CHAPTER 6 BIRD DISTRIBUTION, ABUNDANCE AND HABITAT USE

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INTRODUCTION

Values and natural functions of wetlands gained growing recognition in the 1970s (Good et al. 1978, Greeson et al. 1979). Consequently, wetlands and are now considered sensitive habitats with diverse functions that are protected at federal, state and local levels. Of the many functions wetlands exhibit, their ability to provide resting, feeding and breeding habitat for a wide diversity of birds is among the most noticeable and appreciated. Abundant, often highly visible and unique avifauna are an important component of open space values, enriching quality of life. Despite these attributes, many hectares of marshes, swamps and other bird habitats are lost or impacted each year, in part due to our inadequate knowledge of how to protect the biologic function of wetlands.

Birds have been intensively studied in deciduous forests of east-central states (Blake and Karr 1984, Blake 1986), west coast coniferous forests (Artman 1990, Stofel 1993) and in other upland environments. Birds of coastal wetlands have also been widely studied (Craig and Beal 1992, Weller 1994). Fresh water wetland investigations, however, have been carried out by a relatively few biologists, who primarily documented the distribution and abundance of waterfowl and other marsh birds within pothole lakes and other wetlands in open landscapes of the Central Flyway (Weller and Spatcher 1965, Weller and Fredrickson 1974, Weller 1979). Although the importance of riparian corridors to avifauna, particularly passerines, woodpeckers and other non-game species has more recently been recognized (Brown and Dinsmore 1986, Knopf and Samson 1994), the avifauna of freshwater wetlands, specifically smaller palustrine wetlands distributed through forested landscapes, has not been well documented.

The purpose of this paper is to comprehensively describe palustrine wetland bird communities in the Lower Puget Sound Basin. The avifaunal literature is briefly reviewed to determine the uniqueness of palustrine wetland avifauna in a regional and landscape context. Then, we assess whether generalized landscape characteristics that account for bird distributions and abundances in upland ecosystems apply to predicting bird distributions within palustrine wetlands of the Northwest. We examined the diversity and proportional abundance of birds within the regional context of differing land use and the site-specific wetland attributes of size and vegetation structure, thereby building on the preliminary findings of Azous (1991) and Martin-Yanny (1992). The location, physical, chemical and vegetative description of the wetlands in this study are presented in Section 1 and Chapters 1, 2, and 3 of Section 2.

METHODS

The distribution and relative abundance of birds was determined based on surveys completed during the breeding period from late May to mid-June in 1988, 1989, 1991, 1992 and 1995. Birds were identified by non-territorial calls, territorial song, pecking and drumming, visual sightings and flyovers during 15-minute point counts (Johnston 1990, Verner 1985) at permanent census stations. Usually, four ornithologists surveyed each

wetland totaling one hour per station. Surveys commenced one half-hour after sunup to approximately 9:00 am and stations were surveyed in alternating order to minimize time biases.

We calculated the gamma diversity, the collective species identified across all wetlands (a landscape metric) and alpha diversity, the species identified at a single wetland (a site metric) (Whittaker 1975) by summing the number of species. We calculated all diversity measures only including species observed two or more times. Because alpha diversity measures are insensitive to bird species composition, we calculated diversity indices for birds with specific breeding habitats, versatility ratings, residency traits, and urbanization affinities. This paper reports on some of the more general overall diversity metrics analyzed to date.

We estimated relative abundances for each species at a wetland using average detection values calculated by dividing the total number of a species sighted at a wetland (derived by combining 15-minute station totals into a 1-hour station total and then combining station totals) by the total number of 15-minute observation periods at a wetland. Using this detection value we standardized the data among wetlands with unequal sampling effort (e.g., more stations and hence more time at large wetlands).

We relied on Paulson (1992) to identify total species potentially occurring in palustrine wetlands habitats (Appendix Table 6-1) of the Puget Sound Basin. Species were classified as common residents, rare residents, or migrants according to abundance ratings provided in Hunn (1982). Habitat versatility ratings for bird species were obtained from Brown (1985) and represent the sum total of the number of plant communities and stand conditions used for breeding plus the number of plant communities and stand conditions used for feeding by a species.

Bird preferences for National Wetlands Inventory (NWI) wetland habitat classes (Cowardin et al. 1979) identified at each wetland were converted to habitat preferences identified in Paulson (1992) as follows: open water/unconsolidated bottom = ponds and lakes; emergent wetland, persistent = fresh [water] marsh; forested wetland, needle-leaved evergreen = wet coniferous forest; forested wetland, broad-leaved deciduous = riparian woodland; emergent wetland, nonresistant = wet lowland meadow; scrub-shrub =shrub thickets, and unconsolidated shore. Alpha and gamma diversities within the study wetlands were compared against the potential species richness documented in the Lower Puget Sound Basin that were known to occur in these respective habitats. Habitat land cover and fragmentation was determined by quantifying land cover within 1000 m using remote sensing methods and a geographic information system.

Statistical analysis of correlations and hypothesis testing utilized parametric statistics when assumptions of normality were met and non-parametric statistics when assumptions were violated. We chose $P < 0.05$, and $P > 0.05$ and ≤ 0.10 with $r \geq 0.4$ as significant and weakly significant, respectively. Nevertheless, significance should be interpreted cautiously because of the high variability of the data and concomitantly unacceptably wide confidence intervals for predictive level of significance. This is due to the low number of replicates (e.g., wetlands undergoing significant impacts) and discontinuities in habitat characteristics (e.g., unequal representation of all wetland size classes, etc.).

Regional Species Richness (Beta Diversity)

A total of 94 species were identified and sighted on at least two or more occasions among all the wetlands (Table 6-1). This total wetland diversity of 94 species represents only 59% of the 158 species that could be expected to use habitats found at wetlands in the Lower Puget Sound Basin (Paulson 1992) (Appendix Table 6-1). This diversity, however, is significantly higher than the 56 species found by Stofel (1993), the 23 species identified by Artman (1990) in rural upland second-growth forest, and the 48 species by Gavareski (1976) in urban park environments. All the species identified in these studies were identified at our surveyed wetlands, with the exception of great horned owl, Northern harrier, Northern rough-winged swallow, luzuli bunting, and turkey vulture as well as a few high elevation species such as gray jay, blue grouse, golden-crowned sparrow.

The relative diversity across the study wetlands ranged from 38% to 72% of all birds collectively identified across all wetlands (Figure 6-1). No more than 42% (67 species) of potential regional bird diversity (per Paulson) was present in any one wetland. This represented 71% of our collective wetland sightings and was observed at SR24, a large, open-water, vegetatively rich, and undisturbed wetland. In contrast, the lowest diversity of 37 species (23% of potential regional and 39% of our collective wetlands) was identified at NFIC12 a small, highly disturbed wetland situated between a large subdivision and a roadway. The next lowest richness of 38 (40% of collective) and 39 (41% of collective) species were identified at AL3 and ELS39, respectively, both small, intermittently flooded wetlands.

