Supporting Files

Filename	Description	Uploaded By	Uploaded On
DSRRN_SupportingMaterialsForAccomplishments.pdf	Abstracts, Agendas, Participant Lists and Other Materials for DSRRN Science	Karen Wilson	07/01/2014

Filename	Description	Uploaded By	Uploaded On
	Meeting and Workshops (2012-2013) including: DSRRN Science Meeting 2013, Workshop II, Workshop III and Workshop IV. Supporting materials for previous meetings and workshop are i		
DSRRN_Final_Report_NSF.pdf	DSRRN Final Report detailing information on all meetings, workshops and networking activities for distribution to participants and archiving.	Karen Wilson	07/01/2014

Products

Books

Book Chapters

Noah Snyder (2012). Restoring Geomorphic Resilience in Streams. *Gravel-bed Rivers: Processes, Tools, Environments First*. Michael Church, Pascale M. Biron and Andre' G. Roy. John Wiley & Sons, Ltd. . Status = PUBLISHED; Acknowledgement of Federal Support = Yes

Conference Papers and Presentations

Trevor S. Avery, Adrian Jordaan, Danielle Quinn, Joan Trial, Karen Wilson (2014). *Natural Variability in Alewife Abundances on the East Coast of North America: Long-Term Trends and Links with Climatic and Biological Indices [Abstract Only]*. 144th Annual American Fisheries Society Meeting. Quebec City, Quebec, Canada. Status = OTHER; Acknowledgement of Federal Support = Yes

Inventions

Journals

G. R. Pess, T. P. Quinn, S. R. Gephard, and R. Saunders (2014). Re-colonization of Atlantic and Pacific rivers by anadromous fishes: linkages between life history and the benefits of barrier removal. *Reviews in Fish Biology and Fisheries*. January . Status = PUBLISHED; Acknowledgment of Federal Support = Yes

John Waldman, Karen Wilson, Noah Snyder, and Martha Mather (). Can Resilience Theory Help Guide Restoration of Anadromous Fishes?. *Fisheries*. . Status = UNDER_REVIEW; Acknowledgment of Federal Support = Yes ; Peer Reviewed = Yes

Licenses

Other Products

Forum.

Atlantic Salmon Ecosystems Forum. Restoration: Connecting the Dots, NOAA Fisheries Service Meeting, Orono, Maine, 2014

Held every other year since 2000, the NOAA-sponsored Atlantic Salmon Ecosystem Forum is comprised of a series of presentations that focus on the science and management of key diadromous species in the Northwest Atlantic (i.e., New England and Canada). Once entirely about Atlantic salmon, the focus of the forum has grown to reflect the stronger emphasis on ecosystem-level processes and the role of multi-species interactions in understanding salmon survival and restoration as well as other diadromous species. A broad spectrum of topics pertaining to freshwater, estuarine, and marine phase ecology was covered. These science-based presentations focused on 1) specific biological/ecological questions that inform management actions, 2) the implications of management actions on various species, and 3) identification of future management needs and research goals.

The 2014 forum was titled, "The Atlantic Salmon Ecosystems Forum. Restoration: Connecting the Dots" (www.atlanticsalmonforum.org/), and held at the University of Maine in January 2014. DSRRN provided input to the forum development and planning as well as funding for conference expenses and keynote speaker fees. In addition, DSRRN sponsored and organized the visit for the keynote speaker, Dr. Daniel Schindler, University of Washington, who provided a west coast perspective on Atlantic salmon restoration and management.

The Atlantic Salmon Ecosystems Forum is traditionally an opportunity for state, federal and academic scientists to exchange ideas and network with conservation organizations and managers. This year there were over 160 participants from the following affiliations: general audience (10%), industry (2%), non-governmental organizations (15%), universities (18%), tribal government (3%), state resource agencies (17%), federal resource agencies (29%), and various organizations in Canada (7%).

Listserv.

DSRRN continues as an active listserv (DSRRN@lists.maine.edu) with over 400 subscribers that supports information transfer and on-going collaborations on diadromous species restoration.

Symposium.

