STATE OF MAINE
BOARD OF ENVIRONMENTAL PROTECTION

IN THE MATTER OF

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|---|---|---|
| NORDIC AQUAFARMS, INC<br>Belfast and Northport<br>Waldo County, Maine | )<br>) | APPLICATION FOR AIR EMISSION, SITE LOCATION OF DEVELOPMENT, NATURAL RESOURCES PROTECTION ACT, and MAINE POLLUTANT DISCHARGE ELIMINATION SYSTEM/WASTE DISCHARGE LICENSES |
| A-1146-71-A-N<br>L-28319-26-A-N<br>L-28319-TG-B-N<br>L-28319-4E-C-N<br>L-28319-L6-D-N<br>L-28319-TW-E-N<br>W-009200-6F-A-N | )<br>)<br>)<br>)<br>)<br>)<br>) | |

PRE-FILED REBUTTAL TESTIMONY OF RICHARD HARRIS PODOLSKY TO ADELE FIORILLO'S PRE-FILED DIRECT TESTIMONY ON NATURAL RESOURCES, AND TYLER PARENT'S PRE-FILED DIRECT TESTIMONY ON FISHERIES.

1. I am Richard Harris Podolsky, Founder and CEO of EcologyAndTechnology, an environmental science consulting company based in Camden, Maine. I am a Certified Senior Ecologist through the Ecological Society of America. I have 34 years of experience in quantifying ecological impacts to biological species and their habitats from human activities including but not limited to; on and offshore wind power, solar arrays, hydroelectric plants and dams, on and offshore pipelines, oil spills, aquaculture, mountain top removal coal mining, skyscrapers and big-box development, telecom towers, and gas flares. I also have relevant background in ecological restoration of wildlife populations to Atlantic and Pacific islands, in ecological modeling and risk assessments, GIS and remote sensing, and in the development of scientific software for data-mining and visualization of ecological data. Finally, I have published over 30 peer-reviewed papers and have taught the following courses to graduate and undergraduate students; oceanography, ecology, ecological field methods, ornithology, and conservation of natural resources (See Addendum A).

2. My role on the Nordic Aquafarms, Inc. project is to provide UpStream Watch with an independent, scientific review of project documents related to natural resources and fisheries and to prepare rebuttal testimony to the Pre-Filed Direct Testimony of Adele Fiorillo on Natural Resources and the Pre-Filed Direct Testimony of Tyler Parent on Fisheries.

Wildlife

3. Regarding #3 in the Fiorillo Pre-Filed Direct Testimony, Fiorillo states, "3. Between July 2018 and October 2019 I was asked to complete a number of studies and to develop an impact compensation plan on behalf of Nordic Aquafarms, Inc. Nordic Exhibit 8 is the Natural Resources Report of May 8, 2019, in which we provide the methods and results of the wetland and stream determinations, vernal pool surveys, wildlife, fisheries and benthic assessments." This pre-filed direct testimony asserts that Nordic Exhibit 8 "is the Natural Resources Report." However, it is my opinion that Nordic Exhibit 8 does not constitute a complete "Natural Resources Report" because it in my opinion, too little time was devoted to the field surveying of biological species. For example, only the following field-time was devoted to surveying non-wetland resources:

- 1 partial day on December 12, 2018, for wildlife habitat value
- 2 days for benthos sampling
- 1 day for bathymetric survey

For a project that is as ambitious and impactful as Nordic's, with short and long term and permanent impacts to uplands, wetlands, intertidal, subtidal and water column habitats, it is my opinion that direct, field observations and quantitative assessments of the biological resources be performed in every season of the year and in every habitat that will experience any impact from project activities. There are real consequences and implications to failing to properly characterize the ecological communities in the project area. Simply put, this failure opens doors for there to be unintended consequences and the potential for harm to come to important and protected natural resources both on land and in the water.

Also, Fiorillo fails to discuss or make mention of the scientific implications of this virtual lack of investment in direct, multi-seasonal quantification of the natural resources outside of the wetlands. I am well aware that time and resources are often limited regarding what can be accomplished in the field. Yet, it is my opinion that is it is critical and customary for consultants to disclose and discuss project limitations or inadequacies, in the form of a disclaimer or equivalent, so that readers and stakeholders can understand the implications arising from any important information gaps. A significant implication of the information gaps in the "Natural Resources Report" is that without proper biological surveys one cannot know which species will be exposed to any project impact.

In Fiorillo's #9 Reptiles and Amphibians she states, "Seasonal conditions during the site visit were not suitable for observing reptiles or amphibians" and goes on to assert that, "based on known distribution and habitat preferences of Maine's special status reptile and amphibian species, none of these species are expected to use habitats within the project site." In the complete absence of any biological surveys and observations of these organisms, I consider this conclusion as purely conjectural. If the seasonal conditions were not suitable for surveying herpetofauna, come back in a season that is suitable.

Similarly, Fiorillo states under #10. Birds that, "A project-specific avian survey was not conducted." I am troubled by the fact that all conclusions pertaining to birds is based essentially no direct data from terrestrial and marine habitats. Conclusions reached by Fiorillo regarding birds rely largely on online sources such as e-Bird rather than from actual multi-season surveys in the uplands, wetlands, shoreline and open water in the project area.

Ironically, the e-Bird data that Fiorillo relies upon point to the need for multi-season bird surveys. In Fiorillo's #11 regarding terrestrial birds, she states that, "eight are listed as Special Concern (SC), and five designated as Species of Greatest Conservation Need (SGCN) in Maine's Wildlife Action Plan." Further along in #11, regarding water birds, Fiorillo states, "Of the 19 water bird species with a high likelihood of using the TWWH associated with the intake and outfall pipes, based on e-bird records, three are listed as SC (greater scaup, lesser yellowlegs, semipalmated plover), and four additional species are designated as SGCNs (common eider, least sandpiper, long-tailed duck, semipalmated sandpiper)." Though I am not an advocate for solely relying upon online data sets such a e-Bird, when such sources point to not fewer than 21 species of birds being either Special Concern or Species of Greatest Conservation Need, responsible parties simply must conclude that multi-season, field surveys are justified, and set about to get those important data.

