Protecting Our Lakes

Mecklenburg County, North Carolina

Mountain Island Dam (photo by Meredith Moore)

A practical guide to lake watershed protection and related regulations for homeowners in Mecklenburg County, N.C.

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Figure 1: Sunset Over Mountain Island Lake

"Treat the earth well. It was not given to you by your parents. It was loaned to you by your children." Kenyan Proverb

Lakes have a special allure that draw people to their shores. They provide beautiful scenery and wonderful recreational opportunities like boating, fishing and swimming. In Mecklenburg County, an average of 100,000,000 gallons of water a day is withdrawn from the Catawba River lakes to provide the sole source of drinking water to over 774,000 residents. Protecting the quality of the water in these lakes is essential for maintaining these vitally important uses. In the past decade, Mecklenburg County has experienced an escalated demand for property near and along our lakes. As people have relocated to the area, businesses have flourished and infrastructure has been built to support the development boom. All of this growth has led to increased pollution sources that threaten the quality and usability of the water in our lakes and their connecting creeks. Proximity to our precious waters gives lake residents a special opportunity, if not responsibility, to have a positive impact on water quality. Accepting this responsibility helps protect the water and adjacent land for your enjoyment as well as the enjoyment of other residents and future generations.

The purpose of this booklet is to help residents and business owners who own property and/or live within a lake watershed in Mecklenburg County understand and comply with the regulations pertinent to lake-area living. Take the time to read through this booklet and you may find the answers to some of your questions and perhaps learn something you did not know.

Section 2 Water Quality Buffers

2.1 Buffers and How They Function

Buffers are natural, vegetated areas adjacent to lakes and creeks. These buffers serve to filter pollutants from storm water, absorb runoff and reduce the volume of runoff, thereby reducing erosion and pollutants.

In order to effectively provide their natural filtering function, buffers must be of sufficient width. In North Carolina, the recently adopted Catawba Buffer Rules require a 50-foot minimum buffer width for new development along the Catawba River. Wider buffers may be necessary for steeper slopes, areas downstream of intense development, or for extra protection of highly valued uses such as a drinking water supply reservoir.

A well-established buffer is generally self-perpetuating and requires little maintenance. Native trees and shrubs are recommended for their hardiness, effective canopy and root structure. Buffer canopies intercept rainfall, thereby minimizing soil disturbance. They also improve water quality by providing shade, which lowers water temperature. Cool water carries more dissolved oxygen than warmer water and is essential to the survival of fish and other aquatic wildlife species that are sensitive to changes in temperature. Buffers also provide woody debris for fish habitat.

Figure 2: Buffer on Mountain Island Lake

2.2 Buffer Regulations

In 1992, North Carolina passed a law requiring local governments to develop watershed regulations aimed at protecting water quality in lakes classified as drinking water supplies. Minimum standards were established by the State, and local governments were required to pass regulations for their jurisdictions. Most jurisdictions in Mecklenburg County adopted more stringent watershed regulations and incorporated them into subdivision, land development, and/or zoning ordinances. A majority of these regulations address the following three issues: (1) development density (amount of built-upon or impervious area), (2) buffer widths and (3) land use. Those who live in areas that drain to these lakes, referred to as the lake's watershed, should be familiar with these regulations. A map is provided in Figure 3 to help determine which rules apply to where you live. For more information regarding the buffer requirements for the lake watershed areas, refer to the *Water Quality Buffer Implementation Guidelines* available at the following website: http://stormwater.charmeck.org (select "Regulations", select "Buffers & BMPs").

2.3 Buffer Requirements

Undisturbed buffers required along the shoreline of all Mecklenburg County lakes are measured from the full pond elevation as follows:

- Lake Norman - 760 feet
- Mountain Island Lake - 648 feet
- Lake Wylie - 569.4 feet

Along all perennial streams, undisturbed buffers are measured from the top of the bank on each side of the stream. Critical Areas (CA) are generally located in close proximity to surface waters. Such areas are protected by higher standards because of the greater risk of water quality degradation from pollution. Protected Areas (PA) are located beyond the CA in the watershed. They are subject to fewer restrictions because the risk of water quality degradation from pollution is less. Development density is typically addressed by either a low-density option, (single-family detached dwellings) or a high- density option, (multi-family dwellings or commercial development). There are separate watershed regulations and buffer requirements for each of the three lakes. Refer to the *Water Quality Buffer Implementation Guidelines* referenced above for more information about specific buffer requirements.

