

City Planning for Birds

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To become more environmentally resilient, cities have pursued a wide range of policy actions. Many of these actions, such as land conservation and stream buffers, are implemented to preserve key natural features and keep human settlement away from critical habitats. The natural world is inherently dynamic, and there are countless situations where human settlement and natural habitat are one and the same. Birds, for example, frequently nest in artificial structures and small animals such as opossums and frogs are a common sight in urban neighborhoods. If cities are to become effective stewards of the environment, they should preserve more than pristine natural wilderness. They should also facilitate natural movement of wildlife over different types of terrain and land cover. To succeed in this undertaking, planners need to change their mindset. Rather than perceiving the city as an artificial construct with no redeeming environmental value, planners must strive to understand the city as a dynamic and ever-changing natural realm, home to many different flora and fauna.

A History of Urban Environmental Change

How does one define a city? In the recent past, the modern mind was predisposed to viewing the city as something distinct from the natural world. Famous modern architect Le Corbusier likened the city to a “living machine” and his Radiant City concept prioritized ordered symmetry and mechanical standardization.¹ Over the past few years as environmental concerns have become more prominent, a different concept of city life has emerged. Rather than understanding the city as a giant machine, many prominent thinkers have noted that human settlement patterns have strong parallels within natural systems.² For example, beaver dams and coral reefs are highly complex and intricate and they share a common trait with cities: namely they serve to reorganize existing natural components in a way that is advantageous to an individual species. From this standpoint, a city becomes less of an artificial construct and more of an



Credit: Tim Lumley

extension of the natural world. By understanding cities as arising from nature rather than standing apart from it, local planners can better devise policies that facilitate natural change and increase biodiversity.

So, if cities are an extension of the natural world, it should follow that the growth and development of a city should have direct impacts on the type of flora and fauna found within a city. In Charleston, South Carolina the historic significance of the black buzzard in the city’s growth and development is a good indicator of how cities affect the natural ecology of a region. Prior to the development of modern city sewer systems, Charleston was a popular gathering place for these large birds. The birds were especially prominent around the butcher stalls located on Market Street.³ Though buzzards are not prized for their beauty they had value to the residents of 19th century Charleston because of the useful city service they provided. When butchers in the city had to dispose of bone, gristle, or fat they would simply toss the discarded remains into the street to become a meal for the buzzards. The value of these birds was such that there was a fine of five dollars for killing a buzzard.

All this changed in the late 1910s, however, when the U.S. Public Health Service prohibited the open-air disposal of meat. Further sanitary improvements in Charleston, such

as the screening of butcher stalls and the installation of a city incinerator, ended up depriving the birds of their daily meal, so naturally the birds opted to fly elsewhere for food.

The Value of Monitoring

To quantify environmental change within a city, it is important to have organizations that can engage in ecosystem monitoring. Monitoring enables local governments to perceive the rate of environmental change and determine whether the larger urban ecosystem is trending in a positive or negative direction. While it is not practical to monitor every natural attribute that occurs in a city, there are a number of natural indicators municipalities can rely upon as broad measures of environmental health.

One basic monitoring tool cities can use is a tree inventory. Trees are an important indicator of environmental health for a number of reasons. Trees serve as habitat for animals, they improve air quality, and they can act as buffers to inclement weather such as hurricanes. One good example of a tree inventory in action occurred in 2015 when researchers funded by the Mississippi-Alabama Sea Grant Consortium partnered with the communities of Long Beach and Pass Christian, Mississippi, and Fairhope and Orange Beach, Alabama to identify and count trees within these communities.⁴ Using the Department of Agriculture's i-Tree program, researchers and volunteers inventoried plots within the selected communities. In addition to the tree inventory, the research team also created a mail-out survey that was sent to 2,000 residents to determine the type of value individual residents assigned to trees. Data collected found that over 70 percent of coastal residents were supportive of preserving waterfront open space and their willingness to pay for preservation ranged from a low of \$80 to a high of \$162.

Another environmental indicator cities can rely upon is birds. As a unique class of animals, birds offer a number of distinct advantages for environmental monitoring. One strong reason for monitoring birds is that birds respond to environmental changes in a predictable manner.⁵ For example, a wide variety of birds and bird species indicates a natural area that is high-quality habitat and rich in biodiversity. A study in the Central Appalachian Mountains found a high correlation between the quality of the forest habitat and the variety of birds found in the habitat.⁶ Using a Bird Community Index Score, which was worked out based

on the different bird types present, researchers were able to note a shift from specialist species to generalist species when a natural habitat was degraded.

