

COSEWIC
Status Appraisal Summary

on the

Desert Nightsnake
Hypsiglena chlorophaea

in Canada

ENDANGERED
2011

COSEWIC
Committee on the Status
of Endangered Wildlife
in Canada



COSEPAC
Comité sur la situation
des espèces en péril
au Canada

COSEWIC status appraisal summaries are working documents used in assigning the status of wildlife species suspected of being at risk in Canada. This document may be cited as follows:

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COSEWIC Assessment Summary

Assessment Summary – May 2011

Common name

Desert Nightsnake

Scientific name

Hypsiglena chlorophaea

Status

Endangered

Reason for designation

This nocturnal and secretive snake occurs in arid and semi-arid regions of western North America, reaching its northern distributional limits within seasonally hot interior valleys of south-central British Columbia. Throughout its small Canadian distribution, expanding urban and agricultural developments and their associated infrastructures threaten habitats of the species. Scattered distribution pattern, small population size, and no possibility of rescue contribute to the vulnerability of the species and place it at imminent risk of extirpation.

Occurrence

British Columbia

Status history

Designated Endangered in May 2001 and May 2011.



COSEWIC Status Appraisal Summary

Hypsiglena chlorophaea (formerly *H. torquata*)
Desert Nightsnake
Jurisdictions: British Columbia

Couleuvre nocturne du désert

Current COSEWIC Assessment:

Status category:

XT E T SC

Date of last assessment: May 2001

Reason for designation at last assessment:

"Only about 20 Night Snakes have been reported in Canada, all from a small region in south-central British Columbia that is under intense development pressure. The combination of small population size, widespread habitat loss, and no possibility of rescue effectively places the Night Snake at imminent risk of extirpation".

New reason for designation (only if different from above):

This nocturnal and secretive snake occurs in arid and semi-arid regions of western North America, reaching its northern distributional limits within seasonally hot, interior valleys of south-central British Columbia. Throughout its small Canadian distribution, expanding urban and agricultural developments and associated infrastructures threaten habitats of the species. Scattered distribution pattern, small population size, and no possibility of rescue contribute to the vulnerability of the species and place it at imminent risk of extirpation.

Criteria applied at last assessment: B1+2c (1999 – 2001 criteria)

If earlier version of criteria was applied¹, provide correspondence to current criteria: B1ab(iii)+2ab(iii)

If different criteria are proposed based on new information, provide explanation: NA

If application of current specific criteria is not possible, provide explanation:

Recommendation: Update to the status report NOT required (wildlife species' status category remains unchanged)

Reason:

- sufficient information to conclude there has been no change in status category
 not enough additional information available to warrant a fully updated status report

¹ An earlier version of the quantitative criteria was used by COSEWIC from October 1999 to May 2001 and is available on the COSEWIC website: http://www.cosewic.gc.ca/eng/sct0/original_criteria_e.cfm

Evidence (indicate as applicable):

Wildlife species:

Change in eligibility, taxonomy or designatable units: yes no

Explanation:

The nominal taxon *H. torquata* represents at least four sister species according to recent genetic data (Mulcahy 2008). The species that occurs in British Columbia is *H. chlorophaea* (Desert Nightsnake).

Range:

Change in extent of occurrence (EO): yes no unk

Change in area of occupancy (AO) : yes no unk

Change in number of known or inferred current locations: yes no unk

Significant new survey information yes no

Explanation:

In Canada, all records of the species are still confined to the Lower Similkameen and South Okanagan Valleys in B.C., from an area bounded by Keremeos in the west, Penticton in the north, and the Canada – U.S. border south of Osoyoos in the south (Figure 1) (Southern Interior Reptile and Amphibian Recovery Team 2008). Apparently suitable habitat for the species exists at several additional sites in southern B.C. (Figure 1), but the species remains undocumented from these areas. There are no changes to the EO, which remains small (<5000 km²). From 2003 to 2009, surveys for reptiles have been conducted annually within the range of the Desert Nightsnake in B.C. by Ophiuchus Consulting on behalf of Canadian Wildlife Service, B.C. Ministry of Environment, First Nations groups, and industrial clients (Mike Sarell pers. comm. 2010). As a result of increased search effort, the number of observations has tripled since the preparation of the COSEWIC status report: 1980 – 2000: 20 snakes (COSEWIC 2001); 1980 – 2004: 36 snakes (Southern Interior Reptile and Amphibian Recovery Team 2008); additional, recent observations bring the total from B.C. to approximately 60 snakes (M. Sarell, pers comm. 2010). B.C. Conservation Data Centre has 15 element occurrences of the species, which represent individual or groups of records separated from each other by > 1 km or by > 5 km within a matrix of habitat deemed unsuitable or suitable for the species, respectively; some of the new records from First Nations and private lands have not yet been released and are not included. All records are from restricted areas within hot, arid valleys. Although the known area of occupancy has increased slightly as a result of increased search effort, the actual area of occupancy is thought to be declining due to extensive and expanding agricultural and urban developments throughout the species' distribution in B.C.; however, direct data on distribution trends are lacking (Southern Interior Reptile and Amphibian Recovery Team 2008).

