

Funding Opportunities for Pollinator Protection in North America

A REPORT FOR THE NORTH AMERICAN POLLINATOR PROTECTION
CAMPAIGN WITH SUPPORT FROM THE TURNER FOUNDATION

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Introduction

Pollinators provide a vital environmental service that is often taken for granted. However, it is believed that pollinators are threatened by habitat loss and degradation as well as pesticide exposure. Ample evidence exists that pollinator populations in Europe are in peril - and a growing (though highly incomplete) body of data in the US raises similar concerns stateside. Given their absolutely critical role in the maintenance of ecological systems and food production, pollinators are prime candidates for the rigorous application of the precautionary principle – even without perfect evidence as to the extent and cause of their decline in the US, they need our attention now.

The North American Pollinator Protection Campaign (NAPPC) has realized the need for pollinator protection and is dedicated to promoting the health of pollinating animals in North America. Coordinated by the Coevolution Institute, NAPPC has over 70 affiliated participating organizations and concerned stakeholders. NAPPC is working to implement, promote and support a clear, continent-wide coordinated action plan to encourage activities that assure documented increases in numbers and health of both resident and migratory pollinating animals. NAPPC has realized the need for greater dialogue between the many independent groups working on pollinator issues and recognizes the inherent strength in bringing a variety of voices together to develop collaborative strategies and increased attention to the issue.

California Environmental Associates (CEA) has been working with the North American Pollinator Protection Campaign with support from the Turner Foundation to identify strategic opportunities for pollinator protection in North America. The purpose of this exercise is two fold: 1) to provide strategic approaches for active organizations dedicated to pollinator protection; and 2) to provide current and potential funders with funding opportunities for pollinator protection.

Given these objectives, two major funding needs to further the field of pollinator protection were recognized:

1. **Gathering compelling evidence:** Although the body of evidence for pollinator population declines is abundant in Europe, there is a need for compelling research that documents pollinator declines in North America and identifies the driving forces for these declines.
2. **Strategic activities with large landowners:** As pollinator declines are confirmed, the environmental community must adhere to the precautionary principle and increase efforts to strengthen pollinator populations. Working with large landowners offers the greatest opportunity for scalable, leveraged projects for pollinator protection.

INTRODUCTION

Currently, very few funders have made pollinator protection a focus of their programmatic grant making. There is a need to bring funders supporting related projects, such as biodiversity conservation and sustainable food systems, on board. The funding opportunities outlined in this report provide several examples that may be of interest to them.

Methodology

In developing this assessment of funding opportunities, CEA used the following methodology:

1. **Information review.** CEA surveyed literature available on the decline of pollinator health, current projects addressing the issues, and activities and progress made to date. From this information, we characterized the current key drivers of pollinator decline, identified priority projects needed to address these concerns, as well as current projects addressing the issues and the organizations involved.
2. **Interviews with key experts in the field.** A number of key experts were contacted and interviewed (please see the acknowledgements page for a complete list of interviewees). These interviews provided better understanding of current projects, gaps in current projects, project opportunities and hurdles.
3. **Project opportunity analysis and design.** CEA assessed the project opportunities identified through the literature review and expert interviews based on a number of criteria including:
 - a. Ecological impact: the project effectively focuses on the priority issues that will bring about the most significant benefits to pollinators.
 - b. Ecological scalability: the project is capable of addressing an issue of pollinator health at a national or continental scale, rather than only at a local scale, without dramatically increasing the complexity or costs of the project.
 - c. Tangible impact: the expected outcomes of the project should be tangible and measurable.
 - d. Feasibility and sustainability: the project is likely to successfully produce the expected outcomes, and these outcomes are likely to be sustainable.
 - e. Organizational synergies: the project maximizes the independent efforts currently being made by organizations in the field.
 - f. Financial leverage: the project takes advantage of other state, federal, or private funding that would assure Foundation investment leverage.

From these findings, we developed an outline of funding opportunities and recommendations.

