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Avian Indicators and Results for Johnson Creek

Portland Area Watershed Monitoring & Assessment Program
(PAWMAP)



ENVIRONMENTAL SERVICES
CITY OF PORTLAND

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Portland Watershed Management Plan

PAWMAP Watershed Indicators

“Vital signs” of watershed health: A comprehensive set of responsive and quantifiable indicators used to measure progress towards PWMP goals and objectives

GOAL: Physical Habitat

Riparian Width and Composition
Floodplain Condition
Bank Condition
Shallow Water Habitat (for Willamette)
Channel Substrate Composition
Large Wood
Off-Channel Habitat
Stream Accessibility (Culverts)
Plant Community Composition

GOAL: Biological Communities

Community composition of:
Macroinvertebrates
Fish
Birds
Plants

GOAL: Hydrology

Effective Impervious Area
Stream Connectivity (% piped streams)

GOAL: Water Quality

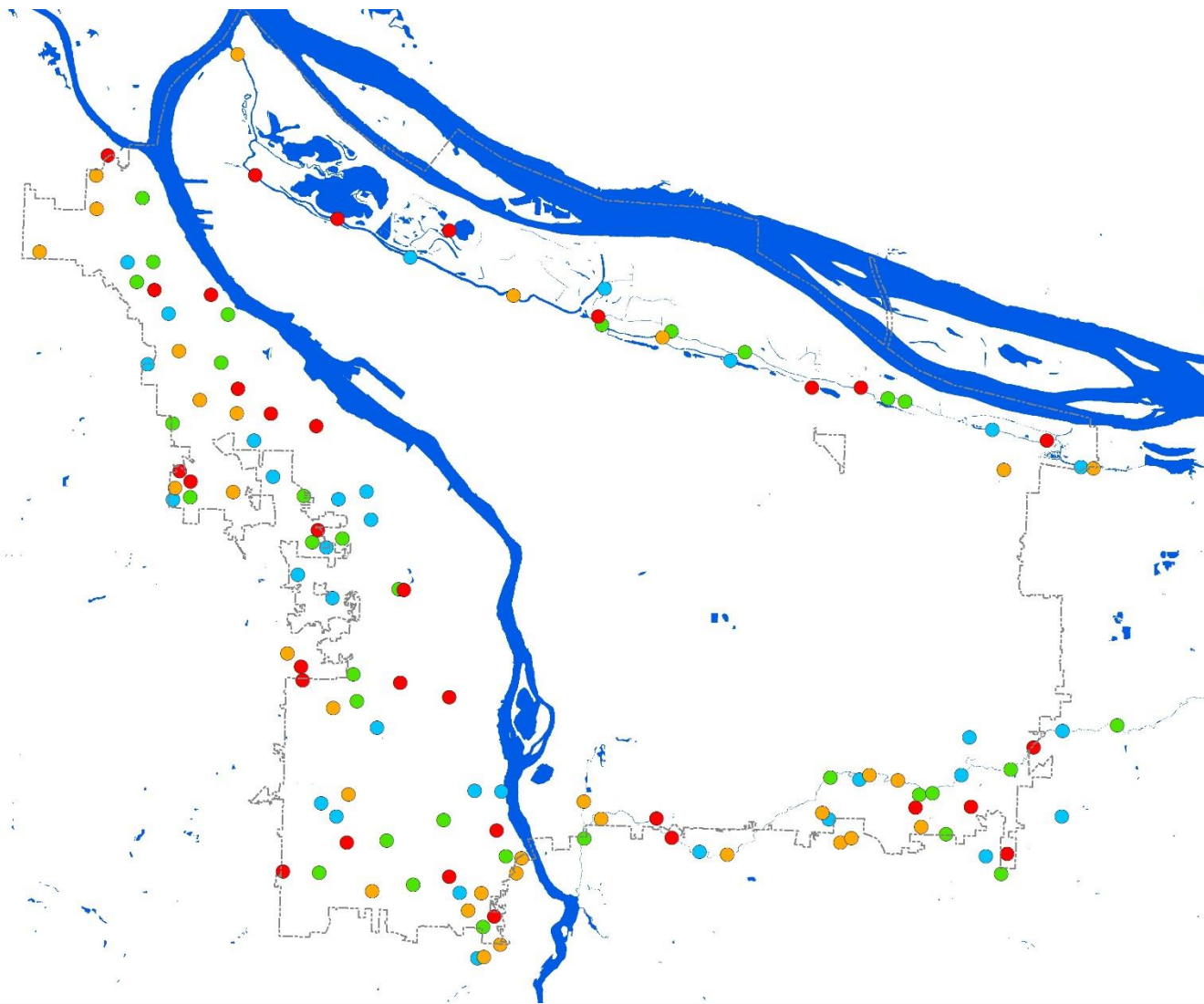
Temperature
Total Suspended Solids
Dissolved Oxygen
E. coli
Total Phosphorus
Ammonia-Nitrogen
Total Mercury
Dissolved Copper

Blue = collected by PAWMAP
Purple = aspirational
Black = GIS data



Study Design

- Generalized Random Tessellation Stratified (GRTS)
- 128 sites total, streams only
- 4 panels of 32 stations: 20 perennial and 12 intermittent
- 1 panel sampled per year



Bird Integrity Index (BII) Methodology

Bryce, Sandra A., Hughes, Robert M., and Kaufman, Philip R. 2002. Development of a Bird Integrity Index: Using Bird Assemblages as Indicators of Riparian Condition. *Environmental Management* Vol. 30, No. 2, pp 294-310.