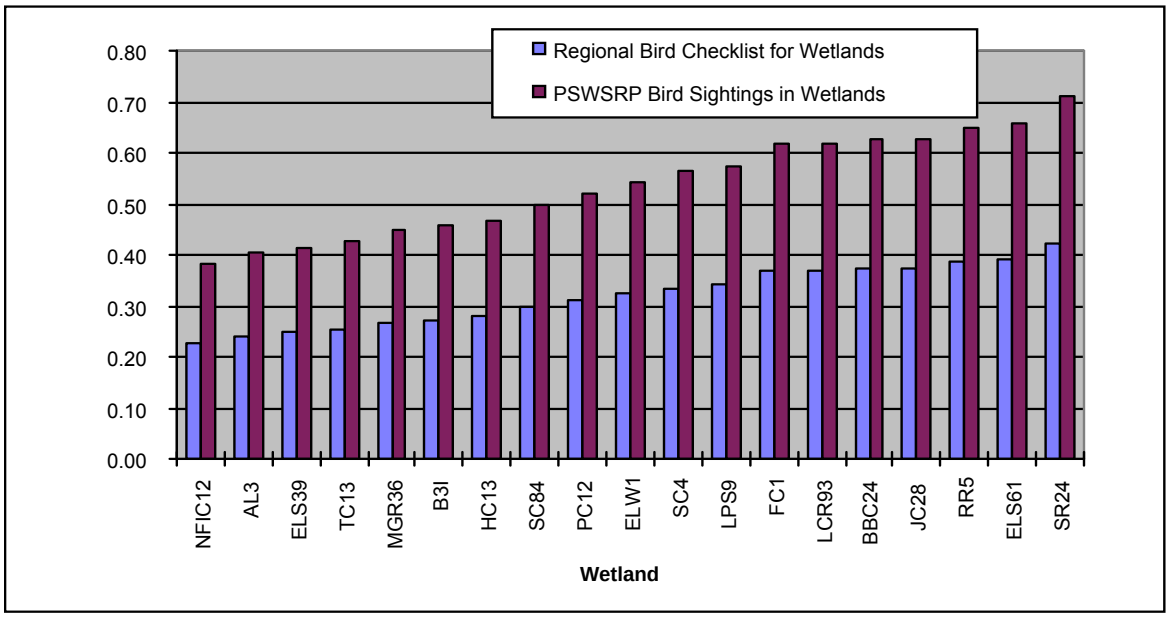

Figure 6-1. Percent of all species collectively found in wetlands.

Only three species, American robin, black-capped chickadee and song sparrow, and representing 3.2% of total diversity were shared between all 19 wetlands. Conversely, four species (4.3%), American coot, hooded merganser, savannah sparrow and spotted

sandpiper were found in only one wetland. Interestingly, 47 species (50% of total) were found in 53% or more of the wetlands.

Migrants accounted for 37% of species (35). Common and rare residents respectively numbered 17 and 42 species and comprised 18% and 45% of sightings thus significantly enhancing the diversity of wetland avifauna. Many residents were species of adjacent terrestrial habitats using wetlands to drink, augment diet, and support their young.

During the study period the observations of thirteen species declined including two rare residents, orange-crowned warbler and red crossbill. Nine other rare resident species showed no change and six weren't observed in sufficient numbers to determine. Forty-nine percent of species showed no change in population and ten species increased. We did not have enough observations of 25 species to determine changes in population status.

The observations of birds known to avoid suburban and urban development both declined and increased depending on species. Three avoiders declined including orange-crowned warbler, varied thrush and willow flycatcher while two increased, black-throated gray warbler and Swainson's thrush. Seven species known to be adaptable to urbanization increased while nine declined.

Species Richness by Wetland (Alpha Diversity)

Species richness varied widely within wetlands over the study period (Figure 6-2). Species richness for all years was higher because different species were observed in different years. We saw the highest richness in 1989 in virtually all wetlands and the lowest in the last year of our research, 1995.

Table 6-1. Species and life history traits of birds sighted at study wetlands.

Bird Species	Percent of Wetlands 1989	Percent of Wetlands 1991	Percent of Wetlands 1995	Percent of Wetlands All Years	Status	Population	Adapt-ability	Versatility Rating
American Coot	0.05	0.06	0.05	0.05	resident	insufficient data	Adapter	10
American Goldfinch	0.79	0.50	0.68	0.84	resident	declining	Adapter	23
American Robin	1.00	1.00	1.00	1.00	resident	increasing	Adapter	37
Anna's Hummingbird	0.11	0.00	0.05	0.16	rare resident	insufficient data	Adapter	25
Bald Eagle	0.00	0.06	0.11	0.11	migrant	insufficient data	Adapter	19
Barn Swallow	0.26	0.22	0.42	0.53	resident	increasing	Adapter	18
Black-capped Chickadee	1.00	0.94	1.00	1.00	migrant	declining	Adapter	28
Belted Kingfisher	0.26	0.22	0.21	0.58	resident	no change	Adapter	Undetermined
Bewick's Wren	0.68	0.89	0.74	0.95	resident	declining	Adapter	22
Brown-headed Cow Bird	0.58	0.33	0.63	0.95	migrant	insufficient data	Adapter	9
Band-tailed Pigeon	0.05	0.06	0.05	0.16	migrant	increasing	Adapter	17
Bushtit	0.84	0.61	0.21	0.95	migrant	no change	Adapter	10
Canada Goose	0.11	0.06	0.11	0.16	resident	declining	Adapter	22
California Quail	0.05	0.00	0.16	0.21	rare resident	no change	Adapter	8
Chestnut-backed Chickadee	0.79	0.78	0.47	1.00	resident	increasing	Adapter	27
Cedar Waxwing	0.84	0.78	0.53	0.89	resident	insufficient data	Adapter	28
Cliff Swallow	0.05	0.11	0.11	0.16	migrant	insufficient data	Adapter	12
Common Yellow-throat	0.58	0.67	0.47	0.68	rare resident	no change	Adapter	9
Dark-eyed Junco	0.68	0.50	0.37	0.84	migrant	insufficient data	Adapter	Undetermined
Downy Woodpecker	0.47	0.56	0.63	0.89	resident	insufficient data	Adapter	21
Fox Sparrow	0.05	0.00	0.11	0.16	resident	insufficient data	Adapter	34
Gadwall	0.11	0.06	0.05	0.11	resident	insufficient data	Adapter	10
Great Blue Heron	0.42	0.28	0.21	0.63	resident	no change	Adapter	27
Golden-crowned kinglet	0.95	0.94	0.37	1.00	resident	no change	Adapter	14
Glaucous-winged Gull	0.16	0.06	0.05	0.16	migrant	declining	Adapter	26
Hammond's Flycatcher	0.26	0.33	0.05	0.47	migrant	no change	Adapter	26
Hairy Woodpecker	0.79	0.50	0.32	0.79	rare resident	insufficient data	Adapter	10
House Finch	0.58	0.22	0.32	0.68	resident	no change	Adapter	28
Hutton's Vireo	0.42	0.06	0.11	0.47	resident	no change	Adapter	27
Killdeer	0.21	0.00	0.11	0.32	resident	no change	Adapter	28
Mallard	0.42	0.28	0.42	0.58	resident	no change	Adapter	10
Marsh Wren	0.68	0.22	0.16	0.68	resident	no change	Adapter	8
Northern Flicker	0.37	0.39	0.37	0.63	migrant	declining	Adapter	27
Northern Oriole	0.11	0.00	0.11	0.21	resident	no change	Adapter	33
Pied-billed Grebe	0.26	0.06	0.11	0.26	resident	no change	Adapter	Undetermined
Pacific-slope Flycatcher	0.95	1.00	0.84	1.00	migrant	insufficient data	Adapter	10
Purple Finch	0.63	0.44	0.47	0.79	migrant	increasing	Adapter	24
Red-breasted Nuthatch	0.53	0.56	0.63	0.84	migrant	insufficient data	Adapter	Undetermined
Red Crossbill	0.32	0.67	0.16	0.79	rare resident	declining	Adapter	29
Red-eyed Vireo	0.11	0.00	0.11	0.16	resident	no change	Adapter	26
Rufous-sided Towee	0.89	0.89	0.89	1.00	migrant	no change	Adapter	37
Rufous Hummingbird	0.21	0.17	0.16	0.32	resident	insufficient data	Adapter	28
Ruby Crowned Kinglet	0.53	0.44	0.63	0.89	resident	no change	Adapter	31
Red-winged Blackbird	0.53	0.33	0.53	0.68	rare resident	insufficient data	Adapter	22
Savannah Sparrow	0.00	0.06	0.00	0.05	resident	increasing	Adapter	11
Song Sparrow	1.00	1.00	1.00	1.00	resident	no change	Adapter	24
Sharp-shinned Hawk	0.21	0.00	0.00	0.21	rare resident	no change	Adapter	15
Steller's Jay	0.58	0.61	0.68	0.84	rare resident	insufficient data	Adapter	33
Tree Swallow	0.58	0.39	0.42	0.84	rare resident	no change	Adapter	22
Violet-green Swallow	0.47	0.39	0.79	0.79	rare resident	insufficient data	Adapter	28
Virginia Rail	0.26	0.11	0.16	0.32	migrant	no change	Adapter	33
White-crowned Sparrow	0.32	0.22	0.05	0.32	migrant	no change	Adapter	29
Western Wood-pewee	0.32	0.17	0.32	0.47	migrant	declining	Adapter	30
Winter Wren	0.95	0.94	0.68	1.00	resident	increasing	Adapter	27

