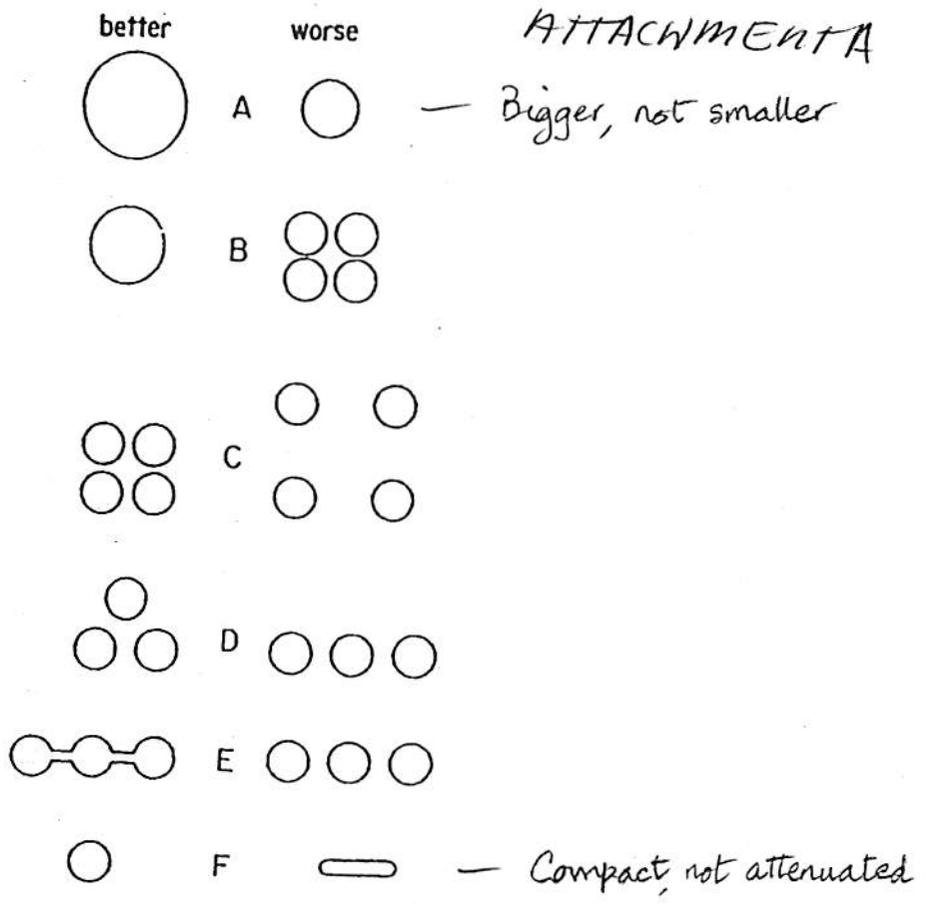


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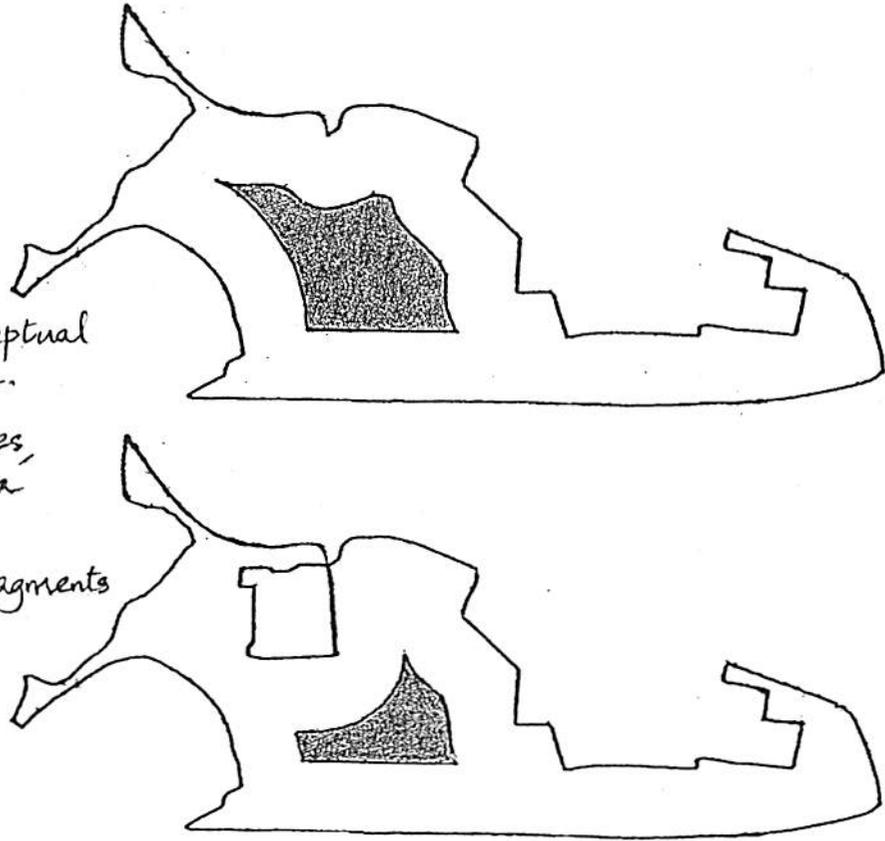
ATTACHMENTS