For each station, scores are given for 13 indicators of Bird Community Health			
	Indicator:	Metric Value:	Metric Score:
Positive Reponses Indicators	1. Native Species	# Native Species	metric value/max value from PAWMAP year 1-4
	2. Neotropical Migrants	# Neotropical Migrant Species	metric value/max value from PAWMAP year 1-4
	3. Warblers	% Warbler Species (of all species observed at a given station)	metric value/max value from PAWMAP year 1-4
	4. Insectivores	% Insectivore Species	metric value/max value from PAWMAP year 1-4
	5. Woodland ground nesters	# Woodland Ground Nesting Species	metric value/max value from PAWMAP year 1-4
	6. Native cavity nesters	# Native Cavity Nesting Species	metric value/max value from PAWMAP year 1-4
	7. Nest sensitive	# Woodland Ground + #Native Cavity Nesting Individuals	metric value/max value from PAWMAP year 1-4
	8. Human Intolerants	# Intolerant Individuals	metric value/max value from PAWMAP year 1-4
	9. Foliage Gleaners	# Foliage Gleaning Species	metric value/max value from PAWMAP year 1-4
	10. Bark Gleaners	% Bark Gleaning Species	metric value/max value from PAWMAP year 1-4



Bird Integrity Index (BII) Methodology

Negative Response Indicators	11. Human Tolerants	% Tolerant Species	Metric values from (PAWMAP year 1-4 min) to 40% scaled inversely from 0 to 1
	12. Omnivorous or Granivorous	% Omnivorous/Granivorous Species	Metric values from (PAWMAP year 1-4 min) to 55% scaled inversely from 0 to 1
	13. Ground Gleaners	% Ground Gleaning Species	Metric values from (PAWMAP year 1-4 min) to 60% scaled inversely from 0 to 1



