MINNESOTA
ENVIRONMENTAL QUALITY BOARD

Information Sources for the 2019 Minnesota State Agency Pollinator Report

This document provides background information on the scorecard metrics used in the 2019 Minnesota State Agency Pollinator Report. The Interagency Pollinator Protection Team (IPPT) develops an annual report on the status of pollinators and pollinator activities in Minnesota. The report, designed and written to be accessible to a wide audience, can be found at the Environmental Quality Board website.

Numerous individuals and organizations contributed to the development of the 2019 report. We are grateful for their time, talents, and expertise. The generosity of volunteers contributing to this statewide effort is commendable.

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Additionally, the IPPT would like to thank staff, scientists, researchers, and volunteers associated with:

- BeeSpotter
- Bumble Bee Watch
- Legislative-Citizen Commission on Minnesota Resources
- The London Natural History Museum
- Minnesota Board of Water and Soil Resources
- Minnesota Department of Agriculture
- Minnesota Department of Transportation
- Monarch Larva Monitoring Project
- The Montreal Insectarium
- National Institute of Food and Agriculture
- United States Department of Agriculture
- United States Fish and Wildlife Service
- University of Ottawa
- Wildlife Preservation Canada
- The Xerces Society
- York University

Outcome: Healthy, Diverse Pollinator Populations that Sustain and Enhance Minnesota's Environment, Economy and Quality of Life

Pollinator species diversity remains largely unknown in Minnesota, and even less is known about insect populations' status and trend. In addition, insect pollinators exhibit a wide range of life history characteristics that result in population responses that vary by species and across land use types. Due to these complexities, the report selected a suite of species with varied levels of habitat specificity and life history characteristics. Data availability and quality varies between species.

Specifically, the report identifies select imperiled species, those species that are endangered, threatened, or at risk; common species or species groups, those species or species groups that are perceived to be stable; and a managed pollinator species that is essential for food production.

To the extent possible, the report relies on quantitative data to assess species' status and trend. Qualitative data and expert opinion help fill gaps in knowledge. These metrics contain a great deal of uncertainty. Additional data collection efforts are recommended to refine these metrics for future reports.

Imperiled Pollinators

- **Rusty patched bumble bee (RPBB)**: Status based on the findings of the Species Status Assessment (SSA) completed by the U.S. Fish & Wildlife Service (USFWS 2016). While Minnesota remains a place where the species can be found, its status is poor compared to historical information. USFWS is working on a Recovery Plan for the RPBB, and we anticipate being able to further derive metrics for the species once complete – including the species' conservation trend in Minnesota.
    - USFWS Rusty Patched Bumble Bee Species Status Assessment
- **Monarch butterfly**: Status and trend metrics for the monarch butterfly are focused on the eastern migratory population, and are based on the overwintering numbers in Mexico and the egg data collected by the Monarch Larva Monitoring Project (MLMP). Because overwintering numbers lack specificity related to the origin of adult butterflies, we also gathered egg and milkweed data from MLMP as these data are MN specific and have been correlated with overwintering numbers in Mexico (Pleasants and Oberhauser 2013).
    - Monarch Watch Overwintering Population Data for 2019
    - MLMP Data for Minnesota
    - Pleasants, J. M., & Oberhauser, K. S. 2013. Milkweed loss in agricultural fields because of herbicide use: effect on the monarch butterfly population. Insect Conservation and Diversity, 6(2), 135-144.
- **Dakota skipper**: There is just one known naturally occurring population of Dakota skippers remaining in Minnesota. Reintroductions are now underway at another site with historic occurrences. USFWS is working on a Recovery Plan for the Dakota skipper, and we anticipate being able to further derive metrics for the species once complete – including the species' conservation trend in Minnesota. At this time, we consider the species' status to be poor based on a single remaining historical population, and the trend to be stable based on expert opinion.

- USFWS Dakota Skipper Species Status Assessment

Common Pollinators

- **Brown belted bumble bee**: This is currently a widespread and common bumble bee in the state. The species' status and trend are unknown at this time, but efforts to collect and compile data for bumble bees is underway and we anticipate being able to derive metrics for future use.
- **Bumble bee communities**: Bumble bees are an important pollinator, and efforts to collect and compile data to assess diversity of bumble bees is underway. We anticipate being about to derive Minnesota-specific metrics for future use.

