

Purpose

This chapter reinforces the importance of being good stewards of the natural environment and offers strategies for environmental sustainability best practices to ensure natural resources and environmental features remain valued community assets.

10 NATURAL RESOURCES AND ENVIRONMENT

Dublin is an exceptional place to live, in large part, due to its complementary mix of intact and functioning natural ecosystems and a high-quality built environment. Its natural resources and environment ground the community in place and provide a foundation for its future. Residents and visitors alike cherish these elements and rank the City's parks, natural areas, and open space as some of the most desirable and valued features in Dublin. During the community outreach process, residents also identified sustainability and resilience as strong values and high priorities for the community. Incorporating practices that improve the City's stormwater management, protect and sustainably manage wetlands and trees, and preserve topsoil, including clean drinking water, clean air, and biodiversity, which will make the City more resilient to growth and a changing climate. The pages ahead identify Dublin's goal for maintaining and improving its environment and provides practical recommendations for how the City can achieve its aims.

Dublin enjoys a relatively temperate climate, receiving more than 40 inches of precipitation annually and ranging in average temperature from an average low of 21 degrees in January, to an average high of 84 degrees in July. The planning area includes open plains in its western half and rolling terrain and steeply sloping edges and limestone outcroppings along the Scioto River. The central and southwestern parts of the City are relatively flat and contain Miamian-Kokomo-Eldean soils prone to flooding and ponding. Before Euro-American settlement, the land was forests and tall grass prairie. Native forests have been replaced with an urban forest, maintained and managed by municipal staff and private property owners. Though neighborhoods, golf courses, office parks and other developments have changed the environment, natural processes are still at work in Dublin. They must be considered and managed to protect residents, wildlife, property and the City's quality of life. The chapter identifies Dublin's goal for maintaining and improving its environment and provides practical recommendations for how the City can achieve its goals.

I'll always veer to more green areas, large trees and open spaces. That is a large part of what I consider to set Dublin apart and above other communities.

*Goal and Objectives for
Natural Resources and Environment*

PROTECT AND ENHANCE THE INTEGRITY OF NATURAL SYSTEMS THROUGH ENVIRONMENTAL STEWARDSHIP.

- Grow the local tree canopy.
- Encourage the preservation and restoration of existing native plants and landscapes.
- Protect topsoil resources from erosion.
- Preserve and enhance watershed management and natural hydrological systems.
- Protect streams and their buffers and provide public access, particularly along the Scioto River.
- Enhance public awareness and involvement in environmental stewardship.
- Connect people with nature.
- Reduce urban heat-island effects.

The goal and objectives for the Natural Resources and Environment Chapter were developed in response to what we heard from the public, an analysis of existing conditions, and a review of past studies.



Most Sustainable.

Identifying ecologically sensitive and important areas including soils and watersheds, planning for wildlife management, and the maintenance and expansion of the City's tree canopy are all essential elements of Dublin's stewardship of its natural resources and environment. Through these activities Dublin can advance its goal of being the most sustainable community.



Most Connected.

With its abundant parks, open space, trails and natural areas - distributed equitably throughout the City - Dublin has the ability to be one of the most connected communities in terms of providing opportunities for residents to connect to nature. Through stewardship of its natural resources and environment and forward-thinking investment in parks, open space, and trails, Dublin can protect natural ecosystems while making Dublin an even more desirable place to live.



Most Resilient.

Planning to protect and improve Dublin's biodiversity, manage its watersheds to absorb extreme precipitation events, maintain and supporting healthy ecosystems, and planning to mitigate the heat island effect through green infrastructure are all meaningful measures to make the City the most resilient. These measures prepare Dublin for shocks associated with a changing climate and enable it to recover quickly when crises occur.



PROTECTING AND ENHANCING NATURAL SYSTEMS THROUGH ENVIRONMENTAL STEWARDSHIP

Dublin's verdant landscape and trees, fertile soil, ample rainfall, and rivers and streams have attracted people to the area for centuries. Its temperate climate and natural resources continue to contribute to its appeal as a place to live, work, play and invest. Survey respondents indicated that most Dublin residents want to protect current natural resources and ensure that future development proceeds in a sustainable manner. As the City grows, a key objective is the preservation of existing resources to sustain a high quality of life for current and future residents. This includes identifying critical resources, habitat, and natural areas and planning for their protection and enhancement or for mitigation when necessary. If done well, future development and environmental sustainability can form two pillars of a resilient Dublin.

