

# HISTORY AND CURRENT STATUS OF FRANKLIN'S GROUND SQUIRREL IN MANITOBA AND ELSEWHERE IN CANADA

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Franklin's Ground Squirrel (*Poliocitellus franklinii*; hereafter, FGS) occurs across a large portion of north-central North America. Its global conservation (Red List) status is "Least Concern", based in large part on the assumption of healthy populations in the Prairie Provinces, contrasting with declining numbers farther south and east, especially in Indiana and Illinois.<sup>1</sup> I became aware of local population declines in southeast Manitoba in the late 1980s, which gradually led me to review Canadian distributional records and related natural history to evaluate this "Least Concern" assessment.

Franklin's Ground Squirrel resembles a small Eastern Gray Squirrel (*Sciurus carolinensis*) but with shorter ears and a less bushy tail (Figure 1). Its geographic range extends from central Alberta and southern Saskatchewan to parts of Kansas, Missouri, Illinois, and Indiana, including portions of southern Manitoba and several northern Great Plains states, and a limited area of northwest Ontario.<sup>2-4</sup> It has recently been detected in extreme northeast Montana, and its potential occurrence in northeast Colorado has been discussed.<sup>5,6</sup> An introduced population in New Jersey, arising from the accidental release of one pair in 1867, persisted for at least 40 years but has apparently disappeared.<sup>7,8</sup>

In 2007, Huebschman reviewed



**FIGURE 1:** Franklin's Ground Squirrel (probably a fully grown juvenile) feeding near a picnic site at Grand Beach, Manitoba on 3 September 2008. Photo credit: Peter Taylor.

comprehensively the distribution, abundance, and habitat associations of FGS throughout its range, compiling a valuable body of museum specimen data and published observations.<sup>4</sup> Though FGS is sometimes described as a tall-grass prairie species, Huebschman pointed out that its habitat preferences include woodland and wetland edges and clearings with dense ground cover, as well as grasslands with scattered trees and shrubs.<sup>4</sup> In Canada, FGS occurs mostly in prairie/farmland-forest transitional regions, often near large lakes and wetlands.<sup>9,10</sup> Ideal habitat includes slightly elevated, well-drained areas where burrows are protected from seasonal flooding. These elevated areas may be either natural, e.g., beach ridges alongside large lakes, or artificial, such as excavated gravel piles or road and railway rights-of-way.<sup>4,11,12</sup> Large, protective objects, including isolated buildings, are also often a feature of burrowing sites.<sup>4,12</sup> Earlier literature refers to FGS occupying the Transition Zone (aspen parkland) but extending some distance into the Canadian Zone (boreal forest).<sup>4,9</sup> Using current ecozone terminology, the Canadian range lies within central and eastern portions of the Boreal Plains and some adjacent parts of the Prairies and Boreal Shield.<sup>13</sup>

### **Pest control, conservation, and research**

Long considered foes of farmers, ranchers and gardeners, ground squirrels have often been the targets of control campaigns.<sup>14,15</sup> In the case of FGS, crop damage and occasional chicken depredation may be offset by consumption of weeds (e.g., they are fond of dandelions) and harmful insects.<sup>16,17</sup> Habitat fragmentation has made many North American ground squirrels vulnerable to local extirpation, leading to a gradual

change in attitudes. An internet search on ground squirrels thus produces a strange mixture of advice on topics from extermination to conservation. Yensen and Sherman commented that the old adage “where there’s one ground squirrel, there’s bound to be lots more” must be replaced with “where there’s one ground squirrel, there’s a place we ought to protect because probably there aren’t many more places with squirrels.”<sup>14</sup>

While conservation concern for ground squirrels in general remains relatively low in western Canada,

population declines of FGS have been reported in some southern and eastern parts of its U.S. range. While rankings and terminology vary among different jurisdictions, FGS is listed as endangered in Indiana and threatened in Illinois, with lower levels of concern elsewhere.<sup>1,18,19</sup>

The possible importance of FGS as a duck-nest predator prompted research on its natural history at Delta Marsh, Manitoba by Hochbaum in 1938 and continued by Sowsls through the 1940s, then by Sargeant *et al.* in several prairie states and provinces in the 1980s.<sup>9,20,21</sup> Natural-



**FIGURE 2:** A rare sighting of a Franklin's Ground Squirrel in wintry conditions. This early-emerging individual was first seen on 2 April 2020 and photographed the following day at a bird feeder in La Vallee Township, Rainy River District, Ontario. Photo credit: Michael Dawber.

