

9.0 Environmental Resources

The Environmental Resources Element of the Comprehensive Plan for the City of Monroe provides an inventory and analysis of the physical and environmental characteristics of the City and surrounding region. Geographical Information System (GIS) data are used to quantify and locate physical and environmental elements with respect to urban development within the City. Existing plans and policies, as well as public input, are referenced to identify key environmental concerns and related projects and/or policies.

9.1 Geology, Topography and Climate

Topography

The City of Monroe is situated in the northeast portion of Louisiana within the Mississippi Alluvial Plain¹⁷. Part of the 11,000 square mile Ouachita River basin, it is characterized by near level topography typical of an area that lies entirely within a floodplain. Elevations state-wide range from at or below sea level (New Orleans is the lowest point at 8 feet below sea level) to just below 600 feet above sea level in the northeast portion of the state where Driskill Mountain, at 535 feet, is the highest point in the entire state.

Of the approximately 20,000 acres of land that constitute Monroe, 70% exist within the 500- year floodplain. The remaining approximate 30% of the total 20,000 acres lies within the 100-year floodplain as shown on the Environmental Considerations Map. The majority of the areas that are within the 100-year floodplain are near the Ouachita River and Bayou DeSiard. The City and Parish are working with the Federal Emergency Management Agency to address flood-prone areas that were previously not identified. Following Hurricane Gustav and Hurricane Ike in September 2008, 1,213 people in Ouachita Parish as a whole registered for individual assistance due to flooding. The “environmental considerations” map on page 103 includes these new areas identified as floor prone.

Geology

The area within North America that is Louisiana dates to approximately 36 to 66 million years ago. Formed during the Paleocene/Eocene epochs as an alluvial plain and characterized by low, marshy land with lush plant growth, Louisiana was formed as an alluvial plain. Known as the Gulf Coast Basin, rock structures are overlain by thick sedimentary rocks that are occasionally layered with salt domes and regions of shallow faults that parallel long distances along the Louisiana coastline.¹⁸ The salt domes formed during dry periods when evaporation caused large beds of salt to be laid down on the surface soils.¹⁹ Situated proximate to the delta of the Mississippi River, Louisiana’s surface deposits are considered young in geologic terms. The majority of the state’s landforms are deposits of material from the delta and the coastal plain streams.

¹⁷ http://www.netstate.com/states/geography/la_geography.htm

¹⁸ Louisiana Geological Survey, “Earthquakes in Louisiana”, Public Information Series No. 7 June 2001

¹⁹ <http://geology.about.com/library/bl/maps/blouisianamap.htm>



Although the state has some fault zones, much of the northern portion of the state is inactive with respect to earthquakes. In the south portion of the state, the faults were thought to have formed during periods of basin subsidence that occurred at an accelerated pace. This portion of the state has experienced earthquakes in the past, however at small magnitudes, typically no greater than 4.0 as measured by the Modified Mercalli Intensity Scale.²⁰

Climate

Monroe enjoys a moderate climate with seasonal temperature fluctuations and minimal windy weather. The yearly average temperature of 64 degrees is coupled with equal or higher humidity, typically during the summer months. The lowest average temperatures generally occur from January through early March with 35 degrees being the lowest average temperature and 46 degrees being the overall average temperature during the winter months. The highest temperatures occur generally from June through September with 95 degrees as the highest average temperature and 82 degrees as the overall average temperature during the summer season. Precipitation averages 52 inches per year in the form of rain, however the occasional freezing rain can be experienced during the winter months, especially when most of the nation is under a deep freeze²¹. Tornadoes typically do not occur in Monroe; however the area is not entirely void of the possibility of this weather phenomenon. When a tornado warning is issued, it is in response to the possibility of a tornado forming as a result of a severe thunderstorm. Hurricanes typically do not pose a concern since most have dissipated upon reaching the inland areas that includes Monroe. Typically heavy periods of rain are experienced instead as remnants of coastal hurricanes. Wind speeds are rather calm most of the time, with a yearly average wind speed of 8 mph. Humidity within the region fluctuates throughout the year; however the average of 58% is only slightly higher during the winter at 63% and slightly higher still at 67% during the summer. Coupled with moderate to higher temperatures and proximity to open bodies of water, the relative humidity ‘feels’ higher when it actually is not²².