2.4 Buffer Violations And Restoration

Where a buffer area has been found to be disturbed, a Notice of Violation (NOV) may be issued to the property owner by the local zoning department or their designee. The violation requires that the property owner restore the buffer to a condition acceptable under the *Water Quality Buffer Implementation Guidelines* available at the aforementioned website. Monetary penalties may also be assessed. Restoration involves replanting trees and shrubs to a certain density in the buffer, which is given in the guidelines. A restoration plan must be submitted and approved by Charlotte-Mecklenburg Storm Water Services, Mecklenburg County Water Quality Program (MCWQP).

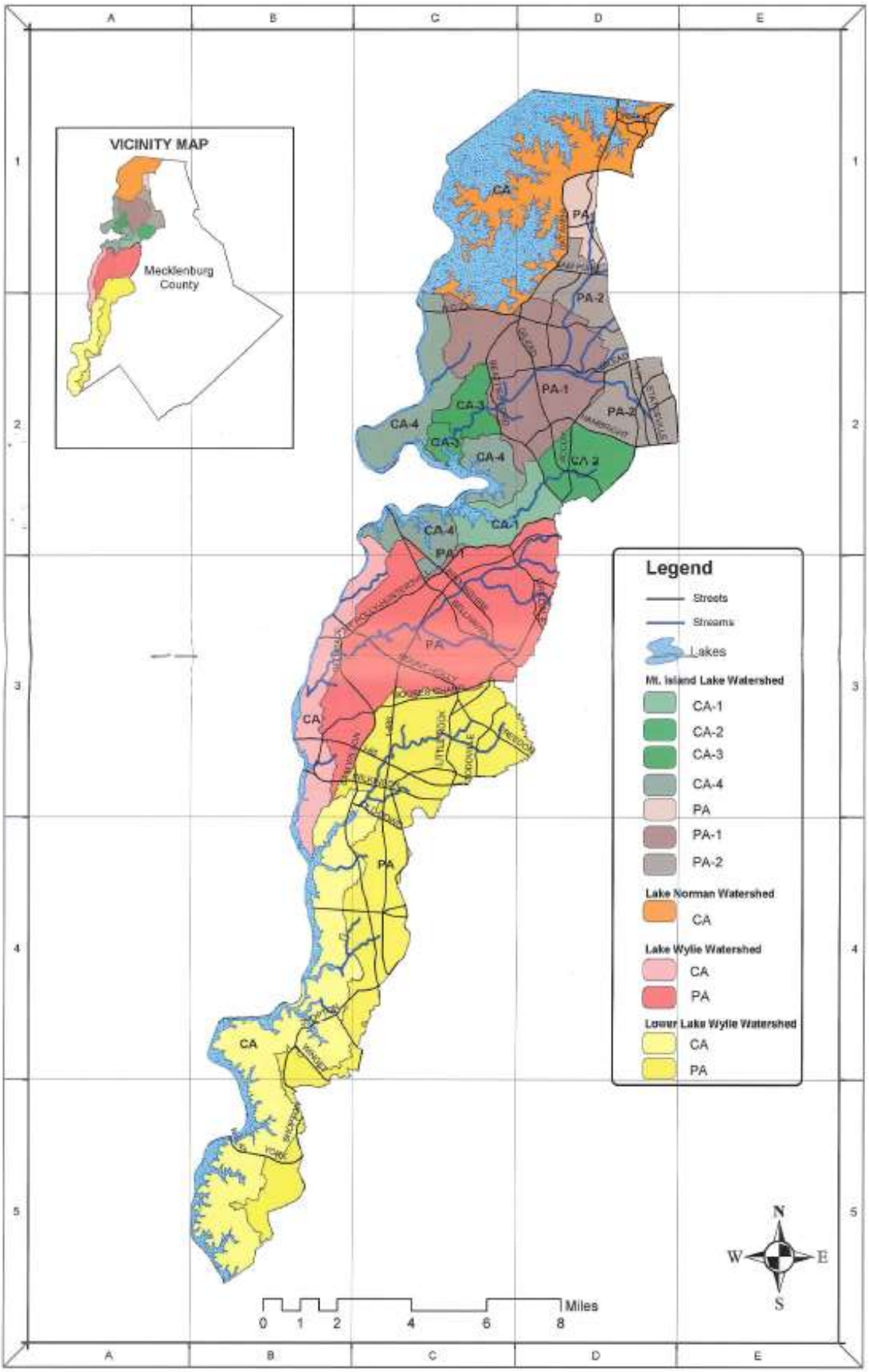

Figure 3: Watershed Protection Areas in Mecklenburg County

An appeal of the violation may be submitted to the Zoning Department. If the violation is not corrected and no appeal is made within 60 days of the date of the NOV, the Zoning Department may (1) revoke the certification of occupancy, making continued occupancy unlawful; (2) issue a citation and, if unpaid, a judgment could become a lien on the property; (3) seek an injunction; or (4) issue a criminal summons.

2.5 Special Permits

A permit is required when conducting certain activities near a lakeshore in Mecklenburg County. Duke Power's Lake Management Division has the following six permitting programs: (1) commercial facilities, (boat slips at condominiums, campgrounds, marinas, etc.), (2) private single-family, (boat docks or piers at a single-family residence), (3) conveyance, (water intakes, bridges, and road crossings), (4) shoreline stabilization, (rip-rapping and seawall construction), (5) excavation or dredging and (6) miscellaneous uses for activities such as installing heat coils or withdrawing greater than one million gallons of water per day. Withdrawal of less than this amount for domestic purposes does not require a permit, but does require a letter of intent to the Duke Power Lake Management Office. Contact their office at 1-800-443-5193 if you think you might need a permit.

