WRITTEN STATEMENT FOR THE RECORD

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ON BEHALF OF THE NATIONAL ASSOCIATION OF COUNTIES

A DECADE OF THE DIGITAL COAST PARTNERSHIP PROGRAM: SUCCESSES AND OPPORTUNITIES

BEFORE THE SUBCOMMITTEE ON OCEANS, ATMOSPHERE, FISHERIES, AND COAST GUARD
COMMITTEE ON COMMERCE, SCIENCE & TRANSPORTATION
UNITED STATES SENATE

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WASHINGTON, D.C.

Chairman Sullivan, Ranking Member Baldwin and distinguished members of the subcommittee, thank you thank you for the opportunity to testify on "A Decade of the Digital Coast Partnership Program: Successes and Opportunities."

My name is Paul Barnes and I currently serve as the Geographic Information Services (GIS) Director for Harrison County, Mississippi. I also serve as the Planning Section Chief in the county's Emergency Operations Center Command in the event of a state emergency declaration. Prior to my current position, I was the Director of GIS for the Southern Mississippi Planning and Development District for ten years. Today, I am representing the National Association of Counties (NACo), who participates as a Digital Coast Partner.

The Digital Coast Partnership is a diverse group of members. NACo, along with the American Planning Association, Association of State Floodplain Managers, Coastal States Organization, National Estuarine Research Reserve Association, National States Geographic Information Council, The Nature Conservancy and the Urban Land Institute work with the National Oceanic Atmospheric Administration (NOAA) on the Digital Coast platform. Through Digital Coast, NOAA has created an innovative public-private partnership to determine the tools, data and training that counties need to protect communities from future risks. Using the Partnership, NACo educates and trains county officials on Digital Coast, collaborates with the partners on coastal issues and strengthens resiliency at the local level.

About NACo

Founded in 1935, NACo is the only national organization that represents county governments in the United States and brings together county officials to advocate with a collective voice on national policy, exchange ideas, build new leadership skills, pursue transformational county solutions, enrich the public's understanding of county government and exercise exemplary leadership in public service.

About America's Counties

Counties are highly diverse, not only in my state of Mississippi, but across the nation, and vary immensely in natural resources, social and political systems, cultural, economic and structural circumstances, public health and environmental responsibilities. Counties range in area from 26 square miles (Arlington County, Virginia) to 87,860 square miles (North Slope Borough, Alaska). The population of counties varies from Loving County, Texas, with just under 100 residents to Los Angeles County, California, which is home to close to ten million people. Of the nation's 3,069 counties, approximately 70 percent are considered "rural," with populations less than 50,000, and 50 percent of these have populations below 25,000. At the same time, there are more than 120 major urban counties, which collectively provide essential services to more than 130 million people every day.

Many of the responsibilities of counties are mandated by both the states and federal government. While county responsibilities differ widely, most states give their counties significant authorities. These authorities include construction and maintenance of roads, bridges and critical infrastructure, assessment of property taxes, record keeping, running elections, and overseeing jails, court systems and public hospitals. Counties are also

responsible for child welfare, consumer protection, economic development, employment/workforce training, emergency management, land use planning, zoning and environmental protection.

These responsibilities become even more crucial for the 452 coastal and Great Lakes shoreline counties who account for 40 percent of the nation's population, and face increased risks due to hurricanes, earthquakes, tsunamis, droughts and other natural disasters. Additionally, since coastal counties economies are often built on a foundation of marine construction and transportation, ship and boat building, tourism and recreation and offshore mineral extraction, counties directly benefit from Digital Coast data, tools and resources to protect this infrastructure.

About Harrison County, Mississippi

While Harrison County is considered "suburban" with a population of just over 200,000 residents, we have a very diverse mix of urban, suburban and rural components. Located on the south-central Mississippi coast, we are the second most populated county in the state, and we encompass 976 square miles (574 square land miles/402 square water miles). Unlike other counties, we have two county seats, located in Biloxi and Gulfport, two of our five incorporated cities. Approximately 151,000 of our residents live in one of these cities, but if Harrison County were a city, we would be the third largest in Mississippi, with 50,000 residents living in the unincorporated area of the county.

Like other coastal counties, our economy is heavily dependent on shipbuilding, fisheries and tourism. In fact, we are home to the longest man-made beach in the U.S., stretching 26-miles from Biloxi to Henderson Point. According to NOAA's Digital Coast Ocean Jobs Snapshot, tourism and recreation account for 79 percent of the jobs in the county and ocean jobs account for 11,034 employees, $242 million in wages and $453 million in goods and services (2013). We also have pharmaceuticals, gaming and two military bases; the Naval Construction Battalion Center and Keesler Air Force Base in the county.

Because we are on the Mississippi Gulf Coast, we face an increased risk of hurricanes and flooding. In 2005, after Hurricane Katrina ripped through our county, we had significant loss of life and tremendous property damage. Most structures sustained some type of damage – almost 25 percent – one in four structures – were greatly impacted. 7,500 properties were moderately damaged, and over 15,000 properties were substantially damaged or destroyed. The approximate cost to replace and/or repair just county-owned infrastructure after Hurricane Katrina was roughly $126 million. In the aftermath of disasters such as these, it is our job to protect our residents and businesses before, during and after disasters. Digital Coast is key to this effort.

Digital Coast is beneficial for coastal and Great Lakes counties of all sizes.

The topic of this hearing is of great importance to my county and many other coastal counties across the United States who are tasked with protecting the environment, ensuring public health and strengthening the economic vitality of our communities.

