

Bird Use of a Channel Restoration Area within the Squamish Estuary

October 14, 2010

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## Table of Contents

Introduction: .....	3
Field Survey Methods: .....	3
Habitat Description: .....	3
Results of Bird Use: .....	3
Table 1: Common bird species recorded during summer 2010 surveys of Site A, Central Estuary, Squamish.....	4
Figure 1: Ten most common bird species recorded in 2010 compared to observations of the same species in 2007 and 2006 .....	4
Table 2: Common bird species recorded during summer 2007 surveys of Site A, Central Estuary, Squamish.....	5
Figure 2: Ten most common bird species recorded in 2007 compared to observations of the same species in 2010 and 2006. Some common species recorded in 2010 were not observed in other years. ....	5
Table 3: Common bird species recorded during summer 2006 surveys of Site A, Central Estuary, Squamish.....	6
Figure 3: Ten most common bird species recorded in 2006 compared to observations of the same species in 2010 and 2007 .....	6
Table 4: Comparison of common bird species (i.e., the ten species with the highest average # / survey) observed during Squamish Estuary surveys in 2010, 2007 and 2006.....	7
Conclusions: .....	7
Appendix I : Bird Species Observed at Site A of the Central Estuary between 22 April and 24 August 2010. ....	8
Appendix II : Cumulative totals of all bird species observed in the Squamish Estuary in 2010, 2007 and 2006. ....	8

## **Introduction:**

The Squamish River Watershed Society along with the Department of Fisheries and Oceans Canada and the Squamish First Nation participated in re-establishing channels for fish passage in the Squamish River Estuary. The most recent project involved extending a channel in what is referred to as 'Site A' at the northern end of the Central Estuary. In an effort to document bird use of the restoration area during and following restoration works, the site was visited 10 times in summer 2006 and 12 times in summer 2007. In 2010, the survey was resumed and the site was visited 11 times. This report summarizes the data collected over the summer of 2010 and compares the results to the 2006 and 2007 monitoring years.

## **Field Survey Methods:**

The study area was visited approximately every two weeks between 22 April and 24 August 2010 (11 surveys), 12 April and 30 August 2007 (12 surveys), and 21 March and 06 August 2006 (10 surveys). On each survey, the site was traversed by beginning at the railway line in the southeast corner of the study area, walking out on the marsh to the southern end of the restoration works, and then along the east side of the channel to the northern dike. The dike trail was then followed briefly into forest to the west and then back out to the access road along the railway line. The survey took between one and two hours and was generally conducted in the morning. All bird species and individuals were tallied and any birds utilizing the channel areas and adjacent cast materials were noted.

