Matthew Farragher
Aquatic Ecology Graduate Student - University of Maine
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Education
University of Maine | Orono, Maine
Master of Science: Ecology and Environmental Science (began Fall 2019)
School of Biology and Ecology, Climate Change Institute
Advisor: Dr. Jasmine Saros
GPA: 4.0

State University of New York at New Paltz | New Paltz, New York
Bachelor of Science: Environmental Geochemical Science (Spring 2016)
Advisor: Dr. David Richardson
Distinctions: Honor's Program, Scholar-Athlete
GPA: 3.26

Graduate experience
Graduate Research Assistant | University of Maine
Orono, Maine
August 2019 - present (40+ hours/week)
Advisor: Dr. Jasmine Saros

- ❖ Completing master's thesis entitled "Effects of changing dissolved organic carbon concentrations on vertical habitat gradients in lakes of Acadia National Park". Experience in the following:

- Bi-weekly sampling
    - Collecting and processing phytoplankton and zooplankton samples
    - Collecting vertical profiles of biological and water quality parameters using YSI-EXO3 Sonde and Turner Designs C3 Submersible Fluorometer
    - Collecting and filtering water samples for nutrient and chemical parameters
- Lake morphometry
    - Creating bathymetric maps of three lakes for volumetric modeling of dissolved oxygen
    - Data collected using Humminbird GPS unit and mapped using ReefMaster software
- High-frequency sensors
    - Deployed high-frequency sensor buoys in three lakes in mid-February 2020 to record hourly readings of temperature, dissolved oxygen, and light attenuation to capture under-ice and open-water dynamics
- Jordan Pond buoy project
    - Assisting Acadia National Parks Service and Friends of Acadia with the operation of the high-frequency data collection buoy in Jordan Pond
    - Monitoring remote connection of buoy
- Data processing
    - Using R programming for database management, statistical analysis, and creating figures

Coursework

- Community Ecology (525)
- Lake Ecology (463)
- Responsible Conduct of Research (601)
- Advanced Limnology (688)
- Bio Oceanography (50)
- Advanced Biometry (597)
- Introduction to R Programming (449)

Teaching Assistantships
(20 hours/week)
BIO 100 - Basic Biology Lab (Fall 2019 and Fall 2020)

- Topics include environmental science, ecology, inquiry biology

BIO 200 - Biology of Organisms Lab (Spring 2020)

- Topics include life history and life functions of each kingdom

❖ Fullinging teaching assistantship duties for introductory and intermediate biology courses. Experience in the following:

- Guiding students through inquiry-based lab exercises and independently designed experiments
- Instructing students to write concise and impactful lab reports and presentations
- Grading lab reports and other assignments
- Proctoring lecture exams
- Instructing students in-person as well as online and asynchronously

Friends of Acadia | Visiting Student Committee Member
September 2019 - present

❖ Attending Friends of Acadia committee meetings to provide student perspective on Acadia National Park's policy, governance, and planning. Experience in the following:

- Student Survey
  - Created and distributed a survey to UMaine students regarding their use and interest in Acadia National Park
  - Shared results of survey with board members to offer insights on how students engage with national parks
- Seasonal Employee Housing committee
  - Discussing options for ensuring affordable housing for seasonal ANP employees
  - Offering experience on seasonal housing issues

Work experience
Fisheries Technician | Cornell University / New York State Department of Environmental Conservation-Hudson River Fisheries Unit
New Paltz, New York
March 2019 – June 2019 (40 hours/week)
Supervisor: Wes Eakin

❖ Monitored herring and other fish species in the Hudson River and at Black Creek estuary in Esopus, New York. Experience in the following:

- Hudson River fisheries surveys
    - Used haul seine techniques to sample fish, targeting alewife, blueback herring, striped bass, and American shad
    - Collected size data and scale samples from target species
    - Administered Floyd tags to striped bass and American shad
    - Used gill netting techniques to sample adult and juvenile sturgeon
    - Collected tissue samples and administered PIT tags to adult and juvenile sturgeon
    - Collected otoliths from subset of dissected target species
    - Collected subset of the following species for multiple studies
        - Alewife ovaries (fecundity study)
        - Striped bass fillets (PCB concentration monitoring)
        - American shad muscle tissues (Genetics study)
- Black Creek herring egg production survey
    - Placed mats along Black Creek stream bed to capture herring eggs, using randomly generated points within streambed to survey a range of substrate characteristics (handheld ArcGIS and GPS units)
    - Conducted water quality assessments upon placement and recovery of each mat, including stream velocity, substrate characteristics, and temperature
    - Enumerated eggs from subsample of egg mat captures using microscope techniques
- Black Creek stream weir
    - Installation and daily maintenance of stream weir to enumerate and record all spawning herring and PIT-tagged individuals moving upstream
    - Downloaded and recorded information from fish counter, video camera, and PIT-tag gates
    - Conducted daily water quality assessments
- Technician duties
    - Net mending and gear maintenance
    - Boat and trailer maintenance, including electrical wiring
    - Mounting and processing scale and fin samples
    - Data entry and quality control