Photo by Don Baccus

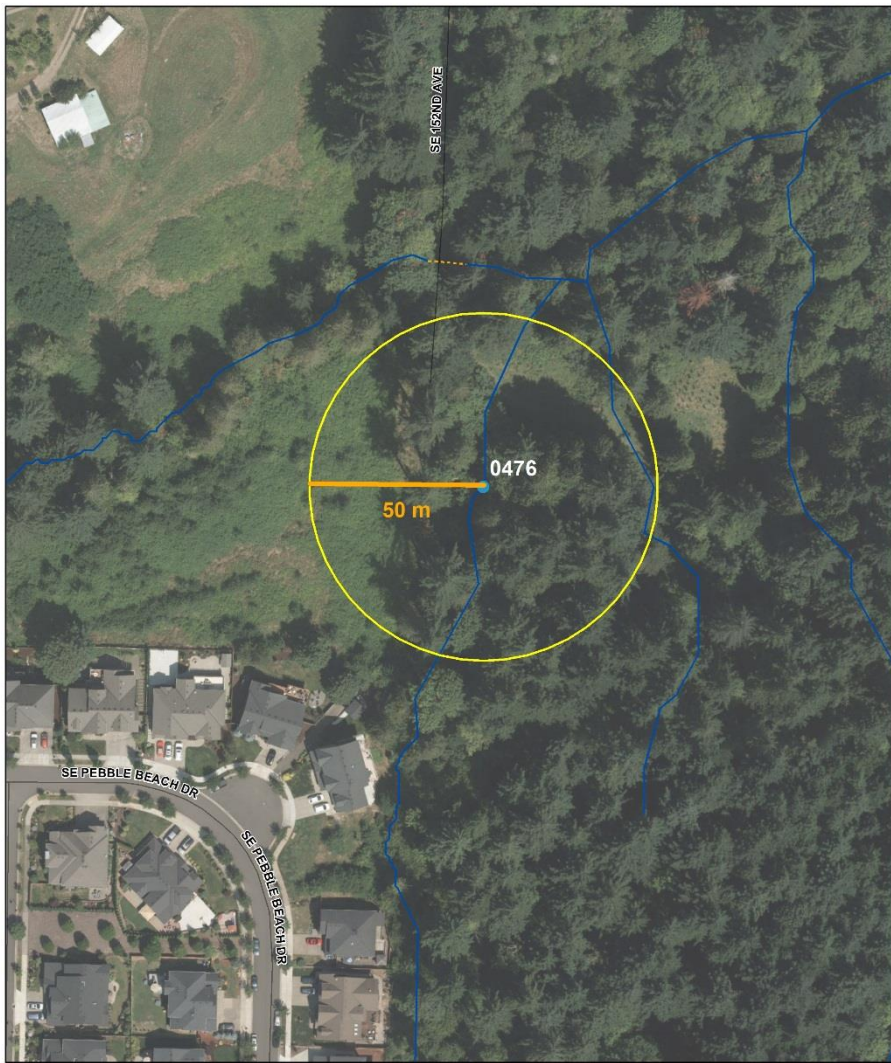


Photos by Greg Gillson



Field Methods