Note:

Calculations of EO and AO were not provided in the Technical Summary associated with the COSEWIC (2001) report. The current EO was calculated as 834 km², and the IAO based on 2 x 2 km grids superimposed on the Canadian distribution is calculated as 72 km² (B.C. Conservation Data Centre 2010) - 80 km² (Dyer, pers. comm. 2010).

Population Information:

Change in number of mature individuals: yes no unk

Change in total population trend: yes no unk

Change in severity of population fragmentation: yes no unk

Change in trend in area and/or quality of habitat: yes no unk

Significant new survey information yes no

Explanation:

Population estimates are not available (Southern Interior Reptile and Amphibian Recovery Team 2008), and the number of records remains too low for reliable extrapolations; only approximately 60 snakes have been found in B.C. from 1980 – 2010. The total population is thought to be small. Each of 15 element occurrences may consist of a population/subpopulation with little gene-flow among other such units. The total population is probably declining, based on extensive habitat loss and degradation, augmented by road mortality (Southern Interior Reptile and Amphibian Recovery Team 2008). The total population is considered severely fragmented, based on suspected small population sizes and extensive habitat fragmentation by natural barriers (lakes, major rivers), human-caused barriers (agricultural fields/orchards/vineyards, residential areas, roads) and relatively low dispersal ability of the species. These circumstances exacerbate naturally scattered distribution of rock habitats (talus, cliff, outcrops), favoured by the snakes, within the landscape. The viability of these small populations is unknown and will probably never be known until eventually surmised from their disappearance. Many occurrences are based on only one-two observations. Barriers to movements are probably insurmountable from east to west across the Okanagan Valley, and major barriers are also present from south to north (Dyer, pers. comm. 2010). There are only four records of the species from the west side of the valley. More records exist from the east side, where the habitat is more continuous but where there is also less habitat protection.

Threats:

Change in nature and/or severity of threats:

yes no unk

Explanation:

Habitat loss and degradation due to urban and agricultural developments remain the primary threats to the species in Canada (Southern Interior Reptile and Amphibian Recovery Team 2008). Secondary threats include road mortality and human persecution. No significant new information on threats is available.

Protection:

Change in effective protection:

yes no

Explanation:

Since the previous status assessment, the Desert Nightsnake has been placed on Schedule 1 of the *Species at Risk Act*. Critical habitat or residences under the Act have not been described for the species. In 2000, records existed from only one protected area located within an Ecological Reserve (COSEWIC 2001). Since then, habitat has been secured in the vicinity of suspected den sites at an additional 8 sites on lands managed by the Canadian Wildlife Service, the Nature Trust of B.C., the Land Conservancy, and the B.C. Ministry of Environment (Southern Interior Reptile and Amphibian Recovery Team 2008; Dyer pers. comm. 2010). In addition, a Wildlife Habitat Area for the Western Rattlesnake (*Crotalus oreganus*), established in 2008 by the province of B.C. under the *Identified Wildlife Strategy of the B.C. Forest and Range Practices Act*, may protect the Desert Nightsnake (Dyer pers. comm. 2010). However, several known sites and much potentially suitable habitat remain unprotected, and habitat fragmentation and isolation of populations continue to be problematic.

Rescue Effect:

Evidence of rescue effect:

yes no

Explanation:

No new information is available. Rescue effect was deemed unlikely in the Technical Summary of the COSEWIC status report mainly because of lack of sufficient habitat. Habitat fragmentation would make immigration unlikely, although the distance between the closest records in B.C. and Washington State is only about 110 km (Lacey *et al.* 1996).

