

Spring 2012 City of Portland Ecoroof Bird Monitoring - Assessment

Background

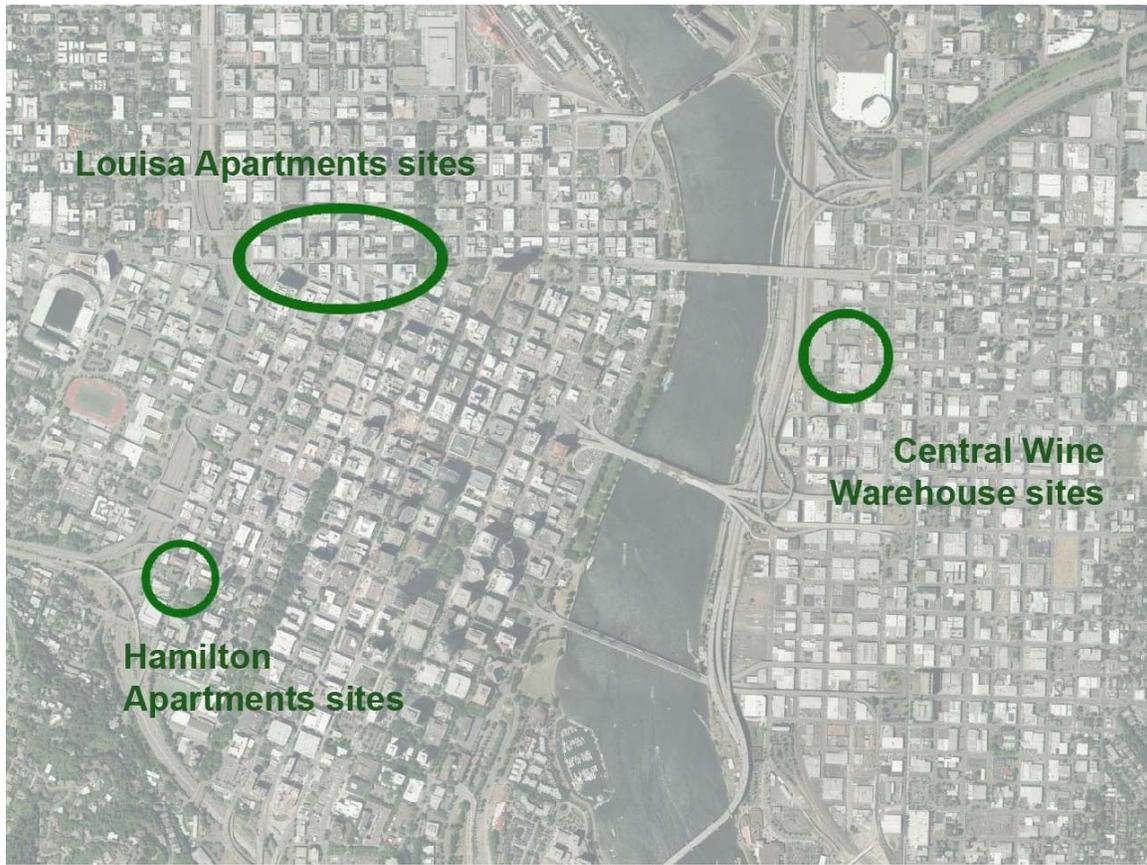
Ecoroofs are becoming a more common alternative to conventional roofing practices because of the multiple benefits they provide. In addition to creating long-term cost savings by extending the life of the roofing membrane, they manage stormwater, cool and clean the air, save energy and provide habitat. Portland's Ecoroof Program is taking a closer look at the habitat benefits of ecoroofs for macroinvertebrates and birds. This ongoing study is the first in the City to compare ecoroofs with conventional roofs and ground-level greenspaces to find patterns of presence and use by birds. Additional sampling is planned for fall 2012 and spring 2013. Future ecoroof designs for boosting habitat value may be compared to this baseline data.

