

**Ontario Wildlife Federation
EcoSpark Report
July 2020**

Thanks to the Ontario Wildlife Federation, the EcoSpark Science in the City program successfully used citizen science and experiential education to encourage students and community members to enjoy the outdoors through actively monitoring birds and animals found in the local natural habitats.



Across Toronto a total of 542 participants were directly engaged in Science in the City programs between June 2019 and June 2020. In addition, more than 1,500 individuals were indirect participants in the project, benefiting from: Science in the City programs in the broader Greater Toronto Area; activities and resources related to Science in the City as part of

EcoSpark's environmental education programs; or citizen science projects shared by participants with members of their own community. Everyone involved in Science in the City now has ongoing support and the skills to build on their experiences. By observing urban nature and taking part in citizen science with EcoSpark, they will continue their journey to becoming community stewards of the environment.

Activities:

Science in the City combines EcoSpark's core programs in a multi-year, community-level engagement project designed to assess ecosystem health from a variety of perspectives. In keeping with our motto: "Discover - Act - Change", this project began with a year of habitat mapping and monitoring, inspiring and training participants for their ongoing stewardship activities, follow-up monitoring and community reporting. The activities were designed to create a sense of community ownership, to identifying areas in need of remediation and to build partnerships and local teams to address them. The following details Science in the City achievements to date.

Teacher Training Resources

With the consultation of Ontario certified teachers, principals, and other educators, EcoSpark created a series of 4 new citizen science lesson plans for students grades 6-12 to participate in Ontario curriculum-linked outdoor education activities to engage local students in stewardship and monitoring on school grounds. The lesson plans use

citizen science databases, mapping tools, worksheets, and supplies to support students collecting valuable ecosystem information from their school grounds. Topics covered include Pollinators, Mapping Tree Benefits, Ticks & Climate Change, and Biodiversity & Invasive Species. Working with EcoSpark staff, students and teachers can contribute their findings to community maps and communicate with the broader scientific community about local ecological health. Each lesson plan includes several activities, with supporting materials (for example, EcoSpark's Guide to Reporting Invasive Species using Ontario EddMaps Tool). We also provided specialized information about incorporating Inquiry-based Learning and included extension activities with suggested adaptations for additional grade levels and curriculum connections.

We have collected student and teacher surveys about the individual citizen science activities included in teacher training materials, and this feedback was used to improve the lesson plans. For example, in response to teacher feedback that technology could be further integrated into EcoSpark's activities, we added step-by-step support for using school board-approved citizen science apps. We also added new online tools (available at www.ecospark.ca) to explore topics of climate change and species occurrence with students. Interactive citizen science maps were created to help teachers and other community members share their local nature data via established citizen science databases, and then analyze the findings on a neighbourhood scale using interactive mapping features. We are continuing to improve these online tools as additional community members make use of them to learn about local ecological health in their areas.

Community Engagement

EcoSpark delivered citizen science training and resources with the public, particularly in the communities of Morningside Park and Rowntree Mills Park, as well as school communities across Toronto where students (through School Watch and Changing Currents) and families (through Greenbelt maps, Water Quality Dashboard, and other engagement tools) could participate in different aspects of Science in the City. Engagement activities were supported by EcoSpark's diverse program expertise, partnerships, and the new projects developed over the year.

EcoSpark led in-person training events for community members in conducting pollinator surveys and monitoring biodiversity in local natural areas through our Park Watch and School Watch programs. School Watch - grades K to 12 - focused on the health of school playgrounds and the plants, pollinators, birds, and other life they support. We introduced the concepts of habitat monitoring, creation, and protection to support healthy abundant life in the world around us. Park Watch – community based – takes the basic tools of the School Watch program to residents sharing in the enjoyment of local parks and green spaces. Coordinating with partners from the City of Toronto, TRCA, Park People and local community groups we collaborated on programs

that assess, maintain, and restore local habitats to ensure they have the ecological integrity needed to support diverse wildlife populations.



