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Data Sources and Methods for the Changes in Wildlife Species Disappearance Risks Indicator

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1 Introduction

The [Changes in Wildlife Species Disappearance Risks](http://www.ec.gc.ca/indicateurs-indicators/default.asp?lang=En&n=47F48106-1) indicator is part of the Canadian Environmental Sustainability Indicators (CESI) program (www.ec.gc.ca/indicateurs-indicators/default.asp?lang=En&n=47F48106-1), which provides data and information to track Canada's performance on key environmental sustainability issues.

The CESI program uses the findings of the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) to report on changes in wildlife species disappearance risks in Canada. COSEWIC is a committee of experts that determines the national status of Canadian wildlife species, subspecies, varieties or other designatable units that are suspected of being at risk of extinction or extirpation.

2 Description and rationale of the Changes in Wildlife Species Disappearance Risks indicator

2.1 Description

The Changes in Wildlife Species Disappearance Risks indicator measures conservation effectiveness and is developed in partnership with the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) Secretariat at Environment Canada. The indicator tracks changes in the level of risk for species assessed by COSEWIC as "at risk" in Canada.

2.2 Rationale

The recognition and assessment of a species as at risk of extinction or extirpation can focus management action towards high-priority issues. Successful management should reduce the risk of species extinction.

2.3 Recent changes to the indicator

The indicator is being updated to bring the data current to May 2014.

3 Data

3.1 Data source

Data are drawn from Committee on the Status of Endangered Wildlife in Canada (COSEWIC) Wildlife Species Status Reports, available at the Species at Risk Public Registry (www.sararegistry.gc.ca/search/advSearchResults_e.cfm?stype=doc&docID=18).

COSEWIC maintains a database of wildlife species assessment results, which were summarized for this indicator. A search can be made for wildlife species of interest at Wildlife Species Search (www.cosewic.gc.ca/eng/sct1/index_e.cfm).

Data contributing to the assessment of individual wildlife species are drawn from a wide range of sources, which are cited within the relevant status reports.

3.2 Spatial coverage

The indicator is national.

3.3 Temporal coverage

In general, wildlife species are reassessed every 10 years. The date of reassessment therefore varies widely within the dataset.

3.4 Data completeness

Data cover only the suite of wildlife species that have been reassessed and are not data deficient.

3.5 Data timeliness

COSEWIC meets twice per year to consider recent species reports, assess wildlife species' risk of extinction or extirpation, and designate a status category. Individual species are generally reassessed every 10 years. This indicator is current to May 2014.

4 Methods

4.1 Committee on the Status of Endangered Wildlife in Canada status assessments

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) uses a process based on science and on Aboriginal and community knowledge to assess wildlife species at risk. All native mammals, birds, reptiles, amphibians, fish, arthropods, molluscs, vascular plants, mosses and lichens are included in COSEWIC's current mandate.

In doing its work, COSEWIC develops the prioritized COSEWIC Candidate List of wildlife species needing assessment, manages the production of wildlife species status reports, and holds meetings at which wildlife species are assessed and assigned to risk categories. In all of its actions, COSEWIC uses the best available information relevant to assessing a wildlife species' risk of extinction or extirpation, which it may obtain from any credible source of knowledge of the wildlife species and its habitat.

COSEWIC annually commissions status reports for high-priority candidate wildlife species on the COSEWIC Candidate List or for wildlife species that require reassessment (update status reports). A status report is a comprehensive technical document that compiles and analyzes the best available information on a wildlife species' status in Canada. It contains information on the basic biology of a wildlife species, as well as information on a wildlife species' distribution in Canada, population sizes and trends, habitat availability and trends, and threats to the wildlife species.

All status reports (including updated status reports and unsolicited reports) must meet COSEWIC's standards for quality and completeness, and are subject to thorough reviews by the appropriate Species Specialist Subcommittee and the Aboriginal Traditional Knowledge Subcommittee, as well as by jurisdictions that have a responsibility for the wildlife species (including governments of the provinces and territories where the wildlife species occurs, federal departments responsible for the wildlife species, and wildlife management boards). Additional outside experts may also be asked to review status reports. When the reviews are complete and any required revisions have been incorporated, the report is distributed to all COSEWIC members.