Having gone through Hurricane Katrina in 2005, I am well aware of the challenges that local communities face to prepare, respond and recover from disasters. It takes time. That is why my county and others like mine are using NOAA's Digital Coast Initiative to strengthen resiliency at the local level.

Today, I would like to highlight a few reasons why Digital Coast is so valuable to coastal communities, and potential opportunities for the program moving forward:

1. **Digital Coast is integral to counties' ability to protect both public safety and natural resources.**

2. **Not only is Digital Coast a valuable tool for local governments, it can also help citizens, businesses and communities save money.**

3. **NOAA's Digital Coast program can be strengthened if we work together.**

Digital Coast is integral to counties' ability to protect both public safety and natural resources.

In recent years, we have seen a spate of incredible and catastrophic disasters across the country, and it is only getting worse. According to NOAA, 2017 was one of the worst years on record for natural disasters. Hurricanes Harvey, Irma and Maria alone cost $265 billion. These storm events directly impacted coastal counties who are responsible for public safety, protection of natural resources and strengthening local economies.

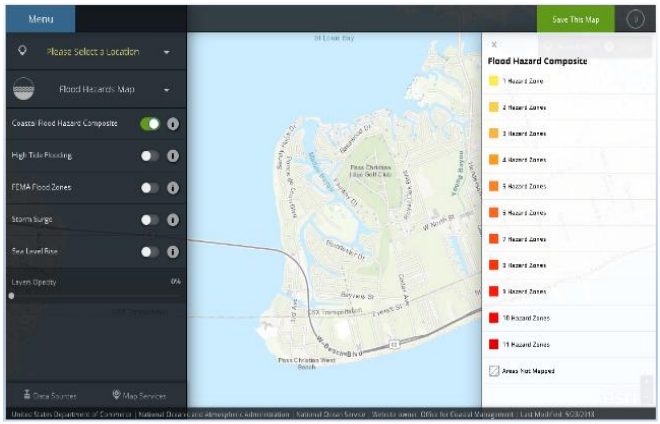
First, counties play an indispensable role in addressing public health and safety issues. When a hurricane hits, flooding occurs or a tsunami threatens, residents, businesses and visitors call us for help when they are wondering whether they should evacuate, are looking for the nearest shelter, need to be rescued or aren't sure what to do. This was demonstrated over and over in 2017 with Hurricanes Harvey, Irma and Maria, as well as the massive wildfires across our western states. Digital Coast can help us plan well in advance of disasters to protect life, property and the unique heritage of our communities.

While state statutes and organizational structures vary, local emergency management responsibilities are most commonly vested in county governments. Following a disaster, local emergency managers are often first on the scene and play a key role in coordinating emergency management efforts and working to mitigate damage before and after disasters.

That's why we use Digital Coast data and tools to develop effective evacuation routes in my county. In 2017, before Hurricane Nate hit, we determined which areas would be potentially impacted by storm surge. Additionally, by using Digital Coast, we are able to effectively identify instances where residents should shelter in place, evacuate in zones or undertake a full-scale evacuation. This helps to prevent an evacuation disaster such as the one during Hurricane Rita where people spent over two days on clogged Texas roads and over 73 people died.

We also use Digital Coast wetlands and flood exposure data to justify new building codes in special flood areas. For example, the *picture below* on the left shows the Henderson Point area in Harrison County

without flooding. However, the *picture on the right* shows the area with a flood hazard composite layer using potentials for flooding and storm surge. This visualization allowed the county to justify an additional two-foot elevation requirement above base flood elevation for new structures in this area.



Other counties are using Digital Coast to develop flood visualization tools for residents and businesses. Calcasieu Parish, in southwestern Louisiana, utilized Digital Coast to develop an urban flash flood forecasting and early warning system in the Contraband Bayou Watershed. With a population of nearly 200,000 residents spread across 1,094 square miles, the parish created a visual interactive storyboard. This real-time data allows the parish officials, residents and businesses to see which parts of the watershed may be impacted by a storm event, allowing the parish to efficiently coordinate and prioritize emergency response efforts within the region. It is the first of its scale and caliber in the entire state of Louisiana.

In addition to assessing flood risk, Digital Coast has proven effective in evaluating fire hazard risk in Southern California. With the combination of weather, topography, native vegetation and the notorious Santa Ana winds, Southern California is highly susceptible to wildfires. Although wildfires are inevitable in this region, Digital Coast is helping county officials identify high-risk areas. By using Digital Coast's Coastal Change Analysis Program (C-Cap), researchers were able to scrutinize 26 years of data to identify wildfire risk areas and their proximity to urban developments. As the project continues, communities and researchers will be able to anticipate future wildfire risk, based on changing development patterns.

Second, as counties are major owners of public infrastructure – 45 percent of our nation's public road miles and nearly 40 percent of bridges, a third of the nation's transit systems and airports, 78 percent of public transportation, 976 hospitals and 91 percent of all local jails – we use Digital Coast to keep this infrastructure safe.

Annually, counties spend $122 billion on building public infrastructure and repairing and operating public works, $22 billion on sewage and solid waste management and almost $83 billion on community health and public hospitals. To protect these investments, we must develop risk assessment, emergency management and mitigation plans for a variety of natural and manmade disasters to protect this infrastructure. In Harrison County, to protect the 1,880 miles (39.9 percent) of county-owned and

maintained road miles and 108 of the 298 bridges in the county, we use Digital Coast and other GIS data for bridge and road management and maintenance efforts, corridor and ecosystem preservation to name a few.

