



# State of Ontario's Biodiversity 2015 Summary

Ontario Biodiversity Council







Eastern Newt  
Photo: David J. Hawke



Ekwan River  
Photo: Mike Oldham

## Introduction

Biodiversity is the variety of life on Earth and is essential to sustaining the living systems we depend on for our health, economy, food and other vital services. To effectively protect and conserve biodiversity, it is necessary to understand biodiversity, the pressures that are acting upon it, and where there may be opportunities for improvement. Reporting on the state of Ontario's biodiversity every 5 years is identified as one of the actions in Ontario's Biodiversity Strategy (OBS) (the first report was released in 2010). The Strategy also requires reporting on progress in achieving Ontario's 15 biodiversity targets every 5 years. The Ontario Biodiversity Council leads this reporting effort.

Indicators are used to assess the state of Ontario's biodiversity and progress on Ontario's biodiversity targets. These indicators summarize data from monitoring programs and other sources to convey information on pressures, states, impacts and societal responses related to biodiversity. They provide key information on topics relevant to biodiversity conservation and the OBS targets. The indicators are largely based on frameworks used at the national and international levels. Information from indicators is assessed at the provincial scale, but is also presented in the context of Ontario's four major ecozones (Hudson Bay Lowlands, Ontario Shield, Mixedwood Plains and Great Lakes) and finer landscape scales.

This summary report provides an overview of status and trends for the 45 indicators included in the State of Ontario's Biodiversity 2015 report, as well as an assessment of progress against Ontario's 15 biodiversity targets. Some indicators relate directly or indirectly to the biodiversity targets and others deal with important aspects of biodiversity that are not associated with the targets.





Lake Opinigo  
Photo: Simon Dodsworth



Snowshoe Hare  
Photo: David J. Hawke



Great Blue Heron  
Photo: Rebecca Zeran

## Web-based biodiversity reporting

The State of Ontario's Biodiversity 2015 report is presented in a dynamic web-based framework that includes detailed indicator assessments and links to relevant background documentation ([www.ontariobiodiversitycouncil.ca/sobr](http://www.ontariobiodiversitycouncil.ca/sobr)). The website's flexible navigation allows visitors to find and view information in a number of ways using both desktop and mobile devices. Interactive, responsive and detailed, the web-based reporting framework provides more data than traditional printed reports. Indicators can be downloaded in a PDF format, and associated technical reports and data are also available for download. Indicators will be updated as new information becomes available.

## What is biodiversity and why is it important?

Biodiversity is the variety of life on Earth. It includes all living things and the ways they interact with each other and the environment. Simply put, biodiversity is life. There are three levels of biodiversity: genetic diversity – the variety of genetic information contained in individual plants, animals and micro-organisms; species diversity – the variety of species; and ecosystem diversity – the variety of habitats, ecological communities and ecological processes.

Biodiversity is about being connected. All species, including humans, rely on each other to survive. Humans depend, directly and indirectly, on biodiversity for clean air and water, food and fibre, and amazing outdoor experiences like hiking, fishing and canoeing. Conserving Ontario's biodiversity is important because healthy ecosystems sustain healthy people and a healthy economy. Ontario's biodiversity also has inherent value and must be recognized, appreciated and conserved for its own sake.

## Ontario's Biodiversity Strategy and biodiversity targets

Ontario's Biodiversity Strategy provides guidance and a common focus for biodiversity conservation across the province. The strategy was renewed in 2011 in a process led by the Ontario Biodiversity Council. Four strategic directions reflect the critical components required to conserve Ontario's biodiversity. They are: Engage People, Reduce Threats, Enhance Resilience and Improve Knowledge. Each of the strategic directions is supported by long-term objectives, outcomes, actions and targets.

The success of this Strategy is tracked through 15 specific targets that represent key areas of focus for biodiversity conservation in Ontario and support national and international initiatives (e.g., Aichi Biodiversity Targets). Progress is assessed over a 10-year timeframe to encourage ambitious actions that will ultimately lead to significant improvements in the state of Ontario's biodiversity.



## PROGRESS ON TARGETS

The biodiversity indicators show that there have been mixed results on progress towards achieving Ontario's biodiversity targets. There has been some progress towards meeting components of all targets and two targets have been met (targets 6 and 7). Nine of the 11 targets with a 2015 end date will require additional action over the next 5-year period. The four targets with a 2020 end date will also require sustained efforts.