Ecoroofs are altered habitats; generally thin-soiled, open and exposed, with ground-hugging vegetation, and prone to summer drought and periods of brief winter saturation. In the region, they are most similar to rocky outcrops on ridges, where sedums, mosses and grasses are predominant. Urban ecoroofs tend to be isolated from other habitat, like islands surrounded by pervious surfaces and raised up, making them more accessible to avian species than terrestrial ones.

Protocol

- 9 sites were monitored, all among highly urbanized surroundings near or in downtown Portland, Oregon: 3 greenroofs (2 ecoroofs, 1 roof garden); 3 conventional roofs ("control" roofs); and 3 ground-level greenspaces (mostly open with trees and some shrubs).
- All roofs are flat and on commercial buildings.
- Monitoring occurred from 8-10am on eight mornings between 4-12-12 and 5-12-12.
- All sites were to be sampled three times. However 6 sites were sampled three times, and 3 sites were sampled twice due to weather conditions and volunteer availability.
- For each sampling, bird monitoring occurred simultaneously at one ecoroof, one nearby conventional roof, and one nearby ground-level greenspace.
- Birds heard and seen on or directly above the sites were counted, as well as fly-overs that were low enough to appear related to the site.
- 10 trained Audubon volunteers, one Audubon staff and two City staff contributed to bird monitoring shifts.

Site Descriptions



Central Wine Warehouse Sites

An area of approximately 20,000 square feet was monitored for each of the following sites:

- ***Central Wine Warehouse ecoroof:***
Ecoroof Constructed: 2008
Number of Stories: 2
Distance from Willamette River: 3 blocks
Design: Mix of all native sedum, grasses and forbs in extensive greenroof soil blend with red cinder drainage channels. Soil depth averages about 5".
- ***Tazo conventional roof:***
Number of Stories: 2
Distance from Willamette River: 2 blocks, with the interstate and railroad running between.
Roofing Type: Asphalt membrane with a light-colored granular coating.
- ***Tazo parking lot:***
Distance from Willamette River: 2 blocks, with the interstate and railroad running between.
Vegetation: Site is paved with small landscape strips with medium-size non-native trees providing about 40% canopy.

Hamilton Apartments Sites

An area of approximately 4000 square feet was monitored for each of the following:

- ***Hamilton West Apartments ecoroof:***
Ecoroof Constructed: 1999
Number of Stories: 10
Distance from Willamette River: 14 blocks
Design: Dominated by non-native sedum and volunteer grasses, with some forbs. Includes a geotextile drainage membrane beneath two different soil blends between 3 and 5” deep.
- ***12th Avenue Terrace Apartments conventional roof:***
Number of Stories: 6
Distance from Willamette River: 14 blocks
Roofing Type: Covered in 1/2” depth pea gravel.
- ***PSU park block (12th and Market St.):***
Distance from Willamette River: 13 blocks
Vegetation: Open lawn with large non-native street trees around two sides.

Louisa Apartments Sites

An area of approximately 8700 square feet was monitored for each of the following sites:

- ***Louisa Apartments roof garden:***
Ecoroof Constructed: 2005
Number of Stories: 2
Distance from Willamette River: 14 blocks
Design: Soil depth undulates between 6 and 18”. Planted with various non-native ornamental grasses, shrubs and small trees in pots. Accessible to residents and their dogs.
- ***Crystal Ballroom conventional roof:***
Number of Stories: 4
Distance from Willamette River: 15 blocks.
Roofing Type: Asphalt membrane with a light-colored granular coating.
- ***North Park Block (Couch and Park Ave.):***
Distance from Willamette River: 9 blocks.
Vegetation: Lawn with large non-native street trees. 80% tree canopy (deciduous).