For our large urban counties who own a lot of public safety and purpose infrastructure, Digital Coast is even more important. Miami-Dade County, home to 2.6 million Floridians, owns and maintains five county airports, almost half of the county's road miles, 225 bridges, thousands of miles of pipes, pump stations and water and wastewater treatment plants, marinas, parks, nursing homes and a public hospital. Due to its geographic location along the southeastern Florida coast, the county uses Digital Coast data and projection tools to conduct "stress tests" on their facilities to determine vulnerability to sea level rise and storm surge events. Using resulting data, the county priorities which public safety facilities are the most important to get up and running after a disaster. Furthermore, Miami-Dade County collaborates with NOAA to offer Digital Coast trainings to public employees to understand these challenges at the county level.

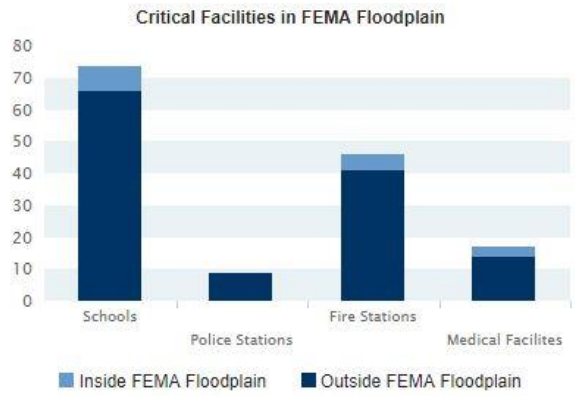
Another example hails from Virginia. The state is working with local communities to address the vulnerability of transportation infrastructure on the Eastern Shore from sea level rise and flooding events. Using data sets from the Digital Coast Sea Level Rise and Coastal Flooding Impacts Viewer, the state determined that 33 miles of roads in the region are vulnerable to a one-foot sea level increase in the next several decades and nearly a quarter of roads would be impacted by a six-foot rise by 2090.

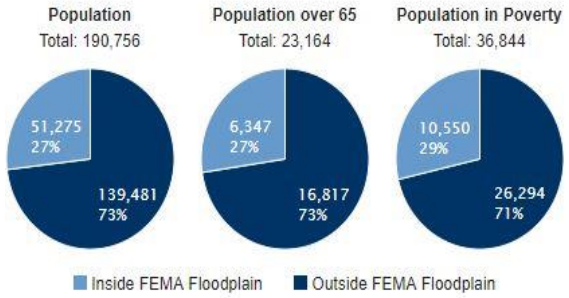
Third, counties are responsible for preservation of natural resources, while protecting the public. We use Digital Coast information to set ordinances, rules and regulations on water quality, flood protection, acquiring damaged homes or businesses and relocating structures, set building codes, adopt land use setbacks, environmental restoration projects and returning property to open space, wetlands or recreational use and other programs.

Throughout Mississippi, the Gulf region and nationwide, our counties are actively assessing how to use natural infrastructure and open space to buffer from storm events. In Harrison County, data provided through Digital Coast combined with our locally collected information helps to identify potential areas to acquire for open space conservation and/or natural infrastructure. In Jackson County, on the eastern Mississippi coast, the county has a living shoreline plan, which was just updated using Digital Coastal. Parks, open spaces, wetlands, beaches and shorelines absorb stormwater, improve offer water quality and offer habitat for wildlife as natural infrastructure to protect communities from flooding.

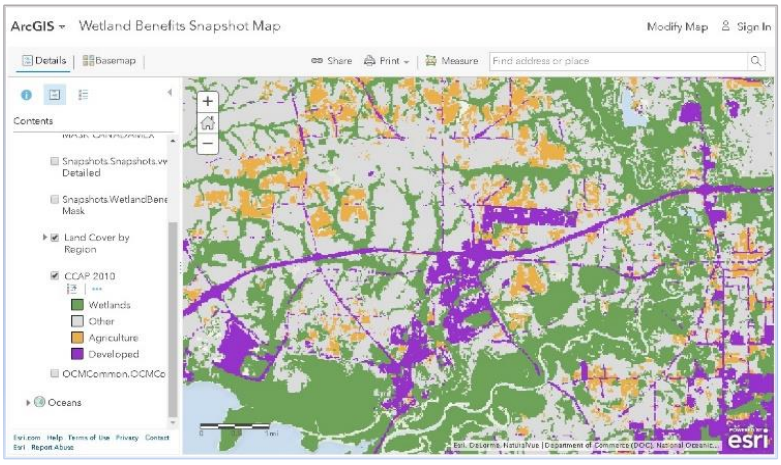
Other counties are also utilizing GIS to meet water quality standards. Within the Chesapeake Bay watershed, Prince George's County, Md. uses GIS-based tools to clean up polluted waterways. Located alongside the eastern portion of Washington, D.C., Prince George's is facing tighter stormwater requirements in the Chesapeake Bay. To keep the waterways clean, the county has launched an online GIS tool that allows residents to quickly report trash and litter locations.