Significant progress has been made on targets related to education, awareness and societal actions (Engage People targets 1 - 5). While further work is required, this is an encouraging sign that there has been headway on the OBS goal of mainstreaming biodiversity. Progress has also been good on targets related to reducing pressures on biodiversity (Reduce Threats targets 6 - 9) but sustained efforts are required to meet all of the targets. Progress has been slower on targets related to the Enhance Resilience strategic direction (targets 10 - 14). Most of these targets involve broad landscape-level actions and additional effort is clearly needed. Finally, monitoring and reporting on Ontario's biodiversity (target 15) has improved, but further broad-scale monitoring is necessary.

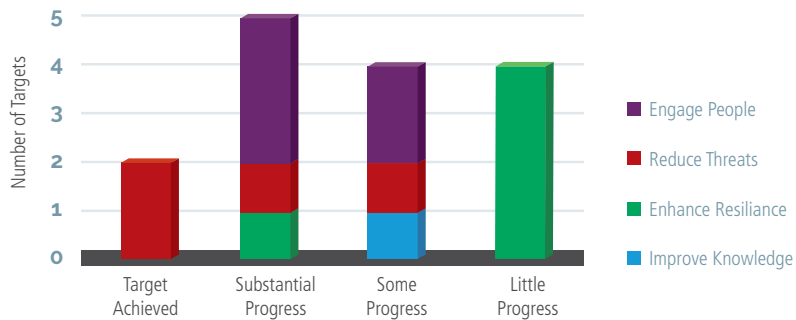


Figure 1. 2015 progress on Ontario's biodiversity targets.

## STATE OF ONTARIO'S BIODIVERSITY

In comparison to the 2010 Report, a greater proportion of biodiversity indicators show improving trends while fewer show deteriorating trends. There are 14 indicators with a baseline trend – these are largely new indicators developed to address OBS targets.

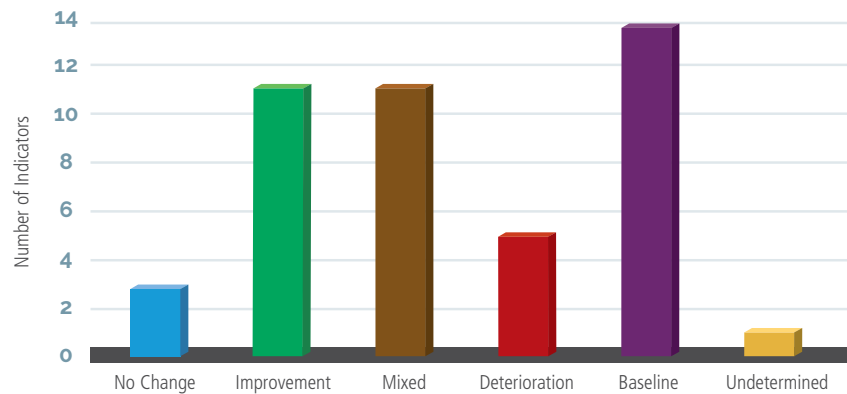


Figure 2. 2015 summary of trends for biodiversity indicators.

Trends related to some pressures have improved since 2010. The per capita Ecological Footprint, release of pollutants and introduction of alien species in the Great Lakes have all shown an improvement. In contrast, some habitat loss indicators show continued deterioration, as do those related to climate change, despite reduced greenhouse gas emissions. Overall, pressures are the greatest in the Mixedwood Plains Ecozone of southern Ontario.

Many of the indicators related to the state of ecosystems and species are assessed as mixed, showing both improving and deteriorating trends. Others have shown no change since 2010. One positive trend is an apparent reduction in the rate of wetland loss in southern Ontario over the last decade. Efforts to improve the state of species and ecosystems are ongoing; however, more work is needed to address the cumulative impacts of pressures.
















Most trends for indicators related to conservation response were positive owing to increased societal awareness and action to conserve biodiversity. Sixty percent of Ontarians are aware of biodiversity and the majority agree that it is important to their health and well-being. Although there have been continued improvements in many areas, these have not always been sufficient to achieve targets. For example, the amount of protected areas and conservation lands has increased by more than 9,000 km<sup>2</sup> (bringing the total to 11.2% of province) since 2010, but an accelerated rate of protection will be needed to achieve the 2020 target of 17% of the province. Additionally, funding for biodiversity conservation has not increased since 2010.