COSEWIC members use status reports as a basis for discussion and for status assignment at semi-annual Wildlife Species Assessment Meetings. For each wildlife species considered at a Wildlife

Species Assessment Meeting, COSEWIC sequentially considers each of five items to determine a Canadian status designation:

1. Is there sufficient information presented in the report to determine wildlife species eligibility?
2. Given sufficient information, is the wildlife species eligible for assessment?
3. Is the status report adequate and acceptable for assessment purposes?
4. What status is suggested by application of approved COSEWIC quantitative assessment criteria and guidelines?
5. Does the suggested status conform to the COSEWIC definition for the proposed status category?

Wildlife species are assigned one of seven status categories: Extinct (X), Extirpated (XT), Endangered (E), Threatened (T), Special concern (SC), Not at risk (NAR) or Data deficient (DD). In May 2014, 936 wildlife species had status categories (see Table 1).

Table 1: Status of wildlife species assessed by COSEWIC as of May 2014

Status	Total number of species
Extinct	15
Extirpated	22
Endangered*	306
Threatened*	165
Special concern*	200
Not at risk	172
Data deficient	56
Total	936

* The sum of species designated as Endangered, Threatened and of Special concern make up a total of 671 species at risk.¹

4.2 Status changes

COSEWIC also notes a "change status" in its assessments, based on the most recent two assessments. This change status provides the base information for the CESI indicator, as summarized in Table 2.

Species with a change status of "New" have only been assessed once; they are therefore not included in the indicator. Species with a status of "Data deficient" on one or both assessment dates are also excluded.

Wildlife species that are reported in the "Reassigned" category are individually examined, and grouped into CESI units that can be considered as a whole. If the direction of change can be determined unambiguously, the units are assigned to the appropriate CESI change group. For example, a wildlife species that was split into two subspecies on reassessment would be treated as one CESI unit. If both new subspecies changed in the same direction on reassessment, the unit would be given a CESI change category. If the direction of change cannot be determined, the unit is given a CESI change category of "Unknown".

For 2014 data, the 74 wildlife species with a status change of "Reassigned" were grouped into 37 CESI units whose status could be examined. Of the 37 units, seven were assigned to the "No change" category, three to "Lower risk" and three to "Higher risk", while the remaining 24 could not be determined. Units that cannot be unambiguously assigned to a change category are not included in

¹ COSEWIC includes the "Extirpated" category in the at-risk group in their reporting.

the indicator. For detailed information on the allocation of wildlife species with a COSEWIC change status of "Reassigned", consult Annex 1.

Table 2: Relationship between COSEWIC status changes and CESI changes in disappearance risk

COSEWIC status change	Definition	CESI changes in disappearance risk
In a higher risk category	Wildlife species placed in a higher risk category after the most recent reassessment	Higher risk
No change ¹	Wildlife species stays in the same category after reassessment	No change
In a lower risk category	Wildlife species placed in a lower risk category after reassessment	Lower risk
No longer at risk	Wildlife species moved to the Not at risk category from a Risk category	Lower risk
New	Wildlife species examined for the first time are assigned a category of New	Excluded
Changed	Wildlife species moved to the Data deficient category from a Risk category or to a Risk category from the Data deficient category	Excluded
Reassigned ²	Wildlife species that has been assigned to a different designatable unit than previously	Case-by-case assignment

Notes:

¹ Wildlife species that are "Data deficient" on both dates when an assessment is made are excluded.

² Wildlife species that are reported in the "Reassigned" category are examined individually and grouped into related units. Where the direction of change can be unambiguously determined, these units are assigned to the appropriate change category.

5 Caveats and limitations

Knowledge of which wildlife species may be at risk is far from complete, and only a portion of those suspected to be at risk can be assessed. The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) prioritizes assessments based on expert opinion. Early efforts focused mainly on vertebrates and plants, and these are also the best-known wildlife species. As a result, these wildlife species are over-represented among wildlife species that have been reassessed. Similarly, knowledge of wildlife species is greatest in southern Canada and in terrestrial systems.

Many wildlife species in Canada have not yet been assessed by COSEWIC, but are suspected of being at some risk of extinction or extirpation. These wildlife species, referred to as candidate wildlife species, are identified and prioritized by the Species Specialist Subcommittees or by the Aboriginal Traditional Knowledge Subcommittee as candidates for detailed status assessment. Candidates may also include wildlife species already assessed by COSEWIC as "Not at risk" or "Data deficient", but where new information suggests they may be at risk.