Furthermore, we utilize Digital Coast and other GIS tools to educate the public about disaster risks. While Digital Coast has a multitude of useful tools to make our work easier, my department largely relies on the Digital Coast Flood Exposure County Snapshot and its corresponding Wetlands Benefits Snapshot. These snapshots give a visual understanding of where wetlands are located in the county. Using the Flood Exposure County Snapshot, residents, businesses and the public sector immediately see that 27 percent of our residents and 11 percent of our critical infrastructure (hospitals, roads, schools and shelters) are located within a FEMA floodplain *(shown below).*





Through the Wetland Benefits Snapshot map, we can quickly display wetland areas in the county, as *shown on the picture on the right,* to educate residents and businesses about allowable development on a property. As a result, county code and zoning offices can discuss needed requirements with property owners and buyers before building can commence, such as wetlands surveys and elevation certificates. This allows residents and businesses to make educated decisions BEFORE they buy a property and allows the county to limit development in these hazardous flood prone areas.



<u>Not only is Digital Coast a valuable tool for local governments, it can also help citizens, businesses and communities save money.</u>

The value of the one-stop-shop for Digital Coast tools is immeasurable. Data collection can be very time-consuming and expensive and many local governments neither have the resources or the staff to collect it. This comprehensive data collection does not necessarily exist elsewhere.

For example, in Harrison County, we lack the ability to collect elevation data. Instead, we rely heavily on Digital Coast data. This allows us to predict areas that may be inundated by flash flood and storm surges.

If we tried to collect the data ourselves, it would easily cost our Harrison County tax-payers tens of thousands, if not hundreds of thousands of dollars. This would quickly drain available county resources for other vital emergency management programs.

Additionally, Digital Coast offers free online and classroom trainings to educate practitioners and the public about tools and strategies to address risk. These offerings include a wide range of courses, such as ways to use green infrastructure for coastal risk, building risk communications skills, how to plan and facilitate collaborative meetings and how to utilize Digital Coast tools to amend land use codes for natural infrastructure.

Training such as these are not only valuable for my county, but many communities across the U.S., especially those who have limited staff and resources to attend these classes. Moreover, the no-cost trainings increase awareness of risk, mitigation challenges and bring together diverse communities, disciplines of jurisdiction, federal, state and local agencies and organizations together. This results in a more collaborative effort.

Finally, Digital Coast allows for better analysis of risk, which can lead to decreased flood insurance costs. Under the Federal Emergency Management Agency's (FEMA) National Flood Insurance Program (NFIP), which provides federally-backed insurance for residents and businesses in flood zones, participating counties must adopt and enforce sound floodplain management practices to reduce future flood damage.

By using Digital Coast, my county can undertake targeted pre-disaster mitigation investments to reduce the risk of flooding events. For example, we use Digital Coast C-CAP land cover and wetlands data to add additional layers to our GIS maps which allows us to better analyze vulnerable areas. As a result, the county has increased the community's FEMA's Community Rating System (CRS) score, which has decreased risk and lowered NFIP premium insurance rates by twenty percent for our residents in special flood hazard zones.

NOAA's Digital Coast program can be strengthened if we work together.

There is no doubt that the NOAA Digital Coast Initiative has changed lives. Through the data, tools and trainings, counties and other local governments are taking proactive steps to protect their communities from future risks.

But, we need Congress's help to ensure that the program remains in place and continues to grow. NOAA's Digital Coast gives counties and other stakeholders necessary resources that they would not be able to collect easily elsewhere. However, the program faces constant risk of disbandment unless Congress acts.

We are encouraged by the *"Digital Coast Act"* (S. 110/H.R. 4062) introduced in both the House Senate. We thank the sponsors for your support and championing these bills.

We are especially encouraged by the Senate's decision to pass S. 110 by unanimous consent last year and support your continued efforts to swiftly enact legislation to codify NOAA's Digital Coast program into law. This will ensure that communities like mine are protected and supported for years to come.

We thank you again for your efforts and we look forward to working with Congress, NOAA and the Digital Coast Partnership to move and strengthen the program in the years ahead.

In conclusion

Chairman Sullivan and Ranking Member Baldwin, the bottom line is that Digital Coast gives communities the data and tools they need to better protect their residents, while providing a cost-effective service for federal, state and local governments and their citizens. Through Digital Coast we can not only protect and transform communities, but we can also lay the groundwork for a new and better future. Digital Coast is an extraordinary partnership that works.

Thank you again for the opportunity to testify today on behalf of America's 3,069 counties. I would welcome the opportunity to work more closely with you to strengthen and improve our coastal planning efforts. I would be happy to address any questions.

Attachments:

- Ocean Jobs County Snapshot: Harrison County, Mississippi
- Flood Exposure Snapshot: Harrison County, Mississippi
- Wetlands Benefits Snapshot: Harrison County, Mississippi

COASTAL COUNTY SNAPSHOTS
coast.noaa.gov/snapshots/

Ocean Jobs Snapshot

Harrison County, Mississippi

Ocean Jobs = A Healthy Economy

In 2013, ocean-related businesses provided 13.3% of the total jobs in Harrison County. This represents a 56% increase in ocean jobs since 2005. Nationwide, ocean jobs represent double the number of jobs supported by agriculture.

Harrison County ocean jobs account for

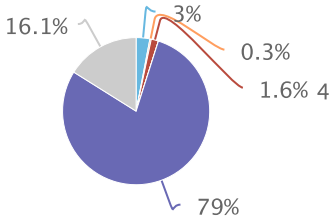
11,034	$243m	$453m
employees	in wages	in goods & services

in 2013

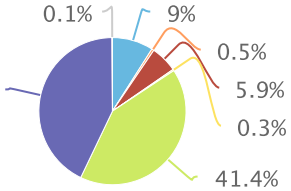
Ocean Jobs by Sector

Comparing Harrison County's ocean sectors to the state and nation shows how local concerns may or may not coincide with state and national priorities.

