Hydrophytic Plants in Arizona's Palustrine Landscapes

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Hydrophytes existing within desert environments or within states that have a high percentage of arid and sub-arid habitats, have been relatively poorly studied. The natural tendency for scientists interested in hydrophytes has been for them to seek out and live in parts of the world where wetland or aquatic conditions prevail. Nevertheless, although hydrophytes of arid and sub-arid regions may not be nearly as abundant as the xerophytes which typify those regions, they may have an importance to desert wildlife, to indigenous man and to modern culture that is more significant than their relative abundance might indicate.

Rivers and streams with their associated palustrine vegetation are valuable components of deserts even if they are somewhat intermittent and with fluctuations of inundantions. The prehistoric but relatively advanced Hohokam desert culture flourished by exploiting central Arizona's palustrine system. For more than 2,000 years man in the Sonoran Desert has learned from, modified, and mimicked by irrigation methods, the natural inundation cycles characteristic of palustrine situations. The close juxtaposition of hydrophytic and xerophytic vegetation in the Sonoran Desert of southern Arizona is illustrated in Figure 1.

Arizona's wetlands, as well as those in all forty-nine other states are of major interest to the National Wetlands Inventory program of the U.S. Department of the Interior. These landscapes are, among other things, habitats for fish and wildlife. It is through an analysis of this National Wetlands Inventory that the U.S. Fish and Wildlife Service will become better prepared to manage and protect specific aspects of this national resource.

The National Wetlands Inventory team has generated as one of its references a National Hydrophytes list. The plants found on this list represent those species found commonly in association with wetland or aquatic conditions. The list is quite extensive and represents a national index. There are of course regional differences and exceptions. In the interest of contributing to an accurate list of Arizona's hydrophytes, exacting records were kept during inventory field checks. Field checks were carried on throughout the state over a twelve month period (September 1978 to September 1979). During that period all indicator plants found on both the National Hydrophytes list and identified in palustrine systems in Arizona were recorded. Figure 2 illustrates a palustrine situation in Arizona.

There are several questions that come to mind when considering hydrophytic plants within desert environments. First, are hydrophytes truly a part of the desert environment or are they by definition

