

REPORT CARD FOR  
**ALABAMA'S**  
INFRASTRUCTURE  
2015

[infrastructurereportcard.org/alabama](http://infrastructurereportcard.org/alabama)

**ASCE**<sup>®</sup>  
AMERICAN SOCIETY OF CIVIL ENGINEERS

# INFRASTRUCTURE MATTERS

We all use infrastructure every day, but we rarely think about it. Whether you're driving across roads and bridges, taking a shower, or charging your cell phone, infrastructure affects everyone in Alabama. Infrastructure also impacts our businesses and helps move our economy, taking freight from ports to store shelves and taking workers to their jobs.



The bad news is that Alabama's infrastructure has some challenges that you should know about before it's too late to keep these systems from breaking down. Infrastructure deteriorates every single day as it ages, just as our bodies do, and many of these critical systems are reaching the end of their useful life. The effects of weather, wear-and-tear, and increased use from a growing population all take their toll on our infrastructure. Regular maintenance helps extend how long they can serve us, but without regular checkups the condition of our infrastructure is unknown, potentially placing thousands in harm's way.

While you may not think about infrastructure every day, Alabama's civil engineers do think about it because they've pledged to build it, maintain it, and keep the public safe. The Alabama Section of the American Society of Civil Engineers (ASCE) now provides a Report Card on Alabama's Infrastructure so every citizen and decision maker can understand how Alabama's infrastructure is doing. If you drive, if you fly, if you own a business, if you take a shower – this Report Card is for you.

The 2015 Report Card on Alabama's Infrastructure gave the state an overall G.P.A. of C-. Alabama's civil engineers studied 11 infrastructure categories, including:

- Aviation
- Bridges
- Dams
- Drinking Water
- Energy
- Inland Waterways
- Ports
- Rail
- Roads
- Transit
- Wastewater

Of those 11, four infrastructure categories are in good condition, six categories range from mediocre to poor condition, and one category lacked enough information for a grade to be determined.

The good news is there are solutions to all these challenges, and we can raise Alabama's infrastructure grades. By learning more today about the conditions of the infrastructure you use every day, you too can help raise the grade.

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## 5 STEPS WE CAN TAKE NOW

The Report Card provides five recommendations to raise our grades:

1. **Let's know our dam safety risks.** You have to inspect infrastructure to know the condition of it, and when it comes to dams, we're not doing a good job. In fact, we don't even know where all the high-hazard dams in the state are. Let's find and inspect our dams before something happens.
2. **If we just do the maintenance, we can avoid stinky breaks and getting lost in potholes.** Many of Alabama's homes have septic systems to treat their wastewater, but without being properly maintained they can ruin water supplies for a community. Not keeping up with road maintenance also has a cost. Those annoying potholes are costing every driver in Alabama \$300 or more than each year to drive on rough roads!
3. **Let's be self-sufficient and invest in Alabama's future.** When it comes to rebuilding the oldest and most deficient infrastructure, our state shouldn't wait on anyone, especially Washington. Alabama has many infrastructure assets that are simply reaching the end of their life or stand in the way of keeping the economy growing. Let's leverage state funds to make investments that improve how we work and live.
4. **When we do work, let's prepare for the future.** Damage from storms, floods, and other disasters can be minimized if our critical infrastructure is made more resilient. If we review and update the engineering requirements and then implement them over time, we can rebound quicker in a disaster and save hassle and costs in the future. Let's follow the scout model: be prepared.
5. **Keep up with new technology and methods for infrastructure.** From sensors on infrastructure that alert engineers to issues to delivery models like rapid bridge replacement, innovations are happening with infrastructure. As a hub of construction and engineering firms and a nationally recognized workforce training program, Alabama can continue to collaborate and build cost effective, sustainable infrastructure using these tools.

## HOW YOU CAN GET INVOLVED

1. **Get the full story** behind this Report Card at [www.infrastructurereportcard.org/alabama](http://www.infrastructurereportcard.org/alabama).
  2. **Find out the condition of the infrastructure near you** on the Save America's Infrastructure app available on iTunes and GooglePlay.
  3. **Ask your elected leaders what they're doing to make sure your infrastructure is reliable for the future.** Use your zip code to find your list of elected officials at [www.infrastructurereportcard.org/take-action](http://www.infrastructurereportcard.org/take-action).
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# METHODOLOGY

The purpose of the **Report Card for Alabama's Infrastructure** is to inform the public and legislators of the current condition of our state's infrastructure in a concise and easily accessible format of a school report card. Each of the categories of infrastructure covered in the Report Card is assessed using rigorous grading criteria and the most recent data to provide a comprehensive assessment of your infrastructure.

## CRITERIA FOR GRADING

ASCE has used the following criteria to discuss and grade the state of the infrastructure:

- **Capacity**- Evaluate the infrastructure's capacity to meet current and future demands.
  - **Condition**- Evaluate the infrastructure's existing or near future physical condition.
  - **Funding**- Identify the current level of funding (from all levels of government) for the infrastructure category and compare it to the estimated funding need.
  - **Future Need**- Evaluate the cost to improve the infrastructure and determine if future funding prospects will be able to meet the need.
  - **Operation & Maintenance**- Evaluate the owners' ability to operate and maintain the infrastructure properly and determine that the infrastructure is in compliance with government regulations.
  - **Public Safety**- Evaluate to what extent the public's safety is jeopardized by the condition of the infrastructure and what the consequences of failure may be.
  - **Resilience**- Evaluate the infrastructure system's capability to prevent or protect against significant multi-hazard threats and incidents and the ability to expeditiously recover and reconstitute critical services with minimum damage to public safety and health, the economy, and national security.
  - **Innovation**- Evaluate the implementation and strategic use of innovative techniques and delivery methods.
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# GRADING DEFINITIONS

ASCE has defined the grading scale for this infrastructure report as:

## **A 90-100%: EXCEPTIONAL: FIT FOR THE FUTURE**

The infrastructure in the system or network is generally in excellent condition, typically new or recently rehabilitated, and meets capacity needs for the future. A few elements show signs of general deterioration that require attention. Facilities meet modern standards for functionality and resilient to withstand most disasters and severe weather events.

## **B 80-89%: GOOD: ADEQUATE FOR NOW**

The infrastructure in the system or network is in good to excellent condition; some elements show signs of general deterioration that require attention. A few elements exhibit significant deficiencies. Safe and reliable with minimal capacity issues and minimal risk.

## **C 70-79%: MEDIOCRE: REQUIRES ATTENTION**

The infrastructure in the system or network is in fair to good condition; it shows general signs of deterioration and requires attention. Some elements exhibit significant deficiencies in conditions and functionality, with increasing vulnerability to risk.

## **D 51-69%: POOR: AT RISK**

The infrastructure is in poor to fair condition and mostly below standard, with many elements approaching the end of their service life. A large portion of the system exhibits significant deterioration. Condition and capacity are of significant concern with strong risk of failure.

## **F 50% OR LOWER: FAILING/CRITICAL: UNFIT FOR PURPOSE**

The infrastructure in the system is in unacceptable condition with widespread advanced signs of deterioration. Many of the components of the system exhibit signs of imminent failure.

## **? INCOMPLETE: DATA AVAILABLE IS INSUFFICIENT TO PROVIDE A GRADE**

## ABOUT ASCE

As civil engineers, we are committed to improving Alabama's infrastructure. Founded in 1931, the Alabama Section of the American Society of Civil Engineers (ASCE) represents 1,600 civil engineers in Alabama. We understand that infrastructure is vital to our economy, health, and natural environment. With our commitment to serve and protect the public in mind, civil engineers from ASCE throughout the State graded each infrastructure category according to the following eight criteria: capacity, condition, funding, future need, operation and maintenance, public safety, resilience, and innovation.

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## What You Should Know About Alabama's Aviation

Alabama has 80 public use airports, 74 of which are listed in the Federal Aviation Administration (FAA) National Plan of Integrated Airport System (NPIAS), with 6 of those offering commercial service. The state also boasts approximately 7,262 licensed pilots. Historically the state has been well-funded on a per capita basis and most of Alabama's aviation facilities boast excellent capacity with average to above average facility conditions according to Alabama Department of Transportation (ALDOT) licensing and pavement standards. While significant FAA and ALDOT funding has been allotted to improve Alabama aviation facilities in recent years, the FAA 5-Year Capital Improvement Plan drops below the per capita percentage. Commercial operational metrics fall below average yet based aircraft are slightly above the average. In order for the available capacity to be fully utilized and the lifespan of the existing facilities to be maximized, sufficient funding must be appropriated in order for the state to realize the economic potential of the airport system.

## How Alabama's Aviation Works

Alabama's aviation system is primarily managed by the FAA and ALDOT. Funding is provided mainly through the FAA Airport Improvement Program (AIP) with sponsor matching grants provided by ALDOT. Other grant programs are available on a limited basis through ALDOT, such as state funded 50/50 projects and the military surplus fund. ALDOT inspects each airport once per year for licensing purposes and safety deficiencies. The FAA inspects airports that are 14 Code of Federal Regulations Part 139 certified (serving air carrier operations) once a year for compliance. Most General Aviation (GA) airports served their immediate municipality or region and are governed by a municipality or a specified airport authority. In recent years, ALDOT has taken aggressive steps to bring as many airports as possible into satisfactory standing within state licensing, safety, and pavement condition standards. These steps have also coincided with other measures to ensure that airports fell within FAA design requirements for various operational characteristics. These steps have worked hand in hand with new FAA mandates as they are implemented. The overall airport system has been organized in a 'regional' grid to the greatest extent possible to best serve the flying public of the state of Alabama.

## How's Alabama's Aviation Performing

### Condition

Condition is the measure of the physical qualities of airport infrastructure and services available to the state of Alabama. The state as a whole has made an aggressive effort to keep the most important aviation infrastructure – pavements for runways - and all necessarily FAA/ALDOT standards met, with failures often resulting in a non-renewal of the airport's license.



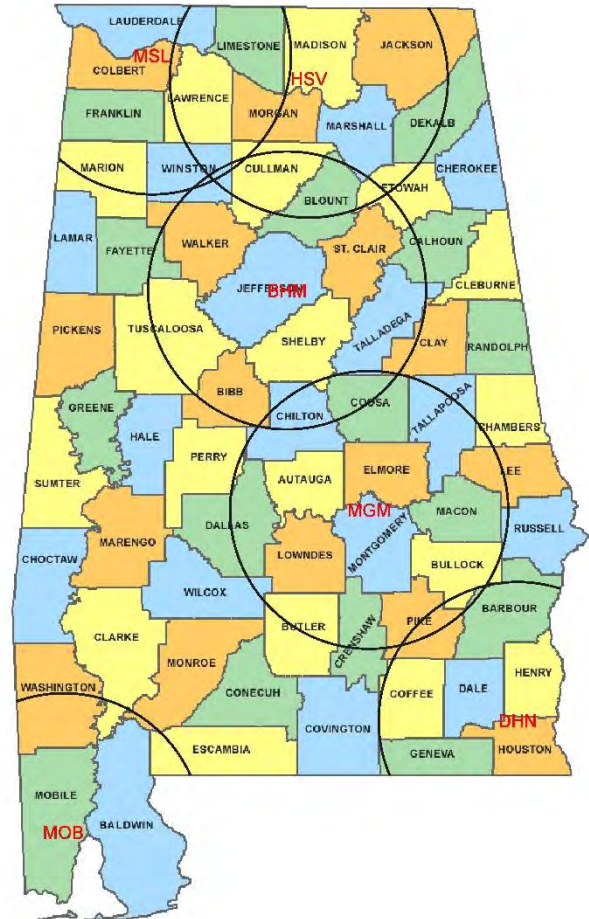
- Less than half of airports require multiple types of minor maintenance per the most recent state inspection reports, with 17% needing immediate response (includes lighting, marking, and/or pavement distresses)
- None of Alabama's airports have primarily asphalt pavements exhibiting a total PCI (Pavement Condition Index) under 55 (failing grade) per the state pavement management plan dated 2012

## Capacity

Airport capacity is measured as the infrastructure's ability to meet current and future demands. Here are the facts showing airport capacity:

- Alabama represents 1.45% of the aviation demand nationwide, based on population and land mass
- About 1% of national aircraft operations occur in Alabama
- 80% of Alabama's population lives within 1 hour of an airport housing a commercial carrier
- Less than 1% of national passenger enplanements originate in Alabama airports
- 1.5% of based aircraft nationally which is higher than the national average (based aircraft is defined as the total number of aircraft that use an airport as a home base)
- Alabama airports see an average of 6,293 operations per airport compared to a national average of 15,015 operations per airport
- Alabama moves 0.5% of national air cargo operations (2013 data)

Alabama as a whole has an extremely capable system that can handle significantly more capacity than existing figures in the Air Carrier and Cargo sectors.



## Operation & Maintenance

Operation and maintenance identifies how well airport sponsors are managing their airport facilities and assesses the degree to which Alabama's airports comply with regulatory requirements. The following facts illustrated this aspect of the Alabama aviation system:

- Licensing trends have increased incredibly since 2005, from 33% of airports displaying qualities needed for licensure to 96% present-day
- Majority of airports meet airside facility objectives, landside facility objectives, and aviation service objectives, enabling funding agencies to assist airport sponsors with more revenue producing facilities in recent years
- Airport ownership is trending from small municipality-owned airports to consolidated airport authorities which represent multiple entities who are able to accomplish much more than combined than individually

## Public Safety

Public safety is of the utmost importance to the aviation industry leaders in the state of Alabama. Aggressive steps have been taken in order to correct safety pavement surface condition and runway length deficiencies throughout the state. The following items identify key metrics:

- 8 airports are Part 139 certificated and adhere to Part 139 security standards
- Approximately 17% of airports display deficiencies currently preventing the renewal of state license, with one airport closure and one night closure
- Approximately 15% of airports display primary surface or access/security deficiencies per state licensing standards, both violations and minor maintenance
- Approximately 21% of airports have potential obstructions such as trees, utility poles or terrain in their varying approach surfaces per state licensing standards, both violations and minor maintenance

## Funding

The FAA issues grant funding through its Airport Improvement Program, which is funded primarily by the Airport and Airway Trust Fund which receives revenues from a series of excise taxes paid by users of the national airspace system, and by the General Fund. The AIP provides grants to airports included in the NPIAS.

The ALDOT Airport Development Fund receives revenues generated by the state excise tax on the sale of aviation and jet fuels. The excise tax imposed on these fuels is the sole revenue source provided by the State of Alabama for the bureau's airport improvement program and its operating budget. During 2013, the tax for aviation fuel was .095 cents per gallon and the jet fuel rate was .035 cent per gallon.

Local funding was not measured specifically but can be assumed to be consistent with other states. Local funding is often variable and linked to a number of factors including air service, number of operations and local industry.

- 2014 FAA funding in Alabama totaled \$55 million, which is 1.70% of nationwide funding distributed, ahead of the Alabama per capita rate of 1.45%
- 2014 ALDOT Aeronautics Bureau Issued 28% of requested grant funding, \$611,836 of \$2,128,852
- Alabama trails most other southeastern states in the amount of state funds spent on airport improvements

## Future Need

The FAA publishes its NPIAS report every two years, which outlines the next 5 years of capital improvement project costs. Alabama airports represent \$356 million of the planned funding (1.07%). Comparing to the 1.45% per capita rate and past rates, this item is in need of a small increase, at minimum, to match potential demand based on population, land mass and based aircraft. Using that same metric, the amount of funding lost is presently \$128 million over 5 years, or \$25 million per year. Comparing these numbers to Capacity, it appears this funding could be directed towards accommodating based aircraft, much of which is business aviation related and directly impactful to local economies.

According to the Airports Council International *Capital Improvement Needs of 2015-2019*, Small Hub airports and smaller (all airports in Alabama fall under this category) represent 35% of the total national budget. Airline prices are projected to rise, as are passenger counts and cargo. In terms of specific projects, terminal facilities represent 36% of the total budget, followed by reconstruction at 18%. At present, Alabama appears well positioned as far as these improvements, compared to national need.

As the business/corporate aviation community continues to grow nationally, Alabama is well-positioned to take advantage of its airside capacity advantages. Since the statistics have pointed towards a need in based aircraft upgrades, future funding could be invested in airports in two areas of the state: (1) municipalities located outside of areas 1 hour from air-carrier airports (20% of population), or (2) areas on the outer fringes of metropolitan areas. Potential economy-boosting entities are constantly sought for recruitment of these areas that are primed for future development, and the availability of suitable airport facilities are often listed among the top reasons to locate facilities in a certain regions, be industry, manufacturing technology or other businesses.

## Resilience

Resilience is the system's ability to prevent or protect against multi-hazard threats and incidents and the ability to efficiently recover and reconstitute critical services with minimum damage to public safety and health, economy and



national security. This area is even more critical for aviation infrastructure, as airports serve as 'jump-off' strategic locations in times of disaster/emergency.

- 92% of airports with updated security plan/grid
- Low FAA risk factor for all Alabama airports

## Innovation

As the FAA moves the aviation industry further into the future by incorporating items such as Unmanned Aerial Systems (UAS), NextGen and more electronic methods of data transmittal, the ALDOT Aeronautics Bureau has also taken steps in technological advancement. The following are two areas presently undertaken at the Alabama state level:

- Aviation leaders have implemented a regional state system planning effort in order to create economic opportunities in all areas of the state, based on geography, corporate/business trends, population trends and aircraft operations.
- By Executive Order 1 issued by the Governor on January 23, 2015, the Alabama Department of Transportation's Aeronautics Bureau was assigned authority over all unmanned aerial technology in the state of Alabama. The executive order also established the Unmanned Aerial System Council to serve as an advisory group to the Aeronautics Bureau. The UAS Council is composed of representatives from various state agencies, members of the legislature and a representative of an airport authority. The UAS Council and Bureau will be focused on tracking, analyzing and responding to all matters related to UAS technology. The UAS Council is directed to meet at least quarterly to fulfill this function.
- The Aeronautics Reimbursement and Grant Organization System (ARGOS) is a computer program that allows vendors to electronically submit invoices to the Aeronautics Bureau for reimbursement. ARGOS captures data from individual invoices submitted by a vendor and uses it to populate reports, create spreadsheets, and generate calculations that will allow the Aeronautics Bureau to process payments faster and more efficiently while also allowing stakeholders such as the airport sponsors, engineers, consultants, auditors, and the FAA to access up to the minute information regarding airport projects and grant management. The purpose of the program is to give the Aeronautics Bureau the ability to pay reimbursement requests faster and efficiently organize the historical data to ensure that grant balances are not exceeded, duplicate invoices are not processed, and projects are as compliant as possible with auditing standards. The information collected and compiled by the database is also useful to the airport sponsors, consultants, engineers, and FAA personnel who also share responsibilities for the same projects. For this reason, the Aeronautics Bureau developed the program to be easily accessed by those stakeholders.

