



2019-2020 Progress Report

The Power of Collaboration
to Solve Wind-Wildlife
Challenges





Bald Eagle. Eagle Research at NWTCC | NREL, Flickr

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Letter from AWWI Executive Director Abby Arnold

More than a decade ago, AWWI's founders envisioned a collaborative research institute that would produce credible assessments of the risks renewable energy presents to wildlife and provide solutions to address them. Today, we take pride in the work AWWI, along with our partners, has done to fulfill this vision.

This is a crucial time for the future of our planet overall, and for wildlife in particular. Meeting the Biden-Harris goals of a carbon pollution-free power sector by 2035 while concurrently conserving 30 percent of U.S. lands and waters by 2030 will not be easy. With your help, we've made significant progress on wind-wildlife issues over the past decade, yet we recognize that the challenges we face have not diminished – in fact, they have increased. The call to expand renewables is more urgent than ever, and it is up to us to take on the challenge.



U.S. policy and business leaders recognize the critical role of renewables in transitioning to a low-carbon economy, but doing so at the speed and scale needed requires cooperation around a shared mission, development and acceptance of science among diverse stakeholders, creative approaches to public policy, and trust among key partners. AWWI offers a forum to provide robust science and creative solutions to the decision makers and practitioners who are working to meet the challenge for renewable energy and wildlife head on.

Our accomplishments over the past two years, highlighted in this report, are only possible due to tremendous support from our champions. Thank you to everyone who is part of this effort. If you are not yet a part of AWWI, please join us. Together, we can achieve ambitious renewable energy and wildlife conservation goals and help secure a sustainable future.

Sincerely,

A handwritten signature in blue ink that reads "Abby Arnold".

Abby Arnold, Executive Director



Texas wind Farms | Daxis, Flickr

SPOTLIGHT

Partnering to Solve Challenges

When AWWI's Partners and Friends come together to work on wind-wildlife issues, they create new opportunities.

AWWI would not exist without the ongoing dedication of our Partners and Friends. We thank you for your support and we are inspired by what we've collectively achieved. We look forward to strengthening and expanding the relationships we've established as we work with all of you to continue to be the trusted source of independent science-based information to solve challenges that are both familiar and new.



"Wind energy will play a critical role in delivering a net-zero emissions economy by 2050. Concurrently, the Biden-Harris administration has committed to achieve the conservation of 30% of U.S. lands and waters by 2030. As a trusted broker of credible science and scalable, cost-effective solutions that are developed through stakeholder collaboration, AWWI has a central role to play in bringing leaders in the industry and conservation community together to help achieve this vision of the future."

— **Ken Young**, Chief Operating Officer, Apex Clean Energy



"We are faced with dual, interconnected crises — biodiversity and climate change — and renewable energy has the potential to be part of the solution for both. The science is clear: the future of our planet depends on finding ways to produce carbon-free electricity in ways that conserve and protect wildlife. AWWI has a critical role to play in making this possible and amplifying this message."

— **Bill Corcoran**, Director, Beyond Coal Campaign, Sierra Club



"Climate change is the biggest threat facing birds in North America, and hundreds of species are at risk. Responsibly developed renewable energy is part of the solution, and AWWI plays a key role in helping us understand and minimize local impacts so that birds can benefit from a transition to clean energy at the macro level."

— **Jill Deppe**, PhD, Senior Director of the Migratory Bird Initiative, National Audubon Society



"AWWI's efforts in the area of technology innovation and evaluation have been particularly valuable. AWWI's collaborative approach has produced a level of trust and a sense of shared purpose among diverse stakeholders that has been producing tangible results, with real-world benefits to bats and raptors in wind energy applications."

— **Mike Azeka**, Senior Director, Environmental Strategy, EDF Renewables



"The American Wind Wildlife Information Center (AWWIC) has continued to grow, and today it contains data from more than 355 public and private studies and 33% of the U.S. installed wind fleet. AWWIC will continue to be the cornerstone of critical research about which species are at risk, where, and why, information that is vital to help us effectively target conservation approaches and solutions."

— **Danna Small**, Senior Environmental Manager, Pattern Energy



"State wildlife agencies are tasked with achieving a delicate balance between conserving our wildlife and our state economies' economic needs. AWWI's focus on collaborative dialogue that's aimed at connecting decision makers and helping us build the foundations for working together is extremely helpful in developing pathways for communication and collaboration."