On-line biological data such as e-Bird are typically used as secondary or tertiary data and not as primary sources. But when these non-primary sources point to so many species of conservation concern, responsible parties ought to be compelled to conclude that investing in multi-season surveys in all

habitats that will host project impacts are warranted. The fact that no field surveys were done in the face of such compelling, albeit ancillary, evidence for their need, calls into question the assertion by Fiorillo at the end of her #11, that, "None are listed as State or federally threatened or endangered." With e-Bird pointing to so many birds being "listed" species and therefore on the cusp of transitioning to fully State or federally threatened or endangered, we cannot assume that the project site might not actually host a bona fide threatened or endangered bird species afforded protection under the Endangered Species Act (ESA).

Similarly, for bats, Fiorillo's #15, Fiorillo concludes, "All of Maine's eight bat species are listed, and based on known distribution and the habitat available, all have some potential to be present during the summer." As with birds, when available data indicate such a high degree of likelihood that a protected or threatened species may be present, responsible parties take that as a clear indication that multi-season, field surveys are desirable, indeed are warranted, and set about to acquire those data. Finally, regarding Fiorillo's Wildlife section #16, without some investment in field surveys, I cannot agree with Fiorillo's conjecture that, "based on known distribution and habitat preferences of Maine's special status invertebrate species, none of these species are expected to be present within the project site." The same logic applies here as it does with birds and herpetofauna -- unless you survey, you just don't know what you might be missing.

Benthos

4. Regarding the benthos, some very significant impacts were simply not considered by Fiorillo in item #21, where she states, "Impacts to the benthos in the Project Area during construction and operation of the Nordic Aquafarms salmon aquaculture facility will be both temporary and permanent. The temporary impacts, including increased turbidity during dredging, rock removal, and pipe burial; and underwater noise from dredging, hoe ramming, pile driving, and construction vessels will be short term and occur only during construction (from November 1 through April 1). The permanent impacts will include the loss of soft bottom habitat, converting to hard substrate with the two intake pipes, one discharge pipe and the anchoring system. The loss of this area is minimal considering the amount of similar available habitat throughout Belfast Bay as well as the anchoring design which supports the pipe above the substrate. The addition of hard substrate in the form of the intake and discharge pipes will provide a positive component to an otherwise predominately soft substrate for colonization by marine organisms." What is entirely lacking here is a discussion by Fiorillo of the direct and indirect impacts from the permanent, subtidal, discharge of thermally charged waters and impacts from the two intake pipes.

Regarding the discharge pipe, we know from Nordic's own admission, that the discharge waters will differ considerably from ambient, receiving waters of Belfast Bay in temperature profile and possibly in chemical composition. The chemical composition/profile of discharge water depends entirely upon the ultimate performance of Nordic's Effluent/Wastewater treatment technology which promises, "nutrient removal rates at 99 percent for many key discharge parameters" (as stated in Nordic's General Application for WDL/MEPDES Permit, Question #18, Attachment 10, page 78).

Regarding temperature, the discharge waters may average between 15˚F and 20˚F warmer than the ambient temperature of Belfast Bay and west Penobscot Bay. The volume of warm water may be in excess of 7 million gallons per day of wastewater discharge between the Little River and Islesboro Island when the facility becomes fully operational (Phase 2). By Nordic's own admission, this discharge of thermally charged water will create a permanent thermal anomaly in the vicinity surrounding the discharge pipe which, depending upon the plumes movement with time, tide, wind and wave, may impact 1-2 miles north/south and 1 mile east/west and cover an area equivalent to between 1 and 2

square miles, equal to between 700 and 1500 football fields.

Given the amount of scientific literature devoted to the ecological impacts of thermal pollution discharges from both fossil fuel and nuclear power plants as well as the interesting literature on naturally occurring shallow water thermal vents, it is a surprising omission that in item #21, Fiorillo fails to even make mention of the impact to benthos from this permanent, thermal pollution anomaly.

This omission is surprising especially because it is so well understood in environmental science that thermal pollution has profound impacts on the ecosystems where they occur. Indeed, we are learning though climate change research that for some species single-digit changes in temperature can result in profound changes to their distribution, abundance and behavior. Therefore, it is vitally important and relevant to this project to fully understand the impact of the thermal anomaly because it will directly impact water column species, such as phyto- and zooplankton, larval fish and invertebrates and thereby the benthos and other species in the food chain that depend upon the water column. Similarly, if the benthos experience impacts in the vicinity of the thermal discharge so too will the fish, waterfowl and human livelihoods that depend upon this benthos.

Some of the important questions that are left unanswered by Fiorillo's complete failure to address the thermal and chemical anomalies include but are not necessarily limited to these:

- Will the discharge waters, which we understand may average between 15˚F and 20˚F warmer than ambient, result in the mortality of phyto and/or zooplankton species and/or larval fish and invertebrates in the water column from "thermal shock"?
- Is there any chance of the thermal or chemical anomalies occurring in the area around the discharge wherein an LD50 threshold might be reached? (LD50 refers to the amount of temperature rise required to kill half the members of a population over a specified period of time).
- If there will be mortality of water column organisms from the thermal or any chemical anomalies, will their carcasses settle out and be deposited and stored in bottom sediments in the vicinity of the discharge pipe or will they stay in suspension in the water column due to wind, wave and tidal actions?
- Though the discharge site is relatively shallow and will likely keep most dead organisms in suspension, isn't there a chance that some of this plankton rain will accumulate in sediments, and might these reenter the water column and be made bio-available for uptake in the food chain periodically?
- If it is true that the thermally anomalous discharge waters will contain a wide variety of chemicals including pharmaceuticals/therapeutants, detergents/cleaners and other chemical agents added by Nordic and possibly not all removed during effluent/wastewater treatment, and given that biological uptake and chemical reactions accelerate as the temperature of the aqueous environment rises, might some of these chemicals recombine to form other chemicals and subsequently bio-accumulate in plankton, benthos, and thereby further up the food chain?
- In other words, if water column organisms die from thermal shock after bio-accumulating chemicals, might they end up being a pathway up the food chain for the accumulation of toxins in the sediments and/or the water column in the vicinity of the discharge? In addition, this decomposition has the chance to result in additional BOD (biochemical oxygen demand) and in so doing result in exacerbating anaerobia in the discharge area.

These are a few of the reasonable questions that should have been raised and addressed under aegis of Benthos in the Natural Resource Report, especially given the number of biological species and human

livelihoods that depend upon a healthy water column and benthic ecology of Belfast and western Penobscot Bay. In truth, evaluation of these effects can only be understood and managed in the context of a robust baseline benthic ecology survey, one that establishes fixed points and looks at benthic and water column community composition throughout the year and covers areas both near the discharge as well as areas within the modeled receiving area and on into the intertidal zone. But no such surveys were done.