## Let's Raise the Grade

The following recommendations are suggested for the Alabama aviation system:

- **Fund aviation initiatives that help the state grow.**
  - Raise state funding for aviation in line with its economic benefit to the state.
  - Increases the Airport Trust Fund and Passenger Facility Charges at commercial service airports.
- **Consolidate resources where practical.**
  - The trends towards a regional aviation footprint that encompasses a larger, combined entity rather than multiple small communities, should be embraced. This allows for greater combined economic gain and also decreases maintenance strain on financially- strained communities.
- **Save funds by repairing and maintaining before major repair is needed.**
  - Place emphasize and incentives on remediation to prevent total failures, in order to maximize existing infrastructure life and maximize budgets

- **Embrace economic recruiting.**
  - Take advantage of physical and logistical capacity and continue the momentum that businesses such as Airbus have brought to the state in aviation business development (especially at the general aviation level), with emphasis on manufacturing, technology and green initiatives.
  - Promote Alabama's commercial airports and promote the state of Alabama's attractiveness to national travelers and entities. This would include pursuit of available grants for air service development.
  - Educate on the opportunities available due to capacity and abundant facilities, specifically in the business/corporate aviation sector.
  - Recognize the opportunities for additional aircraft operations and additional revenue streams produced by hangar construction and increased activity due to Alabama's above average based aircraft.
  - Apron facilities, corporate hangars and T-hangars should be prioritized to house based aircraft and keep them at Alabama airports, due to their direct and indirect ties to economic growth.

## Find Out More

- Federal Aviation Administration: [www.faa.gov](http://www.faa.gov)
  - National Plan of Integrated Airport Systems: [www.faa.gov/airports/planning\\_capacity/npias/](http://www.faa.gov/airports/planning_capacity/npias/)
  - Operational Data: [www.faa.gov/airports/planning\\_capacity/passenger\\_allcargo\\_stats/passenger/](http://www.faa.gov/airports/planning_capacity/passenger_allcargo_stats/passenger/)
  - Aviation Forecasts: [www.faa.gov/about/office\\_org/headquarters\\_offices/apl/aviation\\_forecasts/](http://www.faa.gov/about/office_org/headquarters_offices/apl/aviation_forecasts/)
  - Part 139 Airport Certification: [www.faa.gov/airports/airport\\_safety/part139\\_cert/](http://www.faa.gov/airports/airport_safety/part139_cert/)
- Alabama Department of Transportation Aeronautics Bureau website: [www.dot.state.al.us/aerweb](http://www.dot.state.al.us/aerweb)
  - Inspection Reports: [www.dot.state.al.us/aerweb/airport\\_safety\\_inspection.htm](http://www.dot.state.al.us/aerweb/airport_safety_inspection.htm)
  - Unmanned Aerial Systems: [www.dot.state.al.us/aerweb/Alabama\\_UAS/UAS.html](http://www.dot.state.al.us/aerweb/Alabama_UAS/UAS.html)
  - Pavement Maintenance Program: [www.dot.state.al.us/aerweb/airport\\_pavement\\_program.html](http://www.dot.state.al.us/aerweb/airport_pavement_program.html)
  - Airport State System Plan: [www.dot.state.al.us/aerweb/alabama\\_state\\_airport\\_system\\_plan.htm](http://www.dot.state.al.us/aerweb/alabama_state_airport_system_plan.htm)
- Airports Council International: [www.aci-na.org](http://www.aci-na.org)
  - Airport Capital Development Needs 2015-2019: [www.aci-na.org/sites/default/files/2014-15\\_capital\\_needs\\_survey\\_report\\_final.pdf](http://www.aci-na.org/sites/default/files/2014-15_capital_needs_survey_report_final.pdf)
- Airport Cooperative Research Program: [www.trb.org/ACRP](http://www.trb.org/ACRP)



## What You Should Know About Alabama's Bridges

Alabama's bridges span more than 485 miles, a distance longer than a one-way road trip between Mobile and Huntsville. State transportation officials have classified 20% of Alabama's 15,986 bridges as either structurally deficient or functionally obsolete, and the situation is certain to worsen in the next several years as Alabama's bridge inventory continues to age. The number of structurally deficient bridges in Alabama ranks as the 15th highest in the nation, based on quantity, and equates to more than the total number of bridges in Hawaii. While some progress is being made, Alabama still needs substantial increases in revenue to fund improvements to its deteriorating bridge infrastructure. Furthermore, the low rate of Alabama's transportation user fees do not keep up with system needs and demands.



Courtesy of the Alabama Department of Transportation

## How Alabama's Bridges Work

The federal government defines a bridge as a structure over some obstruction, such as water, a highway, or railway that carries traffic and is longer than 20 feet. Alabama is home to nearly 16,000 bridges, with the Alabama Department of Transportation (ALDOT) owning and maintaining 5,758 bridges, which is about one-third of the bridge structures statewide. County governments own and maintain a little over half of Alabama's bridges, with the remainder being owned by local municipalities. The State of Alabama receives about \$84 million in state and federal funds that go toward bridge replacement projects every year.

# How Are Alabama's Bridges Progressing

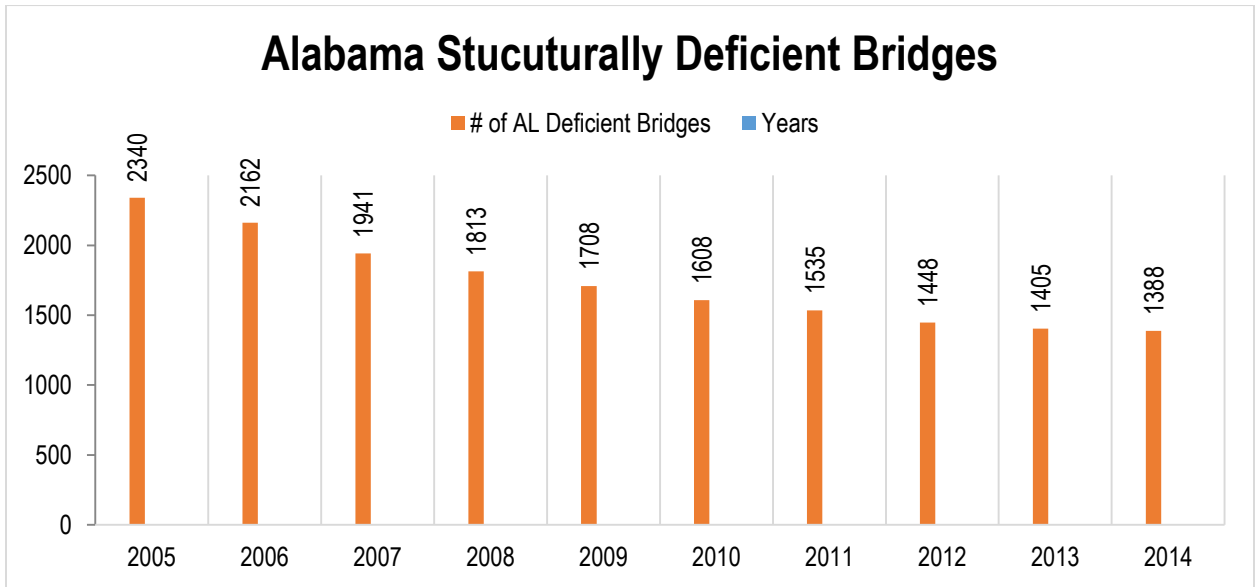
## Condition

Due to the abundance of over 2,600 (about 16%) bridges in Alabama that are currently posted for reduced weight limits and many more that are currently closed to all traffic, drivers are required to detour an average length of 12 miles. According to ALDOT, approximately 8.63% of Alabama's bridges are classified as structurally deficient, compared to the national average of 11%. A bridge is structurally deficient if there is significant deterioration to the bridge deck, bridge supports, or other major components. Although bridges classified as structurally deficient are safe for continued use, they may be posted for lower weight limits or closed to the public. A structurally deficient bridge can be thought of as an old two seater bicycle with some wear and tear. One could decide that the deterioration of the bike would be dangerous with the weight of two people, but completely safe for just one person to ride on. A structurally deficient bridge compares to the bike analogy in that it is determined to have significant deterioration by a certified bridge inspector or engineer and evaluated for a completely safe posting, if required, for vehicles to drive over.



*Courtesy of the Alabama Department of Transportation*

ALDOT classifies approximately 12% of Alabama's bridges as functionally obsolete. A bridge that is functionally obsolete is safe to carry traffic, but has less than desirable geometric conditions required by current design standards. Bridges that are functionally obsolete often have narrow lanes, inadequate clearances, or poor alignments. This can pose problems for today's traffic volumes and are more susceptible to traffic congestion. The good news is that over the past eight years, the number of structurally deficient and functionally obsolete bridges has decreased. However, as the age and condition of bridges not currently classified as such get older and deteriorate without being replaced or being rehabilitated, it is only a matter of time before the number of deficient bridges will rise again.



*Courtesy of the Alabama Department of Transportation*

### Capacity

The average age of an American bridge in 2013 was 42 years old, and in comparison, the average age of a bridge in Alabama is slightly higher at 44 years old. The average design lifespan of a bridge is 50 years. In an effort to double the service life of a bridge to last 100 years, ALDOT estimates that about 58 state-owned bridges must be replaced on a yearly basis. Today's current rate of replacement is only about 55 bridges per year and this includes state and locally owned bridges. Of these 55 bridges being replaced, only 22 of them are using federal funds with the rest using state or local funds.

### Operation & Maintenance

The Federal Aid Highway Act of 1968, established by Congress, requires all states to meet national bridge inspection standards. This was, in part, due to a highly publicized bridge collapse of the Silver Bridge between Virginia and Ohio caused by a lack of inspection that would have easily caught the problem. The Alabama Department of Transportation follows the Federal Highway Administration National Bridge Inspection Standards (NBIS) to ensure Alabama meets bridge safety qualifications. Alabama's bridges are inspected in accordance with the FHWA's NBIS, and inspections are conducted at regular intervals, at least every 2 years. Certain conditions may warrant more frequent inspections.

### Public Safety

In Alabama, over 79 million drivers pass over a bridge in a single day, and in that same day, over 15 million



*Posted Bridge Crossed by Dump Truck  
Courtesy of the Alabama Department of Transportation:*



vehicles pass over a structurally deficient or functionally obsolete bridge. This means that roughly one in every six drivers will traverse a structurally deficient or functionally obsolete bridge every single day in Alabama. As the average age of a structurally deficient bridge in Alabama approaches 60 years, 10 years more than the average life span, the need for more funding is at a critical point.

To the average person driving down the road, a posting sign doesn't get a second glance, but much larger vehicles driven by people with a Commercial Driver's License (CDL) know the weight of their vehicle and cargo and are trained to be observant of such posting signs. With 2,390 of the 2,630 posted bridges in Alabama being county-owned, many of these are way off the beaten path. According to the Alabama Forestry Commission, there are 23 million acres of timberland in Alabama, accounting for 68% of the total land area in the state. Because of this abundance of timber, many rural bridges service log trucks, but posted bridges may not be able to handle their loads.

## **Funding**

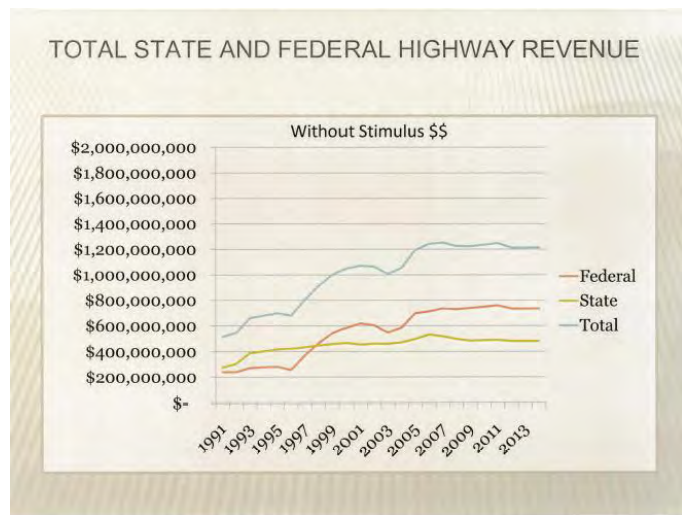
### **Federal Funding**

The Intermodal Surface Transportation Efficiency Act (ISTEA) that was signed into law on December 18, 1991, presented an overall intermodal approach to highway and transit funding with collaborative planning requirements, giving significant additional powers to metropolitan planning organizations. ISTEA was the first U.S. federal legislation on the subject in the post-Interstate Highway System era and provided an average of \$280 million to the State of Alabama from 1992 – 1997. The ISTEA Act was followed by the Transportation Equity Act for the 21st Century (TEA-21) in 1998, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) in 2005, the Moving Ahead for Progress in the 21st Century Act (MAP-21) in 2012, and recently the Fixing America's Surface Transportation Act (FAST) providing certainty that federal funding for Alabama will continue. The federal funding allocated to Alabama for transportation programs has been on average \$730 million. Even though the federal funding level has increased by nearly \$450 million over 20 years, it still is unable to keep up with the aging structures and the cost inflation within the State of Alabama. Currently, the Alabama Department of Transportation allocates 7% of their \$1.2 billion dollar transportation funding program from federal and state funds to bridge replacements. That figure would have to be increased close to \$150 million to replace 1% of the State Route Bridges per year.

## State Funding

Alabama faces a significant transportation funding crisis in the near future. Alabama's transportation user fees, collected via a tax on gasoline, is the primary funding source for bridges and is about 10 cents per gallon less than the national average. Alabama's rate is also lower than most neighboring southeastern states. With fuel economy ever increasing and construction costs on the rise, Alabama's dated rate fails to maintain the buying power it once had. The rate in Alabama was last adjusted in 1993, while studies show that since that time fleet vehicle efficiency has increased up to 25% and highway construction costs have more than doubled.

In February 2012, the State of Alabama took the lack of funding into its own hands by starting the Alabama Transportation Rehabilitation and Improvement Program (ATRIP). The ATRIP Program is a \$1.2 billion Grant Anticipation Revenue Vehicles (GARVEE) Bond with the purpose to rehabilitate and improve transportation infrastructure through the accelerated delivery of project funding. The program's goal is to address critical needs projects across the state in an effort to rehabilitate and improve the in-place facilities and in some cases provide new facilities at locations throughout the state. The program's focus is on essential needs relating to roads and bridges at the local level. Of the approximately 1055 working projects, 379 bridge replacements or bridge rehabilitation projects (36% of projects) on county or city routes will be completed at the conclusion of the ATRIP Program.



## Future Need

While the age and replacement rate of the existing bridges are a major concern, several high-profile projects have been proposed or approved to help meet the travel demands of future generations:

**I-59/I-20 Bridge Replacement:** A major infrastructure rehabilitation project is slated for 2015-2016 that will replace or improve the majority of the bridges in and around Birmingham's downtown central business district, including the 1.25-mile structurally deficient I-59/I-20 bridge through the heart of downtown. Traffic operations will also be improved by the addition of new ramps and widening of existing bridges along the adjacent I-65 corridor. The estimated total cost is \$325 million.

**The Birmingham Northern Beltline:** The Alabama Department of Transportation (ALDOT) has moved into the construction phase of the Birmingham Northern Beltline, a 52-mile, six lane corridor that will stretch from I-59 in northeast Jefferson County to the I-459 interchange with I-20/59 near Bessemer. The project will include several new bridges. The total cost for the entire project is estimated to be \$5.44 billion.

**The Mobile River Bridge:** The I-10 Mobile River Bridge and Bayway Widening project is a proposal to increase the capacity of I-10 in Mobile and Baldwin Counties by constructing a new six-lane bridge across the Mobile



River and widening the existing I-10 bridges across Mobile Bay from four to eight lanes. The project will help meet existing and predicted future traffic volumes and to provide a more direct route for vehicles transporting hazardous materials, while minimizing impacts to Mobile's maritime industry.

## Resilience

All states are subject to some type of natural disaster or catastrophic failure by some external force. The Federal Highway Administration (FHWA) provides Emergency Relief (ER) funds for such events if the right criteria is met. Alabama has had its fair share of severe weather over the years and has taken advantage of these ER funds to repair and restore highway facilities to pre-disaster conditions. As such, much of these repairs are undertaken immediately after a disaster to restore essential traffic, with the remainder of more significant repairs to pre-disaster conditions. An example of this may be a 20 foot bridge that is destroyed due to severe flooding after an event that can be temporarily replaced by two or three pipes until the full 20 foot bridge can be built.

These emergency events do not have to take the form of a tornado or hurricane though. Two such cases in Alabama's history took place at a location where three different interstates intersect in Birmingham, known as Malfunction Junction. In early 2002 and late 2004, at different bridges at this junction, a tractor trailer carrying diesel fuel had an accident, thus impacting a bridge and permanently damaging it to the point of failure and closure. ALDOT was able to have a contractor begin work 16 days after one incident and 8 days after the other. Due to incentives for the contractor, the 90 days given to complete the work for the first incident took only 53 days and the 60 days given to complete the work for the second incident took only 26 days. This is a major accomplishment for such large bridges at such a busy area to be replaced in such a short period of time.

## Innovation

Beginning on January 21, 2015, ALDOT updated their bridge management software from Alabama Bridge Information Management System (ABIMS) to AASHTO Ware Bridge Management Version 5.2.1.0 (BrM). This software is maintained on a server at ALDOT's central office but is used by all bridge inspectors across the state. Making this switch was a big move for ALDOT. This new software has features that allow ALDOT, as well as local agencies, to better prioritize their maintenance needs and will also produce a cost benefit analysis report. This helps the bridge owner make critical decisions to best utilize the limited funds that they receive, by determining what bridge maintenance or bridge replacement project will give them the most "bang for their buck."

## Let's Raise the Grade

- **Address funding uncertainties by finding and implementing funding changes** such as raising state transportation user fees and indexing for inflation.
- **Identify new sources of bridge funding to decrease the number of structurally deficient and load posted bridges.**
- **Replace the key posted bridges currently on State routes to allow for heavy vehicles to cross and keep Alabama's economy moving.**
- **Set a state goal for Alabama to decrease the number of structurally deficient bridges to 6% by 2025.**

## Find Out More

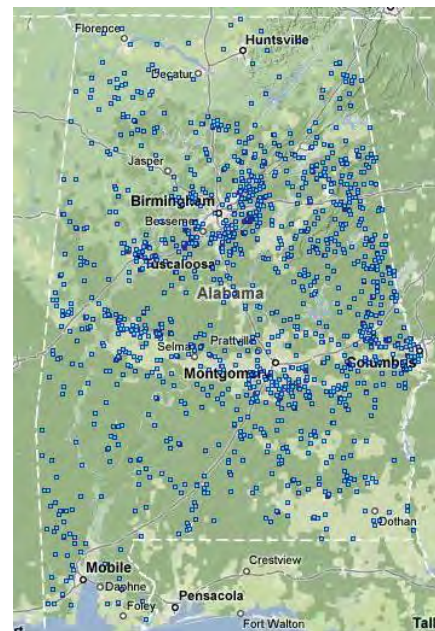
- Alabama Forestry Commission, [www.forestry.alabama.gov/forest\\_facts.aspx](http://www.forestry.alabama.gov/forest_facts.aspx)
- Emergency Relief Manual (Federal-Aid Highways), Updated May 31, 2013, [www.fhwa.dot.gov/reports/erm/er.pdf](http://www.fhwa.dot.gov/reports/erm/er.pdf)
- Transportation for America, [www.t4america.org/tag/bridges](http://www.t4america.org/tag/bridges)
- Alabama Department of Transportation, [www.dot.state.al.us](http://www.dot.state.al.us)
- Federal Highway Administration, [www.fhwa.dot.gov](http://www.fhwa.dot.gov)



## What You Should Know About Alabama's Dams

Alabama is the only state without a Dam Safety Program, which would provide guidelines necessary for the safe design of dams, and critical inspections and maintenance of existing dams. Alabama's 2,200 plus known dams continue to age and the size of the population downstream of these dams continues to increase, placing more people at a greater risk. Some of these dams are established, like the more than 20 hydroelectric power dams along the Alabama, Tennessee and Coosa Rivers that brought electrification south more than one hundred years ago and still provide 5% of Alabama's electricity. However, the number of lesser known dams needing repair continues to grow, while the funding needed also increases over time. Increasing the number of emergency action plans for high hazard dams and completion of dam safety repairs are common sense safety measures. However, a significant commitment from the federal, state, local, and private sector to Alabama's dams is long overdue.