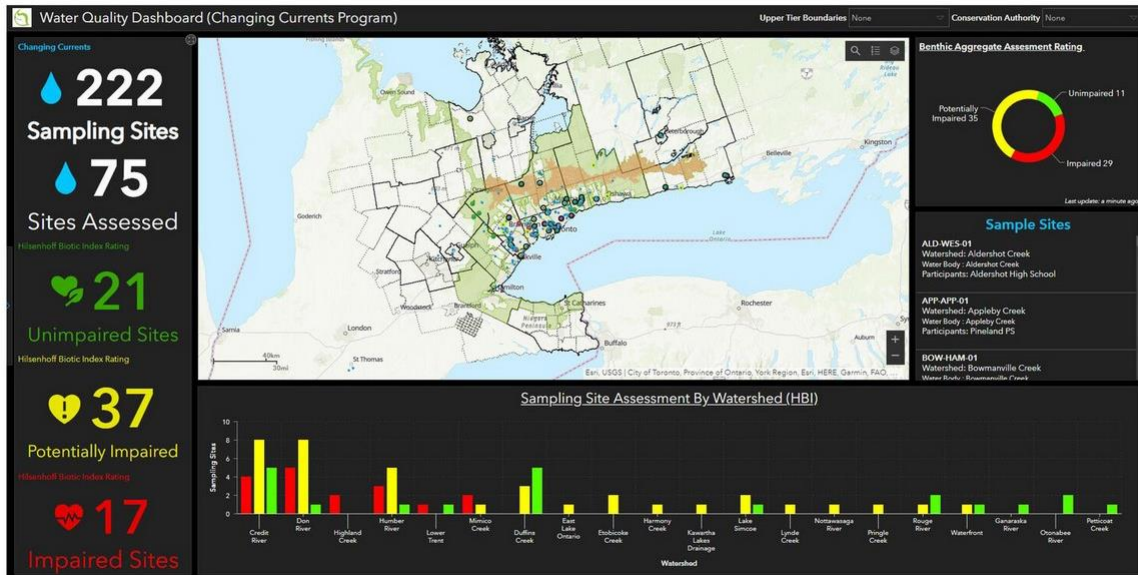
Held in public parks and school grounds, the training sessions enabled participants to gain hands-on experience with scientific equipment while learning simple observation techniques (like pen-and-paper insect counts) they could do on their own. Participants of all ages stated in feedback from these events that they enjoyed the training activities, and they

demonstrated new skills as a result of the training (for example, an “S-shaped” sweep technique for netting insects during field research). Participants also become more familiar with the concept of civic engagement through citizen science, as they were provided with meaningful examples of how community-collected ecological data is used to inform science and policy. For example, one of the published butterfly ID guides used in programs features distribution maps that comprise citizen science data, collected by local community members just like them.

EcoSpark’s award-winning Changing Currents program introduced students – grades 6 to 12 - to the science of stream studies. Students helped assess the health of local waterway using the Ontario Benthos Biomonitoring Network (OBBN) protocol looking at the benthic macro-invertebrates – little bugs - living in the bottom of local streams, water chemistry, and riparian plant life. Taken together these factors can indicate the health of streams and some of the work required to restore and conserve them; Partnerships with local conservation authorities then engage participants in remediation and restoration activities to help address some of the identified problems.

EcoSpark's Interactive Water Quality Dashboard

EcoSpark developed a new Water Quality Dashboard featuring stream data collected from across the GTA, which participants can explore online at ecospark.ca. The dashboard includes an interactive map of Toronto and surrounding areas with layers highlighting features such as regional boundaries, watersheds, and individual waterways. Each Changing Currents study site is represented on the map and linked to a data table showing the study and water quality results. The map is used by teachers to help students analyze data and provide context to help them understand their findings.



EcoSpark's Interactive Water Quality Dashboard displays data collected during stream studies by citizen science participants, using protocols adapted from the Ontario Benthic Biomonitoring Network. (EcoSpark. Available from <https://www.ecospark.ca>. Accessed July 2020.)

EcoSpark's Participant Observations – iNaturalist

Science in the City participants were trained to use citizen science tools to record species observations in the field. For example, EcoSpark's Participant Observations webpage housed on iNaturalist was developed to engage participants in weekly journal posts, naturalist feedback for all observations, and sub-pages including Moths of Ontario and Invasive Species to inform them about their findings. We trained additional participants with community partners by using virtual webinar sessions held during Covid-19 restrictions on in-person gatherings. Today we continue to gain new participants and observations for these remote citizen science projects.

The screenshot displays the EcoSpark Participant Observations page on iNaturalist. The header includes the EcoSpark logo and a banner image of a bee on a purple flower. Below the header, there are statistics: 11,253 OBSERVATIONS, 2,921 SPECIES, 1,191 IDENTIFIERS, and 12 OBSERVERS. A 'Stats' button is also visible. The main content area shows a grid of observation photos with labels: Bumble Bees (Genus *Borbus*, 21 hours ago), True Sedges (Genus *Carex*, 2 months ago), Eastern Woodland Sedge (*Carex blanda*, 8 days ago), and Grasses (Family Poaceae, 2 months ago). Navigation options like Map, Grid, List, Identify, and Search are available at the top of the main content area.

EcoSpark iNaturalist citizen science observation page connects Science in the City participants with other naturalists in the community while supporting grassroots research initiatives. (iNaturalist. Available from <https://www.inaturalist.org>. Accessed July 2020.)

Similarly, interactive online tools including the Greenbelt Storymaps were developed during the Science in the City program to help communities explore the intersection of ecology and policy. Participants continue to access and build on the tools, available online at ecospark.ca.

Planting for Pollinators

Our Planting for Pollinators project was adapted to engaged families, individuals, teachers, and students in supporting native plant and pollinator biodiversity with activities they can do at home during the Covid-19 related restrictions on public gatherings.



Each participant in this pilot activity was provided with everything they needed to get started growing native plants at home, whether in a garden or on a balcony or windowsill.

They attended informational webinars and/or were emailed extensive information on the benefits of native plants and instructions for care, as well as the citizen science training. Supplies (in the form of custom-mixed native plant seeds, planter boxes or pots, seed-starter mats, organic soil, and printed instructions and citizen science materials) were provided by mail or contact-less pick-up in the local communities.



