

# Progress Report

2021-2022







Bull elk roaming near Wild Horse Wind Facility, Washington, USA - c/o Puget Sound Energy

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## Letter from REWI Executive Director Abby Arnold

Recognizing the rapid expansion of clean energy and the need to decarbonize the electric sector, in the last two years, REWI has undertaken its most significant organizational change since our founding in 2008. We have expanded our focus to address solar energy and wildlife interactions, in addition to wind-wildlife interactions. This transition included a name change from the American Wind Wildlife Institute to the Renewable Energy Wildlife Institute, and an added commitment to address questions about the wildlife and natural resource issues associated with the rapid development of large-scale solar energy – predominantly photovoltaic solar facilities – in the United States.

This expansion would not have been possible without the support of our Partners and Friends, colleagues, advisors, and staff who built REWI’s successful wind-wildlife research program, which serves as a foundation and model for the new solar program.

This expansion also demonstrates the commitment of our supporters to build sustainable renewable energy and the importance of collaboration among industry, NGO, and state and federal government representatives to accelerate the responsible deployment of wind and solar energy to mitigate climate change and protect wildlife and ecosystems.

There is an urgency to our mission. With the passage of the Inflation Reduction Act, renewable energy and clean technology have seen an influx of financial investment. Related policy initiatives by federal and state agencies are expanding.

As this landscape continues to evolve, REWI’s core commitments - evident in the stories shared in this Progress Report - remain the same:

- Scientific integrity
- Stakeholder collaboration
- Application of results

2021 and 2022 demonstrated the integral support of REWI’s Partners and Friends in helping the renewables-wildlife community achieve major milestones. As we look ahead, the immediacy of the climate crisis necessitates continued work toward bold goals, including building out REWI’s solar program, sustaining and evolving our wind program, and identifying ways to catalyze dialogue and progress on issues related to renewable energy, wildlife, and ecosystems.

Thank you to all who participate in this effort. If you are not yet a part of REWI, now is the time to join us.

Sincerely,

*Abby Arnold*

Abby Arnold, Executive Director







## Remembering REWI Co-founder Dr. James “Jim” Walker

REWI joins the renewable energy and conservation communities in mourning the loss of Dr. James “Jim” Walker. Dr. Walker served as a major figure in the energy industry, having made an impact across numerous companies and organizations as the former Executive Director and Vice Chair of the California Energy Commission, the former CEO and Vice Chairman of enXco (now EDF Renewables), co-founder of the Princeton Energy Group, former President of the American Wind Energy Association (AWEA, now the American Clean Power Association), and the [co-founder of REWI](#) (then AWWI).

A force to be reckoned with, Dr. Walker was a pioneer for wind energy and wildlife. He exemplified vision, wisdom, leadership, humility, and drive.

Dr. Walker passed on April 12, 2023, the same week [IPCC Report #6](#) was released – a warning that we are closer than ever before to the brink of a global temperature increase of 1.5 degrees Celsius. Biodiversity and human civilization are at risk and we stand at a pivotal moment.

Recognizing that if wind energy (and renewable energy as a whole) is to realize its full potential, Dr. Walker knew that increased attention was needed to address its impacts on wildlife. His inspiration and persistence drove the creation of AWWI, garnering the support and commitment of the wind industry in partnership with the conservation science and wildlife communities.

***“We must get ahead of the challenges involving renewable energy production, wildlife, and ecosystems, and Dr. Walker understood this at a time before many were talking about these issues. His passion and vision – along with the continued support and involvement of REWI’s Partners and Friends – have enabled our organization to push forward the critical work needed to meet net-zero goals.”***

- Abby Arnold, Executive Director, Renewable Energy Wildlife Institute

Dr. Walker’s influence on REWI extends beyond his vision of its founding. The [organization’s 10th-anniversary celebration](#) recognized his legacy by announcing the creation of the [James A. Walker Future of Wind and Wildlife Fellowship](#). The Fellowship provided an opportunity to research interdisciplinary, cross-sector topics that are key to addressing wind-wildlife challenges. Zara Dowling was awarded the one-year Fellowship in 2019. You can read more about Zara’s story in the [2019-2020 REWI Progress Report](#).



