
Steller's Jay Invasion on Southern Vancouver Island, British Columbia

Andrew C. Stewart
British Columbia Ministry of
Environment, Lands and Parks
Wildlife Branch
780 Blanshard St.
Victoria, B.C., Canada V8V 1X4

Michael G. Shepard
1241 Broad St.
Victoria, B.C., Canada W8W 2A4

ABSTRACT

Field observations during the autumn of 1992 indicated a large Steller's Jay (*Cyanocitta stelleri*) movement occurred on southern Vancouver Island. The jays were reluctant to cross wide expanses of water. Banding studies during the winter of 1992/1993 suggest that Steller's Jays disperse and occupy discrete winter territories. A review of literature and Christmas Bird Count data showed similar invasions have occurred periodically since at least 1913.

INTRODUCTION

Irruptive migrations are known for several species of North American corvids. Significant migrational movements of the Blue Jay (*Cyanocitta cristata*) have been documented in eastern North America (Broun 1941; Bent 1946; Stewart 1982) and more recently in the west (Weber 1977; Smith 1979). In the southwest, invasions by two conifer seed specialists, the Clark's Nutcracker (*Nucifraga columbiana*) and Pinyon Jay (*Gymnorhinus cyanocephala*) have also been reported (Wescott 1964; Davis and Williams 1964; Goodwin 1976). Less well known are seasonal movements by the Steller's Jay (*Cyanocitta stelleri*), generally considered to be a resident, non-migratory species (Bent 1946; Guiguet 1954; Godfrey 1986). Wescott (1969) found that Steller's Jays invading southern Arizona were all first-year birds. Analysis of band returns lead Morrison and Yoder-Williams (1984) to conclude that the Steller's Jay is non-migratory and characterized their movements as wanderings or dispersals.

In British Columbia, some authors have suggested that there may be a southward movement during some years (Swarth 1922; McCabe and McCabe 1928; Munro 1931; Munro and Cowan 1947; Cannings et al. 1987). Autumn invasions by the Steller's Jay have long been noted to occur on southern Vancouver Island (Munro 1923, 1931; Bent 1946; Guiguet 1954). In the early autumn of 1992, a very large passage of Steller's Jays occurred on the coast of southwestern British Columbia (Siddle 1993) and northwestern Washington (Tweit and Gilligan 1993). This movement was most pronounced in the city of Victoria, located at the south end of Vancouver Island. A Christmas Bird Count (CBC) conducted there on 17 December 1992 resulted in a tally of 659 Steller's Jays, the highest ever recorded in Canada.

The Steller's Jay is widely distributed throughout Vancouver Island, inhabiting mid to low elevation coniferous forests composed of western hemlock (*Tsuga heterophylla*), Douglas-fir (*Pseudotsuga menziesii*), amabilis fir (*Abies amabilis*), grand fir (*Abies grandis*), western redcedar (*Thuja plicata*) and Sitka spruce (*Picea sitchensis*). These extensive forests reach the outskirts of urban Victoria near Langford and Metchosin, about 5 km. to the west. Victoria's native forest was composed of open stands of Garry oak (*Quercus garryana*), arbutus (*Arbutus menziesii*) and Douglas-fir, most of which has subsequently been lost to agricultural and urban development (Stanley-Jones and Benson 1973). Remnants of this original forest are now found only in isolated parks, although mature oak trees have been retained in some resi-

dential areas. The Steller's Jay is normally rare within urban Victoria except during invasion years when it may be abundant (R. W. Campbell, pers. comm.).

This paper describes the spectacular 1992/93 Steller's Jay invasion, summarizes banding activities from that period, and reviews historical invasions on southern Vancouver Island.

METHODS

Field observations from *American Birds'* reports for southern Vancouver Island were obtained for the autumn, winter, and spring period from 1977 to 1993. CBC data to 1944 and other historic information were obtained from the journal *Audubon Field Notes/American Birds*, the local naturalist journal *Victoria Naturalist*, and literature listed in two bibliographies on British Columbia ornithology (see Campbell et al. 1979, 1988). CBC data were summarized for the south coast region of British Columbia and compared with Victoria. Because this highly conspicuous species can be detected relatively independent of survey effort, we chose not to correct CBC data for party hours.