## **Habitat Description:**

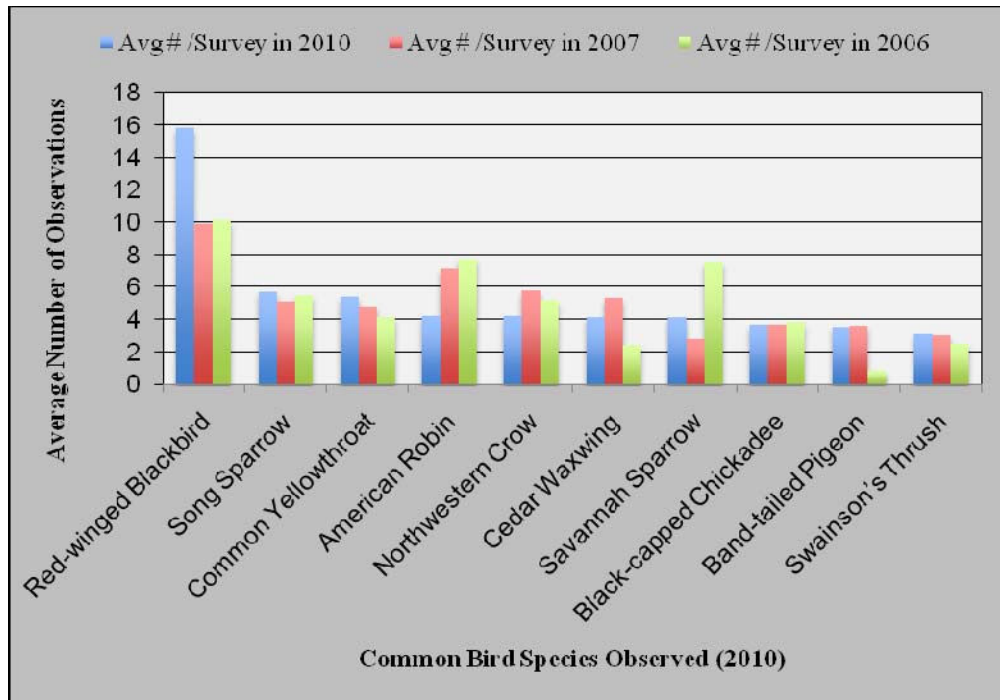
Site A of the Central Estuary is characterized by areas of open water, large areas of Cattail (*Typha latifolia*) marsh, wet grasslands, and shrub-dominated borders. Rare plant species, including Henderson's Checker-Mallow (*Sidalcea hendersonii*; Blue) and Vancouver Island Beggarticks (*Bidens amplissima*; Blue, Special Concern), have been identified on or adjacent to the site. Common shrub species in riparian areas include Nootka Rose (*Rose nutkana*), hawthorn (*Crataegus* sp.), Pacific Crabapple (*Malus fusca*), Pacific Ninebark (*Physocarpus capitatus*), Sweet Gale (*Myrica gale*) and Salmonberry (*Rubus spectabilis*). Tree species, including Sitka Spruce (*Picea sitchensis*) and Red Alder (*Alnus rubra*), are present in areas of higher ground.

## **Results of Bird Use:**

Sixty-two (62) bird species were observed in 2010, while 58 and 77 species were observed in 2006 and 2007, respectively for 90 species over the three years of the survey. Appendix 1 provides a complete list of all species observed in 2010 by survey date, while Appendix 2 provides a complete list of birds by survey year. The 10 most common birds recorded (average # / survey) in 2006, 2007 and 2010 are listed in Tables 1 to 3 below. Figures 1 to 3 illustrate these results and provide comparison between years.

**Table 1: Common bird species recorded during summer 2010 surveys of Site A, Central Estuary, Squamish.**

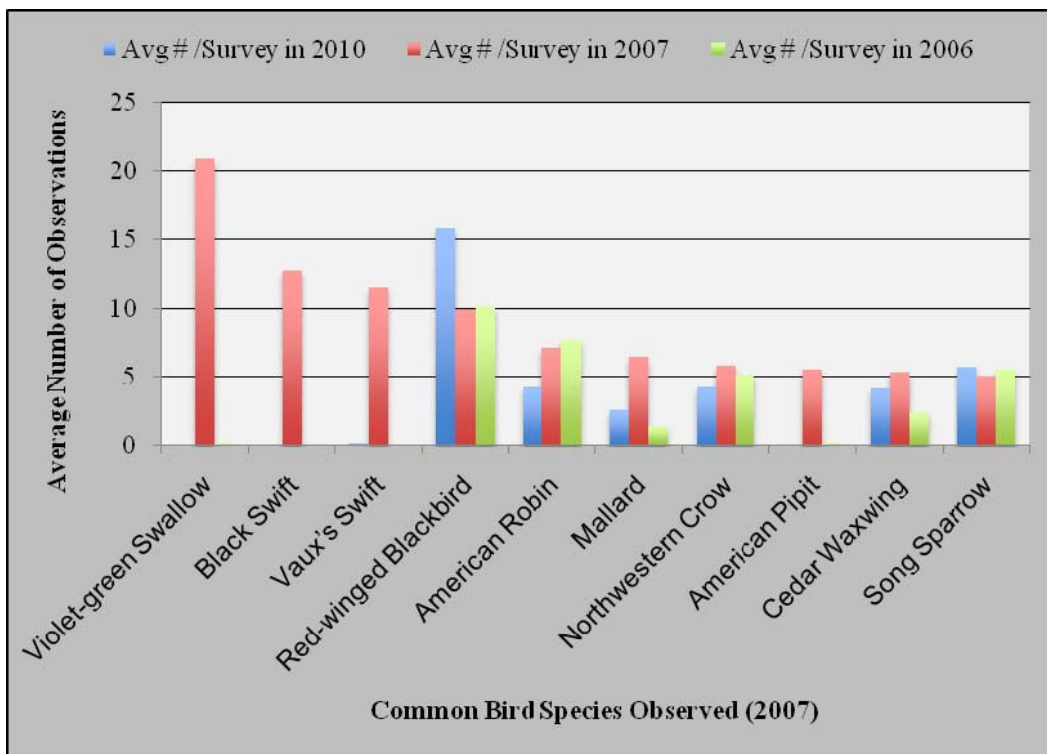
Rank	Common Name	Cumulative #	Average Number per Survey		
			2010	2007	2006
1	Red-winged Blackbird	174	15.8	9.9	10.1
2	Song Sparrow	63	5.7	5.1	5.5
3	Common Yellowthroat	59	5.4	4.8	4.1
4	American Robin	46	4.2	7.1	7.7
5	Northwestern Crow	46	4.2	5.8	5.2
6	Cedar Waxwing	45	4.1	5.3	2.4
7	Savannah Sparrow	45	4.1	2.8	7.5
8	Black-capped Chickadee	41	3.7	3.7	3.8
9	Band-tailed Pigeon	38	3.5	3.6	0.8
10	Swainson's Thrush	34	3.1	3.0	2.5



