

MINNESOTA STATE AGENCY POLLINATOR REPORT

2021 | Annual Report



Charge

Executive Order 19-28 recognizes pollinators' importance to Minnesota's economy, ecology, and way of life and directs the Environmental Quality Board (EQB) to convene the Interagency Pollinator Protection Team (IPPT). The IPPT provides operational support, ensures interagency collaboration, develops cross agency policies and programs, and reports annually on progress.

The IPPT includes representatives from the Minnesota Departments of Administration, Agriculture (MDA), Corrections, Education (MDE), Health, Natural Resources (DNR), and

Transportation (MnDOT); the Minnesota Board of Water and Soil Resources (BWSR), the Minnesota Pollution Control Agency; and the Minnesota Zoological Garden (MNZOO).

Acknowledgements

The IPPT wants to thank the organizations and individuals that shared their stories, and the collaborators and survey respondents that helped us shape this report. They highlight that it takes all Minnesotans working together to create a better future for pollinators.

On the cover:

A green metallic sweat bee
feeding on a dogbane flower.

Photo by Laura Marti





Bee from the Megachilidae family feeding on butterfly weed.
Photo by Laura Marti

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INTRODUCTION

The purpose of the 2021 Minnesota State Agency Pollinator Report is to highlight goals, challenges and actions for pollinator protection. This annual report synthesizes new developments in pollinator protection over the past year and presents success stories from across the state.

Scorecards showing progress on pollinator protection goals are included in the appendix. After 2021, the IPPT will update these scorecards every three years to allow time for indicators to reflect progress from pollinator-related programs and initiatives.

In 2021, the IPPT gathered public feedback on the 2020 Minnesota State Agency Pollinator Report and input on barriers that individuals and organizations face in helping pollinators. As a result of this feedback, the IPPT has consolidated the report format so that in future years the team can focus on collaborating with Minnesotans on pollinator protection actions.

2021 Highlights

- **Increased capacity for habitat work.** The Legislature passed changes to the DNR-administered Reinvest in Minnesota (RIM) Critical Habitat Match program that will increase capacity for restoring and enhancing habitat and for activities that inform habitat management.
- **Grants for pollinator habitat.** The Legislature approved funding from the Environment and Natural Resources Trust Fund (ENRTF) for new and existing BWSR grant programs:
 - › The **Beneficial Insect Pilot Program** will strategically restore and enhance approximately 1,000 acres of habitat for pollinators and other beneficial insects on public lands or private lands across Minnesota.
 - › The **Lawn to Legumes Program (L2L) Phase 2** program engages residents statewide to establish pollinator habitat in residential yards through funding opportunities and technical assistance, and will also include opportunities to install pollinator habitat in community spaces.
- Public interest in pollinators translated into bills that were proposed to the Legislature. However, they did not all receive support.



Participants in the L2L Demonstration Neighborhood program showcasing their newly-planted pocket garden with pollinator-friendly plants.

Photo by Chisago Soil and Water Conservation District

- **Updated state seed mixes.** BWSR, MnDOT, DNR and other partners continue to update more than 70 state seed mixes to help meet emerging needs for pollinators, climate change, and landscape resiliency.
- **MnDOT successfully enrolled 256,000 acres in the Monarch Candidate Conservation Agreement with Assurances (CCAA).** The Monarch CCAA is a formal agreement to address the conservation needs of at-risk species before they become listed as endangered or threatened. In 2020, MnDOT monitored 50 random sites for presence of milkweed resulting in 56% of sites above the milkweed stem goal.
- **New bee-themed lottery ticket.** A rusty patched bumble bee-themed lottery ticket launched April 2021, and by August 2, 2021, over 1.6 million tickets had sold. This raised over \$3.3 million, a portion of which goes to the ENTRF, the Game and Fish Fund, the Natural Resources Fund, and the state's General Fund.
- **Native seed packet distribution.** During summer 2021, IPPT members and several collaborators began the process of distributing 50,000 packets of native seeds, along with a planting guide for Minnesotans, to grow pollinator-friendly gardens.
- **Releases of imperiled butterflies.** In June 2021, MNZOO reintroduced Dakota skippers from their breeding program at two DNR Wildlife Management Areas in southwest Minnesota. Over the next few years, survey data will be used to inform habitat management for prairies with Dakota skipper populations.
- **Farms endorsed for Integrated Pest Management (IPM) practices.** To date, MDA's Minnesota Agricultural Water Quality Certification Program (MAWQCP) has endorsed 45 farms for IPM practices, and 27 farms for wildlife conservation.