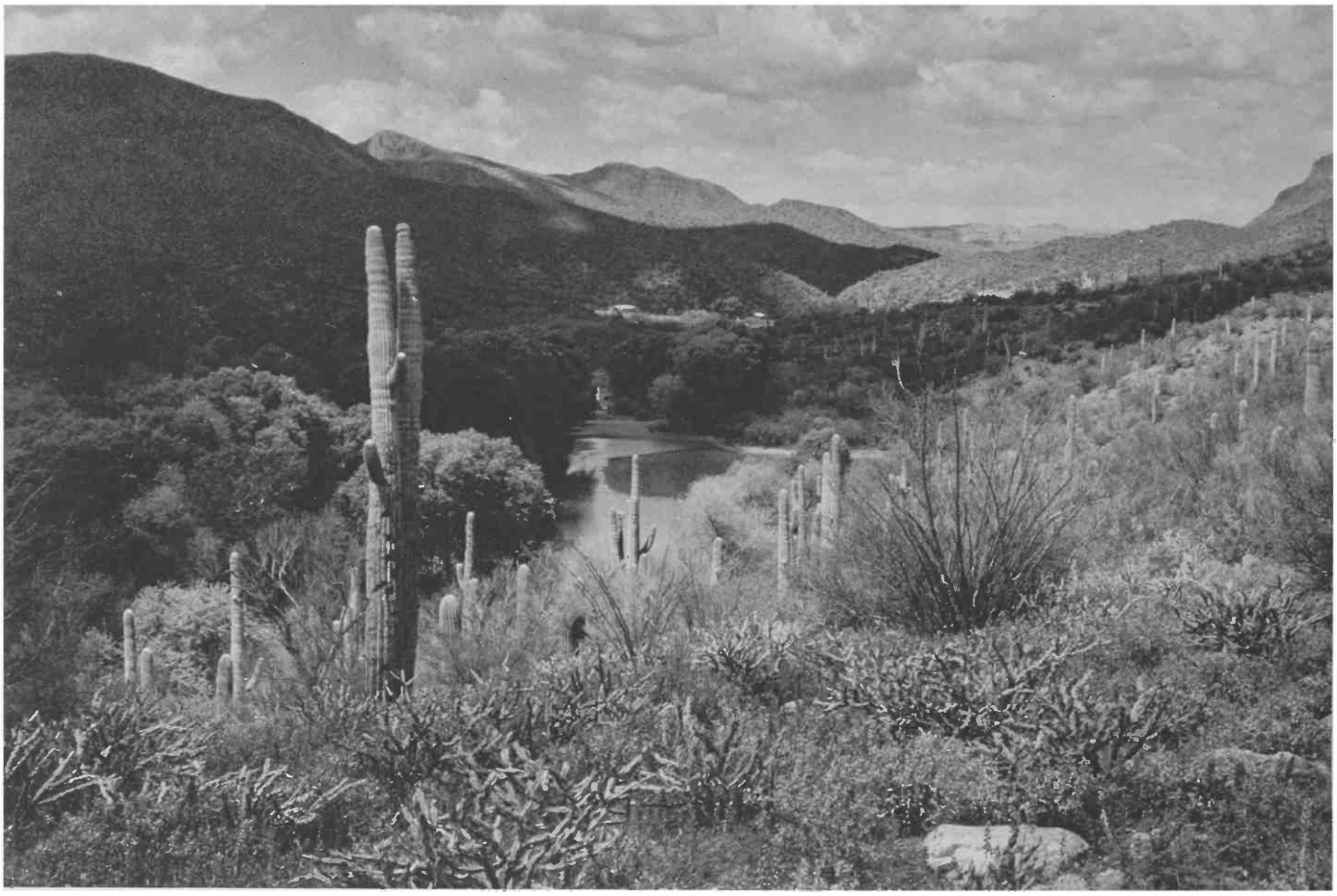

Figure 1. Example of the close juxtaposition of hydrophytic and xerophytic vegetation in the Sonoran Desert of southern Arizona.

separate entities? Hydrophytes are plants that grow in and are adapted to aquatic or wetland environments. Wetlands exist in Arizona for many of the same reasons they exist in Alaska or Florida. There is an excess amount of water found within the surface landscape. The difference between Arizona's wetlands and Alaska's wetlands is perceived not so much in their different points of origin as in the resulting influences the climatic factors have on the water body. An arid, semiarid or desert environment is defined primarily by the rate of potential evaporation compared to annual rainfall. Water bodies found

Table 1. Hydrophytic trees.

Genus	Species	Common Name
Alnus	*oblongifolia*	Arizona alder
Betula	*occidentalis*	Water birch
Celtis	*laevigata*	Sugar Hackberry
Fraxinus	*velutina*	Velvet ash
Juglans	*major*	Arizona walnut
Platanus	*wrightii*	Arizona sycamore
Populus	*fremontii*	Fremont cottonwood
Populus	*angustifolia*	Narrowleaf cottonwood
Salix	*gooddingii*	Southwestern black willow
Salix	*laevigata*	Red willow
Salix	*lasiandra*	Yellow willow tree
Salix	*taxifolia*	Yewleaf willow
Sambucus	*mexicana*	Mexican elderberry
Tamarix	*aphylla*	Athel tamarisk
Tamarix	*pentandra*	Tamarisk

Table 2. Hydrophytic shrubs.

Genus	Species	Common Name
Allenrolfea	*occidentalis*	Iodine bush, Jointfir
Baccharis	*emoryi*	Emory baccharis
Baccharis	*glutinosa*	Seepwillow baccharis
Baccharis	*sarothroides*	Broom baccharis
Cephalanthus	*occidentalis*	Common buttonbush
Cornus	*stolonifera*	Red-osier dogwood
Forestiera	*neomexicana*	New Mexican forestiera
Pluchea	*sericea*	Arrowweed
Rosa	*fendleri*	Fendler rose
Salix	*exigua*	Gray sand bar willow
Salix	*irrorata*	Bluestem willow
Sarcobatus	*vermiculatus*	Black greasewood
Vitis	*arizonica*	Canyon grape

Figure 2. An example of a palustrine situation in Arizona.

on the surface landscape in a desert situation quickly succumb to the prevailing forces of evaporation, transpiration and low supply. Wetlands are more the temporary or intermittent condition here in the desert. Therefore, hydrophytes are not xeric plants even though they may be found in the desert. Furthermore, hydrophytes offer genuine evidence that wetlands do survive and flourish under cyclic patterns here in Arizona (Figure 3).