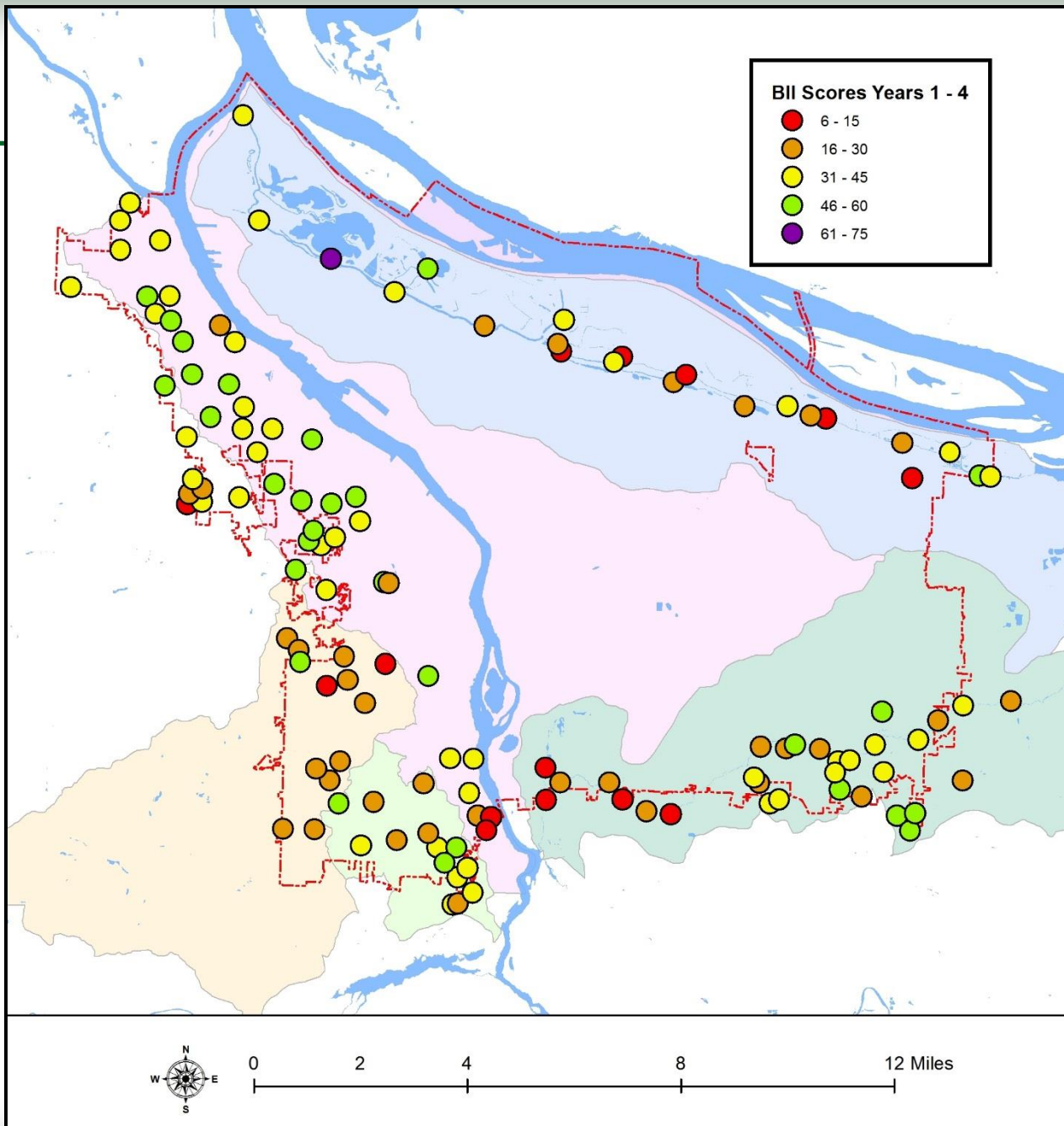


Mitchell Creek

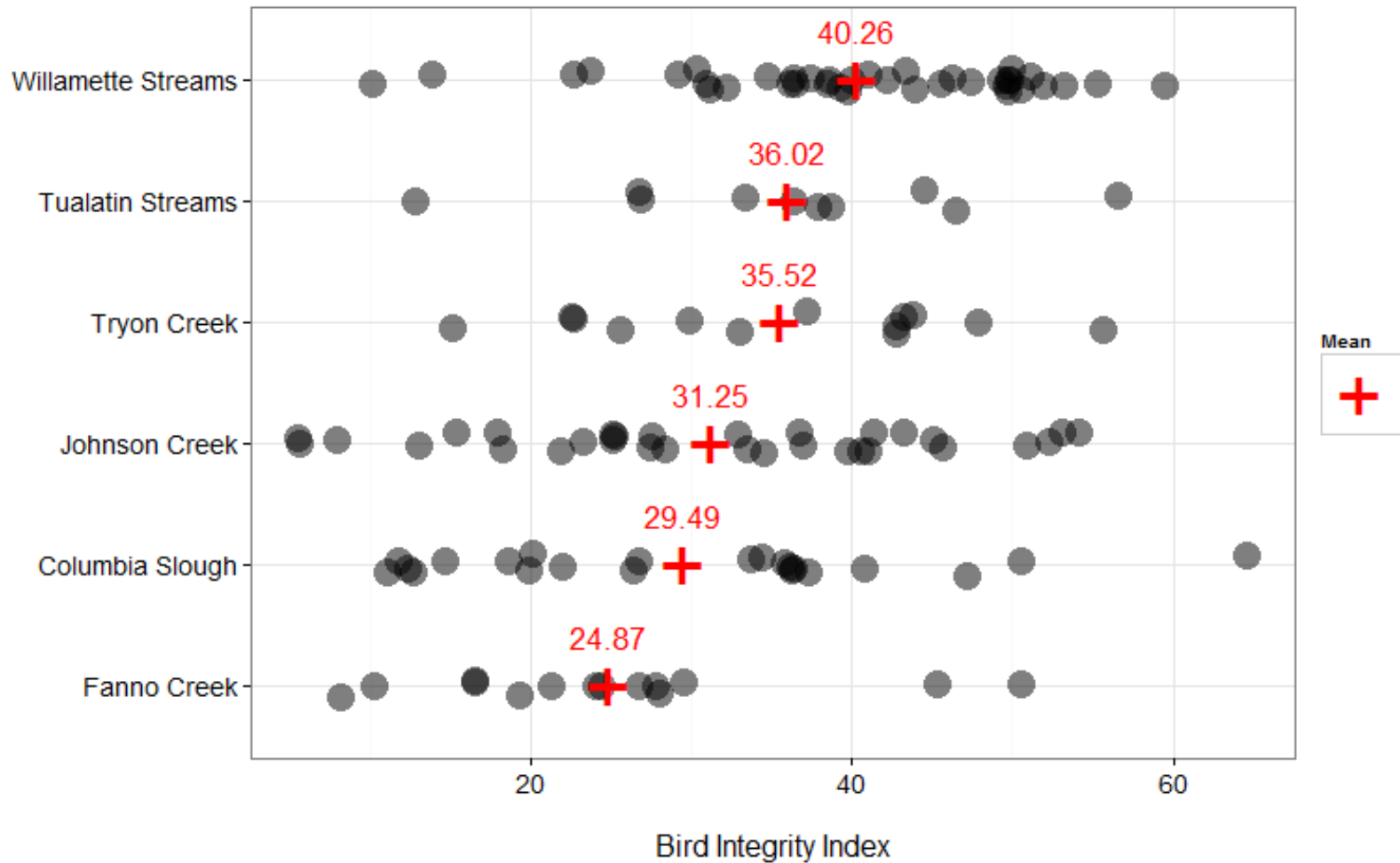