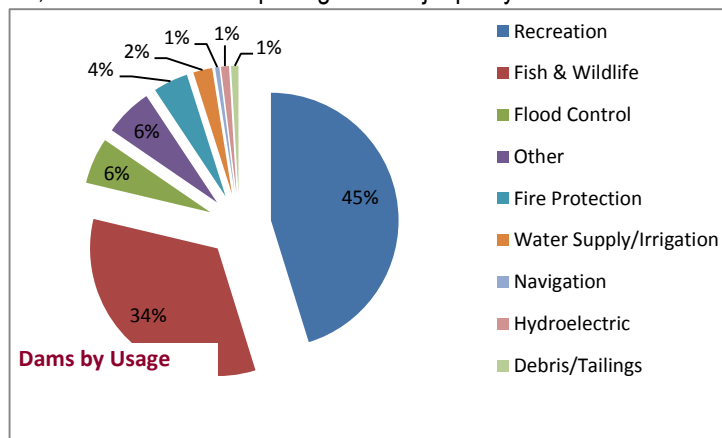
Alabama Identified Dams

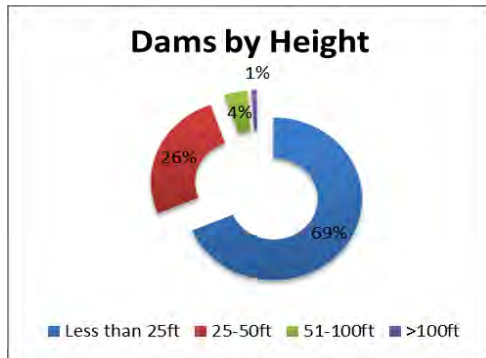


## How Alabama's Dams Work

In Alabama, dams have been built both for and by public and private users. Most dams are not protecting people unless they are designed for flood risk reduction, but rather could be putting them in jeopardy. Known dam

construction types consist mostly of earthen making up 87% and the remaining 13% consist of concrete, gravity, rockfill and others. A vast majority of dams, 83%, are owned by private citizens, which includes those within subdivisions and on farms. Other dam owners are public utilities (1%), federal government (2%), and state and local government (6%).





Dams are classified based upon three factors—size, hazard potential or anticipated consequences. Jurisdictional criteria, established by the Army Corps of Engineers National Inventory of Dams (NID) are dams that are 25 feet in height or more as well as exceed a storage volume of 15 acre feet or those that are equal or exceed 50 acre feet and exceed 6 feet in height.

Dams are considered **high hazard potential** if their failure or mis-operation will result in the loss of human life. They are identified as **significant hazard potential** if their failure or mis-operation will result in no probable loss of human life but can cause economic and/or environmental loss. Dams can be identified as **low hazard potential** if their failure or mis-operation will result in no probable loss of human life and low economic and/or environmental loss.

Through a grant from FEMA, the Alabama Department of Economic and Community Affairs (ADECA) is currently updating the state's dam inventory using aerial photography, computer mapping tools, and satellite imagery. Thus far, ADECA has studied 40 counties and currently conducting inventory of another 12 counties. They have identified an additional 37 high hazard potential dams and many more significant and low hazard potential dams.

Since onsite surveys are not included in this study, it is difficult to differentiate between these hazard potentials. It is critical for public safety that Alabama's dams be classified using onsite surveys and those determined to be High and Significant Hazard be inspected and any deficiencies discovered noted.

## How Are Alabama's Dams Performing

### Condition and Capacity

Since 1998, the number of high hazard potential dams in the U.S. has increased from 9,281 to more than 14,700 according to the 2013 update of the U.S. Army Corps of Engineers National Inventory of Dams (NID). According to the NID, Alabama has 2,241 dams, 196 of which are high hazard potential, another 449 of which are significant hazard potential, and the remaining 1,592 of which are low hazard potential, the remaining 4 dams are undetermined. Over 75% of the Alabama known dams are more than 40 years old, and 17% are over 30 years old. Based on inspections reported in the NID, only 19% of high hazard potential and only 2% of all dams in Alabama are being inspected, maintained and have Emergency Action Plans (EAP). In contrast, in states with a dam safety program, all high hazard potential dams are inspected annually and required to have EAPs. According to the Association of Dam Safety Officials, there have been several documented dam failures in Alabama and likely many more undocumented. Fortunately, there were no casualties resulting from these failures; however, some of the failures resulted

View of Dam Failure Looking Downstream



in significant economic and environmental losses. There is a very high likelihood that undetected rusted spillway pipes, deteriorating concrete structures, and embankment erosion of older and unmaintained dams will cause additional dam failures and, quite possibly, loss of life.

Examples of previous Alabama dam failures are as:

- East Lake Dam in Birmingham overtopped during heavy rainfall in 2004, resulting in severe slope erosion and near failure. 270 residents were evacuated. If failure had occurred, several homes and roadways could have been destroyed.
- Keith Lake Dam in St. Clair County overtopped during heavy rainfall in 2004, resulting in total dam failure and a path of destruction 3600 feet long, 1350 feet wide.
- A Shelby County dam failed due to soil piping along the 60" discharge pipe in 2013. Approximately 200 million gallons of water were released in less than an hour. There was significant damage to roadways and downstream properties.

Due to the lack of a Dam Safety Program, little is known regarding the capacity of Alabama's dams. Many of our dams are in need of rehabilitation to meet current design and safety standards. They are not only aging, but they should be subject to stricter criteria as a result of increased downstream development and advancing scientific knowledge predicting flooding, earthquakes, and dam failures.

## **Operation & Maintenance**

Other than the dams regulated by the Federal Energy Regulatory Commission and Alabama Department of Environmental Management and maintained by the U.S. Department of Agriculture, Natural Resources Conservation Service, the remaining dams in Alabama are not regulated and many of the public and private dam owners are not required to practice proper dam maintenance. Just like a driver's license is required to drive, it is essential that all dam owners be taught proper inspection and maintenance procedures for their safety and the public's. One example of a frequent problem is dam owners allowing trees to grow in earthen dams because they're not aware of the issue this creates. Tree roots naturally seek a water source which in this case, is the lake. When these trees die, the root canals provide a conduit for the water to escape, possibly leading to dam failure. Trees can also be uprooted by storms, creating holes in the dam and potential failure.

## **Public Safety**

Development of areas downstream of some Alabama dams has likely increased and this population is at risk from a dam failure. As these dams continue to age and the size of the population downstream of dams continues to increase, more people downstream are at a potential risk. According to the ASDSO the number of dams needing repair continues to grow, while the repair costs also increases over time. The following is a brief summary of the statistics cited in the USDA National Resources Conservation Service (USDA NRCS) "Analysis and Strategy for Addressing the Nation's Aging Flood Control Dams:"

- More than 300 fatalities resulted from 23 dam failures that occurred in the U.S. from 1960 to 1998. Seven of the dams had less than 300 acre-feet of water released during the failure.
- Failure of dams between 20 and 40 feet in height caused 86% of the deaths.
- Failure of dams with drainage areas less than 2 square miles caused 47% of the deaths.
- Failure of dams with drainage areas less than 10 square miles caused 75% of the deaths.
- Approximately 4% of Alabama's dams are NRCS dams and the last estimated cost to repair them was nearly \$24 million.

The report also summarizes that loss of life resulting from dam failures is highly influenced by the following main factors:

- The number of people occupying the dam failure floodplain
- The amount of warning time provided to people exposed to flooding
- The severity of the flooding

## Funding

Without an accurate inventory of Alabama's dams, the funding needs for repairs and safety issues in the state are unknown. The Association of State Dam Officials (ASDSO) estimates the total cost to rehabilitate the nation's dams is over \$57 billion. To rehabilitate dams categorized as high hazard potential, the cost to the nation would be \$21 billion, a cost that continues to rise as maintenance, repair, and rehabilitation are delayed. A coalition of those who work on dams and dam safety have proposed legislation to create a new Alabama Dam Safety Program funded with \$1 million to begin to assess the full funding needs.

## Future Need and Resilience

Dam failures not only put the public's safety at risk, but they can also cost local economies millions in damages. Since dam failures can cause severe consequences to public safety and the economy, emergency action plans (EAPs) for use in the event of an impending dam failure or other uncontrolled release of water remain vital. While the number of Alabama high hazard potential dams with an EAP has increased, only 19% of dams have EAPs, far below the national ASDSO and ASCE goal of 100%. Resilience is the ability to come back from an incident or an event, and without EAPs for high hazard dams, Alabama is not prepared for the future.

## Innovation

The dam safety engineering practice is moving towards a risk-based decision-making process for the design, rehabilitation, and operation of dams. Risk-based decisions enable the dam owner to better utilize limited funding, and prioritize projects, by focusing on repairs and operational changes that reduce risk to acceptable levels, thus improving community resilience. Engineers, dam owners, regulators, and emergency management professionals should be engaging those communities potentially affected by a dam failure, in order to provide a fair portrayal of risk. Through broader community collaboration, stakeholders will be better able to support land use decisions, emergency action planning, and maintenance and rehabilitation funding, which will reduce community risk in the long-term.

## Let's Raise the Grade

- **Complete the inventory of Alabama's dams** begun by the Alabama Department of Economic and Community Affairs with FEMA grant assistance and establish a public map.
- **Develop Emergency Action Plans** for every high hazard potential dam area to become more prepared and consider how resilient they can become.
- **Protect the public's safety** by providing sufficient resources to at a minimum assess the high hazard dams in the state to understand their condition and risks.
- **Establish a Dam Safety Program in Alabama**, the only state without a safety and inspection program. Alabama is in need of a program which should at a minimum:
  - Provide for an inventory and periodic safety inspection of existing dams.
  - Regulate the design and construction of new dams and require dam owners to solicit qualified engineers to design and perform periodic inspections and certifications of dams and prescribe remediation of existing dams in need of repair.
  - Assist dam owners and emergency management officials in planning for and executing emergency response measures in the event of a dam incident or failure.



- Educate dam owners, local officials and others on dam safety.
- **Establish a dam rehabilitation and repair revolving grant or loan program** to ensure dam owners can affordably repair privately and publicly owned, nonfederal, high hazard dams.
- **Provide educational resources** to dam owners, like ASDSO's Responsible Dam Ownership resources at [www.damowner.org](http://www.damowner.org).

## Find Out More

### Existing Dam Information

- [Association of State Dam Safety Officials - Alabama Report](#)
- [Responsible Dam Ownership: Information, Guidelines & Tools](#)
- [FEMA - Dam Safety in the United States](#)
- [National Inventory of Dams – Alabama Summary Data](#)
- [Natural Resource Conservation Service – Alabama Watershed Structures](#)
- [Natural Resource Conservation Service – Alabama Dams in Danger](#)

### Major Alabama Dam Owners

- [Alabama Power Lake Information](#)
- [Tennessee Valley Authority Lake Information](#)
- [US Army Corps of Engineers, National Inventory of Dams, Alabama Information](#)

### Information About Dams

- [FEMA Dam Safety Fact Sheet](#)
- [FEMA Living With Dams](#)
- [Association of State Dam Safety Officials Information for Dam Owners](#)

### ASCE Dam Policy Statements

- [Policy Statement 280 – Responsibility for Dam Safety](#)
- [Policy Statement 470 – Dam Repair and Rehabilitation](#)

### Additional References

- [Alabama Department of Community and Economic Affairs](#)
- [American Council of Engineering Companies](#)
- [USDA Natural Resources Conservation Service](#)





## What You Should Know about Alabama's Drinking Water

In Alabama, 577 mostly small, non-municipal water systems provide safe and reliable drinking water. Alabama is in the top 10% nationally in terms of water quality they provide to their customers. The challenge facing the systems is that the infrastructure, including water mains, tanks, plants and pumps, was built in the 1960s, 70s and 80s. Much of it has aged beyond its intended life of about 30 years, making it increasingly in need of repair and replacement. Innovative funding sources to address these needs would allow infrastructure owners to do proactive maintenance rather than reactive maintenance, decrease emergency repairs, and limit loss of unbilled water.

## How Alabama's Drinking Water Works

Most of the 90% of Alabamians that have access to public sources of drinking water get their water from systems that are classified as "small" systems, meaning it serves a population of less than 10,000. This reflects the national data that shows 94% of all systems are classified as small and non-municipal. The systems also ranked in the top 10% nationally in terms of water quality. The systems are generally public corporations formed as an "authority" or "system" and are governed by appointed or elected boards of directors.

The systems are regulated by the Alabama Department of Environmental Management in terms of operations and water quality. Originally established under the Safe Drinking Water Act of 1974, water quality is measured on an ongoing basis in accordance with federal EPA standards and reported to each customer annually. Alabama has an abundance of surface and ground water sources, of which 8% that is withdrawn is used for public water system consumption.

Water is treated through a variety of proven engineering methods, transmitted and distributed through pipe networks that date back decades, and is pumped and stored. The drinking water infrastructure is aged and has not generally been replaced and rehabilitated in advance of the end of its useful life.

# How's Alabama's Drinking Water Performing?

## Condition

While the systems have expanded under various federal and state programs to bring safe and reliable drinking water to 90% of the state's population the infrastructure is now aged beyond the expected life of the materials used. The other 10% of the population is serviced by private and community wells and springs. 342 of the systems were constructed from 1962 until 1977. Another 52,000 miles of pipe were added to existing and new systems in the period from 1977 until 1994. Systems currently operate under a mode whereby most resources are spent fixing leaks and trying to limit unbilled (unaccounted for) water, rather than proactive preventive replacement programs. Of the 831 million gallons withdrawn daily from surface and ground sources only 327 million gallons is consumed by system customers.

## Capacity

Most of the state's systems were constructed to provide drinking water to rural customers under programs that required expansion only for the existing needs of the time. As public facilities, such as schools, and other larger demand facilities, are placed outside municipal areas, systems must upgrade and expand in order to meet demand. The situation is further exacerbated by the requirement that public buildings meet the stringent fire codes. Fire demand, usually well in excess of domestic demand is not easily met by systems constructed under the standards of the funding programs available in the 1960s and 1970s.

## Operation & Maintenance

Systems currently operate under a mode whereby most resources are spent fixing leaks and trying to limit unbilled (unaccounted for) water rather than proactive preventive replacement programs. Public funding is available through the Drinking Water State Revolving Fund for improvements and upgrades but the program is only available for systems able and/or willing to borrow the funds. The FY 2015 Intended Use Plan for the state DWSRF program indicates 43 funded projects for a total of \$69,378,800. Most systems lack the revenue to incur additional debt, making preventative maintenance rare.

## Public Safety

Alabama's public water systems are safe and reliable and the quality of life and economic vitality of the state depend on them. The professionals that operate and those that assist the operators are well trained and capable. The water quality of the state ranks in the top 10% of all states and is reported annually to the customers of the systems of the state.

As public facilities, such as schools, choose to locate in rural areas they face the challenge of providing adequate fire supply. The rural systems were not designed to provide fire demand, but in most cases are being upgraded to ensure adequate fire supply.

## **Funding**

Adequate funding to meet the increasing need for infrastructure rehabilitation and replacement is lacking. Funding is generated through water rates. Currently no grant funds are available to all of the water systems of the state. Borrowing is available but demands an additional burden on the rate structures of the systems in a time of ever increasing pressure to keep water rates affordable. Funding sources need to be expanded to meet the 20-year need of \$7.9 billion.

## **Future Need**

As Alabama's drinking water infrastructure continues to age, unbilled, unaccounted for water will increase. This increases the burden on water sources and financial resources. Underfunding improvements right now only delays the inevitable expenditure, and more costly future, expense of rehabilitation and replacement. Emphasis and funding for the consolidation of systems will be a growing concern.

## **Resilience**

The lack of interconnection and the lack of redundant source water limit the water systems' ability to provide safe drinking water during a catastrophic event or multiple events. The systems rely heavily on electricity provided by local providers with limited backup generation or alternative sources of energy. Most systems draw from only one source whether surface, ground, or purchase making them susceptible to extended periods without a source in the event of a natural or man-made disaster. The lack of interconnectivity or consolidation of systems does not provide for short-term emergency use when events occur.

## **Innovation**

In order to meet the growing gap in funding the state should consider innovative funding sources such as public-private partnerships, infrastructure banks and a water system trust fund. The state should consider programs to encourage consolidation, use of technology, and water use accountability. The role of the new National Water Center located at the University of Alabama should be expanded to include direct input into the development of EPA drinking water quality standards.

## Let's Raise the Grade

- **Fund infrastructure improvements that provide for the consolidation of water systems to take advantage of economies of scope.**
- **Provide a greater source of grant funds for infrastructure rehabilitation and replacement.**
- **Provide resources for system mapping, standard operating procedures, preventative maintenance plans and long range plans.**
- **Develop innovative funding sources such as infrastructure banks.**

## Find Out More

- Alabama Department of Environmental Management, Drinking Water State Revolving Fund (DWSRF) Loan Program Intended Use Plan for Fiscal Year 2015
- American Society of Civil Engineers, 2013 Report Card for America's Infrastructure
- American Society of Civil Engineers – Alabama Section, 2002 Report Card for Alabama's Infrastructure
- Engineering, Inc., "Running on Empty – A Close Look at Alternative Transportation Funding Options", Samuel Greengard, March/April 2012
- Environmental Protection Agency, State Allotment for Drinking Water State Revolving Fund Program Notice, Federal Register, Vol. 74, No. 101, Thursday May 28, 2009
- Environmental Protection Agency, EPA's 2007 Drinking Water Infrastructure Needs Survey and Assessment
- Kathy Horne, Executive Director of the Alabama Rural Water Association, Testimony before the U.S. Senate Subcommittee on Water and Wildlife, February 28, 2012
- Michael J. Harper, ADECA Office of Water Resources, Water Management Branch, Estimated Use of Water in Alabama in 2010 – An Update
- Tuscaloosa News, "Senate Bill Passed This Weekend Includes Funding for Tuscaloosa Water Center", Staff Report, Monday December 15, 2014
- U.S. Department of the Interior, U.S. Geological Survey, Circular 1405, Estimated Use of Water in the United States in 2010



## What You Should Know About Alabama's Energy

Alabama enjoys an abundance of diverse, affordable energy resources including petroleum, natural gas, and coal as well as various renewable energy resources. To continue to meet energy demands and maintain low energy costs, the state must continue to develop and maintain a diverse energy mix that includes all of the state's available fuel resources as well as continue to improve the transmission and distribution infrastructure. Alabama is leading the effort to develop new energy technologies including carbon capture and sequestration and advanced oil recovery techniques, as well as exploring potential renewable energy resources. In addition, research is being expanded, to improve transmission and distribution of energy resources, and to eliminate cyber security threats in the state. Energy providers in Alabama have met the state's current reliability challenges and are well poised to meet the future energy needs as the state's economy continues to grow. Some of Alabama's future energy needs will be met through renewables, energy efficiency, conservation, or demand-side management. However, traditional energy sources such as coal, natural gas, biomass (renewable energy source fueled from organic material), and hydro will still be necessary. In addition, improvements to energy infrastructure including generation, transmission, distribution, and cyber security will be needed in order to maintain reliability and safety.