These indicators will be updated online ([www.ontariobiodiversitycouncil.ca/sobr](http://www.ontariobiodiversitycouncil.ca/sobr)) as new information becomes available and the next summary report is scheduled for release in 2020.

## 2010 REPORT

The first State of Ontario's Biodiversity Report was released in 2010. The report assessed status and trends of 29 indicators related to pressures on Ontario's biodiversity, the state of Ontario's biodiversity, and conservation and sustainable use. The 2010 report showed that Ontarians were placing large demands on the province's biological resources and that biodiversity losses were occurring, especially in southern Ontario. Although efforts to conserve biodiversity increased over the previous decade, it was not sufficient to prevent continued biodiversity loss.

## ASSESSMENT OF PROGRESS ON ONTARIO'S BIODIVERSITY TARGETS

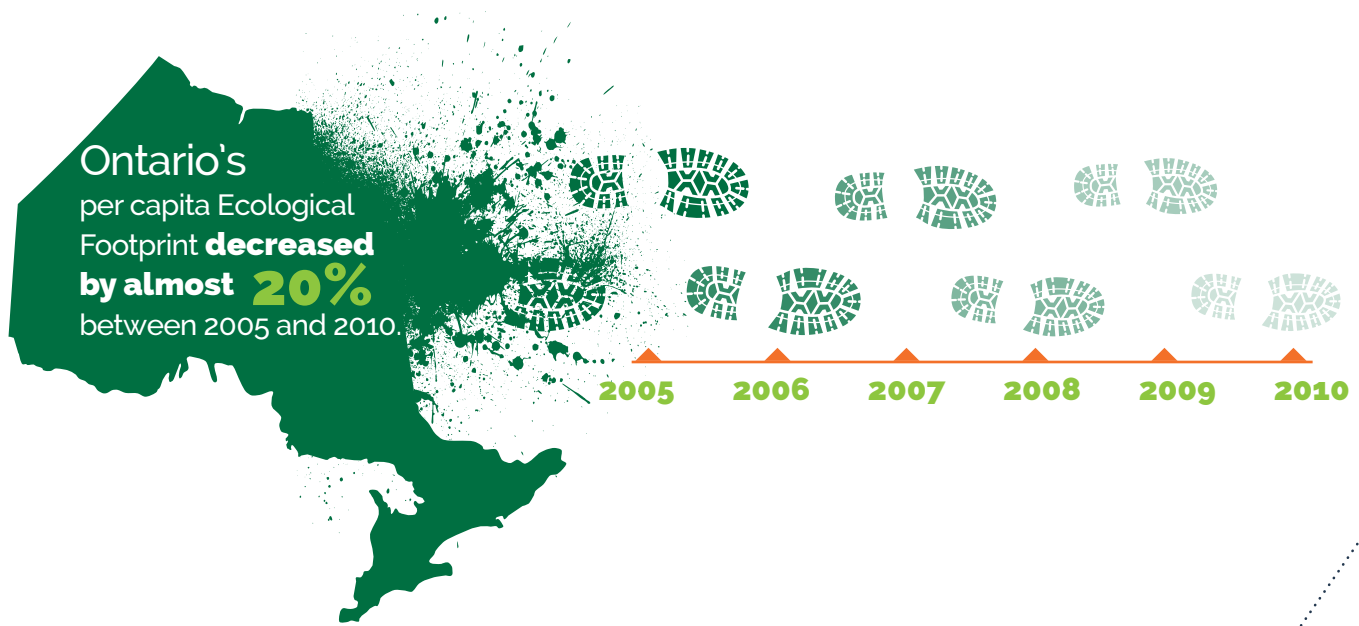
	TARGET	PROGRESS	
ENGAGE PEOPLE	1. By 2015, biodiversity is integrated into the elementary, secondary and postsecondary school curricula, including schools of business.	<b>SUBSTANTIAL PROGRESS</b> - Biodiversity fully integrated into elementary and secondary schools; partially integrated into postsecondary and schools of business.	
	2. By 2015, 50% of Ontarians understand biodiversity and its role in maintaining their health and well-being.	<b>SUBSTANTIAL PROGRESS</b> - 60% of Ontarians were aware of biodiversity; 36% correctly defined it, 17% provided a partial definition. 73% agreed it is important to their health.	
	3. By 2015, the number of Ontarians who participate in biodiversity conservation activities is increased by 25%.	<b>SOME PROGRESS</b> - Participation in biodiversity conservation continues to increase but has not increased by 25%.	
	4. By 2015, all sectors have initiated the development of implementation plans in support of Ontario's Biodiversity Strategy, and by 2020, those plans are implemented.	<b>SOME PROGRESS</b> - Implementation plans to support OBS have been developed; 34 of 70 Ontario companies examined account for biodiversity in their plans and operations.	
	5. By 2020, all relevant policies and programs integrate biodiversity values.	<b>SUBSTANTIAL PROGRESS</b> - 116 government policies and programs identified that integrate biodiversity.	
REDUCE THREATS	6. By 2015, plans for climate change mitigation are developed and implemented and contribute to Ontario's target to reduce greenhouse gas emissions by 6% below 1990 levels.	<b>TARGET ACHIEVED</b> - Provincial Action Plan in place and target to reduce greenhouse gas emissions to 6% below 1990 levels has been met.	