— **Brad Loveless**, Secretary, Kansas Department of Kansas Wildlife, Parks and Tourism; Chairman of AFWA's Energy and Wildlife Policy Committee



"The Wind Wildlife Research Fund really took shape over the 2019-2020 timeframe, and with the support of industry leaders, it has continued to refine its unique approach to driving investment in vital research. The 2021 projects reflect the Fund's ongoing commitment to find meaningful solutions to critical wind-wildlife issues."

— **Jennifer Dean**, VP of Environmental Studies and Permitting, Enel Green Power North America, Inc.



"AWWI's CEO and Executive Leadership Forums play a critical role in convening decision-makers from organizations that span a wide breadth of perspectives on wind-wildlife issues. AWWI's focus on consensus-building around scientific evidence has created an atmosphere of trust that enables individuals with differing concerns and priorities to coalesce around shared values and find common ground."

— **Joy Page**, Director, Renewable Energy & Wildlife, Defenders of Wildlife and 2021 AWWI Board Vice Chair



"AWWI plays a key role in ensuring that research priorities and results are shared across the wind-wildlife community, and the Wind Wildlife Research Meeting provides a critical forum for this dialogue. Despite unusual circumstances due to the pandemic, WWRM 2020 brought together a diverse group of scientists and practitioners for thoughtful conversations about the past, present, and future of our shared endeavor."

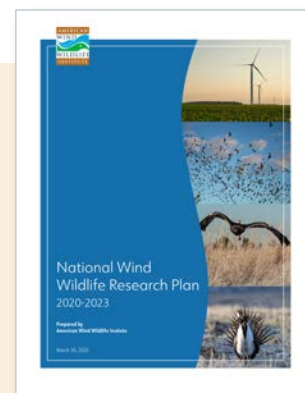
— **Jennifer McIvor**, VP Environmental Policy & Chief Environmental Counsel, Berkshire Hathaway Energy Company and 2019 AWWI Board Chair

Science and Solutions that are Making a Difference

AWWI's Research and Publications

Identifying Priority Research: AWWI's Updated National Wind Wildlife Research Plan

Identifying and advancing wind-wildlife research priorities is critical to sustainable wind energy buildout. In 2017, AWWI consulted with all relevant stakeholder groups and published a National Wind Wildlife Research Plan to identify priority areas for the nation to guide strategically targeted research efforts. In 2020, AWWI [updated the Plan](#) to outline a suite of research topics to guide AWWI's work, reduce uncertainty, and advance solutions to wind-wildlife challenges.



Decades of Wind-Wildlife Research Synthesized, Published in Leading Journal for Ecological Knowledge

In the fall of 2019, the article "[Impacts to Wildlife of Wind Energy Siting and Operation in the U.S.](#)" was published in *Issues in Ecology*, a premier journal published by the Ecological Society of America, a leading source of ecological knowledge. Authored by AWWI's Director of Research and 12 other experts, the study provides a peer-reviewed synthesis of current, accurate, and properly contextualized information about the benefits of wind energy, adverse wind-wildlife impacts, efforts to find solutions, and recommended areas of focus for future research. The publication distills the results of 25 years of research to help stakeholders make informed decisions. AWWI and the Ecological Society of America co-hosted a public [webinar](#) discussing key takeaways from the publication.



Learning from Big Data: AWWI Releases Second Editions of Bird and Bat Technical Reports

In November 2020, AWWI released the second editions of the American Wind Wildlife Information Center (AWWIC) Technical Reports on bird and bat fatalities related to U.S. wind energy facilities.

AWWIC is the most comprehensive database of post-construction fatality monitoring data from U.S. wind projects. Importantly, it draws on both publicly available and contributed data, which has increased data availability in previously underrepresented regions.

The [bird](#) and [bat](#) Technical Reports summarize the most up-to-date fatality rate and fatality incident data from wind energy facilities in the U.S. The robust dataset provided by AWWIC enables us to generate hypotheses about the impacts of wind energy on bird and bat species across the U.S. and conduct research that is helping us better understand what species are at risk, and where and why they are at risk.



Prairie Grouse and Wind Energy: Collaborative Approach to Building a Foundation of Knowledge

In 2019, AWWI worked in close consultation with cross-sector experts to develop “Prairie Grouse and Wind Energy: The State of the Science,” a white paper that synthesizes what we know about interactions between prairie grouse and wind energy and that identifies priority areas for future research.

