

COSEWIC Assessment and Status Report

on the

Yellow-breasted Chat *auricollis* subspecies *Icteria virens auricollis*

Southern Mountain population
Prairie population

and the

Yellow-breasted Chat *virens* subspecies *Icteria virens virens*

Eastern population

in Canada



Southern Mountain population *auricollis* subspecies – ENDANGERED
Prairie population *auricollis* subspecies – NOT AT RISK
Eastern population *virens* subspecies – 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 reports are working documents used in assigning the status of wildlife species suspected of being at risk. This report may be cited as follows:

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Previous report(s):

COSEWIC. 2000. COSEWIC assessment and update status report on the Western Yellow-breasted Chat *Icteria virens auricollis* and the Eastern Yellow-breasted Chat *Icteria virens virens* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 16 pp. (www.sararegistry.gc.ca/status/status_e.cfm).

Cannings, R.J. 2000. Update COSEWIC status report on the Western Yellow-breasted Chat *Icteria virens auricollis* and the Eastern Yellow-breasted Chat *Icteria virens virens* in Canada in COSEWIC assessment and update status report on the Western Yellow-breasted Chat *Icteria virens auricollis* and the Eastern Yellow-breasted Chat *Icteria virens virens* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 1-16 pp.

Cadman, M.D., and A.M. Page 1994. COSEWIC status report on the Yellow-breasted Chat (British Columbia population) *Icteria virens auricollis* and Yellow-breasted Chat (Eastern population) *Icteria virens virens* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 42 pp.

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Également disponible en français sous le titre Évaluation et Rapport de situation du COSEPAC sur la Paruline polyglotte de la sous-espèce *auricollis* (*Icteria virens auricollis*) et la Paruline polyglotte de la sous-espèce *virens* (*Icteria virens virens*) au Canada.

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Yellow-breasted Chat — Photo courtesy of René McKibbin

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COSEWIC Assessment Summary

Assessment Summary – November 2011

Common name

Yellow-breasted Chat *auricollis* subspecies - Southern Mountain population

Scientific name

Icteria virens auricollis

Status

Endangered

Reason for designation

This subspecies is a shrub-thicket specialist that occurs at the northern edge of its range in Canada. The small population, which is restricted to the Southern Mountain Ecological Area in British Columbia, is localized to a particular type of riparian habitat. A number of threats have been identified as serious concerns, including cattle trampling of rose thickets, road maintenance and urbanization, agricultural and potential hydro-electric development of the Similkameen River.

Occurrence

British Columbia

Status history

The Southern Mountain population of the *auricollis* subspecies was designated Threatened in April 1994. Status re-examined and designated Endangered in November 2000 and November 2011.

Assessment Summary – November 2011

Common name

Yellow-breasted Chat *auricollis* subspecies - Prairie population

Scientific name

Icteria virens auricollis

Status

Not at Risk

Reason for designation

This subspecies is a shrub-thicket specialist that occurs at the northern edge of its range in Canada. The discrete population that occurs in the Prairie Ecological Area is localized to riparian systems and is relatively small. However, the population appears to be stable and potentially increasing. Few threats have been identified as serious concerns.

Occurrence

Alberta, Saskatchewan

Status history

The Prairie population of the *auricollis* subspecies was designated Not at Risk in April 1994, November 2000, and November 2011.

Assessment Summary – November 2011

Common name

Yellow-breasted Chat *virens* subspecies - Eastern population

Scientific name

Icteria virens virens

Status

Endangered

Reason for designation

This subspecies is a shrub-thicket specialist that occurs at the northern edge of its range in Canada. Its population in southern Ontario is localized and very small. Since the last status report was produced, declines have occurred in the Ontario population owing to habitat loss. The potential for rescue effect has also been dramatically reduced, because population declines are evident across most of the northeastern range of this subspecies.

Occurrence

Ontario

Status history

Designated Special Concern in April 1994. Status re-examined and confirmed in November 2000. Status re-examined and designated Endangered in November 2011.



COSEWIC Executive Summary

Yellow-breasted Chat *auricollis* subspecies

Icteria virens auricollis

Southern Mountain population

Prairie population

and the

Yellow-breasted Chat *virens* subspecies

Icteria virens virens

Eastern population

Wildlife species description and significance

The Yellow-breasted Chat is regarded as an unusually large warbler. It has olive-green upper parts, a lemon-yellow chin, throat and breast, and a white belly and undertail coverts. It has a thick bill and a long, rounded tail and rounded wings. The face is greyish, with black lores and distinctive white “spectacles”. There are two subspecies – *I. v. auricollis* in the western half of North America and *I. v. virens* in the eastern half. During the breeding season, chats have a distinctive song characterized by repeated whistles, alternating with harsh chattering clucks and soft caws. The Yellow-breasted Chat is a flagship bird species for early successional shrubland habitats; members of this guild are declining widely in North America.

Distribution

Yellow-breasted Chats breed in North America, south of the boreal forest. The *auricollis* (western) subspecies breeds from southern British Columbia, Alberta and Saskatchewan, south discontinuously to northern Mexico. It occurs as far east as western Nebraska, western Kansas, and central Texas. The *virens* (eastern) subspecies breeds from the east-central Great Plains and eastern Texas eastward, and north to southwestern Ontario. Chats winter in the lowlands of eastern and western Mexico through Central America to western Panama.

In Canada, three populations are identified as separate designatable units: the Southern Mountain population of *I. v. auricollis* (British Columbia), the Prairie population of *I. v. auricollis* (Alberta and Saskatchewan), and the *I. v. virens* population (Ontario).

Habitat

The Yellow-breasted Chat is a shrub specialist, occurring in dense riparian shrubland in western North America and early successional shrub habitats in the east. In British Columbia, the riparian habitat where chats live has been reduced by 87%. However, for the Prairie population, habitat may be increasing in Saskatchewan because of shrub succession. In Ontario, habitat has declined since the early 1960s, because of land conversion and successional change.

Biology

Nests are situated close to the ground in dense shrubby vegetation. If nests fail, females will attempt up to three replacement clutches in one breeding season. Loose coloniality may occur, as territories are often clumped. In British Columbia, *I. v. auricollis* shows some site fidelity. In Ontario, some breeding sites are regularly occupied, whereas most others may not be used for more than a few years at best.

Population sizes and trends

In British Columbia, the latest population estimate for *I. v. auricollis* is 152 pairs. There is some suggestion that the population there has declined from historic levels. In Saskatchewan and Alberta, this subspecies expanded its range substantially northward during the 20th century. The Prairie population has been relatively stable since the 1980s, though further increases may have occurred in Saskatchewan. In Alberta, the population is estimated at 900-1000 pairs. There are an estimated 530 pairs in Saskatchewan. Overall, the population of *I. v. auricollis* in Canada is estimated at between 1582 and 1682 pairs. In the west, populations in the adjacent U.S. appear to be relatively stable.

For the I. v. virens subspecies, there are fewer than 42 pairs in Ontario. Until very recently, the provincial stronghold was at Point Pelee National Park and Pelee Island, but this is no longer the case. The Ontario population has declined by about 33% over 10 years. The *I. v. virens* subspecies is showing long-term significant declines in all states adjacent to Ontario, coupled with a range retraction over most of the entire northeast. Thus, the potential for a future rescue effect for the Ontario population is currently low and diminishing.

Threats and limiting factors

In British Columbia, the most important threats to the Southern Mountain *I. v. auricollis* population are habitat loss from urban and agricultural land uses (coupled with proposed hydro-electric dams that would destroy riparian breeding habitat), road maintenance and/or construction, predation by introduced predators, brood parasitism by cowbirds, pesticide use, and collisions with vehicles and structures. Although the Prairie population of *I. v. auricollis* in Saskatchewan has increased because of heightened natural succession in riparian areas, some habitat has been lost as a result of reservoir construction. In Alberta, heavy levels of livestock grazing and damming of rivers may affect some sites. For the Ontario population of the *virens* subspecies, the greatest threats are loss of suitable habitat from land conversion (agriculture/urban) and changes in habitat suitability as a result of natural succession.

Protection, status, and ranks

In Canada, the Yellow-breasted Chat and its nest and eggs are protected under the *Migratory Birds Convention Act*. In North America, the species is considered secure due to its widespread distribution and relatively stable population overall. The Southern Mountain population in British Columbia is currently afforded protection under the *Species at Risk Act* (SARA) as an Endangered species. The Prairie population in Alberta and Saskatchewan is considered Not at Risk. In the western United States bordering Canada, the chat is ranked as 'vulnerable' in Washington, and 'secure' in Idaho and Montana. In Ontario, the *virens* subspecies is currently designated under SARA as Special Concern. This subspecies is declining strongly across most of its northeastern breeding range, including all states bordering Ontario.

TECHNICAL SUMMARY #1 (Southern Mountain population)

Icteria virens auricollis

Yellow-breasted Chat *auricollis* subspecies (Southern Mountain population)

Range of occurrence in Canada: British Columbia

Paruline polyglotte de la sous-espèce *auricollis* (Population des montagnes du Sud)

Demographic Information

Generation time (average age of parents in the population)	2-3 yrs
Is there an [observed, inferred, or projected] continuing decline in number of mature individuals?	Unknown, but not apparent
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 clearly reversible and understood and ceased?	Not applicable
Are there extreme fluctuations in number of mature individuals?	No

Extent and Occupancy Information

Estimated extent of occurrence	8800 km ²
Index of area of occupancy (IAO) - <i>Cannot be precisely calculated, but IAO is probably below COSEWIC thresholds.</i>	<500 km ²
Is the total population severely fragmented?	No
Number of "locations"	Unknown but probably >10
Is there an [observed, inferred, or projected] continuing decline in extent of occurrence?	No
Is there an [observed, inferred, or projected] continuing decline in index of area of occupancy?	No
Is there an [observed, inferred, or projected] continuing decline in number of populations?	Not applicable
Is there an [observed, inferred, or projected] continuing decline in number of locations?	Unknown
Is there an inferred and projected continuing decline in 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
Southern Mountain Population of <i>auricollis</i> (based on Environment Canada 2010a, which estimated a maximum of 152 pairs)	304 individuals

Quantitative Analysis

Probability of extinction in the wild. - PVA analyses indicated 2.7-6.1% extinction risk over 100 years (using 1.85 fecundity rate) for the South Okanagan Valley, and a 5% extinction risk for the Similkameen Valley (Tischendorf 2003; Carr and Tischendorf 2004).	
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Threats (actual or imminent, to populations or habitats)

1) Habitat loss, fragmentation and degradation from agriculture (including livestock grazing in riparian areas), urban development and hydro-electric dams; 2) predation by introduced/exotic predators; 3) brood parasitism by Brown-headed Cowbirds; 4) pesticide use; 5) collisions with vehicles and structures.
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Rescue Effect (immigration from outside Canada)

Status of outside population(s)? Apparently declining according to Breeding Bird Survey results in Washington state, where it is ranked as 'vulnerable', and relatively stable in Idaho, where it is ranked as 'secure'. The population is stable in Oregon, where it is ranked as 'apparently secure'.	
Is immigration known or possible?	Yes
Would immigrants be adapted to survive in Canada?	Yes
Is there sufficient habitat for immigrants in Canada? - suitable habitat is limited and probably declining	Possibly
Is rescue from outside populations likely? - populations in the adjacent U.S. are fairly small and scattered	Possibly

Current Status

COSEWIC: Endangered (November 2011)

Status and Reasons for Designation

Status: Endangered	Alpha-numeric code: C2a(ii)
Reasons for designation: This subspecies is a shrub-thicket specialist that occurs at the northern edge of its range in Canada. The small population, which is restricted to the Southern Mountain Ecological Area in British Columbia, is localized to a particular type of riparian habitat. A number of threats have been identified as serious concerns, including cattle tramping of rose thickets, road maintenance and urbanization, agricultural and potential hydro-electric development of the Similkameen River.	

Applicability of Criteria

Criterion A (Decline in Total Number of Mature Individuals): Not applicable. While a decline may have occurred, there is no evidence that it exceeds the 30% threshold.
Criterion B (Small Distribution Range and Decline or Fluctuation): Not applicable. The extent of occurrence exceeds 20,000 km ² , and while the IAO is <500 km ² , none of the subcriteria apply.
Criterion C (Small and Declining Number of Mature Individuals): Meets Endangered C2a(ii) as population size is <2500 mature individuals, there is continuing decline (projected and inferred), and one population has at least 95% of all mature individuals.
Criterion D (Very Small or Restricted Total Population): Meets D1 for Threatened (population is <1000 mature individuals but >250).
Criterion E (Quantitative Analysis): Not applicable. While estimated extinction probabilities are lower than threshold values, they provide support for the likelihood of an ongoing and projected population decline.