Managed Pollinators

- **European honey bee**: Honey bees are important for crop pollination and food production. While there are many threats facing honey bees, honey yield in pounds has remained relatively steady over the last decade, however yield is 21% lower than the preceding decade. Based on the available information, we have assigned the European honey bee with a status of fair and a trend of about the same.
  - NASS Honey Yield

Number of species presumed no longer to occur in Minnesota

Minnesota's list of Species in Greatest Conservation Need (SGCN) includes 33 species of butterfly and moth, and five species of bumble bee, for a total of 38 SGCN pollinators. While it's likely additional species may also be lost from the state, we do not have adequate survey effort to make that conclusion at the time of this report.

We recognize the difficulty in detecting individuals within small populations, and the associated uncertainty surrounding the identification of species presumed to no longer be in Minnesota. In some cases survey effort in some portions of the state may be inadequate, but based on survey efforts elsewhere within the state and expert opinion, we presume these species have been lost from Minnesota.

- **Ottoe skipper**: Once found in southern Minnesota, this species has not been observed in several years despite significant effort by the Minnesota Department of Natural Resources (DNR) and other entomologists. If rediscovered within the state, it is most likely to occur in the prairies in the southeastern corner of the state.
- **Uncas skipper**: This skipper is described as a globally unique subspecies. The resident population from the Anoka Sandplain in central Minnesota has disappeared and the last known sighting is several decades old. Occasional migrants enter Minnesota rarely, presumably from neighboring South Dakota, but there is no evidence that those individuals form resident populations.
- **Karner blue butterfly**: Once occurring in portions of east central and southeast Minnesota, this species has not been observed in over a decade despite intensive surveys and habitat restoration.
- **Poweshiek skipperling**: Once a ubiquitous butterfly occurring in prairies throughout western and southern portions of the state. Following a rapid decline in the early 2000s, this species has not been observed in over a decade. Poweshiek skipperling is listed as a federally endangered species.

- **Uhler's arctic butterfly**: A species that was known only from the prairies of western Minnesota, and it has not been observed in the state in several decades.

Goal 1: Lands through Minnesota Support Healthy, Diverse and Abundant Pollinator Populations

Metrics were selected to cover efforts for public and private lands. For public lands, metrics were chosen on land where state agencies have a significant role in the restoration and management of habitat, including DNR and Minnesota Department of Transportation (MnDOT) land. Private lands metrics were chosen for state and federal programs that have a significant influence over available pollinator habitat. Efforts related to residential landscapes were also included, as this is a growing area of focus and of high potential value due to a large number of acres currently in turf.

The following is a summary of why status and trend markers were chosen for each of the metrics.

- **State managed protected lands restoration** – Status of "Okay" was selected due to use of pollinator BMPs developed for state managed lands. The quality of restorations is improving for pollinators, but lack of seed availability is a limiting factor. A trend of "About the Same" was selected due to the steady rate of restoration on DNR-managed public lands.
- **State managed highway right of way restoration** – A status of "Okay" was selected due to positive efforts to adjust mowing practices and restore roadsides to native vegetation. A trend of "Getting Better" was selected due to plans to increase the number acres managed for pollinators.
- **State private lands restoration** – A Status of "Good" was selected due to state funds and partnership resources dedicated to the new Minnesota CREP initiative. A trend of "Getting Better" was selected due to a large enrollment of easements helping to meet a goal of restoring 60,000 acres over five years.
- **Federal private lands restoration** – A status of "Poor" was selected due to the loss of over 160,000 acres of Conservation Reserve Enhancement lands over the last five years and a trend of "About the Same" was selected due to funding for conservation programs to remain about the same (2% increase) in coming years based on the U.S. Department of Agriculture's Economic Research Service. The acreage cap for the Pollinator Habitat Initiative (CP-42) was reached in 2017 and is not expected to be increased.
- **Urban and suburban land restoration** – A status of "Okay" was selected due to current interest from landowners in establishing habitat. A trend of "Getting Better" was selected due to the start of the new Lawns to Legumes program and building excitement about establishing residential pollinator habitat.

