Natural Floodplain Ecosystems

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Floodplain rivers in their natural form are in a constant state of change, roaming about across unrestricted floodplains, creating and destroying side channels, backwaters, oxbow lakes, and a variety of other habitats. In this process, over long time periods, rivers maintain a relative balance between these various habitats (Figure 1), a situation called "Dynamic Equilibrium" (National Research Council 1992). The floodplain serves as an important part of the river itself, acting as a check valve to absorb high flows or flood pulses, as a kidney to cleanse runoff waters, as a mechanism of energy exchange, and as temporary and seasonal habitats for its biological components. In fact the presence of a periodic flood pulse is a key factor in maintaining a healthy river ecosystem (Bayley 1991 and Junk et al. 1989).

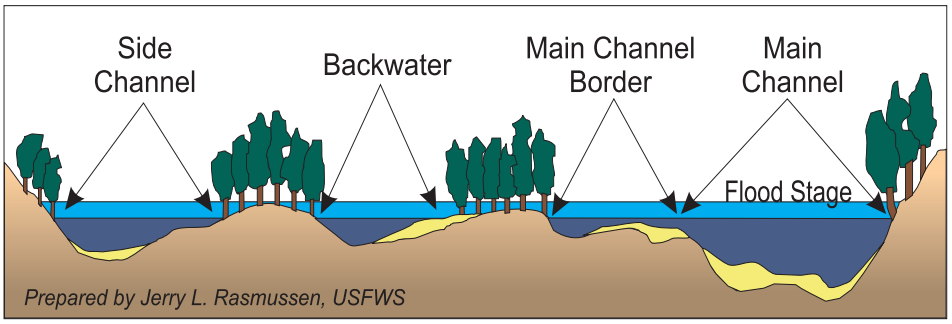

Figure 1. Natural floodplain habitats are a constantly changing mix of shallow floodplain channels, backwaters, and terrestrial habitats, maintaining a situation called "dynamic equilibrium".

The floodplain's alternately flooded and dried habitats are known to biologists as the Aquatic Terrestrial Transition Zone or ATTZ (Figure 2 and 3). This area of periodically flooded vegetation plays an extremely valuable role in cleansing runoff waters and in the transfer of nutrients between a river and its floodplain (Junk et al. 1989). It is also used extensively by riverine fishes for spawning, feeding, and rearing of their young. The native fishes of any river have evolved and adapted to habitats created by these natural processes, and are themselves impacted when "Dynamic Equilibrium" and the "ATTZ" are lost. Unfortunately, the very purpose of man's development projects has been to control our rivers and to

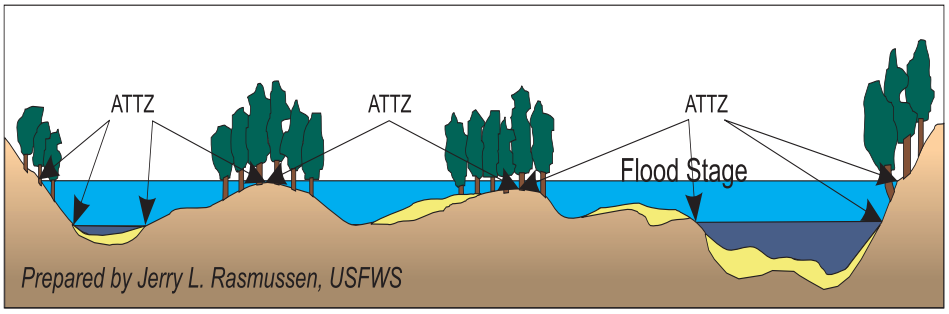

Figure 2. In alternating between its aquatic and terrestrial situation, the ATTZ allows for rapid recycling of nutients and serves as a seasonal fish feeding and spawning habitat.

disrupt these dynamic processes — therein lies the conflict between natural and man-made systems.

Figure 3. View of flooded ATTZ habitat.

References

Bayley, P.B. 1991. The flood pulse advantage and the restoration of river-floodplain systems. *Regulated Rivers: Research & Management*, Vol. 6, pp. 75-86.

Junk, W.J., P.B. Bayley, and R.E. Sparks. 1989. The flood pulse concept in river-floodplain systems, pp. 110-127. In: D.P. Dodge (ed.) *Proceedings of the International Large River Symposium.* Can. Spec. Publ. Fish. Aquat. Sci. 106.

National Research Council. 1992. Restoration of Aquatic Ecosystems. National Academy Press, Washington, D.C. 552 pp.

Jerry L. Rasmussen, March 9, 1999