	7. By 2015, strategic plans are in place to reduce the threats posed to biodiversity by invasive species.	<b>TARGET ACHIEVED</b> - Strong national and provincial strategic framework including Ontario Invasive Species Strategic Plan (2012).	
	8. By 2015, the release of pollutants harmful to biodiversity is reduced.	<b>SOME PROGRESS</b> - Observed reductions of greater than 50% in the point-source release of major pollutants, but still issues with contaminants in the environment.	
	9. By 2020, the growth of Ontario's per-capita resource consumption and waste generation is halted and reversed.	<b>SUBSTANTIAL PROGRESS</b> - Ontario's Ecological Footprint has been reduced, but is now larger than biocapacity, which has decreased.	
ENHANCE RESILIENCE	10. By 2015, the status of species and ecosystems of conservation concern in Ontario is improved.	<b>LITTLE PROGRESS</b> - Although the status of some species at risk has improved, more species have declined. Trends in ecosystems not yet assessed.	
	11. By 2015, the proportion of private lands in Ontario that are managed for biodiversity is increased.	<b>SUBSTANTIAL PROGRESS</b> - The proportion of private lands with stewardship and lands acquired for conservation have increased.	
	12. By 2015, natural heritage systems plans and biodiversity conservation strategies are developed and implemented at the municipal and landscape levels.	<b>LITTLE PROGRESS</b> - Municipal natural heritage system planning has increased, but in 2013 natural heritage systems were identified in less than 30% of municipal plans.	
	13. By 2020, at least 17% of terrestrial and aquatic systems are conserved through well connected networks of protected areas and other effective area-based conservation measures.	<b>LITTLE PROGRESS</b> - Although the amount of protected areas and conservation lands has increased since 2010, at 11.2% it is still well below 17% target.	
	14. By 2020, programs and policies are in place to maintain and enhance ecosystem services.	<b>LITTLE PROGRESS</b> - Although there are many biodiversity related policies and programs that help maintain ecosystem services, there are few that specifically address ecosystem services.	
IMPROVE KNOWLEDGE	15. By 2015, a long-term monitoring and reporting system for assessing the state of Ontario's biodiversity is established and operating.	<b>SOME PROGRESS</b> - Ontario has a well-developed, online biodiversity reporting system and improved monitoring; additional comprehensive broad-scale monitoring is needed.	



