Pollinator Conservation in Minnesota and Wisconsin

A Regional Stakeholders Report

The Xerces Society for Invertebrate Conservation

Portland, OR | Sacramento, CA | St. Louis, MO | Princeton, MN | Cape May, NJ

THE XERCES SOCIETY
FOR INVERTEBRATE CONSERVATION

The Xerces Society for Invertebrate Conservation is a nonprofit organization that protects wildlife through the conservation of invertebrates and their habitat. Established in 1971, the Society is at the forefront of invertebrate protection worldwide, harnessing the knowledge of scientists and the enthusiasm of citizens to implement conservation programs. The Society uses advocacy, education, and applied research to promote invertebrate conservation.

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Report of the stakeholders meeting held on August 11, 2010,
at University of Wisconsin – Eau Claire

Prepared by

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January 2011

Report Overview

On August 11, 2010, twenty-four representatives from farm organizations, universities, nonprofit conservation organizations, and state and federal agencies in Minnesota and Wisconsin convened at the University of Wisconsin – Eau Claire to examine the status of pollinator conservation efforts in the region. The goal of this meeting was to conduct a comprehensive assessment of past and current efforts to protect bees, butterflies, and other pollinators in Minnesota and Wisconsin, and to identify additional opportunities for reversing some of the recent nationwide declines of pollinators. This report summarizes the primary themes of that stakeholder meeting and identifies recommendations that conserve this essential ecological and economic resource.

Pollinators: A Declining Resource

Pollinators are an integral part of our environment and our agricultural systems. They are important in 35% of global crop production and they produce the seeds and fruits that sustain wildlife as diverse as songbirds and black bears. Pollinators include butterflies, moths, wasps, flies, beetles, bats, hummingbirds, and bees. Bees—both native bees and honey bees—are considered the most important pollinators in temperate North America.

Nationwide there are approximately four thousand species of bees, with roughly five hundred native to Minnesota and Wisconsin. The non-native European honey bee (*Apis mellifera*) is the most important managed crop pollinator in the United States. However, the number of honey bee colonies is in decline because of disease and other factors.

Native bees, which also serve an essential role in native ecosystems and are often superior pollinators of crops such as pumpkin, berries, and orchard crops, are also in decline. Among the most conspicuous of these are several bumble bees formerly very common in Minnesota and Wisconsin, including the rusty-patched bumble bee (*Bombus affinis*), the yellow-banded bumble bee (*Bombus terricola*), and the Ashton cuckoo bumble bee (*Bombus ashtoni*). These once common bees have not been documented in most of the eastern U.S. for several years. The loss of these species represents approximately one quarter of the region's bumble bee diversity, and is especially concerning because bumble bees are among the most efficient agricultural pollinators.

In addition to bees, Minnesota and Wisconsin are home to several other at-risk pollinators. The migration of the iconic monarch butterfly (*Danaus plexippus*) was listed as an endangered phenomenon by the International Union for Conservation of Nature in 1983. Habitat loss in overwintering areas in Mexico and milkweed loss in their summer breeding range within the U.S. are identified as two likely factors influencing monarch population health. Another notable at-risk butterfly is the Karner blue (*Lycaeides melissa samuelis* [raised to *Plebejus samuelis* in the most recent revision]), a federal endangered species found only in remnant native plant communities where sandy soils support its' larval host plant, perennial lupine (*Lupinus perennis*).

Many of Minnesota and Wisconsin's agricultural sectors depend on insect pollination, for example, Wisconsin's cranberry industry. Producing 3.85 million barrels of cranberries per year Wisconsin is the nation's largest cranberry producer, accounting for 60% of the national supply—and employing 7,200 people. The production area covers 18,000 acres in more than nineteen counties. To meet growing export demand, the state is expected to add another 5,000 acres of cranberries within the next decade, all of it requiring bee pollination.