SE 101st Ave and Johnson Creek



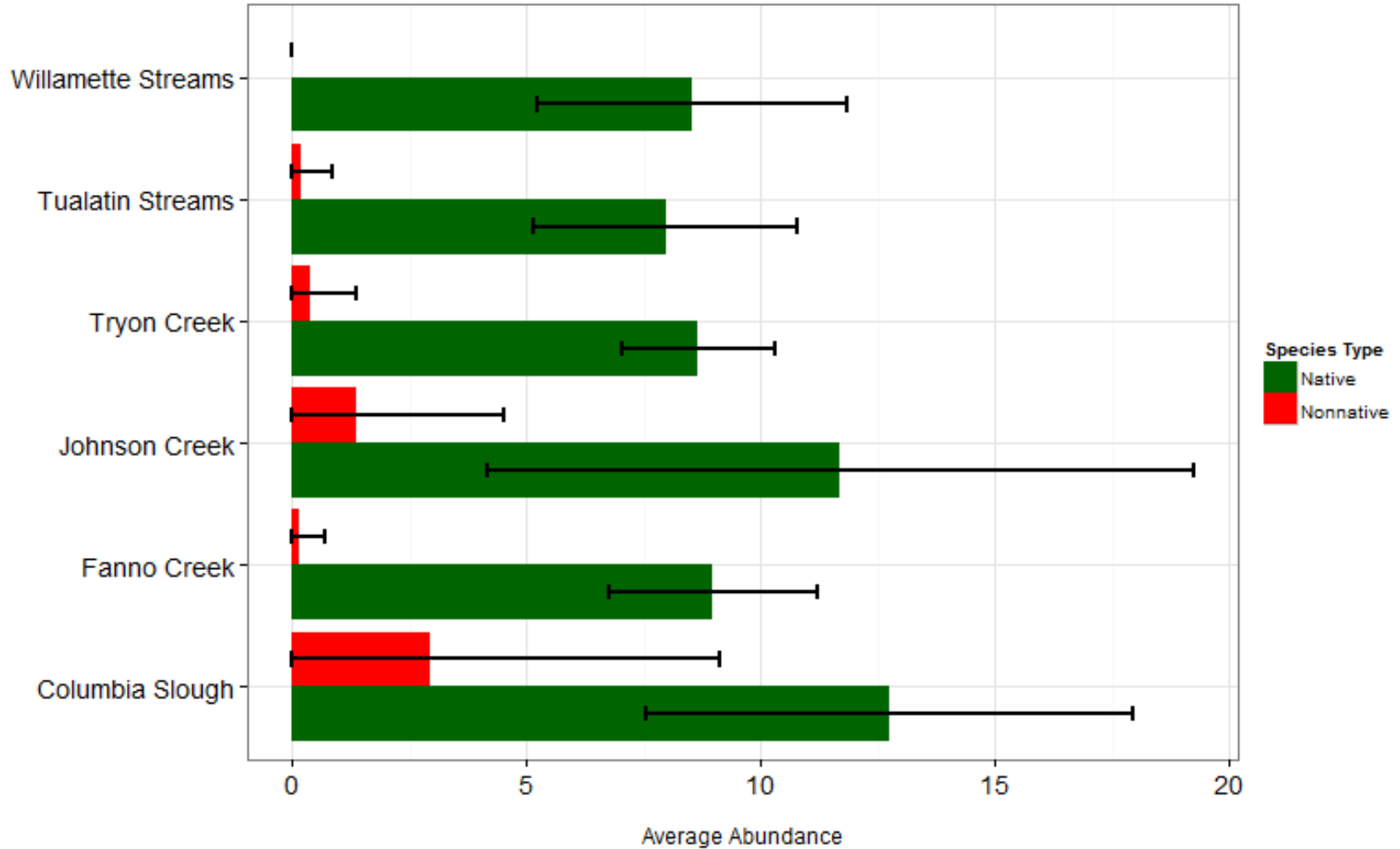


BII Scores: Years 1 - 4 (Panels 1-4)