9.2 Soils

There are 22 different soil types that exist within the City of Monroe. Of these, silt loam constitutes the most predominant category of soil, having four variations that cover greater than approximately 73% of the total land area of the City (USDA – Natural Resources Conservation Service). Water coverage makes up approximately 10% of the entire City, and Perry Clay (a soil that allows occasional flooding) makes up just fewer than 6% of the City coverage. The remaining approximate 18% of soil coverage within the City consists of other variations of silt loam, clay, and areas of escarpment or rock-faced land having no soil cover. In addition to the soil cover, approximately 5 acres of the entire City is categorized as landfill, indicating either an actual solid waste facility, or, areas where dumping of non-natural material exists.

For purposes of building construction suitability, the Hebert silt loam (main soil category in Monroe) is rated as being somewhat to very limited in its capacity to support a dwelling, whether the structure is built with a sub-base or is constructed slab-on-grade. Reasons for this include the shallow depth to saturated zone and shrink-swell characteristics of the soil.²³ One of the silt loam soils, Portland, is classified as prime farmland by the US Soil Conservation Service.

²⁰ Louisiana Geological Survey, “Earthquakes in Louisiana”, Public Information Series No. 7 June 2001

²¹ <http://www.ocs.orst.edu/pub/maps/Precipitation/Total/States/LA/la.gif>

²² Ouachita Enterprise Corporation (OEC), Economic Development in Monroe, West Monroe, Ouachita Parish in Northeast Louisiana

²³ USDA – Natural Resources Conservation Service, Soil Types, Ouachita Parish, Louisiana – Dwellings and Small Commercial Buildings, Survey Area Version 5, 04/13/2007



Hydric soils consisting of Wrightsville Silt Loam exist throughout the City constituting approximately just fewer than 10% of the total soil types, with concentrations occurring along the Ouachita River, Bayou DeSiard, and in the Forsythe Avenue neighborhood.

9.3 Hydrology

Waterways that exist within the City of Monroe include the Ouachita River, Bayou DeSiard, and the Black Bayou Lake. The Ouachita River serves as the west border of the City and flows in a north-south direction. With its beginnings in the Ouachita Mountains in Arkansas, the River flows south throughout Arkansas as a mountain stream until it reaches just south of Hot Springs, AR, where it empties into Lake Catherine and then becomes a meandering river on its way into Louisiana.

The aquifer that provides groundwater supply to the Ouachita Parish is known as the Sparta aquifer.²⁴ USGS survey wells have been installed throughout various locations in the Parish to monitor the amount of water that exists within the aquifer along with the quality of the water present. The amount of water present is measured by the amount of time it takes for purged or pumped water to recover at its beginning level within the well. Some wells installed in this aquifer have been recovering since 1999, indicating that although the water in the aquifer is recovering to its original levels, it is occurring at a very slow rate. Other wells in this aquifer have experienced long-term water level declines. The quality of the water is measured by chloride concentrations. Within northern Louisiana, chloride concentrations have remained unchanged at most monitored wells, however, chloride concentrations continued to increase in areas where large withdrawals have induced saltwater encroachment in southeastern Louisiana, outside of the Ouachita Parish.²⁵

9.4 Plants and Wildlife

Within the City of Monroe, plants and animal life are typical of an urban area with limited areas of patched grass cover, fielded growth, and indigenous tree growth. Animal life that does exist occurs primarily along the boundaries of the Monroe Regional Airport and in Chennault Park, where the land is undeveloped and fielded. Animal life consists essentially of small field animals including the bobwhite quail, cottontail rabbit, mourning dove, and other small birds and mammals that use the fields for foraging²⁶.

White-tail deer, gray and fox squirrels, and swamp rabbits occupy forested lands of the watershed area that is situated east of the City limits and south of US Highway 80. Mink and raccoon are also present along with migratory waterfowl that use the forested lands during periods of flooding which typically occur each fall and winter.

²⁴ USGS , Water Resources Data for Louisiana, Water Year 2005

²⁵ Ibid

²⁶ Killoden Plantation – A Conservation and Education Plan, May 1994



Plant growth within the City of Monroe and outlying areas includes varieties indigenous to the area, such as wetland bottomland hardwoods; riparian forests, pine forests, abandoned pasture; and cultivated fields (Allen 1994)²⁷. Tree growth also includes indigenous varieties, such as Willow Oak, Green Ash, Hackberry, Cherrybark oak and Bitter Pecan. These trees exist primarily within the park areas and outlying areas of Monroe. Small trees and shrubs include Pawpaw, Spicebush, and Devil's Walking stick.²⁸ Other dominant plant growth includes Common Goldenrod and Groundsel (shrub). In addition, pine, magnolia and oak trees are located in the park areas.

