"Integrated Water Resource Management at the Local Level for the Sustainability and Betterment of Riparian Communities"

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Attempts to Achieve a State of Betterment through Sustainable Multi-Disciplinary Integrated Water Resource Monitoring and Management Programs

To assess baseline conditions of many inland lakes, the Michigan Department of Natural Resources and Environment (MDNRE) has instituted the Lake Water-Quality Assessment (LWQA) Monitoring Program to measure water quality parameters in 700 Michigan inland lakes between 1997 and 2015. The federal constituents include the United States Geological Survey (USGS) and local support is derived from volunteer citizens and riparians through the Cooperative Lakes Monitoring Program (CLMP) which was created by the Michigan Lake and Streams Association (MLSA). Field data from all of these stakeholders will then be calibrated with satellite data to obtain modernized lake data in a timely and economically efficient manner during future years. This program is an example of a sustainable one which utilizes local, state, and federal resources for the determination of the water quality status of inland lakes at both temporal and spatial scales.

Water quality programs which monitor water resources for the protection of both communities and the environment are not unique to the United States. The Government of Canada produces an annual report on Canadian Environmental Sustainability Indicators which includes air quality, greenhouse gas emissions, and freshwater quality data to educate citizens of current environmental conditions. A recent report issued by the Government of Canada in 2007 indicated that non-point source pollution had increased and exceeded aquatic life protection standards. The purpose of the report was to educate the citizens and garner support for the improvement in measured parameters throughout Canada. Although the publication was not procedural in an offering of mitigation strategies or resources, it did reach most of the country and increased education could lead to better decision-making throughout most susceptible regions. These examples highlight the need for proactive local resources that can address water quality issues on a manageable scale. Furthermore, adequate resources and access to data must accompany a willingness to learn by local municipality officials and citizens. In the case of non-point source pollution, it has been recommended that management strategies of phosphorus originate in areas of higher probability of phosphorus loading, such as high erosion and surface runoff areas (Heatwole et al., 1987; Heathwaite and Johnes, 1996).

CONCLUSION

The availability of baseline and continuous water quality data will allow for the determination of critical mitigation measures that may be needed for water quality improvements and critical retention of good water quality for the betterment of the riparian communities who rely on these resources for their well-being and financial security. I argue that it would be wise to incorporate the municipalities into both monitoring and decision-making programs since the total revenues for each local unit of government are dependent on the taxable values of properties around the lake which have been shown to significantly decline with degradation in water quality. Furthermore, education of local officials would allow for future municipal positions to acquire Integrated Water Resource Management training which would be a component of a sustainable and continuous program.

Wolman (1965) proposed the concept of urban metabolism in that the material flows into an urban setting should not proceed to excess, especially without increases to the outflow of materials from daily consumption in a manner that is minimally detrimental to life. This concept could be directly applied to both the influxes of non-point source pollutants from the immediate watershed and urban shoreline development impacts to water quality and possibly incorporated into a functional framework for the reduction of pollutant loads and water quality degradation. If we can determine the amounts of non-point source loads a particular lake can accommodate without impairment to key indicators of abiotic and biotic integrity, then loading rates (such as Total Maximum Daily Loads, or TMDL's) can be more readily established and the system can achieve a steady-state of sustainability as long as those levels are not exceeded. Furthermore, the determination of Critical Source Areas (CSAs) assists conservation and land use planners with management decisions within a specific watershed (Sivertun et al., 1998). Walker and Salt (2006) emphasize the importance of the recognition of resilience with respect to natural systems which envelops the concept that ecosystems vary in their abilities to absorb disturbance and remain functional. Insight into this probability of disturbance assimilation is usually executed with the development of ecological scenarios where various aspects of the system are analyzed with respect to known or predicted disturbances. An intimate knowledge of the lake and surrounding characteristics along with socio-economic factors therefore

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becomes critical for the determination of precise scenarios that may encourage sustainability and protection of the lake within the community. With all of this information present, the riparian communities may then continue with normal activities and perhaps even grow, with the prospect of betterment toward both property attributes and those of the lake ecosystem.

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More on Wake Boats

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Rarely has an issue involving Michigan lakes stirred up as much controversy and anger over the last few years as so-called "wake boats" (also sometimes referred to as wave boats, wakeboard boats, wake-surf boats, bladder boats or ballast boats). Both this magazine and the Michigan Lake Stewardship Associations (formerly, the Michigan Lake & Stream Associations) ("MLSA") have received a great deal of public input regarding wake boats, both pro and con. Even though I have written two fairly recent articles for this magazine regarding wake boats (the Fall, 2013 article entitled "Of Mosquitoes and Killer Bees" and a more recent article titled "The Killer Bees Appear to be Winning – An Update regarding Wake Boats/Bladder Boats" in the Fall, 2017 issue of the magazine), readers still request more information about the potential negative impacts of wake boats.

Many riparians are outraged at what they perceive as significant negative impacts on both water safety and the environment from wake boats. Many riparians insist that the huge waves produced by wake boats are destroying their shoreline and sea walls. A significant number of riparians are also concerned about safety given that the large waves created by wake boats can roll around moored boats, break mooring lines, and create turbulent conditions in near-shore areas. They argue that wake boats should not be allowed on smaller or narrow lakes, and that wake boats should be required to remain a significant distance from shore on bigger lakes when the wake boats are producing waves.

Both this magazine and MLSA have also heard from owners of wake boats. Some of those owners have been reasonable advocates for their position and have suggested courtesy and thoughtfulness as a way of overcoming any perceived problems created by wake boats. They point out that few if any definitive scientific studies have been done to demonstrate conclusively that wake boats harm the shoreline, destroy sea walls or hurt the environment. They also argue that some of the shoreline damage that is occurring is due to high water rather than wave action created by wave boats. Other advocates of wake boats have not been as polite. They accuse the people complaining about wake boats of being uninformed and oppose any further governmental regulation that would "take away their property rights."

It is true that very little scientific research has been done regarding the negative impacts of wake boats, as wake boats are a fairly recent phenomena, at least on a large scale. A study done on the Chesapeake Bay area in 2017 by the Scientific and Technical Advisory Committee was fairly critical of wake boats. Of course, some of the complaining riparians assert that scientific proof is not needed as they have personally seen the large waves created by a nearby wake boat smash into the shore and thrash around moored boats. Nevertheless, more scientific and empirical based objective studies regarding the physical impacts of wave boats would be helpful.

It does seem self-obvious that wake boats probably are not appropriate for small or narrow lakes. By definition, if a lake (or portion of a lake) is no more than 200 to 300 feet wide, a wake boat operating in the center of that narrow area can still throw huge waves within the normal 100 – 150 foot setback from shore. One can only imagine what would happen if a new truck were designed aerodynamically such that when it is lawfully operated on a public road, the shock waves knock over mailboxes, fences and landscaping items adjacent to the road. The public outcry would be deafening and undoubtedly there would be legislation enacted immediately prohibiting or regulating such truck design. Many riparians (particularly on smaller lakes) will appreciate that analogy.

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