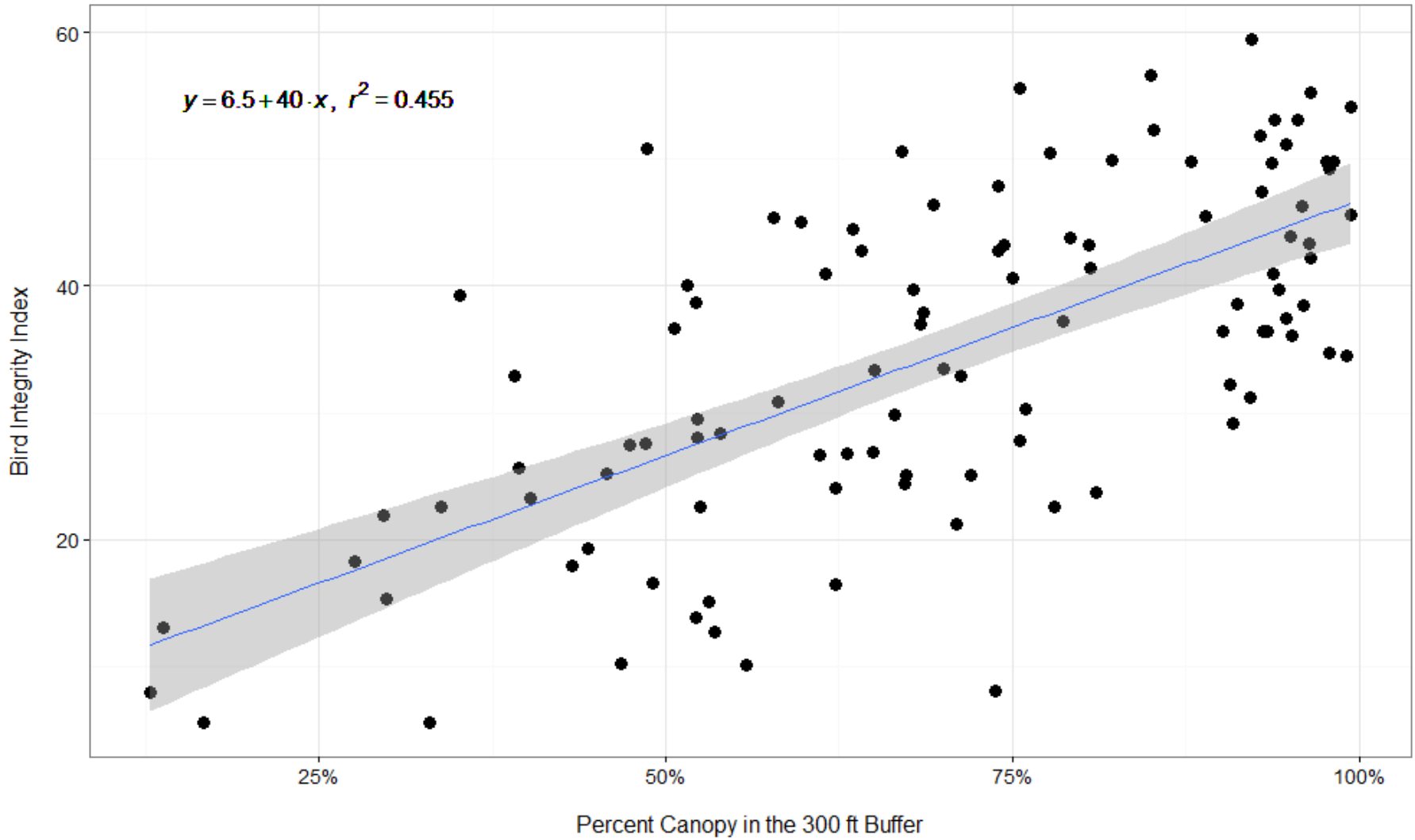


BII score range: 5.5 – 64.6

Average Number Of Native vs. Non-native Birds At Each Site By Watershed

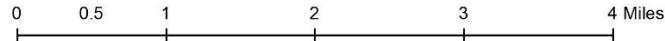
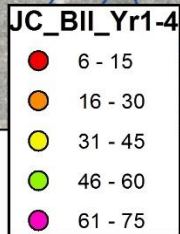
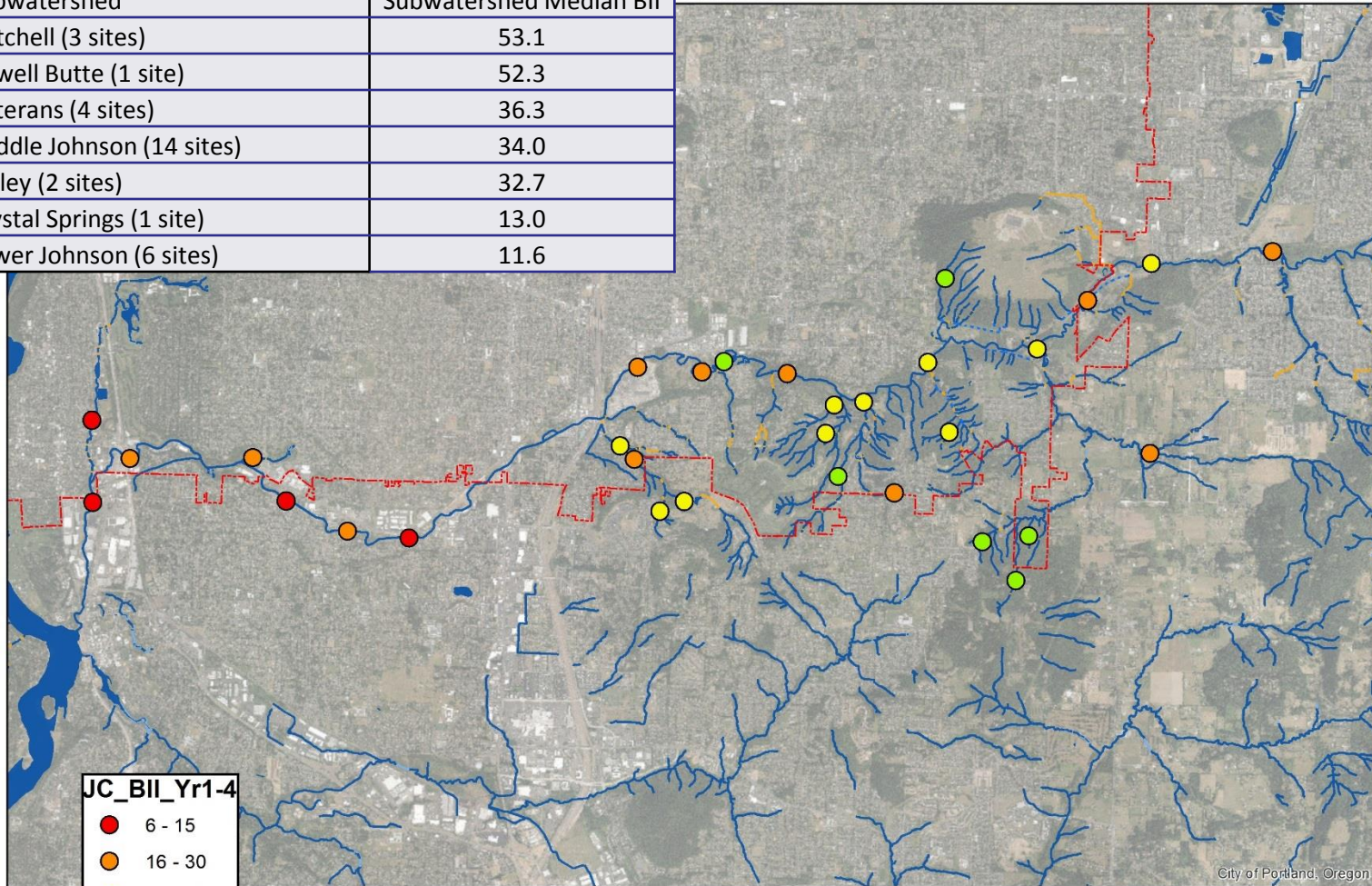


Highly Significant Correlation: BII Scores & Percent Canopy in 300 ft. Buffer



Johnson Creek Subwatershed BII

Subwatershed	Subwatershed Median BII
Mitchell (3 sites)	53.1
Powell Butte (1 site)	52.3
Veterans (4 sites)	36.3
Middle Johnson (14 sites)	34.0
Kelley (2 sites)	32.7
Crystal Springs (1 site)	13.0
Lower Johnson (6 sites)	11.6



At-Risk and Special Status Avian Species

Table 3: Numbers of At Risk and Special Status species observed within each watershed. Avg. #/Station is the number of birds averaged over the number of surveys to account for the five stations with less than three surveys

Watershed	Total Number of Surveys	At Risk			Special Status		
		# Birds	# different species	Avg. #/ Station	# Birds	# different species	Avg. #/ Station
Columbia Slough	61	15	1	0.23	161	15	2.61
Fanno Creek	42	6	3	0.14	61	9	1.45
Johnson Creek	93	13	2	0.14	195	16	2.1
Tryon Creek	39	8	2	0.21	108	11	2.77
Tualatin Streams	30	2	2	0.07	81	8	2.7
Willamette Streams	113	10	1	0.09	478	15	4.19