2021 Highlights continued

- **Habitat Friendly Solar.** Over 53 sites across Minnesota have met the BWSR Habitat Friendly Solar Program standards, restoring 1,317 acres of prairie surrounding solar installations.

Solar energy farm with established pollinator-friendly vegetation.

Photo by Paul Erdmann





A native bee foraging on pasqueflower, one of the first wildflowers to bloom in the spring.

Photo by
Jessica Petersen



CLIMATE CHANGE AND POLLINATORS

Minnesota's climate is changing rapidly, with substantial warming, especially during winter and at night; increased precipitation; and heavier downpours. The state warmed by an average of 3.0°F between 1895 and 2020, with winters and nights warming 2-3 times faster than summers and days. During the same period, annual precipitation increased by 3.4 inches. The decades ahead are expected to bring even warmer winters and nights, and even larger rainfalls, along with the likelihood of increased summer heat and the potential for longer dry spells. In 2021, Minnesota experienced its second warmest

summer on record, as part of a major drought that negatively impacted Minnesota's agriculture and natural landscapes.

Recent studies suggest that climate change has contributed to observed declines in monarch butterflies and bumble bees, and will continue to pose a grave threat to these and other pollinators. An example of this threat is the disruption between spring bee emergence and flower blooms that causes plants to miss out on pollination and bees to miss out on food.

Restoring and managing habitat to promote biodiversity also help reduce greenhouse

gases in the environment. Because pollinators support the reproduction of approximately 80% of flowering plants, they are essential to maintaining diverse and resilient ecosystems that store carbon, support food systems, and sustain local livelihoods.

Working toward abundant and diverse pollinator populations not only will benefit Minnesota's economy and way of life, it will also contribute toward fighting climate change so that future generations can enjoy a healthier environment and quality of life.

DESIRED OUTCOME

Healthy, diverse pollinator populations that sustain and enhance Minnesota's environment, economy, and way of life

Key challenges

- Designing and funding a long-term, landscape-scale monitoring program for pollinators is difficult. Currently, pollinator monitoring is largely supported by short-term competitive grant awards.
- Granting protections for imperiled pollinators can be a slow process. For example, the U.S. Fish and Wildlife Service (USFWS) indicated

that monarch butterflies meet the criteria for listing as an endangered or threatened species, but higher priority listing actions will take place first.

- There is a large knowledge gap about wild pollinators and their needs. The majority of pollinators are insects, and they are the most diverse group of animals in the world. This means that their biological and habitat needs can vary greatly.

Recommended actions

- Define and support Minnesota's pollinator monitoring priorities. As development of a national level pollinator monitoring framework continues over the next few years, state agencies and conservation organizations will define the geographic and ecologic scope.
- Provide sustained, long-term funding for pollinator-specific research, and develop a list of research priorities related to pollinator biological and habitat needs.

Monarchs refueling on native Joe-Pye-weed flower.
Photo by BWSR



Story of action

Learning more about Minnesota's bumble bees

The Xerces Society and the University of Minnesota marked the inaugural year of the [Minnesota Bumble Bee Atlas](#) in 2021. These community science survey efforts will provide valuable data that can be used to track the status of Minnesota's bumble bees over time. Anyone is welcome to participate and contribute to a better understanding of bumble bee needs!



Bumble bee on native
sneezeweed flower.

Photo by BWSR

GOAL 1

Lands throughout Minnesota will support healthy, diverse, and abundant pollinator populations

