

Introduction

Due to their rich alluvial soils and proximity to major transport corridors, riparian forests have long been a focus of human activity. Floodplain forests and high quality free flowing aquatic habitats have almost completely disappeared in Europe (Peterken and Hughes, 1995). They are among the most threatened ecosystems in North America (Noss et al., 1995). Although North America's rivers have been severely degraded, especially in the more populated areas, a few high quality riparian habitats remain in the upper reaches of the Allegheny River in Warren and Forest Counties, Pennsylvania. Seven islands in this region form one of two Congressionally designated Wilderness areas in the state of Pennsylvania. At 368 acres, the Allegheny Islands Wilderness is the smallest federally designated Wilderness in the U.S. The islands are located on a 15 mile stretch of the river between Buckaloons Recreation Area and Tionesta. Old growth, virgin, or impressive river bottom forests can be found in parts of Crull's Island (96.2 acres), Thompson's Island (60 acres), Courson Island (61.5 acres), and King's Island (35.7 acres). Most of the trees on Baker Island (66.9 acres) were destroyed by a tornado in 1985, while R. Thompson's Island (30 acres) was hit by a local tornado in 1975 (USDA Forest Service 1997). Two federally endangered mussels, the clubshell (*Pleurobema clava*) and the northern riffleshell (*Epioblasma torulosa ranqiana*) have been found in the riffle habitats associated with the islands. Several rare fishes, notably the bluebreast darter (*Etheostoma camurum*) and the spotted darter (*E. maculatum*) also frequent the riffle habitats (Anonymous 1988). Portions of the upper Allegheny have been listed as a recreational river in the Wild and Scenic River System in the United States (USDA Forest Service 1992).

Geology and Physiography

The upper reaches of the Allegheny River in northwestern Pennsylvania traverses a maturely dissected terrain. The river has formed a narrow (less than one mile wide) floodplain cut deeply (400-700 feet) into the Devonian, Mississippian, and Pennsylvanian aged sandstones, shales, and conglomerates of the unglaciated Allegheny Plateau. Prior to the Pleistocene, the upper reaches of the Allegheny drained to ancestral Lake Erie. Ice later blocked the drainage to the north and the northwest, backing water up until it flowed over the lowest ice-free divides, joining several sections of the existing Allegheny River which now flows to the south (Kaktins and Delano, 1999). Relief on the Allegheny River islands is limited to 5 to 10 feet. Rich soils derived from reworked glacial outwash and recent alluvium from the uplands blanket the islands. The soils vary considerably in texture and drainage category. King's Island is almost entirely dominated by the Wayland series, a poorly drained, fine silty Mollic Fluvaquent (a wet, poorly developed floodplain soil). The Philo series, a moderately well drained, coarse-loamy Fluvaquentic Dystrochrept (a relatively young, low base saturation floodplain soil), and the Pope series, a well-drained, coarse-loamy Fluventic Dystrochrept, are more common on the higher elevations of Crull's and Thompson's Islands (Ceruti, 1985).

History

The Allegheny River valley has a rich human history. Its water has been a major transport corridor and its rich alluvial soils have been a habitat for maize agriculture since the Woodland period. Several major villages of Senecas and Delawares, Lower Goschgoschink at Tionesta and Upper Goschgosching at West Hickory were located along the Allegheny in present day Forest County (Wallace, 1965; Kent, Rice, and Ota 1981). Thompson's Island was the site of the only battle of the Revolutionary War in northwestern Pennsylvania. Colonel Brodhead defeated the Senecas in 1779 on the island in an invasion of the western part of the Iroquois heartland authorized by George Washington. The headwaters of the Allegheny supported large stands of light, buoyant, easily-worked, white pine which were cut and rafted down river to Pittsburgh in the 19th century. About one-third of Crull's Island was farmed until the difficult access made farming unprofitable. King's Island has two abandoned oil wells (Walters and Williams, 1999) and a hunter's blind. Over 25 separate land parcels on property abutting the river, totaling over 9500 acres, and 21 islands were purchased by the Western Pennsylvania Conservancy in the 1970s, 1980s, and 1990s with the objective of protecting the river's scenic beauty and wildlife habitat (Anonymous, 1988, 1992). The land was later turned over to the US Forest Service. Seven islands, totaling 368 acres, were designated a state wilderness in 1984 and a national wilderness area in the 1990s (US Forest Service, 1997).