River Herring Symposium, American Fisheries Society Annual Meeting, Quebec City, Quebec, 2014

The American Fisheries Society annual meeting will be held in Quebec City, Quebec in August 2014. DSRRN is co-sponsoring a two-day symposium focusing on river herring restoration using an ecological approach: "River herring: towards a holistic understanding." The river herring fishery is one of the oldest fisheries in North America and is well-documented in both Native American and colonial cultures. Commercial landings began to decline significantly by the late 1970s due to loss of habitat, lack of passage, overfishing, and predation. NOAA Fisheries has designated river herring a Species of Concern and as such are developing a long-term conservation plan that considers threats, research, conservation efforts, and coordinated approaches to address data gaps. The purpose of this symposium is to synthesize the growing body of research on the multiple stressors that impact river herring throughout its range and across all life history stages.

Interest in the symposium has been high; what was envisioned as a half-day session is now scheduled for two full days. More than half the talks are authored by individuals who have participated in past DSRRN events.

Other Publications

Patents

Technologies or Techniques

Thesis/Dissertations

Websites

Diadromous Fish Restoration Research Network

<http://umaine.edu/searunfish/>

The DSRRN website (www.umaine.edu/searunfish/) is a clearinghouse of information for students, practitioners, agencies, researchers, academicians, and other stakeholders interested in learning more about diadromous species. The website was updated monthly from 2008 through 2013 in conjunction with the monthly newsletter and it continues to be updated as time permits. The site provided extensive, up-to-date information on: DSRRN Background and Core Partners, DSRRN Science Workshops and Meetings, KnowledgeBase, Penobscot Science Exchange, Restoration Resources, Funding Opportunities, Positions Available, Upcoming Conferences and Events, Recent Publications, Regional Restoration Efforts, News and Diadromous Fish.

Supporting Files

Filename	Description	Uploaded By	Uploaded On
DSRRNSupporting Materials for Products.pdf	List of Presentation Titles and Authors in DSRRN-sponsored Symposia and DSRRN List Serve Welcome.	Karen Wilson	07/01/2014

Participants/Organizations

What individuals have worked on the project?

Name	Most Senior Project Role	Nearest Person Month Worked
Hart, David	PD/PI	1
Elskus, Adria	Co PD/PI	1
Vaux, Peter	Co PD/PI	0
Wilson, Karen	Co PD/PI	2
Arter, Barbara	Other Professional	6
Bailey, Michael	Other Professional	0
Hallsworth, Ruth	Other	1
Aponte Clarke, George	Other	0
Avery, Trevor	Other	0
Chaput, Gérald	Other	0
Collins, Mathias	Other	0

Name	Most Senior Project Role	Nearest Person Month Worked
Courtemanch, David	Other	0
Day, Laura	Other	0
Fairchild, Wayne	Other	0
Flagg, Lewis	Other	0
Gallagher, Merry	Other	0
Kusnierz, Daniel	Other	0
Royte, Joshua	Other	0
Saunders, Rory	Other	0
Snyder, Noah	Other	0
Trial, Joan	Other	0
Wippelhauser, Gail	Other	0
Wright, Jed	Other	0
Zydlowski, Gayle	Other	0

Full details of individuals who have worked on the project:

David Hart

Email: david.hart@umit.maine.edu

Most Senior Project Role: PD/PI

Nearest Person Month Worked: 1

Contribution to the Project: Coordinate and support grant activities within the University of Maine, participate in workshops and meetings

Funding Support: NSF-EPSCOR

International Collaboration: No

International Travel: No

Adria A Elskus

Email: adria.elskus@umit.maine.edu

Most Senior Project Role: Co PD/PI

Nearest Person Month Worked: 1

Contribution to the Project: Planning and coordinating meetings and workshops, general oversight of the project, participating in meetings and workshops

Funding Support: USGS

International Collaboration: No

International Travel: No

Peter D Vaux

Email: peter.vaux@maine.edu

Most Senior Project Role: Co PD/PI

Nearest Person Month Worked: 0

Contribution to the Project: None in this last year. This co-PI has moved to a new position.

Funding Support: None.

International Collaboration: No

International Travel: No

Karen A Wilson

Email: kwilson@usm.maine.edu

Most Senior Project Role: Co PD/PI

Nearest Person Month Worked: 2

Contribution to the Project: Science coordinator for the network, including conceptual background for meetings, meeting organization, moderator/facilitator, publication coordinator/author, final report, list-serve moderator

Funding Support: I am funded full time as a assistant research professor through the University of Southern Maine; some of my time spent on this project came from my "research block." Funding from Maine EPSCOR supported related activities.