In an effort to educate the public on the plant and wildlife of the region, the University of Louisiana at Monroe and the Monroe Garden Study League, a member of the Garden Club of America, has opened its resources for horticulture, gardening, landscaping and flower arranging to the public. This partnership is a direct result of the University's recognition of the importance of agriculture and horticulture to the Ouachita region and the Monroe Garden Study League's interest in furthering the knowledge of the public in horticulture, gardening and agriculture.

9.5 Municipal and Hazardous Waste

The City has a Beautification Director and Board who facilitate the "Keep Monroe Beautiful" program. Through this program citizens can adopt areas and keep them litter free. This empowers the citizens to demonstrate their community pride while assisting the City with a service that would otherwise need to be financed. Anyone can adopt; recognition of the organization, group, or individual is provided by the City through a community awareness sign that is displayed at the adoption site for the duration of the adoption period.

An annual fall volunteer cleanup known as "Watersweep" takes place along Bayou DeSiard and the Ouachita River. Through this cleanup effort, individuals and the community are further educated that litter is not only unsightly but harmful to wildlife and fish.

The City of Monroe also participates in the "Great American Cleanup". Part of the "Keep America Beautiful, Inc." organization, this effort occurs throughout the nation anytime from March through May. In Monroe, volunteer participants continue to break records with attendance each year to come out and make their neighborhoods more beautiful.

In efforts to establish tree growth throughout the City, the Public Works Department along with the Parks and Recreation Department and Louisiana Purchase Gardens & Zoo work with local volunteers through the Keep Monroe Beautiful program in establishing a tree container nursery at the Zoo. The tree nursery is the first phase of a nursery plan for successful growth and planting of an increased number of strong and healthy trees on public lands throughout the city. Known as the 'Green Station', future plans include composting through the use of manure from zoo animals and the installation of a green house to allow propagation of plants.

²⁷ Ibid

²⁸ Ibid



The City of Monroe is proactive in establishing early-on awareness and knowledge of waste problems through programs integrated in the curriculum of the local school system. Through a program titled "WASTE IN PLACE" students in grades K-6 are taught about alternatives for waste disposal with an emphasis on responsible solid waste handling practices. This is provided through hands-on activities that include identification of recycling options, ways to minimize waste that ends up in a landfill, and ways to reuse materials for purposes other than that established as the primary use. The curriculum was developed from three years of research and uses a behaviorally based, systematic approach to changing attitudes and practices related to proper waste handling. The program is consistent with recommendations from the National Board of Education, the National Science Teachers Association, the National Science Foundation, Science for All Americans and Project 2061 which include: utility, social responsibility, intrinsic value of knowledge, philosophical value and childhood enrichment.²⁹

Roadside trash is a continuous problem that costs millions annually to address. Within the State, approximately \$10 million is spent annually to clean up this trash and local governments spend thousands to keep litter off miles of locally-maintained roads.³⁰

9.6 Air Quality

Poor air quality can adversely affect human health and the environment. The quality of the air we breathe is affected by many man-induced activities, most notably automobile driving. Cars and gas-powered equipment emit pollutants including nitrous oxide (NO_x) and volatile organic compounds (VOCs). When these compounds mix with the heat from the sun, ozone is formed. An area is considered to have 'good' ozone levels if the levels do not exceed a pre-established level in any 1- or 8-hour period. The City of Monroe has not experienced elevated ozone levels and thus is in compliance for ozone. This may be a result of the location of the City of Monroe along the Ouachita River, thus providing a constant replenishment of 'clean' air.

The Air Quality Index (AQI) was developed by the US EPA (Environmental Protection Agency) to help the general public understand ambient air readings. The measurements are converted from concentration levels into numbers on a scale that indicates what the quality of the air is for a particular location. Although the City of Monroe is not monitored specifically by the EPA, locations throughout the State provide a good indication of the overall air quality of the entire State. The State of Louisiana, however, has an air quality station that is monitored routinely by the Department of Environmental Quality (LDEQ). Samples of the air are collected and measured at this station on an hourly basis. The data collected is used to track trends in air quality and to determine compliance with National Ambient Air Quality Standards (NAAQS).³¹ Ambient air temperature, ozone, and sulfur dioxide levels are measured.

The Clean Air Act, which was last amended in 1990, requires EPA to set National Ambient Air Quality Standards (40 CFR part 50) for pollutants considered harmful to public health and the environment. The Clean Air Act established two types of national air quality standards. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.

²⁹ http://www.monroela.us/beautification_programs.php

³⁰ City of Monroe – One City, One Future – Inside City Hall – Beautification Department, Litter Prevention

³¹ <http://www.deq.louisiana.gov/portal/tabid/112/Default.aspx>, cited July 27, 2007



The EPA Office of Air Quality Planning and Standards (OAQPS) has set National Ambient Air Quality Standards for six principal pollutants, which are called "criteria" pollutants. They are listed below. Units of measure for the standards are parts per million (ppm) by volume, milligrams per cubic meter of air (mg/m³), and micrograms per cubic meter of air (µg/m³).