Between 2 November 1992 and 17 April 1993, Steller's Jay banding stations were established at 11 sites within residential Victoria. Banding sites were located near existing bird feeding stations where jays were known to be foraging. Initially jays were captured by mist net. Later, however, a portable crow trap (see Bub 1991) proved a more successful capture technique and was used for the remainder of this work. Jays were conditioned to entering a baited trap several days prior to banding. Data on age, sex, wing chord, tarsus, and culmen were recorded following Pyle et al. (1987). Re-trapping was performed at four sites.

RESULTS AND DISCUSSION

Chronology of Invasion

The invasion of Steller's Jays into southern Vancouver Island commenced in mid-August. The first bird was noted on 19 August 1992. Four days later, two birds were observed flying uncharacter-

istically high suggesting a migratory movement. Between 25 and 29 August, flocks numbering from 8 to 23 birds were seen; and by early September, counts of over 100 birds were being reported. The highest count from a single location was 218 birds recorded on 5 September at Ten Mile Point, a southern land head of Victoria (Siddle 1993). The highest daily count was reported on 10 September by local naturalist R. Satterfield, who observed 250 jays along an 11 km route between Esquimalt Lagoon and Weir Beach, southwest of the city.

Peak movements occurred in the Victoria area between 5 and 13 September. During this period jays showed a similar behavior and were frequently observed in loose, strung out flocks flying at or above tree top level in a common direction. Typically, a procession of birds would each in turn alight briefly in a tree top before carrying on to follow others, often several hundred metres farther ahead. One such movement recorded on 13 September involved the steady passage of 63 birds between 1000 and 1130 hrs. Jays were uncharacteristically silent during flight and thus easy to overlook. Their general behavior was remarkably similar to that described for migrating Blue Jays in eastern North America (Broun 1941, Gill 1941, Bent 1946).

The last large group of jays was reported on 27 September; and by the end of the month, jay movements had ceased and local dispersal occurred. From this point on, jays were reported in small flocks of five to eight birds scattered throughout the city, similar to those described by Wescott (1969). Much of their initial foraging activity was focussed on harvesting and caching of Garry oak acorns. Acorn production during the 1992 autumn was reported to be moderate for Victoria (B. Duncan pers. comm.). Following the acorn harvest, foraging activities switched to residential bird feeders. Jays showed a marked preference for sunflower seeds and nuts during this period. Many reports of jays coming to bird feeders were received from throughout the city during early October. Seed caching was pronounced during autumn and mid-winter but was observed to decrease by March. From October to March jays were relatively sedentary.

During early April, Steller's Jays began to show signs of restlessness and on 11 April, the first large jay aggregation since autumn was reported. The departure from the city was abrupt and notably less conspicuous than the prolonged arrival period. Many observers did not detect this movement but noted a decline in the number of jays returning to their feeders during this period. The last jays recorded for some city feeders was between 16 and 20 April (Table 1), and by the end of April most had vacated urban Victoria. A spring bird survey conducted on 8 May within the Victoria CBC area showed that urban areas had been abandoned by jays although they were still relatively common in the city outskirts.

The last large group of jays reported on southern Vancouver Island were observed on 23 May, approximately 20 km north of Victoria.

Barriers To Dispersal

The initial invasion appeared to be impeded and redirected by the coastal waters surrounding southern Vancouver Island. Flocks of jays were frequently observed paralleling the coastline, apparently reluctant to cross wide expanses of water. This behavior likely had the effect of funnelling birds towards southern Vancouver Island and was most pronounced on two of the southern most land heads, Ten Mile Point and Rocky Point, where the largest aggregations were reported. At Ten Mile Point, a large build up of jays was reported to occur daily for nearly two weeks in early September. These birds were restless and would gather along the shoreline occasionally making brief forays over water before returning to shore. Only on 11 September was a flock of 12 jays observed to continue over Haro Strait towards San Juan Island, a distance of 11 km east of Victoria (H. Petch, pers. comm.). An examination of CBC data for the San Juan Archipelago showed no increase in Steller's Jays during 1992/93, suggesting that few birds made this crossing.