The budget and timeframe for this project were limited, resulting in a limited project scope. A more exhaustive assessment could be made with further funding

A Call for Pollinator Protection

Pollination is an essential environmental service. Pollination supports the plants and animals that make up our natural habitats and ecosystems as well as the food and fibers we rely on. It has been calculated that one out of every three mouthfuls of the food and drink we consume is made possible by pollinators. Worldwide, 75 percent of the crop plants grown for food, fibers, and medicines are pollinated by animals. In the US alone, pollination by insects produces \$40 billion worth of products annually, from almonds, apples and alfalfa, to melons, plums, squash, and berries.

Pollination occurs when pollen is moved from one flower to another, most often carried by an unsuspecting pollinator, allowing for the fertilization and reproduction of that plant. While some plants are self-pollinated or wind-pollinated, most flowering plants require help from pollinators to produce fruit and seed. Over 100,000 species serve as pollinators worldwide; bees, flies, moths, butterflies, beetles, bats and birds are the primary pollinators.

Despite the importance of pollinators, a growing body of evidence indicates that they are increasingly under threat. Over 50 pollinator species are already listed as threatened and endangered by the US Fish and Wildlife. However, compelling documentation of their declines, although strong in Europe, is lacking in the US. Much evidence of decline in the United States focuses on the European *Apis* honeybee, a domesticated and feral species which US farmers have become increasingly dependent on for pollination. The number of domestically-managed honeybee colonies in the United States has decreased by over 50 percent since 1945, stemming from pesticide exposure, introduced parasites and diseases, and economic forces. Documentation of global population trends for non-managed honeybees or other pollinating species is less clear. Evidence has shown a decline in some native bee species in Central and North America. Declines in effective cross-pollination – where crops and native plants were shown to suffer reduced fruit- and seed-set – as a result of pollinator scarcity are also highly indicative of more general global problems.

Improper and/or extensive use of pesticides and the loss, modification, and fragmentation of habitat are considered the primary drivers of pollinator decline. Land management and related policies have most often neglected the critical role of pollinators and have not encouraged pollinator friendly practices. For example, the effect of pesticides on pollinators is not required to be documented before they are approved for registration. Other factors resulting in pollinator declines include introduced diseases and parasites as well as competition from other, non-native species. An overall lack of awareness of pollinators and their importance contributes to many of these problems.

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It is reasonable to assume that increasing threats such as pesticide use and habitat loss will lead to greater pollinator declines. Although the evidence of such declines is currently lacking, the consensus in the field is that this is merely due to a lack of compelling baseline data, and not a question of real population declines. If corroborating data in Europe is taken as an indicator of what is around the corner for North America, then the precautionary principle should be strongly supported. The service pollinators provide is of paramount importance and efforts must be made to ensure healthy populations in the future.

Current Efforts for Pollinator Protection

A number of organizations throughout North America are currently working to help protect pollinators and mitigate their declines. The following is a list of a number of these efforts. This list is by no means exhaustive, but gives an outline of the major project concentrations and number of the organizations involved. We have concentrated on those projects currently being implemented by non-governmental organizations since these are more relevant to funding opportunities for philanthropic funders. Project efforts are grouped in four areas: land management, policy, public education, and research.

Research

A number of independent researchers and organizations have been focused on increasing the documentation of pollinator populations, their life cycles and evidence of their declines. Much of this work is focused on understanding the life cycle and habitat requirements of native bees. For example, James Cane and Vincent Tepedino of the USDA's Bee Laboratory at Utah State University have been documenting the causes and extent of declines among native pollinators in North America. The results of their work were recently published in a special edition of Conservation Ecology on pollinator declines (June 2001).

A number of studies have also focused on documenting the contributions native pollinators make to crop pollination. For example, a recent study by Claire Kremen (Princeton University), Neal Williams (Princeton University) and Robbin Thorp (University of California, Davis) published in the Proceedings of the National Academy of Sciences documents individual species and aggregate community contributions of native bees to crop pollination on farms with varied proximity to natural habitats and management type.

Other organizations conducting research include the Arizona-Sonora Desert Museum, UN Food and Agricultural Organization, United States Department of Agriculture, the Bee Works, staff at the San Francisco State University, UC Berkeley, UC Davis, Princeton University, and University of Guelph, Canada.