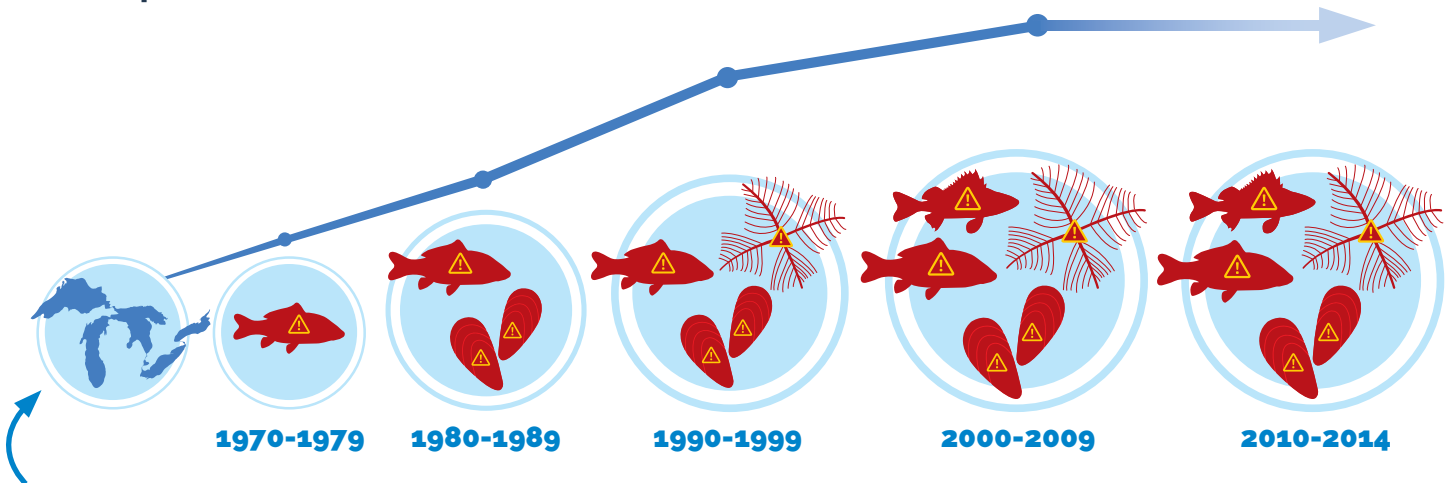
# Pressures on Biodiversity

At the global level, human activities over the last 50 years have changed ecosystems rapidly and have resulted in significant and largely irreversible losses in the Earth’s biodiversity. These changes have supported economic development, but have negatively affected the ecosystems and related ecosystem services that support life. Ontario’s Biodiversity Strategy identifies six main threats to biodiversity that are the result of human actions: habitat loss; invasive species; population growth; pollution; unsustainable use; and climate change. This theme area includes indicators that assess trends in the main threats to Ontario’s biodiversity. Results for a few key indicators are shown below and the table on the facing page includes a summary of status and trends for each indicator in this section.



















## Ecological Footprint



## Alien Species in the Great Lakes



**180 alien species** in the Great Lakes - no new alien species have been established since 2006.

INDICATOR	RELATED TARGET	STATUS	TREND
Consumption – Ecological Footprint	9	Ontario's Ecological Footprint has been reduced, but is now larger than biocapacity, which has decreased.	
Habitat Loss – Land Cover	n/a	At the broad ecozone scale, changes in land cover types between 2000 and 2011 have been minimal.	
Habitat Loss – Roads	n/a	Rate of increase of total road length has slowed since 1985, however, the total length of paved roads has continually increased.	
Habitat Loss – Terrestrial Fragmentation	n/a	In the Mixedwood Plains Ecozone, terrestrial habitat fragmentation is highest in the Toronto Ecodistrict and ecodistricts of southwestern Ontario.	
Habitat Loss – Stream Fragmentation	n/a	Density of dams and stream crossings is highest in the watersheds of the Mixedwood Plains Ecozone and the southern portion of the Ontario Shield Ecozone.	
Habitat Loss – Aquatic Stress Index	n/a	The average Aquatic Stress Index for Ontario watersheds increased by 7.5% between 2003 and 2013.	
Invasive Species – Alien Species in Great Lakes	7	A large number of alien species in the Great Lakes, but invasion rate appears to have decreased; no new alien species established since 2006.	
Invasive Species – Alien Species in Inland Lakes	7	A greater proportion of lakes in southern Fisheries Management Zones had alien species; mean number of alien species per lake increased from north to south.	
Invasive Species – Alien Species in Terrestrial Systems	7	Not assessed.	
Pollution – Release of Major Pollutants	8	Between 2002 and 2013 the release of NO <sub>x</sub> , SO <sub>x</sub> and mercury decreased.	
Pollution – Ground-level Ozone	8	Between 1980 and 2012 seasonal means of ground-level ozone increased, while annual peak concentration decreased.	
Pollution – Water Quality in Inland Lakes	8	Most lakes had phosphorus, pH and calcium levels within acceptable limits. There is a concern for low calcium and pH levels for some lakes in the Ontario Shield Ecozone.	
Pollution – Water Quality in Streams	8	Chloride levels were high near urban areas, nitrate levels were high in southwestern Ontario and phosphorus levels were above thresholds at almost half of monitoring stations.	
Climate Change – Greenhouse Gas Emissions	6	Provincial Action Plan in place and target to reduce greenhouse gas emissions to 6% below 1990 levels has been met.	
Climate Change – Afforestation/ Deforestation	6	Although there was significant restoration through tree planting in southern Ontario, the area of forest lost continued to be greater than gains. However, the net rate of forest loss is decreasing.	
Climate Change – Great Lakes Ice Cover	6	Between 1973 and 2013, ice cover for all the Great Lakes declined.	
Climate Change – Changes in Vegetative Phenology	6	The growing season started earlier and lasted longer in all three ecozones over the last decade.	
Climate Change – Polar Bear Body Condition	6	Polar bear body condition has continued to decline; survival rates have not been updated since 2005.	