In Minnesota, apples are the single largest fruit crop with an annual harvest of eighteen million pounds, valued at $9 million. However the state also produces numerous other crops that depend on bee pollination including a selection of berries, sunflower, canola, and various vegetable crops. Minnesota also ranks sixth in the nation for honey production, each year producing nearly eight million pounds of honey, currently valued at over $11 million.

Minnesota and Wisconsin Pollinator Conservation Workgroup

The August 11, 2010, meeting represents a first-of-its-kind collaboration between agriculture, conservation, and government stakeholders to coordinate regional pollinator conservation efforts. Because of similar ecological landscapes and pollinator taxa and shared agricultural interests in these states developing greater collaboration between stakeholders is the logical first step to advance specific pollinator conservation priorities.

To foster this collaboration, a workgroup of thirty-two members was formed in summer 2010, consisting of representatives of twenty agencies, organizations, and educational institutions. A core group of these workgroup members convened at the August meeting.

Workgroup Facilitator Eric Mader, Assistant Pollinator Program Director, The Xerces Society for Invertebrate Conservation; Extension Professor of Entomology, University of Minnesota.

Workgroup Members (*Indicates attendance at the stakeholder meeting)

Jeff Anderson, Member, National Honey Bee Advisory Board*

Susan Carpenter, Native Plant Garden Outreach Specialist, University of Wisconsin Arboretum

Jean Ciborowski, Integrated Pest Management Program Coordinator, Minnesota Department of Agriculture*

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Habitat Conservation for Pollinators: Farm Bill Programs and Beyond

The first issue addressed at the stakeholders meeting was the efficacy of various habitat conservation efforts, especially wildlife habitat restoration programs financed and administered by the U.S. Department of Agriculture.

To address the decline of pollinators, the 2008 Farm Bill for the first time ever contains language that makes pollinator conservation a priority for every USDA land manager and conservationist. This legislative mandate is directed primarily at the USDA's Natural Resources Conservation Service, the agency that provides technical oversight of private landowner conservation programs such as the Environmental Quality Incentives Program (EQIP), the Wildlife Habitat Incentives Program (WHIP), and the Conservation Reserve Program (CRP).

Since the Farm Bill provisions went into effect, dozens of Minnesota and Wisconsin farmers have enrolled in NRCS programs specifically to establish native wildflower habitat for pollinators. A review of these habitat conservation efforts at the stakeholders meeting identified the following issues.

1 The number of pollinator-specific conservation projects contracted by the USDA-NRCS is not easily documented.

While Minnesota and Wisconsin workgroup members anecdotally know of numerous NRCS-supported pollinator habitat contracts in the region, exact acreage totals and information on the total number of pollinator contracts through EQIP, WHIP, and other programs is not specifically tracked.

2 No mechanism currently exists to measure the pollinator conservation efficacy of most USDA-administered conservation programs.

The extent to which pollinator restoration efforts are successful is not specifically evaluated due to limited agency resources. For example, no consensus exists among pollinator researchers whether native prairie plantings benefit pollinators of spring blooming crops like apples.

A notable exception to this lack of evaluation measures is the efficacy monitoring conducted for the Karner blue butterfly Conservation Reserve Program – State Acres for Wildlife Enhancement (CRP-SAFE) program. Monitoring efforts as part of that program evaluate the successful establishment of perennial lupine, the Karner blue caterpillar's obligate host plant.

3 The extent to which host plants for specific at-risk pollinators are incorporated into habitat restoration efforts is variable, and often unknown.

While the inclusion of perennial lupine is required in the Karner blue butterfly CRP-SAFE program, few other habitat restoration initiatives specifically mandate the inclusion of host plants for specialist pollinators. In the case of milkweeds, the obligate host plants for monarch butterflies, public perception may limit tolerance of them in natural areas adjacent to cropland.