Quantitative Analysis:

Change in estimated probability of extirpation:

yes no unk

Details:

No quantitative analyses are available or possible.

Summary and Additional Considerations:

The Desert Nightsnake has a small geographic distribution within hot, arid valleys of south-central British Columbia, where its populations continue to be threatened by expanding urban and agricultural developments and associated infrastructures. This species remains rare, although the number of records has increased since the preparation of the COSEWIC (2001) status report. These snakes are secretive, nocturnal, and patchily distributed in the landscape; all these factors make them difficult to detect and study. However, apart from issues with detection, their densities appear to be extremely low as evidenced by relatively few additional records despite increased search effort; furthermore, drift fences at communal snake hibernacula have resulted in very few observations of this species (Dyer, pers. comm. 2010).

A recovery strategy for the species was completed in 2008, and its implementation is overseen by the South Okanagan–Similkameen Conservation Program. The recovery strategy calls for the protection of occupied and connecting habitat according to set targets and for the development and implementation of a research program to address important data gaps. These activities are to be carried out within the context of a broader, multi-species approach that also benefits other listed snakes and species that share similar habitats. Habitat protection efforts have been initiated to secure small areas around snake hibernacula at known and suspected sites (see **Protection**). Paucity of detailed information on the distribution and seasonal habitat use of the Desert Nightsnake hinders conservation efforts.

List of authorities contacted:

*Denotes that information was provided by authority contacted.

The following persons were contacted through an email or telephone query:

Cunnington, David. February 2010. Endangered Species Biologist, Canadian Wildlife Service, Delta, B.C. (no response)

*Dyer, Orville. February, November – December 2010. Co-chair of Southern Interior Reptile and Amphibian Recovery Team; Wildlife Biologist, B.C. Ministry of Environment, Penticton, B.C.

*Gelling, Lea. November – December 2010. B.C. Conservation Data Centre, Ministry of Environment Victoria, B.C.

*Govindarajulu, Purnima. February 2010. Small Mammal and Herpetofauna Specialist. B.C. Ministry of Environment, Victoria, B.C.

Gregory, Linda. February 2010. Biologist, Cobble Hill, B.C.

Gregory, Patrick. February 2010. Professor, Department of Biology, University of Victoria, Victoria, B.C. (no response)

Hobbs, Jared. February 2010. IWMS Species/Implementation Biologist, B.C. Ministry of Environment, Victoria, B.C. (no response)

Larsen, Karl. February 2010. Associate Professor, Wildlife Ecology & Management, Dept. Natural Resource Sciences, Thompson Rivers University, Kamloops B.C.

Sarell, Mike. February 2010. Biologist, Ophiuchus Consulting, Oliver B.C.

Sources of information:

B.C. Conservation Data Centre (Victoria, B.C). 2010. *Email correspondence from Lea Gelling to K. Ovaska*. November – December 2010. (cited in Technical Summary)

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Dyer, Orville pers. comm. 2010. *Email correspondence to K. Ovaska*. February & December 2010. Wildlife Biologist, B.C. Ministry of Environment, Penticton, B.C.

Lacey, H.C.H. Shewchuk, P.T. Gregory, M.J. Sarell and L.A. Gregory. 1996. The occurrence of the Night Snake, *Hypsiglena torquata*, in British Columbia, with comments on its body size and diet. Canadian Field Naturalist 110:620-625.

Mulcahy, D.G. 2008. Phylogeography and species boundaries of the western North American Night Snake (*Hypsiglena torquata*): revisiting the subspecies concept. Molecular Phylogenetics and Evolution 46:1095–1115.

Sarell, Mike pers. comm. 2010. *Email correspondence to K. Ovaska*. February 2010. Biologist, Ophiuchus Consulting, Oliver B.C.

Southern Interior Reptile and Amphibian Recovery Team. 2008. Recovery strategy for the Night Snake (*Hypsiglena torquata*) in British Columbia. Prepared for the B.C. Ministry of Environment, Victoria, BC. 13 pp. Website: http://www.env.gov.bc.ca/wld/documents/recovery/rcvrystrat/nightsnake_rcvry_strat_130208.pdf [accessed February 2010].