history research has also been reported from Pinawa, Manitoba and Miquelon Lakes Provincial Park (PP), Alberta.<sup>11,22</sup> The Pinawa study yielded 40 specimens now preserved at the Manitoba Museum in Winnipeg (R. Mooi and J. Klapcecki, pers. comm.). Increasingly detailed biological research has resumed recently at Delta,<sup>10,23,24</sup> which is also the locality for many FGS specimens held by various museums.<sup>25</sup> Conservation concern for FGS, especially in Illinois and Indiana, has inspired extensive research on its habitat requirements, detection, and distribution.<sup>4,12,26-31</sup>

### Summary of natural history

In Canada, FGS is active above ground from the second half of April until early October, albeit rarely before May or after early September. An exceptionally early individual emerged at a residential garden in La Vallee Township,

Ontario on 2 April 2020 (Figure 2). The latest record I have found was near Pinawa on 11 October (year not given, but during 1969-73).<sup>11</sup> Males emerge from hibernation up to two weeks before females; they may recommence hibernation as early as late July, followed by females in late August.<sup>9-11</sup> Growing juveniles first emerge from nesting burrows in early July, gradually becoming independent (Figure 3), and are normally the last to hibernate.<sup>9-11</sup>

Franklin's Ground Squirrel is subject to "boom or bust" population fluctuations with peaks at intervals of 4-10 or even more years, making long-term trends difficult to define.<sup>4,9,10,32-33</sup> A 1933 parasitological study referred to peak abundance in Manitoba in 1912, 1917, 1923, 1927, and 1932, with sharp declines between these peaks.<sup>32</sup> Sowls noted 1938 as a peak year at Delta, with a considerable

decline in 1939 and incomplete recovery even by 1946.<sup>9</sup> Also near Delta, an agricultural incident in a breeding area, followed by overland flooding, caused a sharp decline in FGS numbers between 2000 and 2001, followed by an "ultimate crash" in 2004, but the population had rebounded by 2014.<sup>10</sup> Roger Smith (Brandon University) studied a thriving population near Oak Island Resort in the 1980s, but Hare found none when he surveyed Smith's site in the early 1990s (J. Hare, pers. comm.), though occasional sightings continue in the general area of Oak Lake. Erlie and Tester found an 11-year interval between peak populations (1961-1962 and 1972-1973) in northwest Minnesota.<sup>33</sup>

Soper (as cited by Huebschman) found FGS distribution in Prince Albert National Park (NP), Saskatchewan "notably inconsistent ... in many favourable localities it



FIGURE 3: Juvenile Franklin's Ground Squirrel at Norris Lake, Manitoba on 24 July 2018. Photo credit: Peter Taylor.

appeared to be absent” and later, in southern Saskatchewan, “Local dispersal and numbers are noticeably irregular — sometimes common, scarce or apparently wanting”.<sup>4,34,35</sup> These observations are perhaps related to local population fluctuations. Determination of FGS abundance is further complicated by its inconspicuous nature when in tall, dense vegetation.<sup>4,5</sup> Its whistles are therefore useful for detection and identification.

Further to the general habitat preferences described on p. 17, a fine-scale habitat mosaic, combined with supplementary food, at large campsites and picnic areas seems especially favourable. This observation may be biased by the bold behaviour of squirrels that are habituated to humans, and the resulting diet may not be beneficial (they, squirrels and humans alike, hang around fast-food concessions and are partial to french fries!). Well-known locations of this sort include sites in Birds Hill PP, Riding Mountain NP, and various lakeside parks in Manitoba; Moose Mountain, Buffalo Pound, and Good Spirit Lake PPs in Saskatchewan; and Dillberry Lake PP in Alberta.<sup>36</sup> The affinity of FGS for campsites (and the easy food they represent) was noted in Minnesota in the 19th century,<sup>37</sup> and likely has much earlier origins.