TECHNICAL SUMMARY #2 (Prairie population)

Icteria virens auricollis

Yellow-breasted Chat *auricollis* subspecies (Prairie population)

Paruline polyglotte de la sous-espèce *auricollis* (Population des Prairies)

Range of occurrence in Canada: Alberta, Saskatchewan

Demographic Information

Generation time (average age of parents in the population)	2-3 yrs
Is there an [observed, inferred, or projected] continuing decline in number of mature individuals?	No
Estimated percent of continuing decline in total number of mature individuals within [5 years or 2 generations]	Unknown
Observed, estimated, and inferred percent change in total number of mature individuals over the last 10 years.	Unknown percent; increasing or stable
[Projected or suspected] percent [reduction or increase] in total number of mature individuals over the next 10 years.	Unknown
[Observed, estimated, inferred, or suspected] percent [reduction or increase] in total number of mature individuals over any 10-year period, over a time period including both the past and the future.	Unknown
Are the causes of the decline clearly reversible and understood and ceased? Population has increased in Saskatchewan (not declining); apparently stable in Alberta	Not applicable
Are there extreme fluctuations in number of mature individuals?	No

Extent and Occupancy Information

Estimated extent of occurrence	368,800 km ²
Index of area of occupancy (IAO) - <i>Maximum estimate assuming that each of 1430-1530 estimated pairs is assigned to a 2 km x 2 km grid.</i>	5720-6120 km ²
Is the total population severely fragmented?	No
Number of "locations"	Unknown, but definitely >10
Is there an [observed, inferred, or projected] continuing decline in extent of occurrence?	No
Is there an [observed, inferred, or projected] continuing decline in index of area of occupancy?	No
Is there an [observed, inferred, or projected] continuing decline in number of populations?	No
Is there an [observed, inferred, or projected] continuing decline in number of locations?	No
Is there an [observed, inferred, or projected] continuing decline in [area, extent and/or quality] of habitat? - <i>area of habitat possibly still increasing in Saskatchewan</i>	No
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
Alberta: ~900-1000 pairs	~1800-2000
Saskatchewan: ~530 pairs	~1060
Total (1430-1530 pairs)	~2860-3060

Quantitative Analysis

Probability of extinction in the wild is at least [20% within 20 years or 5 generations, or 10% within 100 years].	Not done
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Threats (actual or imminent, to populations or habitats)

Main threats in the Prairies are dams and channelization that interfere with natural stream flow, which is critical to maintaining riparian vegetation along rivers.
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Rescue Effect (immigration from outside Canada)

Status of outside population(s)? Apparently stable population according to BBS in North Dakota, where it has not been ranked by NatureServe. Stable or increasing in Montana, where it is ranked as 'secure'.	
Is immigration known or possible?	Yes
Would immigrants be adapted to survive in Canada?	Yes
Is there sufficient habitat for immigrants in Canada?	Yes
Is rescue from outside populations likely?	Yes

Current Status

COSEWIC: Not at Risk (November 2011)

Status and Reasons for Designation

Status: Not at Risk	Alpha-numeric code: Not applicable
Reasons for designation: This subspecies is a shrub-thicket specialist that occurs at the northern edge of its range in Canada. The discrete population that occurs in the Prairie Ecological Area is localized to riparian systems and is relatively small. However, the population appears to be stable and potentially increasing. Few threats have been identified as serious concerns.	

Applicability of Criteria

Criterion A (Decline in Total Number of Mature Individuals): Does not meet criterion. There is no evidence for declines. The population is either stable or slightly increasing.
Criterion B (Small Distribution Range and Decline or Fluctuation): Does not meet criterion. Exceeds thresholds for extent of occurrence and area of occupancy.
Criterion C (Small and Declining Number of Mature Individuals): Does not meet criterion. Meets threshold for Threatened for population size (< 10,000 mature individuals), but there is no evidence for population decline.
Criterion D (Very Small or Restricted Total Population): Not applicable. Exceeds thresholds for population size, area of occupancy and number of locations.
Criterion E (Quantitative Analysis): Not done.

TECHNICAL SUMMARY #3 (*virens* subspecies)

Icteria virens virens

Yellow-breasted Chat *virens* subspecies

Range of occurrence in Canada: Ontario

Paruline polyglotte de la sous-espèce *virens*

Demographic Information

Generation time (average age of parents in the population)	2-3 yrs
Is there an [observed, inferred, or projected] continuing decline in number of mature individuals?	Yes
Estimated percent of continuing decline in total number of mature individuals within [5 years or 2 generations]	Unknown
Inferred percent reduction in total number of mature individuals over the last 10 years. - based on breeding bird atlas results that showed a statistically non-significant 55% decline in the number of occupied 10 km x 10 km squares over a 20-year period (see Fluctuations and Trends in text).	-33% decline
Projected or suspected percent reduction in total number of mature individuals over the next 10 years.	Unknown; likely declining
Observed, estimated, and inferred percent reduction in total number of mature individuals over any 10 years, over a time period including both the past and the future.	Unknown percent decline
Are the causes of the decline clearly reversible and understood and ceased? - Successional changes are understood but not clearly reversible, nor have they ceased.	No
Are there extreme fluctuations in number of mature individuals?	No

Extent and Occupancy Information

Estimated extent of occurrence	42,300 km ²
Index of area of occupancy (IAO) - Maximum estimate assuming that each of <42 estimated pairs is assigned to a 2 km x 2 km grid.	< 200 km ²
Is the total population severely fragmented?	No
Number of "locations"	Somewhat variable, but probably now <10 discrete locations
Is there an observed or projected continuing decline in extent of occurrence?	Yes to both
Is there an observed or projected continuing decline in index of area of occupancy?	Yes to both
Is there an [observed, inferred, or projected] continuing decline in number of populations?	Not applicable
Is there an observed continuing decline in number of locations?	Yes, but not quantifiable at this time
Is there an observed, inferred, or projected continuing decline in area, extent and/or quality of habitat? - declines have occurred in all three habitat elements	Yes
Are there extreme fluctuations in number of populations?	Not applicable
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
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Number of Mature Individuals (in each population)

Population < 42 pairs	N Mature Individuals < 84
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Quantitative Analysis

Probability of extinction in the wild is at least [20% within 20 years or 5 generations, or 10% within 100 years].	Not done
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Threats (actual or imminent, to populations or habitats)

Main threats are: 1) successional changes or land conversion reducing habitat supply; 2) habitat fragmentation (species is area-sensitive) leading to socially facilitated population reduction; and possibly 3) Brown-headed Cowbird parasitism.

Rescue Effect (immigration from outside Canada)

Status of outside population(s)? Declining significantly across most of its northeastern breeding range according to BBS, including all states bordering Ontario. Ranked as 'secure' in Pennsylvania and Ohio, 'apparently secure' in Indiana, 'vulnerable' in Michigan and New York, and 'imperiled' in Wisconsin. In Ohio, there is evidence for a range retraction from the northern part of the state, but an increase in population densities in the southern part.	
Is immigration known or possible?	Yes, but increasingly limited because of declines in adjacent states
Would immigrants be adapted to survive in Canada?	Yes
Is there sufficient habitat for immigrants in Canada?	Limited and declining
Is rescue from outside populations likely? - <i>little habitat is available in Ontario for rescue</i>	No

Current Status

COSEWIC: Endangered (November 2011)

Status and Reasons for Designation

Status: Endangered	Alpha-numeric code: C2a(i,ii); D1
Reasons for designation: This subspecies is a shrub-thicket specialist that occurs at the northern edge of its range in Canada. Its population in southern Ontario is localized and very small. Since the last status report was produced, declines have occurred in the Ontario population, owing to habitat loss. The potential for rescue effect has also been dramatically reduced, because population declines are evident across most of the northeastern range of this subspecies.	

Applicability of Criteria

Criterion A (Decline in Total Number of Mature Individuals): Meets Threatened for A2bc because the 10-year decline is estimated at >30%, the causes of which have not ceased (nor are they reversible).
Criterion B (Small Distribution Range and Decline or Fluctuation): Meets Threatened for B2ab(i,ii,iii,iv,v) because area of occupancy is <2000 km ² , there are likely fewer than 10 locations, and there is a continuing projected decline in extent of occurrence, area of occupancy, area and extent of habitat, number of locations, and number of mature individuals.
Criterion C (Small and Declining Number of Mature Individuals): Meets Endangered for C2a(i,ii) because the population is <2500 mature individuals, there is an observed continuing decline in number of mature individuals, the Ontario population is <250 individuals, and one population has >95% of all mature individuals.
Criterion D (Very Small or Restricted Total Population): Meets Endangered for D1 because the population is <250 mature individuals.
Criterion E (Quantitative Analysis): Not done.

PREFACE

Since the previous update status report was written (Cannings 2000), a second Ontario Breeding Bird Atlas project was completed (2001-2005; Cadman *et al.* 2007). This permitted a comparison of numbers and distribution of the Ontario population of Yellow-breasted Chats over a 20-year period. Although its small population size met the criteria for listing as Threatened, the Ontario population was listed as Special Concern in 2000, because of the presumed possibility of rescue from populations in the adjacent United States. More recent information from the U.S. suggests that rescue potential is becoming increasingly unlikely owing to widespread population declines across the northeast.

As a consequence of its Endangered status (stemming from a small and declining population), the British Columbia chat population has received considerable recent attention in terms of targeted surveys, research and conservation efforts (e.g., Machmer and Ogle 2006; Morgan *et al.* 2007; McKibbin and Bishop 2008, 2010a, b; Environment Canada 2010a; Potvin and Bishop 2010). There has also been an attempt to model the viability of the population residing in British Columbia (e.g., Tischendorf 2003).

Targeted surveys have not been carried out for the Prairie population (Not at Risk), but a second breeding bird atlas project was completed in Alberta (Federation of Alberta Naturalists 2007). In addition, chat occurrence data have recently been compiled by Alan Smith for Saskatchewan.

Updated Breeding Bird Survey trend results from the U.S., as well as results from several second breeding bird atlas projects in the U.S., were also available for this report.



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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The Canadian Wildlife Service, Environment Canada, provides full administrative and financial support to the COSEWIC Secretariat.

COSEWIC Status Report

on the

Yellow-breasted Chat *auricollis* subspecies *Icteria virens auricollis*

Southern Mountain population
Prairie population

and the

Yellow-breasted Chat *virens* subspecies *Icteria virens virens*

Eastern population

in Canada

2011

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WILDLIFE SPECIES DESCRIPTION AND SIGNIFICANCE

Name and classification

Scientific name: *Icteria virens virens* (Linnaeus, 1758); *Icteria virens auricollis* (Deppe, 1830)

English name: Yellow-breasted Chat

French name: Paruline polyglotte

Classification: Class Aves, Order Passeriformes, Family Parulidae

Morphological description

The Yellow-breasted Chat is about 18 cm in length and weighs about 25 g. Its robust build and distinctive plumage distinguish it from wood-warblers and other similarly coloured songbirds. While earlier DNA evidence suggested that the Yellow-breasted Chat was related to wood-warblers (Avisé *et al.* 1980; Sibley and Alquist 1982), one recent study suggested that it may in fact be more closely related to the Icterids (blackbirds; Lovette and Bermingham 2002). However, it has been retained in the wood-warbler family (Lovette and Bermingham 2002), which is supported by findings from Klein *et al.* (2004).

The Yellow-breasted Chat has a relatively thick, slightly-curved bill, a long, rounded tail, and rounded wings. Its upper parts are olive-green, and the chin, throat and breast are lemon-yellow (sometimes with an orange tinge). The belly and undertail coverts are white. The face is greyish with black lores and distinctive white “spectacles” (Sibley 2000; Eckerle and Thompson 2001). Females are similar to males, but during the breeding season the lores of females are grey rather than black, and they have a grey lower mandible and a pink rather than black mouth lining (Dunn and Garrett 1997).

There are two subspecies, which are similar in appearance. The western subspecies (*I. v. auricollis*) has a slightly longer tail, and may be greyer above than the eastern subspecies (*I. v. virens*). *I. v. auricollis* also has feathers along the side of the lower jaw that are mostly white, rather than mostly yellow as in the eastern subspecies. *I. v. auricollis* also tends to have a deeper yellow throat and breast than *I. v. virens* (Sibley 2000).

During the breeding season, males sing a distinctive song composed of a slow series of irregularly spaced scolds, chuckles, mews, and rattles; they may mimic other species or make other mechanical sounds and often sing at night. The song of *I. v. auricollis* is higher-pitched, and has a more rapid rattle than the song of *I. v. virens*. The call of both subspecies is a harsh, nasal “cheewb”, or a soft, low, unmusical “tuk” or “ka”. They are typically quiet during the non-breeding season (Eckerle and Thompson 2001).

Population spatial structure and variability

Three populations of the Yellow-breasted Chat have previously been recognized by COSEWIC: 1) *I. v. auricollis* in British Columbia, which is in the Southern Mountain ecological area; 2) the Prairie population of *I. v. auricollis* in Saskatchewan and Alberta; and 3) the *I. v. virens* subspecies in Ontario (Great Lakes Plains ecological area).

No genetic studies have been undertaken to determine the relatedness of the two populations of *I. v. auricollis* in western Canada (see below). However, studies of the Southern Mountain population of *I. v. auricollis* in the South Okanagan Valley showed no significant genetic structuring, suggesting extensive gene flow within that population (Miño *et al.* 2011). Other genetic analyses undertaken elsewhere within the breeding range of *I. v. auricollis* (Montana, Oregon, California, Nevada, Utah) also found little evidence for geographic structuring (Lovette *et al.* 2004).

Designatable units

At the highest (subspecies) level, the first division between populations of Yellow-breasted Chat in Canada is between the western *I. v. auricollis* and eastern *I. v. virens* subspecies. In addition to their taxonomic discreteness, there is a natural disjunction between these populations because of the large geographic distance between them. The two subspecies are also genetically distinct (Lovette *et al.* 2004). As such, there are at least two designatable units in Canada, based solely on the two subspecies.

Reasons for distinguishing the “British Columbia population” of *I. v. auricollis* from that of the Prairies were not documented in earlier status reports. Reasons are presented below, using COSEWIC’s guidelines related to “discreteness” and “significance,” and bearing in mind that these are guidelines only.

1. Discreteness

In Canada, chats in British Columbia and Alberta/Saskatchewan are separated by the Rocky Mountains. While the mountain ranges perhaps do not represent a complete barrier to migratory birds, the Rockies are a significant isolating feature and act as a barrier to gene flow. Many migratory songbirds, including wood warblers, show genetic and migratory differentiation between western and eastern populations (e.g., Kelly and Hutto 2005).

Chats in British Columbia and the Prairies also occupy different eco-geographic regions (the Southern Mountain and Prairie ecological areas, respectively). Some dispersal may occur between regions, but chats in British Columbia exhibit a fairly high level of site fidelity.