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Education

A number of organizations have been focused on educating the public on the role pollinators play in our society. These activities include backyard and urban gardening projects as well as general public education campaigns.

- **Backyard/urban gardening.** A focus for pollinator educational programs has been the development of pollinator gardens in urban and suburban settings. Schools, zoos, museums, and local parks have been the setting for educational pollinator gardens that hope to teach children and adults about the importance of pollinators. These gardens often include information on how individuals can help protect pollinators in their own backyards by identifying recommended plant species, nesting structures, etc. For example, the Butterfly Conservation Initiative is a collaboration of government and non-governmental organizations coordinated by Aquariums and Zoos of America to aid the recovery of imperiled butterflies in North America. As part of this program, butterfly gardens have been created in a number of zoos throughout the US to educate the public on the importance of butterflies as pollinators and their need for protection. Other organizations involved in these educational endeavors include the Coevolution Institute, the Wildlife Habitat Council, and the National Wildlife Federation.
- **Public educational campaigns.** Many organizations have developed campaigns and websites in an attempt to educate the public on the importance of pollinators. For example, the Forgotten Pollinators Campaign is a collaborative effort of a number of organizations including the Bee Works, Arizona-Sonora Desert Museum, Bat Conservation International, the Center for Plant Conservation and others, to call international attention to the critical role pollination plays to society and the threats faced by many populations of pollinators. The campaign informs scientists, conservationists, growers and the public about the animals that pollinate economically important crops and rare plants.

Policy

Very little work is being done at the policy level for pollinator protection. The lack of activity is primarily due to insufficient evidence regarding pollinator declines. Without meaningful documentation of a real problem, it is difficult to gain political will for pollinator protection, especially in times of economic decline and a rise in international tensions. Most political efforts regarding pollinators have been made to address the population declines of managed honey bees. State Beekeepers Associations have gained Congressional interest, resulting in Federal appropriations and concentrated research to address honey bee declines. Political efforts for native pollinators have focused on increasing the awareness on Capitol Hill for pollinator protection. Attempts have been made to educate Congressional members and high level administration officials through meetings led by the Coevolution Institute and handbooks such as the “Pollinator Protection Policies and Practices” handbook produced by the Xerces Society.

Land Management

Land management seems to be the area with the most activity for pollinator protection. This area involves efforts to reduce pesticides on managed lands, projects to create and restore

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habitats on managed lands, land conservation initiatives, and wasteland reclamation efforts for pollinator habitat. More details are provided below.

- **Pesticide reduction.** A number of organizations have been working with pesticide users to educate them on the negative affects of pesticides on pollinators, and to demonstrate how changing their practices can help protect pollinators. This work has included engaging farmers, ranchers, state and federal park managers, state highway departments, golf course managers, corporate land owners and others. For example, Audubon International's Cooperative Sanctuaries program educates businesses, schools, and golf courses on how to manage their lands to enhance and protect wildlife and their habitats and conserve natural resources. Pesticide reduction and alternative mowing practices are stressed as part of the environmental stewardship program and can benefit pollinators greatly. Other organizations involved in this area include the National Fish and Wildlife Foundation, USDA's Natural Resources Conservation Service, Xerces Society, Wildlife Habitat Council, the Arizona-Sonora Desert Museum, the US Fish and Wildlife Service, the Bureau of Land Management, and the US Golf Association.
- **Habitat creation and restoration on managed lands.** A number of organizations have been focusing on educational programs to encourage the sowing of pollinator forage and nesting plants, and properly managing pesticides and herbicides for pollinators. This has included work with farm managers, state highway departments, park managers, golf course managers, corporate land owners and others. For example, the National Fish and Wildlife Foundation and the United States Golf Association has established Wildlife Links, a cooperative program that funds innovative research, management, and education projects on golf courses for wildlife. In relation to this, the Xerces Society has published "Making Room for Native Pollinators", a guide on how to create pollinator habitats on golf courses. Other organizations working on this issue include the Wildlife Habitat Council, the Arizona-Sonora Desert Museum, the National Fish and Wildlife Foundation, Bureau of Land Management, the National Parks Service and Audubon International.
- **Land conservation/restoration initiatives.** Organizations have focused on conserving and restoring habitats with a focus on pollinator rehabilitation. These efforts include identifying and planting native plant species that provide foraging and nesting sites for native pollinating species. The National Fish and Wildlife Federation administers the Native Plant Conservation Initiative, which supports on-the-ground conservation projects that protect, enhance, and/or restore native plant communities on public and private land and most often include a pollinator component in their projects. Other organizations involved in similar projects include Natural Resources Conservation Service, Plant Conservation Alliance, and the Bee Works. The Bureau of Land Management and the US Fish and Wildlife Service have also taken steps to instigate land restoration activities for pollinators.
- **Wastelands reclamation for pollinator habitat.** Several organizations have seen an opportunity in reclaiming wastelands for wildlands with a focus on rehabilitating habitat for pollinators. This is an especially attractive opportunity for pollinators, because many wastelands are located in urban areas with limited land and pollinators require less habitat than most other animals. For example, the Wildlife Habitat Council helps