### Personal observations and data sources

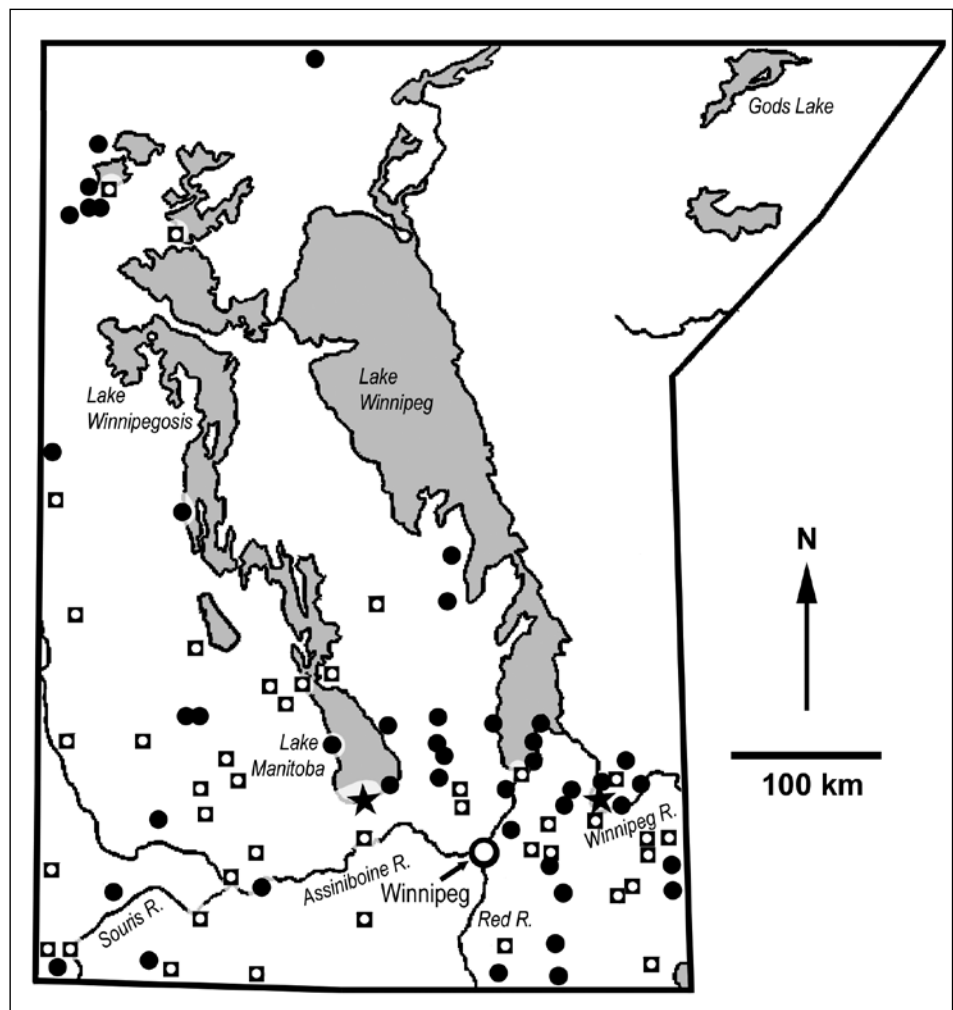
After moving to Pinawa in 1975, I frequently encountered FGS, especially in partly cleared areas near forest edges, often seeing up to five per day in the Pinawa – Lac du Bonnet region without special search effort (*i.e.*, chance encounters while birding). By the late 1980s, my sightings were becoming less frequent, and I started to keep more detailed notes in the late 1990s. In addition to my own observations,

records were compiled from the following sources: (a) specimens at The Manitoba Museum (Winnipeg) and the Sam Waller Museum (The Pas); (b) specimens and publications cited by Huebschman,<sup>4</sup> (c) specimen records in the Global Biodiversity Information Facility (GBIF) and VertNet online databases;<sup>25</sup> (d) papers and unpublished reports;<sup>38-49</sup> (e) photographic records at the iNaturalist website (up to 2019);<sup>36</sup> (f) correspondence arising from an information request in *Nature Manitoba News*;<sup>50</sup> (g) other personal contacts cited in the acknowledgements. Because most of my own and my correspondents’ observations were in Manitoba, the following discussion is unavoidably biased towards this province.

### Canadian distribution summary

**Manitoba** – The map in Figure 4 depicts localities for 171 FGS specimens and 97 other reports for Manitoba, including multiple records at some localities. Some clusters of records are counted as single localities. Forty-five of the resulting 86 localities had records during the period 2000-2019. These give a reasonable indication of current distribution, but not population trends. Anecdotal evidence of local declines and more definite evidence of northward range extensions is presented in the following section.