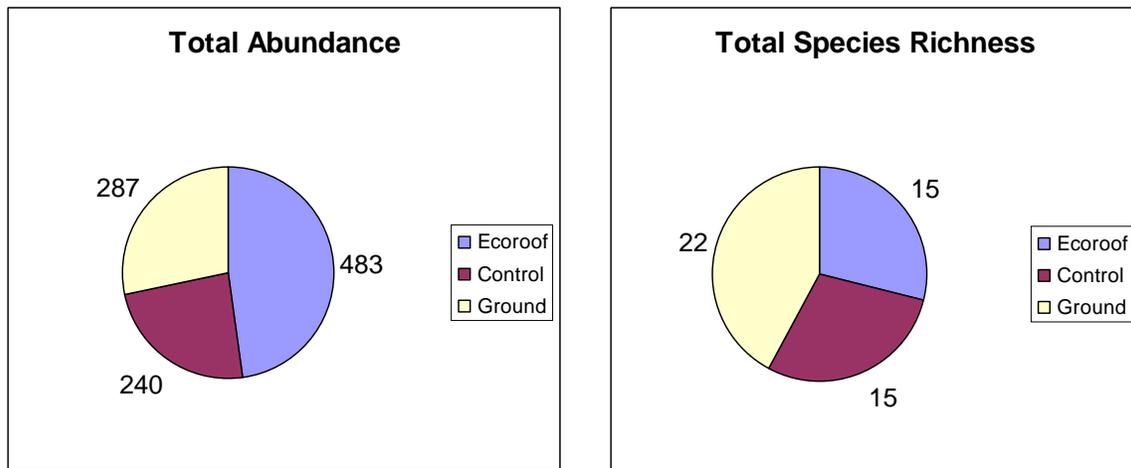
Results

This data should be considered only ‘the tip of the iceberg’ and more sampling days will be needed before these results could be considered statistically significant. The results of future studies will be combined with this season’s results for a more robust data set.

The vast number of variables inherent to a study like this should be kept in mind as well when analyzing the results. Each site has a unique location, context, age, plant palette,

soil, and elevation. Despite this amount of variability, we are identifying early patterns in the data.

Gulls and small, fast, drab birds making fleeting appearances can be difficult to impossible to identify to species level for both novice and advanced birders. There will inevitably be some birds that will go unidentified. Charts that are related to species only include high-confidence identifications. Low-confidence or unidentified birds are included in data relative to abundance. It is also easier to miss birds in ground-level greenspaces because of tree canopy and other visual barriers.