International Collaboration: Yes, Canada

International Travel: No

Barbara Arter

Email: Barbara.S.Arter@umit.maine.edu

Most Senior Project Role: Other Professional

Nearest Person Month Worked: 6

Contribution to the Project: Science Information Coordinator: served as the information hub of the network, connecting participants, fielding questions, maintaining the website, planning meetings, moderating sessions, moderating the listserve

Funding Support: This grant

International Collaboration: No

International Travel: No

Michael Bailey**Email:** michael_bailey@fws.gov**Most Senior Project Role:** Other Professional**Nearest Person Month Worked:** 0

Contribution to the Project: Core Partner: Assistant Project Leader, Central New England Fishery resource Center, USFWS. DSRRN Core Partners provide input, support, and networking for DSRRN workshops, conferences, and websharing.

Funding Support: U.S. Fish and Wildlife Service

International Collaboration: No

International Travel: No

Ruth Hallsworth**Email:** Ruth_Hallsworth@umit.maine.edu**Most Senior Project Role:** Other**Nearest Person Month Worked:** 1

Contribution to the Project: Served as University administration liaison for the project, including help with financials, scheduling at the George Mitchell Center and travel reimbursements.

Funding Support: University of Maine, Sen. George Mitchel Center

International Collaboration: No

international Travel: No

George Aponte Clarke**Email:** George@penobscotriver.org**Most Senior Project Role:** Other**Nearest Person Month Worked:** 0

Contribution to the Project: Core Partner: Deputy Director, Penobscot River Restoration Trust. DSRRN Core Partners provide input, support, and networking for DSRRN workshops, conferences, and websharing.

Funding Support: Penobscot River Restoration Trust

International Collaboration: No

International Travel: No

Trevor Avery**Email:** Stripedbass@acadiau.ca**Most Senior Project Role:** Other**Nearest Person Month Worked:** 0

Contribution to the Project: Core Partner: Faculty, Acadia University, N.S., CA. DSRRN Core Partners provide input, support, and networking for DSRRN workshops, conferences, and websharing.

Funding Support: Acadia University, N.S., CA

International Collaboration: Yes, United States

International Travel: No

Gérald Chaput**Email:** Gerald.Chaput@dfo-mpo.gc.ca**Most Senior Project Role:** Other**Nearest Person Month Worked:** 0

Contribution to the Project: Core Partner: Coordinator, Centre for Science Advice. DSRRN Core Partners provide input, support, and networking for DSRRN workshops, conferences, and websharing. Fisheries and Oceans Canada, Gulf Region

Funding Support: Fisheries and Oceans Canada

International Collaboration: Yes, United States

International Travel: No

Mathias Collins**Email:** Mathias.Collins@noaa.gov**Most Senior Project Role:** Other**Nearest Person Month Worked:** 0

Contribution to the Project: Core Partner: Hydrologist, NOAA Restoration Center Northeast Region. DSRRN Core Partners provide input, support, and networking for DSRRN workshops, conferences, and websharing.

Funding Support: NOAA Restoration Center Northeast Region

International Collaboration: No

International Travel: No

David Courtemanch**Email:** Dave.L.Courtemanch@maine.gov**Most Senior Project Role:** Other**Nearest Person Month Worked:** 0

Contribution to the Project: Core Partner: Water Quality, Maine Dept of Environmental Protection. DSRRN Core Partners provide input, support, and networking for DSRRN workshops, conferences, and websharing.

Funding Support: Maine Dept of Environmental Protection

International Collaboration: No

International Travel: No

Laura Rose Day**Email:** Laura@penobscotriver.org**Most Senior Project Role:** Other**Nearest Person Month Worked:** 0

Contribution to the Project: Core Partner: Executive Director, Penobscot River Restoration Trust. DSRRN Core Partners provide input, support, and networking for DSRRN workshops, conferences, and websharing.