The other important quality of birds as an environmental indicator is that there are many avid hobbyists and bird watching groups cities can partner with to monitor bird migration and habits. The Tucson Audubon Society organizes an annual bird count.⁷ Individual volunteers are assigned to a 1-kilometer site within the region. Once the sites have been assigned, each volunteer chooses a day during the bird count to travel to all the count locations within the site area. Volunteers will spend between 5 and 10 minutes at each site counting birds and marking down the quantity of each species heard and seen. In the year 2015, the bird count recorded 359,265 individual birds belonging to 188 distinct species. Of these 188 species, 170 of them are known to nest in the Tucson area.

Bird count data also helped inform research on the different ecosystem thresholds needed for a wide range of species to thrive. Using bird count data gathered from 2001-2003, researcher Will Turner determined that some species need a higher percentage of desertscrub cover to approach natural occurrence rates.⁸ Using bird count data, the researcher singled out two bird species, Gambel's quail and pyrrhuloxia, whose observed responses showed a high sensitivity to habitat cover. For those two species, it was determined that the minimum amount of desertscrub land cover needed was 10-15%. While this percentage sounds low, it is well above the mean desertscrub cover of the central Tucson region, which is 5.8%. From these observations, the research suggested that modest increases in desertscrub cover at the local and landscape level could restore the presence of some native species. From a local policy perspective, this research suggests that regional biodiversity could be improved through small-scale habitat restoration in spaces like private yards, gardens, and public right-of-ways.

Mitigation Strategies to Accommodate Natural Patterns

With successful monitoring in place, the next step to undertake is mitigation. One mitigation measure implemented by many states is a wildlife crossing. As the term implies, wildlife crossings are either bridges or underpasses that can be used by animals to safely cross roads to other habitats. While many of the largest wildlife crossings have been developed in western states like Washington and Arizona,⁹

this practice has been applied in coastal regions as well. In Florida, 60 wildlife crossings and bridges were installed along a segment of Interstate 75 known as Alligator Alley.¹⁰ These crossings, coupled with miles of exclusionary fence, help facilitate safe passage for large animals such as alligators and panthers. Also, by developing wildlife crossings, policy professionals are able to understand the passage preferences of certain species. An analysis of older wildlife passages by researchers with the Western Transportation Institute determined that black bears and cougars preferred smaller structures with less light and grizzly bears and wolves preferred the larger, open structures.

A wildlife crossing is a costly venture which might be too expensive for small communities. Fortunately there are other mitigation strategies communities can explore to accommodate the movement of animals. One valuable resource municipalities can consult when looking for alternate mitigation strategies is a planning document developed by the City of Edmonton, Alberta. In 2010, Edmonton developed design guidelines for constructing wildlife passages.¹¹ These guidelines go into immense detail about the movement of different species and outline many unique policy suggestions. The policy suggestions outlined within the document may be broadly delineated into two categories: retrofits made to roads and highways to accommodate animal life and retrofits made to natural corridors to facilitate safe wildlife passage. Signs that light up when animals are present and noise barriers that keep artificial sounds to a minimum are some examples of mitigation options cited in the document that can lessen transportation impacts on wildlife. For natural corridors, mitigation strategies are often focused on minimizing the impact of artificial structures on riparian corridors such as rivers and streams. For example, cities can improve the quality of riparian habitat connectivity by retrofitting large culverts through the addition of natural substrate. The presence of natural substrate helps facilitate the movement of aquatic life through the culvert. Transportation engineers can also opt to include multiple culvert cells, with one cell serving as a low flow channel, while other cells remain dry except during storm events to provide additional passage for animals.

Also, much like the bird count research conducted in Tucson, the Edmonton design guidelines identify certain thresholds, either natural or urban, that signify impediments to wildlife migration. Roads, which are one of the primary barriers to natural movement, are shown to be total barriers

to wildlife when they approach 10,000 vehicles per day. By comparison, local roads with traffic under 2,500 vehicles a day are generally not a problem for terrestrial animals. By using traffic count numbers as a guide, local planners can target city mitigation strategies on heavily trafficked corridors where wildlife impediments are at their greatest.

Conclusion

Open space preservation is an important, and necessary, component of environmental planning. However, it is not the only component needed to foster a culture of natural resilience. Accommodation is also a valuable strategy cities must consider when improving their relationship to the natural world. Accommodation entails recognizing the interplay between human settlement and natural change and migration. This interplay between cities and the natural environment is ever-changing which is why monitoring key environmental indicators is important. Through careful monitoring, cities can assess their environmental health and develop mitigation strategies that improve biodiversity and facilitate positive natural change. 🐾

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Endnotes

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