Any activity that could potentially disturb the buffer requires the submittal of a form to the MCWQP entitled "Application for an Authorization Certificate." The form is available at the following website: http://stormwater.charmeck.org (select "Regulations", select "Buffers & BMPs"). The requirements for proper completion of the form are contained in Section 5 of the *Water Quality Buffer Implementation Guidelines* also available on this website. Disturbed areas would include all areas of the buffer where the natural ground cover has been graded, removed or altered. This includes building boat slips and shoreline stabilization along the lakes (see Figure 4).

Figure 4: Boat Slip on Mountain Island Lake

Section 3 Impervious Surface Limitations

One component of the watershed protection regulations is Built Upon Area (BUA) or impervious area. Limitations on the amount of BUA within a drinking water supply watershed are critical to protecting water quality. Research has shown that there is a direct correlation between the amount of impervious surfaces in a watershed and that watershed's water quality conditions. Generally, the more impervious surface coverage, the more polluted the water body. Impervious surfaces have many negative effects on water quality:

- Reduce the amount of pervious ground cover, which prevents storm water from infiltrating into the ground and replenishing the groundwater.
- Act as a direct conduit for pollutants to wash into nearby water bodies, carrying pollutants from rooftops, parking lots and roads.
- Promote runoff and often cause excessive erosion in buffers and streambeds.
- Linked to thermal pollution in water bodies, which can deplete oxygen levels and stress aquatic life.
- Increase downstream flooding due to the loss of permeable areas for soaking up storm water.

Every development within a drinking water supply watershed must show that it is in compliance with the BUA limitations during the design phase. The developer of a project must allocate a maximum amount of BUA to each lot within a development to ensure that the development as a whole does not exceed the maximum allowed. Single-family residents will often find this allocated amount on their deed and/or plat. BUA is tracked for every property in Mecklenburg County by the Zoning Department. Homeowners and potential homebuyers in the watershed protection area should be aware of these restrictions and research their individual BUA limitations. These restrictions may prohibit a home addition, sidewalk, out building or driveway expansion.