Hydrophytes represent a very small percentage of the total number of plant species found in Arizona. However, they are highly valued as a source of both food and shelter for a large variety of animal species.

Table 3. Hydrophytic forbs.

Genus	Species	Common Name
Alisma	*triviale*	Water plantain
Centaurium	*calycosum*	Rosita, Centaurium
Helianthus	*annuus*	Sunflower
Hippuris	*vulgaris*	Marestail
Lemna	*triscula*	Ivy duckweed
Mentha	*arvensis*	Field mint
Myriophyllum	*spicatum*	Water-milfoil
Nymphaea	*odorata*	Skunk cabbage, Waterlily
Polygonum	*pennsylvanicum*	Smartweed
Potamogeton	*gramineus*	Pondweed
Ranunculus	*aquatilus*	Buttercup
Ranunculus	*hydrocharoides*	Buttercup
Rorippa	*aquatica*	Watercress
Rumex	*acetosella*	Sheep sorrel
Sparganium	*emersum*	Bur reed
Suaeda	*nigrescens*	Seepweed
Utricularia	*vulgaris*	Common bladderwort
Xanthium	*strumarium*	Abrojo, Cocklebur
Zannichellia	*palustris*	Common poolmat

Table 4. Hydrophytic grasses.

Genus	Species	Common Name
Agropyron	*smithii*	Western wheatgrass
Arundo	*donax*	Giant reed
Distichlis	*spicata*	Salt grass
Echinochloa	*crusgalli*	Barnyard grass
Glyceria	*borealis*	Northern mannagrass
Phalaris	*arundinacea*	Reed canary grass
Phleum	*alpinum*	Alpine timothy
Phleum	*pratense*	Timothy
Phragmites	*communis*	Reedgrass
Poa	*palustris*	Fowl bluegrass
Sorghum	*halepense*	Johnson grass
Sporobolus	*airoides*	Alkali sacaton

Figure 3. Example of a drainageway with a markedly cyclic pattern of inundation.

Many of our native mammals, birds and lesser forms of wildlife as well as large numbers of migratory waterfowl, shorebirds, and upland species depend on these hydrophytes for food and cover during the spring and fall migration.

Finally, it is important to think of hydrophytes as indicators of environmental variation and uniqueness within our desert setting. Ultimately we must see any environment in its total setting if we are ever to understand what it means. Plants and landscapes viewed as compositions of life forms help us to conceptualize the natural world around us and to understand what sensitive orientations, if any, we may have towards it. An orchestration of many natural and man-made processes is fundamental to the development of any environmental composition. Wetlands and hydrophytes, in their varying forms, help us see changes in one of the most influential processes of all—the extension of human ecosystems into the natural ones. The future of our hydrophytes, our wetlands, and our environments here in the arid Southwest is linked to the managerial vision we develop as a culture. Here in the desert any environmental disturbance is felt with a greater degree of severity than in more flexible ecosystems. We face the future with both an enormous burden and an even greater opportunity for wise environmental planning.

The list of Arizona hydrophytes presented here (Tables 1–5) represents those plant species found in the most common system—the Palustrine System. It is not intended to be a complete list but rather one which accurately represents some of the indicator plants used to classify our state's wetlands and aquatic habitats.

Table 5. Hydrophtic grass-like plants.

Genus	Species	Common Name
Carex	*athrostachya*	Sedge
Carex	*rostrata*	Beaked sedge
Carex	*stipata*	Sedge
Cyperus	*erythrorhizos*	Flat sedge
Eleocharis	*bella*	Spikerush
Eleocharis	*macrostachya*	Creeping spikerush
Eleocharis	*parvula*	Spikerush
Equisetum	*laevigatum*	Horsetail
Juncus	*mexicanus*	Mexican rush
Juncus	*saximontanus*	Rush
Scirpus	*acutus*	Hard-stem bulrush
Scirpus	*americanus*	Swordgrass
Scirpus	*californicus*	Giant bulrush
Scirpus	*olneyi*	Bulrush
Scirpus	*paludosus*	Saltmarsh bulrush
Scirpus	*validus*	Softstem bulrush
Typha	*angustifolia*	Narrow leaved cattail
Typha	*latifolia*	Common cattail