Mike Garland, Michael Brune, Abby Arnold, and Jim Walker at the AWWI 10<sup>th</sup> anniversary event celebrating Dr. Walker



Jim Walker, second from left, in the 1980s

Dr. Walker will be remembered in the work to secure a responsible clean energy future. His legacy is best described by those who knew him.

***“I remember standing in the dimly lit conference room of AWEA’s offices at 14<sup>th</sup> and L streets not too long after I was hired in 2007 and having Jim writing out on white flip board pages stuck to the wall the vision for what would become AWWI – a first-of-its-kind collaboration between industry and conservation organizations to address renewable energy and wildlife issues. His commitment and passion were such that it felt like the organization was being born in that room.”***

- Tom Vinson, VP, Policy and Regulatory Affairs, American Clean Power Association

***“Extremely curious, Jim had a brilliant intellect. He believed in science. He cared about forging trust and consensus and had a devouring passion for the environment. The idea and support to create the American Wind Wildlife Institute, now the Renewable Energy Wildlife Institute, was born from the combination of the power of his brain and the passion of his heart.”***

- Tristan Grimbert, President/CEO, EDF Renewables

***“It was Jim Walker’s leadership that won over the reluctant wind energy industry members of the past to support the development and publication of the bold 2008 DOE Wind Energy Vision for 20% Wind Energy by 2030. It provided a clear roadmap of what needed to be done for the U.S. wind energy industry to evolve from a boutique industry in the electricity marketplace to the global electricity provider that it has become today. Back then, it was a bold vision, while today it seems like a modest estimate of the industry’s real potential. Jim foresaw what the industry could become and stepped up to support that future outcome. Without Jim’s support, that vision might not have become today’s reality.”***

- Robert Thresher, Senior Research Fellow Emeritus, National Renewable Energy Laboratory

\* This Progress Report covers 2021-2022, and although Dr. Walker passed in 2023, REWI wishes to honor his passing in this publication and share reflections on his life and work.



# REWI's Wind Program: Years of Leadership on Compensatory Mitigation

[Eagle conservation](#) – including [compensatory mitigation](#) for eagle take – has long been a core focus of REWI's [wind program](#). Our work in this area began in earnest after the U.S. Fish and Wildlife Service (USFWS) released its updated Eagle Conservation Plan Guidance in 2011, under which power-pole retrofits were the sole recognized option for compensatory mitigation because this was the only option considered quantifiable and verifiable and for which a resource equivalency analysis (REA) existed.

Following the 2011 REWI (then AWWI) Eagle Workshop, REWI staff began a process of identifying other possible sources of compensatory mitigation and securing funding to support research on their potential. In 2015, we published a model for using [voluntary lead abatement](#), and in 2018 we published a [vehicle strike model](#); an update to the vehicle strike model is currently undergoing peer review.