Banding

Between 2 November 1992 and 17 April 1993, 95 Steller's Jays were banded at 11 sites within Victoria (Table 1). Ages were determined for 89 birds; of these 67 were HY/SY (ie. hatched in 1992)

and 22 were AHY/ASY (ie. hatched prior to 1992). Following Pyle et al. (1987), sex could be determined for only six birds, these being females. The remainder fell within the ranges given for males and females. Other measurements taken included weight (97-158 g; \bar{x} =133 g), wing chord (138-155 mm; \bar{x} =145 mm), tarsus (38-46 mm; \bar{x} =43 mm), and culmen (23-32 mm; \bar{x} =27 mm) All captured birds were representative of the coastal race *C. s. stelleri* (Gmelin).

Twenty-seven birds were recaptured during 14 recapture days at four sites. The longest period between initial capture and recapture for one bird was 136 days (2 December 1992 to 17 April 1993) suggesting a winter residency. Two other birds were recaptured 105 days after banding (13 December 1992 to 28 March 1993). At the location where most effort was expended, 21 of 34 jays were recaptured on at least one occasion (Table 1).

From November 1992 to March 1993 we detected no movement between banding sites through recaptures or band sightings, suggesting individuals had established winter territories. During this period we received no reports of banded jays farther than several hundred metres of a banding site. A band recovered from a dead bird in early January 1993 was found less than 250 m from the capture site. Not until 20 April were reports received of banded jays at further distances from our banding sites.

Historical Invasions

The first historical evidence of Steller's Jay invasions occurring on Vancouver Island are reported by J. A. Munro (*in* Bent 1946). He observed that Steller's Jays were "very abundant" and "industriously carrying acorns from Garry oaks" during the autumn of 1913. Although it is unclear where this observation was made, we surmise that it was in the Victoria region where most Garry oak occurs. He further reported that jays were "unusually numerous" during the winter of 1921-22, but again gave no specific location on Vancouver Island. The first clear indication of a Steller's Jay invasion occurring in Victoria was during the winter of 1922/23 (Munro 1923; Bent 1946). In 1953, Guiguet (1954) reported that "there was a considerable in-

flux into the city of Victoria." Although no season was given, it was presumably the autumn of 1953 or the winter of 1953/54.

A review of CBC's conducted in Victoria from 1944 to 1957, and not officially published in the journal *Audubon Field Notes/American Birds*, showed no unusual jay influxes except for the winter of 1957/58. Interestingly, no influx was noted during 1953/54 to support Guiguet's (1954) observation. Victoria CBC's conducted from 1958 to 1993 show five obvious peaks (ie. more than 200 birds) for the winters of 1960/61, 1967/68, 1984/85, 1987/88 and 1992/93 (Fig. 1). If invasion years are defined as those in which urban subunits of the CBC area show above normal jay numbers, then we must also include the winters of 1958/59, 1983/84, and 1986/87. The inclusion of these years is further supported by naturalist observations which show that all three winters were preceded by notable autumn movements into the city. The intervals between invasion years from 1958 to 1993 vary from 1 to 15 years and show no periodicity (Fig. 1). It is also apparent from these data that a marked decline in jays' numbers occurred on years immediately following major invasions.

We compared 11 other CBC areas in the southern British Columbia coast region with 10 or more years data and found that five areas experienced record counts during 1992/93, including three other areas on southern Vancouver Island. Duncan, located near Victoria on southern Vancouver Island, paralleled fluctuations most closely with Victoria between 1970 and 1993 with the exception of 1989/90 and 1990/91 (Fig. 1). Although no other CBC areas showed a pattern comparable to Victoria, most had above average counts for 1992/93, suggesting that the invasion involved the whole south coast region.

SUMMARY and CONCLUSIONS

Field observations made during the autumn of 1992 indicated a large Steller's Jay movement occurred on southern Vancouver Island. A review of literature and CBC data showed similar invasions have occurred here periodically going back to at least 1913. During the autumn 1992 invasion, Stellar's Jays were reluctant to cross wide

expanses of water, a phenomenon recorded for other jay species including the Blue Jay (Bent 1946) and the European Jay (*Garrulus glandarius*) of northern Europe (Alerstam 1990).