Table 6-1 continued. Species and life history traits of birds sighted at study wetlands.

Bird Species	Percent of Wetlands 1989	Percent of Wetlands 1991	Percent of Wetlands 1995	Percent of Wetlands All Years	Status	Population	Adapt-ability	Versatility Rating
Wood Duck	0.32	0.22	0.37	0.63	rare resident	no change	Adapter	25
Yellow Warbler	0.74	0.72	0.21	0.95	migrant	declining	Adapter	19
Yellow-rumped Warbler	0.26	0.11	0.21	0.47	rare resident	no change	Adapter	31
Black Headed Grosbeak	0.84	0.61	0.79	1.00	rare resident	no change	Avoider	34
Brewer's Blackbird	0.21	0.39	0.11	0.47	migrant	no change	Avoider	28
Brown Creeper	0.26	0.28	0.16	0.47	resident	no change	Avoider	32
Black-throated Gray Warbler	0.53	0.39	0.47	0.79	migrant	increasing	Avoider	24
Blue-winged Teal	0.00	0.00	0.11	0.11	resident	no change	Avoider	29
Caspian Tern	0.00	0.00	0.11	0.11	migrant	insufficient data	Avoider	Undetermined
Chipping Sparrow	0.11	0.06	0.11	0.26	migrant	no change	Avoider	36
Cooper's Hawk	0.11	0.00	0.16	0.26	migrant	no change	Avoider	8
Common Raven	0.00	0.00	0.11	0.11	rare resident	insufficient data	Avoider	32
Evening Grosbeak	0.21	0.06	0.21	0.32	rare resident	no change	Avoider	33
Green Heron	0.11	0.06	0.05	0.16	migrant	no change	Avoider	6
Hermit Thrush	0.84	0.33	0.21	0.84	resident	no change	Avoider	22
Hooded Merganser	0.05	0.00	0.05	0.05	migrant	insufficient data	Avoider	25
MacGillivary's Warbler	0.11	0.00	0.21	0.26	migrant	insufficient data	Avoider	Undetermined
Northern Pigmy Owl	0.05	0.06	0.05	0.16	migrant	no change	Avoider	20
Orange-crowned Warbler	0.74	0.44	0.37	0.84	rare resident	declining	Avoider	31
Olive-sided Flycatcher	0.16	0.22	0.11	0.32	resident	no change	Avoider	36
Pine Siskin	0.26	0.00	0.26	0.47	resident	no change	Avoider	27
Pileated Woodpecker	0.21	0.00	0.11	0.26	resident	no change	Avoider	32
Red-breasted Sapsucker	0.21	0.00	0.21	0.37	resident	no change	Avoider	24
Red-eyed Vireo	0.05	0.06	0.11	0.16	resident	no change	Avoider	26
Ruffed Grouse	0.05	0.11	0.05	0.16	resident	insufficient data	Avoider	29
Sora	0.00	0.06	0.11	0.16	migrant	no change	Avoider	28
Solitary Vireo	0.21	0.39	0.21	0.58	migrant	insufficient data	Avoider	10
Spotted Sandpiper	0.05	0.00	0.00	0.05	rare resident	no change	Avoider	4
Swainson's Thrush	0.95	1.00	0.95	1.00	resident	increasing	Avoider	32
Townsend's Warbler	0.68	0.06	0.37	0.79	migrant	no change	Avoider	26
Varied Thrush	0.21	0.00	0.00	0.21	migrant	declining	Avoider	29
Vaux's Swift	0.58	0.44	0.16	0.68	migrant	no change	Avoider	34
Warbling Vireo	0.68	0.17	0.26	0.79	resident	insufficient data	Avoider	10
Western Tanager	0.47	0.33	0.42	0.63	migrant	no change	Avoider	34
Willow Flycatcher	0.84	0.83	0.79	0.95	migrant	declining	Avoider	20
Wilson's Warbler	0.89	0.78	0.63	1.00	migrant	no change	Avoider	33
American Crow	0.84	0.94	0.89	0.95	resident	declining	Exploiter	32
European Starling	0.42	0.28	0.16	0.53	resident	no change	Exploiter	27
House Sparrow	0.21	0.22	0.05	0.42	resident	insufficient data	Exploiter	12
Rock Dove	0.11	0.11	0.00	0.11	resident	increasing	Exploiter	Undetermined

