

MOTIVATION FOR BANNING THE USE OF JET BOATS ABOVE THE ISLAND IN THE KROMME RIVER, EASTERN CAPE

Dr. G.J.Youthed, March 2014

All motorized watercraft have an impact on tidal rivers and estuaries where they operate and can cause damage to these fragile ecosystems. This damage affects the river banks, the water quality and the aquatic fauna and flora.

Damage to the banks is caused by the wake of the passing boat and this erosion can be substantial (Maryland Department of Natural Resources, 1980). The extent of the damage depends on a number of factors including:

1. The size of the boat and the horsepower, with larger, more powerful boats generally producing greater wakes. (Chesapeake Bay Program Technical Studies, 1982).
2. The type of propulsion system is also important and jet boats/jet skis have been shown to produce a wake which is 2-80 bigger than the background waves with from 2 to over 100 times the energy (McConchie & Toleman, 2003). Outboard powered boats generally produce smaller wave amplitudes with less energy. Jet boats produce larger wakes particularly if the stern is loaded (Hill & Younkin, 2005).
3. The speed at which the boat is travelling, with high speeds generally producing larger, more energetic wakes.
4. The nature of the river bank affects erosion in that the finer sediments in the upper reaches of rivers are generally more easily eroded than the coarser sediments in the lower reaches.
5. The distance from shore. The closer the boats are to the bank the greater the force exerted. In the narrow upper reaches of rivers boats necessarily have to travel closer to shore than in the broader lower reaches. They also approach the shore more closely when circling while towing skiers.

In addition to the damage caused to banks the wakes created by boats may have a direct impact on subaquatic vegetation (Chambers, 1987; Coops, Boeters & Smith, 1991) and also on benthic fauna and epifauna on the seagrass leaves (Bishop, 2003).

Erosion of the river banks causes a large amount of sediment to be suspended in the water. This sediment increases the turbidity thus decreasing the penetration of light and this has an adverse effect on subaquatic vegetation (eelgrass) and benthic organisms leading to a decrease in the overall productivity of fish and crab populations (Hill & Yonkin, 2005). This sediment also affects fish directly as it reduces the availability of plant food and the visibility of pelagic food. It also clogs gill rakers and gill filaments (Bruton, 1985). The sediment gradually settles out but every time a motorized boat passes it produces a turbulent flow field and the sediment is re-suspended (Gucinski, 1981). The depth of the water plays a critical role in this re-suspension as boats create greater turbidity when travelling in shallower water as the downward pressure of water created by the craft reaches the sediment with greater energy. It has been shown that boats travelling in water of less than 2.2 meters cause a statistically significant increase in turbidity and light attenuation

(Klein, 2007). It has also been shown by McConchie & Toleman (2003) that jet boats and jet skis produce turbulence flow fields considerably greater than the turbulence created by an outboard engine due to the nature of their propulsion systems. The duration and extent of boating activity and the characteristics of the water body sediments also play a role. The upper reaches of rivers generally have finer sediments which are more easily re-suspended.

While some authors have proposed that the turbulence caused by boats would increase the level of dissolved oxygen in the water it has been shown by Yousef (1974) that while boat activity initially increases dissolved oxygen levels the uptake of oxygen by the suspended particles also increased. Boating activity also increases water pollution through engine discharges.

It is therefore clear, that although all motorised boats have a negative impact on river ecosystems, this effect is more marked in the upper reaches of rivers which are both narrower and shallower and have finer sediments. Jet boats and jet skis have more of an impact on the environment than propeller driven boats due to their larger more energetic wakes and the fact that their propulsion system causes more sediment re-suspension. It would therefore be in the interests of the environment to ban the use of these boats above the island in the Kromme River. Consideration should also be given to limiting access to the shallower upper reaches of the Kromme and Geelhoutboom rivers to smaller boats with lower horsepower motors.

References

- Bishop, M.J. 2003. Making waves. The effects of boat-wash on macrobenthic assemblages of estuaries. PhD Thesis, University of Sydney.
- Bruton, M.N. 1985. The effects of suspensoids on fish. *Hydrobiologia* 125, 221-241.
- Chesapeake Bay Program Technical Studies: A Synthesis 1982. Variables in boat induced turbidity.
- Klein, R. 2007. The Effects of marinas & boating activity upon tidal waterways. Community & Environmental Defense Services, Maryland.
- McConchie, J.A. & Toleman, I.E.J. 2003. Boat wakes as a cause of riverbank erosion: a case study from the Waikato River, New Zealand. *Journal of Hydrology (NZ)* 42(2): 163-179.
- Chambers, P.A. 1987. Nearshore occurrence of submerged aquatic macrophytes in relation to wave action. *Canadian Journal of Fisheries & Aquatic Sciences* 44:1666-1669.
- Coops, H., Boeters, R. and Smith, H. 1991. Direct and indirect effects of wave attack on helophytes. *Aquatic Botany* 41:333-352.
- Gucinski, H. 1981. Sediment suspension and resuspension from small-craft induced turbulence. Chesapeake Bay Program, U.S. Environmental Protection Agency, 401 Severn Avenue, Annapolis, MD 21401.

- Hill, D.F. & Younkin B.D. 2005 Biological Impacts of Hydraulic Disturbances Associated with Jet Boating on the Chilkat River, Alaska. Department of Civil & Environmental Engineering. The Pennsylvania State University. University Park, PA 16802
- Maryland Department of Natural Resources, 1980. Final report on the role of boat wakes in shore erosion in Anne Arundel County, Maryland. Coastal Resources Division, Tawes State Office Building, Annapolis, MD 21401.
- Yousef, Y.A. 1974. Assessing effects on water quality by boating activity. U.S. Environmental Protection Agency, Washington, D.C. 20460.EPA-670/2-74-072.