As Dublin's population expands, demand for new housing will put pressure on open space and wetlands. New development will push out into undeveloped land permanently altering ecosystems and removing the essential services they provide the community including clean water, clean air, shade and moderation of the heat island effect, wildlife habitat and biodiversity, and the aesthetic and psychological benefits residents receive from connecting with nature. To meet the challenge of sustainably accommodating growth and maintaining and enhancing the natural systems that support Dublin's high quality of life and make it resilient to change, the City will need to focus on three objectives: watershed management, preserving its tree canopy and soils, and creating a livable environment.

WATERSHED MANAGEMENT

Protecting and managing Dublin's watershed is a primary consideration in making the City sustainable and resilient. Watersheds—the land areas that water moves down and across into streams and rivers—are the foundations of the ecological systems that provide water for drinking and irrigation. They also play a key role in absorbing precipitation, mitigating the effects of extreme weather events. Lastly, they contain most of the biological diversity and wildlife habitat in the Dublin area. Planning for their protection and management is vital to achieving the City's sustainability and resilience goals.

Streams, rivers, wetlands and riparian areas provide clean drinking water, biodiversity, and wildlife habitat and are some of the most changed and endangered ecosystems in North America—85 percent of Ohio's wetlands have been destroyed or are no longer considered ecologically functional after more than two centuries of settlement and agriculture. Protecting Dublin's watershed and restoring its ability to provide essential ecosystems services is critical to the livability and resilience of the community. The City recognized watershed management as a central component of its the 2018-2020 Dublin Sustainability Framework. Further, watershed protection and management is a positive effect of the plans for an inter-connected regional greenway system along central Ohio's rivers planned in by the Mid-Ohio Regional Planning Commission's (MORPC) RAPID 5 initiative. The recommendations provided in the pages that follow can add to these efforts and help the City achieve the objective of managing its watershed for sustainability and resilience.



SUSTAINABLE LAND DEVELOPMENT

By encouraging sustainable land development and low impact design (LID), in addition to implementing the City's established stormwater management requirements, appropriately located developments informed by an integrated approach that considers natural processes, Dublin can decrease the negative impacts of growth on watersheds. Current GIS data can be used to identify sensitive watershed areas and hydrological considerations in deciding where development should be prohibited or required to incorporate conservation design. Design elements including green roofs that absorb and slow stormwater and decrease heat retention and reduce heating/cooling costs, permeable driveways and exterior decking, planting native plants landscape features such as rain gardens and bioswales, and planting trees can further protect watersheds. Dublin is already implementing some of these elements in its zoning and development codes. As growth continues, it will be important to consider increasing sustainable land development and LID requirements.

Conservation Design

Conservation design is an essential component of sustainable land development for new residential projects. It describes an integrated process that considers the topography, hydrology, vegetation, wildlife as well as resident well-being and sense of place in designing and constructing a new residential development. It emphasizes identifying and inventorying ecologically important areas (such as wetlands, mature woodlands, open space), and then selecting housing locations to complement the location of open space while maintaining density. Home values often increase with proximity to open space and clustering homes around open space ensures that each property has access to common open areas. Conservation design can significantly decrease the impacts of new residential development on watersheds. Dublin currently encourages that all new development proposals in areas that include woods, streams, river frontage, steep slopes, and other natural features or that include significant open space, and specifically those along the River Corridor and near Glacier Ridge Metro Park, incorporate conservation design. In these areas, the City recommends that at least 50% of proposed developed land be preserved as open space.

STREAM BUFFERS

A practical solution to protecting and managing Dublin's watersheds are stream buffers. Stream buffers, or riparian buffers, are areas along a watercourse that is protected from development through designated setbacks to preserve riparian ecosystems and the ecosystem services they provide including reducing flood hazards, slowing stormwater runoff and erosion and increasing aquifer recharge, cleaning water, providing wildlife habitat and biodiversity both on the land and by providing shade to and cooling stream or river water, and reducing noise. Typically, buffers involve specified setbacks from a watercourse where development is prohibited. Dublin currently provides educational to property owners for incorporating stream buffers into landscaping on their property and the City's stormwater code requires setbacks in designated Stream Corridor Protection Zones and near pocket wetlands. Buffers should be considered as an essential component of sustainable land development for new residential developments in areas that include streams and wetlands.