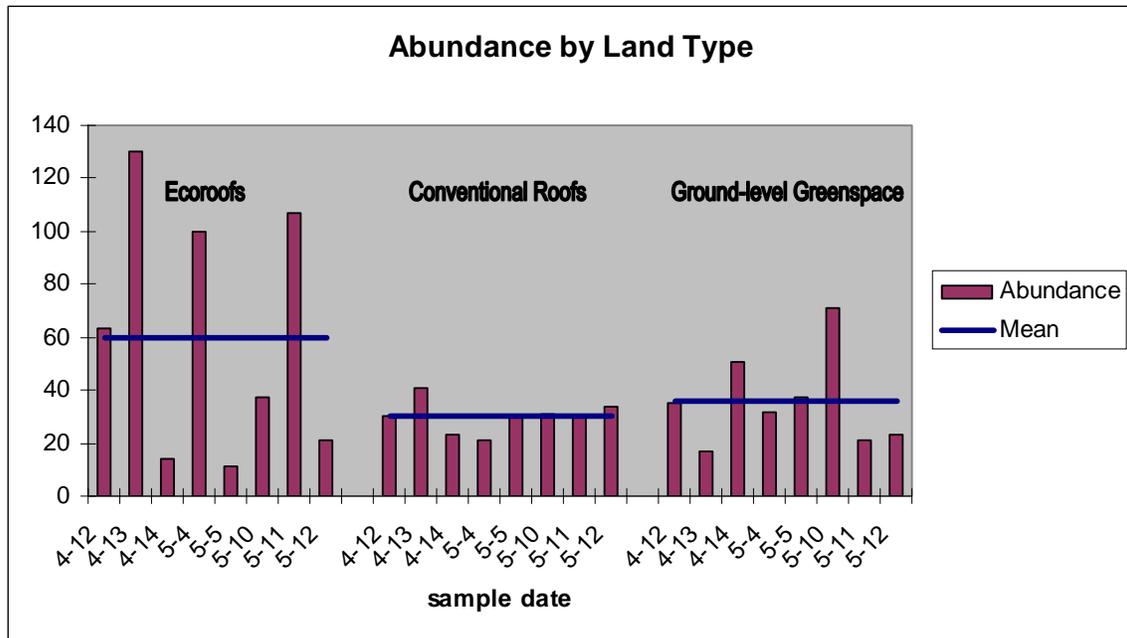


This season’s results found higher avian abundance on ecoroofs than on other land types. This may be correlated to the amount of disturbance (pedestrian, dog, auto) that occurs in ground-level greenspaces. More species were observed on the ground and the additional species tended to be ones associated with cover (tree canopy, brush). The same 15 species were observed on both roof types; however what they were doing on the roofs was different.

In addition to the behaviors shown in the table below, multiple species used both roof types for perching, particularly from parapets where they had good views. Birds also frequently flew over both roof types without landing or interacting in a clear way.

Observed Behavior

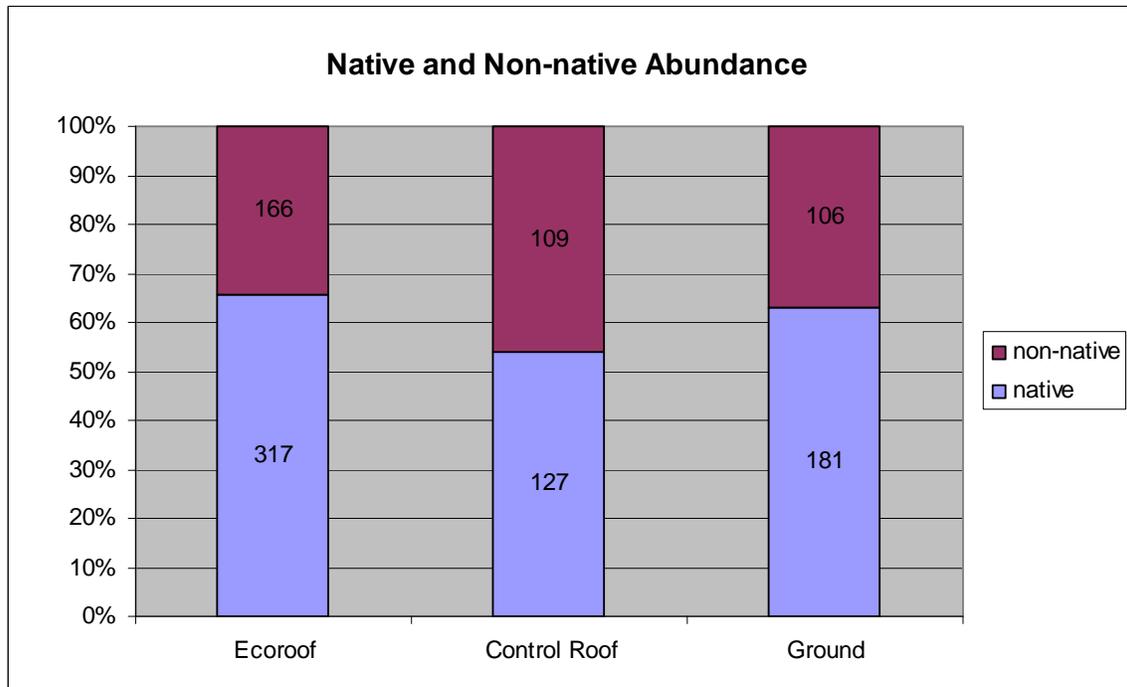
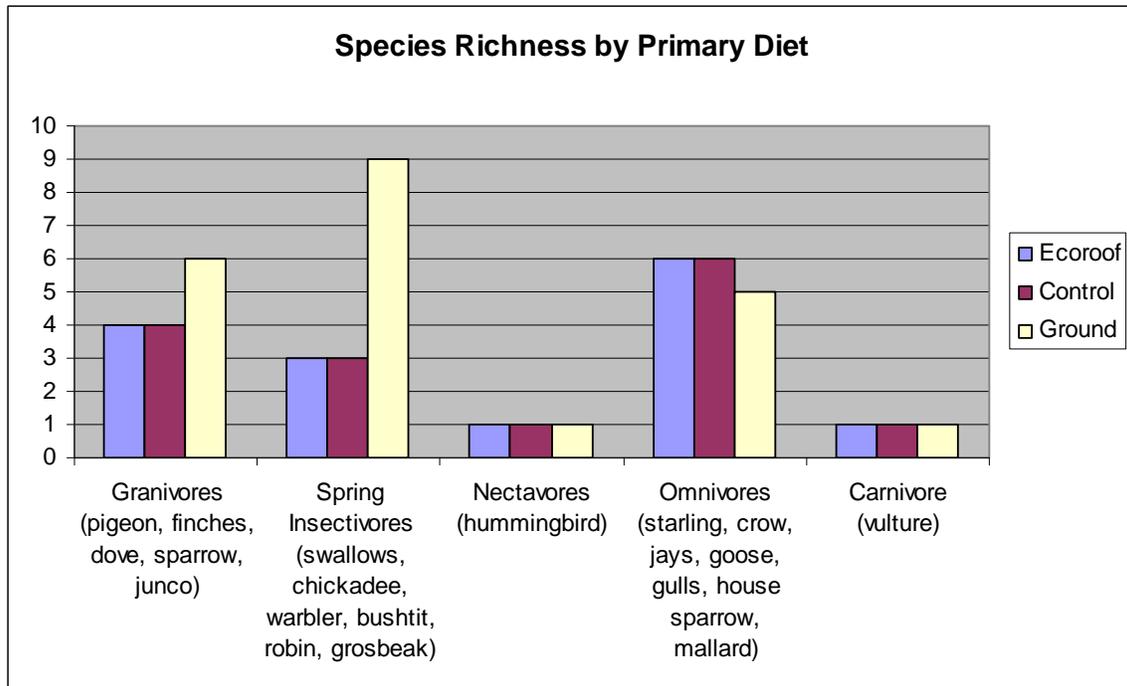
	CONTROL		
	ECOROOF	ROOF	GROUND
Foraging	59	3	54
Gathering nest materials	10	-	7
Displaying	2	-	2
Copulating	2	-	1
Nesting	2	-	-