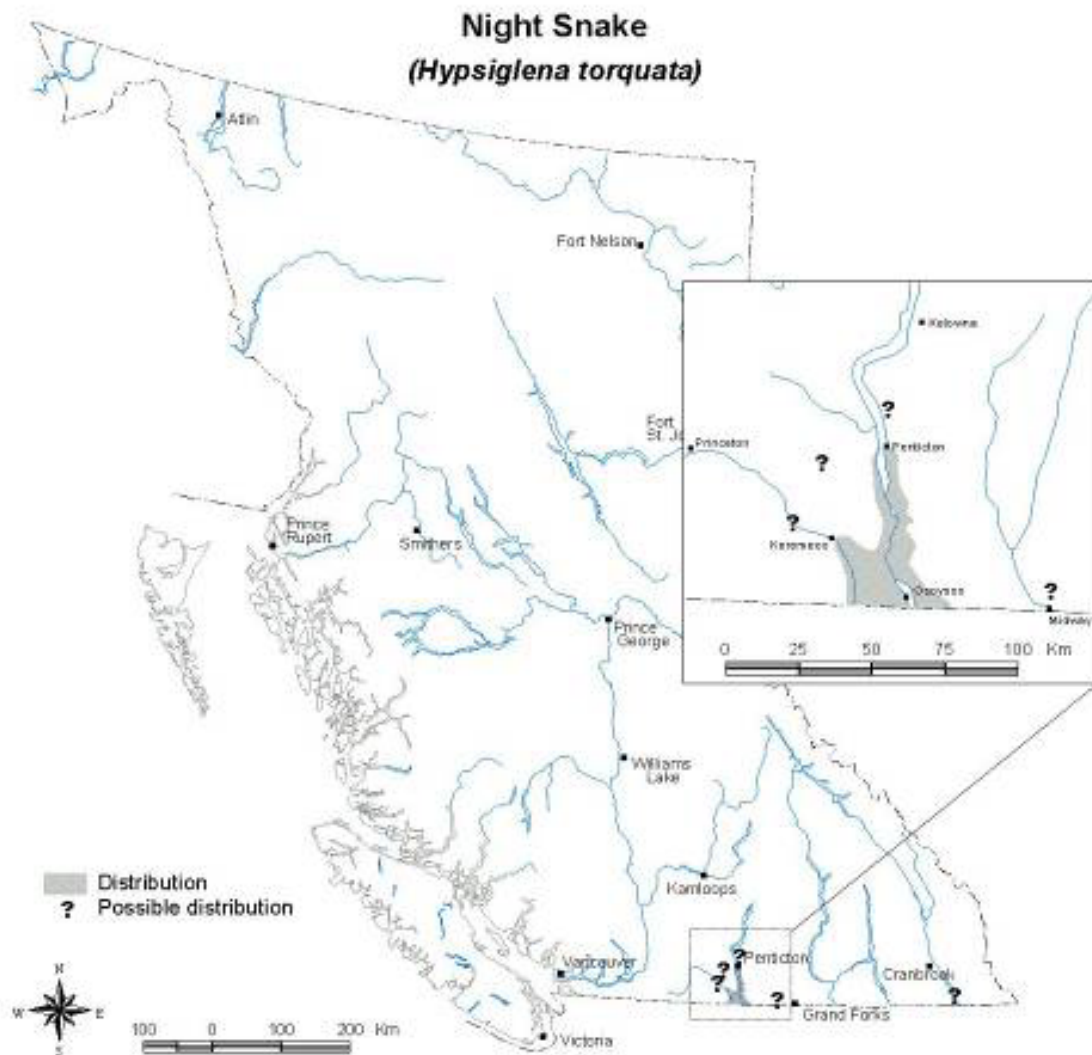


Figure 1. Distribution of Desert Nightsnake in British Columbia. Source: Southern Interior Reptile and Amphibian Recovery Team. 2008. ? indicates presence of potentially suitable habitat with other arid area reptiles, but no documented records of the Desert Nightsnake.