Size, spacing, orientation and shape of habitat fragments relative to probability of species survival. After Faaborg et al. (1995) after Diamond (1975).

This is a conceptual illustration.

To varying degrees, the same core-area principle applies to individual habitat fragments within the greater open space.



Core area (shaded) for interior-habitat species at Alewife Reservation without Belmont Uplands development (top) and with development (bottom). Setback from unvegetated edge ~ 100 m.

**Ecological benefits of preserving the Belmont Upland
Silver Maple Forest**

Patrick Fairbairn, Ph.D. 14 December 2010

“Unimproved”. That is the term typically used in any official evaluation of an open space that is zoned for possible development. No doubt the term has been applied more than once to the Belmont Upland Silver Maple Forest. Is there another way of looking at it? Yes, in fact there are many ways, only some of which I have time to dwell on here.

Physical and chemical functions of any urban wild include the following low-cost, low-maintenance benefits:

- Floodflow regulation.
- Pollutant reduction in the air, soil, and water.
- Buffering of urban noise, screening of unsightliness.
- Regulation of local climate—temperature, humidity, wind.

Do we improve upon these benefits by developing the “unimproved” open space? No, although something is always required to be done to control drainage effects, at considerable expense. The “unimproved” open space does all the above jobs for free.

Biological benefits are my primary subject here. Taken on its own, the Belmont Uplands Silver Maple Forest provides the following types of animal habitat support:

- Year-round resident support (e.g. Eastern Cottontail, White-footed Mouse, Garter Snake, Downy Woodpecker, Black-capped Chickadee).
- Breeding (e.g. Neotropical migrant birds including Warbling Vireo, Baltimore Oriole, Eastern Kingbird).
- Migratory waystation (e.g. other birds including Palm Warbler, Yellow-rumped Warbler, Least Flycatcher).
- Wintering (e.g. Dark-eyed Junco, White-throated Sparrow).
- Occasional use, primarily by larger or rare animals, as part of their relatively extensive habitat needs (e.g. Beaver, Coyote, Bald Eagle).

The Belmont Upland Silver Maple Forest may be regarded as a unique plant community set in a landscape of other communities, both terrestrial and aquatic. Each community serves as a habitat for a number of different plant and animal species, most of which typically occupy more than one community type. For instance, the Garter Snake requires an upland shelter in which to spend the winter underground, but may spend most of its foraging time each summer in wetland habitats. Thanks to the work of many naturalists, we now have a lengthy record of plants and animals that occur in the Alewife Reservation, of which the Belmont Upland Silver Maple Forest forms an integral part. We have acquired a fair notion of how valuable each community type is to each species; we can estimate how important, say, the Belmont Upland Silver Maple Forest is to each of the species that have been recorded there, and how its juxtaposition to other community types affects the habitat quality of each.

Communities like the Belmont Upland Silver Maple Forest occur as patches in a mosaic of other communities. Each community serves as a habitat patch of variable quality in the life history needs of each species that uses it. We can rank the suitability of each habitat patch for a given species according to the following terms, in declining order of value: Optimal, Suboptimal, Marginal, Invasive (dependent on immigration), and Traversable (just good enough to permit some movement across it). The location of habitat patches relative to one another can affect the habitat quality of multi-habitat users. For example, two suboptimal habitats of the Hispid Cotton Rat, a southern US species, can constitute optimal habitat if adjacent to one another. The composition of even low-quality habitat patches determines the degree to which each species can use it. As a local example, habitat of traversable quality for the White-footed Mouse comprises almost any terrestrial community (including inner-city suburbia) except extensive grassland, whereas the Eastern Chipmunk needs wooded cover or at least fencerow vegetation to move easily from one optimal habitat to another.