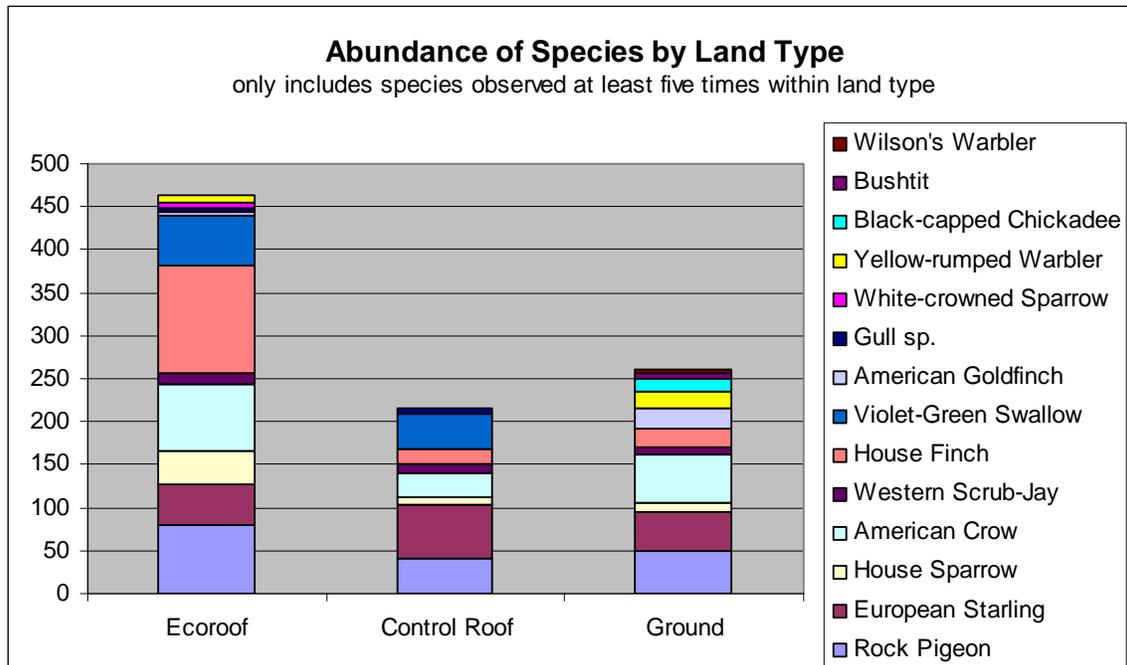
There was high variability in abundance between green roofs. As seen in the chart above, the Central Wine Warehouse (sampled on 4-13, 5-4 and 5-11) had the highest abundances. This may be because it was the largest site sampled in the study being at least three times the size of the other two greenroofs. Central Wine’s corresponding conventional roof and ground-level greenspace were the same area as the Central Wine ecoroof, but they didn’t show a corresponding increase in abundance.

