



## Background

With roots in Mobile, Alabama, McFadden Engineering brings nearly a century of combined experience in civil and environmental engineering to the Southeastern United States. Our team of professional engineers and professional geologists are licensed in Alabama, Florida, Georgia, Louisiana, Tennessee and Mississippi, and are ready to solve unique challenges through our integrative and innovative approach.

## Our Philosophy

At McFadden Engineering, we succeed when our clients succeed. By prioritizing our client relationships, we can anticipate potential challenges and offer innovative engineering solutions to achieve their goals.



## Managing Alabama's Natural Resources

*By: Frank McFadden*

Alabama is blessed to have an abundance of surface water and rainfall, maybe too much rainfall during tropical events! The state boasts 16 distinct river basins; 129,700 total miles of rivers/streams; 59,000 miles of perennial (i.e., streams that flow year-round) rivers/streams; and 490,472 acres of lakes/reservoirs/ponds. So, if you like water sports, water-front property, or enjoy wearing a raincoat and boots, you are in the right state. With an abundance of water comes the obligation and duty to manage these vital natural resources to protect them for future generations. That duty has been promulgated by the Federal Water Pollution Control Act Amendments (FWPCA, PL-92-500) in 1972 to each state where management and enforcement duties were implemented.

Alabama's agency for these duties is the Alabama Department of Environmental Management (ADEM) that was created by the Legislature in 1982 as a separate agency from the Alabama Department of Public Health. Since then, ADEM has been the prime agency for managing our abundant natural resources of air, water, and land via permits, studies, enforcement, etc. As one of the branch managers within the agency opined many years ago, "...we must do a pretty good job since industry, municipalities, and environmental action groups all stay upset at us...".

So, whatever your philosophy concerning environmental matters, you can find an issue where government should be doing more, or maybe less! When you think about it, to perform all the activities that would be required by an agency like ADEM requires significant funding. There have been years where ADEM, and I'm sure agencies in many other states, did not get nearly the necessary funding from the state legislatures; and if not for federal funding, fines, and fees, would cease to exist or at best have limited resources to properly manage their environmental obligations.

Consider what is required if an industry or municipality needs to discharge a wastewater to a local stream, river, or bay. Their engineers determine the flow (gallons per day) of wastewater and make an application to ADEM. In turn, ADEM must determine how well the wastewater needs to be treated to not cause a problem in the receiving stream. The most accurate way to make this determination is to have an abundance of field-collected water quality data from the receiving stream, where a water quality model can be developed to set the level of treatment required in a permit issued to the discharger. However, to collect this data takes personnel and equipment, which is a function of time and money.



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There is just not enough personnel or money to do this type of study for every applicant given the limited resources of the states and the number of requests for permits that are submitted on a yearly basis. As an alternative to this massive data collection effort, the EPA has promulgated procedures to estimate the data from a field study or calibrated and verified water quality model.

This alternative is spelled out in a Memorandum of Understanding between the EPA and the respective states, including Alabama, and is known as a “desktop” water quality model. As its name implies, this model can be developed at one’s desk using the appropriate software and published historical data.

The bottom line is for a very small amount of time and equipment (typically only a desktop or laptop computer), ADEM can model the stream, determine the allowable impact from the discharge and issue the appropriate National Pollutant Discharge Elimination System (NPDES) permit to the applicant. While “desktop” modeling is not as accurate as a full-blown stream data collection study and model, it is usually accurate enough to protect the receiving water from the treated wastewater.

If this proves not to be the case, the permit can be re-evaluated if water quality issues arise, conditions change, or new discharge limits need to be issued.

In summary, I hope you can appreciate the abundant natural resources we have in our state and others. I hope that you can also appreciate the daunting task the agencies have in managing and protecting these resources while accounting for individual and corporate rights. After all, as far back when David was writing the 8<sup>th</sup> Psalm, it suggests that we humans are to manage and protect our resources.

Although we have our ongoing challenges, this effort can be accomplished while supporting growth and development. It requires working from good science and engineering without an over-dose of emotion or greed.

Our team at McFadden Engineering has a long track record of working with regulatory agencies like ADEM. Our goal is to work with these agencies so that the needs of all stakeholders are addressed and that the natural resources we enjoy are protected.