Biodiversity constitutes the sum of all habitat functions as expressed by the number of species recorded. A similar term, species richness, imparts the value-laden sense in which it is frequently used, namely that having a relatively large number of species in the neighborhood is a good thing. All the better if some of the species are rare in this part of their range.

To the best of my knowledge, the Belmont Upland Silver Maple Forest on its own does not support either rarities or unusually great species richness.

So why all this fuss and bother to save a few acres of developable real estate? The answer is Location.

Location. Now where have we heard that term before? Location, location, location. Could these three indispensable factors of our own species' real estate marketplace apply to the habitat value of other animals as well? The Belmont Upland Silver Maple Forest may be only a few acres in size, but it sits in the midst of other habitat patches. Together with these other habitats, the effect is truly impressive. David Brown, a professional naturalist and tracker who knows the area well, has stated that in density and variety of wild mammal sign the Alewife Reservation and contiguous natural areas rival the Quabbin region and various locations in northern New England. The place of the Belmont Uplands in the greater landscape mosaic of open-space community types adds to the value of all.

On the basis of what is known about the minimum area requirements of many animals, especially birds, ecologists have developed a number of conservation guidelines, the following two of which have a close bearing on our current subject:

- A single large open space is better than several small ones.
- Compact shapes are better than narrow ones.

In general, large animals require a relatively large area of suitable habitat for their survival. In the urban setting, as an open space fragment diminishes in size, these larger animals are often the first to go. Furthermore, many animals require a minimum core area within the available open space, sufficiently remote from any edge with unsuitable habitat; hence the typical preference for suitable habitat that is compact rather than linear in shape. Building in the Belmont Upland Silver Maple Forest would not only destroy it but also greatly diminish the value of adjoining habitat, particularly by reducing the size of the core area available to area-sensitive species. In the case of the Belmont Upland Silver Maple Forest, one such vulnerable species is the Wood Thrush.

Why all this attention to other species of no obvious economic value? Because it is extremely important to many of us. Biodiversity is part of the way we measure the quality of our habitat. As large, almost ubiquitous mammals, we are multi-habitat users without equal. No other animal has anything close to our species' ability to control its environment. Not even

those of us who belittle current estimates of our contribution to global warming can deny that our effect on the global environment is highly significant. All concerns about habitat ultimately have to do with human habitat. So, as we look around the everyday world we know, what do we think of its quality? Optimal? Suboptimal? Marginal? Are there places we just want to get through as quickly as possible on our way to something preferable? Most of us would agree that there is room for improvement.

Improvement. That concept again. Let's not worry here about the disposal of our solid and our liquid wastes, our urban ghettos, substandard schools and unhealthy air. How can we improve the tiny fraction of our environment that remains to us as open space habitat? It may be perfectly legal to build on the Belmont Upland Silver Maple Forest, but it's also perfectly legal to pause, weigh all our species' values and needs, and find alternatives. We have that choice. The Emerald Necklace of Frederick Law Olmsted, the Bay Circuit Greenbelt of Charles Eliot, the greenways bordering Boston's rivers, are not created without an effort. The Alewife Reservation and its adjacent open space do not have to contain rarities; they are rarities, something different from the built environment, to be cherished for its own sake as well as ours. That's ecology. Human ecology.

As an ecologist, I have to think across a broad span of time, not according to neat five-year or twenty-year economic plans or business cycles. Many urban planners and sociologists do likewise. Some have identified a trend in US cities toward their redevelopment as centers of consumerism rather than centers of production, toward high-quality environments in which to play as well as work, toward the aesthetic as well as the utilitarian. Our remaining open-space fragments can be redeveloped too, as open space, in answer to this trend. With sound ecological advice, we can manage the remaining open space to increase its residual biodiversity: create or enhance vernal-pool environments; restore upland vegetation to a state resembling that of the pre-Columbian forest, or Colonial agriculture; make the waterways clean, inviting places to fish, swim, or at least dabble one's feet. In doing so, we savor the pleasure of bygone habitats worth reviving. The best thing since sliced bread just could be—unsliced bread. All this is best achieved by keeping our precious remnant open space intact.