2. Significance

While chats in British Columbia and the prairies occupy habitats that are broadly similar (i.e., dense shrubby areas in riparian habitats), there is evidence for local adaptation owing to preferences for different nesting substrates. Chats nest exclusively in rose bushes in British Columbia (McKibbin and Bishop 2008) and primarily in hawthorns and buffaloberry in the prairies (see HABITAT below). There is no use of hawthorn thickets for nesting in British Columbia, despite extensive availability of this type of habitat (C. Bishop and D. Fraser pers. comms. 2011).

An extensive gap in the Canadian range of the species would be created if chats disappeared from either the Prairies or British Columbia. Threats appear to be relatively low in the Prairies, and the population there appears to be fairly stable (or expanding). However, the population in British Columbia is much smaller and may be declining. Moreover, threats to this population are much more numerous and severe. For example, a proposed hydro-electric facility in the U.S. has the potential to flood out one of British Columbia's most important breeding areas in the Similkameen River Valley (see **THREATS AND LIMITING FACTORS**). As such, there is a reasonable prospect that an extensive gap in the species' breeding range in Canada could, in fact, be created.

Based on the above, *auricollis* chats in the Southern Mountain ecological area of British Columbia and those in the Prairie ecological area of Alberta and Saskatchewan are considered to represent two separate designatable units. The *virens* subspecies in Ontario constitutes the third designatable unit.

Special significance

The Yellow-breasted Chat is an enigmatic and striking species. It is a flagship bird species for early successional, shrubland habitats; other members of this guild are declining widely in North America. It is a focal species for conservation in the Canadian Great Basin Partners in Flight Bird Conservation Plan (Partners in Flight, British Columbia and Yukon 2003) and a priority species in Bird Conservation Region 13 (Ontario Partners in Flight 2008). It is one of the few shrub-dependent species in North America that appears to be area- or edge-sensitive (Lehnen and Rodewald 2009a, b). No Aboriginal Traditional Knowledge is currently available.

DISTRIBUTION

Global range

The breeding range of the Yellow-breasted Chat includes eastern and western North America. The *I. v. auricollis* subspecies breeds from southern British Columbia, Alberta and Saskatchewan south discontinuously to northern Mexico. The *I. v. virens* subspecies breeds from the eastern Great Plains and central Texas eastward, and north to extreme southwestern Ontario (Figure 1). Breeding densities are greatest in the southeastern United States (Figure 2).

Most chats winter in the lowlands of eastern and western Mexico (from sea level to 1500 m) through Central America to western Panama (Figure 1); some individuals overwinter in the southern United States and occasionally north to Canada. Based on mitochondrial DNA analyses, the eastern and western subspecies occupy separate overwintering areas (Lovette *et al.* 2004). The eastern subspecies winters in eastern Mexico from Veracruz to Chiapas, south through Central America. The western subspecies winters in western Mexico in Baja California Sur and from Sinaloa to Oaxaca.

Canadian range

Chats often wander widely during the breeding season and these non-breeding birds confound assessments of the species' breeding distribution. In Canada, *I. v. auricollis* breeds in southwestern and south-central British Columbia (British Columbia Breeding Bird Atlas 2011), in southeastern Alberta along the Milk, South Saskatchewan and Red Deer River valleys (Federation of Alberta Naturalists 2007) and in southwestern Saskatchewan (Smith 1996; Figure 3).

In British Columbia, there are two centres of occurrence: the south Okanagan watershed and the Similkameen watershed, with one minor area in the southeast (Environment Canada 2010a). In 2004 and 2005, nesting Yellow-breasted Chats were discovered in the Pend d'Oreille River Valley in southeastern British Columbia (Dulisse *et al.* 2005; Machmer and Ogle 2006). Other sightings have occurred elsewhere in the province during summer (Vernon, Kamloops, Cache Creek, Creston, Pitt Meadows, Vancouver, and Mission), but breeding has not been confirmed (Campbell *et al.* 2001).

In southeastern Alberta, the historical breeding range extended as far north as the Red Deer River (from Empress and Tolman Bridge to Trochu) and southwestwards through Beiseker and Lethbridge down to the Montana border (Salt and Salt 1976). During the 1970s, there were records from as far north as East Coulee and Bindloss, and as far west as East Coulee, Caresland, Taber and Writing-on-Stone Provincial Park (Pinel *et al.* 1993). There were reports in two years from Reesor Lake in the Cypress Hills. In 1974, there were unusual extra-limital breeding season records from the Bow River valley at Carseland and from Bow Valley Provincial Park (Pinel *et al.* 1993).

The distribution of the Yellow-breasted Chat in Alberta is closely associated with the lower river valleys and adjacent coulees of the Milk, South Saskatchewan, Rosebud and Red Deer rivers (Salt and Salt 1976; Pinel *et al.* 1993; Federation of Alberta Naturalists 2007). The core range in Alberta is in the lower Milk River Valley (Salt 1973); however, Wallis (1977) states that this species is fairly common in suitable habitat along the lower Red Deer River valley. The lower Bow River may also have a small population. In addition, chats are found in the drainages of the southern slopes of the Cypress Hills and the Manyberries area (Pinel *et al.* 1993; Federation of Alberta Naturalists 2007). They are more patchily distributed in the tributary valleys of the Red Deer River, north of Duchess (Wallis 1977).

In southwestern Saskatchewan, Yellow-breasted Chats occur north as far as the South Saskatchewan River (Smith 1996). In the south-central parts of the province, the range extends to Perdue and the mouth of Beaver Creek (South Saskatchewan River). With the recent range expansion (over the last 10 years or more), the species is now found as far north as Maymont and Borden on the North Saskatchewan River. In southeastern Saskatchewan, the Yellow-breasted Chat is found along the Qu'Appelle River, east to Highway 9 north of Whitewood, and along the Souris River, east to Elcott.

Yellow-breasted Chats are accidental in Manitoba, with 19 reports from the 1920s through the early 2000s (Edie *et al.* 2005). Most sightings are from south-central or southwestern Manitoba, with more easterly reports from Whitemouth and Hillside Beach, and the most northerly near Riding Mountain National Park. Because there are a number of June sightings, it is possible that the species could periodically breed undetected in Manitoba. There have been four records since Edie *et al.* (2005): 1) a territorial male in suitable breeding habitat from the Lauder Sandhills of southwestern Manitoba (first observed near Grand Clairiere in 2005; K. De Smet pers. comm. 2010); 2) near Melita (28 May 2007); 3) Whiteshell Provincial Park (15 June 2008), and 4) Riding Mountain National Park (early July 2009; K. De Smet pers. comm. 2010). Some of the probable breeding records from the Qu'Appelle Valley in eastern Saskatchewan (Smith 1996) are close to the Manitoba border and similar riparian and sandhills habitat also exists there. The river valleys of western North Dakota, which support small numbers of chats, are also in close proximity to the Manitoba border.

In southern Ontario, the *I. v. virens* subspecies occurs south of Toronto as far as Pelee Island (Eagles 2007; Figure 4). During the first breeding bird atlas (1981-1985) it was found north of the Carolinian region in only the Goderich, Kingston and Sherburne areas (Eagles 1987). Only two records exist outside the Carolinian region for the second atlas (2001-2005; one in Goderich and the other near Pickering).

Although never confirmed, the possibility exists that the *virens* subspecies has bred in Quebec. Of 54 sightings, two are records of probable breeders (territorial males defending breeding territories for more than a week); they include Gatineau Park and Neuville in the Québec City region (S. Denault pers. comm. 2010). Two possible breeding attempts also recently occurred in New Brunswick (Maritimes Breeding Bird Atlas 2010).

For each population, extent of occurrence (EO) was calculated using a minimum convex polygon that encompassed each population's breeding range. For *I. v. auricollis*, the EOs are ~8800 km² for the Southern Mountain population in British Columbia and ~368,800 km² for the Prairie population in Alberta and Saskatchewan. The index of area of occupancy (IAO) for Yellow-breasted Chats in British Columbia is estimated to be a maximum of about 608 km² (based on 152 pairs, each of which occupies a separate 2 km x 2 km grid cell). However, because multiple pairs often occupy more than one grid cell, the actual IAO would be < 500 km². Using the same type of calculation, the maximum IAO for Saskatchewan and Alberta is roughly 5720-6120 km² (based on a population estimate of between 1430 and 1530 pairs).

For *I. v. virens* in Ontario, EO is ~42,300 km². IAO is difficult to calculate precisely, but based on the population estimate (<42 pairs) and the distribution of the species, IAO would be <200 km² using the 2 km x 2 km grid method.

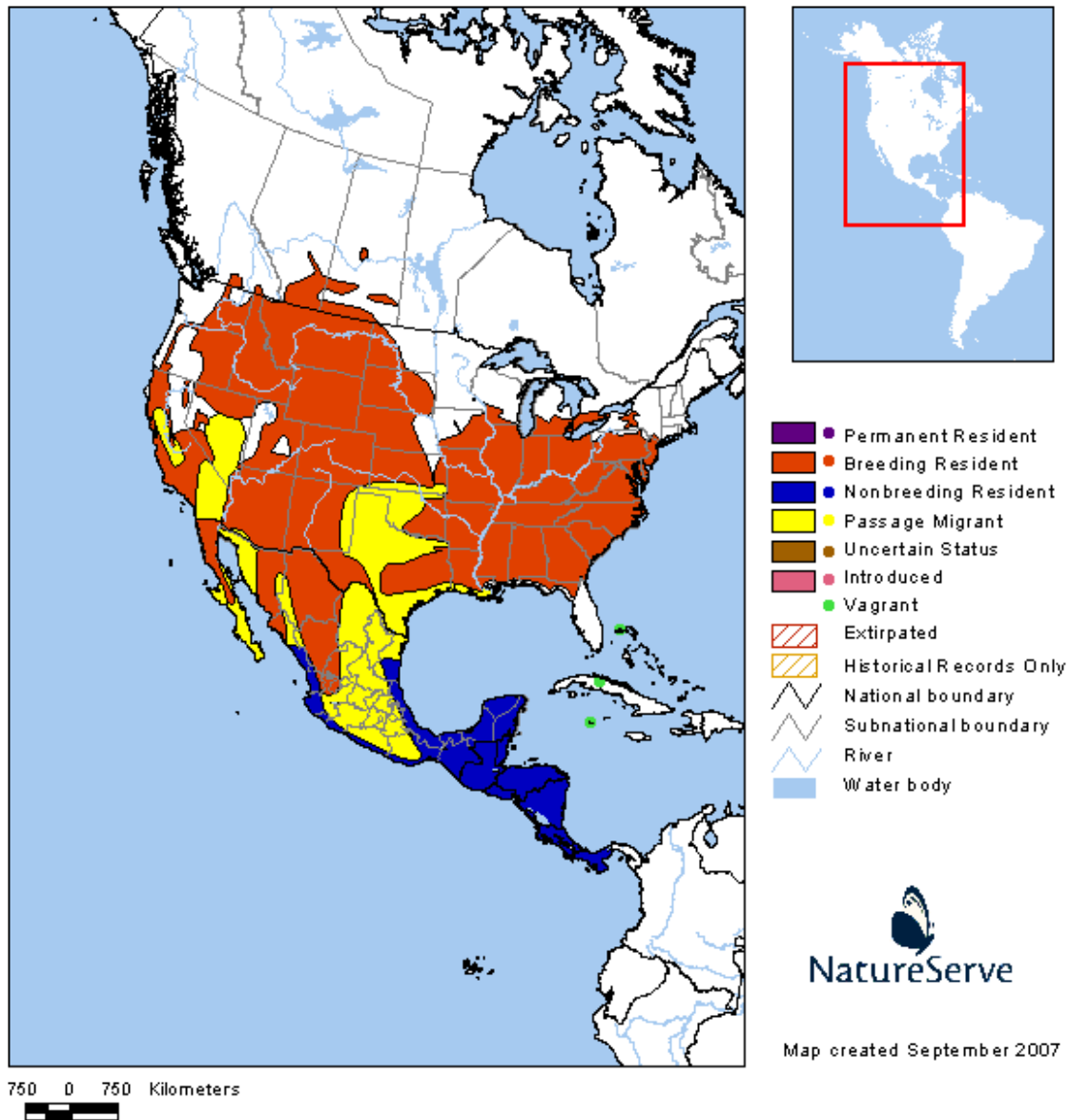


Figure 1. Breeding and wintering range of the Yellow-breasted Chat (modified from Ridgely *et al.* 2003; data provided by NatureServe in collaboration with Robert Ridgely, James Zook, The Nature Conservancy - Migratory Bird Program, Conservation International - CABS, World Wildlife Fund - US, and Environment Canada – WildSpace). The *virens* subspecies' breeding range is the eastern half of North America; the *auricollis* subspecies occurs in the western half. Note that the northwestern range of *auricollis* is much less continuous than depicted here.