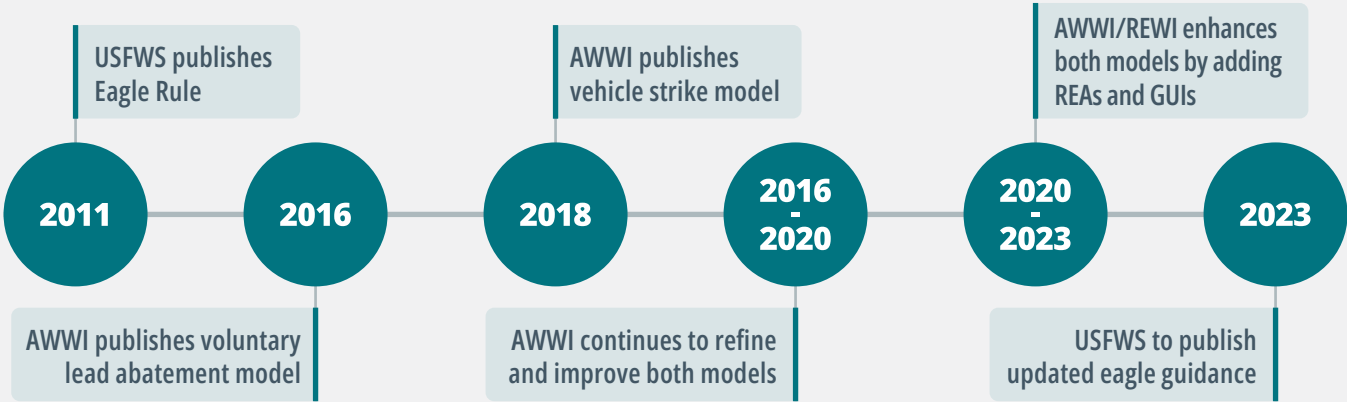
Since publishing these models, we have worked collaboratively with our Partners and Friends to [update and refine](#) them, and in 2021-2022, the models were further enhanced with the addition of REAs as well as graphic user interfaces (GUIs) that the REWI team developed to facilitate their application and use. REWI has worked with

## Planning for a Sustainable Future

REWI's National Wind Wildlife Research Plan, released in 2017 and [updated in 2020](#), details priority areas of research to achieve key outcomes for wind energy development and wildlife. REWI worked with a diverse range of experts to identify areas of research for our focus from 2020 through 2023 and areas where additional research investments are needed.

our collaborators to explore and evaluate the mitigation potential for both options, as well as providing the models to the USFWS for consideration as approved options for compensatory mitigation.

The USFWS is expected to release an updated eagle rule in summer 2023. REWI remains cautiously optimistic that the voluntary lead abatement and vehicle strike models developed by our team will be approved by the USFWS as compensatory mitigation options and included in the updated eagle rule.



## The Impact

If successful, the addition of these two compensatory mitigation options will be the culmination of more than 10 years of work by the REWI team to advance the state of the science and develop creative and innovative solutions to wind-wildlife issues. By expanding the options available to wind developers for offsetting take, these efforts will support the expansion of clean energy production across the country while also increasing opportunities for eagle conservation by reducing lead poisoning and vehicle strikes.

*"REWI's work has been critical in understanding and addressing the impacts that onshore wind may have on wildlife as this critically important industry got off the ground. Its role will be equally valuable in efforts to protect wildlife and bring conservationists and industry together as we expand wind energy to the scale needed to address the climate crisis and ensure a thriving future for people, communities, and wildlife."*

— Jim Murphy, Director of Legal Advocacy, National Wildlife Federation

## Contemplating Counterfactuals

It's understood that some renewable energy development, as with any energy source, has the potential to negatively impact some species and/or their habitats. However, analyses of these potential impacts are almost exclusively one-sided, in the sense that they only consider the effects of building or operating renewables – they do not attempt to quantify the impact on species or habitat of not developing renewable energy projects and letting the climate crisis progress unchecked.

Published in the journal *Frontiers in Conservation Science* in May 2022, the article [Counterfactuals to Assess Effects to Species and Systems From Renewable Energy Development](#) argues that this state of affairs should be corrected so as to provide a more accurate assessment of the net costs and benefits of renewables. REWI played a leading role in writing the paper, along with authors from the U.S. Geological Survey, the National Renewable Energy Laboratory, and Texas Christian University, and also published a [blog post](#) about it.

## 2022 Wind Wildlife Research Meeting

REWI hosted the 14<sup>th</sup> Wind Wildlife Research Meeting (WWRM) in November 2022 in Kansas City, Missouri. The theme of the 14<sup>th</sup> WWRM, which was a hybrid conference with virtual on-demand presentations, poster sessions, and live sessions held in person, was *Winds of Change: Charting a Path Forward for Wind Energy that Facilitates Conservation*. The conference proceedings will be available to the public in summer 2023.