To further explore and discuss the white paper’s findings, in 2020 AWWI convened a virtual forum on prairie grouse and wind energy attended by 60 experts from the wind industry, federal and state agencies, national research laboratories, and conservation/science organizations.

The forum yielded progress on several fronts, including the identification of research needs important to different stakeholder groups. The results will inform U.S. Department of Energy research priorities and support the development of AWWI’s habitat-sensitive species program.



Advancing Novel Solutions: AWWI’s Technology Innovation Program

AWWI’s [Technology Innovation program](#) serves as a catalyst for the development of advanced technologies and strategies to minimize impacts to bird and bat species at highest risk of collision at operational wind energy facilities while optimizing energy production. It also creates a forum for experts to explore and discuss technology-driven strategies critical to expanding and maximizing clean wind energy production while improving conservation outcomes.

In 2019, the program published “[Guidance for Potential Hosts of Wind-Wildlife Technologies and Strategies](#),” which examines considerations for installing and operating wildlife risk-minimization technologies and strategies at wind energy facilities. AWWI collaborated with wind industry and wildlife ecology experts to develop the guidance. This document can help inform decision makers including federal and state agencies, funders of studies, technology vendors and innovators, researchers, and companies considering hosting a study or employing a technology or strategy about evaluations or employment of risk minimization technologies or strategies.



In 2020, the program published an [AWWI Technical Report](#) that explored whether bat activity and mortality at operational wind energy facilities correlate with regional weather data, and whether these data could optimize wind turbine curtailment strategies that reduce bat collision fatalities. The study found that off-site weather variables were most influential in predicting activity of migratory tree bat species at the wind facility. Utilizing a combination of on-site variables such as wind speed and temperature and off-site measurement of broader weather fronts may improve predictions of periods of heightened bat collision risk, leading to smarter approaches to curtailment for key bat species.



The Wind Wildlife Research Fund Takes Flight

The Fund became fully established in 2019-2020

Launched in 2018, the Wind Wildlife Research Fund has secured robust investment by wind companies that participate in AWWI toward sustainable growth supported by science-based solutions to wind-wildlife challenges. This industry-led initiative, which is managed by AWWI, supports a suite of [priority research projects](#).



"With over 120 GW of wind power now installed in the U.S. and significant additional buildout needed to meet the growing demand for clean energy, we are committed to finding effective ways to balance growth while protecting wildlife and natural habitats," said John Di Donato, Vice President of Origination and Development, NextEra Energy Resources. "We believe our investment in the Fund yields significant value to the wind industry and greatly benefits conservation efforts."

Fund investors play an active role in shaping research priorities, and AWWI manages independently executed scientific studies. The Fund supports the development of innovative solutions that reduce adverse wildlife and habitat impacts of wind energy while also helping to lower siting and operating costs.

"As we approach the third anniversary of the Fund's creation, it's an opportune time to reflect on its success," shared Ray Kelly, Senior Director, Environmental, Clearway Energy Group. "Since its inception, more than 30 companies representing almost 70% of the installed wind capacity in the U.S. have invested over \$2.75 million into research that is directly focused on priority challenges for our industry."



"The Fund's research is helping to advance initiatives central to our company's approach to environmental stewardship and expediting our understanding of how priority species interact with wind energy facilities" said Kevin Lynch, Managing Director, External Affairs, Avangrid Renewables. "The scientific knowledge we gain from this research will give us confidence that we're enhancing wildlife protection as we develop and operate clean energy generation that is efficient and lowers costs for consumers."

The Fund is possible thanks to companies' investment in advancing the body of scientific results on critical issues, and to their commitment to the application of these new insights to support the responsible expansion of wind energy in the U.S. and beyond.

Delivering Results

Support from the Fund has yielded meaningful results that have advanced scientific knowledge about how priority species interact with wind energy facilities.

The Fund's [first published results](#) looked at the effects of wind energy infrastructure on lesser prairie-chickens at a previously disturbed site in Kansas and found no negative effects.

[Another study](#) was the first assessment aimed at identifying associations between fatality rates of migratory tree bats at wind energy facilities and landscape-level factors.