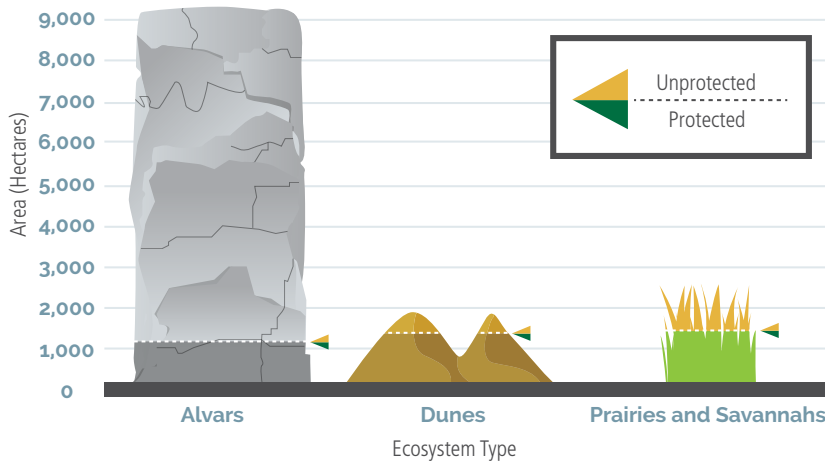
Ontario is a vast province that covers more than 1,000,000 km<sup>2</sup> of the Earth's surface. Despite its large human population, much of the landscape remains dominated by natural systems. These forests, wetlands, lakes, streams and other ecosystems provide the foundation that sustains Ontario's biodiversity. More than 30,000 species are known to reside in Ontario. Although most of these species are secure, some are of conservation concern due to their rarity or because their populations have declined in response to various threats. Genetic diversity within each species represents a third level of biodiversity that allows species to survive and cope with changing environmental conditions. This theme area includes indicators that assess the state and trends in the three levels of biodiversity – ecosystem, species and genetic diversity. Results for a few key indicators are shown below and the table on the facing page includes a summary of status and trends for each indicator in this section.