The watershed regulations define BUA as "impervious or partially impervious material." BUA includes but is not limited to asphalt, concrete, stone, brick, terrazzo, roofing, ceramic, buildings, pavement, recreational facilities, gravel areas, metal, wood, plastic, rubber, pervious asphalt, pervious pavers, and outdoor turf/carpet. Pervious surfaces include grass, sand, soil, pine straw, mulch, wooden slated decks, surface water and the water area of a swimming pool.

Section 4 Exotic Species

Exotic species are plants or animals living in an area, which is not their native territory. Exotics often flourish and out-compete native species because there are no natural predators or diseases to control the population. To help control the spread of exotic species, follow these tips:

- Remove all plant material from boats, trailers and vehicles. Plants can survive two to three days out of water and as long as two weeks in a bilge.
- Select native plants for landscaping and gardening. Native plants are usually hardier and require less watering.
- Drain your livewells, bilge water and transom wells before leaving the boat landing.
- Do not dump aquatic plants or release fish from your aquarium or garden ponds into a lake or stream.

- Do not remove Grass Carp from the lakes. Grass Carp are often released into lakes by State and local agencies to feed on Hydrilla. Grass Carp can eat several times their body weight in plant material each day (see Figure 5).

Figure 5: Grass Carp

Section 5 Fertilizers and Pesticides

Fertilizers contain large amounts of nutrients like nitrogen and phosphorus, which stimulate plant growth. When improperly or excessively applied, fertilizer can be transported by storm water runoff and deposited into our lakes and creeks. In the water, fertilizer stimulates algae growth. Excessive algae growth or "algae blooms" often occur in the summer. These blooms can cause fish kills by depleting the water of its oxygen supply.

Many pesticides and herbicides contain a variety of toxic compounds and heavy metals, which are harmful to the environment. When applied improperly or in excess, they can enter our lakes and creeks where they can kill fish and other aquatic life and contaminate drinking water supplies.

By following the guidelines provided below you can minimize the adverse effects fertilizers, pesticides, and herbicides have on our environment:

- Always follow label directions. Make sure the product is appropriate for your intended use.
- Never apply when heavy rain is expected within 12 hours.
- Do not apply within 50 feet of lakes, creeks or near storm drains and ditches.
- Test your soil to determine what, if any, nutrients your lawn needs. Contact Mecklenburg County's Cooperative Extension Service for a free test kit and assistance at (704) 336-2561.

- Use alternatives that are less harmful to the environment. These are often available at your local hardware or lawn and garden store.
- Spot spray pest and weed problems whenever possible.
- Store fertilizers, pesticides and herbicides in a locked, dry place safe from flooding and accidental spillage.
- Use native trees and shrubs for landscaping. They typically have fewer pest problems and require less water.
- Utilize natural areas for landscaping instead of planting turf grass. This will reduce the need for fertilizers.

Section 6 Current Efforts to Protect Lake Water Quality

6.1 Monitoring

Mecklenburg County has 28 water quality monitoring sites on the lakes and 31 monitoring sites along the creeks. The goal of the monitoring program is to identify and eliminate sources of water pollution and restore water quality conditions. The monitoring sites were selected to provide an overall representation of water quality conditions throughout Mecklenburg County. The data collected gives a sense of the overall water quality conditions, helps track water quality trends and helps pinpoint specific water pollution problems. Monitoring of the 31 stream sites is performed monthly. Monitoring of the 28 sites on Lake Norman, Mountain Island Lake and Lake Wylie is conducted every other month. From May through September an additional 18 sites are monitored monthly for fecal coliform bacteria in order to assess suitable for human contact. Monitoring activities on Lake Davidson and Lake Cornelius are performed twice a year. Monitoring activities include collecting and analyzing samples for pollution indicators such as fecal coliform bacteria, phosphorus, nitrogen, chlorophyll *a*, turbidity and solids. Field tests are also conducted for temperature, pH, conductivity, dissolved oxygen and other parameters.

Figure 6: Monitoring Water Quality Conditions on the Lakes

6.2 Plan Review

Plans for development within Mecklenburg County lake watersheds are reviewed by Storm Water Services/MCWQP to ensure that all regulations regarding buffers are being followed. Additional concerns and recommendations\regarding water quality protection are also addressed.