Most recently, [an article](#) published in the peer-reviewed journal *Acta Chiropterologica* found that bat activity rates measured prior to wind facility development did not predict bat fatality rates at operational wind energy facilities.



New Research to Protect Bats and Reduce Risk

The Fund's third request for proposals solicited proposals for bat research projects to start in 2021. The Fund sought research projects designed to increase understanding of the mechanisms driving risk to bats from operating wind facilities to inform developing and advancing targeted and effective solutions for reducing risk. Following an independent peer review of over two dozen proposals, [three new research projects](#) were announced in spring of 2021. This research will provide valuable scientific knowledge that will help protect priority bat species and enable wind energy to continue to expand while reducing permitting and operational costs.



Event Highlights

Bringing stakeholders together to build relationships and foster collaboration

The 13th Biennial Wind Wildlife Research Meeting

The biennial NWCC [Wind Wildlife Research Meeting](#) (WWRM), presented by AWWI, 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.

WWRM 2020 showcased a robust scientific program in an all-virtual format, garnering more than 400 participants from the U.S. and abroad. The event featured more than 75 on-demand presentations from U.S. and international experts on research addressing wildlife and onshore and offshore wind energy siting, development, and operations, as well as panel discussions on a wide range of topics.

The panel “Wind Energy and Wildlife: Grand Challenges and Opportunities” featured a facilitated discussion exploring the implications of technological innovation in wind energy and wildlife risk assessment and mitigation. This included specific examples of how an interdisciplinary, systemic approach involving engineering and biological sciences can be translated into research and solutions for wind energy development and operation.

The panel “Novel Approaches to Risk Assessment and Mitigation of Habitat-Based Impacts of Wind Energy” addressed the challenge of reconciling the twin goals of conserving wildlife habitat and building out significant amounts of new wind energy. The panel created an opportunity for a diverse group of stakeholders to engage in dialogue about the state of wind-wildlife science and have meaningful conversations about ways we can advance our knowledge and practices. As with past meetings, the panel offered the community a forum to tackle topics that ranged from new paradigms for risk assessment and mitigation to detailed descriptions of solutions that we can implement today.

Pre-Meeting Workshop on the U.S. Fish & Wildlife Service Land-Based Wind Energy Guidelines

WWRM 2020 kicked off with a pre-meeting workshop on the U.S. Fish & Wildlife Service (USFWS) Land-Based Wind Energy Guidelines. The workshop provided an overview of the purpose and history of the Guidelines, including the circumstances that led to their creation, the intent of their implementation, their tiered approach to risk assessment, and the resulting conservation benefits.

Co-hosts from the USFWS and AWEA (now American Clean Power Association, ACP) guided a diverse audience of over 200 participants through the history of the Guidelines, the nuts-and-bolts of how they work, and case studies of their application with presenters from the wind industry, conservation/science organizations, state wildlife management agencies, and USFWS ecological services field offices. The conversation set the stage for continued outreach, education, and dialogue related to the Guidelines and wind project development.

Teddy Llovet, Flickr

Defenders and Pattern CEOs Convene 6th AWWI CEO and Executive Leadership Forum in Early 2020

Chaired by AWWI Partner CEOs, AWWI's CEO and Executive Leadership Forums provide leaders from the renewables industry and the conservation/science community an opportunity to enhance relationships, share perspectives on renewable energy development and conservation issues, and foster dialogue and avenues for working together on shared challenges.

Anticipating possible changes ahead in the outlook for renewable energy and wildlife, the January 2020 Forum in Washington, D.C., hosted by Jamie Rappaport Clark, President and CEO, Defenders of Wildlife, and Michael Garland, CEO, Pattern Energy Group, provided an opportunity for attendees to discuss urgent matters related to conservation and energy.

The Forum included discussions of worldwide biodiversity issues, with a particular focus on the devastating impacts of climate change and the scale of renewable energy buildout needed. With these challenges framed, participants discussed results and investment in solutions for renewable energy and wildlife, with the goal of identifying priority opportunities to address key challenges to sustainably meet the pressing renewable energy development goals identified in the 2018 Intergovernmental Panel on Climate Change report.

“Addressing the dual, interconnected crises of climate change and rapid biodiversity loss means expanding renewable energy responsibly, with safeguards and mitigation to protect vulnerable wildlife species. Fortunately, the partnership between the wind energy and conservation communities has never been stronger, and our goals have never been more aligned.”