The biennial WWRM provides an internationally recognized forum for researchers and stakeholders to share and engage on the latest science focused on better understanding the risk of wind energy to wildlife and developing solutions to avoid, minimize, and offset impacts. The meeting also brings together thought leaders to discuss priority topics and themes in the wind-wildlife arena.

Academics, researchers, conservation scientists, consultants, federal and state officials, NGO representatives, and industry professionals come together every other year for this unique opportunity.

## Data Informs Understanding of Risk

REWI staff have been focused on applying data in the American Wind Wildlife Information Center (AWWIC) to research questions such as seasonal timing of bird and bat collisions, cumulative fatality estimates, and risk factors of collision risk. These efforts have resulted in peer-reviewed manuscripts and enhance the return on investment in sharing post-construction mortality monitoring (PCM) data with AWWIC. Additionally, AWWIC's Bird and Bat Technical reports summarizing collisions observed during PCM studies have proven to be a valuable resource. The data have been consulted by the USFWS for bat species status assessments and utilized by researchers funded by REWRF.



Bald eagle



# REWI's Solar Program: Responding to a Rapidly Evolving Clean Energy Sector

The expansion of large-scale photovoltaic (PV) solar in the U.S. has created an urgent need to understand how this development will impact wildlife and habitat – both positively and negatively. These issues are complex and occur at various spatial scales and biological levels, including populations, communities, and ecosystems. To address these diverse challenges, REWI is evaluating solar-wildlife interactions by viewing PV solar facilities as ecosystems within a larger landscape.

REWI looks at these questions holistically by assessing undesirable solar-wildlife interactions such as habitat loss and fragmentation and fatalities, as well as positive interactions such as improved ecosystem services and enhanced biodiversity.

## REWI's First Solar-Wildlife White Paper

As with research into wind-wildlife interactions launched more than thirty years ago, REWI is filling a void – very little is known about how PV solar affects wildlife and ecosystems, whether at the facility or landscape level. Further, while much of the research on wind-wildlife interactions focuses on the risk of impacts to specific species, the potential for PV solar's impacts – positive and negative – span a much wider range of trophic levels.<sup>1</sup>

To establish a solid foundation for years of research to come, our first task was to conduct a question-driven literature review that sought to ascertain the level of understanding of key factors relating to interactions among PV solar facilities and natural resources, including wildlife, their habitats, and ecosystem function and services. The resulting expert-reviewed white paper, *Solar Energy Interactions with Wildlife and Their Habitats: A Summary of Research Results and Priority Questions*, was underway in 2022 and publicly released in May 2023.

The paper presents the above-mentioned interactions in a framework that considers PV solar facilities as ecosystems with biotic and abiotic interactions<sup>2</sup> within the footprint of the facility as well as in the surrounding landscape. It organizes what is known and what remains unknown or uncertain regarding the ecological and environmental effects of PV solar on wildlife within the following categories:

- Habitats and landscapes
- Fatality impacts
- Mitigation of negative impacts, enhancement of benefits, and on-site vegetation management

We look forward to advancing knowledge and the state of the science on these important topics.

It's estimated that U.S. solar installations will increase by as much as 500% in the next decade.

Solar developers and others working to advance renewable energy recognize that along with successful commercialization, sustainable development requires investments to understand and minimize risk from the interactions among solar energy facilities, wildlife, and natural resources.

## REWI's National Solar Wildlife Research Plan (2023-2025)

A core focus of our work in 2022 was the development of REWI's *National Solar Wildlife Research Plan*. The Plan seeks to identify and prioritize key areas where additional, strategically targeted research investments are needed to advance our understanding of:

- Trends and impacts related to the conversion of land for PV solar facilities, and the cumulative impacts to wildlife, their habitat, and movement
- How wildlife interacts with PV solar facilities, including demographic, metapopulation, and wildlife community considerations within PV solar facilities and within the landscape, and identifying changes to these interactions and mitigation opportunities at various scales
- How ecosystem functions are affected or enhanced within PV solar facilities due to various management decisions across regions

In addition, the Plan will support the development and evaluation of strategies to avoid, minimize, and compensate for adverse impacts when necessary to conserve healthy wildlife populations and ecosystems.