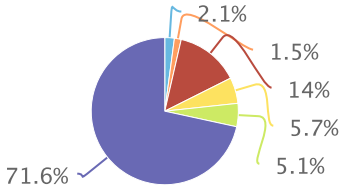
Harrison County



Mississippi



Nation



Harrison County Percentages

- Tourism and Recreation (79.0%)
- Living Resources (3.0%)
- Marine Transportation (1.6%)
- Suppressed (16.1%)
- Ship and Boat Building (NA)
- Offshore Mineral Extraction (NA)
- Marine Construction (0.3%)

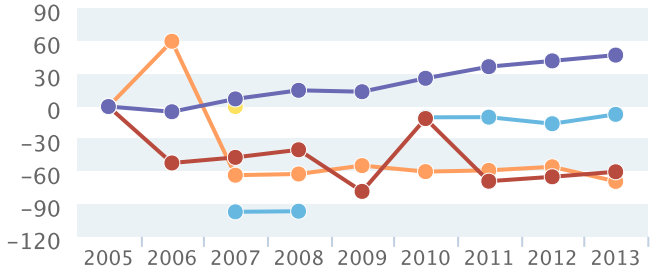
Job Trends

When making coastal management decisions, it is important to understand how the six sectors have changed over time.

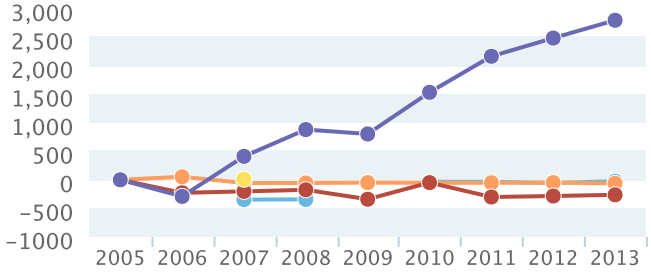
Harrison County Percent Changes

- Tourism and Recreation (47.2%)
- Marine Transportation (-60.2%)
- Ship and Boat Building (NA)
- Marine Construction (-68.9%)
- Living Resources (-7.3%)
- Suppressed (16.1%)
- Offshore Mineral Extraction (NA)

Percent Change in Jobs



Number of Jobs Gained or Lost



County and National Wages

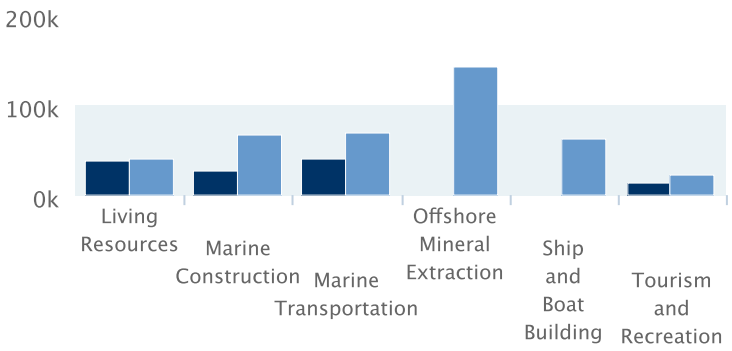
Higher local wages can be attractive to employees but a deterrent to new or expanding businesses. Managers should consider cost of living rates when making this comparison.

Impact of Part-time Workers

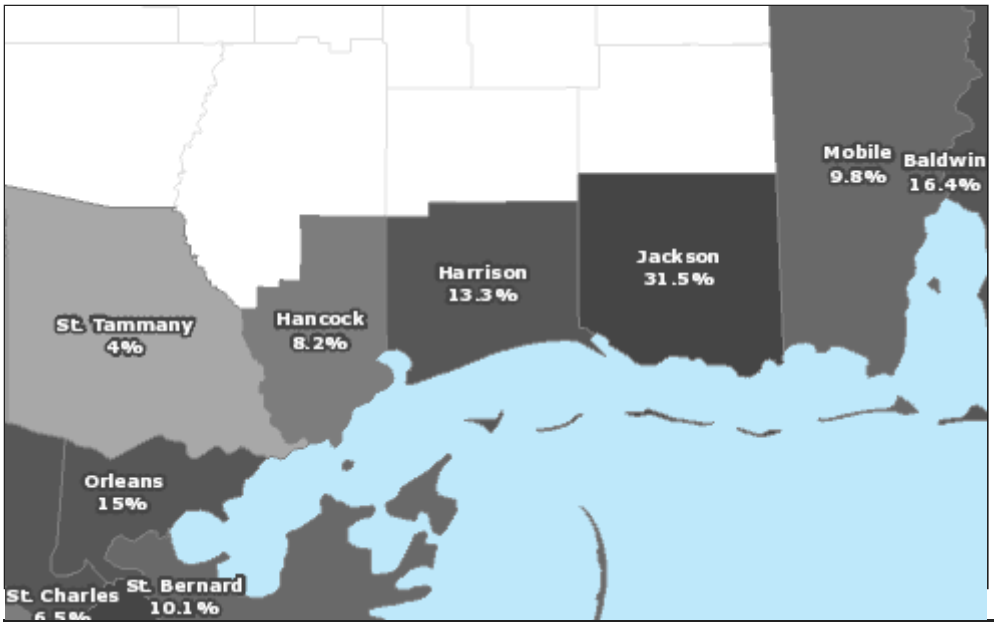
Average tourism wages can be smaller due to the high percentage of part-time workers, but total tourism wages are often among the highest because of the large number of people employed.