Key output: More food sources for pollinators

Key challenges

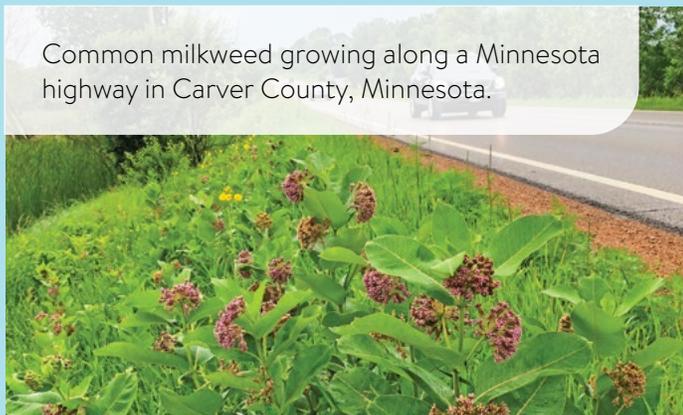
- Supporting habitat for pollinators is often one of many conservation goals. Land managers must balance pollinator requirements with other conservation and economic needs, such as managing habitat for other wildlife that may have distinct needs from pollinators.
- Obtaining a diverse seed mix for pollinator habitat can be costly, and some plant species may be difficult to source.
- Non-native plants often dominate lands enrolled in some common federal conservation programs, such as the Conservation Reserve Program (CRP) and the Environmental Quality Improvement Program (EQIP). These plants may provide limited food for native pollinators.

- Adopting pollinator-friendly gardening practices can mean shifting away from established social norms, such as maintaining a pristine turf lawn and clearing garden stems in the fall.

Recommended actions

- Encourage monitoring habitat for its effectiveness to pollinators on state-funded restoration projects. Data on restoration and management impacts can inform our understanding of the trade-offs associated with managing habitat for multiple conservation and economic goals.
- Invest in infrastructure for native plant propagation, storage, and harvest on state lands, and promote research on production methods for native species. Giving state land managers and their partners the tools to support genetic diversity in seed mixes can promote climate change resiliency and adaptation in habitat restorations.
- Continue support and development of programs, such as the L2L program, to subsidize costs, guide individuals to create pollinator habitat, and increase awareness about the benefits of pollinator habitat.

Common milkweed growing along a Minnesota highway in Carver County, Minnesota.





Urban Roots' conservation youth interns learning native plant identification.

Photo by Urban Roots

Story of action

If you plant it, they will come

The pollinator garden at the Sun Ray Library was planted in 2016 through a partnership between Urban Roots and Saint Paul Public Library. The garden was funded through the Friends of the Saint Paul Public Library. Youth involved in Urban Roots' conservation efforts participated in the transformation of the 5,000 square foot space from turf grass to 44 different native plant species.

Today, Urban Roots' youth use it to learn to identify native plants, conduct pollinator surveys, and

collect native plant seeds to start other habitat projects. Library staff create scavenger hunts encouraging guests to explore the garden, hold story times in the garden, collect bouquets of native flowers to display in the library, and lead conservation programs with Urban Roots and other community groups to teach the public about pollinators.

Recently, a University of Minnesota entomologist reported seeing a federally endangered rusty patched bumble bee in the garden!

GOAL 2

Minnesotans will use pesticides judiciously and only when necessary, to reduce harm to pollinators from pesticides while retaining economic strength

Key output: Reduced pesticide impacts to pollinators through integrated pest management (IPM)

Key challenges

- IPM can be highly successful in guiding the judicious use of pesticides, however there are many challenges, including:
 - › IPM programs do not exist for all pests or areas, such as some ornamentals and specialty crops, where pesticides are used;
 - › Education on IPM does not always reach all those who manage pests (e.g., homeowners);
 - › It's challenging to capture all efforts to adopt and promote IPM across all pest management scenarios and all educational entities.
- A wide variety of pesticides toxic to pollinators have been detected across Minnesota, (see the [2020 Water Quality Monitoring Report](#)) and in prairies where endangered Dakota skipper butterflies are being reintroduced (see the [MNZOO Report](#) "Potential causes of declines in Minnesota's prairie butterflies with a focus on insecticidal control of the soybean aphid"). Additional research is needed to understand how levels of these pesticides found in the environment affect pollinators.
- Pesticide registration and federal risk analyses are based on studies of honey bees or common surrogate bees. Pesticide exposure risk and pesticide effects on native pollinators are not fully understood.
- Pesticide misuse, such as drift, is not always reported to MDA for investigation. Additionally, the MDA has limited resources to investigate complaints.



Netting can help protect crops from insect pests.