Table 9-1 National Ambient Air Quality Standards

Pollutant	Primary Stds.	Averaging Times	Secondary Stds.
Carbon Monoxide	9 ppm (10 mg/m ³)	8-hour ⁽¹⁾	None
	35 ppm (40 mg/m ³)	1-hour ⁽¹⁾	None
Lead	1.5 µg/m ³	Quarterly Average	Same as Primary
Nitrogen Dioxide	0.053 ppm (100 µg/m ³)	Annual (Arithmetic Mean)	Same as Primary
Particulate Matter (PM ₁₀)	Revoked ⁽²⁾	Annual ⁽²⁾ (Arith. Mean)	
	150 µg/m ³	24-hour ⁽³⁾	
Particulate Matter (PM _{2.5})	15.0 µg/m ³	Annual ⁽⁴⁾ (Arith. Mean)	Same as Primary
	35 µg/m ³	24-hour ⁽⁵⁾	
Ozone	0.08 ppm	8-hour ⁽⁶⁾	Same as Primary
	0.12 ppm	1-hour ⁽⁷⁾	Same as Primary
		(Applies only in limited areas)	
Sulfur Oxides	0.03 ppm	Annual (Arith. Mean)	-----
	0.14 ppm	24-hour ⁽¹⁾	-----
	-----	3-hour ⁽¹⁾	0.5 ppm (1300 µg/m ³)

Source: <http://www.epa.gov/air/criteria.html>

The US Environmental Protection Agency (EPA) and the State of Louisiana Department of Environmental Quality (LDEQ) track air pollution in the State of Louisiana. The LDEQ established the Comprehensive Toxic Air Pollutant Emission Control Program in 1991, in efforts to regulate major sources of toxic air pollutants (TAPS) under Chapter 51 of the Louisiana Administrative Code Title 33, Part III (LAC 33:III.Chapter 51). Typical regulated sources of air pollutants include industry and manufacturing that produce emissions as part of their operations.

Emissions of air pollutants recorded in Ouachita Parish have generally declined from 1991 when emissions were 3.5 million pounds, to 1993 when emissions were 2.2 million pounds. From 1994 through 2005, the total annual emissions fluctuated between 3.6 million pounds (1995) to as low as 1.7 million pounds in 2005.³²

³² Toxic Emissions Data Inventory (TEDI) Data Sets, Louisiana Department of Environmental Quality (LADEQ), <http://www.deq.louisiana.gov/portal/Default.aspx?tabid=114>, cited July 30, 2007



A Voluntary Ozone Action Program established by the LDEQ holds these three goals :

- Improve air quality through voluntary actions.
- Create public awareness and promote individual responsibility through education.
- Provide credible measures of air quality improvement efforts.³³

9.7 Noise

The level of noise that a community experiences typically stem from everyday activities – landscaping machinery, street noise, airplanes, school buses, children playing – to those associated with short-term, or temporary activities, i.e. street paving, utility servicing, and tree cutting. Other short-term noise that isn't temporary, rather experienced on a daily or periodic but consistent schedule, can include that from nearby freight or passenger trains. The noise experienced can be just the sound of the wheels on the tracks as it continues along a rail line, or it can be as disturbing as the sound of a train horn as it nears a street crossing. Further still, noise from trains can be constant, as in the case of a train operating yard, where the constant high-pitched sound of train wheels moving on and switching between tracks is constant.

Noise, defined as unwanted or excessive sound, is an undesirable by-product of our modern way of life. It can be annoying, can interfere with sleep, work, or recreation, and in extremes may cause physical and psychological damage. While noise emanates from many different sources, transportation noise is perhaps the most pervasive and difficult source to avoid in society today.³⁴ Noise is measured by decibels (db). The table that follows shows the levels of sound that can be experienced without discomfort in relation to the activity category identified. One-hour and ten-hour (continuous) sound levels are presented as decibels.

This table is typically used in conjunction with highway improvement or construction projects and is used as a guideline in identifying where abatement, or mitigation measures, may be necessary as a result of a highway project. It is presented here as a point of reference for permissible levels of noise at locations where specified activities are occurring.