Once established, the plants can be transferred to school grounds or community gardens to support biodiversity in public greenspaces.

The beneficial insects supported by these flowering plants form the basis of the pollinator ecosystem services upon which we all rely. Participants were also trained to monitor the insect visitors, for example by photographing native bees or butterflies and submitting them to EcoSpark's citizen science project housed on the iNaturalist database platform.

Planting for pollinators citizen science project supplies, and end result photo below from Toronto teacher trained in Science in the City, (EcoSpark 2020 and B.Ahrens 2020).

Participants

A total of 542 participants were directly engaged in Science in the City programs between June 2019 and June 2020 in the City of Toronto. In addition, more than 1,500 individuals were indirect participants in Science in the City.

Direct Participants

School Watch workshop & student session participants: 206

Park Watch community workshop participants: 268

Virtual training community participants: 68

Total Direct Participants: 542

Indirect Participants

All of EcoSpark's School Watch, Park Watch, and Greenbelt program participants across the Greater Toronto Area benefited from Science in the City resources, content, and programming materials (for example, citizen science reporting tools and lesson plan development informed all School Watch sessions). Science in the City program participants outside of Toronto are included here.

Greater Toronto Area (excluding Toronto) Participants: 780

In addition, an estimated one person for each direct Toronto participant listed above learned about the project resources by word of mouth and benefited as an indirect participant. For example, a Toronto student could share their data collection technique with a parent after a Science in the City session.

Toronto Indirect Participants: 542

Finally, many teacher and student participants in Changing Currents water quality monitoring programs were connected with new citizen science tools and techniques thanks to Science in the City activities taking place in their Toronto schools and communities. Here we estimate the participants from Changing Currents Toronto sessions that were also engaged in citizen science stewardship actions, environmental monitoring in Science in the City locations, or dual Changing Currents-School Watch participants.

Changing Currents Indirect Participants: 200

Total Indirect Participants: 1,522

Project Outcomes

The outcomes of Science in the City to date are well-aligned with the specific goals set out from the project's development. We assessed the success based on written and verbal feedback from participants, tools (such as the Water Quality Dashboard) and datasets (such as EcoSpark's iNaturalist Participant Observations citizen science project) created for Science in the City, and the new techniques and opportunities people gained by participating in the project (such as their time spent identifying wildlife outdoors).

Specifically, the Science in the City project's first year has made significant progress toward these outcomes:

- Community members are reconnected to their aquatic and terrestrial green spaces through hands-on citizen science and stewardship activities, gaining a more tangible understanding of their role in the conservation and enhancement of natural areas.
 - Example: Morningside Park community citizen science event
- Citizen Science projects expand the capacity for community members to enjoy their outdoor spaces, promoting both healthier lifestyles and environments.
 - Example: Rowntree Mills Park citizen science training in formerly closed park
- Youth and adults will become scientific researchers with the skills to monitor local populations of pollinators, birds, amphibians and more. They will become eco-literate and gain the ability to take more active roles in decisions about the places they live, play, and work.
 - Example: Changing Currents participants successfully complete Ontario Benthic Biomonitoring Network protocols and assess water quality using the Dashboard
- Through community reporting, schools, students and residents will share their knowledge about the health and needs of their local green space and waterways, putting their communities on pathways towards stronger environmental stewardship.
 - Example: Social media posts about citizen science opportunities and discoveries communicate findings to broader audiences
- Community groups, conservation authorities, local governments, and charities work together towards the common goal of protecting and enhancing local green spaces and waterways.
 - Example: Park People hosted EcoSpark staff for a virtual citizen science training session

- Local data collected by citizen scientists is contributed to larger research datasets that provide valuable information for scientists, NGOs, governments, and other stakeholders interested in conserving Ontario's natural areas and enhancing and protecting wildlife.
 - Example: EcoSpark's iNaturalist Participant Observations page features 11,000 observations to date

Expenses

\$500 Education consultant

\$830 Equipment (Field tools and supplies including citizen science planting supplies and field equipment for insect and biodiversity surveys)

\$120 Communications (promotional materials)

\$353 Program evaluations materials (program resources)

\$146 Transportation (staff transportation to events)

\$1948 Staff salary (costs to directly implement program including supervision and designing, preparing, and delivering community and teacher training, coordinating supplies, managing and displaying citizen science data for community groups, communicating with community groups to promote events and resources)

\$603 Overhead administration (costs related to program support)

Total \$4,500

Conclusion

Science in the City has become one of EcoSpark's core initiatives as the organization trains teachers, students, and community members to use citizen science to monitor and assess the health of the natural world around them. By teaching people when, where and how to identify native and invasive species, to find bees and butterflies, birds and frogs, and even the benthic invertebrates in the bottom of their local streams, EcoSpark connects people to the natural world around them. Discovering how to assess the health of their local ecosystem is the first of many steps to making informed conservation decisions that contribute to the enhancement of the natural world around us.

Sincerely yours,



Paul Mero
Executive Director
EcoSpark