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corporations optimize Brownfield redevelopment and Superfund/RCRA remediation through the use of natural resource-based approaches and ecological enhancements which include wildlife conservation and enhancement for pollinators. Few organizations have become involved in this area. Greater exploration of the opportunities available in this emerging field is needed.

Strategic Opportunities for Pollinator Protection

Through research and interviews, many projects for pollinator protections were identified. As outlined in the methodologies section, a number of criteria were used to rank these alternative approaches. The following section describes those opportunities that ranked highest against these criteria. These opportunities fall into two categories where major funding is needed to further the field of pollinator protection:

1. **Research: Gathering Compelling Evidence.** Compelling research is greatly needed to confirm the occurrence of pollinator declines in North America and means for mitigating their threats.
2. **Strategic Activities with Large Landowners.** Large landowners must be educated and employed for pollinator protection through strategic policy, education, and land management projects.

These two components are equally important and should be pursued simultaneously. Ideally, these two components should support and validate one another. Research projects should be designed to not only provide compelling evidence of pollinator declines, but also to provide examples of steps that can be taken by land owners to strengthen pollinator populations.

For example, one possible three to five year funding strategy drawn from the various opportunities described below might focus on effectively integrating several research sites with landowner demonstration sites. Based on a strategic research agenda to provide evidence of pollinator declines and life cycle data, several sites could be chosen throughout North America where landowners would also participate in the development of pollinator friendly practices. The research sites could be coordinated with working landscapes such as ranches or farms to apply and test alternative farming practices such as alternative or reduced pesticide use. Results from these sites would be used to develop regional recommendations and user-friendly practices for land-owners. In addition, funds could be dedicated to integrating this resulting information and existing information into the NRCS's information systems such as the PLANTS database. More details on the components of this possible strategy are described in more detail below.

1. Research: Gathering Compelling Evidence

Although there is a growing body of evidence of pollinator declines in the US, there is a need for more compelling data. The North American Pollinator Protection Campaign is currently seeking funds for an approved National Research Council (NRC) comprehensive review of the current state of published knowledge. This study will provide unassailable information. It is thought that such a study by the esteemed NRC will bring credibility to the issue and gain the support of Congress, government agencies and the agro-business community for pollinator protection.

While the NRC survey of knowledge will provide a stamp of legitimacy to the issue, assemble what is known, and potentially uncover important keystone research, it should not be construed as advancing the science. Many of our respondents expressed an immediate need to begin targeted research. Further, it is essential that the NRC study not be done at the expense of, nor in preference to, focused strategic research that substantiates declines and demonstrates preventative and restorative measures.

Research funders should consider working with highly creative scientists at institutions such as the Department of Biological Sciences at Stanford University or the USDA's Bee Lab in Logan, Utah to evaluate approaches which might provide compelling proof and guidance for pollinator declines. Such an approach would rely on a set of strategic, fully integrated projects which are designed to provide concrete results regarding pollinator population declines in a short time frame.