## How Alabama's Energy Works

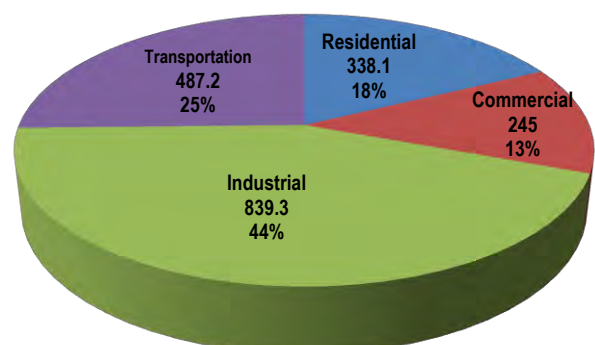
Alabama stretches from the white beaches of the Gulf of Mexico to the southwestern edge of the Appalachian Mountains. In this location, the population is treated to very warm and humid summers and moderate winters with occasional (but usually short durations) blasts of cold air, all of which result in high energy needs. Because the state is vulnerable to harsh weather such as tornados or hurricanes, energy suppliers must be particularly concerned about storm response, resilience of infrastructure, and reliability issues.

Alabama's energy resources include extensive coal deposits and substantial natural gas reserves, as well as conventional crude oil deposits, oil sands, coalbed methane, and biomass. In addition, Alabama's extensive network of rivers and forests provide for inexpensive, hydroelectric power and biomass.

According to the DOE Energy Information Administration's SEDS database, Alabama consumed nearly 1,905 million British thermal units (Btu) of energy in 2012. As a heavy manufacturing state, it is no surprise that the largest sector (44%) was Industrial.

Alabama is home to three oil refineries that have the

**Alabama Energy Consumption by Sector in 2012 (Million Btu)**

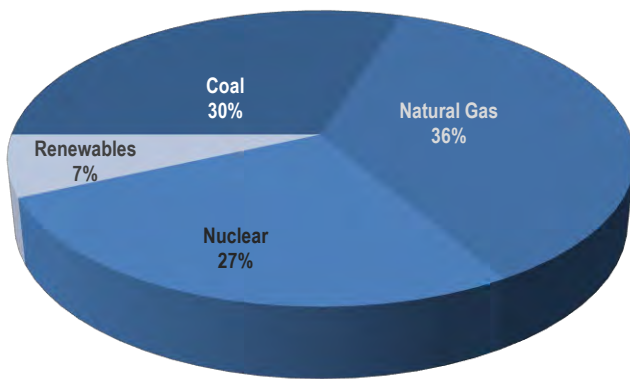


combined capacity to process approximately 120,000 barrels of crude oil per day. Although this is considered a relatively small amount of crude oil, petroleum products made at Alabama's refineries are used as transportation fuels (mostly gasoline and jet fuel) and either used locally or shipped by pipeline to nearby states. Both the Colonial and Plantation interstate pipelines receive petroleum liquid products from Texas and Louisiana and transport them to and through Alabama.

Alabama produces natural gas both onshore and in state waters offshore in the Gulf of Mexico. Currently the natural gas production in Alabama is less than 1% of total U.S. natural gas production. More than half of the natural gas produced in Alabama is from the coalbed methane deposits in the Black Warrior Basin or in the Cahaba Coal Field. An increasing amount of the natural gas consumed in Alabama is delivered to the electricity generating sector.

To support Alabama's manufacturing base, it is no surprise that Alabama is one of the top states in the nation in electricity generation per capita. Coal has historically been the largest fuel for electric utilities in Alabama, but today the primary fuel for electric generation is natural gas, followed closely by coal and nuclear, then hydroelectric and

**Alabama Electricity Generation Fuel by Type (MWh) in 2012**



other renewables. Utilities in the state have quietly become major generators of nuclear power. TVA's Browns Ferry plant in north Alabama has three reactors with a combined generating capacity of 3,310 megawatts, making it the second largest nuclear power plant in the U.S. Alabama has always been a large producer of hydroelectric power, with more than twenty dams located along the Alabama, Tennessee and Coosa Rivers. Electrification came to the south via hydroelectric dams more than one hundred years ago, and today, hydroelectric power (considered a renewable source in the chart) is approximately 5% of Alabama's electricity generation.

Alabama's diverse fuel mix has allowed the state to continue to economically meet its energy demands. In

2013, Alabama ranked seventh among the states in net electricity generation from renewable energy resources. Conventional hydroelectric facilities supplied 80% of this generation from renewable resources. Also, Alabama ranked fifth in the U.S. in net electricity generation from wood waste, landfill gas, and other biomass in 2013. Nearly all of that biomass electricity was generated by nonutility power producers, primarily in the industrial sector.

## How Alabama's Energy Is Performing

### Condition, Capacity, and Operations and Maintenance

Alabama's energy infrastructure relies heavily on electricity and pipeline systems, which have historically shown good resiliency and high reliability. With prudent planning by the energy sector, and appropriate oversight of the regulatory agencies, the state of Alabama has continued to demonstrate its capability to meet the energy needs of its population and businesses. However, the effects of the ever-increasing environmental regulations on the energy sector could lead to electric generating unit retirements which could impact the reliability of the system.



- In 2012, Alabama ranked 17th among the states (with more than 6,300) producing natural gas wells.
- Alabama's geographical location in relation to the natural gas transmission pipeline infrastructure in the southeast provides inflow of more than 22,000 MMcf/d (million cubic foot per day).
- Alabama's underground infrastructure consists of approximately 50,000 miles of transmission, distribution and service pipeline combined.
- In addition to pipeline supply Alabama has two underground storage facilities with 43,600 MMcf (million cubic foot) of storage capacity.
- Alabama has three LNG (Liquid Natural Gas) storage facilities with capacities in excess of 800 MMcf (million cubic foot)
- Alabama is the home to more than 32,500 MW of electric generating resources owned by electric utilities, independent power producers and combined heat and power operations. These resources provide sufficient capacity to meet Alabama's growing need for electricity for the near future; however, this does not consider the potential for early retirements that may be required for environmental compliance reasons.
- In an effort to continue to improve the reliability of the electric system in the state and across the southeast region, Alabama electric utilities have reported increased investment in transmission infrastructure. Utilities in the state employ various inspection techniques for their power lines including aerial inspections, to evaluate the condition of and make necessary repairs to the system.
- Alabama's industrial sector consumes the most energy, using almost as much as the transportation and residential sectors combined.
- Alabama's residential consumers in Alabama use less *total energy* (Btu/customer) in their homes on average than most residential consumers in other states. However, the state's average household consumption of residential *electricity* (kWh/customer) is one of the highest in the country because of high air-conditioning demand during the hot summer months and the widespread use of electricity for home heating during the winter months.

## Public Safety and Resilience

Dependable and affordable energy resources are crucial to Alabama's economic health. The public relies on all forms of energy to stay comfortable, informed, and safe at all times. Alabama's energy companies must continue to provide reliable energy to the state so its citizens know they can depend on uninterrupted power sources for their temperature control (warm or cool), their communication needs, and their safety.

- Electric utilities across Alabama work diligently to prepare for and respond to extreme weather events in the state, restoring power to customers as quickly and safely as possible. Alabama is susceptible to many different types of storms (hurricanes, tornados, winter storms, etc.), and the utilities have shown a strong ability to respond to the most extreme cases of each of these. Comprehensive and tested emergency response protocols have been established and proven in the state of Alabama.
- The nonprofit Southeastern Reliability Corporation (SERC), which is responsible for promoting and improving the reliability and critical infrastructure of the bulk power supply systems in 16 states, reports, "There are no transmission constraints that could significantly impact reliability of the utilities in the SERC region."
- According to the North American Electric Reliability Corporation (NERC) Long-Term Reliability Assessment, the SERC-SE and SERC-N regions (which include the state of Alabama) are projected over the next 10 years to meet or exceed all of the reliability standards set by NERC.
- Utilities in the state have consistently shown the ability to meet the energy demands in the most extreme peak load cases and have not suffered from rolling blackouts that can be common in other parts of the country.
- Natural gas utilities and pipeline companies work together with the Alabama Public Service Commission's Pipeline Safety Division with safety as the first priority in energy delivery.
- Alabama's natural gas industry has a planned to spend in excess \$450 million in 2015 for maintenance, replacement and improvements of existing infrastructure. This investment will ensure safe, reliable and affordable natural gas delivery.



- Electricity providers across the state of Alabama report the power delivery systems to be over 99.9% reliable. This information is based on the fewer number of service interruptions and the shorter duration of outages.

## Funding, Future Need, and Innovation

Utilities in the state of Alabama have invested millions of dollars in research and development projects to improve efficiency, reliability, and affordability. Taking into account the future energy production uncertainties, including energy demand and environmental regulation, these innovation efforts will be crucial to provide reliable energy resources in the future. Additionally, research to enhance renewable energy resources, improve energy transmission and distribution, and eliminate cyber security threats is ongoing.

- The National Carbon Capture Center (NCCC), the focal point of the U.S. Department of Energy's (DOE) efforts to develop advanced carbon capture technologies, is located in Wilsonville, Alabama. The center works with scientists and technology developers from government, industry and universities who are creating the next generation of carbon capture technologies.
- The largest demonstration of integrated carbon capture and storage (CCS) on a pulverized-coal power plant in the U.S. is the James M. Barry electric generating plant in Bucks, Alabama. The CO<sub>2</sub> geologic sequestration project in the Citronelle Oil Field in South Alabama is also ongoing in conjunction with the Plant Barry carbon capture project. Currently Alabama has large oil reserves that cannot be developed without access to large volumes of CO<sub>2</sub>. The advancement and deployment of carbon capture technologies could result in the development of these oil resources in the state related to commercial carbon capture projects.
- The Southeastern Solar Research Center (SSRC), is located at Southern Research's engineering campus in Birmingham and features multiple configurations of PV solar panel arrays, microinverters and an advanced energy-monitoring system. The facility was built to study southeastern U.S. climatic effects – such as high levels of heat, humidity, precipitation and pollen – on the performance for photovoltaic (PV) systems in the region. The data from the SSRC will provide insight into the optimal design of solar PV systems for utilities and promote a better understanding of solar PV applications in the Southeast.
- Utilities in Alabama have invested billions of dollars to build and maintain a smarter, more robust transmission and distribution system. Smart grid technologies allow utilities to remotely monitor the grid, gather data regarding grid conditions, and isolate problems on the grid, enabling faster restoration of power. This technology also allows utilities to better manage demand, lower operating costs, improve reliability and efficiency, better integrate intermittent renewable energy and energy storage options into the system, and give customers more control over their energy usage and more choices for efficiencies in their own homes or businesses. In addition a secure, flexible grid is more resilient to physical and cyberattacks.
- Natural gas infrastructure projects (originating in Alabama) in excess of a half a billion dollars are planned, filed or approved to increase compression and modifications to existing pipelines to serve the growing need for natural gas by local utilities, industries and power generators in the southeastern U.S. These projects will improve reliability, safety and support growth for the economy in Alabama.



## Let's Raise the Grade

The following recommendations are provided to ensure Alabama's energy infrastructure remains safe, reliable and affordable while continuing to improve. Alabama will need to:

- **Preserve a diverse fuel mix to maintain the lowest energy cost for customers** and enhance the state economy as new residents and industries consider locating in Alabama. The state will need to focus on potential

energy and environmental regulations (possibly even legislation) to ensure that realistic economic and reliability impacts have been communicated and understood before changes are mandated.

- **Maintain public safety by improving resiliency and reducing or eliminating cyber security threats.** This additional security can be achieved by continuing to enhance transmission and distribution systems with SMART Grid technology.
- **Continue to improve generation, transmission and distribution infrastructure to ensure safety and reliability.** Focusing on characterizing vulnerabilities and identifying mitigation options is key.
- **Provide mechanisms for timely approval of new generation and transmission line projects** to minimize the cost and timeframe from planning to operation. The timely approval should include adequate regulatory review but should streamline the permitting process so that unnecessary barriers to land development are removed while still protecting and preserving natural resources.
- **Continue to support and promote the research and development of new energy technologies** by providing funding and incentives for research projects. In addition, energy suppliers should seek out and highlight the co-benefits of new technologies such as carbon capture and advanced oil recovery.
- **Promote and increase public education with regard to energy conservation and stewardship.** Increased energy conservation can be achieved through energy efficiency incentives for consumers and utilities; incentives to produce, use and promote alternative fuels and infrastructure for transportation; and develop, enhance and support education initiatives for consumers and businesses.

## Find Out More

- [Alabama Natural Gas Association](#)
- [Alabama Power](#)
- [National Electric Transmission Congestion Study](#)
- [North American Electric Reliability Corporation Long-Term Reliability Assessment](#)
- [PowerSouth Energy Cooperative](#)
- [Quadrennial Energy Review](#)
- [Southeastern Electric Exchange](#)
- [Tennessee Valley Authority](#)
- [U.S. Energy Information Administration, Alabama State Energy Profile](#)



## What You Should Know About Alabama's Inland Waterways

Alabama Locks & Dams play a critical role in the inland waterway and transportation system, and not addressing the current capacity, aging, and funding issues facing them will adversely impact the economics and growth of the region and nation. The State of Alabama has one of the largest inland waterways systems in the U.S. Most of the locks and dams supporting this system were built in the mid-1950s and 1960s and are operating past their design service life of 50 years and have reached, or exceeded, their capacity. These structures are essential for economical, efficient and safe shipment of goods from inland port facilities to the Port of Mobile and also for connection to the much larger national inland waterway network. The Coffeeville Lock and Dam on the Tombigbee River was observed to have a throughput of 10 million tons in 2013. This would be equivalent to the hauling capacity of more than 390,000 semi-tractor trailer trucks. The Lock and Dam also records vessel delay rates and durations in excess of 90% and 150 hours, respectively. In recent years, national funding for navigational projects has suffered as high-priority projects, such as the Olmstead Lock and Dam on the Ohio River, have experienced an escalation in project costs and as a result, required the use of all available funding appropriated for inland waterway navigational projects. This cost escalation and appropriation practice has depleted funding and placed on backlog a number of other high-priority projects.

## How Alabama's Inland Waterways Work

Alabama's inland waterways system is considered one of the largest in the country and consists of 16 navigational locks on six rivers. Most of the locks within the state are managed by the Mobile District, U.S. Army Corps of Engineers and its Nashville District manages the locks on the Tennessee River, in the northern part of the state. Five of the rivers that make up the state's inland waterway system either flow directly or indirectly to the Gulf of Mexico through Mobile, which is the location of the state's major port for international trade. Recent studies have shown the Port of Mobile annually handles an average of 55 to 60 million tons of cargo. This tonnage will either arrive, or depart, the Port of Mobile via air, road, rail, or inland waterways. Studies have shown barge shipping on the U.S. inland waterway network is an efficient, cost-effective and safe mode of transportation for the shipment of liquid and dry bulk cargos.

## Alabama's Inland Waterways Systems

### Condition

Essential elements of Alabama's Inland waterways systems have been in operation since the state's creation or incorporation. A more structured and standard inland waterway network was implemented in the mid-1900s with the

U.S. Army Corps of Engineers operating locks and dams on the navigable waterways. Locks along the Alabama inland waterways were constructed between the 1940s and 1970s, with most being built during the 50s and 60s. Much of the lock and dam infrastructure within the state has reached and passed the 50 year design service life mark or are quickly approaching it.

## **Capacity**

In 2013, the Coffeeville Lock & Dam and Demopolis Lock & Dam reported having over 10 million tons passing through its locks. These facilities are the top two cargo passage locks and dams in the Alabama inland waterway system. This annual throughput is equivalent to approximately 28,000 tons/day or more than 18 barges per day for each. The Coffeeville and Demopolis lock size is 600'x100' and is capable of locking 8 barges and a push boat through at the same time. Based on these numbers, it is estimated that 2-3 full locked tows are required on an average day. Delays are occurring on these and a number of other locks within the State. For example, Coffeeville Lock & Dam experiences extremely high delay rates and duration. From 2012 to 2014, it has reported a greater than 94% vessel delay rate and average delays in 2012 and 2014 in excess of 130 hours.

Many of the locks in the Alabama system share a similar lock size with a smaller throughput and also record significant delay rates. Some locks of the state's inland waterways system are at capacity and others will approach these limits as growth continues. Much of the current lock demand is a result of either the export or import of cargo through the Port of Mobile. With the port's expansion plans, it may be reasonably anticipated that inland waterway capacity will need to grow as well.

## **Operation & Maintenance**

National funding for operations and maintenance has seen a sharp decrease in appropriations from \$4.4 billion per year in 2009 to \$2.4 billion per year in 2013. The federal government's 2014 civil works budget appropriations for Alabama inland waterways are approximately \$74 million. As the lock and dam infrastructure continue to age, there will be a greater need for operations and maintenance to sustain the system.

## **Public Safety**

The consequence of a failure of lock and dam structures can be wide-ranging, from catastrophic to minor inconveniences. The failure of a lock gate could lead to loss of life, downstream flooding, significant costs in emergency services, dewatering of the upper pool, etc. or simple maintenance, which may require delaying river traffic. In the case of a long-term failed lock, cargoes to be transshipped may have to be rerouted onto other modes of transportation, such as road and rail, depending on the severity of the failure and the need for cargoes to be delivered on a set schedule. Transshipment on other modes of transportation could increase current congestion, be costly due to increase need for trucks and railcars, and could increase the occurrence of accidents.

## **Funding**

New construction and major rehabilitation project funding is split equally between the Inland Waterway Trust Fund (IWTF) and general appropriations. The IWTF receives revenue from a fuel tax charged to users of the inland waterways system. For many years the tax rate was \$0.20 per gallon. Due to recent federal legislation, the rate has been increased by \$0.09 to \$0.29, which went into effect April 2015. The tax increase is estimated to increase yearly

revenues to the IWTF by \$80 million. In addition, included with the passage of the WRRDA are strict limitations to the amount of IWTF support received by individual projects, which prevents excessive individual allocation.

## **Future Need**

According to the U.S. Census Bureau, it is estimated that the overall U.S. population will increase by almost 18% from 2000 to 2030; the southern U.S. is expected to grow by 26%. This expected growth will encourage the expansion of Gulf Coast ports to increase throughput of goods for the population. With future imports and exports expected to increase four and seven-fold, respectively over the next 30 years, it should be expected that inland waterway shipping would increase by the same factor or more. It is difficult to accurately determine the future needs of the system, but it is evident that capacity will be a future issue, especially as the infrastructure continues to show its age.

## **Resilience**

Loss of a lock, especially during peak demand, could be catastrophic. Bulk cargo being transported by barge is not easily or economically moved by other means of transportation. Each barge's cargo is equivalent to the load of approximately 58 semi-trucks, so the rerouting of a 6 barge-tow's cargo via truck would put approximately 348 trucks on the road. That would be approximately 390,000 trucks/year, or over a 1,000 trucks/day –to bypass the Coffeerville Lock and Dam. This could place major strain on already overstressed highway and/or rail system and could cause commodity price increases, increase in traffic and rail incidents, and increase the need for greater maintenance budgets for other modes of transportation services.

## **Innovation**

Many technologies have been utilized to assist in safe navigation of the nation's and Alabama's waterways. Some of these technologies involve research on flow fields approaching locks, electronic mapping, and smoother filling and emptying systems inside the locks. Also, structures have been added to protect against runaway equipment and barges damaging the lock and dam structure. While many measures have been taken to advance the system, the fact still remains that many significant changes may be required until reconstruction efforts are undertaken.