4 Concerns exist about the extent to which habitat restoration projects may serve as population sinks.

All stakeholders agreed that habitat restoration efforts adjacent to cropland will provide negligible benefits unless restoration sites are protected from pesticide drift. While current NRCS guidelines do recognize the risk of pesticides to pollinators and recommend habitat enhancements be positioned a safe distance from crop fields or in sheltered locations, the effects of pesticides used in natural areas (such as by local forestry or mosquito control agencies) are not well monitored.

Opportunities may exist to prioritize habitat restoration efforts on farms with lower pesticide use. For example, conservation practices that protect biodiversity on organic farms may help meet USDA National Organic Program certification requirements.

An additional threat to pollinators in restored and remnant habitats is frequency, intensity, and scale with which fire is used as a vegetation management tool. While prescribed burning can help maintain open, early successional habitat, widespread burning has been documented to significantly reduce numbers of at-risk butterflies from specific natural areas in our region.

5 Cost share levels provided by agencies may be inadequate to optimize habitat restoration success.

It is not clear whether the financial support available through the NRCS and the Farm Service Agency for pollinator conservation projects accurately reflects the true costs of implementation. For example, the establishment of pollinator-friendly wildflowers in field borders is supported in Wisconsin with a 50% cost share rate through the NRCS at a rate of $350.00 per acre. Some workgroup members note that based upon anecdotal experience, the actual cost of restoring quality native wildflowers may be more than the anticipated $700/per acre rate, especially where extensive site preparation for pre-planting perennial weed abatement is necessary.

6 The Conservation Stewardship Program (CSP) is under-utilized by regional landowners as a mechanism for supporting additional habitat restoration efforts.

Since the Farm Bill went into effect, pollinator conservation has been promoted most heavily in Minnesota and Wisconsin by the NRCS through the WHIP and EQIP programs. The newer Conservation Reserve Program (CSP), which rewards agricultural producers for existing conservation efforts and provides incentives for adopting additional conservation practices, is less commonly utilized as a way to support habitat restoration efforts in the Upper Midwest. This is in contrast to states such as Pennsylvania where pollinator conservation has been heavily promoted through CSP, resulting in hundreds of new acres enrolled in the past two years.

7 Few pollinator conservation initiatives exist in urban areas.

Opportunities to support pollinators in urban areas remain largely untapped. While local outreach events suggest strong interest in the topic on the part of urban gardeners, Master Gardeners, and urban greenspace managers, this interest has not yet translated to on-the-ground adoption of habitat restoration. Similarly, while habitat enhancement opportunities exist in transportation and utility rights-of-way (potentially reducing vegetation management costs), no large-scale pollinator conservation efforts have been implemented.

Protecting Endangered, Declining, and At-Risk Pollinators

The second subject addressed at the stakeholders meeting was the status of rare, endangered, declining, and at-risk pollinators in our region. Among these are several formerly common bumble bees (*Bombus* spp.), a number of other native bees with specialized habitat requirements, the federally listed Karner blue butterfly (*Lycaeides melissa samuelis* [raised to *Plebejus samuelis* in the most recent revision]), and the monarch butterfly (*Danaus plexippus*), which, while still common, is undergoing a well-documented and unprecedented decline.

Of these species, only the Karner blue has been targeted for specific habitat conservation efforts, most notably through the USDA Farm Service Agency's CRP-SAFE. As of summer 2010, the CRP-SAFE program has enrolled 1,000 acres of highly erodible private land (the maximum amount authorized). Currently, a diverse coalition of game and nongame conservation interests are advocating for expansion of the Karner blue CRP-SAFE to authorize enrollment of an additional 1,000 acres.

In reviewing the situation of rare, declining, and at-risk pollinators, the stakeholder group identified the following issues.

1 No formal regulatory protection exists to mitigate disease transfer between managed and wild bumble bees.

Scientists examining the disappearance of several formerly common Minnesota and Wisconsin bumble bees, including the rusty-patched bumble bee (*Bombus affinis*), the yellow-banded bumble bee (*Bombus terricola*), and Ashton cuckoo bumble bee (*Bombus ashtoni*), believe these losses result from the accidental introduction of one or more exotic bumble bee diseases that escaped from commercially reared bumble bees sold for specialty crop pollination. Currently, no Minnesota or Wisconsin state or federal regulations exist to control the interstate movement of bumble bees, nor is health certification required to ensure that commercially produced bumble bee hives are disease free.

