A Book Review: ***Nature in Fragments: The Legacy of Sprawl***. 2005. Elizabeth A. Johnson and Michael W. Klemens, eds. American Museum of Natural History. New York, Columbia University Press.

QH 545 C545 N38 2005 - This book can be borrowed from the Cameron Library at the U of A, using a regular Edmonton Public Library card. I have also ordered my own copy from Amazon and am willing to lend it out.

Between 2006 and 2011 93% of Edmonton's urban growth occurred in suburban neighbourhoods or in low-density rural areas where 75% of residents commute into the city.

CBC News, Oct. 3, 2013

To safeguard our natural capital and the associated ecological services, the City of Edmonton is committed to conserving, protecting, and restoring our natural uplands, wetlands, water bodies, and riparian areas, as an integrated and connected system of natural areas throughout the city.

Natural Area Systems Policy, C531, 5 June 2007

After reading *Nature in Fragments*, which documents the myriad ways in which sprawl affects biodiversity, overwhelmingly negatively, you will conclude like I did that the above are completely incompatible. Realizing, too, how little we understand about ecosystem processes and how human activity alters them, I came to my usual conclusion, that conservation is a far better option than restoration and, certainly, mitigation.

The book's first chapter describes the sociological causes of sprawl and explains why we moved from our original compact, walkable settlements to our present huge, sprawling cities; it was not just the coming of the car but also government housing policy, including the encouragement of home ownership by easy mortgages and insurance, good roads, the practice of financing of municipalities from property taxes, single-use zoning, and so on. Sprawl is not just the result of population growth, but of definite policy, land-use and consumption choices. Although the authors are American and the concepts and examples in this book all refer to the United States, they apply equally well to the Canadian situation.

In the second chapter we get an overview of the various impacts of sprawl on biodiversity, such as habitat loss and degradation, fragmentation, invasive species, the various types of pollution, overexploitation of natural resources (e.g., wood for big houses, energy) and climate change (which may make sprawl-hindered migration to more suitable climate regimes more urgent for survival). Subsequent chapters deal in more detail with the effects of sprawl on natural processes and organisms. That on how sprawl affects wetlands is especially comprehensive and contains lessons that Edmontonians should find thought-provoking. For example: "Because poor water quality can promote eutrophication, leading to the establishment of large, rhizomatous species such as *Phragmites australis* [reed canarygrass] (Keddy, 2000), attempts to restore a more diverse plant community in urban wetlands are likely to fail unless the quality of the water entering the wetland is first improved." I take this to mean that constructed wetlands receiving unfiltered stormwater don't stand much of a chance of having native riparian communities. The removal of mosquitoes at the request of homeowners can reduce the food supply for birds and amphibians; it may take decades for the impact of a road near a wetland to manifest itself on the diversity of a wetland. Another chapter covers the impact of both disturbance and suppression of disturbance (such as fire, flooding) on natural systems. There is a chapter on bees and pollination, and another on effects on soil communities and decomposer ecosystems. A suggestion of interest to our plant-growers is that, rather than inoculating trees with standard ectomycorrhizal fungi in the greenhouse, seedlings should be started in soil cores removed from nearby natural habitats in which trees of the same species are growing, to allow colonization with the ectomycorrhizal fungi specific to that location. Can you imagine the City of Edmonton going to that kind of trouble?

The chapter on disease provides some insight into how human health can be affected by sprawl. For example, the increase in Lyme disease in the northeastern U.S. has been linked to reduced mammalian diversity and a corresponding increase in the density of white-footed mice (which harbor the disease-carrying black-legged ticks) in smaller habitats due to fragmentation.

Another section of the book looks at sprawl's effect on a number of species, including those that have limited dispersal ability, those that conversely are mobile or wide-ranging, and those that appear to benefit from sprawl. However, even some species that appear to be abundant and thriving in urban areas, such as American robins, gulls and coyotes, may not actually be doing well. They may be

attracted to certain conditions in the city, but the quality of food they obtain there may not allow them to raise healthy offspring. The high numbers of non-native plants in cities are of course due to the presence of weeds which are constantly being introduced by human activity, nurseries and gardens, human and vehicular traffic, and disturbance. However, some native species can benefit from disturbance; nor may the large-scale removal of non-natives in some habitats be ecologically justified. (It's complicated!)

In the fourth section of the book, which focuses on attempts to meet the challenges of sprawl, the importance of connectivity to effective conservation is stressed, with case studies of projects under way. This section includes chapters on conserving biodiversity through state and regional planning and local planning, raising public awareness of the impacts of sprawl, and effecting a shift from sprawl to a better land-use paradigm.

The chapter on raising public awareness notes that when presenting a message that catalogs problems one should always attempt to provide solutions. (Ignore my expression of despair in the opening sentence! Perhaps one reason why last year a group of us were successful in getting the Oleskiw trail (originally proposed to go through riparian forest) re-routed to an already disturbed area was that we offered an alternative.) Sprawl is undeniably a bad thing for nature; so, what can we do about it? First of all I would say, possibly controversially, that if you are contemplating buying an acreage or a cottage by the lake, don't, no matter how much you want to be "in nature." If you already live on an acreage, make sure a maximum amount of area is under natural vegetation or some mixture of such. For those of us with suburban gardens, grow natives where we possibly can. (The Edmonton Native Plant Group was formed around 2000 to salvage native plants from natural areas being developed and to propagate them in an attempt to counteract the huge numbers of cultivated plants that would subsequently be grown in suburban yards. One of ENPG's spin-off achievements, however, has I believe been ecological education: sensitizing the public to the difference between native and non-native plants and natural vs. anthropogenic communities.) Other things we can do include the advocacy route; attend meetings, make representation to Council, protest inappropriate development decisions, demand that more money be spent on management and conservation of natural areas, research and monitoring, and on better communication and education both for city employees and the public. In 2001 the Edmonton Natural History Club organized a well-attended conference on sprawl and sustainability, and invited some high-profile speakers. Perhaps it's time for the City of Edmonton to host a reprise?

I recommend that this book be read by everyone: politicians, planners, naturalists and ordinary citizens, and that its essential messages be conveyed to children in the classroom and field.

The rare swamp pink (*Helonias bullata*; family Liliaceae) of the eastern U.S. is threatened in its stream and wetland habitats by the impact of housing on adjacent uplands through alteration in water flow and groundwater levels, invasive non-native plants, destruction by trampling and bank erosion, and browsing by deer that thrive in sprawling developments.