## **Let's Raise the Grade**

- **Fully fund the Water Resource Reform and Development Act as well as construction to replace aging, over-capacity locks and dams.**
- **Research and implement more efficient filling and emptying system to make lockages safer and quicker.**
- **Increase public awareness of the benefit of an efficient inland waterway system.**

## **Find Out More**

- [USACE-Civil Works Budget FY 2015](#)
- [USACE-Civil Works Budget FY 2014](#)
- [USACE - Civil Works Budget FY 2013](#)

- [U.S. Lock and Dam Maintenance Study](#)
- [Waterways Council – Alabama State Profile](#)
- [Port of Mobile, AL](#)
- [Shipping Comparisons](#)
- [Alabama Navigable Waters](#)
- [Waterways Council - IWTF fuel tax increase](#)
- [Navigation Data Center](#)
- [Institute of Water Resources - Port and Inland Waterway Strategy](#)



## What You Should Know About Alabama's Ports

Alabama's coastline is relatively short, but its single deep water port at Mobile, on the Gulf of Mexico is the 12<sup>th</sup> largest in the United States by volume. The Port of Mobile has a container capacity of 350,000 twenty-foot equivalent units (TEU) per year. Over the past 15 years, the Alabama State Port Authority Ports in Alabama has spent \$800 million on land-side improvements. Alabama's most anticipated project is dredging the ship channel to the currently authorized depth and width to fully utilize Port of Mobile's capacity ahead of the Panama Canal expansion. In addition, Alabama has several inland ports that move critical commodities for industry. Alabama's ports receive little funding from the state, but a combination of funding from the US Army Corps of Engineers Civil Works Program, and the Water Resources Reform and Development Act (WRRDA) continues to provide for construction and maintenance projects.

## How Alabama's Ports Work

The State of Alabama has a single deep water port at Mobile, on the Gulf of Mexico. The Port of Mobile is the 12<sup>th</sup> largest US port by volume. The Port of Mobile is managed by the Alabama State Port Authority (ASPA), and funded by a combination of revenues (leases and fees to tenants and operators) and federal grants. All Port-generated revenues are expended on capital improvements and asset management.

The state's other ports, including Birmingham, Decatur, Tuscaloosa, Florence, Guntersville, and Montgomery, are located on rivers which provide access to the Gulf. Located on the Locust Fork of the Black Warrior River, the Port of Birmingham provides the steel and road construction industries with raw materials shipped north from Mobile. Also on the Black Warrior River, the Port of Tuscaloosa, which has no railway connections, handles dry bulk commodities such as lignite, coal, and coal coke. The Port of Decatur, on the Tennessee River, is connected to the Norfolk Southern and CSX railroads and handles sand, asphalt, grain, fertilizer, poultry feed, coal, and steel pipe.

## How Alabama's Ports Are Progressing

### Condition

The Port of Mobile is in relatively good condition. Over the past 15 years, ASPA has spent \$800 million on shoreside improvements, including a "lower harbor" turning basin capable of turning Post-Panamax ships. Additionally, the Port has made bulkhead and fender improvements, constructed a new high capacity wharf and outdoor storage yard for steel products, a new container terminal, a new terminal to transfer steel slabs from deep draft vessels to barges, transit shed and warehouse improvements and various rail improvements.

The ASPA's current focus for the Port of Mobile is on port security, emissions reductions, navigation issues, and "first mile" issues. "First mile" refers to intermodal transportation connections to the port facilities such as highway and rail



connections that are actually off port property. These issues are of concern in making landside cargo connections as quick and efficient as possible. Poor connections to the regional highway and rail systems can dramatically slow movements of goods on and off the port adding to the costs to shippers and making the port a less attractive.

The Port also maintains its own police force to ensure safety. The primary functions of the Port Police are to secure the public port's assets and to enforce the Port's federally mandated and US Coast Guard approved Security Plan for homeland security.

## Capacity

The Port of Mobile has a current container capacity of 350,000 twenty-foot equivalent units (TEU) per year. At its full build-out capacity, the Port's capacity will be 1.5 million TEU per year. The three largest carriers calling each week are Maersk, MSC, and CMA-CGM, each with 8,500 TEU vessels. In 2014, the Port Authority's public terminals handled 29 million tons of cargo. An expansion of the Port Authority's Intermodal Container Transfer Facility is underway and expected to be completed by year-end 2015. Phase II expansion work at the container terminal is also underway to provide additional capacity by 2016.

The Port of Mobile is served by five Class 1 railroads, and operates its own ASPA Terminal Railway. The 40-mile channel leading to the Port is 45 feet deep and 400 feet wide to the Lower Harbor, and 40 feet deep and 400 feet wide on the Mobile River segment of the federal channel. The current channel depth and width is not adequate for the larger vessels that will be making port calls. In the future, this will be a disadvantage for the port as it tries to maintain market share as well as attract new shippers. The Mobile Ship Channel is congressionally authorized to expand to 55 feet deep by 550 feet wide, and in 2015 the US Army Corps of Engineers launched its study process to take the channel to deeper and wider dimensions.

## Funding

The Port of Mobile is funded by a combination of revenues (leases and fees to tenants and operators) and federal grants. The Port receives very little state investment, as the Alabama Department of Transportation is prohibited by state law from investing in port infrastructure. The Restore Act, which is a framework for allocating funds from the civil and administrative penalties awarded as a result of the BP Horizon oil spill, is a potential source of funding, but the Port has so far received no funding from the Act. Any new federal project construction or ongoing maintenance on the ship channel serving the Port of Mobile is funded by the US Army Corps of Engineers Civil Works Program budget. Federal maintenance dredging dollars for all US seaports is provided by the federal Harbor Maintenance Trust Fund.

The Water Resources Reform and Development Act (WRRDA), passed in 2014, provides funding for inland waterways construction and maintenance projects, dredging, and work at smaller ports. According to U.S. Senator Sessions, "The WRRDA legislation ensures the viability of the Port of Mobile and allows for continued growth and maintenance that will benefit the region."

## Future Need

**Channel improvements.** The most urgently needed improvement for the Port of Mobile is to dredge the channel to the currently authorized depth, and widen it in strategic locations. An agreement with the Army Corps of Engineers to begin an Environmental Impact Statement is expected in the summer of 2015.

**Surface transportation access.** Improvements to the “first mile” include a proposed I-10 bridge over the Mobile River that will help to relieve traffic congestion around nearby port.

**Post-Panamax capital improvements.** The Port has \$350 million in planned capital improvement projects, focused on meeting Post-Panamax vessel requirements. The McDuffie Coal Terminal, the Choctaw Point Container Terminal, and Pinto Island Steel Terminal are all constructed and equipped to serve today’s larger Post-Panamax and Aframax vessels.

**Intermodal Container Transfer Facility.** Phase 1 of the facility is now under construction. The facility, which will cover 62 acres and handle 250,000 railcars annually, will directly connect containerized exports, imports, and domestic shipments with five Class I railroad lines.

**Roll-On/Roll-Off facility.** Construction of the new facility has been advertised as a public-private partnership (P3) project. The RO-RO facility will be located at the Theodore turning basin, which allows vessels calling at the coal or container terminals to turn around without entering the crowded upper harbor.

## Resilience

The Port of Mobile is taking a variety of measures to minimize the impact of storms on the Port, and to allow it to return to operation as soon as possible. These include upgrading wharfs, increasing the elevation of infrastructure, and moving essential equipment to higher ground. Emergency management contracts are in place, emergency management procedures are practiced annually, and the Port maintains active communication and collaboration with its federal partners.

## Innovation

Innovative approaches at the Port of Mobile include revenue sharing and the use of public-private partnerships (P3). To date nine projects have been completed at the Port using P3 financing. Some of the projects completed using the P3 funding mechanism are:

- Choctaw Point Container Terminal Phase I - long term concession agreement between ASPA and APM Terminals
- Pier D-2 steel coil handling terminal - long term concession agreement between ASPA and Alabama Steel Terminals
- Carbon steel handling facility - long term cargo terminal and handling agreement between ASPA and ArcelorMittal and Nippon Steel & Sumitomo Metal Corp. (NSSMC)
- Pier D terminal grain storage facility – long term lease and operating agreement between ASPA and Farmers Grain Dealers

## Let’s Raise the Grade

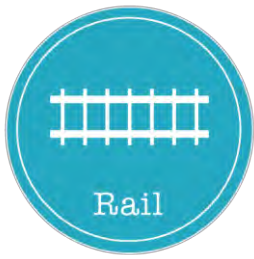
- **Dredge Port of Mobile ship channel to the authorized depth, and widen in strategic locations.** Work with USACE to complete the project EIS currently under way.
- **Relieve surface transportation congestion and bottlenecks** through new projects and improvements.
- **Develop an improved National Freight Strategy that will minimize competition for surface transportation funding between ports, cities, and the Alabama Department of Transportation.** This will

save dollars being spent by neighboring ports engaged in speculative development in an effort to lure away tenants.

- **Allow state tax dollars to be spent on port infrastructure that will ease the movement of cargo and generate economic value for the public.** Currently state law does not allow the State Department of Transportation to expend funds on port property.

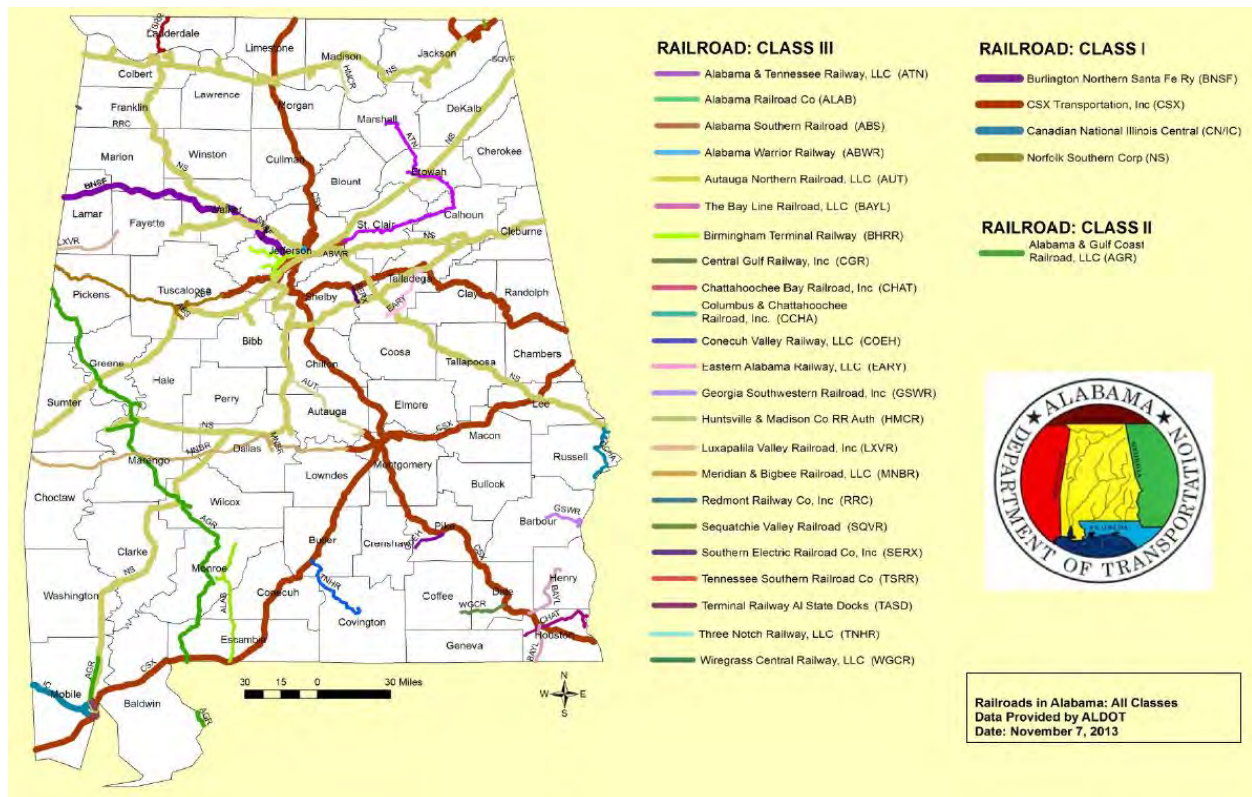
## Find Out More

- Alabama State Port Authority, [www.asdd.com](http://www.asdd.com)
- American Association of Port Authorities, [www.aapa-ports.org](http://www.aapa-ports.org)
- Mobile Area Chamber of Commerce, Economic Development, [www.mobilechamber.com/economic-development](http://www.mobilechamber.com/economic-development)
- Alabama Information Network, [www.state.al.us](http://www.state.al.us)



## What You Should Know About Alabama's Railroads

Alabama's rail network plays a dynamic role in transporting freight and passenger rail services. Alabama's rail resources are an essential component of a multimodal network that provides transportation for industries and supports growth in the system. Alabama ranks in the top fifteen states nationally in many freight use categories for commodities carried by rail, with coal being the top commodity. There are four, large Class I railroads operating in Alabama, who own and maintain approximately 72% of the state's track mileage. Alabama has an additional Class II railroad, and 23 smaller Class III railroads that operate approximately 4,000 freight rail miles of track in Alabama. Amtrak's *Crescent* is the only passenger rail service in Alabama, currently running daily along an east-west corridor, making stops in Anniston, Birmingham and Tuscaloosa.



## How Alabama's Railroads Work

Rail operations in Alabama are a private sector enterprise with improvements and investments made by each railroad to address its needs and business goals. Class I railroads (Amtrak, BNSF, CSXT, CN/IC and NS) account for 72% of track mileage, Class II or "regional" railroad (Alabama and Gulf Coast Railway) accounts for 8%, while Class III or "short-line" railroads account for the remaining 20%. According to Alabama Department of Transportation's (ALDOT) 2013 State Rail Plan, Alabama's freight rail network includes:

- 4 Class I railroads in 2012, defined by annual operating revenues of at least \$452.7 million
  - Class I railroads in Alabama include Burlington Northern Santa Fe (BNSF), Canadian National Illinois Central (CN/IC), CSX Transportation (CSXT), and Norfolk Southern (NS), accounting for approximately 72% of track mileage in Alabama.
- 1 Class II railroad in 2012, defined by annual revenue threshold of at least \$36.2 million
  - The Alabama & Gulf Coast Railway (AGR) is the only Class II railroad, and accounts for approximately 8% of Alabama's total track mileage.
- 23 Class III railroads address local demands and operate fewer than 100 miles of track
  - Class III railroads in Alabama consists of approximately 20% of total track mileage.

The State of Alabama does not own, operate or fund any freight or passenger rail services in the state, and there are no plans to undertake any capital projects in the short or long-term. ALDOT will continue to coordinate with entities such as Alabama Department of Economic and Community Affairs (ADECA), neighboring State Departments of Transportation, the Southern Rail Commission, and others as they proceed with their rail planning initiatives. ALDOT's primary involvement in rail improvements and investments is to ensure public safety through the FHWA-funded Section 130 and bridge inspection programs. The Section 130 program funds safety improvements to eliminate railway-highway crossing hazards. Under the bridge inspection program, all roadway bridges statewide, including those over rail lines, are evaluated and rated for sufficiency to remain in service. This program will continue to be the mainstay of the State's rail investment activities. ALDOT also cooperates with the Governor's office and other State agencies, particularly ADECA, to support industrial/economic development initiatives as appropriate. ALDOT's Innovative Programs Bureau oversees the Industrial Access Road and Bridge Program, which provides funds limited to construction, construction engineering, and inspection costs to provide public access to new or expanding distribution, manufacturing, and industrial firms. The latest federal transportation program called MAP-21 also has provisions for states to develop Freight Plans consistent with the national freight network. Federal and private sectors have been the primary sources of funding for rail projects in Alabama.

## How Alabama's Railroads Are Operating

### Condition

In 2011, total rail traffic in Alabama was estimated at over 165 million tons. Rail traffic originating in Alabama and terminating out-of-state accounted for 16%, out-of-state traffic terminating in Alabama accounted for 22%, Alabama traffic remaining in-state accounted for 8%, and rail traffic only traveling through the state accounted for 54%. The top 8 commodity shipments originating in Alabama were: primary metal products, non-metallic minerals, pulp/paper,

chemicals, clay, miscellaneous mixed shipments, transportation equipment, and lumber/wood products. The top 8 commodity shipments terminating in Alabama were: coal, farm products, metallic ores, chemicals, waste scrap, primary metal products, food products, and miscellaneous mixed shipments. Overhead traffic, which is the tonnage travelling through Alabama without starting or stopping in the state, accounts for a majority of tonnage moved by rail in Alabama. Much of this traffic is from intermodal containers and trailers traveling along the NS and CSXT corridors.

## Capacity

Freight railroads are crucial to efficient product delivery. Rail is four times more fuel efficient than trucks, and a single train can haul as much freight as several hundred trucks. Freight rail provides efficient long-haul and short-haul service and integrates closely with the trucking industry. Because the freight railroads are private entities, they own the infrastructure over which they operate, meaning they also invest heavily in those networks. According to Association of American Railroads' (AAR) 2012 State Rankings, Alabama was ranked 21<sup>st</sup> in the nation for total rail miles by state, with a total of 3,194 miles (U.S. total consists of 138,524 miles).

Amtrak's Passenger rail service line, the *Crescent* travels over 1,300 miles between New York and New Orleans once a day, in both directions. Throughout Alabama, the *Crescent* line stops in Anniston, Birmingham, and Tuscaloosa, traveling on its 30 hour journey from east to west. According to Amtrak, a total of 67,233 passengers boarded and departed from the *Crescent* line in Alabama in 2012. This was the same year Amtrak served a record of 31.2 million passengers and had over \$2 billion in revenue, while employing more than 20,000 people nationwide.

Demand for passenger rail is expected to increase in the long term due to the rising cost of owning automobiles, the state and federal governments' struggle to maintain roads and bridges, and an aging population. Alabama's passenger rail service expansion is being deliberated. A study by ADECA has been considered by the Southern Rail Commission (SRC) to build a corridor for a rail passenger service between Birmingham and Montgomery. There is also a similar study to provide the same service in the Birmingham-Atlanta Corridor. Other potential corridors in Alabama for future passenger rail include Birmingham-Montgomery-Mobile, Atlanta-Birmingham-New Orleans, Birmingham-Nashville, Birmingham-Chattanooga, and New Orleans-Mobile-Jacksonville-Orlando-Miami. The SRC has made plans to comply with Federal Rail Administration (FRA) requirements for incremental implementation of service.

Intermodal connections, meaning those involving two or more different modes of transportation for moving goods throughout Alabama, have many strengths that have led to transporting freight on time and economically. Intermodal facilities include the Port of Mobile, Port of Huntsville, Norfolk Southern's Birmingham Regional Intermodal Facility, BNSF's Finley Boulevard Yard, CSXT's Boyles Yard, and CSXT's Central Alabama Intermodal Container Transfer Facility (CAICTF). In 2012, the Port of Mobile handled 133,105 rail cars, which led Alabama State Port Authority's board of directors, a revenue-funded state agency, to approve \$11.5 million in costs for construction, inspection, and testing of a rail access bridge that will connect five Class I railroads and the Authority's Terminal Railway to an intermodal Transfer Facility. This project will make the Port of Mobile's shipping containerized freight more efficient and economical.