6 References and further reading

6.1 References

Government of Canada (2013) Committee on the Status of Endangered Wildlife in Canada. Retrieved on 14 May, 2014. Available from: www.cosewic.gc.ca/eng/sct1/index_e.cfm.

6.2 Further reading

Government of Canada (2014) Species at Risk Public Registry. Retrieved on 14 May, 2014. Available from: www.registrelep.gc.ca/default_e.cfm.

International Union for Conservation of Nature (2013) IUCN Red List of Threatened Species. Retrieved on 14 May, 2014. Available from: www.iucnredlist.org.

National General Status Working Group (2011) Wild Species Reports. Retrieved on 14 May, 2014. Available from: www.wildspecies.ca/reports.cfm?lang=e.

Annex 1: Allocation of wildlife species with a COSEWIC change status of "Reassigned", 2014

For the CESI indicator, species in the "Reassigned" category have been classified into "Higher risk", "Lower risk" or "No change" categories when adequate information is available. This table summarizes the rationale for and conclusions of that classification.

Each CESI change unit is given a permanent CESI ID. Once the species involved in a CESI change unit have been reassessed, they are removed from this analysis.

Common name	Scientific name	CESI ID	COSEWIC IDs	Last assessed	CESI change class	Rationale for CESI assignment	Taxonomic group
Lake Sturgeon	<i>Acipenser fulvescens</i>	1	954, 955, 956, 957, 958	Nov 2006	No change	"Western populations" unit designated Endangered in May 2005. Western populations unit was split into five separate populations in November 2006; all new populations designated Endangered.	Fishes (freshwater)
Eastern Sand Darter	<i>Ammocrypta pellucida</i>	2	1075, 1076	Nov 2009	No change	The species was considered a single unit and designated Threatened in April 1994 and November 2000. Split into two separate units in November 2009; both units were designated Threatened.	Fishes (freshwater)
Bowhead Whale	<i>Balaena mysticetus</i>	3	1054	Apr 2009	Lower risk	Hudson Bay - Foxe Basin population and Davis Strait - Baffin Bay population were both designated Threatened in May 2005. In April 2009, these populations were considered a single unit (Eastern Canada - West Greenland population) and designated Special concern.	Mammals (marine)
Fin Whale	<i>Balaenoptera physalus</i>	5	874, 875	May 2005	Unknown	A single unit was designated Special concern in April 1987. In May 2005, the Pacific population was designated Threatened and the Atlantic population was designated Special concern.	Mammals (marine)

Mountain Sucker	<i>Catostomus platyrhynchus</i>	6	1115, 1116, 1117	Nov 2010	Unknown	A single unit was designated Not at Risk in April 1991. Split into three populations in November 2010, designated Threatened, Special Concern and Not at Risk.	Fishes (freshwater)
Kiyi	<i>Coregonus kiyi</i> subsp	8	873, 876	May 2005	Unknown	The Kiyi was designated Special concern in April 1988. Split into two subspecies in May 2005; the Upper Great Lakes Kiyi was designated Special concern, the Lake Ontario Kiyi was designated Extinct.	Fishes (freshwater)
Beluga Whale	<i>Delphinapterus leucas</i>	9	130, 366	May 2004	Unknown	Part of the Southeast Baffin Island - Cumberland Sound population was moved to a different unit in 2004; comparisons over time are not possible.	Mammals (marine)
Allegheny Mountain Dusky Salamander	<i>Desmognathus ochrophaeus</i>	10	963, 1004	Apr 2007	Unknown	A single unit was designated Threatened in 2001. In April 2007, split into two populations which were designated Endangered and Threatened.	Amphibians
Peregrine Falcon <i>anatum/tundrius</i>	<i>Falco peregrinus anatum/tundrius</i>	12	995	Apr 2007	Unknown	Two subspecies (Threatened in May 2000 and Special concern in 1992) were combined and designated Special concern in April 2007.	Birds
Atlantic Cod (Maritime)	<i>Gadus morhua</i>	13	1108, 1009	Apr 2010	Higher risk	In May 2003, the Maritimes population was designated Special concern. The Maritimes population was split into two units in 2010, both of which were designated Endangered.	Fishes (marine)
Atlantic Cod (Arctic)	<i>Gadus morhua</i>	14	1106, 1107	Apr 2010	Unknown	In May 2003, the Arctic population was designated Special concern. The Arctic population was split in 2010 into two units, designated Special concern and Data deficient.	Fishes (marine)
Southern Flying Squirrel	<i>Glaucomys volans</i>	16	945, 946	Apr 2006	Lower risk	Designated Special concern in April 1988. Split into two populations in April 2006 and both were designated Not at risk.	Mammals (terrestrial)