Sea Turtle Monitoring Volunteer | The Leatherback Trust
Playa Cabuyal, Guanacaste Province, Costa Rica
January 2019 – February 2019 (40+ hours/week)

❖ Volunteered with researchers and graduate students to monitor nesting populations of endangered sea turtles in northwestern Costa Rica. Experience in the following:

- Conducted nighttime beach patrols to monitor activity of green, leatherback, and olive Ridley sea turtle species
- Collected data from nesting turtles including egg enumeration, carapace length and width, skin tissue samples, nest fungal samples, and nest depth
- Administered PIT tags and metal clip tags to nesting turtles
- Relocated nests away from high-tidal zones or areas of concentrated human activity
- Excavated nests after hatches to determine hatch success and predation rate
- Monitored environmental factors such as groundwater height and sand temperatures at incremental depths

- Cleaned and maintained rudimentary camp in remote location without electricity, cell phone service, or other amenities
- Aided graduate students with the following projects:
    - camera trapping turtle hatchlings
    - conducting oceanic biodiversity surveys via drone and snorkeling methods
    - collecting sand samples for microplastic content analysis

Research Technician | University of Notre Dame
University of Notre Dame Environmental Research Center, Land O' Lakes, Wisconsin
May 2018 – September 2018 (50+ hours/week)
University of Notre Dame, South Bend, Indiana
September 2018 – January 2019 (40 hours /week)
Supervisors: Dr. Stuart Jones, Alex Ross

❖ Studied fish and benthic invertebrates in a comparative whole-lake experiment to predict the global implications of increasing dissolved organic carbon on food-web dynamics. Also conducted a wide range of technician duties across multiple disciplines. Experience in the following:

- Long Lake food-web project
    - Sampled benthic invertebrates using Eckman dredge and sediment corer
    - Conducted fish population surveys via angling and minnow trapping methods
    - Performed gastric lavage and analyzed diet content of largemouth bass
    - Measured and identified benthic invertebrates in several instars, often keyed to genus level (microscope, ImageJ techniques)
    - Administered PIT tags to largemouth bass
    - Removed otoliths and tissue samples from subset of largemouth bass
    - Collected, identified, enumerated, and measured zooplankton samples (microscope, ImageJ)
- Limnology surveys
    - Conducted limnology surveys on multiple lakes to record water quality metrics, light penetration, and weather using water sampling methods, probes, and deployable sensors
    - Downloaded data from weather stations, rain gauge, HOBO data loggers, and dissolved oxygen sensors
    - Filtered and processed water samples to analyze chemical properties, water quality parameters, and nutrients (photospectroscopy methods)
    - Processed aquatic and atmospheric gas samples (gas chromatography)
    - Deployed benthic domes to measure benthic primary productivity
    - Used loss-on-ignition methods to measure organic carbon content of benthic sediment samples
- Technician duties
    - Installed 150 meter-long divider to separate two lake basins for long-term whole-lake manipulation experiment
    - Analyzed data and created exploratory figures (R statistics)
    - Supervision and schedule management of one undergraduate assistant
    - Data entry, quality control, and database management (Microsoft Excel, R)
    - Net mending and field equipment maintenance

- Computer equipment and sensors management
- Lab upkeep and organization

❖ Assisted PhD and master's students with the following projects:

- FishScapes:
  - Surveyed fish via electrofishing, angling, and snorkeling methods
  - Transferred PIT-tagged largemouth bass populations between lake basins for fish population hyperstability experiment
  - Collected and processed water chemistry samples from 20 lakes
- Productivity Mesocosms:
  - Mesocosm installation and manipulation
  - Identified and enumerated mesocosm zooplankton samples
  - Prepared nutrient assays for experimental mesocosms
- Bluegill Rapid Evolution:
  - Collected bluegill for sampling via angling, electrofishing, and fyke netting
  - Performed gastric lavage and analyzed diet content of bluegill
  - Administered lethal doses of anesthetic (MS-222) to bluegill
  - Dissected bluegill for gill arches, fin clips, stomachs, scales, muscle tissues, and eyeballs (opsin genome project)
  - Collecting mussels and snails via snorkeling for stable isotope baselines
- Methane Cycling:
  - Collected aquatic and atmospheric gas samples, including samples from flux chambers used to measure atmospheric methane inputs from lakes
  - Prepared dissolved gas samples for isotope analysis
  - Analyzed methane production of experimental benthic sediment slurries