The designing of such an approach is beyond the scope of this paper. However, a number of interesting examples were offered to us that might serve to illustrate such an approach. For example, a project might be designed that establishes a matrix of research sites in different geographical areas and climates with varied degrees of habitat alteration from non-altered to very altered. A consistent collection system should be used across these sites to compare results. The comparison of non-altered and very-altered systems should provide more conclusive data as pollinator populations are thought to be hit the hardest in highly degraded areas. University students might be employed for such collection activities.

It might also be possible to simply study relationships between native plants and specific, native pollinators. Has the reduction in native plant habitat significantly reduced pollinator levels, or vice versa? Juxtaposing studies in areas rich and poor in native coverage could answer this question, and inform the debate on causation.

Another idea: the difficulty in finding baseline data from the past limits many research agendas. It might be possible to call on the abundant data published in reports several decades ago or the numerous specimens collected and stored at metropolitan zoos and museums as baseline data. Current data could be collected from areas around these metropolitan areas and compared with this baseline data. Scientific procedures would need to account for a margin of error from past collections. This project design would allow for greater temporal results in a short time frame.

Research efforts can also be strategic in gaining the ear of Congress. Evidence of pollinator declines in strategic Congress members' home states may make a great impact. For example, research sites might be concentrated in states where representative Congress members sit on the appropriations committee for agriculture or the environment. Projects might also be

concentrated in states where environmentally sympathetic Congress members could become spokespersons for pollinators.

In addition to information on the state of pollinator population health, there is still a lot to be learned about their taxonomy and life cycle requirements. New native pollinators are continuously being discovered, some not until the point that they are on the verge of being wiped out. Information on the foraging and nesting requirements of many species are unknown. In addition, there are still questions as to how much habitat is needed for many species and the level of degradation/fragmentation they can tolerate.

Collection sites used in any of these projects should be continued in order to provide data on these issues and to identify actions that can be incorporated into land management practices for greater pollinator protection. For example, data on the foraging and nesting requirements of particular species, toxicity of given pesticides on pollinators, degree of habitat degradation/fragmentation tolerated by given pollinator populations, etc. would help to create more effective conservation projects on the ground.

2. Strategic Activities with Large Landowners

Strategies that leverage activities at the greatest scale - on larger plots of land in more open spaces - should be a priority for pollinator protection. Activities that focus on large landowners, such as farmers and ranchers, park managers, golf courses and corporate land owners offer the greatest impact and leverage for pollinator protection. The following are a number of activities including policy, education and land management initiatives that focus on this strategy.

Education: Enhancing Land Manager Information Sources

Over two-thirds of the United States land is privately owned. A vast majority of this land is managed for food production. There is a great need to further educate land managers such as farmers and ranchers on the importance of pollinators for food production. The most effective means for educating land managers is through the sources of information they and their advisors readily access. A great opportunity for a highly effective project would be to supplement the information tools made available to the USDA's Natural Resources Conservation Service (NRCS) farm agents and farmers, such as the PLANTS database and the Windows Pesticide Screening Tool (WIN-PST) tool with relevant information on pollinators.

- **PLANTS Database**

The NRCS's PLANTS web-based database provides standardized information about the vascular plants, mosses, liverworts, hornworts, and lichens of the United States and its territories. It includes information on species names, distributional data, species abstracts, characteristics, etc. PLANTS is the USDA's most visited website, and a great opportunity to get practical information regarding the relationship between plants and pollinators out to a vast audience of land managers.

Fact sheets are available for over 2,500 conservation plant species that are commonly used for land restoration or various conservation activities such as creating buffers, growing windbreaks, stabilizing soil, reclaiming old mines, and providing habitat for wildlife.

However, no information is available regarding the affect particular plants might have on pollinators.

A highly effective project would be to work with the NRCS and their partner organizations to supplement the PLANTS database with information related to pollinators. For example, information might be provided on native plants that provide pollinator habitat by geographic regions, generalist species that support pollinators, the pollinators that support or depend on particular plant species, alternatives for integrated pest management that benefit pollinators, etc.