Photo by Gabbi Sparby

Recommended actions

- Support development of IPM programs in locations where pesticides that are highly toxic to pollinators are likely to be used, and gather more information about IPM adoption through coordination with organizations like the National Agricultural Statistical Service.
- Expand education about IPM by developing pollinator resolution training modules for schools and local governments that include IPM, and increasing promotion of existing resources such as the MDA's pesticide best management practices and the MAWQCP IPM endorsement.
- Develop a list of research priorities related to the impacts of pesticides on pollinators (e.g., evaluate how the levels of neonicotinoid insecticides found in surface water may affect pollinators).
- Continue to spread the word about how to properly report pesticide misuse to the MDA and encourage people to use and support this service.



Applying pesticides according to the label helps prevent off-target drift.



Biological control is a non-pesticidal method of managing pests. Lady beetle larvae commonly eat soybean aphids.

Photo by Theresa Cira



Lieutenant Governor Peggy Flanagan and MDA Commissioner Thom Petersen recognizing the work that Kimber Contours farm is doing to help pollinators.

Photo by MDA

Story of action

Farming practices for a healthy environment

Kurt Kimber, Christine Kimber, and Carol Lowry are siblings who own and operate the **Kimber Contours** family farm near Castle Rock, Minnesota. The land has been in their family for five generations.

All crops raised are for human consumption including sweet corn, soybeans, wheat, dry peas, and Kernza® and have been certified organic since 2017. The farm was also certified under the MAWQCP in 2017 and have received all

four endorsements — wildlife, integrated pest management, climate smart, and soil health. Some practices they have added to their 240-acre parcel include contour cropping, native prairie integrated with row crops, cover cropping on a majority of the land each year, mowing instead of tillage when they can, and a grass buffer leading to the nearby ditch.

The farm also hosts hives for beekeepers Yuuki Metreud and Meghan Forrest who own Boreal Apiaries, LLC.