Ecology

King's Island is one of the more accessible islands of the Wilderness area (see map). It is situated downstream from a publicly owned boat launch site, set amidst a riparian forest of large, multistemmed, silver maple (*Acer saccharinum*) one mile south of West Hickory. Silver maple is a rapidly growing, fairly shade intolerant species that is largely confined to riparian areas. Like most other riparian species it can tolerate long periods of inundation. Its multistemmed nature has been attributed to resprouting following ice damage and flooding. The groundlayer is dominated by sensitive fern (*Onoclea sensibilis*). Ninebark (*Physocarpus opulifolius*), silky dogwood (*Cornus ammomum*), and buttonbush (*Cephalanthus occidentalis*) are common shrubs. Note the abundance of lianas (riverbank grape (*Vitis riparia*) and wild cucumber (*Echinocystis lobata*)).

The riffle habitat on the northwest side of King's Island is prime mussel, darter, and water-stargrass (*Heteranthera dubia*) habitat. Several studies have been completed on niche partitioning of darters in the upper reaches of the Allegheny (Stauffer et al., 1996). *Spartina pectinata*, cordgrass or slough-grass, a characteristic species of wet prairies in the Midwest, is common on the small island to the northwest of King Island.

Although several studies have been completed on the bottomland forests of the Allegheny River (Pierce 1981; Williams et al., 1999), only two surveys of the Allegheny River's islands have been reported (Whitbeck, Hartman, and Brenner 1997; Walters and Williams, 1999). King's Island is fringed with canary reed grass (*Phalaris arundinacea*) and black willow (*Salix nigra*). The interior of the island can best be characterized as a savanna of large silver maple and sycamore (*Platanus occidentalis*) and several other

bottomland species interspersed with glades of various composites (*Eupatorium rugosum*, *Rudbeckia laciniata*, and *Solidago* sp.). Importance values (rel. density + rel. frequency + rel. basal area/3 for the large (10+ cm dbh) trees of the island are as follows: silver maple (56.2), sycamore (18.2), white ash (5.1), butternut hickory (2.8), black willow (5.2), basswood (trace), red elm (3.3), peachleaf willow (2.4), black locust (3.2), butternut (1.8), and hawthorn (1.6) (Walters and Williams, 1999). The ground layer also includes a number of weedy species characteristic of rich areas and disturbed sites (wood nettle (*Laportea canadensis*), jumpseed (*Polygonum virginianum*), Canada avens (*Geum canadense*), and vervian (*Verbena* sp.) as well as a number of wetland indicators (jack in the pulpit (*Arisaema triphyllum*), skunk cabbage (*Symplocarpus foetidus*), and jewelweed (*Impatiens* sp.). Three to five feet high stands of ostrich fern (*Matteuccia struthiopteris*) are also common. Soil texture, depth to the watertable, and frequency of flooding and abrasion are among the more important factors influencing the composition of the herbaceous layer and the tree strata (Menges 1986; Hupp, 1990).

Major Threats

Major threats to the integrity of the islands include the establishment of a number of number of invasive aliens (multiflora rose (*Rosa multiflora*), Japanese knotweed (*Fallopia japonica*), garlic mustard (*Alliaria petiolata*), dames rocket (*Hesperis matronalis*), purple loosestrife (*Lysimachia thyrsiflora*) and stinging nettle (*Urtica dioica*). The exotics increase with human disturbance and have the ability to significantly alter ecosystem structure and function. Overbrowsing by white-tailed deer and the apparent lack of regeneration of the silver maple and the sycamore are other problems. Regeneration of the maple and sycamore may be episodic or it may have ceased with the construction of the Kinzua Dam upstream in 1965. Most riparian ecosystems have adapted to thousands of years of varying water levels and disturbances associated with floods. Flow is currently regulated by release from the dam. It's been suggested that the spring floods in the predam period and the resulting scouring action formerly created the mineral soil seedbed conditions required for silver maple's establishment (Walters and Williams 1999).

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