6.3 Service Requests

Citizens call in over 600 requests each year concerning possible threats to water quality. When citizens report discolored creeks, possible sewage spills or someone dumping a substance in a creek or storm drain, Storm Water Services/MCWQP investigates the possible pollution problem. If you suspect a potential water pollution problem call and report it at 311.

6.4 Public And Private Land Acquisition

Purchase of lands adjacent to lakes is another method both public and private entities have used to protect lake water quality. Currently in Mecklenburg County, public land is owned along all three lakes. Some of this land is managed as parks and wildlife refuges, while the rest is preserved as nature preserves.

6.5 Public Education And Awareness

Storm Water Services/MCWQP works to educate the public about the surface waters of Mecklenburg County. Storm Drain Marking and Adopt-A-Stream are a couple of programs that are in place to get citizens involved in water quality protection. Presentations are given by staff to homeowner's associations, homebuilders and other public groups and organizations to help educate the public. A great deal of literature is also available for public distribution. Contact staff with questions or concerns Monday-Friday, 8:00 a.m. to 5 p.m., at 311.

Section 7 Frequently Asked Questions

1. Is it legal to withdraw water for irrigation from a lake or stream without a permit?
   Yes, according to riparian ownership rights, the use of waters for domestic purposes, such as watering a garden, is legal without a permit. A riparian owner is a waterfront property owner. Duke Power Lake Management must be notified in writing, however, if any amount of water will be withdrawn from any of the lakes. Withdrawal of greater than one million gallons per day from a lake for commercial or industrial purposes must be permitted.

2. As a waterfront property owner, what is the one thing I can do that will benefit water quality the most?
   Leaving your property as natural as possible will benefit water quality the most by providing a buffer area between your activities and the water.

3. What's the biggest threat to our lakes?

Nonpoint source pollution is the biggest threat overall. This is pollution that is picked up by storm water as it flows over streets, lawns, and the general landscape. This type of pollution increases as population and impervious surfaces expand.

4. How do I know when and where it's safe to swim?
   Storm Water Services/MCWQP increases monitoring efforts in lakes during summer months due to increased recreation. If high levels of pollutants are observed and it is determined that lake areas are unsafe for swimming, a "No Swimming" sign will be posted. It's recommended that you not swim in any of Mecklenburg County's streams. Current water quality information on the lakes and streams in Mecklenburg County is made available on the following website: http://stormwater.charmeck.org

5. Where can I get information on boat safety, rules, and regulations?
   Contact the Lake Wylie, Mountain Island Lake or Lake Norman Marine Commissions. They offer classes on boat safety and have information about rules and regulations for distribution. Refer to page 15 for a list of phone numbers.

6. Who do I contact about shoreline stabilization, dredging, or building a pier?
   Contact Duke Power Lake Management at 1-800-443-5193. You will be asked to complete a permit, which will be reviewed, by Duke Power and the MCWQP.

7. How should I remove dead or diseased trees from the buffer? Do I need to call someone first?
   Dead or diseased trees may be removed from the buffer; however, it is always a good idea to call Storm Water Services/MCWQP at 311 before disturbing any vegetation in the buffer.

8. Can I use permeable asphalt or concrete in the buffer or use it to decrease my impervious area?
   No, according to the North Carolina Department of Environmental and Natural Resources permeable pavement cannot be used in our region. This is due to the high clay content of our soil, which causes the void spaces in the permeable pavement to clog and reduces its capacity to allow storm water to infiltrate.

Glossary of Definitions

100-year floodplain - lowland area bordering a stream which is impacted by flood waters associated with a 100-year flood event (at least a 1% chance of flooding in any given year)

algae bloom - excessive algae growth in a water body caused by an overload of nutrients; may cause oxygen depletion

best management practice - measures developed to improve storm water quality through pollutant removal

biological oxygen demand - a measure of the amount of oxygen consumed during biological and chemical processes that break down organic matter in water

built-upon area - includes the portion of a development project covered by impervious or partially impervious cover (e.g. pavement, gravel, buildings, etc.)

