Appendix D. Bird survey data.

Appendix D.1. Survey dates for quarterly bird sampling, 2001 at the Duwamish River/Elliott Bay restoration and reference sites: Quarter 1 (April), Quarter 2 (June), Quarter 3 (September), Quarter 4 (December).

Site	Sample Dates by Quarter			
	1	2	3	4
Hamm Creek Estuary*	4/5/01 4/18/01 4/20/01	6/22/01	9/4/01	12/01/01
Turning Basin Reference Site*	4/18/01 4/20/01	6/22/01	9/4/01	12/01/01
Herring's House	4/5/01	6/5/01	9/4/01	12/01/01
Kellogg Island Reference Site	4/5/01	6/5/01	9/4/01	12/01/01

*Surveys were performed at these sites on multiple days during the April survey before protocol was finalized.

Appendix D.2. Scientific names of birds observed in the Hamm Creek Estuary and Herring's House restoration and reference sites, 2001.

Common Name	**Scientific Name**	**Common Name**	**Scientific Name**
Western grebe	*Aechmophorus occidentalis*	Belted kingfisher	*Ceryle alcyon*
Double-crested cormorant	*Phalacrocorax auritus*	Northern flicker	*Colaptes auratus*
Green heron	*Butorides virescens*	Violet-green swallow	*Tachycineta thalassina*
Great blue heron	*Ardea herodias*	Northern rough-winged swallow	*Stelgidopteryx serripennis*
Canada goose	*Branta canadensis*	Cliff swallow	*Petrochelidon pyrrhonota*
Mallard	*Anas platyrhynchos*	Barn swallow	*Hirundo rustica*
Gadwall	*Anas strepera*	Northwestern crow	*Corvus caurinus*
Green-winged teal	*Anas crecca*	Black-capped chickadee	*Poecile atricapilla*
Common goldeneye	*Bucephala clangula*	American robin	*Turdus migratorius*
Bufflehead	*Bucephala albeola*	Song sparrow	*Melospiza melodia*
Common merganser	*Mergus merganser*	White-crowned sparrow	*Zonotrichia leucophrys*
Red-breasted merganser	*Mergus serrator*	Red-winged blackbird	*Agelaius phoeniceus*
Hooded merganser	*Lophodytes cucullatus*	American goldfinch	*Carduelis tristis*
Merganser sp.	*Mergus* sp.	Purple finch	*Carpodacus purpureus*
Killdeer	*Charadrius vociferous*	Rock dove/Pigeon	*Columba livia*
Greater yellowlegs	*Tringa melanoleuca*	European starling	*Sturnus vulgaris*
Spotted sandpiper	*Actitis macularia*	English/House sparrow	*Passer domesticus*
Mew gull	*Larus caus*	House finch	*Carpodacus mexicanus*
California gull	*Larus californicus*		
Glaucous-winged gull	*Larus glaucescens*		
Gull sp.	*Larus* sp.		
Caspian tern	*Sterna caspia*		
Tern sp.	*Sterna* sp.		
Bald eagle	*Haliaeetus leucocephalus*		
Red-tailed hawk	*Buteo jamaicensis*		
Osprey	*Pandion haliaetus*		

Appendix D.3. Birds observed during year 2001 quarterly surveys at the Duwamish River/Elliott Bay restoration and reference sites: Quarter 1 (April), Quarter 2 (June), Quarter 3 (September), Quarter 4 (December). "X" denotes presence of birds.