PRESERVING DUBLIN'S TREE CANOPY AND SOILS

Despite more than two centuries of change, Dublin is home to a thriving, diverse tree canopy - an urban forest planted and cared for by residents and the City mixed with native trees preserved intentionally or by fortune of their locations. Dublin also retains productive topsoil, a legacy of ancient processes that provided the foundation for the community's agricultural beginnings and now nurtures the community's verdant landscapes and biodiverse ecosystems. An urban tree canopy provides a multitude of essential benefits including: improved air quality; a cooling effect that moderates the "heat islands" created by concentrations of pavement, buildings and other surfaces that absorb and retain heat; reduced energy consumption; effective stormwater management and erosion control; enhanced biodiversity by creating habitat for wildlife; promotion of mental and physical well-being for residents through green spaces and shade; aesthetic enhancement of urban landscapes; noise reduction; and increased property values. Dublin's soils help manage stormwater runoff and floods, support urban agriculture, and moderate the heat island effect, an essential component for supporting a robust and healthy tree canopy. Protecting and improving both the City's tree canopy and soils will ensure that Dublin's environment will continue to provide essential ecosystem services as it grows and adapts to change.

Dublin takes pride in its trees and has a long history of cultivating and caring for them. For 34 years, it has held the designation of Tree City USA by the National Arbor Day Foundation and remains committed to maintaining that status. For the past eight years, it has received the Growth Award. To monitor and track improvements in the tree canopy coverage, the City maintains a sophisticated GIS database that includes geo-located points for individual trees. It also analyses coverage using LIDAR and infrared imagery.

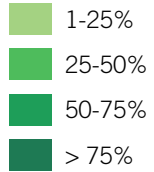
By understanding the existing tree canopy, the City is able to identify where it needs to be improved or increased and also how it will be effected by proposed developments. This can inform decisions about how many trees to plant, when, and where and whether tree loss needs to be mitigated to account to loss from development and where that mitigation will have the greatest impact. The City's geo-located data can also be laid over environmental data to guide natural resource management with implications for the kinds of trees that may be planted and their impact on soil erosion and health, stormwater runoff and flooding, wildlife habitat, and moderating the heat island effect. In addition to protecting existing tree canopy, a key focus will be to ensure that as the western growth area develops, the commitment to providing tree plantings/tree cover reflects the character of the established areas of the City.

All of this data supports a general objective of growing the tree canopy which is especially vital to counter the impacts of development which include more impervious pavement and buildings which increase stormwater runoff and retains more heat, more cars with their noise and emissions, and more people which put pressure on existing wildlife habitat and biodiversity.

