Article 44

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The Return of the Beaver

They're back. Beavers were extirpated from many watersheds by the early 1900s due to heavy trapping pressures and habitat disturbance. Beaver populations, however, have soared in the past two decades in response to less trapping, fewer predators, and reintroduction efforts by state wildlife agencies.

Population statistics illuminate this remarkable recovery. By the early 1900s, the North American beaver population had dwindled to about 100,000. Since then, it has recovered to an estimated level of six to 20 million individuals. The recovery may not be fully complete. Some wildlife biologists estimate that some 60 to 400 million beavers were present in North America prior to the advent of the fur trade (Naiman *et al*., 1986). During the recovery, beavers have expanded their range and returned to many watersheds where they had long been absent. Indeed, some wildlife biologists believe that due to relocation programs, the beaver currently has a greater range than before Europeans arrived on the continent (Clements, 1991).

This adaptable mammal can now be found across most of North America, and is a common sight in many urbanizing watersheds (Figure 1). It is no longer unusual to see beavers or their dams in such unlikely places as downtown Washington, D.C., suburban Detroit, or a new subdivision in Portland. Indeed, increased efforts to protect stream valleys, parks, creek buffers, greenways, wetlands, floodplains, riparian forests and other natural areas in urban watersheds also help to reserve prime beaver habitat.

While the return of the beaver is welcome, it has many implications for the urban watershed manager. First, the beaver is considered a "keystone species" because it fundamentally influences the ecology of headwater streams and adjacent riparian areas. In natural areas, for example, researchers have found that beavers can directly alter up to 40% of the small streams and rivers in the landscape, and an impressive 15% of the forest cover (Hammerson, 1994; D'Eon *et al.*, 1995). Their activities increase the retention of sediment and organic matter. The network of dams and pools created by beavers also has a profound impact on the water quality and ecology of streams.

As a consequence, urban watershed managers are now faced with a series of questions about beavers after an absence of many generations. How will beavers alter the narrow belts of urban riparian forest? Will they play a positive or negative role in fishery habitat? In what manner will they change the water quality of urban streams?

On a more pragmatic level, the engineering works of the beaver often conflict with the plans of humans. Complaints about blocked culverts, flooding, inundation, and tree damage have sharply increased as beaver and human habitat overlap. What techniques can be applied to minimize beaver problems? Can a beaver problem ever be truly eliminated? Lastly, is it possible to reconcile the concerns of angry landowners, wildlife lovers and animal rights activists in an effective management plan?

In this article, we explore the implications of the return of the beaver, beginning with a review of its fascinating natural history and its impact on headwater streams. A range of management techniques for countering beaver problems are then assessed. In most cases, these techniques have had limited effectiveness, i.e., they can reduce beaver damages but seldom can

Table 2: Beaver Biology and Life History (Olson *et al.*, 1994)

Mating Behavior	Pair for Life
Size at Maturity	40-60 lbs
Territory	Approximately 1/2 square mile. Territorial marking with scent glands.
Living Arrangements	Family colonies
Dispersal	Leave to establish new territory within 5-10 miles at around age 2
Food Sources	Bark of trees and shrubs as well as softer vegetation
Litters	2-4 young per litter
Distribution	Not found in Arctic, arid Southwest, Florida, nor Atlantic Coastline