## Creating a Vital Resource: The SolSource Database

Data are essential to research and informed decision-making. Since 2018, the *American Wind Wildlife Information Center* (AWWIC) has captured key datasets in a format that can be analyzed and compared, and offers the most complete source of data on wildlife mortality at wind energy facilities in the U.S.

In 2022, REWI *successfully applied* for a grant through the U.S. Department of Energy Deploying Solar with Wildlife and Ecosystem Services Benefits (SolWEB) program to develop a solar database similar to AWWIC, but with one key difference: whereas AWWIC catalogs fatality data, the SolSource Database

will examine a range of data types across entire ecosystems and wildlife communities.

The SolSource Database will serve as a community resource that supports the project siting activities of developers and public agencies. It will also promote scientific research addressing risks, challenges, and opportunities related to PV solar, wildlife, and other natural resources. Given that REWI's Partners and Friends will be end-users of the SolSource Database, their participation is critical to its success, and their feedback regarding their needs and abilities to contribute information will be incorporated into the development of the Database.

## Solar Power and Wildlife/Natural Resources Symposium

In 2021, REWI convened the *inaugural* Solar Power and Wildlife/Natural Resources Symposium, which drew over 600 stakeholders from academia, industry, the conservation sector, and public agencies to review the state of the science and identify research gaps and priority questions. The online Symposium featured more than 80 on-demand presentations and panel discussions on current research pertaining to solar power and related wildlife and natural resources, including emerging topics and questions related to:

- Evaluating and Mitigating Impacts on Wildlife and Their Habitats
- Land Management and Wildlife Compatibility
- Water Resource Management
- Solar Lifecycle and Natural Resource Considerations

The second *Solar Power and Wildlife/Natural Resources Symposium* will occur November 14-16, 2023, in Norfolk, VA – mark your calendars!



Heron on solar panel

<sup>1</sup> Trophic level: The position of an organism within a food chain in an ecosystem. The positions could include decomposers, primary producers, primary consumers, secondary consumers, tertiary consumers, etc.  
<sup>2</sup> Biotic: Living parts of an ecosystem (e.g., plants, animals, fungi, protists, bacteria, etc.). Abiotic: Nonliving parts of an ecosystem (e.g., soil, water, climate, weather, and inorganic nutrients).



# The Renewable Energy Wildlife Research Fund Expands to Solar Energy

Launched in 2018 as the Wind Wildlife Research Fund, in 2022 the rebranded [Renewable Energy Wildlife Research Fund](#) expanded its approach and vision to incorporate research on the potential impacts and benefits of solar energy to wildlife.

The Fund, an industry-led initiative managed by REWI, supports independent, peer-reviewed research to study and implement cutting-edge projects and technologies that deliver high-impact results on the ground at utility-scale solar and on-shore wind facilities.

As of December 2022, support had been initiated for 20 priority research projects that expand our understanding of the challenges and potential solutions for interactions between wildlife and renewable energy. The Fund also launched its first solar-wildlife projects in 2022, which are exploring:

- A study design for a prospective project to better understand the **effects of utility-scale PV solar energy development on bird communities in the midwestern U.S.**: The research field for solar energy and wildlife is still developing; this project will help establish baseline information and provide a foundation for future research.

The fundraising for the full study is occurring in summer 2023 and full study execution is pending.

- **Research on the impact of PV solar installation and agrivoltaics on ecosystem function and the soil health of agricultural land:** It is generally accepted that the introduction of a solar project will benefit agricultural land by allowing it to rest and recover; this research seeks to substantiate this assumption and quantify the gains.
- **Use of a solar energy facility in southeast Wyoming by greater sage grouse:** Research on how wind energy facilities may affect sage grouse is ongoing; this project will examine how the species may interact with solar energy facilities.