Fisheries Volunteer | Aspen Center for Environmental Studies
Aspen, Colorado
October 2017 – February 2018 (5 hours/week)

❖ Assisted with the reintroduction of native cutthroat trout at Hallam Lake for educational purposes. Experience in the following:

- Built and maintained trout streams and spawning beds
- Cultivated invertebrates to feed cutthroat trout residing in fish tank
- Cleaned and maintained fish tank pump system and drainage pipe
- Maintained weir plate and adjacent land to prevent groundwater flow
- Assisted with educational seminars and other institution events

Creel Clerk | AmeriCorps and Iowa Department of Natural Resources
Black Hawk Lake Fisheries Management Station, Lake View, Iowa
April 2017 – September 2017 (40-50 hours/week)
Supervisor: Ben Wallace

❖ Conducted creel surveys to estimate fishing pressure at a recently renovated lake and assisted with fisheries surveys across a twelve-county district. Experience in the following:

- Interviewed anglers on their fishing experience and catch at Black Hawk Lake
- Recorded length and weight data for harvested fish
- Fostered relationship between the community and the Iowa DNR
- Provided detailed fishing reports to Biologist for the DNR's weekly fishing report
- Conducted fish population surveys via electrofishing, gill netting, fyke netting, hoop netting, and beach seine netting
- Conducted common carp and bigmouth buffalo mark-recapture surveys to estimate biomass and age structure in an ongoing best management practice study
- Removed otoliths, scales, and spines from a variety of fish species to estimate age and growth
- Assisted with the collection of fish tissue for Iowa's Fish Tissue Monitoring program
- Operated DC electrofishing boat
- Assisted with walleye broodstock collection via gill-netting and egg harvesting
- Administered non-lethal doses of anesthetic (MS-222) and injected PIT tags to advanced fingerling muskellunge prior to stocking
- Assisted with aquatic vegetation surveys (transect and point-intercept methods)
- Assisted with fish kill investigations, including fish enumeration and water quality testing
- Maintained and cleaned fish barriers at Black Hawk Lake for rough fish management
- Maintained and repaired nets and other netting equipment
- Assisted with presenting educational seminars to school groups
- Entered current and backlogged data (Microsoft Excel, Pendragon)

Project Assistant: Bluegill Survey | Cary Institute of Ecosystem Studies
Millbrook, New York
November 2016 - March 2017 (30 hours/week)
Supervisors: Dr. Christopher Solomon, Alex Ross

- ❖ Determined the age structure and reproductive fitness of bluegill populations across a gradient of fishing pressure for twenty-two lakes in Wisconsin. Experience in the following:

- Maintained and operated precision saw for sectioning bluegill otoliths
- Mounted otoliths onto slides for reading to estimate age and growth of fish
- Interpreted otolith slides to estimate age and growth (Olympus cellSens, ImageJ)
- Data entry and quality control for large data sets (Microsoft Excel)
- Aided PhD candidate with largemouth bass young-of-year point count survey
- Weighed gonad samples to estimate reproductive fitness of bluegills

Project Assistant: Mouse-Mast Project | Cary Institute of Ecosystem Studies
Millbrook, New York
May 2016 - November 2016 (40 hours/week)
Supervisors: Dr. Richard Ostfeld, Kelly Oggenfuss

- ❖ Researched the effects of plant communities on the spread of Lyme disease and other tick-borne diseases by transmission through mammal hosts in oak-dominated forests. Experience in the following:

- Trapped and handled small mammals including mice, chipmunks, and squirrels for population estimates, tick burden, fecundity, and weight
- Conducted black-legged tick population surveys (transect methods)
- Kept chipmunks and squirrels in rearing facility as part of long-term virology study
- Conducted identification surveys for mast-producing tree seedlings
- Conducted identification surveys for tree and shrub seeds
- Quantified Lyme bacteria *borrelia burgdorferi* in black-legged ticks using direct fluorescent antibody assay and microscope techniques
- Hiked challenging terrain in adverse weather to collect mammal data
- Data entry and quality control for large data sets (Microsoft Excel)
- Collected blood samples and engorged adult female black-legged ticks from whitetail deer carcasses during Fall 2016 deer hunting season