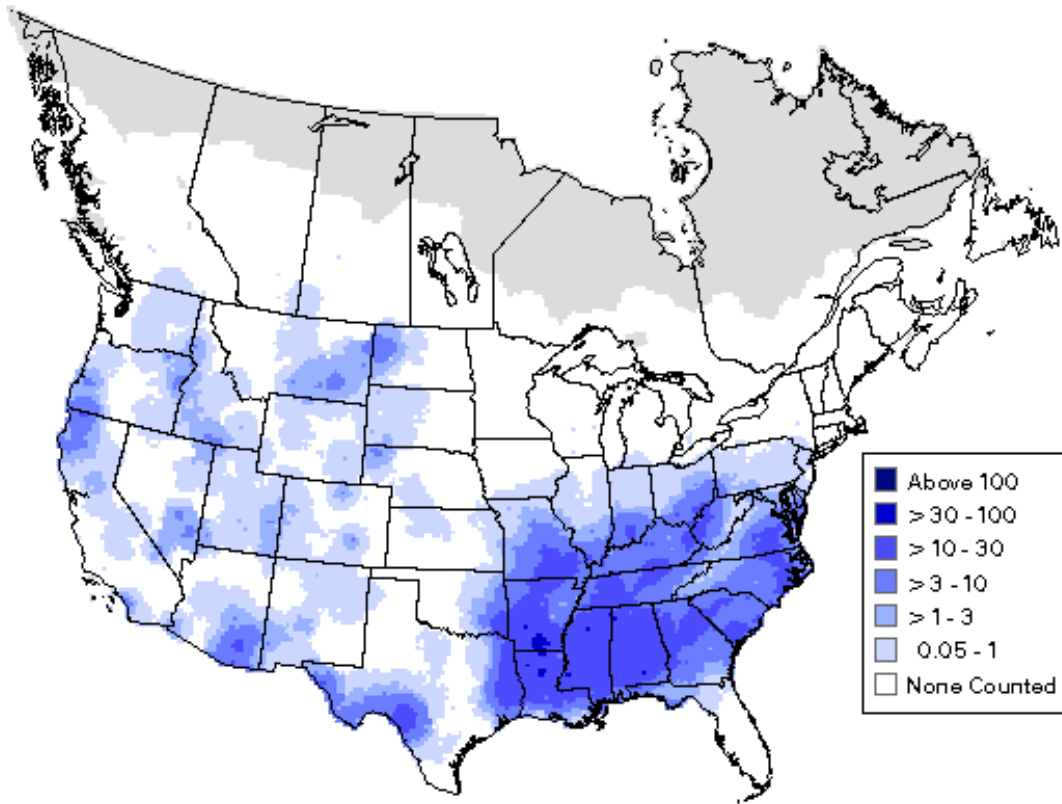


Figure 2. Abundance map of breeding densities of the Yellow-breasted Chat in North America, based on data from the Breeding Bird Survey (1994-2003; from Sauer *et al.* 2011). Data from much of Canada were generally too sparse for good interpolation. The species is rarely detected by the BBS in many other regions as well, so this map is not intended to portray all occurrences.

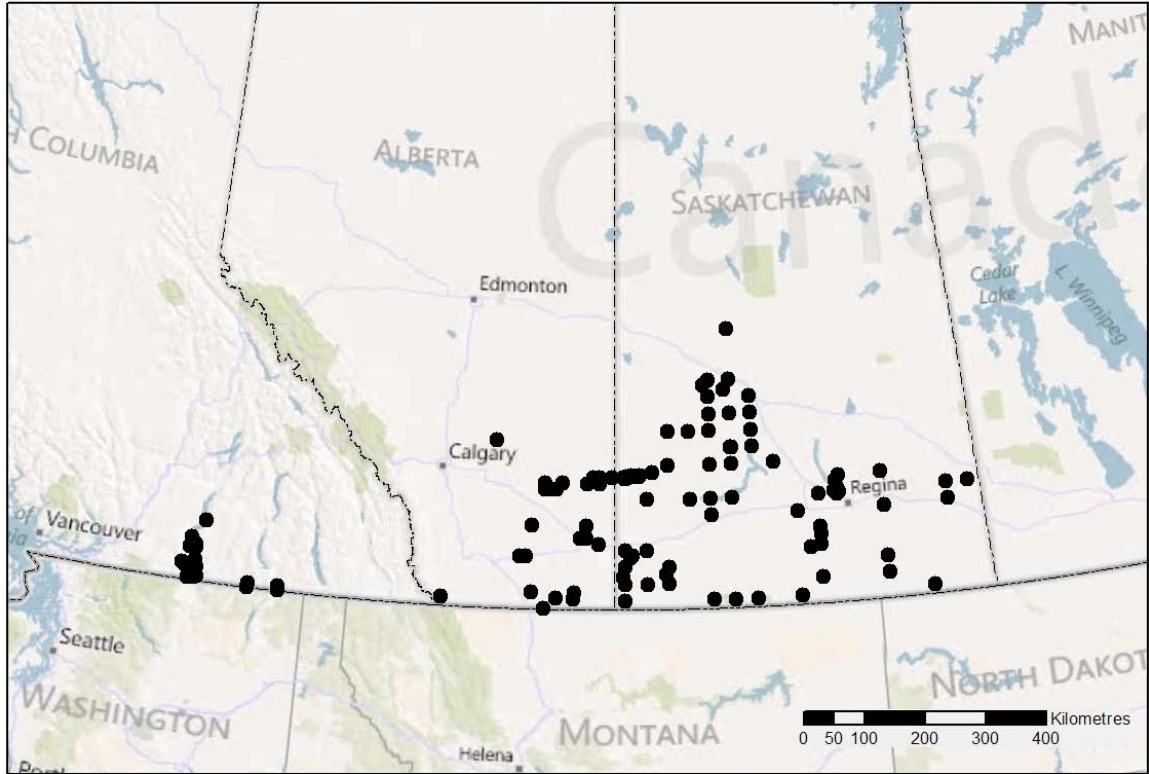


Figure 3. Distribution of the Yellow-breasted Chat (*auricollis* subspecies) in western Canada. Data for British Columbia and Alberta represent breeding records since 1987 only. Data for Saskatchewan show occurrence records dating back to 1921. (The map background layer is produced by Bing Map ©2011 Microsoft Corporation and its data suppliers.)

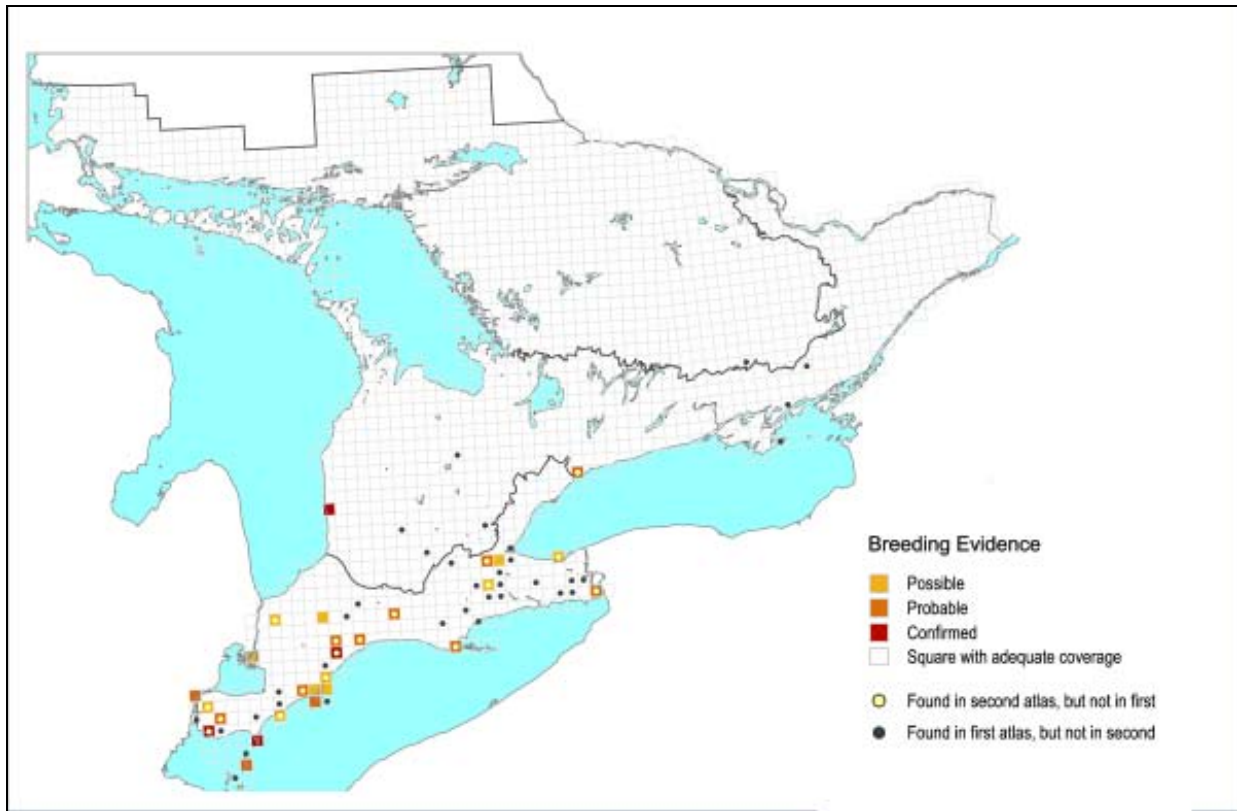


Figure 4. Breeding distribution of the Yellow-breasted Chat (*virens* subspecies) in southern Ontario, based on data from the Ontario Breeding Bird Atlas for the period 2001-2005 (reproduced with permission from Cadman *et al.* 2007). Squares with black dots are those in which the species was found in the first atlas period (1980-1985), but not in the second (2001-2005).

HABITAT

General structure and composition of habitat

The Yellow-breasted Chat requires dense, low shrubby vegetation and is classified as an open-canopy obligate species (Dennis 1958; Eckerle and Thompson 2001). A wide variety of early-successional habitats (dense, low deciduous or coniferous vegetation) are used, including early shrubby regrowth on abandoned agricultural fields, power-line corridors, clear-cuts, fencerows, forest edges and openings, and areas near streams, ponds and swamps (Eckerle and Thompson 2001). While the species will tolerate areas of open grass within territories, it does so only if dense shrubs occur close by (Johnson and Odum 1956).

In British Columbia, *I. v. auricollis* requires dense thickets of understory vegetation in low-elevation riparian areas such as streams, oxbows and other wetlands (Cannings 2000; Morgan *et al.* 2006). These consist of native species of Wild Rose (*Rosa* spp.), Snowberry (*Symphiocarpus albus*), willow (*Salix* spp.) and other shrubs, with an overstory of Water Birch (*Betula occidentalis*) or Black Cottonwood (*Populus trichocarpa*; McKibbin and Bishop 2010a).

In Alberta, Yellow-breasted Chats are found “in dense shrubbery in the understory of riparian poplar forests of major river valleys, or in dense tangled shrubbery of smaller coulees and drainages that lack tree cover” (Federation of Alberta Naturalists 2007). They are also sometimes associated with riparian woodland, mainly in major valleys in the Dry Mixed Grass Sub-Region (C. Wershler pers. comm. 2010). Chats occasionally nest on shrubby slopes in upland areas in the Cypress Hills, but upland areas are not usually suitable habitat in Alberta (Pinel *et al.* 1993). Shaded thickets of Thorny Buffaloberry (*Shepherdia argentea*), native species of hawthorn (*Crataegus* spp.), rose, willow and Water Birch are used (Wallis 1976).

In Saskatchewan, chats occur along major watercourses, in coulees or draws, and in dune complexes (Smith 1996). Within these landforms, they prefer the densest, tall shrubby vegetation, common components of which are willow species, Round-leaved Hawthorn (*Crataegus rotundifolia*), Saskatoon (*Amelanchier alnifolia*), Chokecherry (*Prunus virginanus*), and Thorny Buffaloberry. In Montana, habitat models identified shrub cover, deciduous trees and tree diversity as the variables that best predicted Yellow-breasted Chat distribution and abundance along the Missouri and Madison rivers (Noson *et al.* 2009).

A major difference between the eastern *I. v. virens* subspecies and the western *I. v. auricollis* subspecies is that the former occurs in early successional habitats that change relatively rapidly, while the latter occur in lowland riparian habitats that are less subject to successional change (McKibbin and Bishop 2010a). In Ontario, Yellow-breasted Chats use regenerating old fields, forest edges, railway and hydro rights-of-way, young coniferous reforestations and, occasionally, wet thickets bordering wetlands (Wormington 1982, 2006; Eagles 2007). Tangles of grape (*Vitis* spp. and raspberry (*Rubus* spp.) are a frequent feature.

Successional stage: vegetation structure and height

In British Columbia, McKibbin and Bishop (2010a) found that habitat selection was not random; territories were selected for specific vegetation characteristics. Breeding territories contained a significantly higher percentage of shrubs and significantly lower proportion of grass and forbs than within random plots.

The stage at which chats colonize early successional habitats in the eastern United States is when invasion of woody plants begins and there is a scatter of trees. Densities peak when dense shrub thickets are abundant and decrease as forests begin to mature (Karr 1968; Shugart and James 1973; Hurst and Bourland 1996; Twedt *et al.* 1999). Of the three types of shrubland described by Peterjohn (2006), Yellow-breasted Chats occupy “young shrublands”, that is, vegetation where woody cover becomes dominant but there are still patches of herbaceous vegetation. As these habitats age, woody plants (< 3 m tall and dominated by shrubs and woody vines) continue to encroach on the herbaceous vegetation.

Microhabitat for nesting

In British Columbia, nests of *I. v. auricollis* were found in 12 plant species, with the dominant one being Wild Rose (72% of 246 nests; McKibbin and Bishop 2010a). Nests in Alberta are found in dense foliage 1-2 m above the ground (Federation of Alberta Naturalists 2007). In Ontario, Peck and James (1987) reported *I. v. virens* nesting in raspberry (5 nests), grapevine (2 nests), dogwood (*Cornus* spp., 2 nests), hawthorn (1 nest), Eastern Red Cedar (*Juniperus virginiana*, 1 nest), and Fragrant Sumac (*Rhus aromatica*, 1 nest).

Response to habitat fragmentation

There is some evidence to suggest that the Yellow-breasted Chat is sensitive to patch size. First, in British Columbia, nesting dates for *I. v. auricollis* were later in isolated habitat patches than in continuous riparian habitats. Although the difference was not significant, the average number of fledged chicks was 2.08 in large (15-70 ha) patches compared to 1.57 in small patches (< 2 ha; Morgan *et al.* 2007). Second, according to a spatially explicit metapopulation model that included dispersal distances, the population of *I. v. auricollis* in the Okanagan Valley appeared to be constrained by habitat fragmentation (Tischendorf and Lindsay 2004).