2 The Minnesota Department of Natural Resources has not yet recognized the status of declining bumble bees.

The help address the decline of the rusty-patched and yellow-banded bumble bees, in 2009 the Wisconsin Department of Natural Resources added them to their Special Concern Species list. This action resulted in official monitoring of both species through the DNR's Natural Heritage Inventory database, the first step in protecting the species by establishing greater documentation of their abundance and distribution. No similar action has been initiated by the Minnesota DNR, despite ongoing multi-year monitoring efforts by University of Minnesota scientists which demonstrate a dramatic and widespread decline of these species. Based upon initial conversations, both University of Minnesota scientists and Minnesota DNR recognize the need for additional dialog around this issue.

3 Additional bumble bee species may also be in decline.

Ongoing field surveys by Minnesota and Wisconsin entomologists suggest that several additional bumble bee species may also be in decline, including the yellow bumble bee (*Bombus fervidus*) and the American bumble bee (*Bombus pensylvanicus*). Additional monitoring and abundance comparisons with historic records are needed for a more accurate picture of these species' population trends.

4 Life history information for many other native pollinators is lacking.

Several native Minnesota and Wisconsin bees, butterflies, and other pollinating insects are known to be rare. In many cases, these species are associated with uncommon habitats such as deep sand soils or are known to forage on a limited number of flower species—in extreme cases, only a single species. Pollinators with such specialized lifecycle requirements are at particular risk of extinction or extirpation due to habitat loss, fragmentation, or degradation.

5 The Karner blue butterfly CRP-SAFE is largely successful but needs additional refinement.

Direct observation by multiple workgroup members of the Wisconsin USDA Farm Service Agency's program to restore land for the Karner blue butterfly reveals wide variations in the success rate of native plant establishment. In some cases, variations in planting date and the possible presence of herbicide residue have reduced seeding success. In addition, current planting guidelines require a large percentage of grasses (which provide minimal benefits to pollinators) and include herbaceous plants of limited nectar value to butterflies. One of the challenges associated with refining this program is the lack of a designated funding source to support periodic scientific oversight.

6 Milkweed, the host plant for monarch caterpillars, are frequently perceived as a weed, and often eradicated with herbicides in agricultural areas and transportation corridors.

The tri-national monarch butterfly conservation plan, developed by the Commission for Environmental Cooperation (an international organization established under the NAFTA treaty), specifically notes the loss of milkweed host plants broadly across the United States as a contributing factor in monarch butterfly declines. In Minnesota and Wisconsin, workgroup members have identified declines in milkweed due to vegetation management efforts in roadside corridors and herbicide use associated with the increased planting of herbicide resistant crops. Workgroup members also noted the value of milkweed to other butterflies, native bees, and as nectar plants for honey bees.

Mitigating Harm from Pesticides

The final topic area addressed by the stakeholder workgroup meeting was the role of pesticides in pollinator health in our region. While pesticides are primarily regulated at the federal level, state licensing of pesticide applicators, as well as local cropping systems and pest control priorities, all shape region-specific challenges to pollinator conservation. Two specific issues were noted at the stakeholder meeting.

1 The now widespread use of systemic pesticides reflects a national trend away from response-based pesticide use to prophylactic use.

In recent years, systemic (typically neonicotinoid class) insecticides have been promoted for their lower mammalian toxicity, and widely adopted by nursery crop growers, landscape pesticide applicators, and as a seed treatment for agronomic crops. Recent research, including research conducted by workgroup members, demonstrates that in some cases these systemic insecticides are expressed in flower nectar or pollen, resulting in pollinator poisoning. Concerns also exist about the residual action of systemic insecticides in soil, and the uptake of those chemicals by diverse plants over a multi-year period.