**Northwest Ontario** – Starting with a report at Rainy River in 1925, FGS has occupied a limited portion of northwest Ontario in and near the



**FIGURE 4:** Distribution of Manitoba specimen, photographic, and sight records for Franklin’s Ground Squirrel. ★ natural history studies near Delta and Pinawa;<sup>9,11</sup> ● 2000-2019; ■ pre-2000. The northern boundary of the map is at about 54.9°N. Some closely spaced localities, such as St. Ambrose PP and Lake Francis WMA (ENE of Delta), are represented by a single symbol. Some 2000-2019 records overlie pre-2000 records.

communities of Kenora, Fort Frances, and Rainy River.<sup>4,36,51-53</sup> This area is contiguous with the Manitoba range, extending north to 49.8°N near the Manitoba boundary and east to 93.3°W near the Minnesota border.

*Saskatchewan and Alberta* – Huebschman compiled localities for FGS specimens from Saskatchewan and Alberta at several museums, along with observations by various naturalists and researchers.<sup>4</sup> Engley and Norton mapped additional Alberta records including specimens at the University of Alberta (Edmonton) Museum of Zoology, details of which are in the GBIF database.<sup>25,54</sup> They questioned a pre-1900 specimen record from Pincher Creek (about 180 km south of Calgary, well beyond the current known range.<sup>54</sup> Six additional locations in the Drumheller region of Alberta were compiled by Schowalter.<sup>55</sup> The Royal Saskatchewan Museum (Regina) has FGS specimens from 11 localities, nine for the 20th and two for the 21st century (R. Poulin, pers. comm.), which were not included in Huebschman's compilation. A rapidly growing number of photographic records for FGS in both Alberta and Saskatchewan are available at iNaturalist.<sup>36</sup> Records from these sources are compiled in Figure 5, using a 2019 cutoff for iNaturalist.

### Changes over 200 years

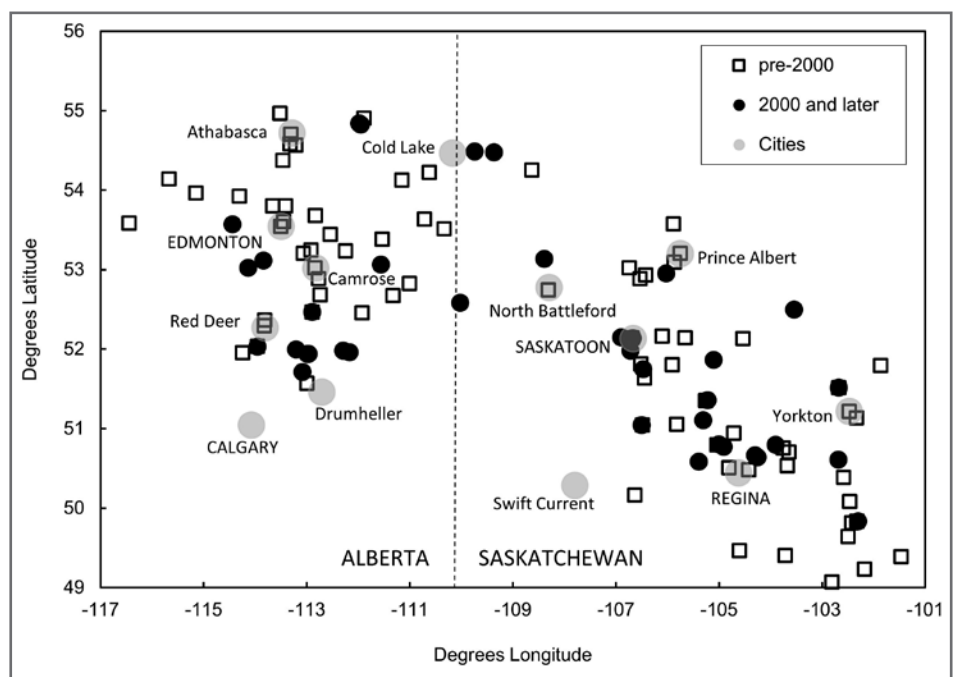
The original “discovery” of FGS by members of Franklin's First (Coppermine) Expedition at Carlton House, Saskatchewan in May 1820 attests that the species is not a newcomer to the Prairie Provinces (see Figure 6).<sup>56,57</sup> Early Manitoba records include two undated Smithsonian Institution (Washington, D.C.) specimens. One was collected by Robert Kennicott (1835-1866) at “Red River Settlement” (present-