Undergraduate experience
Undergraduate Research Assistant | SUNY New Paltz Biology Department
January 2015 – June 2016 (3-12 hours/week)
Advisor: Dr. David Richardson

❖ Recorded water quality measurements and conducted biological surveys in three lakes recovering from acid precipitation. Experience in the following:

- Conducted limnology surveys to monitor water quality parameters
- Processed water samples for phosphorus, chlorophyll *a*, and ion content (UV-visible spectroscopy and ion chromatography methods)
- Conducted zooplankton identification and community composition surveys
- Assisted the New York State DEC with largemouth bass mark-recapture surveys, collecting size data and scale samples
- Entered 40+ years of historical storm data taken from Mohonk Lake Cooperative Weather Station (Microsoft Excel)
- Assisted other research assistants with independent research projects and presentations
- Trained new undergraduates on lab protocols and other duties
- Managed, conducted, and presented independent research "The effect of acidity on the clearance of green algae by *Daphnia pulex*" as either a poster or oral presentation at the following university seminars:
    - SUNY New Paltz Honors Program senior thesis seminar, oral presentation
    - SUNY New Paltz 2016 Student Research Symposium poster presentation
    - SUNY New Paltz Environmental Geochemical Science senior thesis seminar, oral presentation

Publications
- Richardson DC, Charifson DM, Davis BA, **Farragher MJ**, Krebs BS, Long EC, Napoli M, Wilcove BA (2018) Watershed management and underlying geology in three lakes control divergent responses to decreasing acid precipitation. *Inland Waters.* Vol. 8, No. 1, 70-81.

Presentations

- **Farragher MJ** (2020) Effects of changing dissolved organic carbon concentrations on vertical habitat gradients in lakes of Acadia National Park. Master's thesis proposal seminar, Orono, ME.

- Richardson DC, **Farragher MJ**, Holgerson MA, Groskreutz M, Hoffman KK, Andersen MR, Hondula KL (2019) #PONDING - What is a pond? Global Lake Ecological Observatory Network (GLEON) meeting, Huntsville, Canada.

- **Farragher MJ**, Wilcove BA, Davis BA, Herten J, Hollander A, Richardson DC (2016) The effect of acidity on the clearance of green algae by *Daphnia pulex*. Ecological Society of America annual meeting poster presentation, Fort Lauderdale, FL.

- Davis BA, Wilcove BA, **Farragher MJ**, Herten J, Hollander A, Richardson DC (2016) The effects of fish species on lake dissolved oxygen concentration compared to an acidic lake. Ecological Society of America annual meeting poster presentation, Fort Lauderdale, FL.

- Wilcove BA, **Farragher MJ**, Davis BA, Herten J, Hollander A, Richardson DC (2016) Decreasing acid precipitation in the Shawangunk Mountains, New York and the differential recovery of lake acidity. Ecological Society of America annual meeting poster presentation, Fort Lauderdale, FL.

- **Farragher MJ**, Wilcove BA, Davis BA (2016) Acid rain recovery and a trophic cascade in the Sky Lakes (Shawangunk Ridge, NY). Northeast Global Lake Ecological Observatory Network (NEGLOEN) annual meeting oral presentation. Cary Institute of Ecosystem Studies, Millbrook, NY.

- Stanson V, Krebs BS, Davis BA, **Farragher MJ**, Richardson DC, Thompson J, Chen A (2015) The ecosystem effects of fish introduction and the recovery from acid rain: A story of fish and macrophytes. Ecological Society of America annual meeting poster presentation, Baltimore, MD.

- Krebs BS, Chen A, Davis BA, **Farragher MJ**, Stanson V, Richardson DC (2015) The zooplankton community during the introduction and loss of a zooplanktivorous fish species in a temperate lake. Ecological Society of America annual meeting poster presentation, Baltimore, MD.

Training and Certifications

- Electrofishing Safety, April 2017 (Department of Interior Online Learning)
- Principles and Techniques of Electrofishing, August 2017 (Iowa AFS Sponsored)

Volunteer experience

- Food AND Medicine - food security volunteer, Brewer, ME | 2019-present
- The Leatherback Trust - see above | Jan-Feb 2019
- Aspen Center for Environmental Studies - see above | Fall 2017
- SUNY New Paltz - Songbird banding assistant | Summer 2016
- Vassar College - Saw-whet owl banding assistant | Fall 2016
- SUNY New Paltz Athletic Department - Special Olympics volunteer | 2013-2016