For the *I. v. virens* subspecies, recent work in Ohio confirms that the chat is one of the few shrub-dependent bird species that show some degree of area-sensitivity. Lehen and Rodewald (2009b) found a highly significant relationship between abundance and habitat patch size. This supports other evidence for area sensitivity in this species (Dennis 1958; Burhans and Thompson 1999; Rodewald and Vitz 2008). Although chats will occupy patches as small as 2 ha (Askins 1994), it is recommended that management units are patches of at least 4 ha (Environment Canada 2010b).

There is also some evidence that occupancy of shrub habitat depends on landscape composition. Discrete patches of shrub in Ohio were more likely to be occupied if other patches of shrub occurred within a 1 km radius (Lehen and Rodewald 2009a).

Non-breeding habitat

Stopover habitat for Yellow-breasted Chats is believed to be similar to breeding habitat (i.e., low, dense shrubby vegetation). However, the species is occasionally found in suburban habitats during spring migration (Phillips *et al.* 1964; Parnell 1969).

Habitat structure in the wintering areas is likely similar to that used for breeding. Generally, shrub-steppe, with dense, low cover of woody vegetation is the habitat used (Rappole *et al.* 1995). In Veracruz, Mexico, chats were found in young second-growth shrubland (1-10 m tall) and savannah with pasture and scattered clumps of trees (Rappole and Warner 1980; Rappole *et al.* 1998). In western Mexico, Hutto (1980) found chats in riparian gallery forests, mangroves, plantations with dense understory, and second growth, but not in undisturbed deciduous forest (Hutto 1989). Saab and Petit (1992) found chats in grassland that was not grazed or mowed (2-4 years old, 1-3 m high) in Belize. Also in Belize, Petit *et al.* (1992) found chats in scrub and pine savannah with dense patches of shrubs and frequent fires.

Habitat trends

I. v. auricollis (Southern Mountain population in British Columbia)

In British Columbia in the 1920s, Taverner (1922) noted that the Yellow-breasted Chat was very common wherever suitable riparian habitat was found in the South Okanagan Valley. At least 87% of riparian thickets in British Columbia have been converted to agricultural or urban use since 1938 (Dyer and Lea 2001; Lea 2008). Agricultural conversion intensified in the South Okanagan Valley between 1954 and 1958, mainly because of channelization of the Okanagan River (Cannings 2000). This loss of riparian habitat is thought to have had major impacts on the numbers of the Southern Mountain population of *I. v. auricollis*. However, the rate of riparian habitat loss may have slowed over recent years.

Heavy livestock grazing and disturbance could also have a detrimental effect on patch occupancy by chats in British Columbia. Gibbard and Gibbard (1992) found that chats were usually not found in riparian habitats exposed to heavy grazing or at sites with heavy traffic noise. C. Bishop has occasionally recorded chat territories dissected by recent or current livestock use, and even next to busy highways (BC Ministry of Environment, Land and Parks 2004). This does not necessarily mean that chats were breeding successfully in these habitats (see below).

I. v. auricollis (Prairie population in Alberta and Saskatchewan)

Given the range expansion of *I. v. auricollis* in parts of Saskatchewan, it is quite possible that the amount of suitable habitat has increased there. At a broad level, historically frequent fires and grazing by American Bison (*Bison bison*) controlled habitat succession in the prairies. However, fire suppression and absence of bison grazing, in addition to climate change, has contributed to increased shrub cover in prairie grasslands (Grant *et al.* 2004; Briggs *et al.* 2005). In Saskatchewan, it is also possible that the decline in American Elms (*Ulmus americana*), as a result of Dutch Elm Disease, has opened up the canopy with a resultant increase in the extent of dense shrubbery favoured by chats (B. Luterbach in pers. comm. to A.R. Smith). It is possible that chats have exploited these habitat changes.

More recently, there has been little quantification of change in riparian shrub habitat in the prairies that could affect Yellow-breasted Chats. A recent study used 153 randomly located transects to document changes in vegetation between 1985 and 2001 in upland and wetland habitats (Watsmough and Schmoll 2007). This provided some support for increased habitat for chats in Saskatchewan. Although low shrub cover declined by 7% in the moist mixed grassland and by 2% in the mixed grassland, tall shrub cover increased in the moist mixed grassland and mixed grassland by 17% and 19%, respectively. In Alberta, low shrub cover declined in both moist mixed grassland (-7%), and mixed grassland (-6%). Tall shrub cover also declined in moist mixed grassland (-7%) and there was none in mixed grassland (Watsmough and Schmoll 2007).

I. v. virens population (Ontario)

In the east, ecological processes determining habitat trends that affect *I. v. virens* are quite different from those affecting *I. v. auricollis* in the west. This is at least partly due to the fact that much of the suitable habitat in the east is of anthropogenic origin, and requires human disturbance in order to be maintained. Widespread logging and fragmentation of forests during the 19th and 20th centuries probably led to initial increases in Yellow-breasted Chats and other bird species of early and mid-successional habitats (Askins 1993).

However, the more recent trend of rapid succession to forest on abandoned farmland, coupled with intensification of agriculture, have meant that shrub habitats have declined on the landscape (Askins 2000). For example, in the Lower Great Lakes Physiographic Region, it has been estimated that more than 50% of habitat for Yellow-breasted Chats has been lost since 1966 (Dettmers and Rosenberg 2003). Southern Ontario is now largely composed of forests, open farmland and urban areas. Early successional shrub habitats are increasingly fragmented, occurring in smaller, isolated patches with individual patches being of low habitat quality (Environment Canada 2010b).

BIOLOGY

Life cycle and reproduction

Based on research on the *virens* subspecies in Indiana, Yellow-breasted Chats are assumed to be mostly single-brooded (Thompson and Nolan 1973). However, colour-banded *auricollis* chats in the South Okanagan Valley revealed that double and even triple broods occur (C. Bishop pers. comm. 2010). In addition, recent findings demonstrate, for the first time in the Neotropical-Nearctic migration system, that the Yellow-breasted Chat is one of a few migratory bird species that appear to also breed for a second time on fall/winter stopover in Mexico (Rohwer *et al.* 2009). Very little is known about the frequency of this phenomenon, nor the extent to which it may differentially apply to the *auricollis* and *virens* subspecies. Surveys conducted at the same areas in Mexico in 2010 failed to detect evidence for breeding (C. Bishop pers. comm. 2011).

Yellow-breasted Chats are predominantly monogamous, although polygynous males with two mates have been observed (Thompson and Nolan 1973; Dussourd 1998 cited in Eckerle and Thompson 2001). Extra-pair paternity is common (Eckerle and Thompson 2001; Miño *et al.* 2011). There is also evidence for conspecific brood-parasitism, at least in British Columbia (Miño *et al.* 2011).

Nests are located near the ground in low, dense shrubby vegetation. In the South Okanagan Valley in British Columbia, height of nests was 73-88 cm (McKibbin and Bishop 2010a). In Ontario, nests are usually placed 0.9-1.2 m above ground (n=15 nests; Peck and James 1987). Females lay 3-6 eggs in British Columbia (mean 3.54 eggs, n=57 nests, Morgan *et al.* 2007), and 1-5 eggs in Ontario (mean 3.5 eggs, n=14, Peck and James 1987). The mean date of the first egg in British Columbia is 9 June (Cannings *et al.* 1987), though egg-laying begins the third week of May and continues through 12 July (Morgan *et al.* 2007). In Ontario, eggs have been found in nests between 2 June and 1 July (Peck and James 1987).

The incubation period lasts about 11-12 days (in Indiana) with all incubation being done by the female (Eckerle and Thompson 2001). Both parents feed the young. Young leave the nest at about 9 days old (Eckerle and Thompson 2001). After independence, immature birds may move away from the natal site.

All second-year females are probably capable of breeding (Thompson and Nolan 1973). Females will attempt as many as three clutches in a single breeding season after successive nest failures. A new nest is built for each attempt, and the female may pair with a new male on each occasion (Thompson and Nolan 1973).

For populations of *I. v. virens* in the United States, nest success (i.e., those that fledged at least one young) rates varied from 22% (n=49) of nests in Indiana (Thompson and Nolan 1973), to 45% in Kentucky (1.45 young/nest; Ricketts and Ritchison 2000), 45% in South Carolina (2.3-2.9 young/nest; Whitehead *et al.* 2000) and 84% in another Kentucky study (3.25 young/nest; Schadd and Ritchison 1998). In British Columbia, 57% of nests fledged at least one young, and a mean of 1.53 fledglings was produced per female, for an overall fecundity of 2.86 young per successful nest (Morgan *et al.* 2007).

Breeding densities

In high-density areas, territories are often clumped together, suggesting loose coloniality (Eckerle and Thompson 2001). Territory size varies according to population density, ranging from 0.4-2.4 ha (mean 1.2 ha, n = 28) at low densities in Indiana (Thompson and Nolan 1973) to 0.51-0.91 ha at high densities in Virginia (Dennis 1958). In British Columbia, mean territory size for *I. v. auricollis* is $0.25 \pm \text{SD } 0.24$ ha (n=20, Morgan *et al.* 2007). More recent data from georeferenced singing males, and a larger sample size, indicate that chat breeding territories average $0.37 \text{ ha} \pm \text{SD } 0.27$ ha (n = 66; Mckibbin and Bishop 2010a). Foraging area and defended territories may vary in size depending on whether males are monogamous or polygamous (C. Bishop pers. comm. 2010).

Site fidelity

From 2002-2007, 75 adult *I. v. auricollis* and 385 nestlings were colour-banded in the South Okanagan Valley. Both males (31%) and females (10%) showed some fidelity to the territory or study site where they were banded as adults (McKibbin and Bishop 2010b). The low value for females is likely an underestimate, and is attributed to their secretive nature (C. Bishop pers. comm. 2011). Site fidelity for returning birds banded as nestlings was 10% (McKibbin and Bishop 2010b).

In Ontario, breeding sites do not appear to be normally occupied by *I. v. virens* for more than a few years (Eagles 2007). Some studies of the *virens* subspecies in the east (e.g., Thompson and Nolan 1973) have suggested that chats are remarkably mobile and transient, with the appearance of numerous non-mated birds and low site fidelity from year to year for both sexes, suggesting that they are predisposed to moving around the landscape in search of appropriate habitat, which is itself short-lived in the east.

Survival

Generation time is not known, but the average age of mature birds in each population is probably about 2-3 years old. The longevity record is about 9 years (Klimkiewicz *et al.* 1983). In British Columbia, a breeding male *I. v. auricollis* lived for 6 years or more, and a female for 5 years (McKibbin and Bishop 2008).

In the South Okanagan Valley, local survival for male *I. v. auricollis* chats was 0.65 ± 0.07 SE (95% CL 0.5 – 0.77; McKibbin and Bishop 2010b). In Ohio, Lehen and Rodewald (2009) calculated apparent annual survival rate (survival rate for birds recaptured at least twice within a season or between years at the same site) for *I. v. virens* as 0.75-0.8.

Predation

There is little information on adult or juvenile depredation. In the South Okanagan Valley, unidentified predators accounted for depredation at 29.8% of nests (range 17.6-43.3%; C. Bishop unpublished data). In British Columbia, potential predators include Black-billed Magpie (*Pica hudsonia*), introduced Eastern Fox Squirrels (*Sciurus niger*), feral domestic cats (*Felis domesticus*) and various snake species (Environment Canada 2010a; C. Bishop pers. comm. 2010).

Little information exists on predation on chats in other parts of their Canadian range. In Indiana, nest predation accounted for 44 of 47 failed nests (Thompson and Nolan 1973), and the predators there included snakes, Blue Jays (*Cyanocitta cristata*) and Eastern Chipmunks (*Tamias striatus*). Ricketts and Ritchison (2000) suggested that the predator community in eastern North American landscapes traditionally occupied by chats prior to European settlement (disturbed forest patches within a forest matrix) was much less diverse than that which currently occurs in human-altered landscapes. These species include medium-sized mammalian predators like Raccoon (*Procyon lotor*) and Virginia Opossum (*Didelphis virginiana*).

Dispersal/migration

Dispersal

Recent studies of *I. v. auricollis* in British Columbia indicated that dispersal distances were relatively small (McKibbin and Bishop 2010b). For example, males that were banded as adults and did not return to their previous year's territory had dispersal distances ranging from 6.4 to 42.9 km. Returning chats banded as nestlings had dispersal distances ranging from 2.5 to 15.6 km for males and 2.3 to 2.6 km for females.

Migration routes

Considered to be a Neotropical migrant, the Yellow-breasted Chat migrates from breeding areas to wintering areas in central and southern Mexico and Central America. Each autumn, small numbers of eastern *virens* chats (largely immatures) also inexplicably move to the northeastern Atlantic coast and attempt to overwinter, but few do so successfully (Eckerle and Thompson 2001). This is demonstrated by annual fall records of chats in Massachusetts (particularly along the coast), as well as northern Maine and the Maritimes. In Quebec, there are at least 54 such records (S. Denault pers. comm. 2010).

Migration timing

Because chats are so secretive following breeding, it has been assumed that they began leaving their breeding territories in early July and that half had left by the end of July (e.g., Dennis 1967 in Virginia). However, Eckerle and Thompson (2001) suggest that they regularly stay on the breeding grounds well into August. Movements outside the breeding range, particularly by juveniles, can confuse the assessment of timing of fall movements (see Migration routes above).

By late April, winter residents leave Panama and Costa Rica (Ridgely and Gwynne 1989; Stiles and Skutch 1989), and by May they leave Mexico (Howell and Webb 1995).

Spring arrival dates in British Columbia peak in the second half of May (R.W. Campbell in pers. comm. to Eckerle and Thompson 2001) and probably in late May/early June in Alberta (Federation of Alberta Naturalists 2007). In Ontario at Point Pelee National Park, the maximum catch of Yellow-breasted Chats at banding stations was on 12 May (earliest 25 April; Speirs 1985). The average arrival date at Rondeau Provincial Park is 9 May (earliest 25 April; Woodliffe 1979); the average at Kingston is 14 May (earliest 5 May; Weir 1989).