Chestnut Lamprey	<i>Ichthyomyzon castaneus</i>	17	1137, 1138	Nov 2010	Unknown	The species was considered a single unit and designated Special concern in April 1991. Split into two populations in November 2010 and both were placed in the Data deficient category.	Fishes (freshwater)
Northern Brook Lamprey	<i>Ichthyomyzon fossor</i>	18	970, 971	Apr 2007	Unknown	The species was considered a single unit and designated Special concern in April 1991. The species was split into separate units in April 2007; one unit was designated Special concern and the other Data deficient.	Fishes (freshwater)
Bigmouth Buffalo	<i>Ictiobus cyprinellus</i>	19	1016	Apr 2008	Unknown	A single unit was designated Special concern in 1989; in 2008 the unit was split and this subunit assessed as Not at risk. The other subunit (ID 1024) was reassessed in 2009 as Special concern.	Fishes (freshwater)
Deepwater Sculpin	<i>Myoxocephalus thompsonii</i>	21	914	Apr 2006	Unknown	In 2006, the unit was enlarged from the unit considered in 1987.	Fishes (freshwater)
Atlantic Walrus	<i>Odobenus rosmarus rosmarus</i>	22	915	Apr 2006	Unknown	Two separate populations: Eastern Arctic (Not at risk in 2000) and Northwest Atlantic (Extirpated in April 1987 and May 2000) were combined in 2006 and designated Special concern.	Mammals (marine)
Eastern Foxsnake	<i>Pantherophis gloydi</i>	23	1021, 1022	Apr 2008	Higher risk	A single unit was designated Threatened in May 2000. The unit was split into two populations in April 2008 and both were designated Endangered.	Reptiles
Gray Ratsnake	<i>Pantherophis spiloides</i>	24	983, 984	Apr 2007	Unknown	A single unit was designated Threatened in May 2000. Split into two populations in April 2007, designated Endangered and Threatened.	Reptiles
Five-lined Skink	<i>Plestiodon fasciatus</i>	25	973, 974	Apr 2007	Unknown	A single unit was designated Special concern in 1998. In April 2007, two units were designated Endangered (Carolinian population) and Special concern (Great Lakes/St. Lawrence population).	Reptiles

Western Chorus Frog	<i>Pseudacris triseriata</i>	26	1018, 1019	Apr 2008	Unknown	A single unit was designated Not at risk in May 2001. In April 2008, the unit was split into two populations, designated Threatened (Great Lakes/St. Lawrence - Canadian Shield population) and Not at risk (Carolinian population).	Amphibians
Barren-ground Caribou	<i>Rangifer tarandus groenlandicus</i>	27	822	May 2004	Lower risk	In 1991 the Low Arctic population was designated Threatened. The Dolphin and Union population is composed of a portion of the former Low Arctic population, and it was designated Special concern in May 2004.	Mammals (terrestrial)
Peary Caribou	<i>Rangifer tarandus pearyi</i>	28	823	May 2004	No change	This unit was created in 2004 for the Peary Caribou subspecies (designated Endangered) and contains all or part of three previous units (designated Endangered, Endangered and Threatened).	Mammals (terrestrial)
Showy Goldenrod	<i>Solidago speciosa</i>	29	1113, 1114	Nov 2010	Unknown	The species was considered a single unit and designated Endangered in 1999, confirmed in 2000. Split into two populations designated Endangered (Great Lakes Plains population) and Threatened (Boreal population) in 2010.	Vascular plants
Spring Salamander	<i>Gyrinophilus porphyriticus</i>	31	1160, 1161	May 2011	Higher risk	The species was considered a single unit and designated Special Concern in 1989 and 2002. Split into two populations in May 2011. The Carolinian population was designated Extirpated and the Adirondack/Appalachian population was designated Threatened in May 2011.	Amphibians
White Sturgeon	<i>Acipenser transmontanus</i>	32	1216, 1217, 1218, 1219	Nov 2012	Unknown	A single unit was designated Special concern in 1990, but Endangered in 2003. In November 2012, the unit was split into four populations, three of which were designated Endangered and one Threatened.	Fishes (freshwater)