With the involvement of more than 30 renewable energy companies and two trade organizations, the Fund benefits from broad industry support. In addition to providing financial resources, this makes it possible to conduct research at renewable energy projects across a diverse representation of regions and habitats, thereby enhancing the overall quality of the science.

In 2021, the Fund was steered by an Executive Committee led by Kyle Boudreaux, Chair (NextEra Energy); Kristen Goland, Vice-Chair (Avangrid Renewables); and Ray Kelly, Secretary (Clearway Energy Group). In 2022, the Fund Executive Committee consisted of Kristen Goland, Chair; Ray Kelly, Vice-Chair; and Devon Muto, Secretary (EDF Renewables). The Fund looks forward to adding more solar research projects to its portfolio of work.

## Delivering Actionable Insights

*“Clearway has been a strong supporter of the Renewable Energy Wildlife Research Fund since its inception in 2018, and we greatly value the knowledge and insights that the Fund delivers. Our participation and investments in the Fund go hand in hand with the environmental stewardship pillar of our ESG program.”*

— Ray Kelly, Senior Director, Permitting & Environmental, Clearway Energy Group and Chair of the Fund’s 2023 Executive Committee

*“The Fund enables participating companies to leverage our collective resources and achieve the scale necessary to address priority research questions. Its collaborative approach ensures the resulting research is viewed as credible by a diverse range of stakeholders, and it provides actionable information that developers can immediately deploy to further protect wildlife and habitat.”*

— Ian Evans, Environmental Manager, Pattern Energy and Chair of the Fund’s Solar Working Group

## 2021-2022 Fund Research Highlights

Over the course of 2021-2022, several Fund projects resulted in published results that advanced the state of the science on interactions between wildlife and renewable energy facilities:

**Using Local and Regional Weather Data to Improve Smart Curtailment Strategies for Bats:** This [proof-of-concept study](#) explored the development of decision support tools that could inform wind turbine curtailment using bat fatality models developed with machine learning technology and regional weather data. Making turbine curtailments more targeted and proactive can reduce bat fatalities while also maximizing clean energy production.

**Comparing the Effectiveness of Curtailment Strategies in Reducing Bat Fatalities:** Published in the peer-reviewed journal [PLOS ONE](#), this [Fund-supported study](#) explored the question utilizing the AWWIC database: what level of curtailment is optimal for minimizing bat fatalities while maximizing carbon-free electricity generation?

**Using Machine Learning to Model Eagle Behavior and Improve Turbine Curtailment Strategies:** This area of Fund-supported research has explored ways to develop turbine-specific algorithms that incorporate eagle flight behavior recorded by camera-based detection systems such as IdentiFlight into curtailment decisions to improve curtailment algorithms for these systems and ultimately reduce eagle collision risk. These efforts yielded published papers in [2021](#) and [2022](#), and a third publication is undergoing peer review.

**Improving Adjustments for Raptor Carcass Persistence:** The presence of raptor carcasses is used to determine a wind facility’s take, and this information in turn can be used to estimate take at other facilities. In many studies, the persistence of carcasses from other birds such as gamebirds has been used to estimate persistence of raptors, which may yield inaccurate results. This [Fund-supported study](#) sought to produce more accurate estimates of fatalities of eagles and other raptors. The study demonstrated that raptor carcasses persist longer on the landscape than gamebirds, which are used as surrogates for eagle monitoring standards. This revelation could have major cost saving impacts for the renewable energy industry and result in more accurate estimates of raptor collision mortality.



A bee flies around the Aurora Solar Plant, Minnesota, USA - c/o Enel Green Power







Hoary Bat - c/o Adam Searcy

# Regional Impact: Bringing Diverse Stakeholders Together for Renewables and Wildlife

As deployment of renewable energy accelerates, REWI is invested in expanding its outreach and communications capabilities, which includes convening regional workshops to fill knowledge gaps and inform policies and decision-making with scientific research. By bringing committed stakeholders together to learn and collaborate on challenges, REWI helps renewable energy developers site locally for conservation success while advancing climate solutions globally, setting the stage for the expansion of renewables and the achievement of net-zero carbon goals.