Interspecific interactions

Yellow-breasted Chat nests are frequently subject to brood parasitism by Brown-headed Cowbirds (*Molothrus ater*). In two studies in British Columbia, 13% (n=23 nests) and 23.5% (n=57) of nests were parasitized (Cannings *et al.* 1987; Morgan *et al.* 2007). Few nesting records of Yellow-breasted Chats exist in Saskatchewan, but three of the five documented nests were parasitized (Saskatchewan Bird Data Bank 2009). In the east, parasitism rates are 25% for Ontario (n=16; Peck and James 1987) and 21% in the northeastern United States (n=14 nests; Eckerle and Thompson 2001).

Deposition of cowbird eggs has been associated with some ejection of chat eggs by female cowbirds. Following hatching, Yellow-breasted Chat nestlings appear able to compete with cowbird nestlings, with daily nest survival rates (e.g., in Indiana, Thompson and Nolan 1973) and number of fledglings produced per female (in British Columbia, Morgan *et al.* 2007) in parasitized nests not significantly different from unparasitized nests. However, nests that were parasitized were more likely to suffer predation than unparasitized nests (Thompson and Nolan 1973), which decreases overall productivity. Nest survival rates did not differ between parasitized and unparasitized nests in Missouri (Burhans and Thompson 1999).

Adaptability

The Yellow-breasted Chat is very much a habitat specialist. It may be relatively tolerant of predicted climate change, because it is generally adapted to a warmer climate.

In British Columbia, *I. v. auricollis* has responded positively to habitat management in key areas (e.g., fencing of riparian areas to control grazing by domestic livestock). In Saskatchewan, Yellow-breasted Chats have apparently responded to successional changes (shrub encroachment), as demonstrated by their northward range expansion and increased abundance.

POPULATION SIZES AND TRENDS

Search effort

Partly because of its skulking, secretive habits, and partly because of the patchy distribution of its habitat, the Yellow-breasted Chat is hard to survey accurately using standard bird surveys.

Targeted surveys

Surveys for Yellow-breasted Chats have been conducted in British Columbia and Ontario using special survey techniques for the species (call playback in appropriate habitat). Surveys are conducted each year in the South Okanagan Valley as well as the outlier population in the Kootenays. Some surveys have also been conducted in Saskatchewan to document the range expansion (A. Smith pers. comm. 2010). However, systematic surveys over large areas have not been done there, resulting in a possible underestimate of the Saskatchewan population.

In southwestern Ontario, surveys of 13 chat sites that were reported as being occupied from 2001-2009 were carried out during June 2010 using playback tapes (M. Cadman and C. Bishop pers. comm. 2010). On Pelee Island, five surveyors spent more than 250 hours during the 2010 breeding season at 10 landowner locations from late May to early July, plus making numerous visits to all the previously known chat sites on the island. The Pelee Island Bird Observatory has also been carrying out chat surveys there in recent years (G. Gibson pers. comm. 2010).

Forest Bird Monitoring Program

The Forest Bird Monitoring Program (FBMP) was initiated in Ontario in 1987 to monitor songbird populations (Welsh 1995). This program consists of 10-minute point counts conducted twice per season at the height of the breeding period. FBMP surveys (n=22 survey stations) were conducted annually at Point Pelee National Park from 1994 to 2008 and provide FBMP trend information on Yellow-breasted Chats, but only for this particular location (Lepage *et al.* 2009).

Breeding Bird Atlases

Breeding bird atlas projects have been conducted in many provinces and states since the early 1980s. In a growing number of cases, atlases have been repeated ~20 years later, enabling a comparison of breeding bird distributions between the two periods. In Canada, first atlases were conducted for the Maritimes in 1986-1990 (Erskine 1992), Ontario in 1981-1985 (Cadman *et al.* 1987), and Alberta in 1987-1991 (Semenchuk 1992). The atlas of Saskatchewan birds (Smith 1996) was carried out with a different protocol to the other atlases (as a compilation of multiple data sources), and the breeding birds of British Columbia project (Campbell *et al.* 2001) was not a true atlas.

Repeat (second) atlases have been completed for Ontario (2001-2005; Cadman *et al.* 2007), Alberta (2000-2005; Federation of Alberta Naturalists 2007), and the Maritimes (2006-2010; Maritimes Breeding Bird Atlas 2010). In Ontario and the Maritimes, coverage was systematic and reasonably comparable in both the first and second atlases. The second Alberta atlas did not achieve the same level of coverage as the first. A second atlas was also recently launched in Quebec (2010), while first atlases have been launched in British Columbia (2008) and Manitoba (2010).

North American Breeding Bird Survey

The North American Breeding Bird Survey (BBS) is an annual survey conducted once in mid-June throughout the United States (since 1966) and southern Canada (since ~1968). Volunteers stop along randomly selected roadside routes, and record all birds seen or heard at 50 survey points located at 800-metre intervals (Sauer *et al.* 2011). Although the BBS covers all of the Yellow-breasted Chat's breeding distribution, detection rates are extremely low for this species in Canada. The BBS is largely inadequate for monitoring Yellow-breasted Chat populations at the northern edge of their range because of the species' rarity. Moreover, most chats occur in linear (riparian) or patchy habitat not well surveyed by roadside BBS routes. A strength of the BBS is the long time series of data available and the continent-wide coverage.

BBS trend analyses are performed by the Canadian Wildlife Service and the United States Geological Survey for various time periods and spatial extents (e.g., provinces, states, physiographic regions). In Canada, too few routes were available where Yellow-breasted Chats were detected to produce reliable trend estimates. For the United States, BBS analyses are available on a state-by-state basis where sample sizes are sufficient.

Christmas Bird Count

The Christmas Bird Count (CBC) is an annual survey conducted in Canada, the United States, and scattered areas of Latin America. Volunteers count all bird species heard or seen within a 24-km diameter circle on a pre-selected date between 14 December and 5 January (National Audubon Society 2009). The CBC is not well standardized; there is considerable year-to-year variation in the number and skill of volunteers who carry out the survey, as well as annual variation in weather conditions. Moreover, the CBC has limited value for monitoring chat populations because much of the species' wintering range is not well-covered by the survey.

Migration monitoring

Daily counts of migrants in spring and/or fall migration at stop-over areas in Canada are another source of population trend information. For Yellow-breasted Chat in Canada, only one such migration monitoring station currently records sufficient numbers of chats over a sufficiently long time series to permit statistical analysis (Long Point Bird Observatory on the north shore of Lake Erie, Ontario). This station monitors the *virens* subspecies only. One of the chief limitations of migration monitoring is that it does not usually provide any information on the geographic origins of the birds being counted. For species with large geographic ranges north of the migration count site, this is a major limitation. However, because the Canadian breeding range of the *virens* subspecies is restricted to a small part of southwestern Ontario, trends at Long Point Bird Observatory should be fairly representative of the provincial population and for the potential for rescue from source populations farther south.

Abundance

Population sizes for North American landbird species have been estimated using extrapolations of data from the BBS (see Blancher *et al.* 2007). These provide coarse continent-wide estimates, especially for the United States portion of the population, where Yellow-breasted Chats are most common. However, they are not accurate for population estimates at the edge of species' ranges and, as such, grossly overestimate the size of Canadian populations.

Based on BBS extrapolations, the North American population of the Yellow-breasted Chat is estimated to be about 10.6 million individuals (Blancher *et al.* 2007). Of these, about 8.6 million are believed to comprise the *I. v. virens* subspecies, while *I. v. auricollis* accounts for about 2 million.

The latest revised update of BBS results suggests that the total Canadian contribution is ~6000 birds (0.05% of the continental population; P. Blancher pers. comm. 2010). However, as noted above, this is likely a gross overestimate because sample sizes for this species are so small (P. Blancher pers. comm. 2010).

I. v. auricollis (Southern Mountain population in British Columbia)

For British Columbia, the latest estimate for the *auricollis* subspecies is 152 pairs or 304 mature individuals (Environment Canada 2010a). Between 2001 and 2005, comprehensive surveys were conducted annually in the South Okanagan Valley. These suggested the presence of 72 pairs (C. Bishop unpublished data). Based on habitat suitability mapping, it is estimated that a similar area of chat habitat to that in the Okanagan Valley is potentially available in the Similkameen Valley (up to 3140 ha; Warman and Sarell 1998; British Columbia Ministry of Environment, Lands, and Parks 1999). Thus, another 70 pairs or more could occur in that area, yielding a total of about 140 pairs. Access is restricted in this area, which is mostly on First Nations land (Lower Similkameen Indian Bands), so a more accurate population estimate is not currently possible.

In addition, in 2004, the first breeding record outside the Okanagan and Similkameen Valley (one nesting pair, and an unpaired singing male) was discovered at Waneta in the Pend d'Oreille Valley (Dulisse *et al.* 2005; Machmer and Ogle 2006). In 2008 and 2009, eight pairs were found at Waneta and Creston, which are the highest counts yet recorded in that valley (M. Machmer pers. comm. 2010).

A population viability analysis indicated 2.7-6.1% extinction risk over 100 years (using a fecundity rate of 1.85) for the South Okanagan Valley, and a 5% extinction risk for the Similkameen Valley (Tischendorf 2003; Carr and Tischendorf 2004).

I. v. auricollis (Prairies population in Alberta and Saskatchewan)

In the second Alberta breeding bird atlas, breeding was confirmed in one atlas square, considered probable in five squares, and possible in 17 squares (Federation of Alberta Naturalists 2007). No abundance estimate was provided, but there was no apparent change in the number of occupied squares between the first and second atlas periods.

Based on surveys done during the 1970s and 1980s, C. Wallis (in pers. comms. to C. Wershler 2010 and D.A. Kirk 2010) estimated Yellow-breasted Chat numbers in Alberta based on their abundance along the lower Red Deer River (from the Drumheller area east to the Saskatchewan border) and the lower Milk River (primarily from Pinhorn Grazing Reserve to the United States border). These stretches of suitable riparian habitat correspond to 274 km in the former river, and 48 km in the latter. Factoring in the way the rivers meander, the Alberta population is now estimated at 900-1000 pairs, based on: 1) an average of 2.3 pairs per 1.6 km; 2) higher densities in some areas (e.g., around Bindloss and Finnegan, where sandbar willow and riparian habitat is extensive) than others (e.g., narrow canyon at east end of Dinosaur National Park); and 3) adding small populations along Box Elder and Ross Creeks along Highway 1, some riparian habitat along the South Saskatchewan River at Drowning Ford and Medicine Hat, the Oldman River, and some other sites (C. Wallis pers. comm. 2010).

In Saskatchewan, the chat is regarded as “fairly common” (Smith 1996). The provincial population was estimated using extrapolations from known breeding Yellow-breasted Chat densities from 14 main areas/river systems (see Table 1). Based on the calculations in Table 1, the population was conservatively estimated at about 530 pairs. This estimate assumes that:

1. All singing males were in fact paired.
2. Territories are occupied over extended periods. In Saskatchewan, the Yellow-breasted Chat shows remarkably high site fidelity. Hence, population estimates that are based on extended periods (e.g., 20 years) are assumed to still be valid.
3. Densities can be reliably extrapolated from smaller areas of river valley to longer stretches.

It is evident that better coverage is needed in most areas to provide a more accurate assessment of the status of the chat in both Alberta and Saskatchewan. Nevertheless, based on the above calculations and extrapolations, the total population estimate for *I. v. auricollis* in Alberta and Saskatchewan is about 1430-1530 pairs (2860-3060 mature individuals).

I. v. virens population (Ontario)

Prior to European settlement, the Yellow-breasted Chat was likely a very rare species in southern Ontario and may even have been absent. Later, when early successional shrubland habitats were more common in the landscape (i.e., during the initial stages of farm abandonment that began in the mid-1900s), chat numbers were higher than now.

During the first Ontario Breeding Bird Atlas (1981-1985), the population was estimated at 50 pairs (Cadman *et al.* 1987). A few years later, the COSEWIC assessment reported 18-38 pairs in the province (Cadman and Page 1994). Based on data from the second Ontario Breeding Bird Atlas and element occurrence data from the Natural Heritage Information Centre, Eagles (2007) later estimated a population of 42-50 pairs. This is likely an over-estimate that a) failed to factor in the likelihood that many of the occurrences in the database represented one-time only transitory events (at least some of which also likely did not consist of *bona fide* breeding pairs), and b) failed to account for the 55% percentage decline of squares occupied from the first to second atlas periods. Nor would Eagles (2007) have been aware of the more recent, post-atlas (post-2005) declines that have occurred at two key sites in Ontario (see **Fluctuations and trends** below). As such, while it is difficult to estimate an accurate population size for Ontario, the current population is likely lower than Eagles' (2007) minimum estimate of 42 pairs (84 mature individuals).

Table 1. Population estimates for the Yellow-breasted Chat in Saskatchewan based on data from a variety of sources, including targeted surveys, Breeding Bird Survey, Saskatchewan Bird Data Bank, and anecdotal observations up until 2009 (compiled by A.R. Smith).

