COSEWIC
Status Appraisal Summary

on the

Townsend's Mole
Scapanus townsendii

in Canada

ENDANGERED
2014

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 – November 2014

Common name
Townsend's Mole

Scientific name
Scapanus townsendii

Status
Endangered

Reason for designation
This species is the largest mole in North America, and in Canada is found in just a 50 km^2 area in the Fraser Valley of southwestern British Columbia. This species is restricted to certain soil types, and its limited dispersal abilities make it highly vulnerable to habitat fragmentation. Threats to the population include agricultural practices and trapping by pest control agents and by property owners. The habitat has been degraded through fragmentation, conversion from pasture land to berry farms, and urbanization.

Occurrence
British Columbia

Status history
Designated Threatened in April 1996. Status re-examined and designated Endangered in May 2003 and November 2014.

COSEWIC
Status Appraisal Summary

Scapanus townsendii

Townsend's Mole — Taupe de Townsend

Range of occurrence in Canada: British Columbia

Current COSEWIC Assessment:

Designated Threatened in April 1996. Status re-examined and designated Endangered in May 2003 and November 2014**.**

Evidence (indicate as applicable):

Wildlife species:

Change in eligibility, taxonomy or designatable units: yes ☐ no ☒

Explanation:

There is no change

Range:

Change in Extent of Occurrence (EO): yes ☒ no ☐ unk ☐

Change in Index of Area of Occupancy (IAO) : yes ☒ no ☐ unk ☐

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

Significant new survey information yes ☐ no ☒

Explanation:

Known Townsend's Mole occurrences are in two general areas in the Fraser Valley of B.C. adjacent to the U.S. border: 1) south of Highway 1 from Abbotsford International Airport east to Sumas Way and Huntingdon and 2) north of Highway 1 and east of Abbotsford (Figure 1). A 2010 review by B.C. Conservation Data Centre (2013) reports some additional Townsend's Mole records since the 2003 COSEWIC status report (COSEWIC 2003). There have been no directed surveys to document EO or IAO during this period; all records of confirmed or suspected Townsend's Mole mounds and tunnels have been opportunistically collected, e.g., in environmental impact assessments conducted by environmental consultants on private lands (Ursus Environmental 2009; AquaTerra Biological Consulting 2010).

The extent of occurrence is calculated at 33 km^2. This increase from 20 km^2 (COSEWIC 2003) is due to the inclusion of several new records about 2 km west of the 2003 distribution limit (Figure 2). The IAO, based on documented occurrences, is now 52 km^2 (AO was previously reported as 13 km^2). As per IUCN guidelines (IUCN 2013), EOO has been adjusted to be equal to AOO to ensure consistency with the definition of AOO as an area within EOO.

The extent of the limited distribution of Townsend's Mole in Canada is well known, even with no recent survey effort and a lack of precision associated with many records (Nagorsen, pers. comm. 2014). The molehills of this species are large and unmistakable, and easy to distinguish from the more common sympatric Coast Mole (*Scapanus orarius*) (LeTay, pers. comm. 2014). In B.C., Townsend's Mole has a known association with deep, dry silt loam soils, which are patchily distributed in the Fraser Valley (Sheehan and Galindo-Leal 1996; COSEWIC 2003). In an unpublished technical report produced for Environment Canada (2013), D. Nagorsen identified these as Marble Hill and Ryder soils (Luttermerding 1980). The largest continuous tracts of these soil types form the core historical range of Townsend's Mole west of Huntingdon, where this species has been known for 80 years. This mole is largely absent from extensive pasture lands east of Sumas Way (Figure 2), where there are no suitable soils.

Number of locations are unknown, but certainly > 10.