## **Operation & Maintenance**

Alabama's rail operations include private sector improvements and investments that are made by each railroad to address its needs and goals. Under the bridge inspection program, all roadway bridges, including those with rail lines, are evaluated for sufficiency to remain in service. The FRA has an Inspector for the following disciplines: Hazardous Materials, Motive Power and Equipment, Operating Practices, Signals and Train Control, and Track. Also, ALDOT employs two inspectors, one for track and the other for locomotive power and equipment. All railroads in the state have ongoing maintenance and repair schedules. FRA's Track Safety Standards include inspecting rails, crossties, special track work (such as turnouts and bridge lift assemblies), tie plates, track geometry, gage alignment, ballast, drainage, and vegetation. Track maintenance involves constant inspection and repair with frequency based on traffic density, tonnage, and condition of the infrastructure. Some major repair activities involve cross tie and rail replacement, which improves the track and road bed maintenance.

## **Public Safety**

The Section 130 program, administered by ALDOT to improve the safety and security of rail transportation, helps to eliminate hazards at railway-highway crossings. According to ALDOT, there are over 6,000 total railway-highway crossings, with 2,747 being public at-grade and 660 being grade-separated (bridge) crossings throughout the State of Alabama. From 2008-2013, the Section 130 program received \$19.7 million (\$4.5 million in 2013) to fund 84 rail/highway grade crossing projects throughout Alabama. To enforce railway-highway safety, the federal Train Horn Rule requires train engineers to sound train horns for at least 15 seconds in advance of all public grade crossings. The non-profit organization Operation Lifesaver has been co-sponsored by federal, state, and local government agencies to promote public awareness about highway-railway safety and to teach the three E's: education, enforcement and engineering. In 2013, Alabama was ranked 6<sup>th</sup> in the nation for accidents at public rail crossings.

## **Funding**

Federally funded programs and private capital from the railroad companies are the main sources of funding for rail projects in Alabama. The State of Alabama also receives federal funds for improvements to rail/highway grade crossings under the Section 130 Program. Other federal funding has been awarded to Alabama, such as:

- ALDOT and the Greene County Industrial Development Authority (GCIDA) have been able to secure a \$400,000 grant from the FRA to improve a 6,600 foot section of track on the Industrial Park Rail in Greene County.
- The State's participation in the Section 130 program resulted in the authorization of 84 rail/highway grade crossing safety projects across the state from 2008-2013, with \$19,763,070 in funding.
- In 2014, the Federal Railway-Highway Crossings Program set-aside for Alabama was \$4,531,606, which is expected to continually increase approximately 3% per year.

ALDOT had hopes to modernize 82 bridges on the AGR and replace 65.8 miles of rail to significantly improve freight services through the Alabama Black Belt, but the TIGER grant application was not awarded. The Alabama Capital Stimulus for Rail Projects Act of 2009 was passed by state legislation to require ADECA, with the help of SRC, to establish and maintain a program to promote passenger rail travel and service. However, the State of Alabama does not have any plans to undertake any capital projects in the near or distant future.

## **Future Need**

Future forecasts for Alabama's rail network was analyzed in Freight Analysis Framework Version 3 (FAF3), which was used to examine the total flows for future years 2015 to 2040 in five year increments. The trend for domestic rail flows, meaning those that are internal to the U.S. and thus have both the origin and destination inside the US, shows that rail exported from Alabama is projected to grow in the next ten years before leveling off, while rail imports are projected to have a slight decline. With future trends most likely to increase, Alabama may face some challenges to meet the demand of maintaining the rail network. According to the HNTB Corporation, who conducted the study for high speed transit from Birmingham to Atlanta, capital cost estimates would range from \$15 billion to \$43.5 billion, depending on the system. Also, Positive Train Control, which is technology designed to automatically stop a train before certain accidents caused by human error occur, are now in the process of being installed on Class I railroads. This is due to a mandate by Congress and the FRA, but many railroads may not make the deadlines set out for installation. Expansion of Passenger Train service on Freight Railroad lines is also a potential service that the state has been considering.

## **Resilience**

Alabama railroads work together to restore service as expeditiously as possible after natural disasters, such as hurricanes and floods. As an example, railroads allow other railroads that have track outages to detour trains on their tracks. When Hurricane Katrina hit in 2005, service on the line east of New Orleans was suspended and has not been in service since. In cases of natural disasters, some rail lines may cease to be economically competitive for their private owners and are taken out of service. Abandoned rail segments can be sold to short-lines, banked to reserve them for future use, converted to multi-use trails, or remain inactive.

## **Innovation**

Although abandoned rail lines should be avoided, the state has been able to find a purpose for these once flourishing corridors by contributing to Alabama's multimodal transportation program. The Rails to Trails Program in Alabama consists of 14 systems of rails to trails (75 miles) throughout the state that have been planned or developed along abandoned rail corridors. There are 7 projects currently receiving funding from the program, which over the years has allocated over \$6.8 million. To preserve what was once existing, efforts have been made to convert abandoned rail lines into nature or walking trails. In the future, more rails to trails initiatives will be considered as part of metropolitan and rural planning programs. A few examples are listed as follows:

- The Chief Ladiga Rail-Trail runs 33 miles from Anniston east to the Georgia state line. Once a CSXT rail line, the trail is maintained by the cities of Piedmont, Jacksonville, Weaver, and Anniston.
- The Railroad Park Rail-Trail is located in downtown Birmingham and travels the length of the 8-block, 19-acre park. Other features include a lake, streams, wetlands, open space areas, a skate park, and playground all overlooking the city's skyline. Future plans include linking the Railroad Park Rail-Trail with the developing Rotary Rail-Trail, which is anticipated to be completed in 2015 and will be built on a former railroad ending at a National Historic Landmark, the *Sloss Furnaces*.

## Let's Raise the Grade

- **Supporting a regulatory and financial environment that encourages continued private investment** in the nation's freight railroad system and allowing for more flexible funding in the freight and passenger railroad services (e.g. *All Aboard Florida* - a privately owned, operated and maintained passenger rail system) is needed.
- **Recognizing the importance of the rail industry to support the economic development of Alabama**, including the development of its energy resources, in the transportation planning process is necessary.
- **Integrating rail into a national multimodal transportation policy** that recognizes and takes advantage of efficiencies in the movement of people and goods is a must.
- **Maintaining a viable and efficient rail freight and passenger transportation system** by ensuring ALDOT and privately-owned rail collaborate in planning all future highway and rail expansion/abandonments is crucial. Promoting the viability of the private rail industry and possible modification of certain rail system components for increased effectiveness is also of great benefit. Strongly considering the expansion of passenger rail service on freight rail lines as a service that the state can operate and maintain can also prove to be beneficial. Implementing passenger rail services from Birmingham to Atlanta would create opportunities to expand Alabama's businesses with densely populated areas.

## Find Out More

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- CSX /State Fact Sheet, CSX [www.csx.com/share/wwwcsx\\_mura/assets/File/About\\_CSX/State\\_Fact\\_Sheets/2014%20PDFs/CSXR525\\_StateFactSheet\\_Alabama\\_6\\_02.pdf](http://www.csx.com/share/wwwcsx_mura/assets/File/About_CSX/State_Fact_Sheets/2014%20PDFs/CSXR525_StateFactSheet_Alabama_6_02.pdf)
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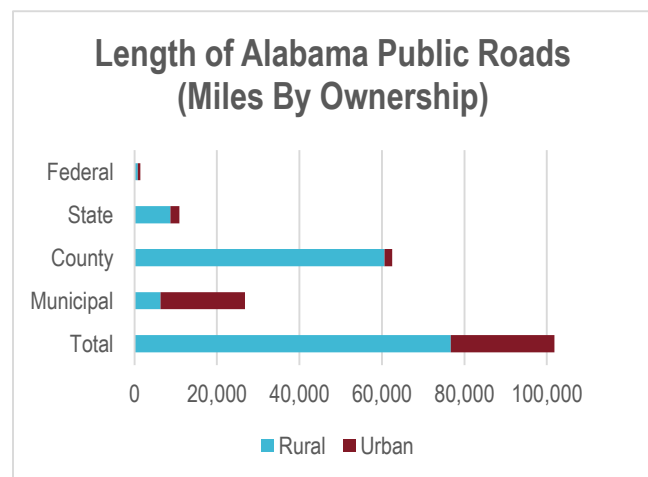


## What You Should Know About Alabama's Roads

Roadways form the backbone of Alabama's economy by getting residents to work, transferring goods and services to market, and connecting residents and visitors to recreational and tourist destinations. Alabama has over 102,000 miles of public roads, ranging from multi-lane highways to neighborhood streets. Vehicle travel has increased by 54 percent to over 65 billion vehicle miles travelled on Alabama roads from 1990 to 2013. Nearly 60 percent of this travel occurs on 11,000 miles of federal and state highways which are maintained by the Alabama Department of Transportation. Of these miles, only about 9 percent have pavements that are in unacceptable and deficient conditions. However, congestion is a growing issue and is expected to affect 17 percent of all roads in Alabama by 2035. Driving on deficient and congested roads costs \$1.2 billion just in additional vehicle operating costs alone, or about \$321 per motorist. Adding the costs of congestion-related delays and traffic crashes, the total cost of inadequate roads in Alabama has reached \$3.1 billion a year. At current funding levels, fewer dollars are being used to make needed improvements and more spending is being directed to keep existing roads open and in acceptable conditions. Without an increase in funding, Alabama will no longer be able to make needed improvements and is facing significant impacts to highway conditions and safety and risks losing economic development opportunities in the future.

## How Alabama's Roadways Work

Alabama has nearly 102,000 miles of public roads, 75 percent are rural roadways and 25 percent are urban roadways. From this total, about 11,000 miles are federal and state highways and are maintained by the Alabama Department of Transportation (ALDOT). These highways account for 11 percent of the state total, but carry about 60 percent of the total travel in the state. The remaining majority of Alabama's roads are county roads and local streets that are owned and maintained by local jurisdictions.



Notably, there are four large urban areas in Alabama whose roadway conditions have a big influence on perceived travel conditions in the state: Birmingham, Huntsville, Mobile and Montgomery. Because of the higher traffic volumes, roadway conditions in these areas have a big impact on the overall grade in Alabama.

# How Alabama's Roadways Are Performing

## Condition

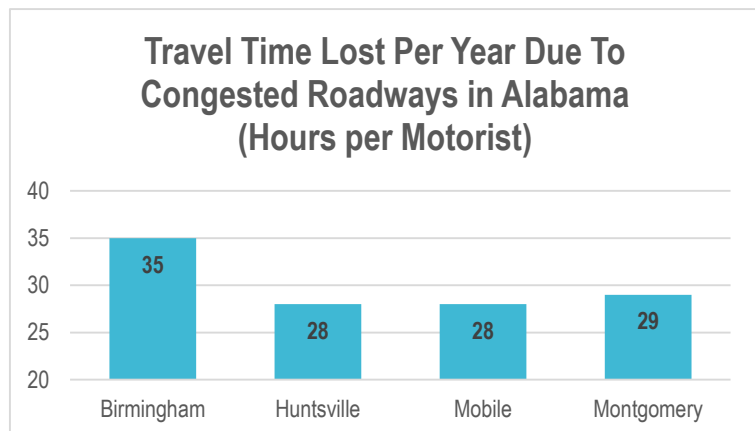
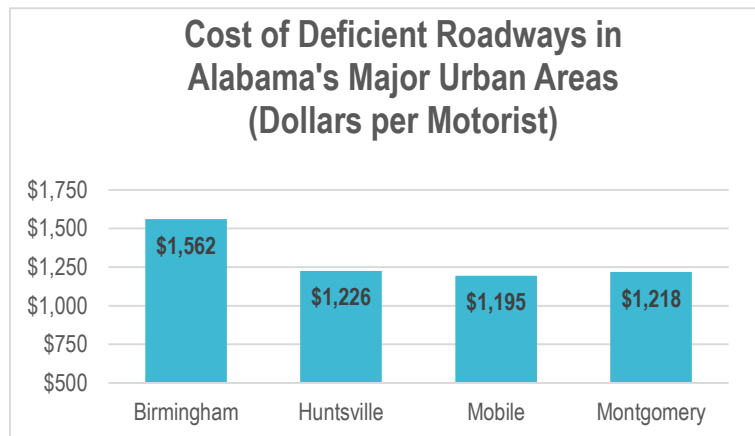
On roads maintained by ALDOT, a pavement management system is used to determine pavement ratings. Good and fair ratings are considered acceptable, whereas poor and very poor ratings are considered unacceptable and deficient. Roads that are deficient are those that show signs of deterioration such as ruts, cracks and potholes. It is critical for such roads to be resurfaced before they need major repair because repairing costs significantly more than resurfacing. In 2014, ALDOT determined that 51 percent of the interstate and state highways were rated good, 40 percent were rated fair, and 9 percent were rated poor or very poor.

Information on the condition of roads not maintained by ALDOT is unavailable due to the lack of a uniform pavement management system by local jurisdictions. However, using data collected by the national transportation research group TRIP, the percent of roads that are rated in poor condition have been determined in the four large urban areas mentioned above. Birmingham has the highest percentage with 21 percent of roads in poor condition. Huntsville, Mobile, and Montgomery each have 13, 18, and 15 percent of roads in poor condition, respectively.

The TRIP data also determined that driving on roads in need of repair is costing each motorist in Alabama an average of \$321 a year in the form of additional vehicle operating costs, or \$1.2 billion total in the state. The costs to Alabama motorists in the four large urban areas of the state are significantly higher ranging from \$1,200 and \$1,600 a year per motorist.

## Capacity

Vehicle travel in the state has increased by 54 percent from 1990 to 2013, with over 65 billion vehicle miles travelled on Alabama roads in 2013. According to Alabama's Statewide Transportation Plan (SWTP), 21 percent of the interstates, freeways and expressways were congested in 2005. In total, 3 percent of all roadways were congested in 2005 and were predicted to increase to 17 percent by 2035. Not surprisingly, the most congested roadways are located in urban areas with Birmingham experiencing the most.



## Operation & Maintenance

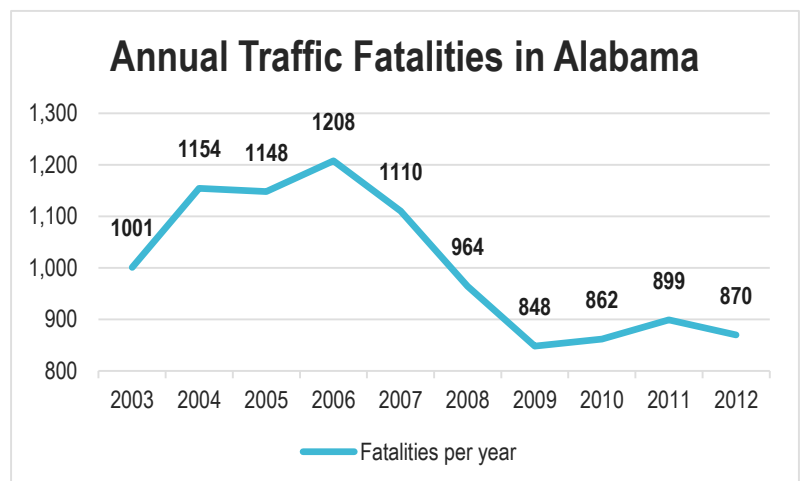
As mentioned before, the Alabama Department of Transportation (ALDOT) maintains about 11,000 miles of total 102,000 miles of roadways in Alabama and local jurisdictions maintain the rest. With construction costs outpacing funding, ALDOT recently made a decision to shift much of its funding towards maintaining acceptable conditions on existing roadways. Without additional funding, ALDOT is under considerable pressure to maintain the existing conditions of major roads and to keep capacity improvement projects to a minimum. In fact, many of the projects that have occurred within the state since 2012 were possible because of the Alabama Transportation Rehabilitation and Improvement Program (ATRIP). The program, discussed in more detail below, has allowed all 67 counties to address key projects that would not have otherwise been addressed.

## Public Safety

Alabama ranked 36<sup>th</sup> in the nation in fatality rate in the 21<sup>st</sup> Annual Highway Report by the Reason Foundation, Alabama's worst ranking among all categories in the report. The overall traffic fatality rate in 2012 was 1.33 fatalities per 100 million vehicles miles travelled, higher than the national average of 1.13. Notably, the fatality rate on Alabama's non-interstate rural roads was 1.92 fatalities per 100 million vehicle miles. Despite the ranking, Alabama has made strides to improve vehicular safety for motorists in the state. ALDOT's decision to fund the development of a Strategic Highway Safety Plan (SHSP) in 2005 has significantly reduced the motorist fatality rate. Up until 2008, there was an average of approximately 1,100 fatalities per year. Between 2008 and 2012, the average had dropped to 887 fatalities per year.

The SHSP led to the implementation of numerous safety initiatives that have saved lives and reduced serious injuries throughout the state. The SHSP was revised in 2010-2011 with a renewed goal to become a Toward Zero Deaths (TZD) program that works to address key areas of highway safety where fatal crashes are involved and to change the highway safety culture in the state.

The 21<sup>st</sup> Annual Highway Report points to three major factors associated with fatal vehicle crashes: driver behavior, vehicle characteristics and roadway features, with roadway features contributing to approximately one-third of all fatal traffic crashes in Alabama. Roadway features that have an effect on public safety include intersections, traffic control/channelization devices, edge of pavement conditions, and roadside obstacles/structures. Unsafe roadway features can usually be identified and addressed with highway safety or improvement projects. Other factors, such as driver behavior must be addressed differently and require using public outreach programs to inform and influence drivers to make safer decisions.





## **Funding**

Alabama roadways rely on a number of funding sources –federal, state and local. Federal and state gasoline and diesel taxes, or just “gas taxes”, are the most important sources of transportation funding in the nation. The federal tax, and the state tax is a fixed-rate tax that collects the same number of cents on every gallon of fuel purchased. Federal fuel taxes have not been increased since 1993. As a result, fewer dollars are being used to make needed improvements and more spending is being directed to keep existing roads open and in acceptable conditions.

In addition, fuel taxes in Alabama have not been increased since 1992. As of October 1, 2015, fuel taxes in Alabama ranked 40<sup>th</sup> in the nation when compared to other states. Road users in Alabama pay 39.3¢ per gallon of gasoline and 46.3¢ per gallon of diesel pumped. Compare this to the national averages of 48.7¢ per gallon of gasoline and 54.4¢ per gallon of diesel pumped.

Over the past decade, total state and federal revenues have remained constant. However, highway construction and maintenance costs have grown every year. Cars are becoming more fuel efficient and are no longer paying their “fair share” at the pump. Considering inflation alone, gas taxes would need to be increased by over 50 percent to match 1993 levels when the fuel taxes were set. Insufficient funding is leading to deteriorating and congested roadways. These conditions in turn lead to increased costs to motorists in the form of higher vehicle repair costs, increased travel times and greater incidence of wrecks. The total cost of inadequate roads in Alabama has reached \$3.1 billion a year and the need for transportation improvements is outpacing the level of state and federal funding available.

## **Future Need**

The future roadway needs in Alabama can be split into three categories: capacity improvement needs, pavement maintenance needs and safety improvement needs. The Statewide Transportation Plan (SWTP) addresses Alabama’s future transportation needs anticipated through the year 2035. In addition to the Statewide Transportation Plan (SWTP), Alabama has a short-term program aimed at identifying critical safety needs. This program, known as the Statewide Transportation Improvement Program (STIP), identifies crucial safety improvement projects needed.