Fiorillo in item #29 again misses the mark by stating, "The abundance of benthic organisms was relatively low. The permanent impacts include the loss of soft bottom habitat, converting to hard substrate with the two intake pipes and one discharge pipe. The loss of this area is not unreasonable as it is minimal considering the pipe anchoring design which reduces impacts to the substrate and the amount of similar available habitat throughout Belfast Bay. The addition of hard substrate in the form of the intake and discharge pipes will provide a positive addition to the substrate for colonization." Here again as in item #21, Fiorillo fails to construe the thermal anomaly and chemical profile resulting from the discharge water as among the permanent impacts from this project, which they so clearly are.

5. As with Fiorillo, Tyler Parent also fails to include the thermal anomaly and chemical profile of the discharge water as either a temporary or permanent project impact. In his item #10, regarding elvers, Parent states, "it is unlikely that the proposed project would have a significant impact on elvers because they will already be developed swimmers". Here again, why didn't this analysis point out and discuss the fact that to get to and from the open Gulf of Maine and into the Little River or up the Passagassawaskeag, that some elvers would have to pass through anomalous water discharged by Nordic?

In item #11, though alewives and blueback herring do not presently use the Little River, Parent admits that, "adults could be moving through the project area on their way to the mouth of the Penobscot River." Here again, a complete failure to point to the fact that thermal/chemical anomaly has the potential to impact these species in this location.

Similarly, in item #12, winter flounder, Parent says, "The project area, with its mainly soft bottom, would likely be suitable habitat for the Winter flounder spawning and nursery habitat." Yet, again, no mention of what impact might be experienced by winter flounder from exposure to project-casused anomalies or indirectly to them from the impact the anomalies might have to their food sources.

Again, item #13, rainbow smelt, Parent says, "after hatching, larvae drift quickly to estuarine waters, making it possible for larvae to occur in the project area." Yet, no mention of the impact that the permanent presence of a thermal/chemical plume might have on them while they reside in or move through the impact area.

In regards to the so very important endangered Atlantic salmon, Parent mentions that, "Juveniles are documented to use Belfast Bay, as a western corridor of Penobscot Bay to get from their natal waters within the Penobscot River to the ocean" yet, fails to make mention in item #14 of any impact from this usage from thermally charged waters covering a large area off shore of the Little River. Also, glaringly absent from #14 is a discussion of the fact that Atlantic salmon who come into contact with Nordic discharge waters might reasonably be exposed to biological agents, such as fish-borne diseases, not removed by Nordic's Effluent/Wastewater treatment technology. Any Atlantic salmon so exposed might become vectors for diseases at a time when this imperiled population is in a vulnerable, rebuilding phase.

All of what I have brought up with regards to eels, herring and salmon apply to both species of sturgeon in Parent's items #15 and #16. For both species, which are federally listed, some individuals can be expected to be exposed to the thermal anomaly and the chemicals and biological agents contained in discharge

waters. Along with the other impacts mentioned by Parent for these two species, it is noteworthy omission for Parent not to have discussed the impact of the a large and permanent, offshore thermal, chemical and possibly biologically active plume covering 1 or more square miles of Belfast and west Penobscot Bays.

Regarding American lobster, the only impact Parent mentions in #21 is from construction when he states, "it is not expected that the in- water construction will significantly impact lobster in the project area." Yet, again, no mention at all about the large, thermal anomaly and what impacts it might have on the distribution and abundance of American lobsters in an area of Belfast Bay, that may be as large as between 700 and 1500 football fields in size. Current research indicates that even a few single degrees of warming of Gulf of Maine waters may be sufficient to compel lobsters to relocate en masse to colder waters in Canada. In this context, why does Parent fail to discuss the possible impact of a 20˚F average increase in warming in the project area to a species so vital to local economies as the American lobster?

Finally, in item #21, shellfish, Parent says, "Scallops, blue mussels, and softshell clams will be able to modify their behavior to temporarily endure the change in water conditions until their area of residence is no longer part of the active construction zone". Why just characterize the impacts as temporary and from construction alone when the entire benthic region and the water column upon which these filter-feeders depend will host a permanent, chemical and thermal anomaly? Why not correctly characterize the anomalies as permanent, and discuss and analyze these real and permanent threats rather than conclude that bivalves, "will be able to modify their behavior to temporarily endure the change in water conditions?" As with the benthos, the full evaluation of effects to fin-fish, molluscan and arthropod fisheries from project impacts can only be understood vis-à-vis robust baseline ecological studies within the project area, throughout the year, and inclusive of areas both near to the discharge as well as areas within the modeled receiving area. But no such surveys were done, and no such approach was taken.

<u>Summary Comments</u>

6. Major summary points are:

- Direct, biological field surveys for virtually all of the non-wetland vertebrate and invertebrate species to be found in uplands, intertidal, subtidal, and in the offshore water column were not conducted resulting in data gaps that make it difficult to fully assess the project's ecological/biological impacts. This deficiency is exacerbated by the fact that desktop data sources used indicate that perhaps as many or more than 20 species of protected organisms may be present onshore and offshore of the project area.

- The temperature and possibly chemical plume anomaly were not considered in the discussion of the distribution, abundance and behavior of both benthos and fisheries. In fact, these aqueous anomalies represent long-term and permanent project impacts and as such need to have their ecological implications considered and discussed.

- Finally, I was surprised that the lack of sufficient biological surveys coupled with a failure to analyze all permanent impacts were not discussed in the Pre-Filed Direct Testimonies referenced here. Rarely, have I seen such a client-centric disposition and approach to a Natural Resource Report. These deficiencies are particularly concerning given the fact that the project will have profound and permanent impacts to uplands, wetlands, inter and subtidal and water column habitats and to the biological food chains upon which so many species, including human livelihoods, depend.