County National

Average Wage Per Employee (2013)



Understanding Neighbors Makes a Region Stronger



Knowing how neighboring communities depend on ocean resources can be important when it comes to developing regional governance policies that benefit all. See the Coastal County Snapshots for nearby counties to better understand regional similarities and differences.

Ocean Jobs as % of Total Jobs (2013)

- < 1%
- 1-3%
- 3-5%
- 5-8%
- 8-12%
- 12-16%
- 16-20%
- > 20%

Digging Deeper

This snapshot provides a good starting point, but there are aspects of the economy that are not captured in this analysis. Information to help fill these gaps is listed below.

Frequently Asked Questions (https://coast.noaa.gov/snapshots/faq/ocean-jobs.pdf)

Key Economic Sectors

Economic statistics that focus on employment, like those used in this snapshot, miss the contributions of the self-employed. However, the self-employed are an important part of some sectors, like commercial fishing. NOAA compiles a wide range of data on commercial fishing (http://www.st.nmfs.noaa.gov/commercial-fisheries/index) that more fully illustrates this sector's economic importance.

Values Outside the Market

Because many of the natural features that make the coast attractive can be enjoyed at no cost, their value is not evident in the "market" data (jobs, wages, etc.). However, independent studies have estimated these "nonmarket" values (aesthetics, health, safety, etc.).

- National Ocean Economics Program (http://www.oceaneconomics.org/nonmarket/)

Combining Data to Make Decisions

Combining information on market and nonmarket values to inform coastal management can be complicated. Below are a few resources that will assist in this task.

- General overview in laymen's terms (http://www.ecosystemvaluation.org)
- Developing and using information on nonmarket values (http://nepis.epa.gov/Adobe/PDF/P100ERJY.pdf)
- Assessing tradeoffs (https://coast.noaa.gov/digitalcoast/tools/invest.html)

Additional Coastal Economic Resources

- NOAA Fisheries Social Indicators (http://www.st.nmfs.noaa.gov/humandimensions/social-indicators/index)
- Marine Ecosystem Services Partnership (http://www.marineecosystemservices.org/)
- Introduction to Economics for Coastal Managers (https://coast.noaa.gov/digitalcoast/training/economics.html)

Data Source for This Snapshot

Economics: National Ocean Watch (ENOW) (https://coast.noaa.gov/dataregistry/search/collection/info/enow). This data set provides ocean- and Great Lakes-related establishments, employment, and wages computed using the Bureau of Labor Statistics' Quarterly Census of Employment and Wages, and gross domestic product (GDP) data derived from state GDP statistics from the Bureau of Economic Analysis.

COASTAL COUNTY SNAPSHOTS
coast.noaa.gov/snapshots/

Flood Exposure Snapshot

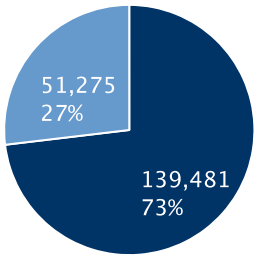
Harrison County, Mississippi

People + Floodplains = Not Good
High-Risk Populations + Floodplains = Even Worse

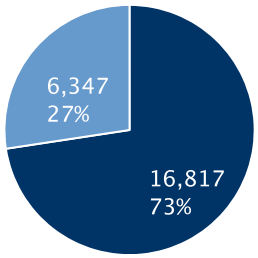
The more homes and people located in a floodplain, the greater the potential for harm from flooding. Impacts are likely to be even greater when additional risk factors (age, income, capabilities) are involved, since people at greatest flood risk may have difficulty evacuating or taking action to reduce potential damage.

Based on 2009-2013 American Community Survey 5-year Summary File data.

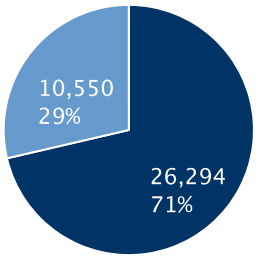
Population
Total: 190,756



Population over 65
Total: 23,164



Population in Poverty
Total: 36,844



Inside FEMA Floodplain Outside FEMA Floodplain

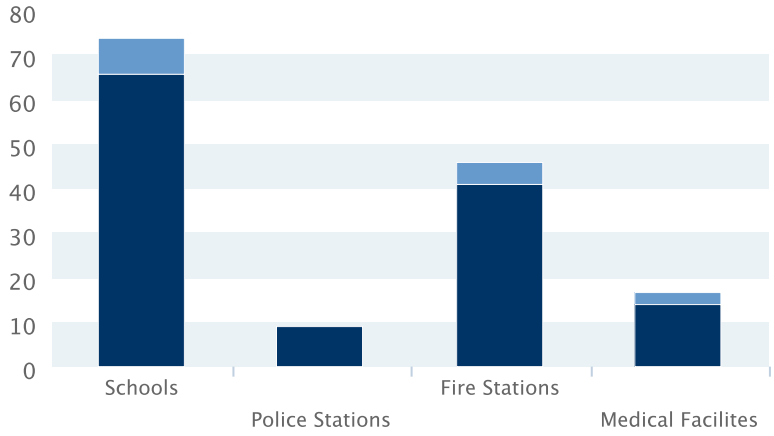
Community Infrastructure + Floodplains = Bad News

11% of critical facilities in Harrison County, Mississippi, are within the floodplain.