▪ **WIN-PST**

The NRCS's Windows Pesticide Screening Tool (WIN-PST) is a pesticide environmental risk screening tool that NRCS field office conservationists, extension agents, crop consultants, pesticide dealers and producers use to evaluate the potential for pesticides to move with water and eroded soil/organic matter and affect non-target organisms. Including parameters regarding pollinators pesticide exposure as part of the WIN-PST model could help bring the risks to the attention of many landowners.

As it is one of the few NRCS-approved environmental risk analysis tools for developing pest management plans, the WIN-PST tool is widely used, often to determine alternative management strategies to meet water quality goals. For each soil type and pesticide active ingredient, WIN-PST determines the relative likelihood that a pesticide will leave the site of application via runoff or move down through the soil below the root zone.

WIN-PST offers a great opportunity to practically educate land managers about the relationship between pesticide use and pollinator health. Working with the NRCS and their partner organizations, WIN-PST could be supplemented with parameters on the effects of particular pesticides on pollinator health and guidelines for improved application. For example, information might be provided on the effect given pesticides have on known pollinators in the area, alternative pesticides that are less harmful to known pollinators in the area, pesticide application recommendations to avoid pollinator harm, etc.

Policy: Leveraging Farm Bill Programs

The conservation programs legislated through the Farm Bill offer great financial leverage for pollinator habitat restoration and creation. These programs make billions of conservation dollars available to private landowners through federal subsidies over the next ten years. Private landowners can benefit from a portfolio of voluntary assistance, including cost-share, land rental, incentive payments, and technical assistance. These benefits are made available to landowners for approved practices on eligible lands. A leveraged funding opportunity would be to support the development of recommendations on how these practices can be improved to enhance their benefits to pollinators.

For example, the Conservation Reserve Program (CRP) provides technical and financial assistance to eligible farmers and ranchers to address soil, water, and related natural resource concerns on their lands. CRP encourages farmers to convert highly erodible cropland or other environmentally sensitive acreage to vegetative cover, such as tame or native grasses, wildlife

plantings, or riparian buffers. The recommended species for these plantings may not maximize the benefits for pollinators. Recommendations might be made on a regional basis to improve these practices by including native flowering forbe species that provide foraging sites for bee pollinators.

Another example is the Grassland Reserve Program (GRP), a voluntary program offering landowners the opportunity to protect, restore, and enhance grasslands on the more than 525 million acres of grasslands and shrub lands in the United States. The program provides funding and technical assistance to conserve vulnerable grasslands from conversion to cropland or other uses and conserve valuable grasslands by helping maintain viable ranching operations. Regional recommendations might be made to border grazing lands with hedge rows containing native flowering species and nesting sights for pollinator bees.

A study to analyze the affect of recommended practices of these programs and others on pollinators and how they might be improved to be more pollinator friendly would have a significant impact. Landowner buy-in is probable as farmers and ranchers already compete for the cost sharing and technical assistance provided by these programs. However, it is imperative that local land managers are included in this process to assure they agree with the recommendations being made and are willing to implement them. One might begin at the state level working with the state technical committees to include these recommendations in their state plans, and roll out recommendations to other states and programs of the NRCS. Working through the US Fish and Wildlife Service's Partners for Fish and Wildlife Program or the Environmental Defense's Center for Conservation Incentives (CCI) might be good avenues for this work. The Center for Conservation Incentives develops and expands incentives for the conservation of habitat on private lands by directing incentive funding toward on-the-ground conservation projects, conducting research, and partnering with landowners and conservationists to improve incentive programs such as the Conservation Reserve Enhancement Program and Safe Harbor programs.

Land Management: Engaging Large Land Owners

A number of opportunities exist to engage large land owners in the United States to improve their practices for pollinator protection. This includes farmers and ranchers, Federal and State agencies, fringe land owners such as the Department of Transportation and utilities owners, and large corporate land owners including golf course managers. Efforts must be made to increase the awareness of the services pollinators bring to each of these constituencies and how they can help. This information should be made available to them through the information sources they readily access and incorporated into their daily land management regimens. The following outlines activities to engage each of these land owner groups.