# NVC/UPSTREAM R1

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Richard H. Podolsky Date: JANUARY 17, 2020

Printed Name: RICHARD H PODOLSKY

Title: OWNER ECOLOGY AND TECHNOLOGY

Parties Assisting:

Name: Address: Signature:_____

Name: Address: Signature:_____

State of ME County of Knox
The foregoing instrument was acknowledged before me
this 17 day of January, 2020.
by Richard H Podolsky
Amy B Pierce Notary Public
My Commission Expires November 29, 2021

Amy B Pierce
Notary Public, State of Maine
My Commission Expires November 29, 2021

# RICHARD HARRIS PODOLSKY, PhD

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## EXPERTISE

Biological, technical and industrial challenges to sustaining global biodiversity, ecological and evolutionary processes underpinning viable populations of terrestrial and marine organisms and impacts to threatened and endangered species, especially bird and bat populations. Interactions between the built environment, electric power production and ecological systems; impact assessments, due diligence and permitting for wind and solar power, powerlines, transportation, pipelines, skyscrapers, aquaculture, invasive species, and telecom towers. Quantitative ecological assessments especially threatened, endangered and range-limited species, ecological risk modeling, scientific software, remote sensing and GIS/GPS, ecological restoration, regulatory negotiation related to NRDA, MBTA, MMPA, BGEPA, NEPA (BA, EA and EIS), and ESA (Sections 7, 10 and HCP).

## EDUCATION

Ph.D., Ecology, Fisheries and Wildlife, **University of Michigan**, Ann Arbor, MI
Dissertation: *Colony Formation and Attraction of Laysan Albatross and Leach's Storm Petrel*
M.S., Ecology, **Rutgers University**, New Brunswick, NJ
Master's Thesis: *Reproductive Performance Within a Herring Gull Colony*
B.A., Biological Conservation with Distinction, **University of Wisconsin**, Madison, WI
Senior Thesis: *Physiological Adaptations to Desert Ecosystems*

## POST-DOCTORAL SCHOLARSHIP

- **Charles Darwin Scientific Station**, Galápagos Islands, Ecuador. Four years of post-doctoral research: *Conservation biology and management of critically endangered Galápagos Petrel.*

- **Stanford University**, Center for Conservation Biology. Post-doctoral courses in *Managing for Viable Populations.*

## POSITIONS

- Certified Senior Ecologist and CEO, **EcologyAndTechnology**, 2013- current
- Senior Managing Scientist, Exponent, 2011-2013
- Senior Ecologist, The Louis Berger Group, 2006-2011
- Senior Scientist, Perot Systems, 2002-2006
- CEO, Avian Systems, 1991-2002
- Science and Research Director, Island Institute, 1985-1991
- Academic Director, Hurricane Island Outward Bound School, 1983-1985

## CURRENT PROJECTS

- Drone Imaging, Artificial Intelligence and Machine Vision Applied to Seabird Monitoring
- Large Mammal Activity Monitoring – Maine and Massachusetts
- Macroinvertebrate and Big Game Assessment
- Snake and Salamander Survey of Wilderness Bog Ecosystem
- Vegetation and Habitat Mapping Using High Resolution Drone Imaging
- Expert Witness: Finfish Aquaculture Impacts to Multispecies Seabird Colonies, ME
- Minimization of Eagle Mortality Risk at a Gas Flare, NJ
- Drones Measure Wind Resources at Wind Farms, Wind*Cubed*, LLC
- Rare and Endangered Birds and Bats of the Oyster River Bog, ME
- Bat, Dragonfly, Butterfly Assessment at Army Corp Flood Water Management Area, MA

## CERTIFICATIONS

- **Certified Senior Ecologist.** The Ecological Society of America (through 2023)
- **Federal Aviation Administration.** FAA Part 107 Certified Drone Pilot
- **Basic and Advanced Security in the Field.** United Nations Department of Safety and Security
- **Certified Scuba Diver.** YMCA

## BOARD POSITIONS AND PROFESSIONAL AFFILIATIONS

Science Advisor, National Audubon Society Seabird Restoration Program, The Ecological Society of America, The American Ornithological Union and The Organization of Biological Field Stations.

## INTERNATIONAL BIODIVERSITY SCIENCE

Provided scientific expertise to the United Nations, the World Bank, NGOs and private corporations. Regarding Performance Standards 1,3,5 and 6 used by the International Finance Corporation of the World Bank. Expertise includes Performance Standard 6 (*Biodiversity Conservation and Sustainable Management of Living Natural Resources*); Biodiversity Enabling Activities; and National Biodiversity Strategies and Action Plans pertaining to the Convention of Biological Diversity.

## SIGNIFICANT CONSULTATIONS

### *PIPELINES*

- **Keystone XL Pipeline**. Project Manager and Technical Lead of a team of 15 scientists in a third-party review of Keystone XL Pipeline EIS for US Department of State. Overall Team Leader for the review as well as Technical Lead responsible for the portion of the EIS review of all threatened and endangered species along the entire route of the pipeline. Fact-checking and external validation of impacts to American burying beetle (*Nicrophorus americanus*), whooping crane (*Grus americana*), least tern (*Sterna antillarum*), piping plover (*Charadrius melodus*), mountain plover (*Charadrius montanus*), black-footed ferret (*Mustela nigripes*), as well as three plants and two fish species.

### *OIL, GAS, TOXINS*

- **BP Deep Water Horizon Oil Spill**. Peer reviewed avian, dolphin and sea turtle studies conducted during and after the Deep-Water Horizon Oil Spill in the Gulf of Mexico. Led the development of a causal analysis of the impact of commercial and recreational fisheries closures to colonial waterbird breeding to evaluate whether fisheries closures led to more prey availability.

- **Exxon Valdez Oil Spill Restoration Team**. Analyzed satellite imagery of over one million acres impacted by the spill to identify and quantify the habitats of species most impacted by the spill. Trained and led an expedition to ground-truth the satellite imagery of Prince William Sound.

***DREDGING***

- **New York Academy of Sciences/EPA**. Managed an industrial ecology project to define mercury pollution prevention strategies relative to the environmental dredging of the Hudson by convening a consortium of corporate, non-profit and academic stakeholders.

***BIODIVERSITY***

- **National Ecological Observatory Network (NEONINC.ORG) US Geological Survey and National Science Foundation (NSF).** Authored design recommendations for bird sampling at 20 NEON bioregion-sampling stations in the US to climate change research.

- **National Park Service, Golden Gate National Seashore, California.** Provided technical consultation and site surveys for impact of recreation on shorebirds migrating to and overwintering at the coastal beaches located in central coastal California that are within the Golden Gate National Seashore.

- **Institute of Ecosystem Studies**. Participated on scientific team that developed a computer-based, cross-platform simulation of Lyme Disease life cycle to examine the cognition and systems thinking of three user groups: scientists, local government officials, and high school students.

- **The Nature Conservancy**. Wrote and developed Diversidad software to scan earth images and identifies biodiversity hot spots in wilderness landscapes to prioritize conservation lands.