day Winnipeg), presumably during his 1859-62 expedition to northern Canada and Alaska.<sup>25</sup> A “Red River” specimen was collected by D. Gunn — no doubt Donald Gunn (1797-1878), who had a long-standing connection with the Smithsonian.<sup>25,58</sup> Though undated, the Kennicott and Gunn records clearly precede the arrival of Ernest Thompson [Seton] in Manitoba in 1882. Thompson described FGS as not abundant anywhere, though generally distributed in wooded or scrubby parts of western Manitoba.<sup>59</sup> Some of his specimens, dated from 1884 to 1891, are at the Smithsonian, the Canadian Museum of Nature in Ottawa, and the Royal Ontario Museum (ROM) in Toronto.<sup>25</sup>

Distributional changes of FGS, linked to European settlement, date back at least to the 19th century. In his 1909 book, Seton mentioned finding no trace of FGS in the thick forests of Riding and Duck Mountains, whereas it was locally established in Riding Mountain NP by 1932.<sup>40,46</sup> Seton also found an overall increase between 1882 and 1909,

especially near the major population centres of Winnipeg, Portage la Prairie, Brandon, Minnedosa, and Dauphin.<sup>46</sup> At about the same time, Herrick noted that FGS “was at one time fairly abundant throughout the southern part of Minnesota, but is being rapidly exterminated by civilization”.<sup>37</sup> Nevertheless, based on iNaturalist records, the northern third of Minnesota remains one of the main U.S. strongholds for FGS.<sup>36</sup>

Sowls summarized the arrival of FGS near The Pas in central-western Manitoba (northwest corner of Figure 4) during the early 1940s, citing a 1941 specimen collected by Sam Waller at Big Eddy and a 1942 sighting by Harry Sanderson near Moose Lake, well east of The Pas.<sup>9</sup> Writing to Sowls in 1946, Waller stated that FGS had spread into the Carrot River farming area (southwest of The Pas) in the past five years.<sup>9</sup> Specimens collected by Waller and others are held in the Sam Waller Museum at The Pas (K. Patterson, pers. comm.), the Manitoba Museum (R. Mooi and J. Klapceki, pers. comm.), and several



**FIGURE 5:** Records of Franklin's Ground Squirrel in Saskatchewan and Alberta:  pre-2000 (mostly specimens);  2000-2019 (mostly sightings and photographic records). Some towns and cities are shown for reference as grey circles; they do not represent records unless overlain by other symbols. The top and sides of the figure are not provincial boundaries.

other collections.<sup>25</sup> Based on my correspondence with David Raitt, FGS still occurs in and near The Pas. His most northerly sighting was about 7 km northeast of Wanless at 54.233°N, 101.295°W. Owen Ridgen documented a remarkable outlying record of an adult (presumably female) carrying a juvenile about 170 km farther east-northeast, between Ponton and Wabowden (54.79°N, 98.81°W).<sup>36</sup>

A similar range expansion into northwest Ontario during the 20th century has also been sustained into the 21st century. A report of FGS at Rainy River in June 1925 was substantiated by ROM fieldwork in 1929.<sup>51</sup> The range extended to Emo by 1936 and to the Kenora area by 1960.<sup>51,52</sup> This has been linked to forest clearing and localized agricultural development.<sup>51,53</sup> Records remain limited to the Kenora – Fort Frances – Rainy River region.<sup>36,53</sup> As of 30 August 2020, they comprise at least: (a) 19 ROM specimens from 12 distinct localities; and (b) 21 recent photographic records including 17 submitted by Michael Dawber, a Rainy River District resident.<sup>4,36</sup> Dobbyn *et al.* predicted in 1994 that further range expansion in Ontario would be constrained by limited soil depth for burrowing on the Canadian Shield,<sup>53</sup> and this holds true for more-recent records. Association of FGS with buildings is common in northwest Ontario (M. Dawber, pers. comm.), perhaps reflecting a lack of burrowing opportunities in natural settings. Nevertheless, the 2019 record near Wabowden, Manitoba (noted in the preceding paragraph) attests to the species' ability to travel considerable distances (likely by following transportation rights-of-way) to local areas of suitable breeding habitat. North of the current known range in Ontario, there appears to be suitable

habitat in the Oxdrift-Minnitaki area west of Dryden (M. Dawber, pers. comm.).