TECHNICAL SUMMARY

Hypsiglena chlorophaea (formerly *H. torquata*)
 Desert Nightsnake
 Range of occurrence in Canada: British Columbia

Couleuvre nocturne du désert

Demographic Information

<p>Generation time (usually average age of parents in the population)</p> <ul style="list-style-type: none"> - No information on age at maturity reported in COSEWIC (2001) or found in literature up to 2010. Technical Summary associated with COSEWIC (2001) reported about 5 years as a plausible value. - Males mature at smaller body size than females (Diller and Wallace 1986; Goldberg 2001) and probably at least a year later. 	Unknown; possibly about 5 years
<p>Is there an [observed, inferred, or projected] continuing decline in number of mature individuals?</p> <ul style="list-style-type: none"> - Inferred decline based on habitat loss due to extensive agricultural and urban developments 	Unknown, but possible
<p>Estimated percent of continuing decline in total number of mature individuals within [5 years or 2 generations]</p>	Unknown
<p>[Observed, estimated, inferred, or suspected] percent [reduction or increase] in total number of mature individuals over the last [10 years, or 3 generations].</p>	Unknown
<p>[Projected or suspected] percent [reduction or increase] in total number of mature individuals over the next [10 years, or 3 generations].</p>	Unknown
<p>[Observed, estimated, inferred, or suspected] percent [reduction or increase] in total number of mature individuals over any [10 years, or 3 generations] period, over a time period including both the past and the future.</p>	Unknown
<p>Are the causes of the decline clearly reversible and understood and ceased?</p> <ul style="list-style-type: none"> - Understood but not clearly reversible or ceased 	No
<p>Are there extreme fluctuations in number of mature individuals?</p>	No

Extent and Occupancy Information

<p>Estimated extent of occurrence (source: B.C. Conservation Data Centre 2010)</p>	834 km ²
<p>Index of area of occupancy (IAO)</p> <ul style="list-style-type: none"> - Based on 2 x 2 km grids superimposed on the Canadian distribution; 72 km² (B.C. Conservation Data Centre 2010); 80 km² (Dyer, pers. comm. 2010); some new, confidential records from private and First Nations lands were not available but might fit within above grid cells. 	72 - 80 km ²
<p>Is the total population severely fragmented?</p> <ul style="list-style-type: none"> - See Population Information 	Yes
<p>Number of locations*</p> <ul style="list-style-type: none"> - Corresponding to the number of element occurrences by B.C. Conservation Data Centre files, each of which might be subjected to separate threat events from agricultural and urban developments and/or roadkill; some new, confidential records are not included and could slightly expand the number of locations. 	15
<p>Is there an [observed, inferred, or projected] continuing decline in extent of occurrence?</p>	No

* See definition of location.

Is there an [observed, inferred, or projected] continuing decline in index of area of occupancy? - Inferred decline based on habitat loss and degradation from expanding development	Unknown, but probable
Is there an [observed, inferred, or projected] continuing decline in number of populations?	Unknown
Is there an [observed, inferred, or projected] continuing decline in number of locations*?	Unknown
Is there an [observed, inferred, or projected] continuing decline in [area, extent and/or quality] of habitat?	Yes
Are there extreme fluctuations in number of populations?	No
Are there extreme fluctuations in number of locations*?	No
Are there extreme fluctuations in extent of occurrence?	No
Are there extreme fluctuations in index of area of occupancy?	No

Number of Mature Individuals (in each population)

Population	N Mature Individuals
- Number of populations unknown; each element of occurrence by B.C. Conservation Data Centre may correspond to a population, which would result in 15 known populations; some new, confidential records are not included and could expand the number of populations.	Unknown
Total population: - Only about 60 observations of snakes from 1980 – 2010 have been reported; the total population is small, perhaps <1000 adults, but estimates are lacking. Technical Summary associated with COSEWIC (2001) speculatively reported <200 adults.	Unknown

Quantitative Analysis

Probability of extinction in the wild is at least [20% within 20 years or 5 generations, or 10% within 100 years].	NA
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Threats (actual or imminent, to populations or habitats)

<ul style="list-style-type: none"> - Habitat loss and degradation due to urban and agricultural developments; - Accidental mortality from road kill; - Disturbance and persecution.

Rescue Effect (immigration from outside Canada)

Status of outside population(s) United States: Arizona (S2-imperilled); California, Idaho, Nevada, Oregon, Utah, and Washington (SNR – status not ranked)	
Is immigration known or possible?	Possible but unlikely
Would immigrants be adapted to survive in Canada?	Yes
Is there sufficient habitat for immigrants in Canada?	Probably not
Is rescue from outside populations likely?	No

Current Status

COSEWIC: Endangered (2011)

* See definition of location.