Funding Support: Penobscot River Restoration Trust

International Collaboration: No

International Travel: No

Wayne Fairchild

Email: wayne.fairchild@dfo-mpo.gc.ca

Most Senior Project Role: Other

Nearest Person Month Worked: 0

Contribution to the Project: Core Partner: Research Scientist, Fisheries and Oceans Canada Gulf Fisheries Centre. DSRRN Core Partners provide input, support, and networking for DSRRN workshops, conferences, and websharing.

Funding Support: Fisheries and Oceans Canada Gulf Fisheries Centre

International Collaboration: Yes, United States

International Travel: No

Lewis Flagg

Email: flagglewis@aol.com

Most Senior Project Role: Other

Nearest Person Month Worked: 0

Contribution to the Project: Core Partner: Retired Marine Resources Scientist and former Deputy Commissioner, Maine Department of Marine Resources. DSRRN Core Partners provide input, support, and networking for DSRRN workshops, conferences, and websharing.

Funding Support: none

International Collaboration: No

international Travel: No

Merry Gallagher

Email: merry.gallagher@maine.gov

Most Senior Project Role: Other

Nearest Person Month Worked: 0

Contribution to the Project: Core Partner: Research Fishery Biologist, Maine Department of Inland Fisheries and Wildlife. DSRRN Core Partners provide input, support, and networking for DSRRN workshops, conferences, and websharing.

Funding Support: Maine Dept of Inland Fisheries and Wildlife

International Collaboration: No

International Travel: No

Daniel H. Kusnierz

Email: Dan.Kusnierz@penobscotnation.org

Most Senior Project Role: Other

Nearest Person Month Worked: 0

Contribution to the Project: Core Partner: Water Resources Program Manager, Penobscot Indian Nation. DSRRN Core Partners provide input, support, and networking for DSRRN workshops, conferences, and websharing.

Funding Support: Penobscot Indian Nation

International Collaboration: No

International Travel: No

Joshua L. Royte

Email: jroyte@tnc.org

Most Senior Project Role: Other

Nearest Person Month Worked: 0

Contribution to the Project: Core Partner: Conservation Planner, The Maine Chapter of The Nature Conservancy. DSRRN Core Partners provide input, support, and networking for DSRRN workshops, conferences, and websharing.

Funding Support: The Maine Chapter of The Nature Conservancy

International Collaboration: No

International Travel: No

Rory Saunders

Email: rory.saunders@noaa.gov

Most Senior Project Role: Other

Nearest Person Month Worked: 0

Contribution to the Project: Core Partner: NOAA's National Marine Fisheries Service, Protected Resources Division. DSRRN Core Partners provide input, support, and networking for DSRRN workshops, conferences, and websharing.

Funding Support: NOAA's National Marine Fisheries Service, Protected Resources Division

International Collaboration: Yes, Finland

International Travel: No

Noah P. Snyder

Email: noah.snyder@bc.edu

Most Senior Project Role: Other

Nearest Person Month Worked: 0

Contribution to the Project: Core Partner: Associate Professor, Department of Earth and Environmental Sciences, Boston College. DSRRN Core Partners provide input, support, and networking for DSRRN workshops, conferences, and websharing.

Funding Support: Boston College

International Collaboration: No

International Travel: No

Joan G. Trial**Email:** joan.trial@maine.gov**Most Senior Project Role:** Other**Nearest Person Month Worked:** 0

Contribution to the Project: Core Partner: Senior Atlantic Salmon Biologist, Maine Department of Marine Resources. DSRRN Core Partners provide input, support, and networking for DSRRN workshops, conferences, and websharing.

Funding Support: Maine Dept of Marine Resources

International Collaboration: No

International Travel: No

Gail Wippelhauser**Email:** gail.wippelhauser@maine.gov**Most Senior Project Role:** Other**Nearest Person Month Worked:** 0

Contribution to the Project: Core Partner: Marine Resources Scientist, Maine Department of Marine Resources. DSRRN Core Partners provide input, support, and networking for DSRRN workshops, conferences, and websharing.

Funding Support: Maine Dept of Marine Resources

International Collaboration: No

International Travel: No

Jed Wright**Email:** Jed_Wright@fws.gov**Most Senior Project Role:** Other**Nearest Person Month Worked:** 0

Contribution to the Project: Core Partner: Senior Fish and Wildlife Biologist, Gulf of Maine Coastal Program, U.S. Fish and Wildlife Service. DSRRN Core Partners provide input, support, and networking for DSRRN workshops, conferences, and websharing.