**Figure 1: Ten most common bird species recorded in 2010 compared to observations of the same species in 2007 and 2006.**

**Table 2: Common bird species recorded during summer 2007 surveys of Site A, Central Estuary, Squamish.**

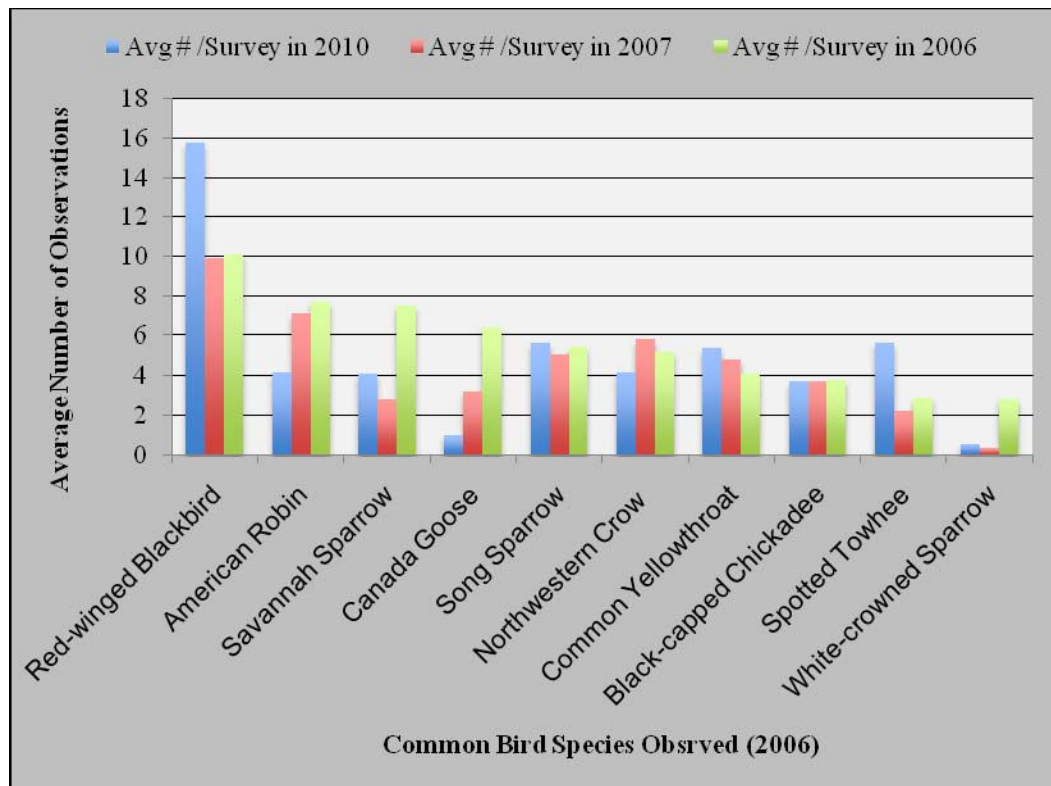
Rank	Common Name	Cumulative #	Average Number per Survey		
			2007	2010	2006
1	Violet-green Swallow	230	20.9	Not Observed	0.1
2	Black Swift	140	12.7	Not Observed	Not Observed
3	Vaux's Swift	126	11.5	0.1	Not Observed
4	Red-winged Blackbird	109	9.9	15.8	10.1
5	American Robin	78	7.1	4.2	7.7
6	Mallard	71	6.5	2.5	1.3
7	Northwestern Crow	64	5.8	4.2	5.2
8	American Pipit	60	5.5	Not Observed	0.1
9	Cedar Waxwing	58	5.3	4.1	2.4
10	Song Sparrow	56	5.1	5.7	5.5



