RIPARIANLANDS ARE WETLANDS: THE PROBLEM OF APPLYING EASTERN AMERICAN CONCEPTS AND CRITERIA TO ENVIRONMENTS IN THE NORTH AMERICAN SOUTHWEST

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The classification and delimitation of natural systems is complicated by much divergent, convergent, and parallel terminology often used only locally or regionally. Many of the concepts and terms now in use have evolved independently of one another either in different disciplines and/or in different geographic areas with their various languages. Nowhere does this cause more problems than in the classification of wetlands.

The periodicity of water (permanent, seasonal, ephemeral) and attendant hydrological and biological functions are the most basic features of the system that are examined in determining whether a particular locality or area is technically a wetland (or wetland habitat). It is an inescapable reality that our Southwest riparianlands are wetland systems that are naturally deployed in an enormous range of variation from perennial to periodic wetlands (Fig. 1). Yet under Eastern American criteria for wetlands, many of North America's watercourses and lakes, especially in the arid and semiarid regions of the West, but also in the East, would appear not to be wetlands at all.

Under the dichotomy aquatic vs. terrestrial for major earth environments, land habitats are visualized by many as wetlands versus uplands. Wetland habitats have been extensively classified in scores of papers. The latest "official" wetland classification (Cowardin et al. 1979) divides wetlands into basic categories called Systems. The wettest of the southwestern

riparian habitats fall into the Palustrine System but the riparian concept as such is not addressed in this classification.

Few would disagree that the continuous moisture gradient--from 100% saturated to <10% soil moisture--precludes a perfectly clear separation of all wetlands from uplands. We have recently discussed the intersecting moisture gradients for the directions and degrees of wetness that occur along watercourses (Johnson and Lowe 1985). The transriparian moisture gradient, which begins in a stream bottom and decreases as it crosses the riparian zone into the adjacent uplands, expresses itself in a change from aquatic to riparian, and finally, upland vegetation at a given locality. It is the intrariparian moisture gradient, which begins at the estuary or mouth of a river and decreases in moisture upstream toward the headwaters area on the watershed, that has received insufficient attention in its overall decreased moisture content from the better-watered eastern to the lesser-watered western regions of the continent. The current tendency is to classify and map wetlands on a site-specific basis with insufficient analysis of processes associated with the overall upland-wetland continua and mosaics.

The intrariparian gradients in the Southwest typically result in extensive stands of obligate riparian vegetation on the riparianlands nearer the river's mouth (e.g., cottonwoods--willow, Populus-Salix), gradually decreasing upstream to a narrow band of mixed obligate and preferential riparian trees (e.g., sycamore-ash, Platanus-Fraxinus), and ultimately to a more or less single row of facultative riparian small trees and shrubs along a desert wash or a dry montane drainageway at the headwaters of the basin. Thus, the perennial river communities commonly grade upstream into intermittent stream communities and finally those of the ephemeral drainageways. Johnson et al.

(1984) suggested the following for riparianlands, from wettest to driest: hydroriparian, mesoriparian and xeroriparian systems (Fig. 1).

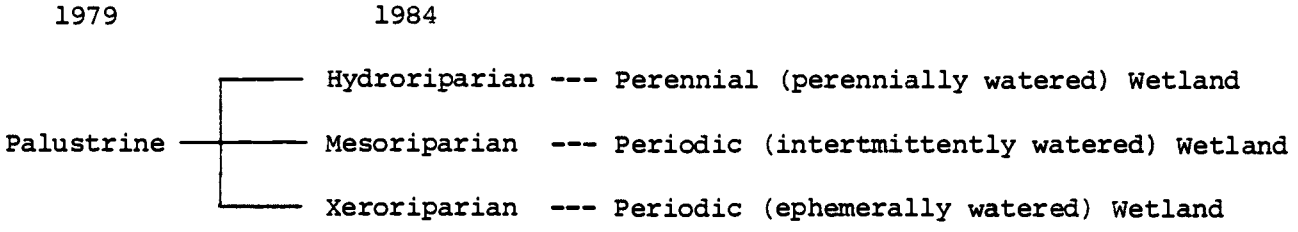

Fig. 1. Water in time and palustrine space in riparian wetlands in the North American Southwest (after Cowardin et al. 1979, Johnson et al. 1984).

Since water flows from uplands into wetlands, two major factors emerge in the study and characterization of wetlands--periodicity of inundation, and relation of the site at hand to uphill-downhill and upstream-downstream characteristics. Thus riparianlands are wetlands relative to the surrounding uplands. Even in the most extreme cases, such as in western Arizona under approximately 3 inches (75 mm) of annual rainfall, an ironwood-sahuaro (Olneya-Carnegiaea) community wash is clearly a periodic wetland community relative to the surrounding upland stands of creosotebush desertscrub (Larrea divaricata). Such riparian desertscrub systems are supported by infrequent water and sometimes by the flow of surface water only once or less during a year's time. These periodic wetlands support riparian systems that are also watered by subsurface flow or sheetflow run-off from higher areas. Such ephemerally watered riparian systems are among the least watered wetlands in the continental continuum of natural communities dependent on water import.

We suggest that North American wetland classification in the future include all of the variation in the North American natural communities dependent on water import, regardless of the periodicity or magnitude of the import.

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