Hospitals. Roads. Schools. Shelters. These facilities play a central role in disaster response and recovery. Understanding which facilities are exposed, and the degree of that exposure, can help reduce or eliminate service interruptions and costly redevelopment. Incorporating this information into development planning helps communities get back on their feet faster.

Based on USGS Structures Database.

Critical Facilities in FEMA Floodplain



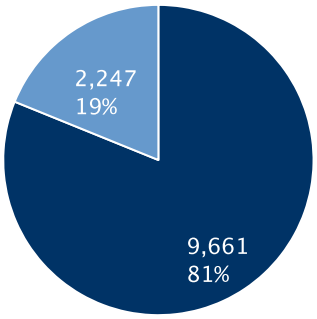
Inside FEMA Floodplain Outside FEMA Floodplain

Increasing Development in Floodplains = More People in Harm's Way
Loss of Natural Buffers = Less Protection

A county with more natural areas (wetlands, forests, etc.) and less development within floodplains typically has lower exposure to flooding. A county that monitors land cover changes within the floodplain will detect important trends that indicate whether flood exposure is increasing or decreasing. Armed with this information, local leaders can take steps to improve their safety and resilience.

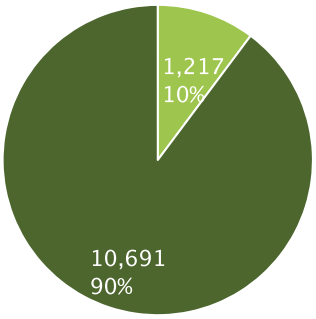
Based on NOAA Land Cover Data.

Amount of Land Converted to Development 1996-2010 (acres)
Total: 11,908



Inside FEMA Floodplain
Outside FEMA Floodplain

Type of Land Converted to Development 1996-2010 (acres)
Total: 11,908



Agricultural Areas
Natural Areas

Harrison County Floodplain

Outside FEMA Floodplain
Inside FEMA Floodplain
Water

Note: This map may not represent the county's entire floodplain.

Next Steps

Through adaptation planning, all communities can be better prepared to face coastal hazards. While each community is different, there are some basic steps that all communities can follow to become more resilient.

1. **Know your risks** – If your county has a hazard mitigation plan, get a copy of it from your county emergency management office or the Federal Emergency Management Agency (FEMA) (https://www.fema.gov/hazard-mitigation-plan-status). Having county information about potential hazards, vulnerabilities, and priority hazard mitigation projects is important. Use the Coastal Flood Exposure Mapper (//coast.noaa.gov/digitalcoast/tools/flood-exposure.html) to create maps showing exposure to coastal flood hazards in your community. The Using Flood Exposure Maps (//coast.noaa.gov/digitalcoast/training/flood-exposure.html) webinar can help you get started.
2. **Develop a team** – To see the issues and opportunities from as many perspectives as possible, engaging a diverse group of stakeholders is always a good idea. The County Snapshots (//coast.noaa.gov/snapshots) are used to help people visualize the issues.
3. **Know what resources are available** – Federal and state agencies have funds available for risk reduction activities. See the funding opportunities listed below to learn more. There are also data and tools available to help people visualize the issues and solutions. For information on creating inundation maps for your community, visit the Visualization section of the Coastal Inundation Toolkit (//coast.noaa.gov/applyit/inundation/visualize.html).
   Funding Sources
   - **FEMA** (https://www.fema.gov/hazard-mitigation-grant-program)
   - **NOAA Coastal Management Program** (//coast.noaa.gov/funding/)
4. **Discover what others are doing** – See how other communities are addressing these issues. Visit the discover section of the Coastal Inundation Toolkit (//coast.noaa.gov/applyit/inundation/discover.html). You may also contribute a story about your community efforts.

Additional information and resources can be found within the Digital Coast's Coastal Inundation Toolkit (//coast.noaa.gov/applyit/inundation/understand.html).

Frequently Asked Questions (//coast.noaa.gov/snapshots/faq/flood-exposure.pdf)

Data Sources for This Snapshot

- **Flood Zones** (http://msc.fema.gov/portal) – Based on FEMA 1% annual chance flood zones
- **Critical Facilities** (http://nationalmap.gov/structures.html) – USGS Structures Database
- **Demographic Data** (//coast.noaa.gov/digitalcoast/data/acs) – NOAA
- **Land Cover Data** (//coast.noaa.gov/dataregistry/search/collection/info/ccapregional) – NOAA

COASTAL COUNTY SNAPSHOTS
coast.noaa.gov/snapshots/

Wetland Benefits Snapshot

Harrison County, Mississippi

Protecting Wetlands = Coastal Communities That Are Safer, Cleaner, and More Economically Productive

Healthy wetlands provide more than just a pretty view. Wetlands are a pivotal part of the natural system, supplying tremendous benefits for coastal communities. Even small acreages can provide some level of benefit. The location, health, and size of individual wetlands also play a role. This snapshot demonstrates three key benefits of wetlands in Harrison County.

Based on 2010 NOAA land cover.

31%

116,068 acres
of Harrison County's land area is wetland.

More Economically Productive: Wetlands Support Fishing Economies

Coastal wetlands provide habitat for many aquatic species that contribute to local food supplies and fishing-related industries.

In addition to providing a base for commercial fishing jobs and revenue, wetlands also support recreational and charter fishing. These economic benefits extend beyond county boundaries.

Based on 2013 ENOW and 2013 ENOW for Self-Employed Workers.