Partnering with a wide range of interested stakeholders, REWI hosted a Montana Wind-Wildlife Workshop in 2021, and last year hosted a regional workshop for Illinois, Indiana, and Missouri. Additional state and regional workshops are in the planning stages.

## 2022 Illinois, Indiana, and Missouri Wind-Wildlife Virtual Workshop

The Illinois, Indiana, and Missouri Wind-Wildlife Virtual Workshop – co-hosted by REWI and the National Renewable Energy Laboratory (NREL) on October 4-6, 2022 – brought together stakeholders from state, local, and federal agencies, the wind energy industry, and the conservation and science community to learn about wind energy and wind-wildlife issues specific to the region.

The workshop was made possible thanks to generous support from NREL, the U.S. Department of Energy's Wind Energy Technology Office, and input from the workshop Planning Committee.

Participants gathered to accomplish the following goals:

- Understand current and anticipated future wind energy development in Illinois, Indiana, and Missouri
- Learn about
  - The state of the science on wind and wildlife, focusing on bats and raptors
  - Federal, state, and local laws, guidance, and regulations
  - Permitting and siting strategies, risks, and project economics
- Explore opportunities for problem-solving and improving collaboration

New relationships and knowledge gained at the workshop continue to benefit participants. The Missouri Department of Conservation shared this observation of the workshop's positive effects:

*“As a result of its strong interest in impacts of wind farms on wildlife, in February 2023 the Missouri Department of Conservation began collaborating with two other interest groups to conduct an eagle study at a wind farm in northwest Missouri. There are genuine interests and responsibilities held by each sector around energy development. More communication is better among these various stakeholders.”*

– Jennifer K. Campbell, Policy Coordinator/  
Environmental Compliance Supervisor, Missouri  
Department of Conservation

Deploying wind and solar energy at the scale required to address the climate crisis depends on opportunities for dialogue on contentious issues. Worldwide, REWI is the only organization with the experience and trust-based relationships with key decision-makers in the public and private sectors who are committed to building out renewable energy while conserving wildlife. By gathering these experts and leaders, REWI makes it possible to achieve more together than we can independently.



Jericho Rise Wind Farm, New York, USA - c/o EDPR NA



# Supporters and Collaborators 2021-2022

A special thank you to REWI's funders, science advisors, and research collaborators

## REWI Industry Partners

Apex Clean Energy  
Avangrid Renewables  
Berkshire Hathaway Energy  
Clearway Energy Group  
Duke Energy Sustainable Solutions  
EDF Renewables  
EDP Renewables  
Enel Green Power  
NextEra Energy  
Ørsted  
Pattern Energy Group  
RWE Renewables Americas  
Southern Power  
Xcel Energy

## REWI Industry Friends

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The Conservation Fund  
The Nature Conservancy  
The Wilderness Society  
Theodore Roosevelt Conservation Partnership  
Union of Concerned Scientists

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## Foundations, Corporate, and Others

DTBird  
Electric Power Research Institute  
H.T. Harvey & Associates  
National Fish and Wildlife Foundation  
NorthWestern Energy  
The Pittsburgh Foundation, The H and J Fund  
Turner Foundation

## Government

Missouri Department of Conservation  
Montana Fish, Wildlife & Parks  
National Renewable Energy Laboratory  
U.S. Department of Energy

## Champions/Sponsors: Solar Power and Wildlife/Natural Resources Symposium (2021)

AES Clean Energy  
American Clean Power Association (ACP)  
American Farmland Trust  
Apex Clean Energy  
Avangrid Renewables  
Clearway Energy Group  
Copperhead Environmental Consulting, Inc.  
Cypress Creek Renewables  
Defenders of Wildlife  
Duke Energy Sustainable Solutions  
EDF Renewables  
Enel Green Power  
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Recurrent Energy  
RES America Developments Inc.  
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Savion, LLC  
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Stantec  
Terry Root  
Union of Concerned Scientists  
Western Ecosystems Technology  
Xcel Energy