Species	Hamm Creek				Turning Basin				Herring's House				Kellogg Island			
Waterbirds	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Western grebe	X															
Double-crested cormorant				X				X				X				
Green heron			X													
Great blue heron			X	X				X	X			X		X		
Canada goose		X	X	X	X		X		X		X	X	X	X	X	X
Mallard	X	X	X	X	X	X	X	X			X	X	X	X	X	X
Gadwall	X	X	X	X	X		X	X	X		X	X	X			X
Green-winged teal				X	X											
Common goldeneye								X								
Bufflehead					X											
Common merganser	X	X														X
Red-breasted merganser							X									X
Hooded merganser				X												
Merganser sp.					X			X							X	
Killdeer	X	X				X	X		X	X	X			X	X	
Greater yellowlegs					X											
Spotted sandpiper		X				X				X						
Unidentified shorebird															X	
Mew gull						X										X
California gull							X									
Glaucous-winged gull							X				X					
Gull sp.				X				X				X	X		X	X
Caspian tern					X											
Tern sp.				X												
Raptors																
Bald eagle												X	X	X		
Red-tailed hawk												X				
Hawk sp.			X													
Osprey			X		X	X	X									
Kingfishers/Woodpeckers																
Belted kingfisher			X						X	X	X			X	X	
Northern flicker												X				
Passerines																
Violet-green swallow		X				X				X						
Northern rough-winged swallow											X					
Cliff swallow						X				X				X		
Barn swallow		X				X				X	X					
Unidentified swallow sp.														X		
Northwestern crow	X	X	X		X			X	X		X	X	X	X	X	X
Black-capped chickadee						X										
American robin		X	X			X				X				X		
Song sparrow	X				X	X	X				X					
White-crowned sparrow				X							X					
Red-winged blackbird		X			X	X							X			
American goldfinch		X	X			X				X						
Purple finch			X				X				X					
Unidentified passerine spp.		X	X	X		X				X		X	X	X		
Introduced																
Rock dove/Pigeon														X		
European starling	X		X	X	X					X	X	X	X	X	X	
English/House sparrow		X								X						
House finch		X				X						X				

Appendix D.4. Mean number of birds observed quarterly by site during 2001 surveys. Quarterly surveys were conducted in April (1), June (2), September (3) and December (4). "-" indicates a zero value.

Common Name	Hamm Creek Estuary				Turning Basin				Herring's House				Kellogg Island			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
American goldfinch	-	0.7	1.3	-	-	2.0	-	-	-	0.8	-	-	-	-	-	-
American robin	-	0.3	0.3	-	-	0.3	-	-	-	0.3	-	-	-	0.3	-	-
Bald eagle	-	-	-	-	-	-	-	-	-	-	-	0.3	0.3	0.8	-	-
Barn swallow	-	0.7	-	-	-	0.7	-	-	-	0.3	1.0	-	-	-	-	-
Belted kingfisher	-	-	1.0	-	-	-	-	-	0.3	0.5	0.7	-	-	0.8	0.7	-
Black-capped chickadee	-	-	-	-	-	0.3	-	-	-	-	-	-	-	-	-	-
Bufflehead	-	-	-	-	27.0	-	-	-	-	-	-	-	-	-	-	-
California gull	-	-	-	-	-	-	1.3	-	-	-	-	-	-	-	-	-
Canada goose	-	2.7	9.7	3.3	4.0	-	5.3	-	2.7	-	7.0	18.0	16.0	17.3	18.3	5.0
Caspian tern	-	-	-		1.0	-	-	-	-	-	-	-	-	-	-	-
Cliff swallow	-	-	-	-	-	0.3	-	-	-	-	-	-	-	0.5	-	-
Common goldeneye	-	-	-	-	-	-	-	3.7	-	-	-	-	-	-	-	-
Common merganser	1.3	5.3	-	-	-	-	-	-	-	-	-	-	-	-	-	1.0
Double-crested cormorant	-	-	-	1.0	-	-	-	3.3	-	-	-	0.3	-	-	-	-
European starling	2.7	-	23.3	1.7	1.0	-	-	-	-	1.0	116.7	13.3	2.0	1.3	56.7	-
Gadwall	1.3	1.3	0.3	10.3	3.0	-	2.7	1.3	10.7	-	0.3	12.0	0.7	-	-	0.7
Glaucous-winged gull	-	-	-	-	-	-	0.7	-	-	-	0.7	-	-	-	-	-
Green heron	-	-	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-
Great blue heron	-	-	0.7	0.7	-	-	-	0.3	0.3	-	-	0.3	-	-	-	-
Greater yellowlegs	-	-	-	-	2.0	-	-	-	-	-	-	-	-	-	-	-
Green-winged teal	-	-	-	1.3	2.0	-	-	-	-	-	-	-	-	-	-	-
Gull spp.	-	-	-	1.7	-	-	-	1.3	-	-	-	2.3	69.0	-	24.7	81.0
Hawk spp.	-	-	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-
Hooded merganser	-	-	-	0.7	-	-	-	-	-	-	-	-	-	-	-	-
House finch	-	6.7	-	-	-	1.7	-	-	-	-	-	7.7	-	-	-	-
House sparrow	-	-	-	-	-	-	-	-	-	0.5	-	-	-	-	-	-
Kildeer	0.3	0.3	-	-	-	1.7	9.3	-	0.3	0.8	1.3	-	-	1.3	0.7	-
Mallard	1.3	2.0	5.0	6.7	6.0	9.3	17.7	4.7	-	-	9.7	36.0	1.3	0.3	5.7	0.3
Merganser sp.	-	-	-	-	3.0	-	-	0.7	-	-	-	-	-	-	0.3	-
Mew gull	-	-	-	-	-	0.3	-	-	-	-	-	-	-	-	-	15.0