- **United Nations Global Environment Facility (GEF).** Conducted on-site evaluations of conservation training, natural resource management, sustainable use of biodiversity resources, and GIS capacity in indigenous lands, to assess UN's $9 million investment in sustainable forestry/biodiversity in several Amazon Basin countries. Analyzed government and NGOs regarding sustainable forestry, GIS and biodiversity in Bolivia. Authored UN report, *Software Tools for the Visualization and Management of Biodiversity Data*.

- **American Museum of Natural History**. Participated on a scientific team regarding GIS capacity analysis to guide the Museum's biodiversity investment in Bolivia, Madagascar, and Vietnam.

***BIG COAL***

- **Mountain Top Removal/Valley Fill**. Project leader and manager on a project where 5 study streams below valley fills are being compared to 3 reference streams not below valley fills with special attention to birds, bats, herpetofauna and fish.

***AQUACULTURE***

- **Cooke Aquaculture.** Expert witness relative to a Department of Marine Resources permit application for new salmon aquaculture sites. Conducted avian and small mammal audits of fish farms provided recommendations to mitigate impacts.

- **Atlantic Aqua Farms Partnership.** Conducted site visits to over a dozen mussel aquaculture facilities in Gaspé, Nova Scotia, Newfoundland, and Prince Edward Island to survey degree and characteristics of impact from seaducks on bivalve culture.

- **Prince Edward Island Aquaculture Alliance.** Study to quantify responses of seaducks to various types of deterrence with special attention to minimization of habituation.

- **Allen Island Field Station, Muscongus Bay, Maine.** While Research Director at the Island Institute I managed a pilot study to raise steelhead trout for commercial market.

***ONSHORE WIND POWER***

- **Siemens – Field Validation of Siemens' Bird and Bat Dissuasion System.** Designed and led a field verification protocol for an array of lasers to keep birds out of wind turbines. Tested the system on over 80,000 birds and bats at four locations both on and offshore in North America and Canada.

- **WindKraft Nord LLC/BayWa, RE.** Designed biological studies and conducted monthly surveys to assess the potential for impact to birds and bats at numerous grid-scale wind power project sites in Texas, Montana, Colorado, Utah, North and South Dakota.

- **Boreal Renewable Energy – Senior Ornithologist.** Senior leadership at 12 wind power projects in New England including conducting surveys and preparing "fatal flaw" reports for proposed wind power sites including Woods Hole Oceanographic Institute, Aquaculture Research Institute and on Cape Cod, Nantucket, Martha's Vineyard, and Berkshire Mountains.

- **Sustainable Energy Development, Inc. – Senior Ecologist.** Supported SED at half a dozen wind power projects in New England by conducting avian surveys and prepared "fatal flaw" reports for proposed wind power sites in Massachusetts and New York.

***OFFSHORE WIND POWER***

- **Maine Community Wind – Principle Ecologist.** Led the study of birds, bats and herpetofauna at the Fox Island Wind Power Project on Vinalhaven, Monhegan Island, and Swans Island entailing monthly biological surveys of birds and bats risk in support of an application for an Incidental Take Permit for Bald Eagles.

- **Patriot Renewables, LLC, - Senior Ecologist.** Designed and led 18 months' offshore seabird surveys in support of a 100MW offshore wind power project proposed by Patriot for Buzzards Bay, MA. Designed and oversaw construction of an avian radar barge 7 miles offshore. Lead a collision risk assessment and population viability analysis of the federally endangered Roseate Tern.

- **Bureau of Ocean Energy Management.** Scientific Reviewer under Master Services Agreement M08PC20060, entitled, "Potential for Interactions Between Endangered and Candidate Bird Species with Wind Facility Operations on the Atlantic Outer Continental Shelf." Provided technical comments to research design and to all project draft and final reports.

- **First Wind, LLC, Hawaii.** Led wind power development support on Maui relating to the implementation of a Habitat Conservation Plan (HCP) and the review and analysis of the risk of turbine tower and blade collision for three endangered, native, Hawaiian birds—the Hawaiian petrel, the Newell's Shearwater and the Nene goose. Provided support in review of the HCP, recruited and trained field teams to conduct nest searches, and conducted extensive coordination with the State of Hawaii to ensure acceptable implementation of the HCP.

*ENDANGERED SPECIES*

- **Avian Risk Assessment Associated with Environmental Impact Statement (EIS) for Everglades and Biscayne National Park.** Designed and led an avian risk assessment for 4 alternative transmission line corridors in or near the Everglades of Florida associated with the planned for expansion of Turkey Point Nuclear Plant.

- **US Fish and Wildlife Service: Principal Investigator on Risk Assessment of Marbled Murrelet and Wind Power Project Proposed for Radar Ridge Washington.** Co-lead a team of 5 senior scientists in the detailed review of the avian field studies and collision risk assessment for the proposed wind power project at Radar Ridge, WA.

- **National Park Service, Cape Lookout National Seashore, North Carolina.** Senior Ornithologist and primary avian analyst on the NEPA EA and EIS of proposed actions resulting from the management of recreation at Cape Lookout National Seashore.

- **Earth Justice, Honolulu, Hawaii –** Provided endangered species consultation regarding two legal actions regarding illegal take of Newell's Shearwater and Hawaiian Petrels on Kaua`i Island and conducted field assessments of power line arrays and artificial lights.

- **National Park Service, Cape Hatteras National Seashore Recreation Management, North Carolina.** Senior Ornithologist and primary Avian Analyst for the National Environmental Policy Act (NEPA) environmental assessment (EA) and environmental impact statements (EIS) of off road vehicles and associated recreation at Cape Hatteras and Cape Lookout National Seashores.

- **Earthwatch/Center for Field Studies**. Principal Investigator: 1. Attraction of Laysan Albatross to Kauai and 2. Peregrine falcon migration on Maine's outer islands.

- **Electric Power Research Institute (EPRI**). Led scientific teams that helped electric power companies in California and Hawaii implement court-ordered mitigation under the Endangered Species Act litigation from the adverse impact of power lines and towers on protected birds. Led interdisciplinary teams of scientists and economists in the valuation of Allegheny Power's vast wetland holdings in Canaan Valley, West Virginia.

- **The National Audubon Society, Maine, Hawaii, the Galápagos Islands, Central and South America, and Antarctica.** Participated as a Research Scientist and Consulting Ornithologist on the Project Puffin Team, which successfully restored Atlantic puffin and other seabird populations to the Maine Coast. Led numerous ecological research/restoration teams in Maine, Hawaii, and Galápagos Islands. Taught ornithology and led eco-tours to Hawaii, Central and South America, Antarctica, and the Galápagos.