³³ <http://www.deq.louisiana.gov/portal/tabid/1784/Default.aspx.Voluntary> Action Ozone Project cited July 31, 2007

³⁴ Highway Traffic Noise in the United States - Problem and Response, U.S. Department of Transportation Federal Highway Administration April 2006, Document No. FHWA-HEP-06-020



Table 9-2 Noise Abatement Criteria (NAC) Hourly

Activity Category	L _{eq} (h)	L ₁₀ (h)	Description of Activity Category
A	57 (Exterior)	60 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	70 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	75 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D			Undeveloped lands.
E	52 (Interior)	55 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

A Weighted Sound Level in Decibels (dBA)*
Source: CFR, Part 772

The City of Monroe is like any typical downtown area with respect to daily activities that generate noise. Although not as busy as its companion cities within Louisiana, the City does generate noise levels synonymous with that experienced in any city environment. Specific to Monroe, however, is noise from the three active rail lines that traverse through the City on a consistent basis.

In 2008, the City was completing an independent study to determine the impact of noise on the surrounding residents of the City as a result of the active rail lines. It is anticipated that a “quiet zone” will be designated within portions of the City where trains cross area roadways. In concert with this study, a review of the road crossings is also being performed in efforts to determine which locations can be eliminated and/or designated as “quiet zones”.

General ordinances adopted in August 1982 by the City of Monroe identify the types of noise levels that are permissible per land use category and time of day. Chapter 23 of the ordinance identifies three districts (residential, commercial, and industrial) and two separate portions of a 24-hour period (day = 7am to 10 pm; night = 10pm to 7am) and its corresponding sound pressure level limit that is permissible. These are indicated in the table that follows.

Table 9-3 Permissible Sound Level Limits

District	Sound Pressure Level Limit dB(A)	
	Day (7 a.m.-10 p.m.)	Night (10 p.m.-7 a.m.)
Residential	65	60
Commercial	70	65
Industrial	85	80

Source: Chapter 23 of City of Monroe General Ordinances

Activities that are allowed to deviate from these levels are further identified in the ordinance and include noise associated with alarming traffic and pedestrians to emergency vehicles, fire and burglar alarms, and navigation alarms associated with boats, aircraft, and locomotives. Other items that are allowed to deviate include parades and activities in concert with municipal and educational locations.



In comparison to the federal highway noise abatement levels, the City of Monroe actually allows higher noise levels in areas that are designated as industrial. The other land use districts identified in the City ordinance correspond closely with the federal activity categories and associated allowed sound levels.

9.8 Environmental Resources Findings

- Of the approximately 20,000 acres of land that constitute Monroe, 70% exist within the 500-year floodplain. The remaining approximate 30% lies within the 100-year floodplain. This could pose an issue of concern if future development is desired and/or future development is limited to areas that are within the 500- or 100-year floodplain.
- Numerous reports of flooding in residential areas not inside the 100-year floodplain were reported after Hurricane Gustav in September 2008.
- For purposes of building construction suitability, the Hebert silt loam (main soil category in Monroe) is rated as being somewhat to very limited in its capacity to support a dwelling with or without a basement foundation. This could pose a limiting factor in attracting future development.
- In an effort to educate the public on the plant and wildlife of the region, the University of Louisiana at Monroe and the Monroe Garden Study League, a member of the Garden Club of America, has opened its resources for horticulture, gardening, landscaping and flower arranging to the public.
- The City has a beautification and litter control program that facilitates the “Keep Monroe Beautiful” program. This empowers the citizens to demonstrate their community pride while assisting the City with a service that would otherwise need to be financed.
- An annual fall volunteer cleanup known as “Watersweep” takes place along Bayou DeSiard and the Ouachita River. Through this cleanup effort, individuals and the community are further educated that litter is not only unsightly but harmful to wildlife and fish.
- The City of Monroe is proactive in establishing early-on awareness and knowledge of waste problems through programs integrated in the curriculum of the local school system. Through a program titled “WASTE IN PLACE” students in grades K-6 are taught about alternatives for waste disposal with an emphasis on responsible solid waste handling practices.
- The City of Monroe has not experienced elevated ozone levels and thus is in compliance for ozone.
- Emissions of air pollutants recorded in Ouachita Parish have generally declined from 1991 when emissions were 3.5 million pounds, to 1993 when emissions were 2.2 million pounds. From 1994 through 2005, the total annual emissions fluctuated between 3.6 million pounds (1995) to as low as 1.7 million pounds in 2005.
- Specific to Monroe is noise from three active rail lines that traverse through the City on a consistent basis. The City is presently undergoing an independent study to determine the impact of noise on the surrounding residents of the City as a result of the active rail lines. It is anticipated that a “quiet zone” will be designated within portions of the City where trains cross area roadways.
- The City of Monroe has a noise ordinance in place; it identifies levels that are permissible per land use category and time of day.