The Louisa roof garden contained both of the nesting species observed (White-Crowned Sparrow in an ornamental shrub and House Finch in an overhanging building eave) yet had the lowest abundances for green roofs (sampled on 4-14, 5-5 and 5-12). It is possible that the disturbances associated with this roof garden being an accessible amenity to building tenants and pets discourages abundance but still presents enough protection for secretive nesting.

When looking at abundance by dietary preferences, generalist omnivores were most frequently observed on both roof types while in the ground-level greenspaces insectivorous species were most abundant. It should be noted that these dietary classifications are only averages, as most species eat some combination of plant and animal matter, with ratios sometimes changing with the season. In spring while nesting, many birds modify their diets to primarily consist of insects.



All land-types were observed to contain a roughly 2:1 ratio for native to non-native bird species, with the ecoroof having the highest ratio of native species. Three species made up all non-native species recorded: Rock Pigeon, European Starling and House Sparrow.



The most abundant bird on ecoroofs was the House Finch. The most abundant on conventional roofs was European Starling. The most common in ground-level greenspaces was the American Crow. Common among all land types was the introduced Rock Pigeon. This species is however likely the primary prey species for urban raptors including Red-Tailed and Cooper's Hawks, and Peregrine Falcons. Regular on all roofs were Violet-Green Swallows, which were rarely observed over ground-level sites. They were the most common migratory species in the study. The majority of birds observed were non-migratory resident species.

Several Portland Special Status Species were observed on ground-level sites: Yellow Warbler, Nashville Warbler, Bushtit and Downy Woodpecker. Special Status Species are considered rare, declining or of special interest because of associations with important habitat attributes or conditions that support functioning ecosystems.

Lessons Learned

- The more sampling days the better. With such a small number of sampling days, the number of variables inherent to this type of study, or any atypical events make the broader statistical patterns difficult to read.
- Season plays a role on monitoring results. Each season brings different birds and though this study focuses on migration, the busiest time for birds, it would be worthwhile to monitor in winter as well when many of our ground-foraging species are present.

- Using Audubon-trained volunteers provides more confident results. Monitoring common urban birds or areas with little bird activity can test the patience of volunteers.
- Being on rooftops with binoculars can cause people outside the study concern. To minimize worry and miscommunications, it is a good practice to make as many building staff know about your research project as possible.
- Getting permission for roof access can be complicated and beginning the process as early as possible is recommended. Also reminders to those responsible for access proved helpful in this study.
- There may be an opportunity to provide nest boxes for Violet-Green Swallows on rooftops. They consume large amounts of flying insects including mosquitos and could perform additional vector control in urban areas.
- It would be beneficial to identify a method for determining if birds nesting on greenroofs in Portland are having success.

Birds of Portland Ecoroofs



House Finch



Western Scrub-Jay



Violet-Green Swallow



Anna's Hummingbird



Yellow-Rumped Warbler



American Crow



Glaucous-winged Gull



American Goldfinch



White-Crowned Sparrow