

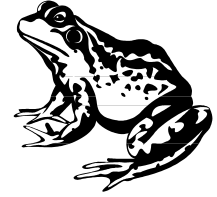
Urbanization and the Wildlife Response

John M. Davis, Urban Biologist (Dallas / Ft. Worth)

Texas Parks and Wildlife Department

Phone: 972-293-3842, Email: jmdavis@aol.com

Theme of the presentation: Traditional urbanization practices cause radical, predictable shifts in wildlife populations ... but it doesn't have to be that way.



Introduction

- Our society benefits from positive wildlife experiences. (Kaplan, et al. 1996, Kaplan & Kaplan 1989, Ulrich 1984)
- Research indicates that employees are able to work better when the company maintains natural areas on the grounds (Kaplan, et al., 1996). It has been demonstrated that people heal faster when they have natural views out their windows (Ulrich, 1984). Research has also shown that people prefer to have wooded neighborhood parks that are kept in a more natural, less formal, manner (Gold 1986).
- As we urbanize the landscape, our connection to the natural world becomes more and more fragile.
- Places where blocks of vegetation exist (parks, natural areas, rights of way, etc.) become increasingly important as places for people to enjoy the outdoors.
- Sounds of nature are preferred. The most preferred sound is bird songs, followed by ocean waves (sounds of nature). The least preferred sounds are urban associated: traffic, saws sirens, and gunfire. (Dawson 1988)
- Market values for homes in natural surroundings are higher, indicating that people prefer to live in these areas. Although natural areas near homes increased their market values, close proximity to formal open space (such as well manicured parks) actually decreased market values (King, White and Shaw, 1991)
- Being outdoors seems to help people relax.
- People are actively craving wildlife more and more. While the number of people playing golf has increased by 29% since 1982, the number of birdwatchers has increased 155% (1994-95 Nat. Survey on Rec. and the Env.)
- Nature and wildlife are obviously very valuable in our society.
- There are several levels of urbanization, From least intensive to most intensive we have... 1. Urban / rural interface - (farmland, lots of open space, housing is limited but increasing) 2. Suburban development - (lots of houses, "support" businesses like gas stations, grocery stores, etc., still some open space) 3. Metropolitan center - (high rises, office buildings, lots of concrete, little to no open space) We will look at the opportunities at each level later.
- The three questions to be answered are... 1. What happens to the land as we urbanize it? 2. How do wildlife populations respond? 3. How can we change the future?

I. What happens to the land as we urbanize an area?

- Areas that once provided food, water, and shelter for wildlife get cleared on a daily basis. These developed areas are then covered with impervious surfaces which prevent water from

absorbing into the ground and thus increase the amount of runoff that is concentrated into drains and dumped straight into our waterways. This not only pollutes the streams with petroleum products and fertilizers, but also drastically alters the natural flow cycle of the aquatic system causing wild water level fluctuations.

- The native vegetation that was removed is replaced with commonly available non-native vegetation resulting in a severe reduction in the urban botanical biodiversity.
- If we don't destroy the habitat with concrete buildings and non-native plantings, we alter it drastically. We clear out the midstory and understory, rake leaves, and put in turfgrass so that all that remains is the relatively sterile canopy and grass.
- With the loss of natural vegetation and denning sites, natural shelter declines... but artificial shelter actually increases. Urbanization creates lots of nooks and crannies for shelter.
- As native plants decline, natural sources of food such as seeds, berries, etc. also decline, but artificial food sources such as trash, food scraps, etc. increase drastically.
- Urban soil is mixed, compacted, and eroded. Urban groundwater is depleted. Urban surface water is concentrated, polluted, and unnaturally variable in its behavior. Urban vegetation is either cleared, paved, or replaced by non-natives.
- Diverse sources of natural food, water, and shelter for wildlife are altered, fragmented, polluted, or destroyed resulting in habitat simplification at the very least.