All Detections Johnson Creek PAWMAP years 1 – 3: 65 species

Song Sparrow	Melospiza melodia	165	Warbling Vireo	Vireo gilvus	6
American Robin	Turdus migratorius	124	Willow Flycatcher	Empidonax traillii	6
European Starling	Sturnus vulgaris	81	Red-breasted Sapsucker	Sphyrapicus ruber	5
American Crow	Corvus brachyrhynchos	79	Wilson's Warbler	Wilsonia pusilla	5
Spotted Towhee	Pipilo maculatus	65	Black-throated Gray Warbler	Dendroica nigrescens	4
Cedar Waxwing	Bombycilla cedrorum	54	Canada Goose	Branta canadensis	4
Black-headed Grosbeak	Pheucticus melanocephalus	50	Red-winged Blackbird	Agelaius phoeniceus	4
Black-capped Chickadee	Poecile atricapillus	42	Band-tailed Pigeon	Columba fasciata	3
American Goldfinch	Spinus tristis	39	Dark-eyed Junco	Junco hyemalis oregonus	3
Steller's Jay	Cyanocitta stelleri	39	Hutton's Vireo	Vireo huttoni	3
House Finch	Carpodacus mexicanus	29	Killdeer	Charadrius vociferus	3
Bewick's Wren	Thryomanes bewickii	26	Rufous Hummingbird	Selasphorus rufus	3
House Sparrow	Passer domesticus	26	California Quail	Callipepla californica	2
Brown-headed Cowbird	Molothrus ater	21	Common Yellowthroat	Geothlypis trichas	2
Mallard	Anas platyrhynchos	21	Great Blue Heron	Ardea herodias	2
Swainson's Thrush	Catharus ustulatus	21	Olive-sided Flycatcher	Contopus cooperi	2
Pacific-slope Flycatcher	Empidonax difficilis	20	Orange-crowned Warbler	Vermivora celata	2
Violet-green Swallow	Tachycineta thalassina	20	Pine Siskin	Spinus pinus	2
Chestnut-backed Chickadee	Poecile rufescens	17	Red Crossbill	Loxia curvirostra	2
Pacific Wren	Troglodytes pacificus	17	Rock Pigeon	Columba livia	2
Mourning Dove	Zenaida macroura	16	Unidentified Swallow	Hirundinidae	2
Anna's Hummingbird	Calypte anna	13	Vaux's Swift	Chaetura vauxi	2
Northern Flicker	Colaptes auratus	13	Brewer's Blackbird	Euphagus cyanocephalus	1
Western Tanager	Piranga ludoviciana	13	Hairy Woodpecker	Picoides villosus	1
Barn Swallow	Hirundo rustica	12	Osprey	Pandion haliaetus	1
Brown Creeper	Certhia americana	12	Pileated Woodpecker	Dryocopus pileatus	1
Western Scrub-Jay	Aphelocoma californica	12	Red-tailed Hawk	Buteo jamaicensis	1
Lesser Goldfinch	Spinus psaltria	11	Ring-necked Pheasant	Phasianus colchicus	1
Western Wood-Pewee	Contopus sordidulus	11	Spotted Sandpiper	Actitis macularius	1
Bushtit	Psaltriparus minimus	10	Townsend's Warbler	Dendroica townsendi	1
Red-breasted Nuthatch	Sitta canadensis	9	Tree Swallow	Tachycineta bicolor	1
Evening Grosbeak	Coccothraustes vespertinus	7	Unidentified Hummingbird	Trochilidae	1
Purple Finch	Carpodacus purpureus	7	Unidentified Woodpecker		1
Unidentified Bird		7	Yellow Warbler	Dendroica petechia	1
Downy Woodpecker	Picoides pubescens	6			