- **Farmers and ranchers**

Farmers and ranchers are one of the biggest constituencies to attract to the cause of pollinator protection. Most farmers and ranchers are willing to protect wildlife when it does not affect their bottom line. Although some farmers are aware of the importance of pollinators to their own or their neighbor's crops, many are not. More effort should be made to increase their understanding of the role of pollinators and help them implement pollinator friendly practices. There are several opportunities in this area.

More information should be made available to farmers and ranchers on how to control their greatest land management problems while minimizing threats to pollinators. To be most effective, any such recommendations should be made to address the needs of the land manager and not the conservationist. For example, recommendations might be made for particular crops that have known pests associated with them. Pollinator friendly solutions could be provided as an alternative to the traditional solutions such as alternative, less harmful pesticides or improved pesticide application practices. This information should be made available to them by the agents they consult on a regular basis; crop consultants, pesticide distributors, university extension agents and NRCS agents should be informed with user-friendly, regional hand books describing pollinator friendly solutions to common crop problems.

Pesticide distributors are a major source of information for farmers. Pesticide companies have been blamed for losses experienced by honeybee managers recently and may be willing to mitigate this damage. One might work with pesticide companies to develop alternative, pollinator-friendly pesticides or application procedures that their distributors are encouraged to provide.

Another opportunity is to work with specialty insurance companies and/or pesticide companies to cover premiums for increased (perceived) risks from new management practices. Farmers and ranchers operate on very tight margins and are often unwilling to try new practices for fear that they will take a financial hit. If they can be assured that recommended practices such as new pesticides or reduced pesticide applications would not affect their productivity, they may be more willing to try. More efforts should also be made to monitor and publicize economic benefits of native pollinators on relevant crops and the real effects of (perceived) increased risks from reduced pesticide use, etc.

As mentioned above, farmers and ranchers look to trusted sources of information. If these advisors are not aware of practices that can benefit pollinators, then their farmers will most likely not be either. Efforts should be made to work with groups such as the National Alliance of Independent Crop Consultants or the National Association of Conservation Districts to increase their awareness of pollinator friendly practices. In addition, educating farmers directly might be possible through their local groups and associations such as The National Cattlemen's Beef Association, the Soil and Water Conservation Society or American Farmland Trust.

▪ **Fringe land owners**

Fringe lands owned by agencies such as the Department of Transportation, utilities companies and railway operators offer an interesting opportunity to implement vast stretches of pollinator habitat. Roadside right-of-ways account for more than 10 million acres of land in the United States. North American railroads operate over 173,000 miles of track. Land management programs on these most often small strips of land can more easily accommodate pollinator habitat requirements as compared to other species, making this a unique opportunity for pollinators.

Regional guides could be developed to incorporate pollinator friendly practices into these constituencies' normal land management regimens. For example, efforts might be made to

develop regional native flowering seed mixes for roadside plantings that would provide pollinator habitat, regional recommendations for less harmful pesticides that eradicate their common plant and animal pests, recommendations on how to apply the commonly used pesticides to reduce exposure to pollinators, etc. The US Department of Transportation Federal Highway Administration's Wildflower Program would be one prospect for initiating such an initiative. This program focuses on issues such as improving erosion control, reducing pesticide spraying and increasing wildlife habitat. Increasing the role and importance of pollinators would be a reasonable next step.

▪ **Corporate landowners**

Another interesting opportunity is to support those organizations working to engage corporate landowners and golf courses to incorporate pollinator friendly practices on their properties. An estimated 16,000 golf courses in the United States provide significant open spaces and opportunities to provide needed wildlife habitat in increasingly urbanized communities across North America. Corporations also often own large tracts of valuable land which can be managed for habitat without affecting their operations.

A number of programs are already being implemented that encourage improved wildlife habitat management and better pesticide applications. However, more can be done to emphasize the role of pollinators in these projects. For example, the Audubon International Cooperative Sanctuary Program for Golf Courses administered in collaboration with the United States Golf Association (USGA) has enrolled more than 2,300 courses in North America. The program helps golf courses improve wildlife habitat management, chemical use reduction and safety, and water conservation. Greater circulation of user-friendly handbooks that address the problems golf course managers experience in pollinator friendly ways could be very useful. The pollinator friendly handbook recently published by the Xerces Society would be a good starting point to develop more regionally specific guidelines.