II. How do wildlife populations respond?

- Depending on their ability to move and adapt, different groups of wildlife respond differently to the pressures of urbanization.
- Due to the alteration of the watershed, and the introduction of chemical contaminants, sensitive aquatic species such as amphibians decline or disappear.
- Because of fragmentation of the habitat, those that are less mobile (such as reptiles) also decline. When a population disappears from an area, it is very difficult for the animals to re-populate.
- Because of all of the environmental factors being upset, any animal that is a specialist or has a special need (ex. requires insects, open fields, or cavities of a certain size) will decline.
- Generalists are those animals that don't have special requirements regarding what they eat or where they nest. They not only withstand the changes that come with current urbanization practices, but thrive. Therefore, they should be discouraged.
- Many of the non-native wildlife species are generalists. Non-native examples include: European Starling, English Sparrow, Pigeon, House Mouse, Norway Rat, Black Rat, and Nutria (to name a few). Native generalists include: Mockingbird, Grackle, Crow, Raccoon, Opossum, Skunk, Coyote (to name a few).
- Although we see an increase in the numbers of small predators, coyotes, cats, etc.... As a society, we tend to eliminate large predators, so there is a conspicuous absence of large predators in most urban areas. This allows large herbivores like deer to become overpopulated in some areas.
- As habitat diversity decreases, the number of specialists decreases. As specialists decrease, interspecific competition for available resources decreases. Combine this with the decrease in large predators, increased artificial food sources, and the generalists thrive! They reach population densities in urban areas that are higher than those found in natural areas. So

traditionally, urban wildlife consists of relatively few species that breed to nuisance proportions.

III. How can we change the future?

- To reverse the damage, we have to restore the factors that have been lost. Everything rests on restoring the native habitat and hydrology.
- Our ability to do this differs depending upon the level of urbanization.
- In the metropolitan centers, we have the fewest options for restoring habitat. There is really none left to preserve or protect, so really the only thing we can do is to try to maximize the habitat value of small park space. Increasing the understory would be good, but would still be very limited in its value. So the main thing that we can do in these areas is try to control exotic populations.
- We can educate people no matter what the level of urbanization is.
- In suburban areas, there may be some habitat left. So we may be able to recognize it for its wildlife value and try to keep it around. Wetlands, creeks, and wooded corridors are all valuable to wildlife, so we can work to ensure that they do not lose that value.
- Corporate properties have great potential for habitat. They often maintain (mow) acres and acres of land. By using simple techniques, we can develop areas so that they are functional, beautiful, and wildlife friendly. Culverts can be designed so that they not only perform their job, but also provide lots of crevices for the local lizard population. Prairie restorations can replace mowed grass. Wetland restoration projects can be initiated using local ponds.
- Schools are also great locations for restoration projects. Once again, there are often acres of mowed grass.
- Some of the best opportunities for restoration can be found in our city parks. Several parks departments have begun to see the benefit of habitat restoration.
- We can use native plants to create home landscapes that are not only beautiful, but are beneficial for wildlife as well.
- On the cutting edge of residential wildlife habitats is "The Preserve" which was built by Destiny Homes in San Antonio. The owner went to great lengths to develop sites in which the houses appear to have been dropped from the sky. He found ways to build homes with absolute minimum disturbance of the habitat around them. The idea was so popular he has begun the Preserve 2.
- But the most potential to change the future of urbanization is found at the urban / rural interface. It is here that we can plan to include wildlife and wildlife habitat in our cities.

Conclusion

Traditional urbanization causes radical, predictable shifts in wildlife populations. It doesn't have to be that way. We can change the future. By understanding how our natural ecosystems work, and by designing our cities in concert with those systems, we can enjoy a clean, healthy, and peaceful urban ecosystem.

Bibliography and Other Pertinent Literature

(Compiled by John M. Davis with Texas Parks and Wildlife)

Urban Ecosystem Management

Adams, L. W. 1994. Urban wildlife habitats: a landscape perspective. Univ. of Minn. Press, Minneapolis. 186pp. ISBN 0-8166-2213-2 Phone 410-997-7161

Or on the internet - <http://www.erols.com/urbanwildlife/bookbod.htm>

Adams, L.W., and D.L. Leedy, eds. 1987. Integrating man and nature in the metropolitan environment. Natl. Inst. for Urban Wildl., Columbia, Md. 249pp. ISBN 0-942015-00-2 Phone 410-997-7161

Or on the Internet - <http://www.erols.com/urbanwildlife/bookbod.htm>

Adams, L.W., and D.L. Leedy, eds. 1991. Wildlife conservation in metropolitan environments. Natl. Inst. for Urban Wildl., Columbia, Md. 264pp. ISBN 0-942015-03-7 Phone 410-997-7161

Or on the internet - <http://www.erols.com/urbanwildlife/bookbod.htm>

Adams, L.W., and L.E. Dove. 1989. Wildlife reserves and corridors in the urban environment: a guide to ecological landscape planning and resource conservation. Natl. Inst. for Urban Wildl., Columbia, Md. 91pp.

Phone 410-997-7161

Or on the internet - <http://www.erols.com/urbanwildlife/bookbod.htm>

Bornkamm, R., J.A. Lee, and M.R.D. Seaward, eds. 1982. Urban Ecology. Blackwell Scientific Publications, Oxford, UK.