Status and Reasons for Designation

Status: Endangered	Alpha-numeric code: B1ab(iii)+2ab(iii)
Reasons for designation: This nocturnal and secretive snake occurs in arid and semi-arid regions of western North America, reaching its northern distributional limits within seasonally hot interior valleys of south-central British Columbia. Throughout its small Canadian distribution, expanding urban and agricultural developments and their associated infrastructures threaten habitats of the species. Scattered distribution pattern, small population size, and no possibility of rescue contribute to the vulnerability of the species and place it at imminent risk of extirpation.	

Applicability of Criteria

Criterion A (Decline in Total Number of Mature Individuals): Not applicable. No information on population trends.
Criterion B (Small Distribution Range and Decline or Fluctuation): Meets Endangered under B1ab(iii)+2ab(iii) as the extent of occurrence (EO) and the index of area of occupancy (IAO) are below the Endangered thresholds; total population is severely fragmented based on extensive habitat fragmentation by natural barriers and human developments, together with small suspected population sizes at most sites and low dispersal ability of the snakes. There is an observed and projected decline in the area, extent, and quality of habitat.
Criterion C (Small and Declining Number of Mature Individuals): Not applicable. It would qualify as Endangered based on an inferred declining number of mature individuals, if the total population is as small (<1000 adults) as suspected. However, no population estimates are available, and there are few data to substantiate this value.
Criterion D (Very Small or Restricted Total Population): Not applicable. It would qualify as Threatened under D1 if the total population is as small (<1000 adults) as suspected. However, no population estimates are available, and there are few data to substantiate this value.
Criterion E (Quantitative Analysis): None available.



COSEWIC HISTORY

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) was created in 1977 as a result of a recommendation at the Federal-Provincial Wildlife Conference held in 1976. It arose from the need for a single, official, scientifically sound, national listing of wildlife species at risk. In 1978, COSEWIC designated its first species and produced its first list of Canadian species at risk. Species designated at meetings of the full committee are added to the list. On June 5, 2003, the *Species at Risk Act* (SARA) was proclaimed. SARA establishes COSEWIC as an advisory body ensuring that species will continue to be assessed under a rigorous and independent scientific process.

COSEWIC MANDATE

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assesses the national status of wild species, subspecies, varieties, or other designatable units that are considered to be at risk in Canada. Designations are made on native species for the following taxonomic groups: mammals, birds, reptiles, amphibians, fishes, arthropods, molluscs, vascular plants, mosses, and lichens.

COSEWIC MEMBERSHIP

COSEWIC comprises members from each provincial and territorial government wildlife agency, four federal entities (Canadian Wildlife Service, Parks Canada Agency, Department of Fisheries and Oceans, and the Federal Biodiversity Information Partnership, chaired by the Canadian Museum of Nature), three non-government science members and the co-chairs of the species specialist subcommittees and the Aboriginal Traditional Knowledge subcommittee. The Committee meets to consider status reports on candidate species.

DEFINITIONS (2011)

Wildlife Species	A species, subspecies, variety, or geographically or genetically distinct population of animal, plant or other organism, other than a bacterium or virus, that is wild by nature and is either native to Canada or has extended its range into Canada without human intervention and has been present in Canada for at least 50 years.
Extinct (X)	A wildlife species that no longer exists.
Extirpated (XT)	A wildlife species no longer existing in the wild in Canada, but occurring elsewhere.
Endangered (E)	A wildlife species facing imminent extirpation or extinction.
Threatened (T)	A wildlife species likely to become endangered if limiting factors are not reversed.
Special Concern (SC)*	A wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
Not at Risk (NAR)**	A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.
Data Deficient (DD)***	A category that applies when the available information is insufficient (a) to resolve a species' eligibility for assessment or (b) to permit an assessment of the species' risk of extinction.

* Formerly described as "Vulnerable" from 1990 to 1999, or "Rare" prior to 1990.

** Formerly described as "Not In Any Category", or "No Designation Required."

*** Formerly described as "Indeterminate" from 1994 to 1999 or "ISIBD" (insufficient scientific information on which to base a designation) prior to 1994. Definition of the (DD) category revised in 2006.



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