* Use the IUCN definition of "location"

Population Information:

Change in number of mature individuals:	yes ☐ no ☐ unk ☒
Change in 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:

COSEWIC (2003) estimated the Canadian population of Townsend's Mole at 450 (420-490) mature individuals. The population estimate was based on a density of 0.5 moles/ha, a population consisting of 60-70% mature adults, and 13 km^2 of suitable habitat; the mole density estimate was based on density ranges from other areas, with a lower value being assumed at the northern range limit of the species (COSEWIC 2003). Although the EOO and the AOO have both increased since 2003, suggesting a larger population number, the EOO includes areas between observations where habitat is unsuitable for Townsend's Mole, and where there are no records of this species. Notwithstanding some new records collected opportunistically since 2003 (Figure 2), there has been no systematic inventory to determine extant sites among the occurrences reported previously to confirm AOO or validate the density estimate from COSEWIC (2003). Suitable habitat is patchy, undergoing continued degradation, and populations are also threatened by pest-control trapping (B.C. Ministry of the Environment 2014; see below). The lack of systematic survey effort over the past decade and the absence of density estimates for the populations in B.C. contribute to the uncertainty of any population estimate at this time.

Although there is insufficient population information to confirm this, the very small population, short maximum dispersal distance (800 m; Giger 1973), patchy distribution of suitable habitat, and ongoing habitat degradation and fragmentation for this species in B.C. likely meets the IUCN definition of severe fragmentation (IUCN 2013).

Threats:

Change in nature and/or severity of threats: yes ☐ no ☐ unk ☒

Explanation:

B.C. Ministry of Environment (2014) used the IUCN-CMP (World Conservation Union – Conservation Measures Partnership) unified threats classification system (Conservation Measures Partnership (2010). The overall cumulative impact of multiple threats was considered Very High-High. Key threats included agriculture (habitat removal and fragmentation), biological resource use (mole trapping) and pollution (pesticides that reduce earthworm densities).

The Fraser Valley is one of the most important areas in Canada for berry crops, especially blueberries and raspberries. Between 1991 and 2006, the amount of blueberry-producing land in this district increased by almost 170%, from 133 to 305 farms (B.C. Ministry of Agriculture and Lands 2008). Virtually the entire core range of Townsend's Mole south of Highway 1 was already berry farm in 2004, having been converted from pastureland used for forage production and dairy farming (B.C. Ministry of Agriculture, Food and Fisheries 2004). In an unpublished technical report produced for Environment Canada (2013), D. Nagorsen noted that Townsend's Moles occur in soils that are ideal for digging and maintaining subterranean tunnels and nests with abundant earthworms. In addition, agricultural practices, including tilling and use of pesticides, may kill moles, as does mole trapping. Tilling and the use of fertilizers and pesticides create soil with poor structure and less earthworm biomass (COSEWIC 2003; B.C. Conservation Data Centre 2013; B.C. Ministry of Environment 2014).

Approximately 60% of habitat south of the highway in the Huntington-Abbotsford area is within the provincial Agricultural Land Reserve (ALR), although there is some precedent to removing land from this designation (B.C. Ministry of Environment 2014). Townsend's Mole habitat north of Highway 1 is more at risk of conversion to residential development, because the human population in this area continues to grow, and most of the land falls outside the ALR.

An Internet search for mole control around Abbotsford yields several private companies. None make any distinction between the endangered Townsend's Mole and the more abundant and widespread Coast Mole. In the region, moles are generally regarded as pests by farmers, golf course owners, and residential, commercial and industrial landowners due to damage caused by mole tunnels (B.C. Ministry of Environment 2014). Methods to control them do not discriminate between species, so there is a high likelihood of ongoing unrecorded mortalities of Townsend's Moles.

Protection:

Change in effective protection: yes ☐ no ☒

Explanation:

With the exception of a few small (~7.5-115 ha) parcels of federal or provincial Crown land and municipal land, the known distribution of Townsend's Mole is on private land. Some habitat is partially protected through the Agricultural Land Reserve, although some lands may be eligible to be withdrawn from the reserve, and there is a movement to restore property rights and economic freedom to landowners and to provide more economical housing in the region (Katz 2009). Some suitable soils were recently protected from development on private land as a result of outreach efforts (AquaTerra Biological Consulting 2010; Letay, pers. comm. 2014).

Rescue Effect:

Change in evidence of rescue effect: yes ☐ no ☒

Explanation:

The Global NatureServe (2014) status is G5, and the mole is ranked S5 in Washington, which shares a continuous population with Canada (COSEWIC 2003). Moles are unclassified in Washington, where they may be killed on private property. There is continuing loss of habitat for this species and therefore rescue may be limited; the B.C. population may even be isolated (B.C. Ministry of Environment 2014).