**Figure 2: Ten most common bird species recorded in 2007 compared to observations of the same species in 2010 and 2006. Some common species recorded in 2010 were not observed in other years.**

**Table 3: Common bird species recorded during summer 2006 surveys of Site A, Central Estuary, Squamish.**

Rank	Common Name	Cumulative #	Average Number per Survey		
			2006	2010	2007
1	Red-winged Blackbird	101	10.1	15.8	9.9
2	American Robin	77	7.7	4.2	7.1
3	Savannah Sparrow	75	7.5	4.1	2.8
4	Canada Goose	64	6.4	1.0	3.2
5	Song Sparrow	55	5.5	5.7	5.1
6	Northwestern Crow	52	5.2	4.2	5.8
7	Common Yellowthroat	41	4.1	5.4	4.8
8	Black-capped Chickadee	38	3.8	3.7	3.7
9	Spotted Towhee	29	2.9	5.7	2.2
10	White-crowned Sparrow	28	2.8	0.5	0.3



**Figure 3: Ten most common bird species recorded in 2006 compared to observations of the same species in 2010 and 2007.**

Results from the summer 2010 surveys are quite similar to data from 2007 and 2006 (Figure 1). One difference is a higher average observation frequency of Red-winged Blackbird, which can be accounted for by a large flock of eighty-three (83) Red-winged Blackbirds observed on 28 July 2010. Differences between other years can also be explained by the presence or absence of large flocks of migratory birds (e.g., flocks of Violet-green Swallow, Black Swift, Vaux’s Swift and American Pipit seen on only a few

days in 2007 [Figure 2]). Red-winged Blackbird, American Robin, Northwestern Crow and Song Sparrow were common in all years, while Common Yellowthroat, Black-capped Chickadee and Savannah Sparrow were common in 2010 and 2006, and Cedar Waxing was common in 2010 and 2007 (Table 4 below).

**Table 4: Comparison of common bird species (i.e., the ten species with the highest average # / survey) observed during Squamish Estuary surveys in 2010, 2007 and 2006.**

Common Species	2010	2007	2006
American Robin	x	x	x
Northwestern Crow	x	x	x
Red-winged Blackbird	x	x	x
Song Sparrow	x	x	x
Cedar Waxwing	x	x	
Black-capped Chickadee	x		x
Savannah Sparrow	x		x
Common Yellowthroat	x		x

The diversity of bird species observed on the surveys has been variable over the study period. Sixty-two (62) species were recorded in 2010 compared to 58 in 2006 and 77 in 2007. While survey timing and weather conditions can explain some year-to-year differences, 2010 results are likely representative of diversity in the study area as it is close to the average diversity (66), recorded over the three study years.