*HYDRO-ELECTRIC, TELECOM TOWERS, POWERLINES*

- **Hawaii Environmental Consultants, LLC.** Conducted environmental site inspections focused on endangered Hawaiian birds, plants and bats at 8 proposed cell phone towers on Lanai, Kauai, Maui, Oahu, Hawaii and Molokai. Final reports were in support of FCC permit applications.

- **Amaila Falls Hydro-electric Project, Guyana.** Provided technical review and impact assessments for the project including field inspections of bird, bat and large predators. Contributed to Environmental and Social Management Plan report focused on methods for minimizing landscape fragmentation and barriers to wildlife movement along the project 90km road through primary forest.

- **Federal Communication Commission (FCC) –** Avian Lead on FCC Programmatic EA. Provided technical leadership to the FCC regarding its Antenna Structure Registration (ASR) program.

- **Dominion Virginia Power Co., Meadow Brook to Loudoun 500-kV Line, Regulatory Support.** Designed studies and led field surveys to help Dominion to comply with the Virginia Department of Game and Inland Fisheries request for the minimization of impact to habitats for three state-listed bird species during the expansion of the Meadow Brook to Loudoun 500-kilovolt (kV) line.

*GREEN BUILDINGS AND LEED*

- **Silverstein Properties, Skidmore, Owings + Merrill Architects**. Provided site-specific recommendations to reduce the risk of collision of migratory and resident birds at the World Trade Center Freedom Tower. Led the design review of the Freedom Tower façade reflectivity, artificial lighting and the use of exterior plantings with the goal of minimizing the factors known to contribute to the risk of bird death by collision.

- **Preti-Flaherty, Wide Water Still Water, LLC**. Provided expert testimony and advice to law firm and land developer regarding the permitting of a Wal-Mart Supercenter near to fragile wetland containing endangered species. Emphasis of this consultation was on minimizing the impact of both sound and light pollution to grassland and wetland wildlife associated with the nearby wetland. Conducted and analyzed relevant literature and provided environmental advice to engineers and architects that were integrated into the plan and helped to achieve a successful outcome for the developer.

**NON-PROFIT ACTIVITIES, POSITIONS AND SERVICE**

- **The Island Institute, Rockland, Maine.** Managed and led the scientific activities of the Institute. Established a digital archive and led an Apple computer-funded project to build custom in-house geographical information system (GIS) software, GAIA. Generated ecological consulting revenues for the Institute and contributed to the development and editing of *Cape Cod to the Bay of Fundy: Environmental Atlas of the Gulf of Maine* (MIT Press, 1996).

- **Hurricane Island Outward Bound School, Maine.** Provided academic oversight to the school's college semester program and other accredited educational programs, including curriculum development, hiring and management of faculty, and oversight of all educational and field logistics for highly mobile courses.

## COLLEGE AND UNIVERSITY COURSES INSTRUCTED

**Community Ecology** (Bard College), **General Ecology** (Rutgers University, University of Michigan), **Ornithology** (Rutgers University, National Audubon Society), **Science and Imaging** (Apple Computer & Eastman Kodak), **Field Methods in Ecology** (College of the Atlantic, Stockton University), **Organisms and Evolution** (Stockton University), **Conservation and Natural Resource Ecology** (University of Michigan), **Ecology of Marine Birds and Mammals** (Wayne State University), **Biological Oceanography** (University of Michigan, University of Hawaii), **Animal Behavior and Communication** (Stockton University)

## FIELD STATIONS AND MARINE LABORATORIES

| Institution | Affiliation |
|---|---|
| 1. Lake Itasca Field Biology Station | Undergraduate Student |
| 2. Oregon Institute of Marine Biology | Graduate Student |
| 3. Bowdoin College Scientific Station | Graduate Researcher |
| 4. Charles Darwin Research Station | Visiting Scientist |
| 5. Bigelow laboratory of Oceanography | Visiting Scientist |
| 6. Cornell Laboratory of Ornithology | Visiting Scientist |
| 7. Point Reyes Bird Observatory | Visiting Scientist |
| 8. Institute for Ecosystems Studies | Visiting Scientist |

## HONORS, AWARDS AND APPOINTMENTS

- Most Innovative GIS Project—The National Park Service
- Computerworld Smithsonian Award Finalist, Computerworld/Smithsonian
- Outstanding Wildlife Ecology Student, the University of Michigan Faculty
- Rackham Doctoral Fellow, the University of Michigan Graduate School
- Frank M. Chapman Ornithology Award, American Museum of Natural History
- Alexander Bergstrom Ornithology Award, Northeast Bird-banders Association
- Graduation with Distinction, the University of Wisconsin

## MEDIA AND PRINT INTERVIEWS

1. KLTV/NBC: Freedom Tower May Be Lifesaver for Birds**.**
2. The New York Sun: Effort Under Way to Reduce Birds' High-Rise Risks.
3. ABC News: A Fatal Attraction.

## PUBLICATIONS

1. Podolsky RH. Easy to Establish, Hard to Eradicate: The Conundrums of Invasive Species on Islands. Earth Systems and Environmental Sciences 2018. (In Press).

2. Sill, WJ, Podolsky R, Wolkowitz, RS. When Birds Make Towers Their Home Sweet Home. AGL Magazine, June 2015, Vol 12, No. 6.

3. Podolsky RH. Fish and Wildlife Service Lists Lesser Prairie-Chicken as Threatened Species. *North American Wind Power Magazine*. June 2014.

4. Podolsky RH. Feds Step Up Avian Enforcement: Will You Be Ready? *North American Wind Power Magazine*. April 2014.

5. Podolsky RH. Birds at Landfills: A Risk to Both Birds and Humans. *American Bar Association Newsletter*. June 2012.

6. Podolsky RH. Emerging Methods to Keep Bats Out of Wind Farms. *North American Wind Power Magazine*. May 2012.

7. Podolsky RH. Marrying Wind Power and Desalinization. *North American Wind Power Magazine*. May 2008.

8. Podolsky RH. Sustainable Slope – Wind Power- Ski Areas Begin to Embrace the Wind. *North American Wind Power Magazine*. June 2006.

9. Podolsky RH. Take back the night. Ecology 2006; 87(12): 3223–3224.

10. Podolsky RH. Industrial Ecology and the Manufacturing of Electricity from Wind. *North American Wind Power Magazine*. August 2005.