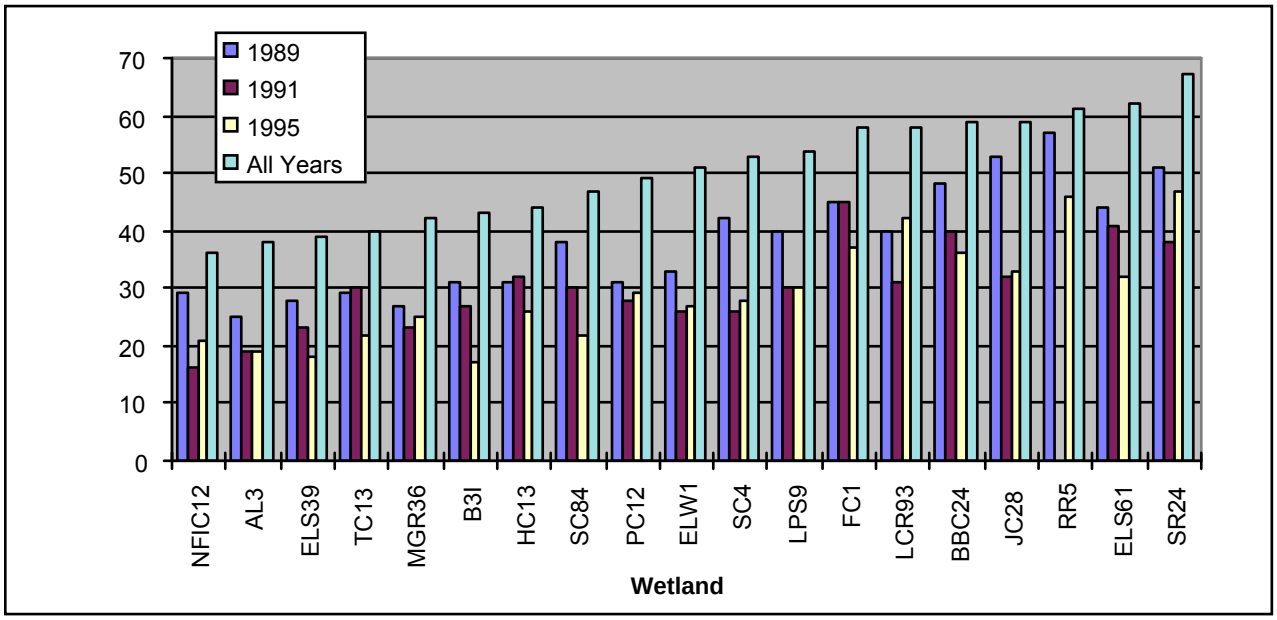

Figure 6-2. Total species diversity in wetlands for each study year.

We used total richness to measure species diversity and found it increased directly with wetland area (Fisher's r to z, R= 0.53, P= 0.018). Our study wetlands ranged from 0.6 to 12.6 ha with 13 wetlands less than four hectares. Among the six wetlands greater than four hectares, only one had less than 50 species present, whereas among the wetlands with less than four hectares, eight had richness of less than 50 (Figure 6-3).

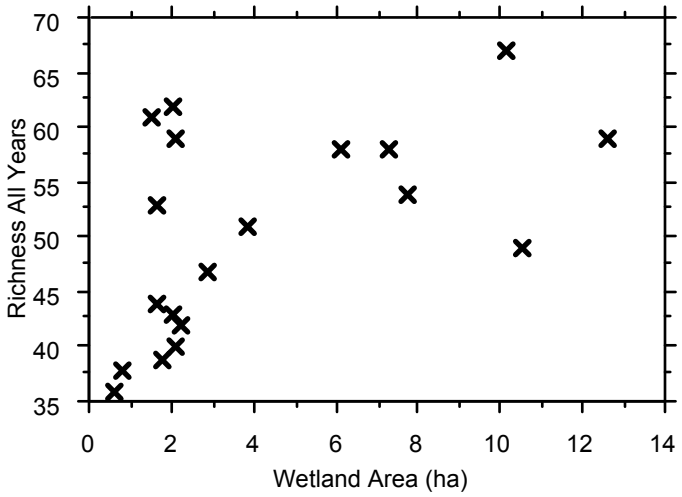

Figure 6-3. Relationship between bird species richness and wetland size.

Large wetland areas, while a major component of the most diverse bird communities we found, is not the only factor important as evidenced in that two of the smallest wetlands of less than two hectares had high richness of 61 and 62 species. Structural complexity was also found to be a contributing factor, as characterized by either the number of NWI vegetation (Fisher's r to z, R = 0.48, P = 0.04), or Paulson's habitat (Fisher's r to z, R = 0.6, P = 0.006) classes (Figure 6-4), though the statistical relationship was stronger with Paulson's habitat classifications. For example, three wetlands with only one NWI vegetation class had 55 bird species or more, representing the upper range of diversity, during the study period. The single NWI classifications used to describe the vegetation communities in those wetlands were equivalent to three of the bird habitat classifications probably better reflecting avian potential.

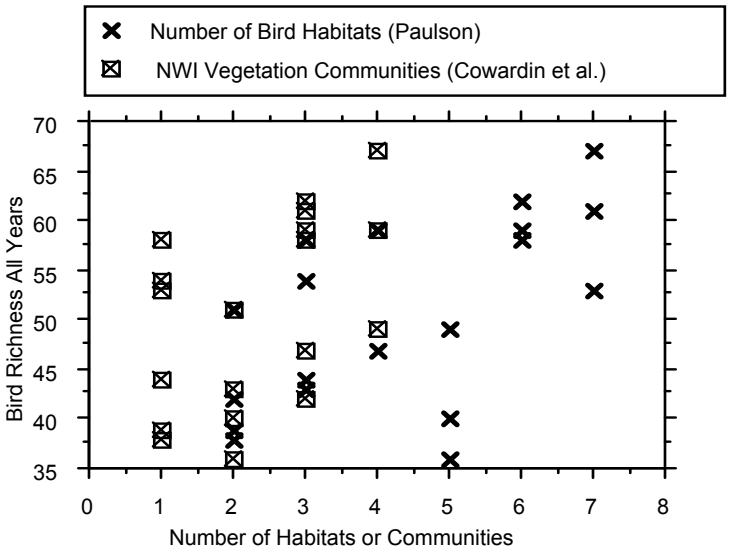

Figure 6-5. Relationship between bird species richness and vegetation community complexity.

Bird diversity in wetlands with adjacent lakes, for example FC1 and ELW1, and open water, such as SR28 and BBC24, was bolstered by waterfowl. Most frequent waterfowl encountered over the three years of complete surveys (e.g.,1989, 1991 and 1995) were mallard (99), Canada goose (10), pied-billed grebe (26), hooded merganser (9), and gadwall (7), with only occasional sightings of blue-winged teal (2), American widgeon (1), and lesser scaup (1).

Relative Abundance

Summary tables for species abundance determined by average detections are provided in Table 6-2, whereas detailed wetland-specific detections are provided in Appendix Tables 6-2. Found in each wetland and in decreasing order of abundance are song sparrow and American robin (both with at least one expected detection per visit), Swainsons thrush, red-wing blackbird and black-capped chickadees. Within selected other wetlands American crow, rufous-sided towhee and Pacific slope flycatchers, willow flycatcher winter wren and marsh wren were abundant.

DISCUSSION

Our bird diversities when compared with diversities observed in terrestrial habitats by others, indicate that wetlands are disproportionately used by birds and are probably the single most productive habitat for this vertebrate class in the Puget Sound Basin. Of all the species identified in Western Washington 82% are found in wetlands. Artman (1990) found only 23 species in 45-50 year old stands dominated by western hemlock but also containing Douglas-fir (*Pseudotsuga menziesii*), Pacific silver fir (*Abies amabilis*), and western red-cedar (*Thuja plicata*). Of the 48 species identified by Gavareski (1976) in 4-400 ha^2 diversely vegetated urban parks of Seattle only two (great horned owl and golden-crowned sparrow) were undetected at wetlands.