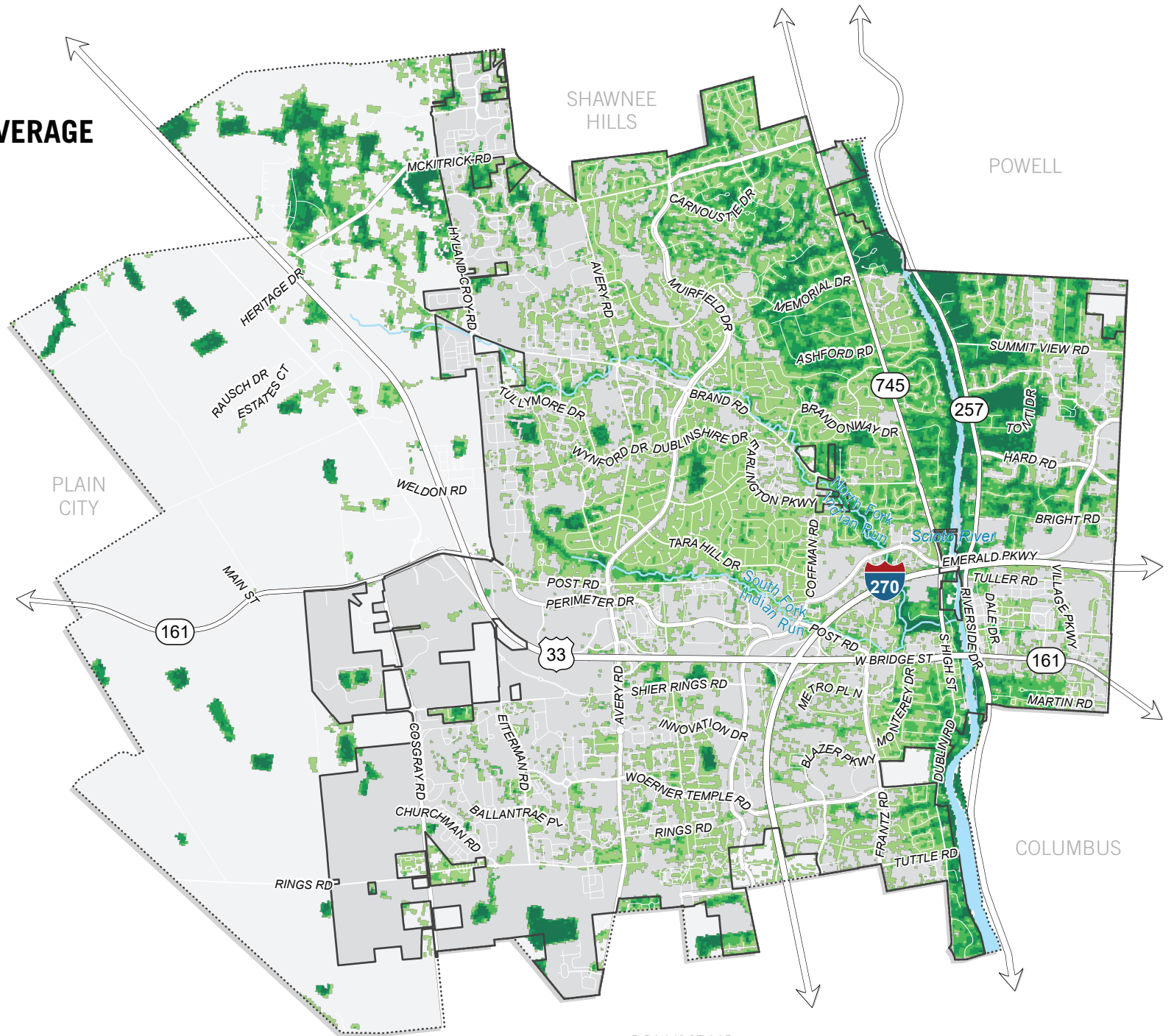
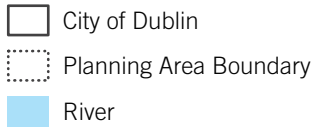
SUPPORT TREE PRESERVATION AND PLANTINGS

Mindful of the value of its trees, in 2001, Dublin adopted a tree preservation ordinance that restricts the removal of healthy trees with a diameter of six inches at breast height or greater for evergreens and two-and-a-half inches for deciduous. If removed, these "protected" trees must be replaced "inch-for-inch" within one year of the removal or the City may charge a fee in lieu of replacement. In the years since, the City has amended the ordinance to grant waivers in certain situations such as when a proposed development plans to incorporate a percentage of lost trees into the development. The City also maintains and makes available to its residents a Landscape and Tree Preservation Manual which provides guidance on the preferred kinds of trees to plant, which are prohibited due to their incompatibility with the City's ecosystems, and which stand up best to deer and pests. The manual also provides direction of obtaining a permit to remove a tree—a program that provides a vital check to unplanned, unregulated changes to the City's tree canopy. Dublin also has an active tree replacement program that removes diseased trees and replaces them with hardier species and a "legacy tree program" in which residents pay to can leave a lasting memorial to a loved one in the form a tree and plaque, cared for by the City.