The Wildlife Habitat Council's Corporate Habitats program has successfully created a greater emphasis on pollinators. For example, they have been working with PPG Industries, Inc. at their 183 acres Monroeville Technical Center to establish a pollinator meadow featuring native wildflowers and grasses and milkweed plots for monarch butterfly breeding. They have also incorporated reduced and rotational mowing to manage meadows and an old used field on their property. The Wildlife Habitat Council has introduced the Rasmussen Award to recognize and encourage corporate adoption of pollinator friendly practices.

In addition to being valuable for many species, corporate habitat projects can also result in reduced costs associated with mowing and landscaping. Monitoring and publicizing such economic benefits should be incorporated into these programs to incentivize other corporations to implement such projects.

▪ **Federal and State agencies' land management practices**

Another avenue of opportunity is educating the managers of the vast amount of public lands in the United States. These lands are most often already managed to maximize

STRATEGIC OPPORTUNITITES FOR POLLINATOR PROTECTION

benefits to wildlife habitats, but more emphasis can be made to increase habitats for pollinator species. Because the lands are often also managed for large numbers of human visitors, pest management for rodents and insects is an important part of their management activities. Practices that can help address these problems while mitigating damage to pollinators should be outlined. One avenue for this work might be through the US Fish and Wildlife Service's Partners for Fish and Wildlife Program or the Bureau of Land Management.

Funders' Interests in Pollinator Protection

Financial support for pollinator protection is a great opportunity for foundations and other funders looking to make their mark in an area that is often ignored. To date, financial support dedicated to pollinator protection has been limited. The Turner Foundation, the CS Fund, V. Kann Rasmussen Foundation, the Richard and Rhoda Goldman Foundation, the Wallace Genetic Foundation and the National Fish and Wildlife Foundation are some of the few funders focused on this area. Those foundations that have made pollinator protection part of the programmatic goals view it as an area for growth within their grant-making portfolio. For example the CS Fund's Food Sovereignty program, focused on seeds saving, soil building, and protecting pollinating insects and animals, is one of their newest, yet they intend on growing this program area as they feel it is an area of increasing significance. The CS Fund also feels pollinator protection is a program area where small, family foundations can make a great impact because it is often a neglected area where much work is needed.

Many philanthropic foundations fund related projects either through biodiversity conservation or sustainable food systems. The objectives of these programs often coincide with pollinator protection. For example, the Homeland Foundation supports sustainable agriculture and reduced pesticide use as part of their program for environmental health. The Hewlett Foundation supports conservation of native plants and animals as part of their Wilderness Areas in Western North America program. These foundations are aware of the need for pollinator protection, but most feel this is an issue that is on the fringe of their programs and "doesn't quite fit". They also feel there are many other competing issues that they are currently committed to, and do not have enough funding to contribute to other areas in the current financial climate.

There is a need to educate foundation staff and board members on the importance of pollinators and their peril. Most foundation staff working on related issues of biodiversity conservation and sustainable food systems are aware of the need for pollinator protection, but they are among the few. Even then, most feel that their board members are even less educated. The most effective means of educating foundations is through other Foundations. Interested foundations might sponsor a "Pollinator Boot Camp", a workshop where several of the top researchers and activists are brought in to educate Foundations on the state of pollinator protection in North America and the need for more support. Program officers working on very specific, pollinator-related biodiversity issues or sustainable food systems would be the primary audience for the bootcamp. The workshop should include a focus on strategic options

FUNDERS' INTEREST IN POLLINATOR PROTECTION

for Foundations to get involved in pollinator protection. Additionally, Foundations currently working on pollinator protection should make it a priority to educate other foundation program staff, either through funders associations such as the Environmental Grantmakers Association or working groups such as the Consultative Group on Biological Diversity.

Unfortunately, funders are often not interested in issues until there is real evidence of a problem. Greater evidence of pollinator declines may help in securing additional funding from currently and potentially interested. Efforts to link the effects of such declines to current foundation interests may help increase the funding collaboration for pollinator protection.

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