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Article- Biodiversity and Citizen Science

Date: November 13, 2014

According to a recent report by the World Wildlife Fund, the 2014 Living Planet Report, the world has lost over half of its wildlife over the last 40 years. While there has been increasing coverage of the fact that more and more species are becoming extinct, the loss of over half of the population of the world's wildlife in such a short period is shocking news.

Biodiversity basically is a measure or description of the diversity of living organisms. It includes everything from the diversity of species to the diversity of ecosystems. Based on current knowledge there are approximately 3 to 30 million species on Earth, but some scientists suggest that the number may be much higher and could be as high as 100 million species. There is also an incredibly diverse range of ecosystems across our planet.

Unfortunately, while we share our planet with many other species, we have also had a large impact on them. Extinction is a normal occurrence in our planets natural system, but the rate at which species disappear is usually low. There have been a number of mass extinction events throughout Earth's history. Since we are currently losing species at much faster than normal rates (in fact it has been estimated that we are now losing them a 1,000 times the normal rate) some scientists believe we are entering the 6th mass extinction.

Our activities are therefore not only dramatically affecting the number of plants and animals on the planet, but also the variety of plants and animals. We are rapidly reducing the biodiversity of Earth.

Biodiversity is important to us not just for those who value and enjoy the natural world, but also for all of us in a much more direct way.

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Our foods depend on diversity not just in the variety of plants and animals we eat, but also in the fact that pollinators, soil organisms, ecosystem functions and other components of life are essential to healthy and productive farming. Similarly many of our medicines come from plants and other organisms and we are continually discovering new medical advances through research into organisms and ecosystems throughout the world.

Biomimicry and biophilic design are new areas of research in which we learn from the way nature solved problems to create new solutions and products that enrich our lives. For example, the lotus flower has inspired a new type of paint that repels dirt by mimicking the surface texture of this plant. The plant's surface is rough thereby suspending small particles so that they can easily be removed by rainfall. These new areas of science and manufacturing depend inherently on inspiration from biodiversity for the incredible complexity of ways nature has solved different problems.

Biodiversity also provides a range of ecosystem services. Ecosystem services are a measure of the way we benefit from nature through such things as stormwater management, air quality improvement, and all of the things that plants and animals do that benefit us. A study of the Greenbelt, which surrounds the Greater Toronto Area, estimates the value of the ecosystem services of this area at $2.6 billion annually, or an average of $3,487 per hectare.

Biodiversity also provides for resiliency. The diversity of life means that there is a greater ability to withstand disturbances. Simple ecosystems can fail or suffer losses more easily than healthy complex systems. For example, a forest rich in different tree species is not going to be impacted by a particular disease the way a single species plantation would be. Another example is the current problem being created by an invasive species, the Emerald Ash Borer. This insect kills ash trees. In some areas ash trees

dominate woodlands or urban tree plantings and the Emerald Ash Borer is having a devastating impact. In areas with greater diversity of tree species the loss of our ash trees will still be a problem, but the forest ecosystem or urban canopy will have a better chance of coping and maintaining its functions.

The amount of biodiversity and rates of loss of biodiversity vary across the globe. Generally, tropical areas are more diverse, but are also losing more species than temperate and boreal systems. In our area we have experienced a loss of biodiversity as Ontario was cleared for settlement. In southern Ontario, we have lost 72% of our wetlands, 80% of woodlands, and 99% of native grasslands.

The landscape we see and value today is very different from the one the First Nations lived in prior to the arrival of European Settlement. This change has fundamentally altered the ecosystems of this area as outlined in detail John Riley's book *The Once and Future Great Lakes Country, An Ecological History*. John, who lives in Mono, and has studied the ecology of this area in detail provides a very well researched description of how the landscape and its ecological functions have changed over the last 500 years. In just one example, John outlines the sad case of the passenger pigeon which went from accounting for fully a quarter of all the birds in North America to the death of the last bird in 1914. He then outlines how the loss of this bird has fundamentally changed the ecology of our forests and the types of trees and other plants that now occupy those forests as flocks of over 2 or 3 billion birds no longer ingest and thereby spread the nuts, berries and other food plants that other animals and First Nations peoples relied upon.

In order to protect our remaining biodiversity, we need to know more about the variety and number of species that continue to inhabit the areas we live

in and we need to value that diversity. Citizen science projects are an excellent way to accomplish these goals.

Citizen science offers an opportunity for people to contribute to scientific knowledge by recording and reporting their own observations. The benefits of citizen science projects include:

- The ability to collect information efficiently and at much lower costs;
- The opportunity to collect data over time and so document change as it occurs;
- Engagement of the public in collecting and sharing information and learning more about what they are observing.

In the case of natural heritage citizen science projects, there is also the benefit of getting people out into nature with all of the associated health benefits that come with being in the outdoors.

In order to learn more about the biodiversity of Clearview, the municipality has established a citizen science project called Biodiversity Clearview which can be accessed at http://www.inaturalist.org/. Interested individuals can sign in on the inaturalist web site and participate in the project logging in their own observations of flora and fauna in Clearview. The project is accessible on the web and participants can also download apps for their iOS or android devices (phones and tablets). The Biodiversity Clearview project also comes with its own guide to the Fauna of Clearview.

In order to participate in the project go to the inaturalist web site at http://www.inaturalist.org/ You can then create your own member profile to become a participant. Once you have a membership profile you can join the Biodiversity Clearview project and begin documenting your observations and enriching our knowledge of the rich and diverse flora and fauna of our area. As an inaturalist member you will also have the benefit of exploring the diversity of our planet by exploring other projects in Ontario and throughout the world.

As we learn more about the diversity of Clearview we will share that information, not just with the organizations that are working to protect the

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environment, but also with the public, so that we can all appreciate the diversity of life in the wonderful area we are fortunate to call our home.

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