2 Pollinator-specific education is not widely incorporated into state pesticide licensing requirements.

Licensing requirements for pesticide applicators in both Minnesota and Wisconsin are based upon a classroom training model with specific knowledge criteria assessed in a formal written examination process. While knowledge criteria in both states does include an overview of pollinator protection, this is minimal and focuses almost exclusively on honey bee protection—and emphasizes the role of the beekeeper in mitigating harm, such as by recommending that hives be moved where spraying will occur. Information on the ecology of native pollinators, and the responsibility of pesticide applicators in reducing harm (spraying at night, using less toxic options, etc.) is largely absent from training materials.

Stakeholder Recommendations

Based on initial stakeholder input, the non-governmental workgroup members (listed below) recommend the following seven actions.

1 The USDA-NRCS should develop a mechanism to record and publish the acreage of pollinator conservation projects that are annually implemented.

The current absence of publicly available data on the amount pollinator habitat established annually through Farm Bill programs (such as EQIP, WHIP, and CSP) functions as a barrier to measuring the effectiveness of outreach efforts to promote pollinator conservation by both the NRCS and partner organizations and agencies. Such data would also provide an essential metric for pollinator researchers assess the successing of landscape-scale pollinator population trends.

2 Cost share rates offered by the USDA-NRCS for pollinator conservation projects should be evaluated for accuracy, and cost share percentages should be raised.

To ensure the successful implementation of pollinator conservation efforts, and to encourage the use of high quality, locally appropriate native plant materials in habitat restoration projects, NRCS practice payment schedules and practice payment scenarios should be reviewed in collaboration with non-agency restoration ecologists, prairie restoration specialists, native seed producers, and pollinator ecologists. Where costs do not reflect actual industry standards, they should be adjusted accordingly. To help maintain the accessibility of pollinator conservation efforts, cost share rates should be offered at the maximum allowable percentages for each program (e.g., 75% for pollinator enhancements contracted through EQIP). One stakeholder noted that the adoption of conservation practices through the Minnesota Department of Transportation's Living Snow Fence Initiative is greater when landowners are offered more competitive financial incentives and compensation for ongoing maintenance of conservation easements.

3 The Minnesota Department of Natural Resources should grant formal special recognition to declining bumble bee species through its Natural Heritage Program.

The decline of several formerly common bumble bee species is now well documented in Minnesota, where extensive field surveys have been conducted over the past decade. The absence of these bees in state inventories of at-risk species is a missed opportunity to enhance monitoring efforts, and ultimately to identifying locations for targeted protection of remnant populations. The addition of *Bombus affinis* and *Bombus terricola* to the state's list of endangered, threatened, or special concern species would result in these species being tracked in the Natural Heritage Database. Inclusion in the list of Species of Greatest Conservation Need (SGCN) as part of the state's Wildlife Action Plan would allow for state wildlife grant funds to be spent on efforts focused on these species. Both actions will enhance the survival potential of these species, and provide a model for appropriate representation of all invertebrates in state conservation initiatives.

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4 The USDA Farm Service Agency should expand the Karner blue CRP-SAFE program to include an additional 1000 acres. Program guidelines should be refined to more effectively establish high quality habitat.

The Karner blue CRP-SAFE program represents an unparalleled conservation achievement. It not only has the potential to directly improve the status of this endangered butterfly, but can also benefit other at-risk Wisconsin wildlife, from declining bumble bees to grassland birds. Meeting the program's initial 1,000 acre goal is a clear reflection of the value that Wisconsin residents place on this effort, and demonstrates that the program has tremendous potential for additional growth. Finally, to ensure long-term program success, the FSA should authorize funds to conduct periodic efficacy monitoring, so that management guidelines reflect the most current and best available science.