Grizzly Bear	<i>Ursus arctos</i>	33	1195, 1196	May 2012	Unknown	The species was considered a single unit and designated Not at risk in April 1979. In 1991, the unit was split into Prairie and Northwestern populations, each of which was assessed in 1991 and 2002. In May 2012, the entire species was re-examined and split into Western and Ungava populations. The Western population was designated Special concern and the Ungava population was designated Extinct.	Mammals (terrestrial)
Tiger Salamander	<i>Ambystoma mavortium</i> or <i>Ambystoma tigrinum</i>	34	1223, 1224, 1227, 1231	Nov 2013	Unknown	Tiger Salamander was originally assessed by COSEWIC in 2001 as three separate populations. In 2012, Tiger Salamander was split into two separate species, Eastern Tiger Salamander (<i>Ambystoma tigrinum</i>) and Western Tiger Salamander (<i>Ambystoma mavortium</i>), each with two populations, for a total of four units.	Amphibians
Western Toad	<i>Anaxyrus boreas</i>	35	1214, 1215	Nov 2012	No change	The species was considered a single unit and designated Special concern in 2002. In November 2012, the unit was split into a Calling and a Non-calling population; both were designated Special concern.	Amphibians
Leatherback Sea Turtle	<i>Dermochelys coriacea</i>	36	1191, 1192	May 2012	No change	The species was considered a single unit and designated Endangered in 1981 and 2001. In May 2012, the unit was split into Atlantic and Pacific populations, both of which were designated Endangered.	Reptiles
Northern Dusky Salamander	<i>Desmognathus fuscus</i>	37	1189, 1190	May 2012	Unknown	The species was considered a single unit and designated Not at risk in April 1999. Split into two populations in May 2012; the Carolinian population was designated Endangered and the Quebec/New Brunswick population was designated Not at risk.	Amphibians

Silver Chub	<i>Macrhybopsis storeriana</i>	38	1193, 1194	May 2012	Unknown	The species was considered a single unit and designated Special concern in 1985 and in 2001. Split into two populations in May 2012; the Great Lakes - Upper St. Lawrence populations unit was designated Endangered and the Saskatchewan - Nelson River populations unit was designated Not at risk.	Fishes (freshwater)
Massasauga	<i>Sistrurus catenatus</i>	39	1220, 1221	Nov 2012	Unknown	A single unit was designated Threatened in 1991 and 2002. Split into two populations in November 2012; the Great Lakes/St. Lawrence population was designated Threatened and the Carolinian population was designated Endangered.	Reptiles
American Badger <i>jeffersonii</i> subspecies	<i>Taxidea taxus jeffersonii</i>	40	1229, 1230	Nov 2012	No change	A single unit was designated Not at risk in 1979. In 2000, each of three subspecies was given a separate designation (Endangered, Endangered and Not at risk). In November 2012, the <i>jeffersonii</i> subspecies was further split into two populations (Western and Eastern), and both were designated Endangered.	Mammals (terrestrial)
Wolverine	<i>Gulo gulo</i>	41	618	May 2014	No change	The species was considered a single unit and designated Special concern in 1982. In 1989, it was split into Western (Special concern) and Eastern (Endangered) populations. In 2014, the Eastern and Western populations were considered as a single unit and designated Special concern.	Mammals (terrestrial)
Loggerhead Shrike Eastern subspecies	<i>Lanius ludovicianus</i> ssp.	42	1265	May 2014	Unknown	The <i>excubitorides</i> subspecies was confirmed as Threatened in 2004. In 2014, the subspecies was split into a Prairie population which retained the Threatened designation, and new unnamed Eastern subspecies which was designated Endangered.	Birds

Caribou	<i>Rangifer tarandus</i>	43	637, 638, 1266	May 2014	Unknown	Following the designatable unit report on caribou (COSEWIC 2011), a new population structure was proposed and accepted by COSEWIC.	Mammals (terrestrial)
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