The following are data sources:

Public Lands

- **State managed protected lands restoration**: Information for newly established pollinator habitat on DNR lands comes from separate databases managed by divisions within the Minnesota Department of Natural Resources (DNR). The total number of DNR acres newly restored include FY17, 4630 acres, FY18, 4440 acres, FY19, 5030 acres. The following is a summary of restoration efforts from four divisions within DNR:
    - Wildlife & Aquatic Management Areas: FY17, 3779 acres; FY18, 3850 acres; FY19 4118 acres
    - State Parks and Trails: FY17, 751 acres; FY18, 501 acres; FY19, 847 acres

- State Forests: FY 17, 7 acres; FY18, 27 acres; FY19, 65 acres
- Scientific and Natural Areas: FY17, 93 acres; FY18, 62 acres; FY19, 65 acres
  *Data from databases from DNR Ecological Services, Parks and Trails, and Forestry Divisions

- **State managed highway right of way restoration**:
  Around 2200 acres of habitat have been restored on public highway right of way since 2016, so around 550 acres a year is being restored. MnDOT is developing performance measures for vegetation management to better guide maintenance practices and increasing use of native seed and prescribed fire.
  - Source: MnDOT summary of restoration projects

Private Lands

- **State private lands restoration**: The Conservation Reserve Enhancement Program (CREP) managed by the Board of Water and Soil Resources (BWSR) Easements Program establishes permanent state easements on private lands and has a goal of restoring 60,000 acres over five years. The program started in fiscal year 2017 and has enrolled around 7,800 acres. A large number of acres are being enrolled in 2019, significantly increasing the number of enrolled acres in the program.
  - Source: BWSR Reinvest in Minnesota Program Database
- **Federal private lands restoration**: Federal Conservation Reserve Program (CRP) acres in non-permanent protection have been relatively stable in Minnesota over the last year with 1,137,162 in fiscal year 2018. Though CRP acres in Minnesota have decreased from around 1,299,000 five years ago and 1,614,000 ten years ago and a high of 1,836,000 in 1994. A 2% increase in funding for conservation lands is expected in coming years based on the U.S. Department of Agriculture's Economic Research Service. The acreage cap for the Pollinator Habitat Initiative (CP-42) was reached in 2017 and is not expected to be increased. The percent of funding through the Environmental Quality Incentive Program that can be used for habitat plantings is planned to increase from 5% to 10%.
  - Source: USDA CRP statistics
  - Agriculture Improvement Act of 2018 Highlights and Implications
  - Xerces Society Staff
- **Urban and suburban land restoration**: There is a movement within urban parks and residential landscapes to establish pollinator habitat to benefit at risk species. There is no current tracking of the number of projects or acres currently being restored. The new Lawns to Legumes program initiated in 2019 and being coordinated through BWSR will be tracking projects that are being funded through the program as well as projects that landowners are initiating on their own.

Goal 2: Minnesotans Use Pesticides Judiciously and Only When Necessary, in Order to Reduce Harm to Pollinators While Retaining Economic Strength

Integrated pest management (IPM) was chosen for evaluating judicious use of pesticides because it is a science-based pest management strategy that minimizes economic, health and environmental risks. Identification of pests, thresholds, and use of multiple management strategies including, but not limited to, the judicious use of

pesticides are core principles of IPM. Development of IPM can be evaluated using several techniques including comparing the amount of funding granted to IPM-related research or programs in the state of Minnesota.

Promotion and implementation of IPM principles is key to reducing unnecessary pesticide use. One way of measuring IPM promotion can be by tracking outreach related to IPM done by the Minnesota Department of Agriculture (MDA) and the University of Minnesota (UMN).

Adoption of integrated pest management is the final metric. Adoption depends on the successful development and promotion of IPM. It can be challenging to measure adoption when baseline historical data for comparison is missing, inconsistently collected, or only available for one set of relevant stakeholders (i.e., growers).