Commercial Fishing	County	State
Jobs	700	3,611
Output from businesses	$35.9 million	$398.6 million
Revenue from self-employed	$32.2 million	$60.2 million

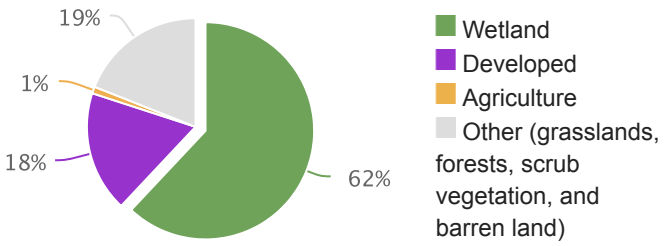
Safer: Wetlands Reduce Flood Impacts

20% (73,841 acres) of Harrison County's land area is in the floodplain.

Wetlands located in coastal and riverine floodplains can protect people and their property, community infrastructure, and agricultural investments from floods. Wetlands act as natural sponges, holding floodwaters and lowering flood heights.

Based on Best available as of 2015 FEMA Flood Zones (100-year); 2010 NOAA land cover.

Harrison County's Floodplain



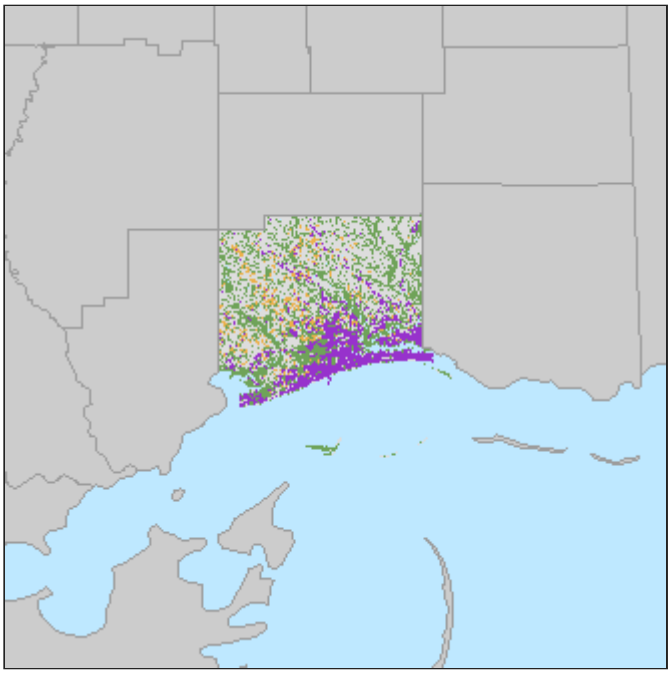
Cleaner: Wetlands Improve Water Quality

Runoff associated with concrete, asphalt, rooftops, and other impervious surfaces is a leading cause of water pollution.

Wetlands near developed and agricultural areas trap pollutants and excess nutrients in surface runoff, keeping water bodies cleaner. This natural filtering helps prevent water use restrictions, such as beach and shellfish closures, and reduces the need for costly treatment systems.

Based on 2010 NOAA land cover.

- Wetland
- Developed
- Agriculture
- Other (grasslands, forests, scrub vegetation, and barren land)



Next Steps

Understanding how wetlands benefit a coastal community can provide strong incentives for wetland protection. The following suggestions and resources provide guidance in moving forward with these efforts.

Integrate wetland protection priorities into community planning – Encouraging wetland protection and development in appropriate places makes communities more resilient. Resources are available to help communities incorporate wetland protection considerations into existing planning efforts.

- Introducing Green Infrastructure for Coastal Resilience training (https://coast.noaa.gov/digitalcoast/training/green.html)
- Coastal Flood Exposure Mapper (https://coast.noaa.gov/digitalcoast/tools/flood-exposure.html)
- Using Flood Exposure Maps webinar (https://coast.noaa.gov/digitalcoast/training/flood-exposure.html)

Prioritize wetlands for protection – Additional factors can influence wetland protection priorities. Consult local experts regarding wetland size, location, and quality; fish and wildlife considerations; regulatory requirements; and tourism, recreation, and other benefits. Resources are available to help communities with the selection and prioritization process, including

- C-CAP land cover data (https://coast.noaa.gov/dataregistry/search/collection/info/ccapregional) and online atlas (//coast.noaa.gov/digitalcoast/tools/lca.html)
- National Wetlands Inventory data (http://www.fws.gov/wetlands/)
- Habitat Priority Planner tool (https://coast.noaa.gov/digitalcoast/tools/hpp.html)
- Green Infrastructure Mapping Guide (https://coast.noaa.gov/digitalcoast/training/gi-mapping.html)

Discover additional helpful resources – More tools, data, and information, including funding sources, are highlighted on the frequently asked questions page (//coast.noaa.gov/snapshots/faq/wetland-benefits.pdf)

Data Sources for This Snapshot

- **Land Cover Data** (//coast.noaa.gov/dataregistry/search/collection/info/ccapregional) – NOAA Coastal Change Analysis Program
- **Flood Zones** (http://msc.fema.gov/portal) – Federal Emergency Management Agency 1% Annual Chance Flood Zones
- **Economics Data** (https://coast.noaa.gov/dataregistry/search/collection/info/enow) – NOAA Economics: National Ocean Watch
- **Self-Employed Workers** (https://coast.noaa.gov/dataregistry/search/collection/info/enow-nes) – NOAA Economics: National Ocean Watch for Self-Employed Workers