chlorophyll *a* - pigment present in all algae types; concentration increases with higher algae biomass

critical area - land with the highest degree of development restrictions due to its proximity to a protected water source and the greater risk of water quality degradation from pollution

dissolved oxygen - measure of the amount of oxygen present in a water body; important for survival of aquatic life

erosion - wearing away of soil particles from the land surface by water, wind, ice, gravity, or other force

fecal coliform - bacteria present in fecal matter; high levels in surface water sometimes indicate a discharge of sewage

groundwater - water below the land surface which is held up in soil layers and rock formations

impervious surface - surface area which does not allow infiltration of water (e.g. pavement, rooftops, gravel, etc.)

high-density development - development with a high density of structures and built-upon areas within a particular land area (e.g. condominiums, apartments, etc.)

macroinvertebrates - small aquatic animals that live mostly on stream and lake bottoms or attached to substrate material; their diversity and abundance indicate water quality conditions

low-density option - development with a low density of structures within a particular land area (e.g. one structure per acre)

normal pool elevation - the average land elevation above sea level reached by a body of water

nutrients - substances necessary for growth and reproduction of organisms; in water, mainly nitrates and phosphates

perennial stream - a stream that maintains water in its channel throughout the year

pervious pavement - an alternative to conventional concrete and asphalt paving materials that allows for infiltration of storm water into a storage area, with void spaces that provide temporary storage. Permeable paving materials include, but are not necessarily limited to, porous concrete, permeable interlocking concrete pavers, concrete grid pavers, and porous asphalt. Compacted is not considered permeable pavement. Use of permeable pavement is limited to the Coastal Plain and Sandhills regions of NC.

protected area - land area subject to development restrictions which are not as stringent as in the critical area due to their further distance from the water body

runoff - rainfall that flows over the land surface into adjacent water bodies, picking up pollutants along the way; also known as storm water

storm drain system - system of drains, pipes, and outfalls that allows storm water, surface drainage, street wash, and other wash waters to be transported quickly from the land surface to nearby water bodies

turbidity - measure of a water body's clarity; caused by suspended matter such as clay, silt, organic and inorganic matter, and/or microscopic organisms such as phytoplankton

Contact Directory

Audubon Society of Mecklenburg County
(704) 537-8181 *www.meckbirds.org*

Catawba Lands Conservancy
(704) 342-3330 *www.catawbalands.org*

Catawba River Foundation/River Keeper
(704) 679-9494 *www.catawbariverkeeper.org*

Duke Power Lake Management
1-800-443-5193 *www.dukepower.com*

Katawba Valley Land Trust
(803) 285-5801 *www.kvlt.org*

Lake Norman Marine Commission
(704) 564-6333 *www.lnmc.org/*

Lake Wylie Marine Commission
(704) 348-2736 *www.lakewyliemarinecommission.com*

Mountain Island Lake Marine Commission
(704) 348-2736 *www.marinecommission.com*

Mecklenburg County Park & Recreation Department
(704) 336-3854 *www.parkandrec.com*

Mecklenburg County Soil & Water Conservation
(704) 336-2455 *www.mecklenburgconservation.com*

Mecklenburg County Water Quality Program
(704)336-5449 *http://stormwater.charmeck.org*

North American Lake Management Society/SE
(608) 233-2836 *www.nalms.org*

N.C. Department of Environment & Natural Resources
Mooresville Regional Office
(704) 663-1699 *www.mro.ehnr.state.nc.us*

North Carolina Wildlife Federation
(704) 332-5696 *www.ncwf.org*

N.C. Wildlife Resources Commission
(704) 986-6109 *www.ncwildlife.org*

South Carolina Dept. of Health and Environmental Control
(803) 898-3432 *www.scdhec.net*

The Trust for Public Land
(704) 376-1839 *www.tpl.org*

Neighboring Governments:

Lincoln County
(704) 736-8432 *www.co.lincoln.nc.us*

Iredell County
(704) 878-3050 *www.co.iredell.nc.us*

Gaston County
(704) 866-3100 *www.co.gaston.nc.us*

York County
(803) 684-8511 *www.yorkcountygov.com*

Town of Cornelius
(704) 892-6031 *www.cornelius.org*

Town of Davidson
(704) 892-7591 *www.ci.davidson.nc.us*

Town of Huntersville
(704) 875-6541 *www.huntersville.org*