Off-Road Vehicles and Their Impact on Stream Environments
A Policy Statement From the Texas Chapter of the American Fisheries Society
January 2002

Off-road vehicles (ORVs) can traverse small streams, which are found in abundance throughout Texas. The scientific findings concerning the impacts from these vehicles upon these environments, across a broad expanse of North American streams, have been overwhelmingly negative. Even ORV advocacy groups and vehicle manufacturers have stressed the importance for vehicle riders to avoid stream habitats because of the damage that these vehicles cause to these environments. Although studies on the impacts from ORVs on specific Texas aquatic habitats are less numerous, the conclusions of studies conducted on streams in this state parallel the conclusions of many others.

In general, the impact of ORVs is one of disturbance, an ecological consideration of great importance in the determination of aquatic communities, their structure, and their persistence. Disturbance is also a subject of a rich body of scientific literature. In many Texas streams, disturbance has a simplifying effect upon the aquatic biota. Species diversity is reduced, trophic interactions are simplified and some species are unable to adapt and disappear from the modified environment. These can include some of the more desirable species, including a number of sport fishes, and rare or imperiled species. Impacts can occur throughout all seasons as different species utilize the shallow waters for reproduction, as nursery areas and as feeding areas. Habitats that are repeatedly used as crossing points have their vegetation and substrates disrupted which in turn changes the nature of the benthic fauna, detrimentally affecting higher trophic levels. Shallow water areas in Texas streams, which are used by ORVs, represent breeding areas for species such as some minnows, suckers and darters during different parts of the year. These areas often form nursery areas for these and other species, such as catfish, throughout the year. Finally, invertebrates are often diverse and abundant in these habitats and these provide foods for many fishes, including those of significant sport value.

The Texas Chapter of the American Fisheries Society joins many other groups in advocating restrictions that limit off-road vehicle access and use in publicly owned stream and river habitats.

Background

Off-road vehicles damage streams, in part because they break down stream banks and this, in turn, causes damage to the riparian vegetation along and in the stream course. This results in erosion, siltation and the prevention of bank stabilization, which increases the potential for other water pollution impacts (Harrison 1980, Wilshire 1983, Edwards and Burns 1986, Allan 1995). With respect to many game species, individuals are more easily encountered in the areas with the least disturbance (Payne et al. 1983, Swanson and Franklin 1992, Rieman and McIntyre 1993).

These vehicles, when driven near streams, also cause damage to riparian vegetation. Payne et al (1983) recorded a direct relationship between the number of trips over an area and the amount of damage to vegetation; up to 99% vegetation loss resulted after 32 passes with an all-terrain vehicle. Vegetation loss was found to carry over into subsequent years and, after one year, up to 85% of all-terrain vehicle tracks were still visible. Some tracks were still evident two years after the last passage of an off-road vehicle. Studies on barrier islands showed that

although infrequent travel over dune vegetation had noticeable immediate impacts, permanent damage was ultimately caused by repeated travel over the same track (Judd et al. 1989). In a comparison of soil erosion in areas with ORV usage and a comparable area where ORVs had been restricted, Snyder et al. (1976) found that due to vegetation damage, the area with ORVs had eight times as much soil erosion as the control area. On trails near creek crossings, McKnelly (1980) found that riders expand trail widths in these areas to avoid potholes and caused root damage to trees nearby through repeated contact with ORV tires.

Off-road vehicles are also a major factor in the spread of non-native plants across the country. By disturbing soils and carrying seeds, ORVs make it easier for exotic plants to become established. A Montana study showed that one ORV can spread 2,000 knapweed seeds over a ten mile area during a single trip (Lacey et al. 1997).

Off-road vehicles also cause severe air and water pollution, expelling 20 to 30 percent of their oil and gasoline unburned into air and water (Harrison1976) and producing as much as 4000 times more carbon monoxide emissions and 118 times as many smog-forming pollutants as modern automobiles on a per-mile basis (California Air Resources Board 1998, U.S. Environmental Protection Agency 1999). These types of pollutants were shown to have measurable impacts to stream environments (Zampella 1994).

Off-road vehicles also affect the behavior of many wildlife species, causing them to avoid areas used by ORVs. Other impacts include direct mortality from unintentionally striking animals, harassment, and habitat modification (Bury and Marlow 1973). Noise from these vehicles also affects the ability of wildlife to find prey, avoid predators, and successfully reproduce. Damage to stream bottoms and increased siltation from ORVs may further impact fishes by changing the local temperatures of streams, causing extreme temperatures to increase. Many fish rely on certain temperature changes for reproduction, and the increased variability can lead to population decreases (U.S. Department of the Interior and U.S. Department of Agriculture 1999). Other changes resulting from disturbances from ORVs include changes in stream benthic communities and community organization (Peterson 1994, Buzby 1998, Covich et al. 1999).

In a preliminary study of impacted and unimpacted sections of the Nueces River, Garrett (in litt.) found obvious impacts to the physical habitat at the site used by ORVs, including a heavily scoured appearance and lack of aquatic vegetation at the impacted site. They also found significant differences between the two sites with respect to their fish communities. The modified site contained less than half of the number of fishes found at the unmodified site, and the species compositions were significantly different. Pollution tolerant species dominated the fish community, species requiring edge habitats were missing and environmentally sensitive species were in greatly reduced abundances. In addition, sport fishes were not found to be abundant in the impacted site.

Because of prior evidence of damage from ORVs, their unregulated use on many state and federal lands has now been restricted. Executive Orders 11644 and 11989 (signed by Presidents Nixon in 1972 and Carter in 1977) were issued to "ensure that the use of off-road vehicles on public lands will be controlled and directed so as to protect the resources of those lands, to promote the safety of all users of those lands, and to minimize conflicts among the various uses of those lands." In Texas, streams are among the largest class of public lands in the state. Even advocates for ORVs and their recreational users admonish caution when using these vehicles near stream environments (e.g. see the internet sites www.suvone.com/suv415.htm, www.atvsafety.org/content/respectforoutdoors.html or www.treadlightly.org for information on

"Tread Lightly" and other responsible land use initiatives). It would seem only prudent that similar concern be expressed for the impact of ORVs on these lands as are shown for federal lands.

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