- **IPM development**: List of grants awarded from the state [Minnesota Department of Agriculture (MDA) and Legislative-Citizen Commission on Minnesota Resources (LCCMR)] and federal [National Institute of Food and Agriculture (NIFA) and United States Department of Agriculture (USDA)] sources for IPM research were compiled to determine what monetary resources are being directed towards research aimed at developing IPM in the state of Minnesota. For example, 10, 12, and 11 IPM-based grants were funded during 2016, 2017, and 2018 respectively.
    - Funding amounts for grants awarded by the MDA were gathered internally via direct communication with the Agriculture Marketing Division as well as the Agricultural Growth, Research, and Innovation Program website and MDA's Greenbook website.
    - Funding awarded by the Legislative-Citizen Commission on Minnesota Resources (LCCMR) was found on the website under Projects Funded.
    - Funding awarded by the National Institute of Food and Agriculture (NIFA) and the United States Department of Agriculture (USDA) was found using the USDA awards portal.
- **IPM promotion and implementation**: The amount of material from the Minnesota Department of Agriculture (MDA) and University of Minnesota (UMN) was estimated to determine IPM outreach and extension material directed towards IPM promotion and implementation. For example, the MDA developed pollinator best management practices (BMPs) for yard and garden, rights of ways, and agricultural landscapes. More than 50,000 copies of these BMPs have been distributed through various avenues. Recently, the MDA developed neonicotinoid insecticide-specific BMPs for their use as seed treatments, soil and foliar applications, and for home and garden use. In addition, the MDA developed guide for managing soybean aphids using an IPM approach.
    - IPM promotion and implementation efforts made by the MDA can be found on the MDA's IPM webpage, the BMP webpage, and internally based on additional efforts throughout the year.
    - IPM promotion and implementation from the University of Minnesota IPM program and Extension were not tallied individually. The programs as a whole were evaluated for frequency of promotion, forms of promotion, demonstrations, and materials developed.
- **IPM adoption**: To determine the level of IPM adoption National Agricultural Statistics Service (NASS) and Minnesota Agricultural Statistics Service (MASS) Crop Surveys were used.
    - Surveys with summaries can be found on the MDA's website under Minnesota Agricultural Statistics Service and National Agricultural Statistics Service and on the USDA's National Agricultural Statistics Service webpage.
    - We currently do not have enough years with the current survey questions to provide an estimated trend.

Goal 3: Minnesotans Understand, Value and Actively Support Pollinators

Dialogue between state agencies and other stakeholders determined the metrics for the 2019 report. Although it is not possible to collect data from all programs available at this time, these metrics provide a base to gauge participation in programs around Minnesota. Metrics were selected based on longevity of the programs, and data reliability, verification, and accessibility. They can be accessed and assembled on a yearly basis with no fee for participation and data collection.

- **Pollinator Resolutions**: Status and trends based on cities, counties, townships, and school districts that passed resolutions through Pollinate Minnesota, Pollinator Friendly Alliance, and Humming for Bees. These resolutions call for an increase in flowering habitat, limit on pesticide use, and to increase awareness of pollinator issues in communities. The upward trend may indicate what is happening with similar programs, such as the Mayor's Monarch Pledge, that are working to raise awareness. In October 2018, 38 Minnesota communities had pollinator resolutions. The number of Minnesota communities that passed pollinator resolutions in October 2019 increased to 44.
    - Pollinator Resolution data from Pollinate Minnesota
    - List of Minnesota's Pollinator Friendly Communities from Pollinate Minnesota, Pollinator Friendly Alliance, and Humming for Bees
- **Community Science**: Status and trends were based on the overall number of Minnesotans participating in the Bumble Bee Watch program between 2016 to 2017 and 2017 to 2018. There was a decrease in Bumble Bee Watch participation overall from 116 in 2017 to 98 in 2018. There was an increase between 2016 with 67 participants to 2017 with 116 participants. With a decrease in participation in 2018, more work is needed to increase community science participation to help with research efforts. Data for 2019 will be included in the 2020 report.
    - Bumble Bee Watch data
    - The Xerces Society, Wildlife Preservation Canada, York University, University of Ottawa, The Montreal Insectarium, The London Natural History Museum, BeeSpotter. 2017. Data accessed from Bumble Bee Watch, a collaborative website to track and conserve North America's bumble bees. Available from http://www.bumblebeewatch.org/app/#/bees/lists. Accessed: Oct. 2019.
- **Pollinator Pledges**: Status and trends will be based on data from the Xerces Pollinator Protection Pledge. These data will not be available until 2020 due to upgrades with the Xerces database. Data will be provided on the number of Minnesota communities and individuals participating in the Xerces Pollinator Pledge program, which is part of the Bring Back the Pollinators campaign and the Million Pollinator Garden Challenge.
    - Xerces Pollinator Pledges Data