## Wetlands

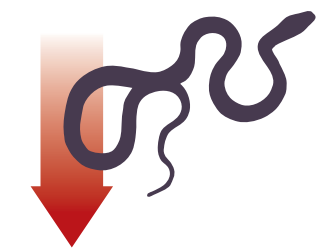


**0.6%** of Southern Ontario's wetlands were lost between 2000 - 2011

## Rare Ecosystems



## Species of Conservation Concern



**72%** of reptile species are of **conservation concern**



**68%** of freshwater mussel species are of **conservation concern**













**80%** of mammal species are **secure**



**82%** of insect species in assessed groups are **secure**



INDICATOR	RELATED TARGET	STATUS	TREND
Ecosystems – Forest Cover	n/a	Forest cover at the ecoregion level has been stable in Ontario Shield and Hudson Bay Lowlands ecozones, but has decreased in the Mixedwood Plains Ecozone. Forest harvest continues to be within allowable limits.	
Ecosystems – Wetland Cover	n/a	Wetland loss continues in the Mixedwood Plains Ecozone, but the rate of loss over the last decade appears to have been reduced.	
Ecosystems – Rare Ecosystems	10	14% of alvars, 61% of prairies and 75% of coastal dune ecosystems are legally protected. More than 80% of the area of these rare ecosystems is ranked as being of good or high quality.	
Ecosystems – State of Great Lakes	n/a	Despite successful restoration efforts and improvements in some conditions, the cumulative impacts of many pressures continue to threaten the Great Lakes.	
Ecosystems – Stream Flow Alterations	n/a	The most prevalent flow alterations for 274 stations over the last 30 years were later dates for low flows in the summer and increasing flow variability, primarily in the Mixedwood Plains Ecozone.	
Species – Species at Risk Status Changes	10	Most Species At Risk that were reassessed by COSSARO showed no change, while 22% were moved into a higher risk category and 9% were moved into a lower risk category.	
Species – Species of Conservation Concern	10	Most Species of Conservation Concern showed no change in general status, however more species moved into higher risk categories (13), than lower risk categories (6).	
Genetic Diversity – Genetic Diversity of Select Species	n/a	Human activities are affecting genetic diversity of select species in Ontario.	

 Improvement  
  Deterioration  
  No change  
  Mixed  
  Baseline  
  Undetermined



Eastern Sand Darter  
Photo: Alan Dextrase



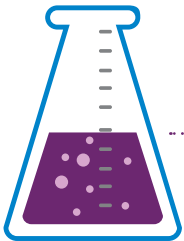
While there are serious threats and challenges to conserving Ontario's biodiversity, there is a strong and vital network of individuals and organizations working hard to reverse these trends. From the establishment of protected areas and conservation lands to the stewardship of private lands, Ontarians care and are committed to conserving the province's biodiversity. This theme area includes indicators that assess the conservation response of both individuals and organizations to the loss of Ontario's biodiversity. Results for a few key indicators are shown below and the table on the facing page includes a summary of status and trends for each indicator in this section.

### Protected Areas and Conservation Lands



**11.2%** of Ontario is protected within provincial and national parks, Dedicated Protected Areas in the Far North and other conservation lands.

### Biodiversity in Postsecondary Education



At the undergraduate level, **49.5%** of undergraduate programs included reference to the concept of biodiversity.



At the graduate level, **29.4%** of programs included reference to biodiversity.