Numerous records in the southern part of the Interlake region between lakes Winnipeg and Manitoba also reveal extension of known range (Figure 4). Much of this region is characterized by aspen parkland interspersed with small wetlands and low-intensity agricultural development (more pasture and hay than cropland). The northernmost Interlake record was at Lake St. George Caves Ecological Reserve (51.602°N, 97.408°W) in 2016 (J. Burns, pers. comm.). Records from a little farther west, near Mantagao Lake, date back to 1979.<sup>38</sup>

Contrasting with this expansion in lightly farmed parts, several of my correspondents indicated a long-term decline of FGS in intensively farmed areas near the southern edge of the Interlake region. A former Balmoral-area resident, Catherine Thexton reported FGS on her small farm property in 1981, increasing in 1982, then absent in 1983, but reappearing by 1986. Her collection of high-quality bird-song recordings includes some of the melodious calls of these squirrels.<sup>60</sup> The current property owners, Jim and Patsy Duncan, have not seen FGS since moving there in 1995. Writing to me in 2012, Ken Gardner mentioned “a few good colonies years ago in the Stonewall area”, a locality also mentioned by Soper.<sup>48</sup> Similarly, Liis Veelma and Rudolf Koes considered FGS to be increasingly scarce in southern Manitoba, except for hot spots already mentioned.

In southeast Manitoba (east of the Red River and Lake Winnipeg), recent records extend slightly north of most published range limits; FGS occurs commonly along the east shore of Lake Winnipeg to Victoria Beach and sparingly up the Winnipeg River

to Pointe du Bois (Figure 4). Farther south, it seems scarcer than formerly in and near Whiteshell PP, though still apparently thriving near the Ontario boundary at Falcon Lake resort and persisting at West Hawk Lake. Elsewhere across much of southern Manitoba, FGS seems best described as locally persistent, though thriving at a few localities such as Birds Hill PP. Records are sparse in agricultural regions west of the Red River and south of the Assiniboine River. Retired ornithologist Paul Goossen wrote to me: “I don't think I have ever seen one [FGS] in the Morden-Winkler area; I also don't recall seeing them in the Pembina Valley, nor on our farm near Manitou when I was younger.”

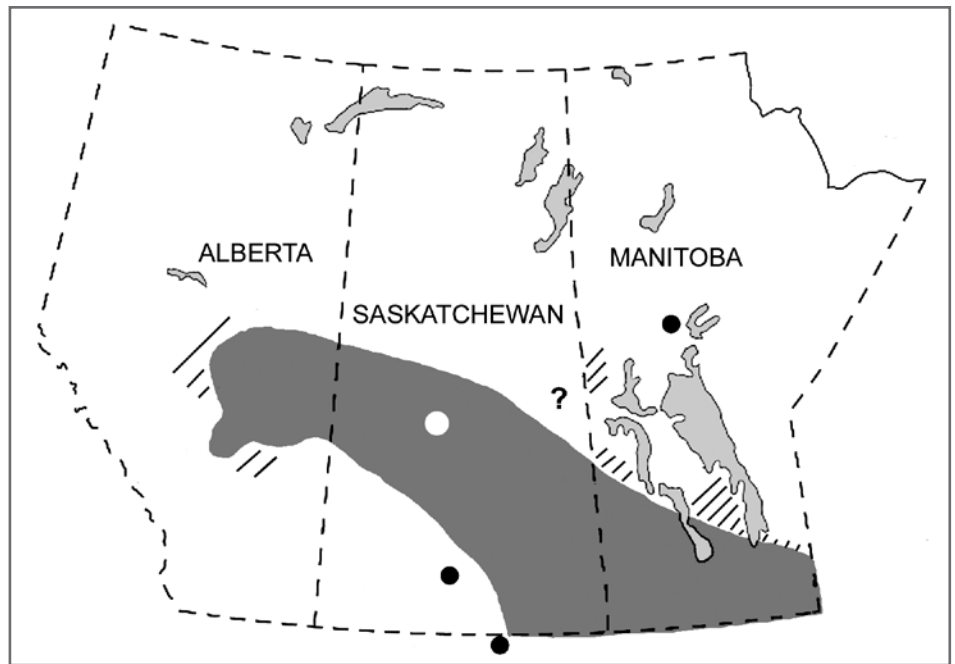
Ken De Smet (pers. comm.) provided the following assessment of the fortunes of Richardson's (*Urocitellus richardsonii*) and Franklin's ground squirrels, incidental to his many years of fieldwork with grassland birds in the Melita – Lyleton – Pierson region of extreme southwest Manitoba. Richardson's went from abundant during dry conditions in the late 1980s and early 1990s to almost nonexistent when the region entered a prolonged climatic “wet cycle” in 1993. The species has remained in small numbers with a localized distribution since then – perhaps one hundredth of the numbers during the dry period. Conversely, Franklin's benefited from the lush vegetation arising from the wetter-than-normal conditions, and De Smet often heard (but rarely saw) them in lush pastureland with minimal shrubbery. During his long-term monitoring of Ferruginous Hawk (*Buteo regalis*) nests, De Smet never found FGS remains, the principal prey species being Richardson's and Thirteen-lined Ground Squirrels (*Ictidomys tridecemlineatus*) and Northern