5 Transportation agencies should work to incorporate native wildflowers into roadside rights-of-ways.

Parallel reviews by multiple workgroup members indicate that the restoration of native prairie plants along roadsides has a direct and positive impact on pollinators and other wildlife communities. Research also suggests that while initial establishment costs are higher when compared to non-native vegetation, long term maintenance costs are lower, because native prairie plants have a greater capacity to crowd out trees and shrubs and require less mowing to maintain motorist safety. Additional ecosystem services, such as water filtration, along with enhancement of rural aesthetics, and the economic impact of such "shovel ready" projects makes the greater adoption of native vegetation along transit corridors an obvious win-win conservation opportunity. One stakeholder notes that habitat restoration along north-south roads may be of particular benefit migrating species, and should be prioritized. To date, initial efforts by the Minnesota Department of Transportation have already been highly successful, resulting in nearly 120 acres of restored native plant habitat along roadsides per year over the past decade. As part of this effort, the agency worked with the MN DNR, the Xerces Society, and others to complete a 2010 Native Grassland Seed Mix Manual that ranks the pollinator value of all plants used in these restoration efforts.

6 Pesticide licensing requirements should be updated to include more effective information on how to protect pollinators.

While current pesticide licensing requirements in Minnesota and Wisconsin require some knowledge of mitigating risks to honey bees, many of those strategies offer minimal protection for native pollinators. To provide more effective statewide protection of pollinators, applicator training, testing, and continuing education curricula should be expanded to include basic information on wild pollinator ecology, and appropriate pesticide harm reduction methods.

7 Agencies should work cooperatively to promote the planting and protection of key host plants, such as milkweeds for monarch butterflies, in appropriate habitats.

Several nationwide initiatives are currently underway to increase the availability of locally appropriate milkweed seed (and the seed of other butterfly host plants), and to encourage their incorporation in restoration efforts at all scales. These efforts are essential to offset the landscape-level loss of milkweeds due to transportation agency mowing practices, urban development, and the increased use of herbicide-resistant crops. Because of their value to many other pollinator species (including bees and hummingbirds) milkweeds should be included in all restoration seed mixes where appropriate and where their presence will not interfere with other land-use practices such as grazing.

Recommendation Signatories

The following workgroup members support full implementation of these recommendations.

Dr. Marla Spivak, Professor of Entomology, University of Minnesota.

Dr. Russell Groves, Assistant Professor of Entomology, University of Wisconsin – Madison.

Dr. Priya Shahani, National Program Coordinator, Monarch Joint Venture.

Dr. Regina Hirsch, Outreach Specialist, Center for Integrated Agricultural Systems, University of Wisconsin – Madison.

Dr. Paula Kleintjes Neff, Professor of Biology, University of Wisconsin – Eau Claire.

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David M. Lowenstein, M.S. Candidate, University of Wisconsin – Madison.

Jeff Anderson, Member, National Honey Bee Advisory Board.

Eric Mader, Assistant Pollinator Program Director, The Xerces Society for Invertebrate Conservation; Extension Professor of Entomology, University of Minnesota.

List of Abbreviations Used in This Report

CRP	Conservation Reserve Program
CRP-SAFE	Conservation Reserve Program – State Acres for Wildlife Enhancement
CSP	Conservation Stewardship Program
DNR	Department of Natural Resources
EQIP	Environmental Quality Incentives Program
FSA	Farm Service Agency
NAFTA	North American Free Trade Agreement
NRCS	Natural Resources Conservation Service
USDA	United States Department of Agriculture
WHIP	Wildlife Habitat Incentives Program

Thanks

Funding for the stakeholders meeting and for other aspects of the Xerces Society's Pollinator Conservation Program is provided by:

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Front Cover
Once common and widespread in Minnesota and Wisconsin, the rusty-patched bumble bee (*Bombus affinis*) has almost disappeared from the two states. (© Johanna James-Heinz.)

Inside cover
Cranberry harvest. (Courtesy of USDA-ARS/Keith Weller.)

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