We also found significantly more species than identified by Milligan (1985) in a survey of wetlands of less than 4 ha^2 in urbanized areas of the Puget Sound Basin. From censuses in April, May and June of 1984, 60 species were found in combined wetland, and wetland and upland habitats, of 23 widely diverse sites characterized by varying density of development. Mulligan also found both total and average avifaunal diversity to be correlated to wetland habitat complexity measured by the number of NWI vegetation classes. Bird diversity was also found to correlate with the percentage of wetland buffered by shrubland or forest vegetation, although interestingly, there was only a minor predicted increase in diversity with increasing buffer width classes of 50, 100 and 200 feet from the wetland edge.

During the baseline surveys of wetlands for this study, Martin-Yanny (1992) listed 88 species. During subsequent surveys our study identified an additional six species, and presumably with continued surveys a few additional species may be expected at decreasing rates. Nevertheless it seems unlikely we would find the entire list of species identified by Paulson as potentially occurring in palustrine wetland habitats because of the limited geographic location of our wetlands within disturbed watersheds.

Paulson (1992) found that most resident species are maintaining their populations despite increasing urbanization. Our study results generally corroborate this finding though we did not have sufficient data to assess all species we observed. Declines were observed among some migrating species and some adapters.

Wetland area and habitat diversity were found to be critical factors in maintaining high biodiversity in wetland bird communities. When wetlands are assessed for function and value related to avian potential, methods based on bird preferences, such as the habitat classification by Paulson, would be more appropriate than the NWI classification system.

Table 6-2. Bird species abundance in order of increasing average detections.

Bird Species	1989	1991	1995	All Years	Detectability over all years, all wetland stations
Blue-winged Teal	0	0	2	2	0.0026
Savannah Sparrow	0	2	0	2	0.0026
Spotted Sandpiper	2	0	0	2	0.0026
Anna's Hummingbird	2	0	1	3	0.0039
Bald Eagle	0	1	2	3	0.0039
Northern Pigmy Owl	1	1	1	3	0.0039
California Quail	1	0	3	4	0.0052
Caspian Tern	0	0	4	4	0.0052
Northern Oriole	2	0	2	4	0.0052
Red-eyed Vireo	2	0	2	4	0.0052
Sharp-shinned Hawk	4	0	0	4	0.0052
Common Raven	0	0	5	5	0.0064
Rock Dove	2	3	0	5	0.0064
Ruffed Grouse	1	2	2	5	0.0064
Sora	0	2	3	5	0.0064
Chipping Sparrow	3	1	2	6	0.0077
Fox Sparrow	1	0	5	6	0.0077
Glaucous Winged Gull	3	1	2	6	0.0077
Gadwall	3	2	2	7	0.0090
Varied Thrush	7	0	0	7	0.0090
Band-tailed Pigeon	3	1	4	8	0.0103
MacGillivary's Warbler	2	0	6	8	0.0103
Red-breasted Sapsucker	4	0	4	8	0.0103
Red-eyed Vireo	2	1	5	8	0.0103
Cooper's Hawk	2	0	7	9	0.0116
Hooded Merganser	6	0	3	9	0.0116
Killdeer	6	0	3	9	0.0116
Canada Goose	2	2	6	10	0.0129
Green Heron	9	1	1	11	0.0142
House Sparrow	6	5	1	12	0.0155
Cliff Swallow	4	6	3	13	0.0168
Rufous Hummingbird	5	4	4	13	0.0168
Yellow-rumped Warbler	7	3	4	14	0.0180
American Coot	4	5	6	15	0.0193
Olive-sided Flycatcher	5	8	2	15	0.0193
Pileated Woodpecker	11	0	4	15	0.0193
Virginia Rail	7	3	5	15	0.0193
Evening Grosbeak	7	1	8	16	0.0206
Brewer's Blackbird	6	7	6	19	0.0245
Pine Siskin	7	0	12	19	0.0245
Belted Kingfisher	7	4	10	21	0.0271
Brown Creeper	9	7	5	21	0.0271
Hammond's Flycatcher	9	10	2	21	0.0271
Hutton's Vireo	19	1	2	22	0.0284
Solitary Vireo	5	13	4	22	0.0284
Wood Duck	9	4	9	22	0.0284
White-crowned Sparrow	14	9	1	24	0.0309

Table 6-2 continued. Bird species abundance in order of increasing average detections.

Bird Species	1989	1991	1995	All Years	Detectability over all years, all wetland stations
Pied-billed Grebe	8	2	16	26	0.0335
Western Wood-pewee	11	6	13	30	0.0387
Red Crossbill	9	23	4	36	0.0464
Vaux's Swift	17	13	8	38	0.0490
House Finch	23	8	8	39	0.0503
Great Blue Heron	17	7	17	41	0.0528
Northern Flicker	10	11	23	44	0.0567
Ruby Crowned Kinglet	19	9	20	48	0.0619
European Starling	32	11	9	52	0.0670
Townsend's Warbler	38	2	13	53	0.0683
Western Tanager	17	7	29	53	0.0683
Barn Swallow	12	11	31	54	0.0696
Downy Woodpecker	16	14	25	55	0.0709
Hairy Woodpecker	36	15	11	62	0.0799
Warbling Vireo	38	3	22	63	0.0812
Brown-headed Cow Bird	23	11	31	65	0.0838
Orange-crowned Warbler	38	23	11	72	0.0928
Black-throated Gray Warbler	25	13	44	82	0.1057
Dark-eyed Junco	40	17	25	82	0.1057
Purple Finch	24	22	38	84	0.1082
Red-breasted Nuthatch	15	29	40	84	0.1082
Violet-green Swallow	18	14	54	86	0.1108
Marsh Wren	55	19	23	97	0.1250
Bushtit	55	30	13	98	0.1263
Mallard	32	18	49	99	0.1276
Tree Swallow	43	27	31	101	0.1302
Hermit Thrush	84	11	8	103	0.1327
Golden-crowned kinglet	59	34	16	109	0.1405
Chestnut-backed Chickadee	41	37	38	116	0.1495
Steller's Jay	28	38	68	134	0.1727
Cedar Waxwing	57	41	42	140	0.1804
Yellow Warbler	67	50	26	143	0.1843
American Goldfinch	54	42	55	151	0.1946
Black Headed Grosbeak	56	37	64	157	0.2023
Bewick's Wren	48	42	68	158	0.2036
Common Yellow-throat	93	63	65	221	0.2848
Wilson's Warbler	115	71	77	263	0.3389
Winter Wren	109	85	114	308	0.3969
American Crow	73	106	134	313	0.4034
Rufous-sided Towee	99	94	140	333	0.4291
Willow Flycatcher	114	90	141	345	0.4446
Pacific-slope Flycatcher	127	147	145	419	0.5399
Black-capped Chickadee	152	138	170	460	0.5928
Red-winged Blackbird	280	147	165	592	0.7629
Swainson's Thrush	153	179	336	668	0.8608
American Robin	279	230	293	802	1.0335
Song Sparrow	454	389	395	1238	1.5954
Total Abundance	3426	2551	3337	9314	

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Appendix Table 6-1. List of bird species expected to be using palustrine wetlands in Western Washington.