Watershed Health Index and Report Cards

Johnson Creek			Willamette Tributaries			Tryon Creek		
Hydrology	7.33	B+	Hydrology	3.49	D	Hydrology	6.02	B
Effective Impervious Area	7.53	A-	Effective Impervious Area	3.79	D+	Effective Impervious Area	5.24	C+
Stream Connectivity	7.13	B+	Stream Connectivity	3.19	D	Stream Connectivity	6.79	B
Water Quality	5.05	C+	Water Quality	6.13	B	Water Quality	6.07	B
Dissolved Copper	6.90	B	Dissolved Copper	5.60	B-	Dissolved Copper	5.70	B-
Dissolved Oxygen	8.33	A	Dissolved Oxygen	8.74	A+	Dissolved Oxygen	8.56	A+
E. coli	3.96	D+	E. coli	6.14	B	E. coli	5.26	C+
Total Mercury	1.40	F	Total Mercury	1.70	F	Total Mercury	1.80	F
Ammonia-Nitrogen	9.77	A+	Ammonia-Nitrogen	9.92	A+	Ammonia-Nitrogen	9.89	A+
Total Phosphorus	6.30	B	Total Phosphorus	6.57	B	Total Phosphorus	6.60	B
Total Suspended Solids	1.93	F	Total Suspended Solids	4.79	C	Total Suspended Solids	5.72	B-
Temperature	1.85	F	Temperature	5.57	B-	Temperature	5.01	C+
Habitat	4.73	C	Habitat	6.32	B	Habitat	6.51	B
Tree Canopy	6.90	B	Tree Canopy	10.00	A+	Tree Canopy	10.00	A+
Floodplain Condition	6.00	B	Floodplain condition	N/A		Floodplain Condition	10.00	A+
Bank Condition (Hardening)	1.80	F	Bank Condition (Hardening)	10.00	A+	Bank Condition (Hardening)	10.00	A+
Stream Accessibility	3.58	D+	Stream Accessibility	0.72	F	Stream Accessibility	1.55	F
Riparian Integrity	5.60	B-	Riparian Integrity	8.10	A	Riparian Integrity	6.90	B
Large Wood	2.60	D-	Large Wood	4.80	C	Large Wood	4.80	C
Substrate Composition	6.60	B	Substrate Composition	6.50	B	Substrate Composition	2.30	F
Biological Communities (Fish and Wildlife)	3.65	D+	Biological Communities (Fish and Wildlife)	4.20	C-	Biological Communities (Fish and Wildlife)	4.14	C-
Fish	2.49	F	Fish	1.33	F	Fish	1.99	F
Macroinvertebrates	4.30	C-	Macroinvertebrates	5.90	B-	Macroinvertebrates	5.70	B-
Birds	4.17	C-	Birds	5.37	C+	Birds	4.73	C

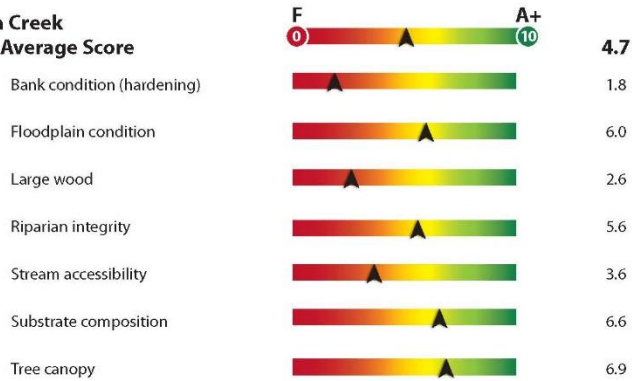


Watershed Health Index and Report Cards

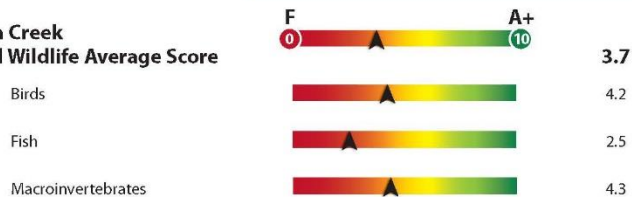
Johnson Creek Report Card



Johnson Creek Habitat Average Score



Johnson Creek Fish and Wildlife Average Score

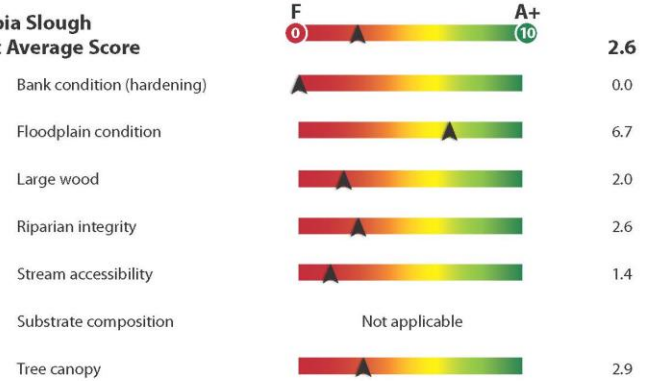


Johnson Creek Report Card · 2

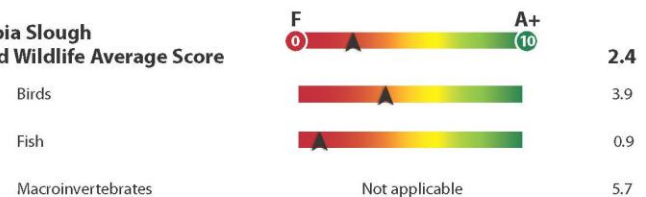
Columbia Slough Report Card



Columbia Slough Habitat Average Score



Columbia Slough Fish and Wildlife Average Score



Columbia Slough Report Card · 2



Some Conclusions/Observations for JC

- Lots of room for improvement with Biological Communities
- High variability across JC watershed in health of riparian bird communities
- Avian Community health higher in headwaters, lower on mainstem; esp. Lower
- Willow Flycatchers: priority for planning, site management, & research
- Mitchell Creek Watershed: priority for protection, reveg/enhancement, EDRR, potential acquisition, NRI etc.
- Highly significant relationship city-wide with riparian bird community health and canopy in 300 foot buffer



The PAWMAP Avian Team

Design, Survey, and Data Analysis:

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- Aileen Miller
- Adam Baz
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- David Helzer

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- Jennifer Devlin
- Casey Cunningham
- Austin Booth



Photo by Jeff Schwilk/ORNIPHOTO.COM