— **Jamie Rappaport Clark**, President and CEO, Defenders of Wildlife.



“AWWI Partners and Friends share a vision of substantially reducing greenhouse gas emissions from electricity production. This means a high percentage of our power will have to come from zero-carbon renewable energy sources in the next few decades, and installed wind and solar capacity will have to increase significantly. The trust, mutual understanding and open communication we’ve developed in these forums will be critical in achieving this shared vision.”

— **Mike Garland**, CEO, Pattern Energy Group



Yellow-headed black birds at Cokeville Meadows | USFWS, Flickr

New Mexico Wind Energy and Wildlife Listening Session

Following a 2018 New Mexico state workshop, in May 2019, AWWI convened a second session to continue an exchange among state level practitioners across sectors on wind energy development and wildlife science specific to New Mexico.



Golden Eagle | Michael Grace, Flickr

The session featured speakers from state offices, conservation/science organizations, and the wind industry who discussed the state's renewable energy targets and wind and solar resources, the urgency of addressing climate change, and the importance of transitioning to cleaner energy sources to protect climate-threatened species. Participants engaged in a structured conversation around priorities, opportunities, concerns, and ideas for future engagement among practitioners in the state.

This session was part of AWWI's developing program to better support states with accurate, up-to-date information on the latest science and solutions, and to provide opportunities for stakeholders to build relationships and work on collaborative solutions to state-specific issues. Thank you to the Turner Foundation for supporting this effort.

The James A. Walker Future of Wind and Wildlife Fellowship

Fostering the next generation of leaders

The 2020 James A. Walker Future of Wind and Wildlife Fellowship celebrated and honored Dr. James A. Walker, a pioneer and visionary in wind and renewable energy. Over 10 years ago, Dr. Walker recognized that increased attention was needed to address challenges involving wind's impacts on wildlife in order for wind power to realize its full potential, and his initiative and persistence led to the creation of AWWI.

The Fellowship, initiated in 2018 as part of AWWI's 10th anniversary, provided an opportunity to research interdisciplinary, cross-sector topics that are key to the success of solving wind-wildlife challenges, and to expand creative thinking, thereby contributing to the next generation of wind-wildlife leadership.

Zara Dowling was selected as the Fellow in 2019. After completing her PhD on the potential impacts of offshore wind development on rare bat species as well as migratory tree bats, she began working at University of Massachusetts Amherst's [Clean Energy Extension](#). When she learned about the Fellowship in 2019, she was immediately intrigued.



"I've always been very interested in thinking about things holistically and using the principles of applied ecology to ensure that human activities are compatible with conservation," Zara reflected. "Renewable energy buildout is a particularly urgent issue — we need development on a massive scale to combat climate change — but we need to devise ways to ensure it doesn't inadvertently endanger individual species and their habitats in the process."

Through the Fellowship, Zara was able to interact with a diverse range of wind industry stakeholders, observe many challenges related to wind-wildlife issues, and begin developing new approaches to meet stakeholder needs for assessing the broader context of risk to wildlife and habitat.

AWWI plans to explore how to continue the Fellowship in the future. Thank you to all who funded the Fellowship; your generosity made this unique landmark opportunity possible!

Creating an Inclusive Future for Wind Energy and Wildlife

In 2020, AWWI launched a scholarship program to enable undergraduate and graduate students with an interest in renewable energy and wildlife conservation to attend the Wind Wildlife Research Meeting, with the goal of encouraging students from diverse backgrounds to learn about wind-wildlife science and interact with professionals in the field. Going forward, AWWI plans to continue to offer the scholarship for other events and to explore other ways to achieve greater inclusivity among individuals working on wind-wildlife issues, including supporting our Partners and Friends in their efforts. For more information, contact info@awwi.org.



A Special Thank You to AWWI's Funders, Science Advisors, and Research Collaborators

2019-2020 Funders

Wind Industry Partners

Apex Clean Energy
Avangrid Renewables
Berkshire Hathaway Energy Company
Clearway Energy Group
Duke Energy Sustainable Solutions
EDF Renewables
EDP Renewables
Enel Green Power
Invenergy (2019)
NextEra Energy
Pattern Energy Group
Siemens Gamesa (2019)
Southern Power
Tradewind Energy (2019)

Wind Industry Friends

American Electric Power (2020)
American Wind Energy Association
ConnectGen
DTE Energy
Engie
IdentiFlight (2019)
Innogy
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Leeward Renewable Energy
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MAP Energy (2019)
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Sierra Club
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Individual Donors

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National Fish and Wildlife Foundation
Patagonia
Turner Foundation

Government

U.S. Department of Energy
National Renewable Energy Laboratory

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Western Ecosystems Technology, Inc.