		STATUS		BREEDING DISTRIBUTION							
SPECIES	Evolutionary Order	B	W	WA	PL	FM	WC	BF	RW	ST	WM
Common loon	1	x	x	o	SW						
Pied-billed grebe	2	x	x	x	R						
Horned grebe	3	x	x	o	SW						
Red-necked grebe	4	x	x	o	S						
Eared grebe	5	x	o	x	Sw						
Western grebe	6	o	x	x	SW						
Clark's grebe	7	o		o	S						
Double-crested cormorant	8	x	x	x	SW						
American bittern	9	x	o	x		SW					
Great blue heron	10	x	x	x		R					R
Great egret	11	o	o	o		S					
Black-crowned night-heron	12	o	o	x		SW					
Canada goose	13	x	x	x	R						R
Wood duck	14	x	o	x	R						
Green-winged teal	15	x	o	x	SW	SW					W
Mallard	16	x	x	x	R	R					W
Northern pintail	17	x	x	x	SW	SW					W
Blue-winged teal	18	x		x	S	S					
Cinnamon teal	19	o		x	S	S					
Northern shoveler	20	x	o	x	SW	SW					
Gadwall	21	x	x	x	SW	SW					W
American wigeon	22	x	o	x	SW	SW					W
Canvasback	23	x	x	x	SW	S					
Redhead	24	x	o	x	S	S					
Ring-necked duck	25	x	x	x	SW						
Barrow's goldeneye	26	x	x	x	S						
Bufflehead	27	x	x	o	SW						
Hooded merganser	28	x	x	x	SW						
Common merganser	29	x	x	x	W						
Ruddy duck	30	x	o	x	SW	S					
Bald eagle	31	x	x	x	R				R		
Northern harrier	32	x	x	x		SW					R
Sharp-shinned hawk	33	x	o	x			R	W	W	W	
Cooper's hawk	34	x	o	x			R	R	R		
Northern goshawk	35	x	x	x			R				
Red-tailed hawk	36	x	o	x			R	R	R		
American kestrel	37	x	x	x					R		
Peregrine falcon	38	o	o	x			r				
Spruce grouse	39	x	x	x			R*				
Blue grouse	40	x	x	x			R				
Ruffed grouse	41	x	x	x				R			
Sharp-tailed grouse	42	o	o	x					W		
Mountain quail	43	o	o	o						R	
Virginia rail	44	x	x	x		R					
Sora	45	x	o	x		SW					S
American coot	46	x	x	x	SW	S					
Sandhill crane	47	o	+	o		sM					sM
Killdeer	48	x	o	x	SW	SW					SW
Common snipe	49	x	o	x		SW					SW
Band-tailed pigeon	50	o	o	x			R	R			
Mourning dove	51	x	o	x				R	R		
Barn owl	52	o	o	x			r	R	R		
Western screech-owl	53	x	x	x			R	R	R		
Great horned owl	54	x	x	x			R	R	R		
Northern pygmy-owl	55	x	x	x			R				
Barred owl	56	x	x	x			R				
Long-eared owl	57	x	x	x					R		
Short-eared owl	58	x	x	x							R
Boreal owl	59	x	x	x			R*				
Northern saw-whet owl	60	x	x	x			R		W		

Appendix Table 6-1 cont'. List of bird species expected to be using palustrine wetlands in Western Washington.

		STATUS		BREEDING DISTRIBUTION							
SPECIES	Evolutionary Order	B	W	WA	PL	FM	WC	BF	RW	ST	WM
Common nighthawk	61	x		x			S		S		
Black swift	62	x		x			S				
Vaux's swift	63	x		x			S	S	S		
Black-chinned hummingbird	64	o		x				S	S		
Anna's hummingbird	65	o	o	o					R	R	
Calliope hummingbird	66	x		x				S	S		
Rufous hummingbird	67	x		x			S	S		S	
Belted kingfisher	68	x	x	x	SW						
Lewis' woodpecker	69	x	o	x					S		
Red-naped sapsucker	70	o		x				S	S		
Red-breasted sapsucker	71	x	o	x			R	R			
Downy woodpecker	72	x	x	x			r	R	R		
Hairy woodpecker	73	x	x	x			R	r			
Three-toed woodpecker	74	x	x	x			r*				
Black-backed woodpecker	75	x	x	x			R*				
Northern flicker	76	x	x	x			R	R	R		
Pileated woodpecker	77	x	x	x			R	R			
Olive-sided flycatcher	78	x		x			S	S			
Western wood-pewee	79	x		x			S	S	S		
Willow flycatcher	80	x		x					S	S	
Least flycatcher	81	x		o				S	S		
Hammond's flycatcher	82	x		x			S	S			
Pacific-slope flycatcher	83	x		x			S	S	S		
Ash-throated flycatcher	84	o		o					S		
Western kingbird	85	o		x					S		
Eastern kingbird	86	x		x					S		
Tree swallow	87	x		x	S				S		
Violet-green swallow	88	x		x	S		S				
Gray jay	89	x	x	x			R				
Steller's jay	90	x	x	x			R				
Black-billed magpie	91	x	x	x					R		
American crow	92	x	x	x			R	R			W
Common raven	93	x	x	x			R				
Black-capped chickadee	94	x	x	x				R	R	R	
Boreal chickadee	95	x	x	o			R				
Chestnut-backed chickadee	96	x	x	x			R				
Bushtit	97	o	o	x					R	R	
Red-breasted nuthatch	98	x	x	x			R	W	W		
White-breasted nuthatch	99	o	o	x				R			
Brown creeper	100	x	x	x			R	W	W		
Canyon wren	101	o	o	x					R		
Bewick's wren	102	o	o	x					R	R	
House wren	103	x		x				S	S	S	
Winter wren	104	x	x	x			R	R	W	M	
Marsh wren	105	x	o	x		R					w
Golden-crowned kinglet	106	x	x	x			R		W		
Townsend's solitaire	107	x	x	x			S*				
Veery	108	o		x				S	S		
Swainson's thrush	109	x		x			S	S			
Hermit thrush	110	x	o	x			S*				
American robin	111	x	x	x			R	R	S		W
Varied thrush	112	x	x	x			R	W	W		
Gray catbird	113	x		x				S	S	S	
American pipit	114	x	o	x		M					M
Bohemian waxwing	115	x	x	o			S		W		
Cedar waxwing	116	x	x	x			S	R	R		
Solitary vireo	117	x		x			S				
Hutton's vireo	118	o	o	o			R	R			
Warbling vireo	119	x		x			S	S		S	
Red-eyed vireo	120	x		x				S	S		
Orange-crowned warbler	121	x	+	x				S	S	Sw	

Appendix Table 6-1 cont'. List of bird species expected to be using palustrine wetlands in Western Washington.