Appendix D.2. Continued.

Common Name	Hamm Creek Estuary				Turning Basin				Herring's House				Kellogg Island			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Northern flicker	-	-	-	-	-	-	-	-	-	-	-	0.7	-	-	-	-
Northern rough-winged swallow	-	-	-	-	-	-	-	-	-	-	1.3	-	-	-	-	-
Northwestern crow	3.7	1.0	0.7	-	1.0	-	-	0.3	2.0	-	0.7	3.0	1.7	0.5	3.3	3.3
Osprey	-	-	1.3	-	1.0	1.7	0.3	-	-	-	-	-	-	-	-	-
Passerine spp.	-	0.3	4.7	1.3	-	1.7	-	-	-	1.0	-	1.0	2.7	0.5	-	-
Pigeon/Rock dove	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	-	-
Purple finch	-	-	14.0	-	-	-	3.3	-	-	-	2.7	-	-	-	-	-
Red-breasted merganser	-	-	-	-	-	-	1.3	-	-	-	-	-	-	-	-	2.7
Red-tailed hawk	-	-	-	-	-	-	-	-	-	-	-	0.3	-	-	-	-
Red-winged blackbird	-	1.0	-	-	2.0	5.0	-	-	-	-	-	-	2.3	-	-	-
Shorebird sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	-
Song sparrow	0.3	-	-	-	1.0	0.7	0.7	-	-	-	6.7	-	-	-	-	-
Spotted sandpiper	-	0.3	-	-	-	0.7	-	-	-	0.3	-	-	-	-	-	-
Swallow sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	0.3	-	-
Tern sp.	-	-	-	0.3	-	-	-	-	-	-	-	-	-	-	-	-
Violet green swallow	-	3.3	-	-	-	1.0	-	-	-	0.3	-	-	-	-	-	-
Western grebe	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
White-crowned sparrow	-	-	-	1.3	-	-	-	-	-	-	0.7	-	-	-	-	-

Appendix E. Non-salmonid fish survey data.

E.1. Numbers of non-salmonids captured at each site during fish sampling 2001.

	Hamm Estuary	**Turning Basin**	**Herring's House**	**Kellogg Island**
Sculpin (Cottidae)	132	39	962	358
Threespine stickleback *Gasterosteus aculeatus*	79	1	25	5
Flatfish (Pleuronectiformes)	100	350	1	142
Shiner perch *Cymatogaster aggregata*	35	-	73	11
Eulachon *Thaleicthys pacificus*	-	1	-	1
Suckers (Catostomidae)	4	-	-	-
Dace (*Rhinichthys* sp.)	7	-	-	-
Snake prickleback *Lumpenus sagitta*	-	-	-	8
Gunnel *Pholis sp.*	-	-	1	-
Sand lance *Ammodytes hexapterus*	1	4	-	-
Pacific lamprey *Lampetra tridentata*	-	1	-	-

E.2. Two non-salmonid species caught during fish sampling 2001: Threespine stickleback (l) and eulachon (r).