11. Podolsky RH. Are Bats the New Birds? *North American Wind Power Magazine*. April 2005.

12. Podolsky RH. Offshore Wind is Coming on Strong. *North American Wind Power Magazine*. January 2005.

13. Podolsky RH. Wind power shifts into high gear. Perspectives. The quarterly publication of the New England Society for Conservation Biology, November 2004.

14. Podolsky R. Application of risk assessment tools: Avian risk of collision model. Proceedings, Onshore Wildlife Interactions with Wind Developments: Research Meeting V. S. Savitt Schwartz (ed). Prepared for the Wildlife Subcommittee of the National Wind Coordinating Committee. Prepared by RESOLVE, Inc., Washington DC, pp. 86–87, Lansdowne, VA, November 3–4, 2004.

15. Podolsky RH. Birds as Wind Park 'Show Stoppers' *North American Wind Power Magazine*. August 2004.

16. Ainley DG, Podolsky R, Deforest L, Spencer G, Nur N. The ecology of Newell's Shearwater and dark-rumped petrel on the island of Kaua`i. Final Report. Task 2, Seabird Ecology Study. Electric Power Research Institute, Palo Alto, CA, 1995.

17. Podolsky R, Ainley DG, Deforest L, Spencer G. Mortality of Newell's Shearwaters caused by collisions with urban structures on Kaua`i. Colonial Waterbirds 1998; 21(1): 20–34.

18. Ainley DG, Podolsky R, Deforest L, Spencer G. New insights into the status of the Hawaiian Petrel on Kaua`i. Colonial Waterbirds 1997; 20:1–7.

19. Podolsky R. Biodiversity prospecting from digital earth imagery. Diversity 1995; 11(4) 16–17.

20. Podolsky R. Ecological hot spots: A method for estimating biodiversity directly from digital earth imagery. Earth Observation Magazine 1994 June: pp. 30–36.

21. Podolsky R. Quantification of habitats in Prince William Sound from Landsat TM satellite imagery. In: Proceedings of the Alaska University, Fairbanks, et al Exxon Valdez Oil Spill Symposium, Abstract p. 147, Anchorage, AK, February 1993.

22. Podolsky R, Conkling P. Satellite imagery aids analysis of rare coastal ecosystems. GEOInfo Systems, June 1992.

23. Podolsky R. Remote sensing, geographic data and the conservation of biological resources. Endangered Species Update 1992; 9(12): 1–4.

24. Podolsky R, Freilich J, Knehr R. Predicting plant species richness from remotely sensed data in a high desert ecosystem. 1992 ISPRS/ASPRS Global Change Conference Proceedings, Washington, DC.

25. Kress SW, Nettleship D, Podolsky RH. Reintroductions of Atlantic puffins, terns, and Leach's storm petrels at former breeding sites in the Gulf of Maine. Bell BD, Kromdeur J (ed). In: Management Methods for Populations of Threatened Birds International Council for Bird Preservation Technical Publication, Cambridge, England, UK, 1992.

26. Podolsky R, Kress SW. Attraction of the endangered dark-rumped petrel to recorded vocalizations in the Galápagos Islands. The Condor 1992; 94:448–453.

27. Podolsky RH. Effectiveness of social stimuli in attracting Laysan albatross to new potential nesting sites. The Auk 1990; 107(1): 119–125.

28. Podolsky RH, Morehouse BC. Analyzing and managing digital earth imagery: An ecological perspective. Scientific Computing & Automation 1990 Jan; pp. 19–26.

29. Podolsky RH. Monitoring biodiversity and landscape richness through digital earth imagery. In: Global and Environmental Monitoring: Techniques and Impacts. International Society for Photogrammetry and Remote Sensing Commission VII Symposium, Vancouver, BC, 1990.

30. Podolsky RH, Morehouse BC, Greene R. Geographic information and analysis of digital earth imagery on the Macintosh II. In: Advances in Spatial Information Extraction and Analysis for Remote Sensing, Orono, ME, 1990.

31. Podolsky RH, Kress SW. Factors affecting colony formation in Leach's storm petrel to uncolonized islands in Maine. The Auk 1989; 106:332–336.

32. Podolsky RH. The Status of the razorbill in the Gulf of Maine. American Birds 1989; 43:14–16.

33. Podolsky RH, Kress SW. Plastic debris incorporated into cormorant nest in the Gulf of Maine. Journal of Field Ornithology 1989; 60:248–250.

34. Podolsky RH. Entrapment of sea-deposited plastic debris on the shore of a Gulf of Maine island. Marine Environmental Research 1989; 27:67–72.

35. Kosinski RJ, Podolsky RH. An analysis of breeding and mortality in a maturing kittiwake colony. The Auk 1979; 96:537–543.

## HIGH TECH ACHIEVEMENTS AND PATENTS

- **Inventor**: US Patent #7,315,799: Method and Article of Manufacture for Determining Probability of Avian Collision. Date of Patent Award: January 2008.
- **Software Author:** Principle designer and project leader on the development of scientific software titles for Windows and Macintosh OS including *FullPixelSearch*, *GAIA*, *Diversidad, Similariidad,* and *FireTower*. In-depth experience with the application of computers to scientific problems, specifically with GIS integration, pattern recognition, data mining and remote sensing.