Future travel in the state is expected to increase by 32 percent by 2035. Travel on urban roads is expected to be even higher with an increase of 50 percent by 2035. Increased travel affects the capacity of existing roads and leads to higher congestion rates. According to the SWTP, congestion is expected to affect 17 percent of all roads in Alabama by 2035. Interstates are expected to suffer the most, with 70 percent expected to operate below desired levels. According to these projections, over 1,800 miles of roadways will be congested in Alabama in 2035 and will require capacity improvement projects of \$20.9 billion to return them to acceptable levels.

In addition to capacity improvement needs, pavement maintenance needs through 2035 are projected to cost an additional \$8.5 billion. The projected safety improvement needs set forth by the STIP will cost an additional \$7.5 billion.

Together, future roadway needs in Alabama is projected to cost almost \$37 billion by 2035. Funding for all highway construction and maintenance through 2035 is projected to be between \$47.4 and \$51 billion. However, these projections include allocations for bridges and pedestrian and bicycle improvements. These additional areas of need project needs of \$20.5 billion for bridges and \$106 million for pedestrian and bicycle improvements, bringing the total projected needs for highway construction and maintenance in Alabama to \$57.5 billion by 2035. These projections indicate a significant funding shortfall in Alabama of between \$6.5 and \$10 billion by 2035.

## **Resilience**

Alabama's infrastructure must be prepared to meet the challenges in any scenario. In the worst of times, roads provide mobility in and out of areas that are threatened by natural and manmade disasters. The greatest threat to Alabama is hurricanes along the Gulf Coast. However, other threats may include accidents that shut down parts of the roadway, chemical spills that could occur anywhere in the state, and even impacts due to climate change, such as rising sea levels. Roads must be able to recover quickly with minimum disruption to public safety, the economy, and national security.

ALDOT and the Alabama Emergency Management Agency (EMA) has identified evacuation routes to deal with large numbers of evacuees from coastal areas. ALDOT has also implemented the Traffic Management Center (TMC) and Alabama Service and Assistance Patrol (ASAP) programs in the Birmingham and Mobile areas. The TMC and ASAP programs utilize various types of surveillance equipment to respond to a variety of incidents ranging from removing debris in the roadway, providing assistance to disabled vehicles, and coordinating incident response with first responders.

## **Innovation**

In the past, Alabama has relied on traditional funding mechanisms and design practices to fund and build roads in the state. Recently, however, stagnant fuel tax revenues and increased construction costs have forced Alabama to find alternative solutions that address growing travel demands and aging infrastructure. Recent innovations include non-traditional funding methods, innovative intersection and interchange designs, and increased application of intelligent transportation systems that increase can capacity.

In 2012, the governor introduced the Alabama Transportation Rehabilitation and Improvement Program (ATRIP), the largest improvement program in state history. ATRIP is a \$1 billion, three-year program that has addressed critical needs projects across all 67 counties in Alabama. The program leverages the state's future federal aid funds as collateral on low interest rate bonds which are issued to fund transportation

improvement projects. The program proves to be innovative because the cost to build roads now using low interest bonds is less than the future cost of construction due to inflation.

In addition to innovative funding strategies, Alabama has started addressing its congestion problems by using alternative intersection and interchange designs and by installing intelligent transportation systems. Alternative intersection designs offer improved mobility and safety by modifying intersection layouts in ways that allow traffic to move more efficiently and safely. Examples include roundabouts, modified left turn lanes, and reduced access points. Intelligent transportation systems improve the efficiency of existing roadways and inform travelers of existing or future roadway conditions. Examples include the installation of traffic signal networks, traffic monitoring systems, incident detection and management systems, and traffic information message boards.

## Let's Raise the Grade

- **Address Funding Uncertainties:** Find and implement adequate long-term funding changes such as raising state transportation user fees and indexing for inflation.
- **Increase Roadway Capacity In and Around Large Urban Areas:** Identify and expand congested roadways in the state and utilize proven Intelligent Transportation Systems.
- **Continue Addressing Key Areas Where Public Safety is a Concern:** Identify unsafe sections of roadways and intersections and fix them as well as increase public awareness of safe driving behaviors.
- **Promote Innovative Transportation Practices to Reduce Costs and Improve Project Delivery:** Increase awareness of alternative solutions and find proven technologies that reduce project costs and speed up project delivery.

## Find Out More

- The Alabama Department of Transportation (ALDOT)
  - State of Alabama Strategic Highway Safety Plan, 2<sup>nd</sup> Edition
  - ALDOT Alabama Traffic 2012 Crash Facts
  - Alabama Statewide Transportation Improvement Program (STIP)
- US Department of Transportation Federal Highway Administration
  - US Department of Transportation Federal Highway Administration Office of Planning, Environment, & Realty (HEP)
- Jacobs Carter Burgess and the Alabama Statewide Transportation Plan (SWTP)
- Jacobs Carter Burgess and the Alabama Statewide Transportation Plan Update: Existing System Assessment
- TRIP Alabama Transportation By the Numbers: Meeting the State's Need for Safe and Efficient Mobility

- ASU Center for Leadership and Public Policy Connecting Our Citizens for Prosperity: Alabama's Successes and Needed Improvements in Transportation Infrastructure
- American Petroleum Institute (API) April 2015 State Motor Fuel Taxes by State
- State of Alabama Office of the Governor
- Smart Growth America



## What You Should Know About Alabama's Transit

Alabama is one of four states that does not provide state funds to support public transit options which pushes most of the state's residents to rely on personal transportation. Despite the lack of state level funds, Alabama does have fourteen public transit providers including four key transit systems throughout the state:

- Birmingham Jefferson County Transit Authority (BJCTA)
- Montgomery Area Transit System (MATS)
- Mobile-The Wave Transit System (WTS)
- City of Huntsville-Public Transportation Division

Along with public transit, there are many private companies that provide transit services to the public and students. Some private transit providers throughout the state include:

- Greyhound Lines- Multi-state transportation company
- UAB Blazer Express- 24 hour weekday operation offering fare-free bus transit to UAB students and employees.
- Auburn's Tiger Transit- Providing transit to Auburn Students and employees
- Birmingham Door to Door Shuttle Service- Specializing in airport pickups and drop offs

A recent study shows Birmingham, Alabama's largest city, leads America's major metropolitan areas in number of daily commuters with less than 1% of working-age citizens using public transportation. The MAX bus system serves the Greater Birmingham Area and generates approximately 3 million passenger trips annually. In addition to a lack of funding, major issues the MAX bus system is facing include: mechanical reliability/maintenance, bus schedules, limited service area, limited service hours, customer relations, and deteriorating facilities and shelters. While transit access isn't widespread, right-sized transit in certain areas is proving to be useful in Alabama communities.

## How Alabama's Transit Works

Alabama has fourteen agencies working to provide transit across the state. The largest of which is the Birmingham Jefferson County Transit Authority (BJCTA), which provides transit to Birmingham, Bessemer, Fairfield, Homewood, Mountain Brook, Midfield, Tarrant, Center Point, Hoover, and Vestavia Hills, primarily through the MAX Bus System. The MAX System reports annual passenger trips and service miles of approximately 3 million each year.



In addition to the MAX bus, other metropolitan areas in Alabama have their own transit systems. In Mobile, the Wave Transit System provides fixed route, trolley, and shuttle services. A recent ridership report estimated a total of 1,110,192 passenger trips for the fixed route vehicles. The Montgomery Area Transit System, or MATS, recorded approximately 941,000 passenger trips in 2014. Huntsville's public transportation system, the Shuttle Bus recorded only 388,458 passenger trips in 2010 with many complaining that the system was chronically late, had overlapping routes, and was not dependable.

## How is Alabama's Transit Performing?

### Condition

Alabama's transit system is currently in need of replacement vehicles for buses that have reached the end of their useful lives. While the average age of BJCTA fixed route vehicles is 6.04 years, over half are nearing the end of their useful lives. Currently, BJCTA has 40 vehicles that will meet its 10 or 12 year useful life by 2014. The aging vehicles require higher maintenance costs and will eventually need replacement. There is also a demand for improved amenities such as system maps, signage, bus shelters, and park and ride lots. As of August 2013, BJCTA welcomed the arrival of 30 new Flyer Excelsior Buses that transitioned MAX into being an all compressed natural gas transit fleet. Natural gas is produced domestically, and offers little fuel emissions and lower maintenance costs.

BJCTA has focused on improving their transit system conditions by identifying problems through a public survey based on categories including: on-time performance ratings, reliability, personal safety, courtesy of the Bus Driver, and cleanliness. Almost 46% of the responses stated that the cleanliness of the bus was in "Good" condition, with 5.18% rating it as "Poor." Some of the issues related to condition that negatively impact the public perception of Birmingham's MAX bus system are:

- Breaking down frequently
- Poor bus stop and shelter conditions
- Safety issues

### Capacity

The National Transit Database (NTD) reports 6 transit agencies directly serving the following cities in Alabama: Birmingham, Mobile, Montgomery, Tuscaloosa, Huntsville, and Opelika. The agencies collectively serve 1,257 square miles, with the BJCTA Max bus serving 1,111 square miles. Between 2012 and 2013, annual bus ridership increased 11%. In 2013, BJCTA had an average of 65 vehicles operated in maximum service (Peak Vehicles), with 76 buses in their fleet, making the system slightly over capacity. When comparing BJCTA capacity to other systems in the NTD that served similar population sizes, one found that BJCTA offers approximately 25% of per person revenue miles, per person service hours, and ridership. However, it should be noted that the other cities in this study receive annual operating assistance from state funds.

### Operation & Maintenance

Proper and timely maintenance can extend the useful life of bus transit service. Operating expenses for transit include fuel and oil, replacement of parts or tires, vehicle insurance, vehicle licenses, and salaries of transit employees that operate vehicles. The Bus Coalition, a national transit advocate group, has requested Congress to establish a competitive Bus State of Good Repair program or to restore the old bus and bus facilities with modifications. Nationally, bus transit needs have continued to grow and the lack of funding has created a sense of urgency for safe and reliable bus service.



The Transit Section of the Alabama Department of Transportation (ALDOT) Bureau of Transportation Planning and Modal Programs requires that all vehicles purchased with Federal Transit Administration (FTA) funds be maintained according to the manufacturers' suggested preventative maintenance guidelines. The ALDOT Bus Maintenance and Management System (BMMS) is a computerized system that reports all maintenance and repair work, and it must be utilized by sub-recipients of grant funds. The maintenance program recommends daily vehicle inspections, vehicle routine and preventative maintenance, vehicle warranty procedures, tracking of repairs, and condition of vehicles. A comprehensive set of guidelines and regulations have been set by ALDOT and FTA.

## **Public Safety**

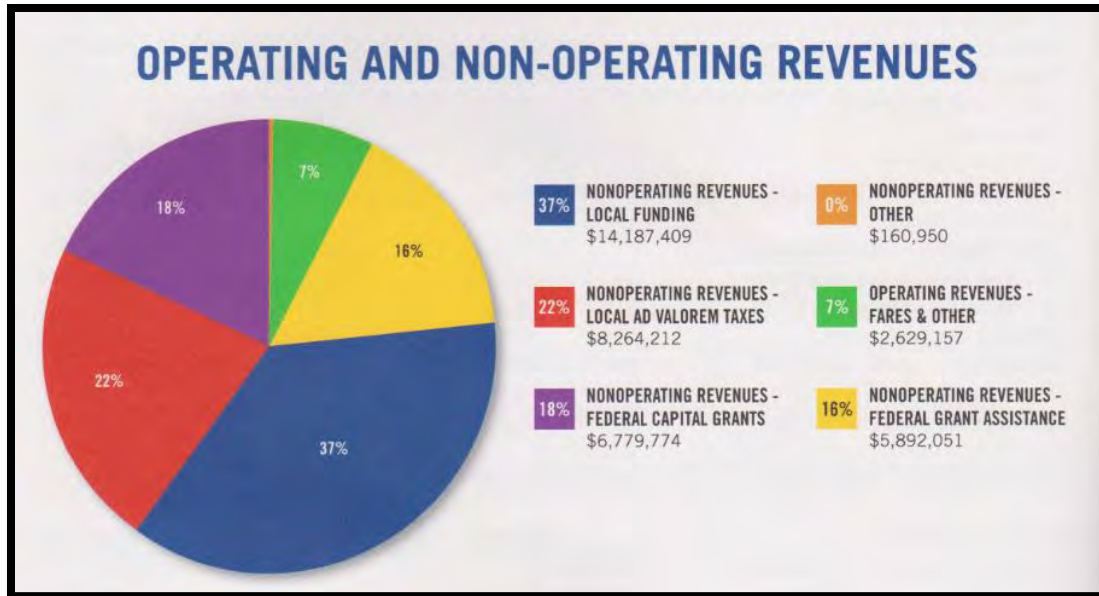
According to the NTD, a total of 21 incidents involving directly operated modes of public transportation in Alabama were reported in 2014. This data shows a decrease of about 19% in incidents from those reported in 2013. Out of the 21 incidents reported, five were vehicle collisions. Forty-three injuries and one pedestrian death were reported as well for Alabama in 2014, with the majority of these incidents occurring in Birmingham. BJCTA requires bus drivers to have a valid Alabama Commercial Driver's License, a good driving record, and at least 2 years of experience driving commercial vehicles or 5 years experience driving non-commercial vehicles.

According to the last BJCTA Comprehensive Transit Development Plan, when rating personal safety, about 39% of passengers rated it as "Excellent," 44% as "Good," and only 2% as "Poor." In an effort to decrease crime and personal injury, the BJCTA published a code of conduct for passengers to follow as a safety guideline while riding the MAX bus, in addition to the NTD's established guidelines. Safety and security problems are treated with high priority.

## **Funding**

Currently, Alabama is one of four states that does not receive state funding for public transit. This means that federal and local funds are used to keep the systems running and often leave little in the budget for all of the improvements needed for the system to thrive and grow. The BJCTA relies on dedicated funding from beer tax, racing commissions, and ad valorem funding. A 2008 report by the BJCTA lists private partnerships (i.e. UAB, Alabama Power, St. Vincent's Hospital) and automobile registration fees as additional sources of funding. It is also suggested that the BJCTA continues efforts to receive state funding for transit. The figure below provides operating and non-operating revenues for BJCTA in 2013. Federal capital grants and federal grant assistance account for \$6,779,774 and \$5,892,051, respectively. The future needs of public transportation in Alabama are estimated to outweigh the current trends in federal transit funding.

In the fall of 2015, BJCTA was awarded a Transportation Investment Generating Economic Recovery (TIGER) grant from the FTA. The grant provides \$20 million for the development of a Bus Rapid Transit System (BRT), which is about one-third of the project's \$65 million preliminary cost. The BRT will strengthen the current bus system, supplement the newly created Zyp bike share program, and enhance the experience of users of the TIGER funded Red Rock Ridge and Valley Trail System providing a truly multi-modal regional transportation system.



Source: Birmingham-Jefferson County Transit Authority's Community Report 2012-2014

## Future Need

Approximately \$29.7 million will be needed between 2015 and 2018 in order to bring the MAX system up to normal operating standards. These funds will go towards 40 new buses, 30 new para-transit vehicles, 25 staff and support vehicles, cameras, and shop equipment for vehicle repairs. The goal is to improve passenger amenities, add automatic vehicle locators, automatic passenger counters, fleet radio upgrades, and security cameras on all buses. Between 2015 and 2020, a new vehicle maintenance facility will be needed and is estimated to cost about \$25 million. This facility will accommodate the fleet of new buses and replace the old facility currently being used. The BJCTA states total capital needed in the next 5 years is \$64.7 million. If available, 80% of these funds (\$51.7 million) will be grant funded and 20% (\$12.9 million) will be matched locally.

## Resilience

Safety and security is always a top priority for transportation providers. It is noted in the BJCTA Community Report that MAX will need to receive approximately \$6 million annually from all sources to maintain its current fleet and be prepared for emergencies. According to the ALDOT State Management Plan, all public transit providers have been asked to prepare for critical incidents, such as natural disasters, sabotage, civil unrest, hazardous material spills, and acts of terrorism. ALDOT has developed a Safety, Security and Emergency Preparedness Plan (SSEPP). The FTA has documented practices for emergency management, which include funding from Federal Emergency Management Agency (FEMA) for recovery. US DOT has conducted a risk study throughout the Gulf Coast area, classifying the WAVE Transit System in Mobile to be a high risk for exposure to sea level rise. The WAVE Transit System is currently requesting proposals for a SSEPP that will follow all local, state, and federal requirements and guidelines. With lessons learned from unforeseen catastrophic events such as Hurricane Katrina, preparedness, response, recovery, and mitigation will lead to a resilient transit system.

## Innovation

BJCTA has been focusing on zero-emissions by integrating the hydrogen fuel cell bus into its fleet. The FTA's National Fuel Cell Bus Program has been funding and supporting a research program through the University of

Alabama at Birmingham to conduct a two year demonstration that will test the reliability and performance of the fuel cell buses. In an effort to improve air quality conditions, the fuel cell buses will produce no harmful pollutants. The bus is able to operate with an electric motor and an advanced lithium battery pack. Since the bus is able to store 25 kg of hydrogen, there is an allowance of about 200 operating miles. Air Liquide has installed one of the 56 national hydrogen-fueling stations in Alabama's BJCTA maintenance facility. With this new and emerging technology on the rise, Alabama's citizens will be able to access one of the few zero-emission hydrogen fuel cell buses in the country. In addition to the fuel cell bus study, BJCTA has also incorporated 30 new compressed natural gas buses (CNG). The combined use of fuel cell, CNG, and hybrid buses will provide improved air conditions to meet the needs of EPA Air Quality Standards.

Montgomery Area Transit System (MATS) has also been contributing to the efforts of a sustainable system by incorporating hybrid buses into its fleet. The American Recovery and Reinvestment Act (ARRA) awarded \$2.67 million towards the MATS Hybrid Bus Project, with the goal of reducing air pollution. Eight of the older diesel buses were replaced with state of the art hybrid buses, which typically get 25% to 35% better fuel economy than diesel buses. The 35-foot buses incorporate hybrid drive systems, which are manufactured by the American workforce. The Transit Investments for Greenhouse Gas and Energy Reduction (TIGGER) Program was established by the FTA in 2009 to make American Recovery and Reinvestment Act (ARRA) funds available for public transit agencies to lower greenhouse gas emissions and energy use around the country.

## Let's Raise the Grade

- **Start dedicating state funding for selected future transit.** The 2021 World Games have been awarded to Birmingham, and a transit system running through areas of Birmingham hosting events and to the airport could meet the needs of event crowds and serve the surrounding densely populated area.
- **Adequately fund maintenance of transit vehicles and facilities to keep systems in state of good repair and reduce life-cycle costs overall.** Routine maintenance will reduce chances of break-downs and replacement of parts.
- **Implement plans to help riders**, similar to the In-Town Transit Partnership that the Regional Planning Commission of Greater Birmingham (RPCGB) has proposed. As an example, this implementation will make bus routes user friendly and accessible to riders by increasing bus frequency and decreasing wait times. The In-Town Transit Partnership would provide an expanded service area that would benefit commuters and reach major employment areas, restaurants, healthcare facilities, and shops.