Dagg, A. 1981. A reference book of urban ecology. Otter Press, Waterloo, Ontario, Canada. 190pp.

Sears, Adam R., and Stanley H. Anderson, 1991. Correlations between birds and vegetation in Cheyenne, Wyoming. *in* Wildlife conservation in metropolitan environments, L.W. Adams, and D.L. Leedy, eds., Natl. Inst. for Urban Wildl., Columbia, Md. 264pp.

Franklin, T. M., and L. W. Adams. 1980. Bird response to habitat improvement in an urban environment. *Maryland Birdlife* 36 : 14-16.

MacArthur, R.H., and J.W. MacArthur. 1961. On bird species diversity. *Ecology* 42:594-598.

VanDruff, L.W., E.G. Bolen, and G.J. San Julian. 1994. Management of urban wildlife. Pages 507-530 *in* Research and management techniques for wildlife and habitats. 5th ed., T.A. Bookhout ed., The Wildlife Society, Bethesda, Md,

Hay, Keith G. Year? Greenways : Wildlife and Natural Gas Pipeline Corridors. Put out by the Conservation Fund ... to get a copy, call (703) 525-6300 ... I think ... I am not sure how we got this publication ... sorry.

The Value of Wildlife

1994-95 National Survey on Recreation and the Environment sponsored by U.S. Fish and Wildlife Service, U.S. Forest Service, National Park Service, Sporting Goods Manufacturers Association, and others. Check with one of these agencies for a copy.

Dawson K.J. 1988. Flight, fancy, and the garden's song. *Landscape Journal* 7:170-175.

Gold, S.M. 1986. User characteristics and response to vegetation in neighbourhood parks. *Arboricultural Journal* 10:275-287.

Kaplan, R. 1993. The role of nature in the context of the workplace. *Landscape and Urban Planning*. 26, pp. 193-201.

Kaplan, R., and Kaplan, S. 1989 The experience of nature: A psychological perspective. New York: Cambridge University Press.

Kaplan, Rachel, Lisa V. Bardwell, Harry A Ford, and Stephen Kaplan. 1996. The Corporate Back 40: Employee Benefits of Wildlife Enhancement Efforts on Corporate Land. *Human dimensions of Wildlife*. Volume 1. Number 2. pp. 1-13.

King, David A., Jody L. White, and William W. Shaw, 1991. Influence of Urban Wildlife Habitats on the Value of Residential Properties. *in Wildlife conservation in metropolitan environments*, L.W. Adams, and D.L. Leedy, eds., Natl. Inst. for Urban Wildl., Columbia, Md. 264pp.

Ulrich, R. S., 1979. Visual landscape and psychological well-being. *Landscape Res.* 4:17-23.

Ulrich, R. S. 1984. View through a window may influence recovery from surgery. *Science*, 224, 420-421.

O'Donnell, Michael A., and Larry W. VanDruff, 1987. Public Attitudes and Response to Wildlife and Wildlife Problems in an Urban-Suburban Area *in Integrating man and nature in the metropolitan environment*, L.W. Adams and D.L. Leedy eds., Natl. Inst. for Urban Wildl., Columbia, Md. 249pp.

Shicker, Lisa, 1987. Design Criteria for Children and Wildlife in Residential Developments, *in Integrating, man and nature in the metropolitan environment*, L.W. Adams and D.L. Leedy eds., Natl. Inst. for Urban Wildl., Columbia, Md. 249pp

U.S. Dept, of Commerce. 1985. National data book and guide to sources-statistical abstract of the United States. Bureau of the Census.

U.S. Dept. of the Interior,U.S. Fish and Wildlife Service and U.S. Dept. of Commerce, Bureau of the Census. 199 1. National Survey of Fishing, Hunting, and Wildlife-Associated Recreation. U.S. Govt. Printing Office 1993.

Ecological Restoration

Riley, Ann 1998, Restoring Streams in Cities : A guide for planners, policymakers, and citizens, Island Press, Washington D.C., ISBN: 1-55963-042-6

Packard, Stephen & Cornelia Mutel, 1997. The Tallgrass Prairie Restoration Handbook : for prairies, savannas, and woodlands. Island Press, Washington D.C. ISBN 1-55963-320-4
Arendt, Randall G. 1996. Conservation Design for Subdivisions Island Press, Washington D.C. ISBN 1-55963-489-8

Hammer, Donald A. 1997. Creating Freshwater Wetlands 2nd. ed. CRC Press, ISBN 1-56670-048-5