Quantitative Analysis:

Change in estimated probability of extirpation: yes ☐ no ☒ unk ☐

Details:

There has been no PVA.

Summary and Additional Considerations: [e.g., recovery efforts]

The Townsend's Mole population is restricted to an area of < 50 km^2 near Huntingdon and Abbottsford, B.C., adjacent to the U.S. border. Ongoing threats to this species, the habitat of which is restricted to two soil types, include agricultural practices, urbanization, and trapping by mole control agents. Recent efforts focused on recovery planning have enhanced understanding of habitat associations and threats. At the same time, negligible effort has been given to inventory efforts, and as a result, there is little new information on the species (Fraser, pers. comm., 2014). There was a Townsend's Mole recovery team composed of members from the B.C. Ministry of Environment and the Abbotsford Land Trust until 2011; a recovery plan was produced by B.C. in 2014 (B.C. Ministry of Environment 2014). Efforts are underway by Environment Canada to produce a federal addition to the B.C. Recovery Strategy for the species, which will include critical habitat identification.

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Authorities Contacted and Reviewers

*Denotes that information was provided by authority contacted.

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*Syd Cannings, Canadian Wildlife Service

*David F. Fraser, B.C. Ministry of Environment

*Neil Jones, COSEWIC Secretariat (ATK)

*Sylvia Letay, B.C. Ministry of Forests, Lands and Natural Resource Operations (former Townsend's Mole Recovery Team Chair)

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*Leah Westereng, B.C. Ministry of Environment

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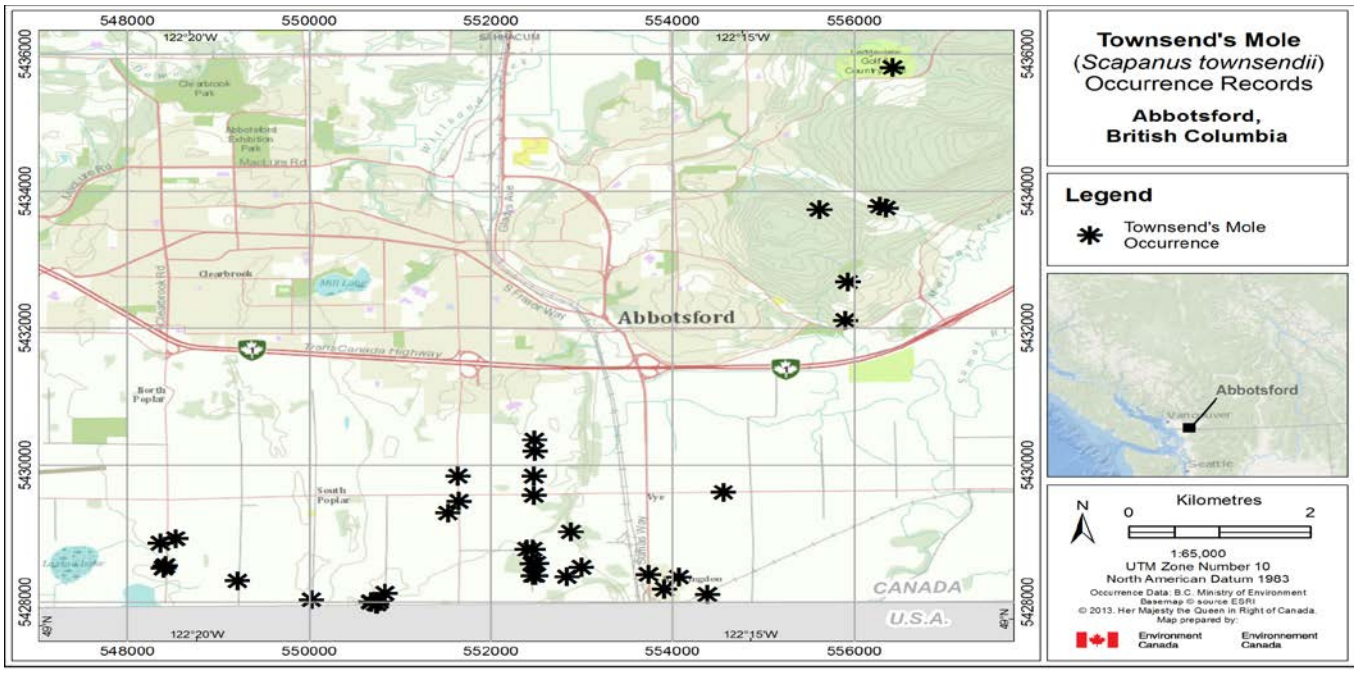

Figure 1. Townsend's Mole (*Scapanus townsendii*) occurrence records to 2010 in Canada (B.C. Ministry of Environment 2014).