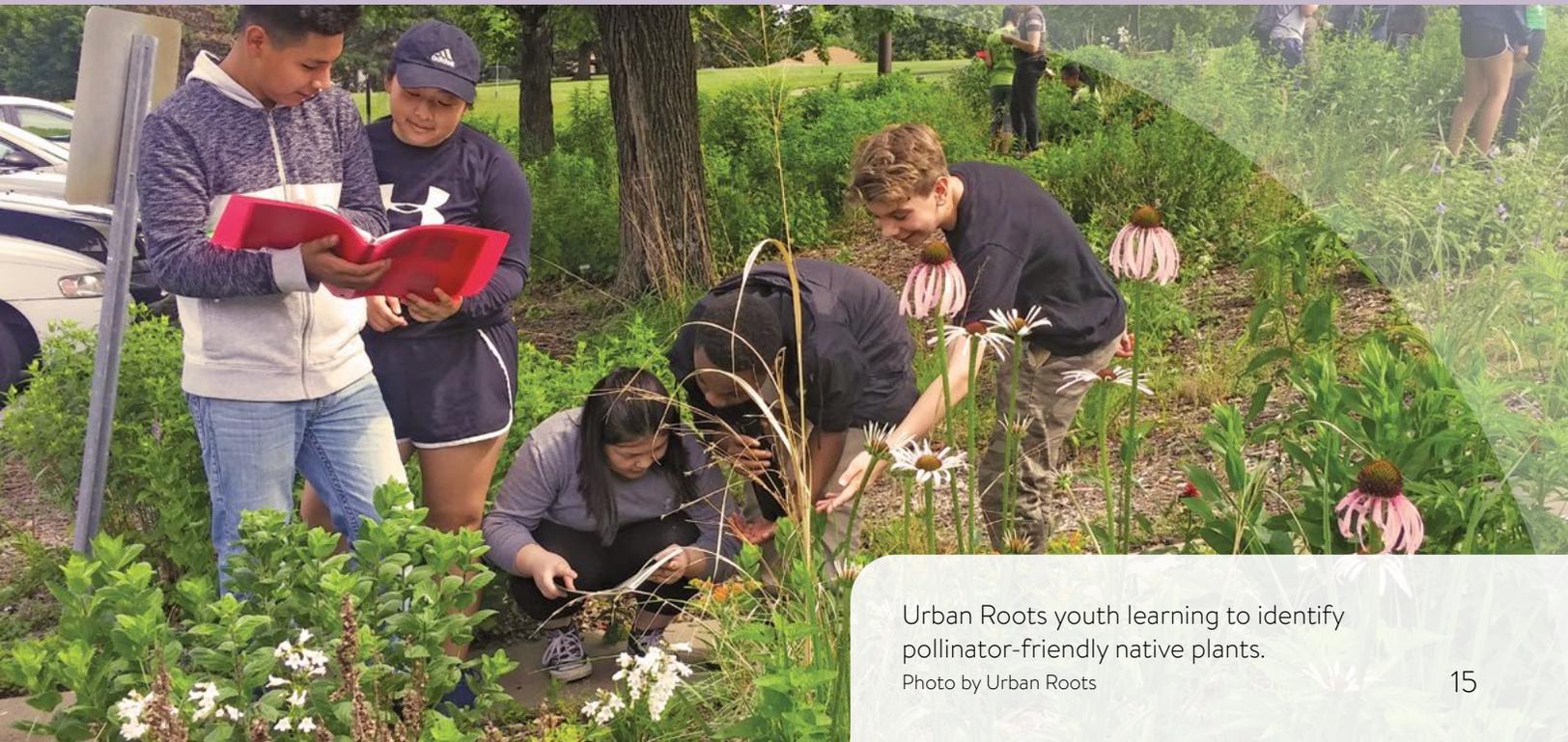
GOAL 3

Minnesotans will understand, value, and actively support pollinators

Key output: More action through community commitments

Key challenges

- Many pollinator educational programs are short-term and are not always accessible to all Minnesotans.
- Misconceptions about honey bees and beekeeping persist. While honey bee colonies are dying at elevated rates, honey bees are a managed species and are not at risk of extinction. Also, while commercial beekeeping is an important component of the agricultural economy, more people keeping bees as a hobby can negatively impact both honey bees and native bee populations by competing for floral resources and potentially spreading disease.
- There are local restrictions on landscaping that can hinder establishment of pollinator-friendly spaces in several cities and suburban areas across Minnesota.



Urban Roots youth learning to identify pollinator-friendly native plants.

Photo by Urban Roots

McGregor School children learning about honey bees and beekeeping.

Photo by McGregor School

Recommended actions

- Provide continued and equitable access to pollinator education programs across Minnesota.
 - › Seek consistent long-term funding for MDE to continue to collaborate with school districts and youth-serving community organizations to help support and promote pollinator educational programs and resources.
 - › Engage with culturally-specific community organizations to bring pollinator protection education and awareness to these communities.
 - › Collaborate with and learn from Tribal Nations on the conservation of pollinators and pollinator habitat.
- Increase education and awareness about effective ways to help both managed and native pollinator populations. These include sharing best management practices for managed honey bees with beekeepers and ways to increase habitat that includes native and diverse plants, nesting and overwintering habitat.
- Engage with local authorities to raise awareness and promote pollinator-friendly practices, regulations, adoption of pollinator-friendly resolutions, and participation in programs like **Bee City USA**, and **GreenStep Cities**.



Story of action

Pollinator science for all ages

Students and families in the McGregor School District in northeastern Minnesota have taken on pollinator-related science with the support of 21st Century Community Learning Centers Federal funding and a Rural Innovation grant from Compeer Financial and the Rural Schools Collaborative.

Using multiple educational resources, including community science through You 4 Youth, students have learned to identify and perform counts of a number of bee species commonly found in their yards, tag monarch butterflies, improve pollinator habitat through plant propagation and reduced use of chemicals, and understand the valuable roles pollinators play in our lives.

In the summer of 2021, students ages 5-16, family members, and older adults engaged in learning by donning bee suits and getting hands-on experience with honey bee colonies at a local apiary. Plans for planted areas on the school grounds and school forest area are underway for next spring to provide additional pollinator habitat.

Dakota skippers breeding just prior to being reintroduced by MNZOO staff in 2021.

Photo by Erik Runquist



APPENDIX: SCORECARDS

Key to status

- GOOD Ahead of goals and expectations
- OKAY Meets goals and expectations
- FAIR Behind goals and expectations
- POOR Well behind goals and expectations
- ? Not enough data or too variable

Key to trend

- ↗ Getting better
- ↔ About the same
- ↘ Getting worse
- ? Not enough data or too variable

The IPPT chose metrics and indicators based on available and reliable data. However, painting an accurate picture of the status of pollinators in Minnesota is challenging and complex, and there is still a large gap in our knowledge about their populations and specific needs. Therefore, the IPPT consulted with external subject matter experts to determine status and trends that reflect, as accurately as possible, the progress toward each of the state's pollinator protection goals.