Area	Population estimate (pairs)	Estimate based on	Accuracy*
1. MISSOURI RIVER DRAINAGE			
Frenchman, Cypress Lake to Eastend	25	0.5 territories/km x 50 km	Medium
Frenchman – Val Marie to Border	5		Low
Other areas	4		Low
2. WOOD MOUNTAIN/BIG MUDDY VALLEY			
	5		Low
3. SOURIS RIVER			
Souris River, Halbirte to Estevan	3		Medium
Souris River, Estevan to Elcott	20	0.36 territories/km x 55 km	High
4. CYPRESS HILLS (NORTH SLOPE)			
	5		Low
5. MISSOURI COTEAU			
	12		Low
6. QU'APPELLE VALLEY			
East of Nicolle Flats – Fairy Hill	20	0.31 territories/km x 65 km	High
Nicolle Flats	5		Low
Tributary Creeks	5		Low
Eastern Qu'Appelle Valley	2		Low
7. GREAT SAND HILLS			
	2		Low
8. SOUTH SASKATCHEWAN RIVER (ALBERTA BORDER TO LAKE DIEFENBAKER)			
Coulees	130	2 pairs/coulee x 65 coulees	Medium
River Flats	44	0.35 territories/km x 125 km	High
9. LAKE DIEFENBAKER			
Coulees	170	2 pairs/coulee x 85 coulees	Medium
10. SWIFT CURRENT CREEK			
	50	2.5 territories/km x 25 km	Medium
11. SOUTH SASKATCHEWAN RIVER (GARDINER DAM TO BEAVER CREEK)			
	6		Low
12. ANERLEY VALLEY			
	2		Low
13. NORTH SASKATCHEWAN RIVER (MAYMONT TO WEST OF BORDEN)			
	2		Low
14. EAGLE CREEK			
	10		Low
15. MISCELLANEOUS AREAS			
	4		Low
TOTAL	531		

*Low: An “educated guess” based on the presence of suitable habitat and a few anecdotal observations.
 Medium: An estimate based on numerous anecdotal observations.
 High: Based on at least one comprehensive survey.

Fluctuations and trends

Subspecies *I. v. auricollis* (Southern Mountain population in British Columbia)

Too few detections on BBS routes are available for trend analysis of *I. v. auricollis* in British Columbia. Little other information is available on trends there, but it is likely that the population is currently lower than what it was historically. As recently as the 1920s, chats were described as “common” in riparian areas, but the most recent data suggest that only 152 pairs are left (Environment Canada 2010a). Moreover, latest results from the breeding bird atlas of British Columbia (2008-2011) record breeding evidence from only 14 10 km x10 km squares (British Columbia Breeding Bird Atlas 2011).

Subspecies *I. v. auricollis* (Prairie population in Alberta and Saskatchewan)

According to Salt (1973), the first report of a Yellow-breasted Chat in Alberta was in 1941. However, as early as 1945, chats were regarded as “common” along the Milk River (Rand 1948). More recently, no difference was found in the distribution of chats between the two atlas periods in Alberta; virtually the same squares were occupied (Federation of Alberta Naturalists 2007), indicating that the population has been fairly stable over the last two decades.

In Saskatchewan, *I. v. auricollis* has shown a substantial range expansion since 1940 (A.R. Smith pers. comm. 2010). By the 1990s, the range in south-central Saskatchewan had extended much farther north—to Perdue and the mouth of Beaver Creek on the South Saskatchewan River. In the southwestern part of the province, chats now occur as far north as the South Saskatchewan River. Over the last 10 years, the range has extended 40 km farther north to Maymont and Borden on the North Saskatchewan River. In southeastern Saskatchewan, the Yellow-breasted Chat is found along the Qu’Appelle River east to Highway 9 north of Whitewood, and along the Souris River east to Elcott. However, within this current breeding range, the species is still local and restricted primarily to thickets along watercourses, in coulees, and occasionally in dune areas (A.R. Smith pers. comm. 2010).

Subspecies *I. v. virens* (Ontario)

Comparisons between the two Ontario breeding bird atlas periods suggested a 20-year decline both in the number of occupied 10 km squares and a range retraction (Eagles 2007). Forty-five squares had evidence of breeding during the first atlas, whereas only 27 squares in the second atlas were occupied. After adjusting for differences in survey effort, an overall decline of 55% over 20 years was calculated for Ontario (equivalent to -33% over 10 years), though the results were not statistically significant. The decline was greater in the Simcoe-Rideau region (-86%; $p < 0.1$) than in the Carolinian region (-45%; $p < 0.1$), which may indicate a possible range retraction southwards (Eagles 2007)—a phenomenon that is consistent with breeding bird atlas results from nearby Ohio (see **Rescue Effect** below). Because there is close to a 1:1

relationship between atlas square occupancy and abundance for rare species like the Yellow-breasted Chat, the 33% decline in occupancy over 10 years is regarded as a reasonable estimate of population change for Ontario (P. Blancher pers. comm. 2011).

Almost 40% of the Ontario breeding population previously occurred regularly in just two areas of the province: Point Pelee National Park and Pelee Island, both of which receive a high degree of attention amongst birders and researchers. Analysis of standardized FBMP point count surveys (n=22 sample points) conducted at Point Pelee National Park estimated a 21% average annual decline in chat abundance from 1995 to 2008 (Figure 5; Lepage *et al.* 2009). Chats in the park are declining because of successional changes in vegetational communities that were previously farmland up until the mid-1900s. More recently, only one pair is believed to have bred at Point Pelee in 2009 (Environment Canada 2010b; A. Wormington pers. comm. 2010); and possibly one pair in 2010 (J. Vandermuellen in pers. comm. to M. Cadman 2010). No chats were found breeding in the area of nearby Windsor or LaSalle in 2010, though they are usually found in the vicinity annually (P. Pratt, in pers. comm. to M. Cadman 2010).

On Pelee Island, there were still five to six pairs in 2008 (A. Wormington pers. comm. 2010), but only one possible pair was recorded in 2010 (G. Gibson pers. comm. 2010). This is despite the persistence of otherwise suitable habitat on the island and directed search effort. Three further possible breeding records of chats in 2010 came from the Credit River Valley and Bronte Creek (both singing males: S. Mainguy in pers. comm. to M. Cadman 2010) and from Elgin County where G.W. Prieksaitis confirmed breeding near Rodney (pers. comm. to M. Cadman 2010).

At Long Point Bird Observatory (north shore of Lake Erie), long-term daily counts of migrants over a 50-year time period show statistically significant declines in chat numbers (Figure 6). The average annual rates of decline in spring and fall were 3.5% and 2.3%, respectively. These values are equivalent to overall declines of 82% (spring) and 68% (fall) over 50 years. Average annual trend statistics for the most recent 10-year period (2000-2010) were -6.0% (spring) and -11.5% (fall), but these were not statistically significant.

All the available evidence suggests that chats in Ontario have been declining, both in terms of numbers and occupancy. There are now probably fewer than 10 locations (measured as the number of landowners) that the species occurs in as a functionally breeding species (measured as a mated pair) in any one year.

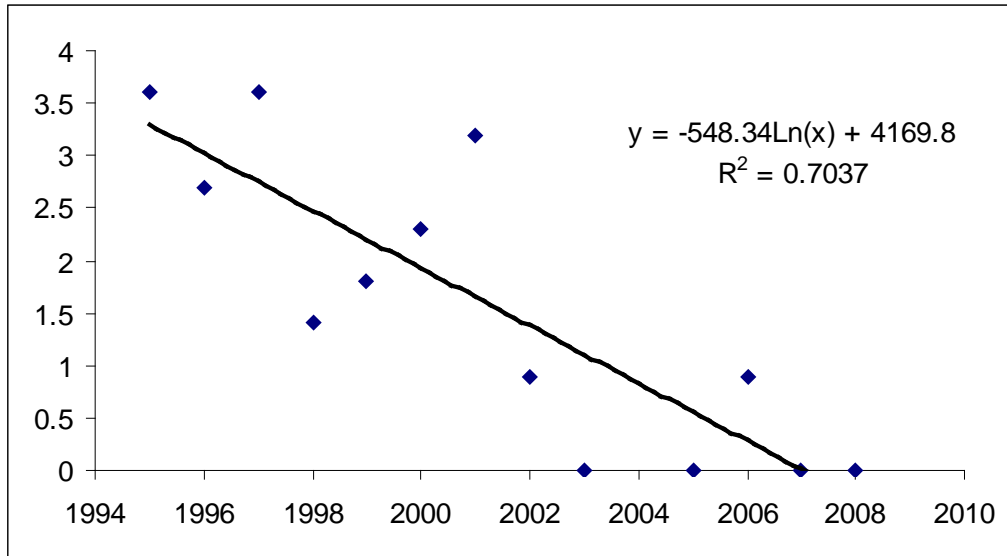


Figure 5. Changes in counts of Yellow-breasted Chats (*virens* subspecies) at Point Pelee National Park from 1995 to 2008, based on Forest Bird Monitoring Program results (-21% average annual change; $P < 0.001$; $n=22$; modified from Lepage *et al.* 2009).

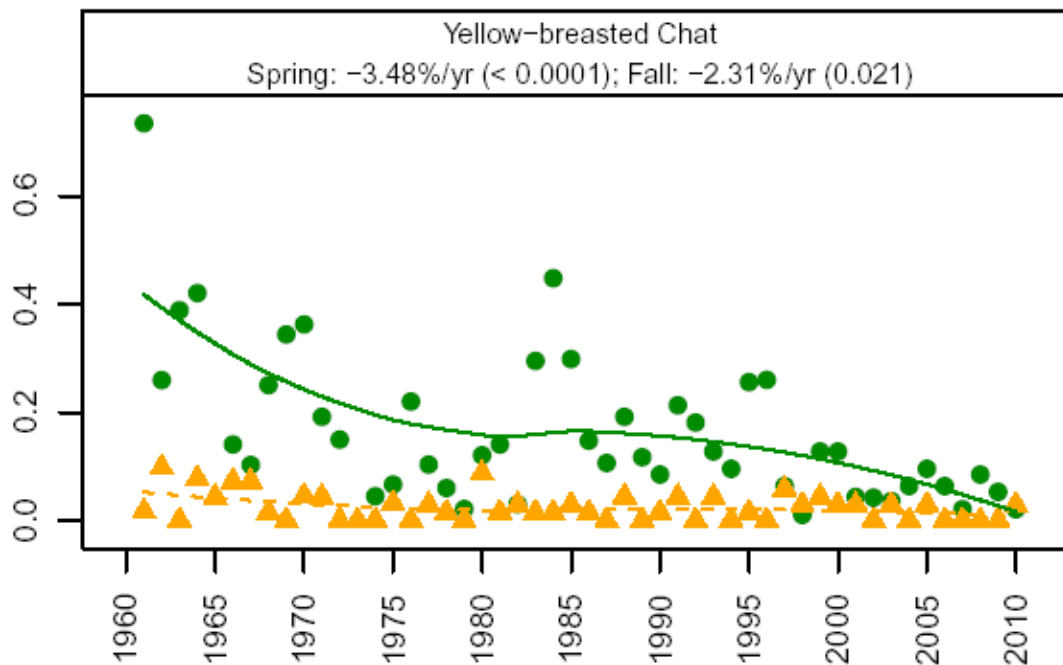


Figure 6. Long-term changes in indexed counts of Yellow-breasted Chats (*virens* subspecies) at Long Point Bird Observatory in spring and fall migration from 1961 to 2010. Spring indices are denoted by solid green circles; fall indices are orange triangles. Trend statistics for each season are average annual estimates; P values are in parentheses. Graphic courtesy of Bird Studies Canada.

Rescue effect

Populations of Yellow-breasted Chats adjacent to parts of Canada could provide a source for a rescue effect. BBS trends from potential source states in the western U.S. are essentially stable (Table 2), suggesting that they could rescue the Prairie population of *I. v. auricollis* in western Canada. Montana could represent a potential source population for chats in Saskatchewan and Alberta. This, in fact, may be the case, given that the species appears to be stable or increasing in those two provinces. Chats are relatively common along the major river systems of eastern (especially southeastern) Montana (Marks and Brown 2005), but much less common and more localized in the northwestern region west of the Continental Divide closer to Canada (D. Casey pers. comm. 2010).

In British Columbia, Tischendorf (2003) and Carr and Tischendorf (2004) suggested that the long-term viability of the Southern Mountain chat population may be dependent on immigration from adjacent parts of Washington state. At least some limited movement of *I. v. auricollis* birds from Washington into British Columbia occurs, based on a band recovery from Washington in B.C. (C. Bishop pers. comm. 2010). However, BBS results from Washington indicate a long-term decline of 2% (Table 2), and the breeding population there is rather small and scattered. While the BBS trend for Idaho is relatively stable (Table 2) and a larger population occurs there, the chat population is mostly concentrated in the southern part of the state (see Figure 2).

In the east, the reason for the earlier COSEWIC designation of Special Concern for the *I. v. virens* subspecies (rather than Threatened) was owing to perceived potential for rescue from neighbouring states (Cadman and Page 1994). However, BBS results show long-term population declines in all states bordering Ontario (Table 2). Further support comes from breeding bird atlas projects in states bordering Ontario, with almost all of these states showing declines in occupancy rates (Table 3). The exception (Ohio) shows a clear southward contraction in range, coupled with consolidation in the southern part of the state. Indeed, there is suggestion that chat populations in eastern North America are contracting southward, with statistically significant increases being seen in BBS trends in several Gulf Coast states. In addition to population declines occurring in nearby source populations in the U.S., rescue in Ontario is also increasingly diminished by ongoing loss of habitat. Last, there is no evidence that rescue has effectively taken place since the last COSEWIC status assessment. Overall, it would appear that the chances for rescue in Ontario are low, at best.

Table 2. Long-term population trends of Yellow-breasted Chats in U.S. states bordering Canada, based on the Breeding Bird Survey, 1966-2009 (Sauer *et al.* 2011). Statistically significant results (i.e., upper and lower 95% confidence intervals do not overlap with zero) are bolded.

State	Average annual % change	95% CI	95% CI	N of BBS routes
Washington	-2.0	-4.4	0.3	33
Idaho	0.5	-1.0	2.1	24
Montana	1.1	-0.6	2.6	27
North Dakota	0.3	-1.7	2.2	18
Wisconsin	-4.1	-10.2	2.3	9
Michigan	-6.0	-10.3	-1.9	17
Ohio	-2.7	-3.5	-2.0	70
Pennsylvania	-5.1	-6.0	-4.1	92
New York	-9.9	-1.7	-5.2	25

Table 3. Raw changes in number of squares or blocks occupied by Yellow-breasted Chats (*virens* subspecies) in the northeastern states bordering Ontario in the first and second breeding bird atlases.