Munro (1931) believed that Steller's Jay movements occurring on Vancouver Island were southerly in direction. Although a southerly trend to these movements would account for the exceptionally high numbers periodically experienced in the Victoria area, more work is required to confirm this.

Banding by the authors during the winter of 1992/93 suggests that Steller's Jays disperse and occupy discrete winter territories following invasion. This work also suggests that about 25% of this population were composed of adult birds, differing from work by Wescott (1969). This work also differs from Brown (1963) who showed that while most young Steller's Jays dispersed in autumn, the adults remained on their breeding territories throughout the year. Since our findings indicate that adult birds formed a significant component of the 1992/93 invasion, this movement can not be solely attributed to dispersing first-year birds. We believe this phenomenon may best be explained by the invasion migration theory developed by Svårdson (1957). He theorized that invasions are adaptations to annual food shortages and that these invasion movements are initiated every year. During most years resident species, such as the Steller's Jay, would find sufficient food within their normal range and consequently these movements would go unnoticed. During years when food was not abundant, these movements would continue beyond their normal range until areas of sufficient food were found. These years would be noted as invasion years.

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Table 1.		Banding and chronology details for the influx of Steller's Jays in the Victoria area on southern Vancouver Island, British Columbia in winter 1992/93.						
Greater Victoria Local Area	Banding Site	No. Banding Days	No. Birds Captured	No. Birds Recaptured	Maximum Stay Recaptured Birds (days)	First Jay Observed	Last Jay Observed	Total Length of Stay (days)
City Centre	Government St.	3	3	2	57	-	-	-
	Moss Street	1	8	-	-	-	-	-
Cadboro Bay	Telegraph Bay Rd.	9	34	21	136	23-Aug-92	18-Apr-93	238
	Kilgary Place	1	5	-	-	27-Aug-92	16-Apr-93	232
Gordon Head	Edgelow Street	4	12	4	105	-	-	-
Queenswood	Alpine Crescent	1	3	-	-	-	-	-
	Haro Road	1	3	-	-	-	-	-
Uplands	Uplands Road	1	7	-	-	2-Sep-92	-	-
	Exeter Road	1	1	-	-	-	-	-
Portage Inlet	Colquitz Street	2	14	0	-	-	20-Apr-93	-
	Viewcrest Drive	1	5	-	-	-	-	-

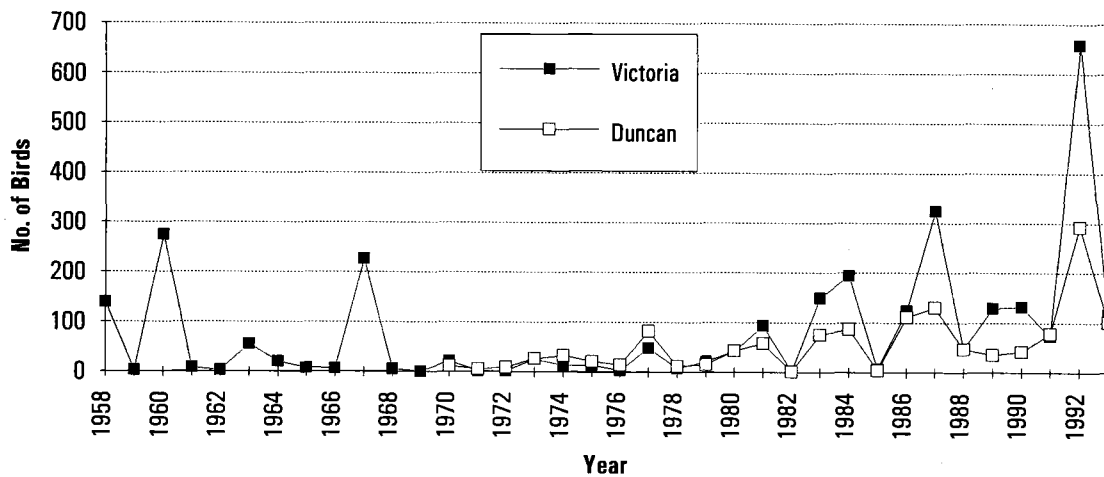


Figure 1. Annual summary of Christmas Bird Counts for the Steller's Jay for Victoria and Duncan, southern Vancouver Island, British Columbia between 1958 and 1993.

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