DESIRED OUTCOME: Healthy, diverse pollinator populations that sustain and enhance Minnesota’s environment, economy, and way of life

| GROUP | INDICATOR | STATUS | TREND | SUMMARY |
|-----------------------|--------------------------|-------------|-------|---|
| Imperiled pollinators | Rusty patched bumble bee | POOR | ? | While populations are known to remain in parts of Minnesota, including within the Twin Cities, and some targeted research is occurring, we still know little about their presence across the state and whether those populations are healthy. |
| | Monarch butterfly | POOR | ↘ | The 2020-2021 overwintering eastern monarch populations showed a decline of approximately 26% (from 2.83 to 2.10 hectares) compared to the previous winter. The population is well below the international goal of 6 hectares. |
| | Dakota skipper | POOR | ↔ | The MNZOO continued the world's only reintroduction program for this threatened butterfly in 2021, releasing more than 1,100 individuals at two state-managed prairies in southwest Minnesota. The remaining wild populations monitored by the DNR remain stable. |
| Common pollinators | Common bumble bees | FAIR | ? | This year, the Xerces Society, in collaboration with the University of Minnesota, launched the Minnesota Bumble Bee Atlas. This project will generate data that can help experts determine the statewide status of common bumble bees and bumble bee communities. |
| | Bumble bee communities | OKAY | ? | |
| Managed pollinators | European honey bee | FAIR | ↔ | Honey produced per colony, a measure of honey bee health, remains steady, but is still approximately 20% lower than the previous decade. |

GOAL 1: Lands throughout Minnesota support healthy, diverse, and abundant pollinator populations

Key output: More food sources for pollinators

| GROUP | INDICATOR | STATUS | TREND | SUMMARY |
|---------------|--|-------------|---|---|
| Public Lands | Restoration on state-managed protected lands | OKAY |  | Restorations by the DNR have improved substantially in the past few decades. |
| | Restoration on state-managed highway rights-of-way | OKAY |  | MnDOT continues to increase use of native seed and prescribed fire along state-managed road rights-of-way. |
| Private Lands | Restoration on state private land easements | GOOD |  | Restoration of pollinator habitat through the Minnesota Conservation Reserve Program and other BWSR easement programs remains steady. |
| | Restoration on federal private land easements | FAIR |  | The number of acres enrolled in CRP remain similar for the past three years. |
| | Restoration on urban and developed lands | FAIR |  | BWSR's L2L program will continue to assist interested residents with establishing pollinator habitat in residential yards, and will also include opportunities to install pollinator habitat in community spaces. |

GOAL 2: Minnesotans will use pesticides judiciously and only when necessary, to reduce harm to pollinators from pesticides while retaining economic strength

Key output: Reduced pesticide impacts to pollinators through integrated pest management

| INDICATOR | STATUS | TREND | SUMMARY |
|-----------------|-------------|----------|--|
| IPM development | OKAY | ↔ | The number of Minnesota-specific IPM-related grants remain consistent for the past five years. |
| IPM promotion | OKAY | ↔ | Promotion of IPM remains consistent despite COVID-19-related restrictions. |
| IPM adoption | ? | ? | It is difficult to draw broad conclusions about trends in IPM adoption with limited long-term, consistent data. The MDA gathers data on insecticide use in several crops, rotating between them every several years; 2016 data about soybean is available online . New IPM farm endorsements from the MDA increased from 3 in 2019, to 18 in 2020, and to 24 in 2021, with a total of 45 across the years. |

GOAL 3: Minnesotans will understand, value, and actively support pollinators

Key output: More action through community commitments

| INDICATOR | STATUS | TREND | SUMMARY |
|------------------------|-------------|---|--|
| Pollinator resolutions | FAIR |  | There were no new adoptions of pollinator resolutions recorded by Pollinate Minnesota in 2021. |
| Community science | OKAY |  | In 2020, the number of participants in the Bumble Bee Watch was 232. This is the highest participation since 2016. |
| Pollinator pledges | OKAY |  | Pollinator pledges through the Xerces Society increased from 262 in 2019 to 304 in 2020. |

A metallic green sweat bee
feeding on a yellow flower.

Photo by Laura Marti



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