State	Periods	First atlas	Second atlas	Summary
Michigan ¹	1983-1988 2002-2008	140	27	Decline
New York ²	1980-1989; 2000-2005	122	25	Decline
Ohio ³	1982-1987; 2006-2011	559	1075	Map from 1st atlas shows statewide distribution; map from 2nd atlas indicates a retraction in the north and expansion in the southern part of the state
Pennsylvania ⁴	1984-1989; 2004-2008	1442	805	Decline
Vermont ⁵	1976-1981; 2003-2007	3	1	Decline?

¹ Breeding Bird Atlas Explorer (2010)

² McGowan and Corwin (2008)

³ Ohio Breeding Bird Atlas II (2010)

⁴ Cornell Lab of Ornithology (2009)

⁵ Vermont Center for Ecostudies (2010)

THREATS AND LIMITING FACTORS

No information is currently available on possible threats (e.g., habitat loss or fragmentation) faced by the species on its wintering grounds. On the breeding grounds, the relative importance of different threats vary by region and subspecies.

Subspecies *I. v. auricollis* (Southern Mountain population in British Columbia)

In order of importance, the most important threats identified in British Columbia are: 1) habitat loss from urban and agricultural land use (including habitat degradation from livestock grazing); 2) predation by introduced predators; 3) brood parasitism by Brown-headed Cowbirds; 4) human disturbance and direct harm from recreational activities; 5) pesticide use; and 6) collisions with structures and vehicles (Environment Canada 2010a). Construction of hydro-electric dams could also have a severe impact on chat habitat (D. Fraser pers. comm. 2011).

In British Columbia, extensive linear areas of scrub habitat are removed by roadside maintenance, including habitat that is used by chats. One of the main threats to riparian areas used by chats comes from grazing by livestock (Environment Canada 2010a). Not only does livestock grazing open up the dense scrub vegetation structure preferred for breeding, resulting in habitat degradation, but it also fragments habitat patches. Recent research suggests that productivity may be lower in smaller patches than large habitat patches (Morgan *et al.* 2007), which could cause local declines in chat populations. A secondary effect of grazing is that it leads to increases in Brown-headed Cowbird numbers, which parasitize chat nests (see below). Taken together, these factors could lower population levels in riparian habitats. When grazing intensity was reduced in 2002-2003 in the South Okanagan Wildlife Management Area, the number of chat breeding territories increased from the 3-4 pairs that were present from the 1990s-2001 to 9-11 territories in 2003-2004 (Environment Canada 2010a), and to 19 territories in 2010 (C. Bishop pers. comm. 2011).

Predation by introduced predators could pose a threat to chats in British Columbia (Environment Canada 2010a), or at least act as a limiting factor. Between 2002 and 2005, unidentified predators accounted for the loss of an average of about 30% of nests (annual range 17.6-43.3%) in the South Okanagan Valley (C. Bishop unpublished data). Among species that could depredate chat nest contents are American Crows (*Corvus brachyrhynchos*) and Black-billed Magpie. Introduced mammalian predators include the introduced Eastern Fox Squirrel (Cowan and Guiget 1965) and domestic cat (C. Bishop unpublished data).

Yellow-breasted Chats are vulnerable to brood parasitism by Brown-headed Cowbirds (Cannings *et al.* 1987; Burhans and Thompson 1999; Whitehead *et al.* 2000), a factor that may be exacerbated by grazing (see above). While the impact of cowbird parasitism could be substantial, the fact that chats routinely eject cowbird eggs and also are able to rear mixed broods of cowbird and chat young could reduce detrimental effects (Burhans and Freeman 1997; Morgan *et al.* 2006). In 2002-2005, 46% of nests were parasitized (n=123) and 59% of nests fledged cowbirds; for nests where at least one chat chick was fledged, the mean number of chat chicks was significantly lower in parasitized nests than in unparasitized nests (2.44 vs 2.93, $P = 0.03$; C. Bishop unpublished data). Because of declining cowbird abundance, parasitism rates may be decreasing in the South Okanagan Valley (Morgan *et al.* 2006a; Environment Canada 2010a).

Pesticides are used intensively in the Okanagan and Similkameen valleys and could have detrimental impacts on chats, especially given the large area of orchard and vineyards in the Okanagan Valley. For example, eggs from American Robins nesting in orchards in the Okanagan have shown high concentrations of DDE, despite the fact that organochlorine pesticides are now banned (Harris *et al.* 2000). Other pesticides are also used heavily in orchards, and Cannings (1995) suggested that chats nesting in habitat close to orchards could be exposed. Moreover, even though most riparian areas where chats breed are far from agricultural areas where pesticides are applied, spray drift can occur to distances of 500-1000 m (Bishop *et al.* 2010).

Chats are killed on spring and fall migration due to collisions with vehicles (Potvin and Bishop 2010), tall buildings, TV and radio towers, and ceilometers at airports (Eckerle and Thompson 2001). Although this may involve small numbers of birds at any one site or event, the annual effect is cumulative across the chat's entire range and could be substantial (Environment Canada 2010a).

Large-scale river damming for hydro-electric purposes could pose a severe threat. For example, in Washington state, two dams have recently been proposed by the Okanagan Basin Water Board on the Similkameen River (see <http://www.columbia-institute.org/river/dams.html>). If this project were to go forward, the flooded area would include a large portion of the Similkameen Valley in British Columbia, including most of the Yellow-breasted Chat's habitat (D. Fraser pers. comm. 2011).

Subspecies *I. v. auricollis* (Prairie population in Alberta and Saskatchewan)

The main threat to the Yellow-breasted Chat in Alberta and Saskatchewan currently appears to be human interference with natural stream flow (e.g., dams and channelization, water withdrawal projects), which is critical to maintaining riparian vegetation along rivers (Federation of Alberta Naturalists 2007). In Saskatchewan, reservoir construction may have resulted in the loss of some habitat for this species. The largest of these are Lake Diefenbaker and Rafferty Reservoir; the former probably removed habitat for many chat pairs, whereas the latter is thought to have flooded the territory of only one bird. Clearing of vegetation on river flats for irrigation has occurred to the west of Lake Diefenbaker, but most of these sites remain intact (A.R. Smith pers. comm. 2010).

Grazing in riparian areas is also suggested as a potential threat in Alberta (Federation of Alberta Naturalists 2007). However, it appears that grazing can have a positive effect on habitat for Yellow-breasted Chats in Saskatchewan. For example, in the Leader Estuary area of Saskatchewan, chats were twice as likely to be found in grazed compared to ungrazed areas, though sample sizes were too small to detect statistically significant differences (Saskatchewan Breeding Bird Database; A.R. Smith pers. comm. 2010). Although these results appear to contrast with those from the Southern Mountain population, it is probably the intensity of grazing which is important.

Subspecies *I. v. virens* (Ontario)

In Ontario, the greatest threats to *I. v. virens* are thought to be: 1) loss of suitable habitat from natural successional changes on abandoned farmland leading to closed canopy forest; 2) conversion of shrubby, early-successional vegetation to cultivated fields; 3) habitat fragmentation effects (reduction in average size of patches, increased edge), which creates source-sink dynamics; and 4) cowbird parasitism (Environment Canada 2010b).

In eastern North America, much of the habitat traditionally occupied by Yellow-breasted Chats is dependent on disturbance (Environment Canada 2010b). Without disturbance or management, this habitat can rapidly succeed to closed forest.

Chats may be pre-adapted to colonize short-lived successional habitat by moving to new areas, as habitat becomes available. However, this presupposes that there is a sufficient supply of suitable habitat patches. In reality, the supply of these types of habitat in the eastern landscape is declining. The chat population has likely declined as a result, and range retraction may well be occurring. This means that even if suitable habitat were available (through management), the remaining chat population could be below or approaching the threshold at which it can no longer locate or colonize these new habitats. Also, because chats show some area sensitivity, many habitat patches may be so small and isolated that they do not facilitate semi-colonial breeding by chats, a feature which may be necessary for population persistence. If population declines persist in the northeastern United States and southern Ontario, then local and regional numbers can be expected to fall below the threshold for population persistence.

Little information is available on cowbird parasitism for the *virens* subspecies, but cowbird abundance in eastern North America has been declining significantly in recent decades (Sauer *et al.* 2011), so the scope and severity of this threat is diminishing. High levels of predation by mammalian and avian predators could pose a threat to *I. v. virens*, but no information exists in Ontario (Environment Canada 2010b).

PROTECTION, STATUS, AND RANKS

Legal protection and status

The Yellow-breasted Chat and its nest and eggs are protected under the *Migratory Birds Convention Act*. It is not listed under the U.S. *Endangered Species Act*, or the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The Yellow-breasted Chat is listed as Least Concern by the IUCN, because of its large range and relatively stable population overall (BirdLife International 2008).

In western Canada, *I. v. auricollis* is currently afforded protection as an Endangered species in British Columbia under Schedule 1 of Canada's *Species at Risk Act* (SARA). The Yellow-breasted Chat is also on the British Columbia Red List of candidate species to be considered for legal designation as Endangered or Threatened under the *Wildlife Act*. The Prairie population in Alberta and Saskatchewan is considered 'Not at Risk.' In Ontario, the *I. v. virens* subspecies is currently designated as 'Special Concern' under SARA. This population is also listed as 'Special Concern' in Ontario under the province's *Endangered Species Act, 2007*.

Non-legal status and ranks

NatureServe (2009) lists the Yellow-breasted Chat as 'Critically Imperiled' to 'Imperiled' (S1S2) in British Columbia, 'Vulnerable' (S3) in Alberta, 'Apparently Secure' (S4) in Saskatchewan, and 'Imperiled' (S2) in Ontario. In the United States, the chat is listed as 'Secure' overall (N5). In the western states bordering Canada, it is ranked as 'Vulnerable' to 'Apparently Secure' (S3S4) in Washington, and 'Secure' (S5) in Idaho and Montana. The species is declining strongly across most of its northeastern breeding range, including all states bordering Ontario. It is ranked as 'Secure' (S5) in Pennsylvania and Ohio, 'Apparently Secure' (S4) in Indiana, 'Vulnerable' (S3) in Michigan and New York, and 'Imperiled' (S2) in Wisconsin.

According to Partners in Flight, the eastern Yellow-breasted Chat (*virens* subspecies) is a priority species in four bird conservation regions.

Habitat protection and ownership

About half of the habitat (5078 ha) occupied by chats in the South Okanagan Valley in British Columbia occurs on First Nations land (45%), with the remainder being on private land (44%), provincial Crown land (6%) and conservation lands (5%; Environment Canada 2010a). In the South Okanagan, protected areas and Crown land include Vaseux-Bighorn National Wildlife Area, the Oxbows Wildlife Management Area, reserves south of McIntyre Bluff, and Inkaneep Provincial Park. In the Similkameen Valley, almost all existing habitat for chats occurs on First Nations lands. In the Kootenay Valley (confluence of Columbia and Pend d'Oreille Rivers), current nesting habitat exists in various parcels of land mostly in private ownership. One chat territory overlaps with a BC Hydro transmission line, another power line, and a third with Beaver Creek Provincial Park (Machmer and Ogle 2006; Machmer 2009a, b).

In Alberta, *I. v. auricollis* occurs in Dinosaur Provincial Park (Saunders and Cordes 1989), near Gooseberry Lake Provincial Park (slopes of Neutral Hills), Writing-on-Stone Provincial Park, and just north of Waterton Lakes National Park (C. Wershler pers. comm.). It also occurs as a scarce or uncommon breeding species at Canadian Forces Base Suffield National Wildlife Area (Dale *et al.* 1999).

In Saskatchewan, lands having various degrees of protection include Grasslands National Park, Nicolle Flats Nature Area, Buffalo Pound Provincial Park, Hidden Valley Conservation Area, Saskatchewan Landing Provincial Park, Cypress Hills Interprovincial Park, and Crown land on the Souris River.

In Ontario, many chat occurrences are on privately owned land, but the most important, regularly occupied sites are within publicly owned protected lands, such as Point Pelee National Park, Fish Point Provincial Nature Reserve (Pelee Island) and Rondeau Provincial Park. Other lands are owned by conservation groups and agencies, including the Nature Conservancy of Canada, Ontario Nature, and Essex Region Conservation Authority.

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BIOGRAPHICAL SUMMARY OF REPORT WRITERS

Dr. David Anthony Kirk has been working for more than 20 years with the federal and provincial governments of Canada, as well as non-government organizations. He has a wide range of ecological and land use experience in different ecosystems ranging from tropical to boreal. His company (*Aquila Conservation & Environment Consulting*) specializes in the use of multi-species and single species distribution models for use in conservation planning (integrating human resource use and biodiversity conservation), as well as literature reviews and objective analysis of a variety of human disturbance influences on biodiversity in anthropogenic landscapes. David is particularly interested in the spatial mapping of biodiversity and also works extensively on the status, recovery and management of species at risk. He has written or co-authored 22 COSEWIC status reports and updates, as well as 8 recovery plans, 8 action plans and 8 management plans for species at risk. *Aquila's* emphasis is on peer-reviewed scientific articles in ecological and conservation journals as a forum for informing policy and management practices, and David has co-authored 27 papers in peer-reviewed scientific journals in the last 16 years.

Dr. Jennie L. Pearce's research has focused on modelling the distribution, viability and habitat requirements of wildlife to inform and guide conservation efforts. Her company, *Pearce & Associates Ecological Research*, utilizes the latest statistical techniques and computerized technology in the design, implementation and presentation of environmental data and research to a wide range of clients, including government, not-for-profit organizations and industry. She has led numerous research projects to develop spatial distribution models for mammal species with limited distribution records, developed population viability models for species with small populations at the edge of their geographic range and modelled the temporal population changes expected to occur in abundant, but ecologically sensitive species, when landscapes are modified due to human activities. She has written or co-authored 6 COSEWIC reports and has published more than 37 scientific papers in the area of conservation biology.