## INVITED PRESENTATIONS AND WEBINARS

1. The Role of GIS in Monitoring Seabirds. NEARC Keynote Address.
2. Monitoring Seabirds: Global Challenges, Local Actions. Gulf of Maine Research Institute.
3. Behavioral ecology of waterbirds focused on aspects of deterrence, attraction and habituation to various control methods. Aquaculture Alliance, Prince Edward Island.
4. Endangered Species: Regulatory Update, Emerging Tools, Case Studies.
5. Environmental Impacts of Alternate Energy: Fatal Flaws and Why Some Projects Fail.
6. Skidmore, Owings + Merrill, LLP. Reducing Risk of Bird Collision: Freedom Tower.
7. National Wind Coordinating Committee. Bird and Bat Collision Modeling.
8. Society for Conservation Biology. Biodiversity Prospecting Tools. New York, NY
9. EnergyOcean 2004. Offshore Wind Power Production. Palm Beach, FL
10. International Seabird Symposium. Status of Seabird Restoration Efforts. Scotland, UK
11. Environment Canada. Avian and Bat Collision Modeling. NB, Canada
12. Massachusetts Technology Collaborative. Avian Issues and Wind Power. Boston
13. European Wind Energy Conference, Madrid Spain. Wind Power and Birds and Bats
14. Tuft University School of Veterinary Medicine. Seabird Restoration
15. UCLA Institute of the Environment. Los Angeles, CA
16. Lamont Doherty Earth Observatory. Palisade, NY
17. Institute for Ecosystems Studies. Millbrook, NY
18. Second International Conference on Petrels and Albatross. Honolulu, HI
19. U.S. Environmental Protection Agency. New York, NY
20. Port Authority of NY and NJ. New York, NY
21. General Electric Corporation. Schenectady, NY
22. Rockefeller University. New York, NY
23. Cooper Ornithological Society. Hilo, HI
24. New York Botanical Gardens. Bronx, NY
25. SPOT Image Corporation. Reston, VA
26. Apple Computer, Inc. Cupertino, CA
27. NASA Ames Research. Moffitt Field, CA
28. Stanford University. Palo Alto, CA
29. United States Secret Service. Washington, DC
30. Hawaii Audubon Society. Honolulu, HI
31. Massachusetts Institute of Technology. Cambridge, MA
32. William McDonough + Partners. New York, NY
33. Pacific Seabird Group. Seattle, WA

34. The RAND Corporation. Santa Monica, CA
35. Monteverde Conservation League. Monteverde, Costa Rica
36. Exxon Valdez Oil Spill Symposium. Anchorage, AK
37. The Woods Hole Research Station. Woods Hole, MA
38. Yale University. New Haven, CT
39. NASA Headquarters. Washington, DC
40. Apple Computer, Inc. Worldwide Developers Conference, San Jose, CA
41. Environmental Grantmakers Conference. San Francisco, CA
42. Distinguished Lecturer, University of Michigan. Ann Arbor, MI

## GOVERNMENT AND INDUSTRY RESEARCH AWARDS

- US EPA Region 2. Industrial Ecology/Pollution Prevention in the NY Harbor
- Port Authority of NY and NJ. Industrial Ecology/Pollution Prevention in NY Harbor
- General Electric Aircraft Engines. Automated Analysis of SEMs of Turbines
- Electric Power Research Institute. Bi-directional Mapping for Conservation
- Hawaii Biodiversity Joint Venture. Attracting Laysan Albatross to Oahu
- Electric Power Research Institute. Light Pollution and Endangered Seabirds of Kaua`i
- Arthur K. Watson Foundation. The Gulf of Maine Environmental Atlas
- Charles Darwin Research Station. Restoration of the Endangered Galápagos Petrel
- Island Foundation, Inc. Computer Mapping for Natural Resource Analysis
- Apple Computer, Inc. Research and Development Grant
- EARTHWATCH/Center for Field Research. Falcon Migration on Maine islands
- EARTHWATCH/Center for Field Research. Laysan Albatross Ecology on Kaua`i, Hawaii
- American Museum of Natural History. Chapman Fund. Colony Formation in Petrel

## EDITORIAL EXPERIENCE

- Book Designer; *Sun Seasons - Youth in the Wild Florida Keys* by Bill Schwicker**.**
- Author; ***Perfect Pirates*** in Gulls Ravens and a Vulture: The Ornithological Paintings of James Wyeth. 2005.
- Author and editor of award winning; *From Cape Cod to the Bay of Fundy: An Environmental Atlas of the Gulf of Maine*, 2005. MIT Press, Cambridge, MA.

## POPULAR PRESS

1. A Once Rare Bird Now Eats Another. **Working Waterfront, June 2016.**
2. Loons: They Make a Lake a Lake. ***Maine Boats and Harbors Magazine. June 2015.***
3. Snowy Owls: Maine's Newest Snowbird. ***Maine Boats and Harbors Magazine. April 2015.***
4. Two Birders in Newfoundland. ***PenBay Pilot. August 2014.***
5. Nunatak: Four days on the Gaspé. ***PenBay Pilot. September 2013.***
6. Order Envy in the Fog. ***PenBay Pilot. December 2012.***
7. Monhegan Island: Birding Madness. ***PenBay Pilot. October 2012.***
8. Antarctica: Discovery and Exploration. ***Grand Circle Travel***. 29 pp.
9. Portugal: By Land and Sea. ***Grand Circle Travel.*** 24 pp.
10. The Kingdom of Spain. ***Grand Circle Travel.*** 29 pp.
11. Turkey: A Rich and Ancient Tapestry. ***Grand Circle Travel.*** 31 pp.
12. Alaska: Land of the Midnight Sun. ***Grand Circle Travel.*** 33 pp.
13. Costa Rica: Where Diversity Reigns. ***Grand Circle Travel.*** 30 pp.

14. This Year in Space. ***SciTech Quarterly***.
15. Satellite Imagery Aids Analysis of Rare Coastal Ecosystems. ***GEOInfo Systems***.
16. Optical Storage Medium and the Preservation of the Rainforest. ***SciTech Quarterly***.
17. Lost Island Birds. ***Island Journal***.
18. Mind over Macintosh. ***SciTech Quarterly***.
19. Satellite Search Aids Wetlands Visualization. ***GIS World Magazine***.
20. Maine's Rarest Seabird. ***Maine Boats and Harbors***.
21. The Thin Edge. ***Island Journal***.
22. Pleistocene Islands: The Rise and Fall of Maine's Island Empire. ***EARTHWATCH Magazine***.
23. This Island Earth. ***New Alchemist Quarterly***.
24. Island Extinction: The Saga of the Great Auk and Sea Mink. ***Island Journal***.
25. The Razors Edge: Maine's Rarest Seabird. ***Island Journal***.
26. Night Birds: Storm Petrels on the Maine Coast. ***Island Journal***.

**MISCELLANEOUS**

- Master Bird Banding Permit: # 21,768. YMCA Certified Scuba Diver. Red Cross CPR/First Aid, Foreign Language: Spanish Level IV. FAA Part 107 Certified Drone Pilot (through 2021).

# The Ecological Society of America

*Founded 1915*

*The Ecological Society of America,*
*upon recommendation of the*
*Board of Professional Certification, hereby certifies that*

## Richard Harris Podolsky

*meets the requirements as a certified*

## Senior Ecologist

*and is governed by the Society's Code of Ethics.*

*Certified by the Ecological Society of America from*
*June 1, 2018 through June 30, 2023*

*Chair, Board of Professional Certification*

*President, Ecological Society of America*