		STATUS		BREEDING DISTRIBUTION							
SPECIES	Evolutionary Order	B	W	WA	PL	FM	WC	BF	RW	ST	WM
Nashville warbler	122	o		x					S	S	
Yellow warbler	123	x		x				S	S		
Yellow-rumped warbler	124	x	o	x			S*		Mw		
Black-throated gray warbler	125	o		x			S				
Townsend's warbler	126	x	o	x			S*				
Hermit warbler	127	o		o			S*				
American redstart	128	x		x				S	S		
Northern waterthrush	129	x		o					S		
MacGillivray's warbler	130	x		x				S	S	S	
Common yellowthroat	131	x		x		S					
Wilson's warbler	132	x		x			S	S		S	
Yellow-breasted chat	133	o		x					S	S	
Western tanager	134	x		x			S	S	S		
Black-headed grosbeak	135	x		x				S	S		
Lazuli bunting	136	x		x					S	S	
Rufous-sided towhee	137	x	o	x				R	R	R	
Savannah sparrow	138	x	o	x							S
Fox sparrow	139	x	x	x					S	SW	
Song sparrow	140	x	x	x		S			R	R	
Lincoln's sparrow	141	x	x	x		S*			M		
White-crowned sparrow	142	x	x	x			S		M	SR	
Dark-eyed junco	143	x	x	x			R	S	W	W	
Bobolink	144	o		o							S
Red-winged blackbird	145	x	o	x		SW					W
Yellow-headed blackbird	146	x	o	x		S					M
Brewer's blackbird	147	x	o	x					S		R
Brown-headed cowbird	148	x	o	x		S	S	S	S	S	
Northern oriole	149	o		x				S	S		
Pine grosbeak	150	x	x	x			R*				
Purple finch	151	x	x	x			R	R			
Cassin's finch	152	x	o	x			S*				
House finch	153	x	x	x					R	R	
Red crossbill	154	x	x	x			R				
White-winged crossbill	155	x	x	o			R*				
Pine siskin	156	x	x	x			R	W	W		
American goldfinch	157	o	o	x					R		
Evening Grosbeak	158	x	x	x			R	R			
Total:	158										

BREEDING SPECIES	66	38	84	65	69	30	19
NONBREEDING SPECIES	52	29	46	31	45	23	34
BREEDING HABITAT SPECIALISTS	34	13	31	4	5	2	5
NONBREEDING HABITAT SPECIALISTS	2	4	11	1	1	4	0

STATUS
B - breeding status

(also migratory status of nonbreeders)

S - summer
W - winter
M - migrant (spring and fall)
F - fall
W - wintering status
x - widespread
o - occurs in <33% of region
+ - occurs in <10% of region
c - coast only

DISTRIBUTION BY AREA
WA - Washington

x - widespread in area

o - occurs in <33% of area

Appendix Table 6-2. Detection rates for species within each wetland all years combined.

	Detection Rates																		
Species	AL3	B3I	BBC24	ELS39	ELS61	ELW1	FC1	HC13	JC28	LCR93	LPS9	MGR36	NFIC12	PC12	RR5	SC4	SC84	SR24	TC13
American Coot							1.25												
American Crow	0.67	1.50	0.33	0.92	0.83	1.00	1.67	0.67	3.08	0.58	3.58	1.92	0.75		1.67	1.92	3.75	0.33	0.92
American Goldfinch		1.08	0.33	0.25	0.33	0.08	0.50	0.25	2.75	0.42	4.42		0.17	0.08	0.42	0.42	0.25	0.83	
American Robin	0.67	2.42	5.75	0.75	3.33	2.92	2.42	1.75	6.00	5.17	5.92	2.58	1.17	2.25	3.00	8.42	5.25	5.50	1.58
Anna's Hummingbird			0.08		0.08													0.08	
Bald Eagle						0.08	0.17												
Barn Swallow		0.08	0.50		0.42	0.17	2.17		0.17		0.33				0.33	0.17		0.17	
Black-capped Chickadee	0.42	2.25	1.42	0.50	1.00	2.67	2.17	1.58	2.42	2.25	4.75	1.58	0.58	1.25	2.50	3.25	1.92	4.75	1.08
Belted Kingfisher			0.58		0.08	0.17	0.25	0.08	0.08	0.08		0.08			0.08	0.08		0.17	
Bewick's Wren	0.08	0.33		0.17	0.58	1.42	1.42	0.17	1.00	0.50	2.17	0.08	0.25	0.25	0.25	1.92	1.17	1.25	0.17
Brown-headed Cow Bird	0.17	0.42	0.33	0.17	0.42	0.08	0.25	0.08	0.50	0.42	0.50	0.08		0.33	0.50	0.08	0.17	0.83	0.08
Black Headed Grosbeak	0.17	0.42	1.50	0.17	1.42	0.67	0.83	0.33	0.58	1.25	1.33	0.17	0.08	0.50	0.58	0.67	0.17	2.00	0.25
Brewer's Blackbird		0.33		0.08	0.17		0.50			0.08	0.17	0.08				0.08		0.08	
Brown Creeper			0.33		0.08			0.08		0.08				0.17	0.42	0.17		0.25	0.17
Black-throated Gray Warbler	0.08		0.17		0.08			0.75	1.17	0.75	0.17	0.08	0.42	0.08	0.50	0.58	0.50	1.25	0.25
Band-tailed Pigeon								0.25								0.08		0.33	
Bushtit		0.50	0.08	0.17	0.33	0.17	0.50	0.17	0.33	0.42	2.33	0.33	0.25	0.25	0.25	1.00	0.08	0.75	0.25
Blue-winged Teal					0.08		0.08												
Canada Goose						0.42	0.33								0.08				
California Quail				0.08	0.08				0.08							0.08			
Caspian Tern						0.08	0.25												
Chestnut-backed Chickadee	0.17	0.17	0.67	0.17	0.33	0.17	0.25	0.17	1.00	0.58	0.42	0.25	0.42	0.25	1.00	0.92	0.42	2.08	0.25
Cedar Waxwing	0.08	1.00	1.00		0.50	0.42	1.25	0.50	0.92	0.67	0.17		0.17	1.25	1.08	0.67	0.33	1.50	0.17
Chipping Sparrow									0.17		0.08		0.08	0.08				0.08	
Cliff Swallow		0.08		0.08			0.92												
Cooper's Hawk	0.08				0.17				0.08	0.33								0.08	
Common Raven										0.17								0.25	
Common Yellow-throat		0.17	2.92		1.58	0.08	0.92	0.67	1.25	3.08	1.58	1.42		2.17	1.75			0.83	
Dark-eyed Junco	0.17		0.08	0.17	0.17			0.25	1.00	0.08	0.33	0.08	0.42	0.08	0.33	0.75	0.25	2.17	0.50
Downy Woodpecker	0.08	0.08	0.25		0.08	0.08	0.33	0.17	0.17	0.17	0.58	0.50		0.17	0.33	0.25	0.33	0.83	0.17
European Starling		0.92			0.17	0.33	1.42		0.50	0.17	0.50	0.08				0.17	0.08		
Evening Grosbeak	0.08								0.58	0.08	0.08				0.25			0.25	
Fox Sparrow		0.17	0.08							0.25									
Gadwall							0.50								0.08				
Great Blue Heron		0.17	0.17		0.25	0.50	1.17			0.08	0.17	0.08		0.17	0.17	0.08		0.42	
Golden-crowned kinglet	0.25	0.25	0.42	0.25	0.17	0.33	0.08	0.92	0.75	0.42	0.25	0.50	0.67	0.17	1.00	0.83	0.58	0.83	0.42
Green Heron		0.17					0.67					0.08							
Glaucous-winged Gull						0.08	0.33				0.08								
Hammond's Flycatcher	0.08				0.25			0.17			0.08	0.08		0.25	0.42		0.33	0.08	
Hairy Woodpecker		0.08	0.67		0.17	0.08		0.42	0.08	0.33		0.33	0.25	0.08	0.67	0.25	0.50	1.00	0.25
Hermit Thrush	0.25		0.50		0.42		0.08	0.67	0.25	0.92	0.08	0.50	0.42	0.67	0.58	0.42	0.92	1.58	0.33
House Finch	0.17	0.25	0.33	0.33	0.42	0.50	0.25		0.08		0.42				0.08	0.08	0.17	0.17	
Hooded Merganser															0.75				
House Sparrow		0.17		0.08	0.08	0.17	0.25		0.08					0.08	0.08				

Appendix Table 6-2 continued. Detection rates for species within each wetland all years combined.

