BUFFER NEEDS OF WETLAND WILDLIFE

HABITAT MANAGEMENT DIVISION
The Fragment Connection by William Stolzenburg, Nature Conservancy, July/August 1991:

"Fragmentation entails a biological fallout more complicated than an arithmetic reduction of living open space might intuitively suggest. Ecologists have lately begun to see more clearly what happens when, say, a big forest suddenly becomes a small forest squeezed by development. From the isolated remnant disappear the wide roammers—the bears, big cats and wolves. The same goes for the deep forest specialists, types like the hooded warbler, the goshawk and the marten. Flooding in from the outside are the generalists, the common species of the edge—the starlings and cowbirds, the opossums and raccoons. Like an onion peeled by the layers, there comes a point when the core becomes nothing but the edge, a place where the generalists rule." Page 20.

"According to population theory, the fewer the individuals, the more potentially devastating the purely random forces of nature. A roll of the demographic dice can leave a small population with too many old, too few females, too little genetic variability—too little internal rebound to survive. Natural catastrophes, like fires, storms, droughts and disease—blows that might dent a big population—can crush a small one." p. 20
WETLANDS - PROVIDE FOOD, WATER, SHELTER FOR FISH AND WILDLIFE

Wetlands and their buffers are essential for wildlife. The complex interface of land and water is used to meet life needs by 85% of terrestrial wildlife species in the State (Brown, 1985; Thomas, 1979).

One value provided by wetlands is production and maintenance of the public's fish and wildlife resources. If there is to be no net loss of wetland area and function, it is essential that wetland protection measures and buffers be planned to protect fish and wildlife.

WETLAND SYSTEMS = WETLANDS + ADJACENT UPLANDS

Wetlands and the uplands adjacent to them form a physical, hydrologic, chemical and biologic system. Native fish and wildlife populations have evolved with this system and take advantage of interactions.

Large numbers of wetland dependent wildlife need not only the wetland but also the adjacent upland to meet essential life needs: food, water, shelter from climatic extremes and predators, structure and cover for reproduction and rearing of young. For example, waterfowl feed primarily in wetlands but most species nest on dry ground where nests will not be flooded. In the Columbia Basin, heavy grazing next to wetlands removed buffer vegetation and reduced waterfowl production by 50% (Foster et al. 1984). A wetland may be preserved but if the waterfowl nesting habitat in the adjacent upland is lost, a component of the wetland's function is lost.

DISTURBANCE AND LOSS OF WILDLIFE FUNCTION

A person approaching heron or a flock of waterfowl can agitate and flush them even at distances greater than 200 feet. In 1976-7, Department of Wildlife found migratory bird use increased 30-50 fold on three Columbia Basin wetlands where parking lots and access were relocated to areas 0.25 to 0.5 mile from the wetlands (Foster et al. 1984). Conversion of farm lands to office park along North Creek in King and Snohomish counties, significantly reduced the function of the areas wetlands for migratory waterfowl although the wetlands remain.

Many of the wet pasture areas that provide waterfowl feeding are frequently not scored high in wetland rating systems because of low diversity of plant life. If there is to be no net loss of wetland wildlife function, even these will need sufficient buffers.

HABITAT FOR MOST SPECIES = PLANT STRUCTURE OVER DISTANCE

Animals evolved with different plant communities and hydrology in and around wetlands. They depend upon plant communities and their associated physical structures both inside and outside the wetland. To retain full complements of wetland dependent wildlife, the plant structure in adjacent uplands needs to be retained for sizable distances from the wetland edge.
Wetland dependent wildlife such as salamander, waterfowl, beaver, and mink use the adjacent uplands to meet essential life needs. They are dependent on both the wetland and the adjacent uplands. The buffer zones are areas where animals have needed separation and interspersion to reduce competition and maintain populations. The more narrow the buffer left around a wetland when land use changes, the more susceptible the wetland becomes to loss of habitat function and productivity. Remaining wetland wildlife are more concentrated and more vulnerable to disease and predation.

WETLAND BUFFERS - ALSO ESSENTIAL FOR WETLAND-RELATED WILDLIFE

Natural vegetation next to wetlands moderates extreme environmental conditions. Plant structures provide microclimates that keep water and surface temperature cooler in summer and warmer in winter than surrounding areas.