* Contributors to the James A. Walker Future of Wind and Wildlife Fellowship

Special Thank You (Continued)

Science Advisors and Research Collaborators

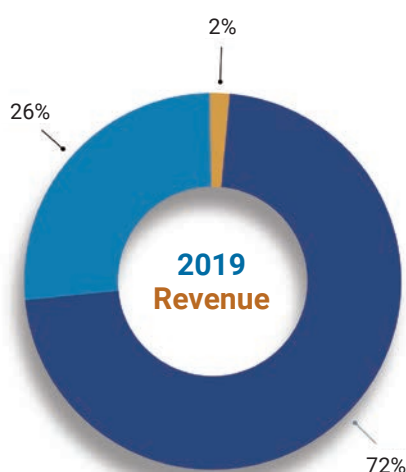
Science Advisors

Amanda Hale, Texas Christian University
Douglas Johnson, U.S. Geological Survey
David Nelson, University of Maryland
Leslie New, Washington State University, Vancouver
Terry Root, Stanford University
Dale Strickland, WEST, Inc

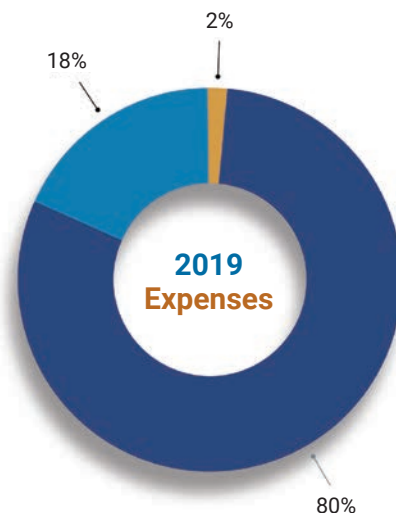
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Leigh Ann Starcevich, Western EcoSystems Technology, Inc.
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2019 Financials

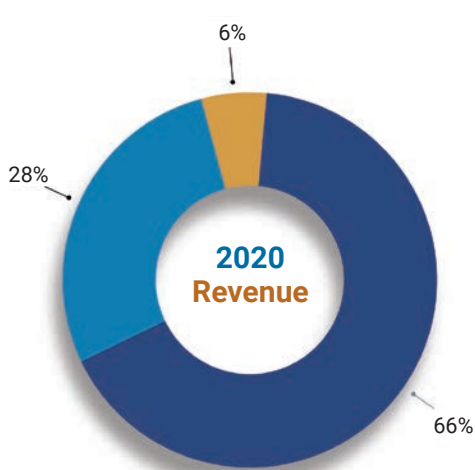


Contributions	\$ 2,637,628
Contracts and Grants	\$ 965,470
Other Income	\$ 62,487
Total	\$3,665,584

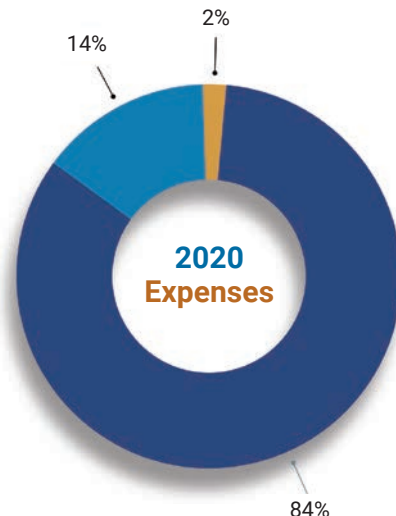


Program Services	\$ 2,170,159
General & Administration	\$ 489,732
Fundraising	\$44,598
Total	\$ 2,704,488

2020 Financials



Contributions	\$2,506,910
Contracts and Grants	\$ 1,056,582
Other Income	\$212,316
Total	\$3,775,809



Program Services	\$2,676,135
General & Administration	\$ 463,914
Fundraising	\$ 63,383
Total	\$ 3,203,432



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