	Detection Rates																		
Species	AL3	B3I	BBC24	ELS39	ELS61	ELW1	FC1	HC13	JC28	LCR93	LPS9	MGR36	NFIC12	PC12	RR5	SC4	SC84	SR24	TC13
Hutton's Vireo			0.17		0.17		0.08						0.08		0.42	0.50	0.17	0.08	0.17
Killdeer		0.08				0.17			0.25		0.08					0.08		0.08	
Mallard		0.17	1.25	0.08	0.83	0.17	3.75				0.17	0.58		0.17	0.75			0.33	
Marsh Wren			0.58	0.08		0.58	4.25		0.25	0.42	0.50	0.17		0.17	0.17	0.08	0.08	0.75	
MacGillivary's Warbler									0.17	0.25	0.08				0.08				0.08
Northern Flicker		0.33	0.83		0.33		0.08		0.08	0.17	0.08	0.33			0.42	0.33	0.42	0.25	
Northern Oriole			0.08				0.08					0.08			0.08				
Northern Pigmy Owl	0.08									0.08							0.08		
Orange-crowned Warbler		0.17	0.83	0.58	0.58	0.17	0.25	0.25	0.17	0.17	0.17			0.42	0.08	0.25	0.42	1.00	0.50
Olive-sided Flycatcher	0.08		0.08			0.08			0.33								0.50		0.17
Pied-billed Grebe					0.08	0.42	1.50								0.08			0.08	
Pine Siskin			0.08	0.08					0.58	0.08	0.08		0.08			0.08	0.33	0.17	
Pileated Woodpecker			0.42						0.08					0.08	0.58			0.08	
Pacific-slope Flycatcher	1.42	0.42	2.75	0.25	0.58	0.33	0.50	1.83	3.08	2.50	1.17	2.58	1.83	1.50	2.25	1.92	0.83	7.42	1.75
Purple Finch	0.08	0.17		0.17	0.25	0.08			1.25	0.50	0.58		0.33	0.25	1.25	0.83	0.33	0.83	0.08
Red-breasted Nuthatch	0.08		0.58	0.08	0.25	0.08		0.17	0.92	0.67	0.08		0.08	0.33	0.83	0.17	1.00	1.17	0.50
Red-breasted Sapsucker			0.08		0.08					0.08		0.08		0.08	0.17	0.08			
Red Crossbill			0.17		0.08	0.17		0.42	0.08	0.08	0.25	0.08	0.17	0.08	0.33	0.33	0.33	0.25	0.17
Red-eyed Vireo									0.08						0.08			0.17	
Red-eyed Vireo								0.17		0.25								0.25	
Rock Dove		0.17					0.25												
Rufous-sided Towee	0.25	0.83	0.33	1.00	1.17	1.58	0.17	0.33	2.08	0.42	4.58	0.17	2.00	1.33	0.75	5.42	2.58	1.75	1.00
Rufous Hummingbird			0.42	0.08	0.17		0.08							0.08				0.25	
Ruffed Grouse										0.08				0.08				0.25	
Ruby Crowned Kinglet	0.17	0.08	0.25	0.17	0.17			0.42	0.25	0.17	0.17	0.25	0.42	0.08	0.33	0.08	0.25	0.67	0.08
Red-winged Blackbird		0.08	13.33		9.67	1.00	9.50	0.25	0.08	2.75	6.33	5.42			0.42			0.33	0.17
Savannah Sparrow									0.17										
Sora			0.17				0.17			0.08									
Song Sparrow	1.17	4.08	10.33	1.58	3.17	4.33	5.92	3.92	6.00	6.50	14.42	3.92	1.83	3.50	4.58	9.50	6.83	10.08	1.50
Solitary Vireo	0.08		0.17		0.17		0.08		0.33		0.08			0.17		0.33	0.08	0.17	0.17
Spotted Sandpiper									0.17										
Sharp-shinned Hawk				0.08		0.08				0.08	0.08								
Steller's Jay	0.08	0.08	2.17		0.25	0.17		0.17	1.08	0.58	0.17		0.25	0.75	1.00	0.67	0.75	2.50	0.50
Swainson's Thrush	1.42	0.67	2.08	0.42	1.00	0.33	0.75	2.75	5.50	8.58	2.08	3.33	2.17	2.67	4.17	4.17	3.33	7.17	3.08
Townsend's Warbler	0.33		0.33	0.17	0.08	0.08		0.17	0.83	0.17		0.08	0.25		0.67	0.25	0.42	0.50	0.08
Tree Swallow	0.08	0.25	0.67	0.25	0.25	0.50	3.17		0.67		0.25	0.08	0.08	0.08	1.25	0.17	0.08	0.58	
Varied Thrush				0.08	0.08		0.33											0.08	
Vaux's Swift	0.25		0.25		0.17	0.25	0.17	0.75		0.08	0.08		0.08		0.33	0.08		0.42	0.25
Violet-green Swallow			1.33	0.08	0.50	0.42	1.17	0.08	0.83	0.17	0.67		0.17	0.25	0.17	0.33	0.25	0.75	
Virginia Rail			0.50		0.08		0.33			0.08		0.17		0.08					
Warbling Vireo		0.08	0.67	0.08	0.17	0.08	0.25	0.08	0.08	1.50	0.58	0.08			0.58	0.17	0.25	0.58	
White-crowned Sparrow	0.08			0.42	0.50		0.08		0.67							0.25			
Western Tanager	0.17		0.75					0.33	0.42	0.50	0.08			0.25	0.25	0.17	0.08	1.25	0.17
Western Wood-pewee	0.25		0.25		0.42	0.17		0.08						0.33	0.50		0.08		0.42

Appendix Table 6-2 continued. Detection rates for species within each wetland all years combined.

	Detection Rates																		
Species	AL3	B3I	BBC24	ELS39	ELS61	ELW1	FC1	HC13	JC28	LCR93	LPS9	MGR36	NFIC12	PC12	RR5	SC4	SC84	SR24	TC13
Willow Flycatcher	0.17	0.42	2.75	0.75	1.92	0.58	1.50	1.50	1.08	4.25	3.33	1.75	0.17	0.75	1.83		0.58	4.08	1.33
Wilson's Warbler	0.58	0.17	1.67	0.33	0.17	0.17	0.75	1.83	1.08	4.50	0.08	1.50	0.75	0.67	3.08	0.67	0.25	2.75	0.92
Winter Wren	1.67	0.25	3.92	0.25	0.25	0.58	0.50	1.42	2.83	1.33	0.42	1.08	0.33	1.08	2.42	0.92	0.42	4.00	2.00
Wood Duck			0.33		0.17	0.17	0.08			0.25		0.08	0.08	0.08	0.08		0.17	0.25	0.08
Yellow Warbler	0.25	0.67	0.92	0.25	0.42	0.83	1.08	0.25	0.67	3.17	0.50		0.25	0.17	0.25	0.58	0.17	1.33	0.17
Yellow-rumped Warbler		0.08	0.08					0.33	0.08		0.08		0.08	0.08		0.25		0.08	