Savannah Sparrow was confirmed as nesting in the study area when a nest containing five eggs was found on 26 May 2010 (see photo) while Red-winged Blackbirds and Common Yellowthroats, two common species observed in 2010, are believed to breed successfully at the site. Many of the other species recorded during the surveys are also expected to nest on or adjacent to the study site.



Rare and endangered species observed in 2010, include the Great Blue Heron (Blue-list; Special Concern), Band-tailed Pigeon (Blue-list; Special Concern) and Peregrine Falcon (Blue-list; Special Concern). As in 2007, Band-tailed Pigeons were particularly common in 2010 with a cumulative total of 38 individuals seen.

### **Conclusions:**

The new channel and surrounding habitats in the Squamish Estuary has increased habitat diversity in the area likely resulting in a higher diversity of breeding bird species. Belted Kingfisher, Great Blue Heron, Spotted Sandpiper and ducks now use the channel areas, whereas they are unlikely to have done so previously. Although some Cattail habitats were disturbed for channel construction, marsh-breeding birds such as Common Yellowthroat and Red-winged Blackbird are still common breeders at the site.

The overall effects of the channel restorations works are considered to be favorable for bird species in the region.

**Appendix I : Bird Species Observed at Site A of the Central Estuary between 22 April and 24 August 2010.**

Note: For a daily break down of species observed please contact [srws@shaw.ca](mailto:srws@shaw.ca)

**Appendix II : Cumulative totals of all bird species observed in the Squamish Estuary in 2010, 2007 and 2006.**

Common Name	Scientific Name	2010	2007	2006
American Goldfinch	<i>Carduelis tristis</i>	21	6	3
American Kestrel	<i>Falco sparverius</i>		1	
American Pipit	<i>Anthus rubescens</i>		60	1
American Robin	<i>Turdus migratorius</i>	46	80	77
Bald Eagle	<i>Haliaeetus leucocephalus</i>	4	1	
Band-tailed Pigeon	<i>Patagioenas fasciata</i>	38	40	8
Barn Swallow	<i>Hirundo rustica</i>		1	
Belted Kingfisher	<i>Ceryle alcyon</i>	2	1	1
Bewick's Wren	<i>Thryomanes bewickii</i>	3		
Black-capped Chickadee	<i>Poecile atricapillus</i>	41	41	38
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>		6	1
Black Swift	<i>Cypseloides niger</i>		140	
Black-throated Gray Warbler	<i>Dendroica nigrescens</i>	6		1
Brown Creeper	<i>Certhia americana</i>	2		
Brown-headed Cowbird	<i>Molothrus ater</i>	12	54	17
Canada Goose	<i>Branta canadensis</i>	11	35	64
Cackling Goose	<i>Branta hutchinsii</i>			1
Cassin's Vireo	<i>Vireo cassinii</i>	1		
Cedar Waxwing	<i>Bombycilla cedrorum</i>	45	60	24
Chestnut-backed Chickadee	<i>Poecile rufescens</i>	7	11	10
Common Raven	<i>Corvus corax</i>	5	5	3
Common Merganser	<i>Mergus merganser</i>		2	
Common Yellowthroat	<i>Geothlypis trichas</i>	59	53	41
Cooper's Hawk	<i>Accipiter cooperii</i>		1	
Dark-eyed Junco	<i>Junco hyemalis</i>		45	2
European Starling	<i>Sturnus vulgaris</i>		8	4
Downy Woodpecker	<i>Picoides pubescens</i>	2		
Evening Grosbeak	<i>Coccothraustes vespertinus</i>	4	1	
Glaucous-winged Gull	<i>Larus glaucescens</i>	18	31	
Golden-crowned Kinglet	<i>Regulus satrapa</i>	15	18	3
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>		1	15
Great Blue Heron	<i>Ardea herodias</i>	6	5	6