TREE CANOPY COVERAGE



Context Layers



WORKING DRAFT
FOR STAFF REVIEW ONLY



PROTECT TOPSOIL RESOURCES FROM EROSION

Dublin collaborates with the Franklin Soil and Water Conservation District (SWCD) to locate, understand, and protect critical topsoil in and around the City. Programming includes educational materials for teachers to use in the classroom on the importance of soil and conservation and the “Backyard Conservation” program which helps residents reduce pollution from their homes from lawn fertilizers, pesticides, and vehicle fluids and employ common sense practices such as rain gardens, rain barrels or cisterns, native plants, drip irrigation, and pervious surfaces to reduce stormwater runoff. The Franklin SWCD also provides GIS services and natural resource evaluations to aid Dublin in protecting topsoil. Through a variety of programs and the actions of the City and private property owners, Dublin can protect its topsoil at the same time as it addresses other environmental considerations (e.g. wetlands, tree canopy, urban heat island effect) in ways that are mutually beneficial.

CONCLUSIONS AND RECOMMENDATIONS

- Continue and expand the City’s rain barrel reimbursement program to reduce storm runoff and soil erosion.
 - Examine local development regulations for opportunities to minimize impervious surfaces for new development and explore code amendments that better accommodate permeable surface alternatives.
 - Consider low impact design and conservation design elements in all new residential developments.
 - Strengthen open space requirements to specify higher percentages of native and/or adapted plantings and to prioritize non-turf green space.
 - Incorporate stream buffers as a component of low impact and conservation design.
 - Work with local land trusts to conserve undeveloped lands that are critical to watershed protection.
 - Work with local non-profits and utilities to create incentives for planting trees on private property in line with the Landscape and Tree Preservation Manual.
- Prioritize tree replacement, increasing the tree canopy, mitigation for tree loss, and incorporation of existing trees into any zoning, planned unit development, or subdivision regulation updates with the goal of no net loss of trees.
 - Utilize new development and capital improvement projects as opportunities in the western growth area to provide a level of tree plantings and tree canopy that is more reflective of the tree canopy in the established areas of Dublin.
 - Prioritize soil protection and mitigation for soil loss in any zoning, planned unit development, or subdivision regulation updates with the goal of no net soil loss.
 - Consider requiring design elements that reduce soil erosion from stormwater runoff including impervious driveways, rain gardens, and bioswales in new developments.
 - Strengthen the partnership with Franklin Soil and Water Conservation District and the Ohio Department of Agriculture Soil and Water Conservation Division to provide educational programs and incentives to protect topsoil.
 - Work with local land trusts to conserve undeveloped land containing critical soils and intact woodland ecosystems.



CREATING A LIVABLE ENVIRONMENT

Dublin's environment must be livable - for both its residents and wildlife. Three areas of concern that require specific attention are the heat island effect, managing wildlife and residents' interactions with their wildlife neighbors, and ensuring all residents can connect with nature. The City's efforts to ensure resilience benefits and reinforces other efforts. To mitigate the heat island effect, it can draw on conservation design principles and utilize green infrastructure to provide shade and cool local temperatures which has the added effects of creating habitat for birds, small mammals, and insects and cooling the water in streams and the Scioto River which benefits fish. Likewise, these tools are useful for watershed management. The last component of making Dublin's environment livable is leveraging its wealth of parks, open space, trails, blueways and greenways to create opportunities for residents to connect with the natural environment. The following actions can help the City achieve the objective of creating a livable environment.

MITIGATE THE HEAT ISLAND EFFECT

"Heat islands" are areas of the built environment that retain heat during the day and radiate it back magnifying daytime temperatures and increasing nighttime temperatures where they exist. Typically, heat islands are found where the landscape is characterized predominantly by pavement and buildings which absorb and re-emit the sun's heat more than natural landscapes such as forests and grasslands. The effect can be stifling with localized daytime temperatures being up to seven degrees hotter than outlying areas and nighttime temperatures being up to five degrees hotter. Seven and five degrees may not sound like a lot, but it means that residents will have to run their air conditioners longer, increasing their power bills and putting added strain on service providers. Combine this with projected growth and a warming climate and the effect can become a significant concern.