Funding Support: U.S. Fish and Wildlife Service

International Collaboration: No

International Travel: No

Gayle Zydlewski**Email:** gayle.zydlewski@maine.edu**Most Senior Project Role:** Other**Nearest Person Month Worked:** 0

Contribution to the Project: Core Partner: Assistant Professor, School of Marine Sciences, University of Maine. DSRRN Core Partners provide input, support, and networking for DSRRN workshops, conferences, and websharing.

Funding Support: University of Maine

International Collaboration: No

International Travel: No

What other organizations have been involved as partners?

Nothing to report.

Have other collaborators or contacts been involved? Yes

Impacts

What is the impact on the development of the principal discipline(s) of the project?

In the DSRRN Workshop I Resilience of North Atlantic Diadromous Fish Assemblages: A Restoration Perspective Application, participants explored the utility of resilience theory for the restoration and management of diadromous fishes. We are currently revising a manuscript for Fisheries (American Fisheries Society) that will bring these ideas to managers and on-the-ground practitioners.

One of the challenges of working with under-appreciated or harvested species is that the data describing population characteristics and abundance is patchy and comes from a variety of uncoordinated sources, such as counts of spawning adults, harvest numbers from a variety of fishing gears and occasional research efforts. In the DSRRN Workshop II Variability of North Atlantic Diadromous Fish Populations: Establishing Reference Points for Restoration Assessment, participants explored the use of proportional variability (PV, Heath 2006) as a method for comparing variability of population characteristics over time and space from disparate data sources.

What is the impact on other disciplines?

DSRRN prioritized interdisciplinary collaborations and interactions. Some of the most fruitful involved collaborations with hydrogeomorphologists and climate specialists, reflected in workshop participants, sessions in the final science meeting, and the diversity of disciplines represented by DSRRN's Core Partners. For example, the final session in the DSRRN Final Science Meeting (2013) featured talks by aquatic ecologists and hydrogeomorphologists.

What is the impact on the development of human resources?

Graduate and undergraduate students were directly and indirectly engaged in the project as graduate assistants, note takers and meeting assistants. DSRRN Science Meetings represented unique opportunities for students to interact in formal and informal discussions with scientists and managers from the East Coast and Canada. DSRRN networking introduced academics and managers, expanding perspectives and initiating and strengthening collaborations.

What is the impact on physical resources that form infrastructure?

Nothing to report.

What is the impact on institutional resources that form infrastructure?

DSRRN's networking functions will continue in the form of a listserve and symposia and other networking events organized by DSRRN participants. We anticipate that the listserve will continue to strength communication and collaboration among diadromous fish researchers (and managers and practitioners), and will be of great use as the planning and organization of the next International Diadromous Fish AFS Symposium moves forward. This symposium was last held in 2007 (AFS International Symposium: Challenges for Diadromous Fishes in a Dynamic Global Environment; Haro et al 2009, Challenges for Diadromous Fishes in a Dynamic Global Environment, AFS Symposium 69).

What is the impact on information resources that form infrastructure?

Nothing to report.

What is the impact on technology transfer?

Nothing to report.

What is the impact on society beyond science and technology?

The management, conservation and restoration of diadromous fishes has become more and more visible to U.S. citizens on the east coast with the continued removal of dams, closure of fisheries (river herring, eel) and rising awareness of the connections between freshwater and marine habitats. Diadromous fish such as river herring (alewife and blueback herring) provide a tangible connection between inland communities and the ocean, and, because these fish (and many other diadromous fishes) return to their natal rivers to spawn, these fish runs provide an opportunity for stewardship in a world increasingly disconnected from ecological processes.

DSRRN's website has provided a public place for information on diadromous species, and DSRRN activities have provided an opportunity for field biologists, managers, NGOs and academics to meet, share information and collaborate.

Changes/Problems

Changes in approach and reason for change

Nothing to report.

Actual or Anticipated problems or delays and actions or plans to resolve them

Nothing to report.

Changes that have a significant impact on expenditures

Nothing to report.

Significant changes in use or care of human subjects

Nothing to report.

Significant changes in use or care of vertebrate animals

Nothing to report.

Significant changes in use or care of biohazards

Nothing to report.