Common Name	Scientific Name	2010	2007	2006
Greater Yellowlegs	<i>Tringa melanoleuca</i>		1	1
Green-winged Teal	<i>Anas crecca</i>	2	7	10
Hairy Woodpecker	<i>Picoides villosus</i>		2	
Hooded Merganser	<i>Lophodytes cucullatus</i>		1	
Hammond's Flycatcher	<i>Empidonax hammondii</i>	1		
House Finch	<i>Carpodacus mexicanus</i>	1	1	9
Least Sandpiper	<i>Calidris minutilla</i>		1	
Lincoln's Sparrow	<i>Melospiza lincolni</i>	3	1	1
MacGillivray's Warbler	<i>Oporornis tolmiei</i>		2	
Mallard	<i>Anas platyrhynchos</i>	27	71	13
Merlin	<i>Falco columbarius</i>		1	2
Mourning Dove	<i>Zenaida macroura</i>		3	3
Marsh Wren	<i>Cistothorus palustris</i>	10	2	
Mountain Bluebird	<i>Sialia currucoides</i>		4	
Northern Flicker	<i>Colaptes auratus</i>	2	4	10
Northern Harrier	<i>Circus cyaneus</i>	1	1	
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>		1	
Northwestern Crow	<i>Corvus caurinus</i>	46	64	52
Olive-sided Flycatcher	<i>Contopus cooperi</i>		1	
Orange-crowned Warbler	<i>Vermivora celata</i>	3	6	1
Osprey	<i>Pandion haliaetus</i>	6	1	2
Pacific Wren	<i>Troglodytes pacifica</i>	2	9	4
Peregrine Falcon	<i>Falco peregrinus</i>	1		
Pileated Woodpecker	<i>Dryocopus pileatus</i>	3	3	
Pine Siskin	<i>Carduelis pinus</i>	17	20	2
Purple Finch	<i>Carpodacus purpureus</i>	14	13	9
Red Crossbill	<i>Loxia curvirostra</i>	12		
Red-breasted Sapsucker	<i>Sphyrapicus rubber</i>	1	1	1
Red-tailed Hawk	<i>Buteo jamaicensis</i>	1		1
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	174	109	101
Rock Dove	<i>Columba livia</i>		7	11
Ruby-crowned Kinglet	<i>Regulus calendula</i>	2	10	8
Rufous Hummingbird	<i>Selasphorus rufus</i>	27	38	18
Savannah Sparrow	<i>Passerculus sandwichensis</i>	45	31	75
Sharp-shinned Hawk	<i>Accipiter striatus</i>		1	
Song Sparrow	<i>Melospiza melodia</i>	63	56	55
Spotted Sandpiper	<i>Actitis macularia</i>		11	24
Spotted Towhee	<i>Pipilo maculatus</i>	31	24	29
Steller's Jay	<i>Cyanocitta stelleri</i>	2	1	5
Swainson's Thrush	<i>Catharus ustulatus</i>	34	33	25
Townsend's Solitaire	<i>Myadestes townsendi</i>	1		
Townsend's Warbler	<i>Dendroica townsendi</i>		1	
Tree Swallow	<i>Tachycineta bicolor</i>	5	22	2

Common Name	Scientific Name	2010	2007	2006
Varied Thrush	<i>Ixoreus naevius</i>		12	2
Turkey Vulture	<i>Cathartes aura</i>	8		1
Vaux's Swift	<i>Chaetura vauxi</i>	1	126	
Virginia Rail	<i>Rallus limicola</i>	1	1	1
Violet-green Swallow	<i>Tachycineta thalassina</i>		230	1
Warbling Vireo	<i>Vireo gilvus</i>	3	11	3
Western Wood-Pewee	<i>Contopus sordidulus</i>		1	
Western Tanager	<i>Piranga ludoviciana</i>	3		
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	6	5	28
Willow Flycatcher	<i>Empidonax traillii</i>	27	28	24
Wilson's Snipe	<i>Gallinago delicata</i>	4		3
Wilson's Warbler	<i>Wilsonia pusilla</i>	5	20	3
Wood Duck	<i>Aix sponsa</i>	3		
Yellow Warbler	<i>Dendroica petechia</i>	22	18	10
Yellow-Rumped Warbler	<i>Dendroica coronata</i>	5	17	2