### Biodiversity Awareness



**53%** of respondents could define or partially define biodiversity.




















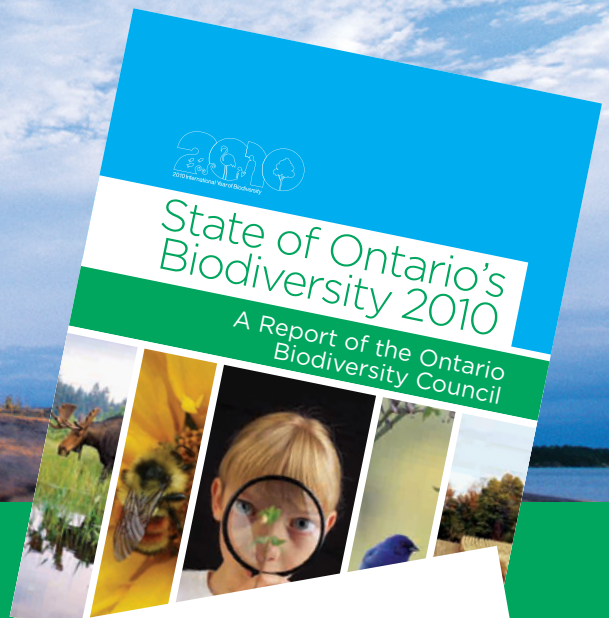
INDICATOR	RELATED TARGET	STATUS	TREND
Protected Areas – Area of Protected Areas and Conservation Lands	13	The amount of protected areas and conservation lands has increased since 2010, and is now at 11.2% of the province.	
Protected Areas – Ecological Representation	13	Representation of terrestrial ecological features is highest in the Ontario Shield Ecozone and this has increased since 2010 due to the establishment of Dedicated Protected Areas in the Far North.	
Stewardship – Stewardship Area	11	Between 2002 and 2012, the annual amount of stewardship land in Ontario increased.	
Stewardship – Volunteer Efforts	3	Between 2006 and 2012 the number of people who volunteered to conserve Ontario’s biodiversity appeared to increase; however, this can largely be attributed to refinement in reporting efforts.	
Stewardship – Tax Incentive Programs	3, 11	The number of people participating in CLTIP/MFTIP has increased. While the area of land conserved under CLTIP has increased, the area of land conserved under MFTIP has decreased.	
Plans/Policies – Natural Heritage Systems Plans	12	The percentage of Municipal Official Plans that formally identify and protect natural heritage features and connectivity is low (< 50%) but did increase between 2009 and 2013.	
Plans/Policies – Biodiversity Integration in Policies	5	116 Ontario government policies or programs integrate biodiversity values. An additional 10 opportunities to include biodiversity values were identified.	
Plans/Policies – Ecosystem Services Policies	14	The explicit consideration of ecosystem services is not yet common in Ontario government policies.	
Plans/Policies – Implementation Plans	4	Four plans specific to OBS 2011 have been developed and additional plans support the OBS.	
Plans/Policies – Business and Biodiversity	4	34 of 70 Ontario companies examined account for biodiversity in their plans and policies.	
Plans/Policies – Development of Invasive Species Plans	7	Strategic plans are in place at the national and provincial level to reduce threats posed to biodiversity by invasive species.	
Sustainable Management – Sustainable Agriculture	3, 11	70% of Ontario farms (37,000) have participated in environmental farm plans since 1992 (an additional 2,000 farms over the last 5 years).	
Sustainable Management – Forest Certification	n/a	In 2013, 76% of Ontario’s managed crown forests were certified – a 7% reduction since 2008.	
Sustainable Management – Walleye Harvest	n/a	25% of 367 Walleye lakes sampled from 2008-2012 had high fishing stress based on estimates of fishing mortality.	
Financing Conservation – Biodiversity Funding	n/a	Over the last 5 years, spending by biodiversity-related ministries and other sources has not increased.	
Education – Elementary/Secondary Curricula	1	Biodiversity has been integrated into the elementary and secondary school curricula.	
Education – Postsecondary Curricula	1	Biodiversity has been partially integrated into postsecondary curricula in Ontario, including schools of business.	
Awareness – Public Awareness of Biodiversity	2	60% of Ontarians were aware of the term biodiversity, 36% correctly defined it, 17% partially defined it. 73% agreed that biodiversity plays an important role in their health and well-being.	
Awareness – Monitoring and Reporting	15	A comprehensive system is in place to assess the state of Ontario’s biodiversity; but more comprehensive, long-term biodiversity monitoring is required.	





Photo: Ontario Tourism

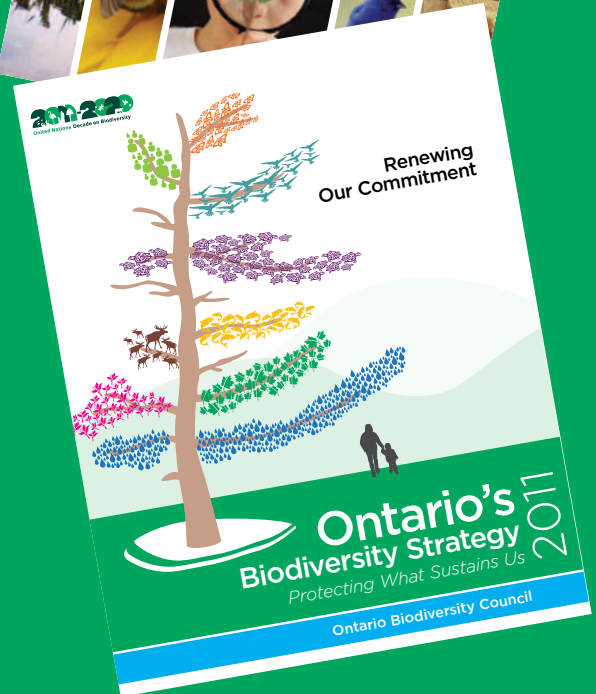


## What's next?

Indicators will be updated as new information becomes available to ensure the most recent and best data are available to help us better understand, conserve and protect Ontario's biodiversity. The next summary report is scheduled for release in 2020 to assess progress on targets and evaluate biodiversity status and trends.

For additional information about the state of Ontario's biodiversity, and Ontario's Biodiversity Strategy visit: [ontariobiodiversitycouncil.ca](http://ontariobiodiversitycouncil.ca)

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