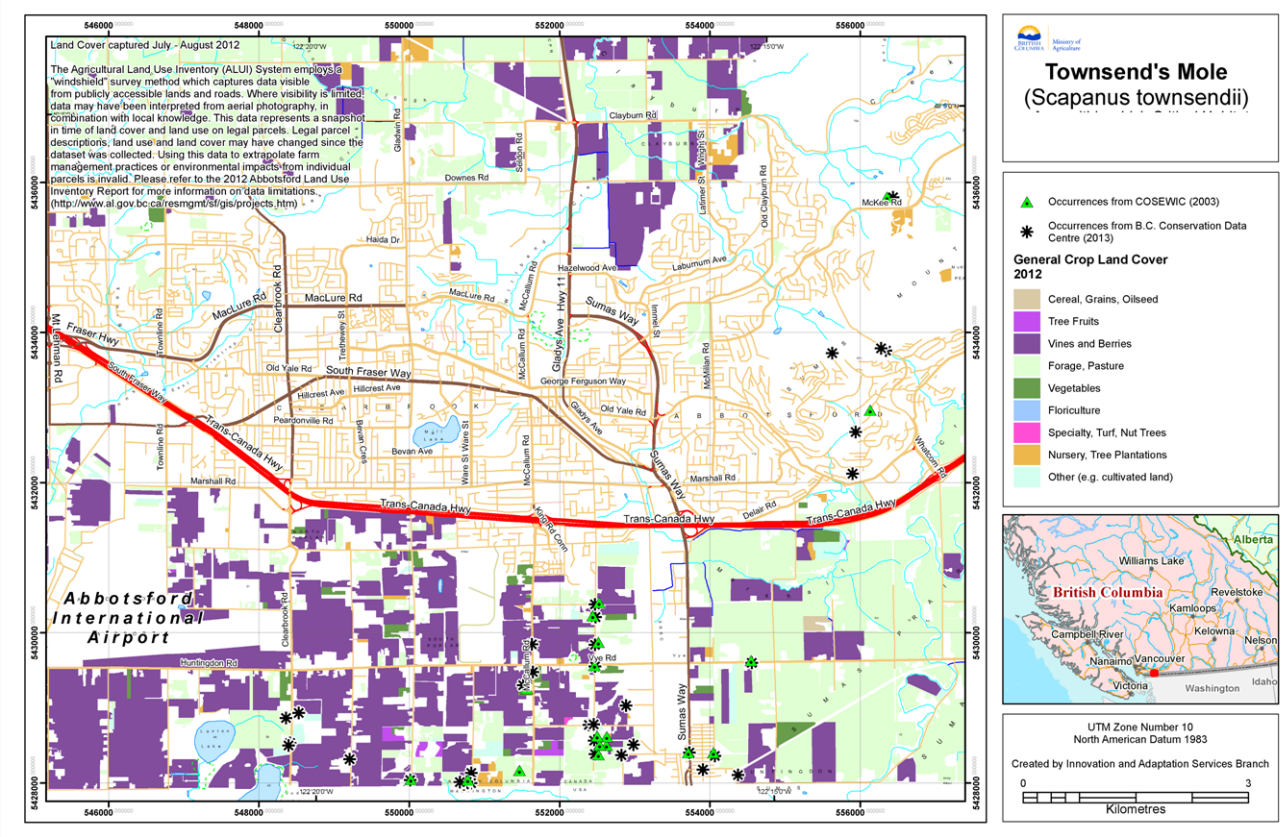

Figure 2. Townsend's Mole occurrences from COSEWIC (2003) and B.C. Conservation Data Centre (2013) overlaid on land cover classification of Agricultural Land Reserve (ALR). Occurrences north of Highway 1 are not in ALR lands.