Lush and divergent vegetation in wetland buffers provides food and cover for many species ranging from large mammals such as deer and elk, to small ones such as voles and shrews. These areas are used for rearing of young. They receive heavy use by animals that concentrate near wetlands but are not necessarily wetland dependent. In Grant County loss of wetland buffers and the cover they provide significantly reduced pheasant populations to 20% previous levels.

Wetland buffers provide nutrients and cover for aquatic systems and their organisms. Large organic debris has been shown to be essential for native fish populations. It provides for pool development and fish hiding cover. Also important is small organic debris, the leaf litter from trees and shrubs. Ninety percent of the biological energy in some aquatic systems comes from leaf litter. Buffers help to maintain existing fish and aquatic invertebrate levels. They also maintain water quality by filtering sediments and pollutants.

WETLANDS WITH OPEN WATER COMPONENTS - NEED LARGER BUFFERS

Brown (1985) reports that 50 vertebrate species use the water-shrub edge for primary breeding or feeding; 46 use the water-forest edge, 98 use the riparian zone of herbaceous wetland, and 85 use ponds. Medin and Clary (1990-1991) found more than 3 times the bird biomass and species richness and mammal density and biomass in beaver ponds wetland complex than in adjacent riparian areas. USFWS reports show that wetland dependent species, dependent in part on open water, needed large buffers.

EVEN SMALL WETLANDS NEED BUFFERS

Size is not the main determinant wetland value to wildlife and need for protection. A Columbia basin study (Foster et al. 1984) showed that there was an inverse relationship between wetland size and waterfowl production. Highest density of ducklings were observed on wetlands of five acres or less in size and were particularly abundant.
on wetlands from 0.1 to 1.0 acre. In this study 68% of nests were within 100 feet of water and all but six of the rest were within 300' of the water.

Many amphibians achieve their highest densities in small wetlands (McAllister and Leonard, pers. observation). Long-toed salamander is one example. It cannot survive in the presence of healthy fish populations. It breeds in small temporary ponds. In small headwater streams of the Pacific Northwest, amphibians are the dominant vertebrates. Their numbers and biomass in these small streams are often greater than that of coldwater fishes in their optimal habitat (Bury et al. 1991)

Small wetlands are frequently very sensitive to impacts. For example, when stream gradient is greater than 4%, most beaver pond wetlands are less than 2 acres in size. They are very sensitive to silting and increased stream flows from logging in a watershed. They suffer greater losses from "blowouts" in high flow events. They may lose their soils and all vegetation in such an event.

DRY CLIMATES CONCENTRATE WILDLIFE USE

Influence of the water table on the landscape and vegetation is often reduced on the eastside of the state with more abrupt wetland-upland edges. Wildlife use tends to be concentrated closer to water in drier climates. Hall (1970) showed more narrow beaver use on streams in eastern California than had been reported in the literature (100' vs. 328'). Mudd (1975) showed minimum riparian area for maximum pheasant and deer use to be 75 feet in one eastern Washington study.

SUMMARY

To retain wetland dependent wildlife in important wildlife areas, buffers need to retain plant structure for a minimum of 200-300 feet beyond the wetland. This is especially the case where open water is a component of the wetland or where the wetland has heavy use by migratory birds or provides feeding for heron. The size needed would depend upon disturbance from adjacent land use and resources involved.

In western Washington wetlands with important wildlife functions should have 300' upland buffers for high impact (urban) land uses and 200' upland buffers for low impact (rural) land uses. In eastern Washington wetlands with important wildlife functions should have 200' upland buffers for high impact land use and 100' buffers for low impact land uses.

Priority species or especially sensitive animals or wetland systems such as bogs/fens or heritage sites may need even larger buffers wetlands to prevent disturbance or isolation of subpopulations or other loss of wetland function or value. See Attachments 1, 2 and 3 for buffer ranges.
Wildlife Needs in Shrub Vegetation Next To Wetlands:

Beaver
Literature: Allen, Arthur W. 1983. USFWS HEP Model. HEP Model models on 600' from wetland edge. Trees and shrubs closest to water are used first (Bradt, 1938). Majority of beaver feed within 328 feet of water. Study in dry environs: 90% beaver feed 100' from water (Hall, 1970).

Belted Kingfisher
Literature: Prose, Bart L. 1985. USFWS HEP Model. Broods use shrub cover along water for concealment (White, 1953). Roosts were 100 to 200 feet from water.