## Sponsors: 14<sup>th</sup> Wind Wildlife Research Meeting (2022)

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National Renewable Energy Laboratory  
Nossaman LLP  
Olsson Associates, Inc.  
Pattern Energy Group  
Tetra Tech  
Vesper Bat Detection Services  
Western Ecosystems Technology  
Wildlife Acoustics

## Science Advisors

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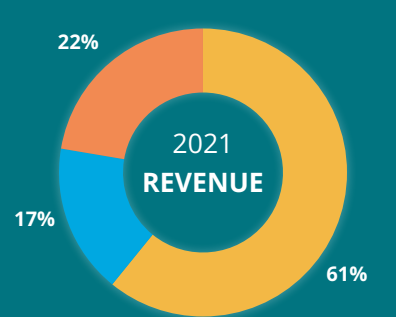
## Science/Technical Collaborators

Tara Conkling, U.S. Geological Survey  
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Robb Diehl, U.S. Geological Survey  
Jay Diffendorfer, U.S. Geological Survey  
Carl Donovan, DMP Stats  
Adam Duerr, Conservation Science Global  
Joelle Gehring, U.S. Fish and Wildlife Service  
James Gerber, University of Minnesota  
Cris Hein, National Renewable Energy Laboratory  
Pat Fields, Consensus Building Institute  
Christian Hagen, Oregon State University  
Catherine Jardine, Birds Canada

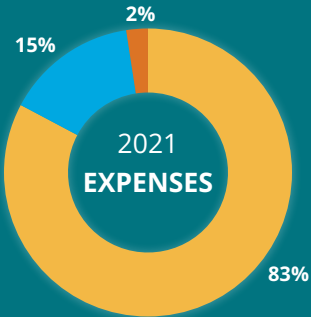
Todd Katzner, U.S. Geological Survey  
John Lloyd, Western EcoSystems Technology, Inc.  
Eric Lonsdorf, Emory University  
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Leslie New, Ursinus College  
Christian Newman, Electric Power Research Institute  
Schuyler Pearman-Gillman, ApexRMS  
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Carol Sanders-Reed, Independent Contractor  
Vince Slabe, Conservation Science Global  
Jeff Smith, H.T. Harvey & Associates  
Kelly Squires, Tau Ecology Research Collaborative  
Paul van dam Bates, University of St. Andrews  
Hannah vander Zanden, University of Florida  
Leroy Walston, Argonne National Laboratory  
Michael Whitby, Bat Conservation International

# Financials

2021

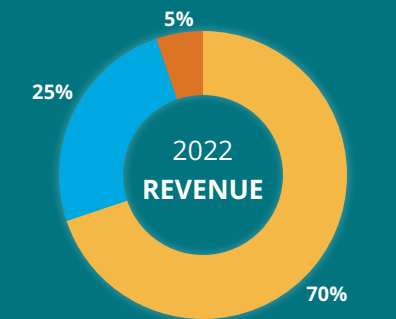


Contributions	\$2,097,076
Contracts & Grants	\$579,468
Other Income	\$769,828
Total	\$3,446,372

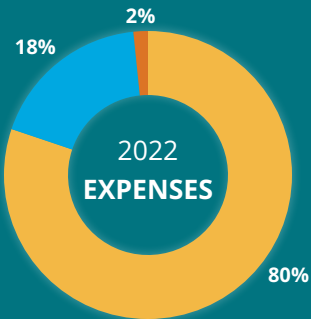


Program Services	\$3,014,860
General & Administration	\$539,735
Fundraising	\$88,271
Total	\$3,642,866

2022



Contributions	\$2,820,058
Contracts & Grants	\$1,005,570
Other Income	\$212,341
Total	\$4,037,970



Program Services	\$3,226,481
General & Administration	\$732,658
Fundraising	\$65,266
Total	\$4,024,404