## Find Out More

- ALDOT Bureau of Transportation Planning and Modal Programs Transit Section. Policy and Procedure Manual for Federal Transit Administration Transportation Programs 5307, 5309, 5310, and 5311. Alabama Department of Transportation.
- [Birmingham-Jefferson County Transit Authority](#)
  - Birmingham-Jefferson County Transit Authority's Community Report 2012-2014. Birmingham-Jefferson County Transit Authority.
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## What You Should Know About Alabama's Stormwater and Wastewater

Alabama's stormwater and wastewater utility networks play an integral part in providing safe, clean drinking water for residents of the state, removing waste safely and efficiently, reducing and controlling flooding, and sustaining our rivers and streams. Currently there are approximately 250 unique utility service providers managing and operating wastewater plants across Alabama, with roughly half also providing and managing drinking water services. These utility operators play a critical role in the collection, treatment and disposal or reutilization of sewerage across the state. An estimated 65% of the collection system infrastructure has reached the end of its useful life resulting in broken, cracked, clogged, and disjointed pipes that have a negative effect on the downstream system resulting in further deterioration of both storm and sewer manholes, pump stations, treatment plants and eventually discharge points including lakes and rivers of the state. Sanitary Sewer Overflows (SSOs) are of primary concern, stemming from inadequate wastewater infrastructure, and resulting in untreated sewage overflow into Alabama's creeks and streams. Though broken and leaky pipes exist in extremely high numbers all across the state, the overall wastewater infrastructure system collects, distributes and treats tens of millions of gallons of waste per day. The proper operation of both wastewater and stormwater infrastructure is critical to the health and safety of the population in the state of Alabama and is actively managed by utility providers, municipal governments, and the Alabama Department of Environmental Management (ADEM).

## How Alabama's Stormwater and Wastewater Infrastructure Work

Alabama's stormwater and wastewater infrastructure is regulated and permitted through the Alabama Department of Environmental Management (ADEM) and managed by public municipalities and utility operators across the state. Investments to stormwater infrastructure primarily come through public funds for maintenance and repair of the system and improvement projects and private funding sources where new infrastructure is required in support of land development. Wastewater infrastructure is maintained and funded through utility operator charges to the public utilizing wastewater services, normally on a volume basis. The state's primary involvement in stormwater and wastewater improvements and investments is to ensure public safety through regulating the system collection and discharge operators, ensuring compliance with federal and state laws related to water quality, pollution, and erosion.

# How's Alabama's Stormwater/Wastewater Infrastructure Progressing

## Condition

Stormwater and Wastewater infrastructure in Alabama has been installed over many years and in many areas is deteriorating and in need of maintenance and repair or total replacement. An estimated 65% of the collection system infrastructure has reached the end of its useful life resulting in broken, cracked, clogged, and disjointed pipes that have a negative effect on the downstream system resulting in further deterioration of both storm and sewer manholes, pump stations, treatment plants and eventually discharge points including lakes and rivers of the state. Sanitary Sewer Overflows (SSOs) are of primary concern, stemming from inadequate wastewater infrastructure, and resulting in un-treated sewage overflow into creeks and streams. Stormwater infrastructure management personnel continue to struggle in locating decades-old pipes, identifying the responsible owners and maintaining these pipes. Throughout the state wastewater treatment plants are being upgraded and new plants built in many of the high density areas of the state, utilizing new efficiencies in equipment and technology to keep pace with increased flows. Minimum wastewater effluent quality requirements are typically met at Alabama treatment plants, but receiving water impacts are still an area of concern for many plants operating across the state. Alabama has approximately 850,000 onsite wastewater treatment systems (septic systems) primarily servicing residential customers that are outside the reach of a sanitary sewer collection system. Of these, approximately 25% are presently failing due to a number of factors including poor soils, lack of maintenance and undersized leaching fields. Failing septic systems present water quality concerns including polluted runoff and increase bacteria in ground water.

## Capacity

The exceedance of capacity of stormwater and wastewater systems is evident in localized flooding and in sewer overflows. While flooding is not always a representation of inadequate stormwater infrastructure, sewer overflows indicate a failure of the collection system. Existing stormwater infrastructure no longer meets the demands of increased development in many urban centers across the state. Main drainage conduits, installed over 100 years ago in many of Alabama's high population density areas, are not capable of handling the increased runoff rates from growth and development. New restrictions on development and requirements for stormwater management through detention or retention structures are helping to ease the burden on existing stormwater infrastructure.

Infiltration and inflow from rain events present a major problem for wastewater collection systems across the state. In aging and poorly maintained systems that are already at capacity, infiltration adds to the load and can create situations where Sanitary Sewer Overflows (SSOs) occur. SSOs are incidents where untreated sewage is discharged from a sewer system directly into the environment. SSOs are tracked by utility companies by number of overflows per 100 miles of sewer pipe and are individually reported to ADEM due to their propensity to cause health concerns. The U.S. Environmental Protection Agency (EPA) has set a target benchmark of less than 4 SSOs per 100 miles of sewer pipe per year. While many Alabama systems meet this benchmark, larger systems in the Birmingham and Mobile areas consistently have 7-10 SSOs per 100 miles of pipe per year. SSOs are commonly seen as the biggest problem facing wastewater service providers across the state. During periods of wet weather, ADEM receives as many as 30 SSO reports a day from affected wastewater utilities. When wet weather extends into multiple regions, the total number of SSOs across the state becomes extremely high.



Community septic systems in Alabama tend to become problematic over time and contribute to the contamination of groundwater and surface water. Many of the septic system installations in Alabama occur in rural areas of the Black Belt where low-permeability soils exist and lead to system failures. In the northern counties karst terrain and fractured rock produce water quality concerns with these systems. The Alabama Onsite Wastewater Board was created in 1999 to examine, license and regulate installation and servicing for these systems and has a generally effective training program that is increasing the knowledge base on the proper installation, use and maintenance of these systems for effective wastewater treatment.

Total Maximum Daily Loads (TMDLs) are a measure of the capacity of the state's water resources to take on residual contamination loadings. An allocation of pollutant loads is established by ADEM and watershed plans are implemented to achieve reduced pollutant levels in surface waters where necessary. Surface waters (rivers, lakes, estuaries, bays) or portions of surface waters which do not meet water quality standards are considered impaired waters. Currently, excess nutrient concentrations account for 30% of Alabama's impaired rivers and streams and 44% of impaired lakes and reservoirs. Wastewater effluent is a primary contributor of increased concentrations of nutrient levels. As TMDLs and nutrient criteria are revised, it is possible that additional advanced wastewater treatment processes would be required at many of the existing treatment plants in high-density areas across the state. These advanced treatment methods are costly to implement, estimated at \$100 million per facility.

## **Operation & Maintenance**

Alabama's stormwater and wastewater operations include both public sector maintenance and improvements and private sector investments that are made during the development or re-development phases of new lands or existing urban areas. County and/or municipal governments are most often responsible for the day-to-day maintenance and operation of most stormwater programs, infrastructure and monitoring, while wastewater infrastructure and treatment plants are operating in a variety of ways throughout the state including municipal government owned, independent utility boards, and public-private partnerships. Maintenance of stormwater and wastewater systems involves constant inspection and timely repair of conduits, plants, pump stations, manholes and discharge points. Maintenance and repair examples range from minor drainage channel sediment removal and culvert and headwall replacement to more costly line replacement, slip-lining, pump station and treatment plant equipment replacement. Jurisdictional agencies across the state have increased restrictions on both wastewater and stormwater infrastructure installations for new developments and at points where new developments meet existing infrastructure. These measures have created sustainable additions to the utility systems and have resulted in limiting impacts to the systems and increasing water quality while continuing to provide services for new land development activities.

Maintenance operations for both systems is almost 100% reactionary due primarily to time and resource limitations. More than capacity, the largest issue facing stormwater and wastewater infrastructure managers is the lack of adequate personnel and equipment resources to check lines, clear blockages, and repair failures. Estimates for the repair and maintenance known to be required on existing stormwater and wastewater systems across the state are \$3-\$5 billion annually. Municipalities and utility organizations are implementing technology solutions through GIS

mapping and computer software to track water quality and infrastructure data, helping identify high priority maintenance issues and prioritize projects for funding.

## **Public Safety**

The EPA and ADEM have extensive public awareness campaigns and regulatory permitting requirements highlighting water quality assessments and stormwater pollution prevention. Alabama has acknowledged the importance of public safety through education and public outreach mandated by Municipal Separate Storm Sewer System (MS4) stormwater permits and additionally driven by strong non-profit environmental groups and academic agencies. MS4 permits are issued to public agencies that operate a stormwater conveyance system that discharges into waters of the state in order to reduce the discharge of pollutants and protect water quality. Public Outreach and Education is an identified control measure associated with the permit, mandating these agencies to develop programs that provide information to the public to change behavior patterns and encourage participation in water pollution prevention activities. This information empowers the public to help protect water quality in Alabama.

Public Safety is also at the forefront of the wastewater utilities in Alabama. The majority of utility and treatment plant operators have, or are currently developing, Emergency Response Plans that are essential to protecting the public health in the event of water quality threats. Alabama continues to struggle with SSOs, reducing our water quality and the protection of our natural water resources. Operators and maintenance personnel are being trained across the state to recognize report and properly contain wastewater system discharges with potential water quality pollution.

Alabama ranked eighth in the nation for toxic release into lakes, rivers, and streams according to a 2010 report produced by Environment America dumping nearly 9.9 million pounds of toxic discharges into Alabama waterways. Much of this is attributed to overland stormwater runoff of pesticides and coal products. Stricter controls on stormwater best management practices, construction and land disturbance permits and EPA approval of ADEM's TMDL plans are moving forward to reduce pollution of Alabama waterways and increase water quality across the state.

## **Funding**

Communities lack funding to adequately maintain stormwater infrastructure and are beginning to implement stormwater fees on development and land disturbance activities in addition to the general tax funds used to provide these services. Stormwater infrastructure maintenance funding is practically nonexistent. Though communities maintain crews and limited equipment for cleaning out existing pipes and clearing brush/silt from drainage conveyance systems as a part of their general fund budgets, most often lumped under public works funding, the greatest amount of money spent on stormwater infrastructure comes from grant programs targeting specific projects to benefit the environment and the community. Stormwater infrastructure grants across the state account for less than \$10 million of infrastructure investment annually.

Funding for wastewater infrastructure comes primarily from water and sewer rates charged to customers. Rates frequently fail to recoup needed costs for maintenance of facilities and expenses leaving major capital improvements the focus of funding at the detriment of normal maintenance and repair of existing infrastructure. Sewer rates are typically set by a local government or utility board of directors that likely feel pressure to keep rates low. In order for

any utility to be sustainable over time, full life cycle costs of infrastructure including maintenance/repair and replacement should be considered when determining acceptable utility rates. A recent study by ADEM and the Environmental Finance Center (EFC) reports that greater than 1/3 of the utility providers in the state have rate structures that are not adequate to cover their operating expenses, making it impossible to replace aging infrastructure, fund new improvements and develop proactive asset management programs.

## **Future Need**

The future needs for stormwater infrastructure across the state include:

- additional equipment and revenue to provide more adequate maintenance of existing infrastructure
- the systematic repair and replacement of aging and failing pieces of the system
- the replacement of pipes that do not meet current capacity loads beginning with major conduits to surface features and working back to smaller pipes draining smaller areas that produce less impact when flooded

Currently less than \$1 billion is being invested each year into the system. An additional \$4.4 billion over the next 20 years on top of existing funding levels is necessary to maintain and improve the infrastructure. Inspection programs have increased with the implementation of MS4 permits and increase the amount of very limited funds needed to maintain this infrastructure. Limited loan programs are available as well as grant programs at the federal level. Communities have made some use of these programs, but the costs associated with writing grants and applying for loans can be difficult to come by for many of the communities that could benefit the most.

Future needs for wastewater infrastructure include replacement of failing infrastructure and additional revenue to maintain existing infrastructure at an acceptable level of service. Treatment plant capacity in most areas of the state has been, or is currently being upgraded to meet and exceed current sewerage flows; the future focus on collection infrastructure will help to limit SSOs and reduce infiltration, and will functionally increase treatment plant capacity at the same time. The future will most assuredly bring more stringent water quality regulations. Future collection systems and treatment facilities will need to utilize advanced processes and equipment to stay compliant with new regulations.

## **Resilience**

The majority of stormwater infrastructure across the state is designed for up to a 25-year storm event. It is not economically feasible to design for all storm events. Extreme storm events will continue to produce flooding and exceed the capacity of storm pipe structures, resulting in damage to roadways, utilities, and public and private buildings and property. Local, state and federal governments have disaster mitigations plans at the ready and emergency management funding available to respond and restore affected areas.

Wastewater system piping is currently operating well past its expected useful life and in many areas has held up remarkable well considering its advanced age. The average age of pipe infrastructure varies widely across the state and within existing systems. Older larger, main-line pipes are often over 100 years old and in areas that are difficult to access, upgrade or replace. Newer lines are on the order of 10-25 years old and can be tracked to recent emphasis on replacing aging infrastructure and system overhauls in some of the larger systems in the state including the Jefferson County and Mobile areas. The design life of the vast majority of these pipes is 50 years. Though broken

and leaky pipes exist in extremely high numbers all across the state, the overall wastewater infrastructure system collects, distributes and treats tens of millions of gallons of waste per day.

## Innovation

Stormwater and wastewater innovation is happening across the state and the country in general. Stormwater infrastructure has been the subject of hundreds of studies and new products developed for the implementation of low-impact-design and green initiatives.

Some of the new products and processes throughout the state include:

- utilizing new recycled composite inlet covers to reduce the cost of replacing broken concrete inlet covers
- utilizing innovative underground stormwater detention strategies that don't expand land disturbance, but help control the rate and quality of stormwater runoff
- rain gardens and biofiltration beds utilized in removing solids and metal particulate from stormwater in heavy industrial sites
- grey water capture and reuse where rain water and/or wastewater discharge is collected and utilized in non-potable efforts such as irrigation.

These initiatives and the increasing technology being developed to combat stormwater runoff problems, mitigate flooding, reduce water consumption and increase water quality are being used in Alabama to increase water quality and maintain our river and stream resources.

Wastewater innovation is not as widespread, but continues to be developed in order to create more efficient wastewater treatment plants and reduce infiltration into the sewer system. Fairhope, Alabama will be home to one of only 200 "Fuzzy Filters compressible media system" installed nationwide when it completes an \$11M upgrade to the sewer treatment plant. This will reduce the nutrient load on plant discharges, helping improve the water quality in Mobile Bay. Throughout the state, utility operators are upgrading treatment plants; many originally built in the 1970s and 1980s. Improvements include better filtration systems, more efficient controls systems, increased treatment capacity and improved water quality. Many utilities have setup management programs for pump stations and lines in order to replace outdated equipment, reduce infiltration through leaky joints and broken pipes and replace broken manhole covers.

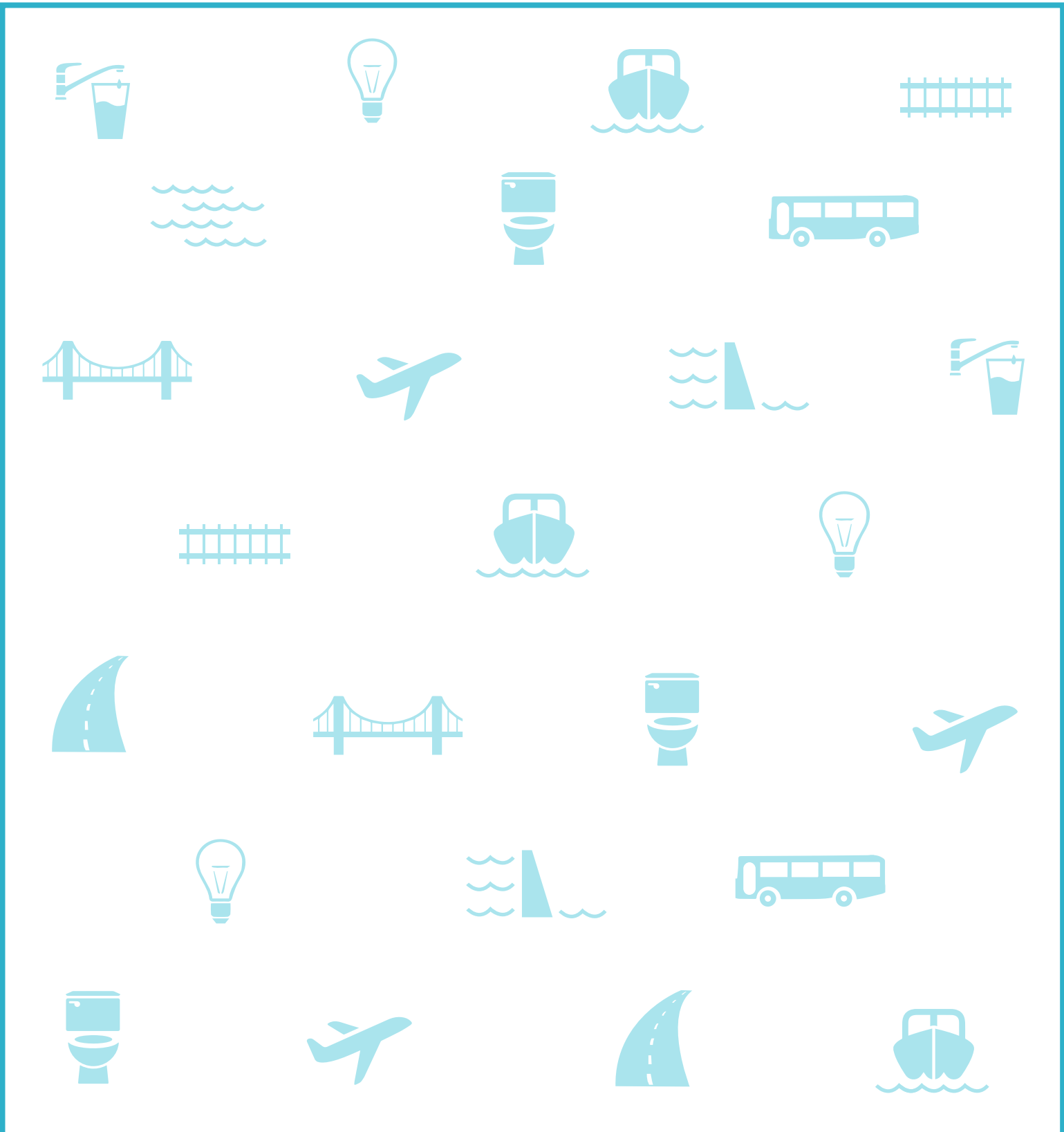
## Let's Raise the Grade

- **Repair failed, cracked, and broken infrastructure.** Replace aging infrastructure that requires excessive maintenance and repeated repair.
- **Provide additional resources and funding options for the daily operation and maintenance of stormwater infrastructure.**
- **Increase workforce training and look for improved technological advances** that can be used to increase efficiency in the management and operation of the systems.

- **Increase enforcement and education** on water treatment, water quality, and stormwater runoff at sites in watersheds of impacted water resources.
- **Support a financial environment that encourages sewer rate structures that provide revenue for maintenance and repair of the existing systems**, increase public investment in Alabama's stormwater infrastructure replacement/repair, extend education of loan programs available for communities to access funds for infrastructure improvements.
- **Raise awareness of the true cost of water and reflect it in water rates.**
- **Recognize the importance of functional storm and sewer infrastructure** to support the economic development of Alabama, including industrial development that relies heavily on water treatment facilities to operate and achieve water quality goals.
- **Continue to establish TMDL strategies that assist in watershed protection.**

## Find Out More

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