TECHNICAL SUMMARY

Scapanus townsendii

Townsend's Mole Taupe de Townsend

Range of occurrence in Canada: British Columbia

Demographic Information

Generation time (usually average age of parents in the population; indicate if another method of estimating generation time indicated in the IUCN guidelines(2011) is being used)	1-2 yrs.
Is there an [observed, inferred, or projected] continuing decline in number of mature individuals? Although declines are inferred from ongoing habitat degradation, overall population trend is unknown	Unknown
Estimated percent of continuing decline in total number of mature individuals within [5 years or 2 generations]	Unknown
[Observed, estimated, inferred, or suspected] percent [reduction or increase] in total number of mature individuals over the last [10 years, or 3 generations].	Unknown
[Projected or suspected] percent [reduction or increase] in total number of mature individuals over the next [10 years, or 3 generations].	Unknown
[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.	Unknown
Are the causes of the decline a. clearly reversible and b. understood and c. ceased?	N/A
Are there extreme fluctuations in number of mature individuals?	Unknown

Extent and Occupancy Information

Estimated extent of occurrence	52 km²
Index of area of occupancy (IAO) (Always report 2x2 grid value).	52 km²
Is the population "severely fragmented" i.e., >50% of its total area of occupancy is in habitat patches that are (a) smaller than would be required to support a viable population, and (b) separated from other habitat patches by a large distance?	Yes
Number of locations* (use plausible range to reflect uncertainty)	Unknown, but likely > 10
Is there an [observed, inferred, or projected] continuing decline in extent of occurrence?	Unknown
Is there an [observed, inferred, or projected] continuing decline in index of area of occupancy?	Unknown

* See Definitions and Abbreviations on COSEWIC website and IUCN 2010 for more information on this term.

Is there an [observed, inferred, or projected] continuing decline in number of subpopulations?	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 subpopulations?	Unknown
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 subpopulation)

Subpopulation (give plausible ranges)	**N Mature Individuals**
An estimate based on density in prime habitat in an EO of 13km^2 suggested 450 mature animals; several recent records extend the EO to 52km^2 but intervening areas are unlikely to support Townsend's Mole, older records unconfirmed through lack of survey, and density estimate unvalidated	Unknown, but likely to be < 1,000 mature individuals

Quantitative Analysis

Probability of extinction in the wild is at least [20% within 20 years or 5 generations, or 10% within 100 years].	N/A

Threats (actual or imminent, to populations or habitats)

Urbanization, agricultural practices, and potential future conversion of lands from the Agricultural Land Reserve to other land uses.

Rescue Effect (immigration from outside Canada)

Status of outside population(s) most likely to provide immigrants to Canada?	S5 in Washington
Is immigration known or possible?	Unknown
Would immigrants be adapted to survive in Canada?	Yes
Is there sufficient habitat for immigrants in Canada?	Unknown
Is rescue from outside populations likely?	Unknown

Data-Sensitive Species

Is this a data-sensitive species? No

COSEWIC Status History

Designated Threatened in April 1996. Status re-examined and designated Endangered in May 2003 and November 2014.

Status and Reasons for Designation

Status: Endangered	**Alpha-numeric Code**: B1ab(iii)+2ab(iii)
Reasons for Designation: This species is the largest mole in North America and in Canada is found in just a 50 km^2 area in the Fraser Valley of southwestern British Columbia. This species is restricted to certain soil types, and its limited dispersal abilities make it highly vulnerable to habitat fragmentation. Threats to the population include agricultural practices and trapping by pest control agents and by property owners. The habitat has been degraded through fragmentation, conversion from pasture land to berry farms, and urbanization.	

Applicability of Criteria

Criterion A (Decline in Total Number of Mature Individuals): Not applicable. Declines have not been quantified.
Criterion B (Small Distribution Range and Decline or Fluctuation): Meets Endangered B1ab(iii) and B2ab(iii), with EO < 5,000 km^2 and IAO < 500 km^2, respectively, and meets severely fragmented (a) with continuing habitat declines (b).
Criterion C (Small and Declining Number of Mature Individuals): Not applicable. Number of mature individuals < 2,500, but decline is unquantified.
Criterion D (Very Small or Restricted Population): Meets Threatened D1 (number of mature individuals < 1,000).
Criterion E (Quantitative Analysis): Not applicable.

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
(2014)

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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