Pocket Gophers (*Thomomys talpoides*).

The substantial, though fluctuating population of FGS at Delta, on the southern shore of Lake Manitoba, has already been mentioned for its research importance (see pp. 17-18), and there are numerous records elsewhere along this shore. Indeed, the shores of Lake Manitoba and the south basin of Lake Winnipeg, albeit subject to the hazard of fluctuating lake levels, may represent the “heartland” for FGS in Manitoba, along with protected “islands” such as Birds Hill PP, Riding Mountain NP and nearby pothole country, and probably Spruce Woods PP. The scarcity of recent records west of lakes Manitoba and Winnipegosis, apart from some developed areas of Riding Mountain NP, may reflect low observer effort.

My evidence of historical change in Alberta and Saskatchewan is more limited than for Manitoba and Ontario. Overall, records extend a little farther into Alberta than depicted by Banfield (Figure 6). One outlying Saskatchewan record and the recent Montana observations lie south of the published range limits (Figure 6). The post-2000 (mostly photographic) records in Figure 5 are distributed over much of the range of earlier records (mostly museum specimens), though lacking so far (hinting at possible range contraction) in the western extremities in Alberta and the southern extremities in Saskatchewan. I have found no records of FGS for portions of central-eastern Saskatchewan adjoining the range extension near The Pas, Manitoba, and recommend searching for it in this region (flagged by a question mark in Figure 6).

All of the range extensions discussed above are summarized in



**FIGURE 6:** Estimated current distribution of Franklin's Ground Squirrel in the Prairie Provinces. The uniformly dark area is the distribution given by Banfield in 1974.<sup>2</sup> Hatched areas represent range extensions. Black circles show extralimital occurrences in south-central Saskatchewan, extreme northeast Montana,<sup>5</sup> and central Manitoba. The white circle shows the type locality at Carlton House, Saskatchewan.<sup>56,57</sup> A question mark indicates potential occurrence in east-central Saskatchewan, based on Manitoba records. The range in northwest Ontario is contiguous with that in Manitoba.

Figure 6, based on the distribution map in Banfield's *The Mammals of Canada* (1974).<sup>2</sup> Other published range maps vary slightly in details; for example, Reid shows FGS occurring farther north near the Manitoba-Saskatchewan border (to about The Pas) and farther west in central Alberta, but not in the Manitoba Interlake.<sup>3</sup> Local range expansion has also been reported in some northern parts of the U.S. range, whereas there is anecdotal evidence of local declines in parts of southern Manitoba, and definite declines in the midwestern U.S.<sup>29,52,61</sup>

## Conclusions

In combination, these records and anecdotes suggest that FGS is maintaining its Canadian range, at least at a broad regional level, thus supporting the “Least Concern” conservation status.<sup>1</sup> There is evidence of local declines in southern Manitoba, partly offset by some northward range expansion. The overall range boundary appears to fluctuate with time, possibly linked

to changing moisture regimes. The prevalence of FGS in a number of national and provincial parks seems to favour the species' long-term prospects, though local populations may become increasingly isolated as agriculture continues to expand and intensify. While a certain degree of development in originally forested areas appears to favour range expansion, increasingly intensive agricultural practices tend to fragment and isolate wildlife populations. This may hinder local recovery of FGS after population crashes, as implicated in population declines in parts of the U.S. range.<sup>4,28</sup>

Given the generally inconspicuous nature of FGS, and especially its local population fluctuations and occasional catastrophes, present data are insufficient to estimate any overall population trend. As the iNaturalist database and similar online resources grow, a more detailed picture of this animal's distribution should emerge, providing a valuable tool for conservation efforts.

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