Fortunately, Dublin's environmental protection measures, as previously discussed, are effective in combating the heat island effect. Conservation Design and Low Impact Design, for instance, promote development that prioritizes open green space and minimizes pavement, reducing heat absorption. The City's focus on maintaining and expanding the tree canopy not only provides shade but also helps cool surface temperatures, ultimately lowering home cooling costs. Additionally, the integration of green roofs into building design insulates structures and absorbs less heat than traditional roofing materials, resulting in cooler homes and reduced energy bills.

Moreover, the incorporation of pervious driveways offers a cooler alternative to asphalt while also decreasing stormwater runoff, contributing to environmental sustainability. By maximizing open space through conservation design, Dublin further mitigates the impact of the heat island effect. As the City continues to grow and develop, addressing the heat island effect will remain a crucial consideration in future urban planning and design efforts. By prioritizing measures that limit impervious surfaces and promote green infrastructure, Dublin can foster a more sustainable and resilient environment for its residents.



MANAGING WILDLIFE

As development encroaches into open space and wildlife habitat, and as green infrastructure creates new habitats for wildlife living in close proximity to humans, Dublin will need to actively manage wild animals to prevent negative interactions with humans, the spread of disease among and between species, and overpopulation of some species to the detriment of others. Without a significant predator population, coyotes, skunks, racoons, squirrels, mice, and other rodents will continue to thrive in proximity to residential developments. Deer will also flourish on the endless range of residential grass and gardens, destroying flowers and threatening human health with Lyme disease, spread by the ticks they carry, and by walking into traffic. They City's plentiful open space, riparian areas, and tree canopy is home to and attracts many species of birds including hawks and other raptors. Dublin recognizes that with its great natural assets come responsibilities. The 2018-2020 Dublin Sustainability Framework emphasizes coexistence with wildlife and public education to reduce confrontations with wild animals. The City also passed an Outdoor Feeding Ordinance to prohibit feeding any wild animals (excluding birds) and provides educational resources to residents about driving with deer, and preventing deer damage to private property through hazing, use of protective fencing, and by planting deer-resistant plants.









CONNECTING TO NATURE

Dublin residents are incredibly fortunate to have access to more than 1,500 acres of green space and more than 130 miles of trails. Parks and open space are natural locations for residents to connect with nature, observe natural ecosystems and processes and learn about the environment. Connecting to nature has positive psychological and physical benefits that add greatly to residents' quality of life and well-being. Fortunately, much of the City's green space is evenly distributed throughout the community and accessible to residents from all income levels and backgrounds. Thirty-six percent of Dublin's population is within a 5-minute walk of a park or open space and 64% is within a 10-minute walk. There are gaps, however, and they tend to correlate with commercial districts. The Dublin Parks and Recreation Master Plan recommends considering adding parks in business and commercial districts. Regional recreational plans such as the Strategic Action Plan: Central Ohio Greenways, and MORPC's RAPID 5 further support the expansion and connection of greenways and trails to enhance resident's connection to nature. Dublin can enhance residents' connection to nature by continuing to offer educational programming that helps residents understand where they live, the natural processes at work around them, how to co-exist with wildlife, and how to improve and restore the community's natural assets.



CONCLUSIONS AND RECOMMENDATIONS

- Consider requiring low impact design and conservation design elements in all new residential developments to reduce the heat island effect.
- Work with local land trusts to conserve undeveloped lands that will reduce the heat island effect, protect wildlife habitat, and maintain open space to foster residents' connection to nature.
- Continue and expand education programs about co-existing with wildlife including environmentally-safe ways to minimize negative interactions (e.g. deer-resistance plants, deer fencing).
- Consider measures to reduce wildlife-automobile collisions (e.g. deer crossing sensors and lights, wildlife over/underpasses in high traffic corridors frequented by wildlife).
- Consider incentive programs to reduce negative wildlife interactions (e.g. animal proof trash/compost/recycling receptacles, keeping house cats indoors, etc.).
- Support the recommendations of the Sustainability Framework Initiative to create resilient built environments and protect natural resources.

ENVIRONMENTAL FEATURES

-  Blueway Access Location
 -  River
 -  Wetland
 -  Parks and Open Space
 -  Watersheds
- Flood Hazard**
-  0.2% Annual Chance Flood Hazard
 -  1% Annual Chance Flood Hazard
 -  Regulatory Floodway

Context Layers

-  City of Dublin
-  Planning Area Boundary

