

## RESTORE Council Activity Description

### **General Information**

*Sponsor:*

U.S. Department of Agriculture

*Title:*

Enhancing Gulf Waters through Forested Watershed Restoration

*Project Abstract:*

The RESTORE Council has approved \$23M in Council-Selected Restoration Component funding for the Enhancing Gulf Waters through Forested Watershed Restoration program, sponsored by the U.S. Department of Agriculture. This includes planning and implementation funds as FPL Category 1. The program will support the primary RESTORE Comprehensive Plan goal to restore water quality and quantity through activities to restore private and public forests by providing technical and financial assistance to private landowners and communities in watersheds where forest resources are instrumental to the health of the Gulf of Mexico. A coordinated cross-boundary effort will be led by state forestry agencies in Alabama, Florida, and Mississippi, leveraging the funding and activities of other organizations that are well established in the RESTORE zone. Activities include social marketing techniques to effectively reach landowners, implementation of best management practices, and use of science-based decision support tools to inform forest restoration investments and quantify outcomes.

A healthy Gulf stems from healthy estuaries, healthy estuaries depend on healthy watersheds, healthy watersheds flow from healthy forests, and healthy forests require engaged landowners. Anticipated environmental benefits from this program include improvements to water quality and quantity and wildlife and threatened and endangered species habitat through professional forest management, avoided land use conversion, and increased forest cover. Program duration is 7 years.

*FPL Category:* Cat1: Planning/ Cat1: Implementation

*Activity Type:* Program

*Program:* Enhancing Gulf Waters through Forested Watershed Restoration

*Co-sponsoring Agency(ies):* N/A

*Is this a construction project?:* No

*RESTORE Act Priority Criteria:*

(I) Projects that are projected to make the greatest contribution to restoring and protecting the natural resources, ecosystems, fisheries, marine and wildlife habitats, beaches, and coastal wetlands of the Gulf Coast region, without regard to geographic location within the Gulf Coast region.

(II) Large-scale projects and programs that are projected to substantially contribute to restoring and protecting the natural resources, ecosystems, fisheries, marine and wildlife habitats, beaches, and coastal wetlands of the Gulf Coast ecosystem.

*Priority Criteria Justification:*

The Gulf Region is dominated by forest cover. In Mississippi, Alabama, and Florida alone there are more than 23 acres of forest and 66% of those forests are privately owned (Hewes et al., 2017). Decades of research (Jackson et al., 2004; Lockaby et al. 2013) show that forests provide the cleanest and most stable water supply compared to other land uses (Giri et al., 2016; Brogna et al., 2018). Lasting improvements to water quality and quantity cannot be achieved without addressing the needs of this diminishing and threatened resource. The logic model for this Program rests on the fact that a healthy Gulf stems from healthy estuaries and healthy estuaries depend on healthy watersheds. Healthy watersheds are dependent on healthy forests which are dependent on engaged landowners. Shared stewardship is the key to success. The Program uses new, proven social marketing techniques to double or triple the engagement of private landowners over traditional outreach. It expands on current techniques for providing landowners with the financial and technological resources they need to protect and better manage their forests. Modest investments now will sustain water quality and quantity benefits for decades to come. To maximize expected impacts, science-based decision support tools using the SWAT model (Arnold et al., 2012) and other data, will inform forest restoration investments and quantify long-term water quality and quantity outcomes. SWAT has been well tested in more than 250 peer reviewed publications (Gassman et al., 2007). This multi-state, landscape level program will help ensure the sustainability and health of the forested watersheds and, therefore, water quality and quantity in the Gulf. The States have agreed to a common suite of best management practices (BMPs) that are time tested, scientifically proven, and overseen by trained professional foresters. Landscape scale benefits will be achieved through standardized restoration and monitoring techniques.

*Project Duration (in years): 7*

## **Goals**

### *Primary Comprehensive Plan Goal:*

Restore Water Quality and Quantity

### *Primary Comprehensive Plan Objective:*

Restore, Improve, and Protect Water Resources

### *Secondary Comprehensive Plan Objectives:*

Restore, Enhance, and Protect Habitats

### *Secondary Comprehensive Plan Goals:*

Restore and Conserve Habitat

### *PF Restoration Technique(s):*

Protect and conserve coastal, estuarine, and riparian habitats: Habitat management and stewardship

Reduce excess nutrients and other pollutants to watersheds: Agriculture and forest management

Reduce excess nutrients and other pollutants to watersheds: Stormwater management

## **Location**

### *Location:*

Priority watersheds as designated by State agencies including but not limited to: Pascagoula River, Biloxi Bay, Bay St. Louis, and the Pearl River (MS). Mobile Bay, Escatawpa River, Lower Alabama River (AL) Ochlocknee River and Bay, Apalachicola River, Suwannee River, Perdido River and Bay, Escambia, Blackwater, Pensacola Bay

### *HUC8 Watershed(s):*

South Atlantic-Gulf Region(Choctawhatchee-Escambia) - Florida Panhandle Coastal(Perdido Bay)  
South Atlantic-Gulf Region(Choctawhatchee-Escambia) - Choctawhatchee(Upper Choctawhatchee)  
South Atlantic-Gulf Region(Choctawhatchee-Escambia) - Escambia(Upper Conecuh)  
South Atlantic-Gulf Region(Choctawhatchee-Escambia) - Escambia(Lower Conecuh)  
South Atlantic-Gulf Region(Alabama) - Alabama(Lower Alabama)  
South Atlantic-Gulf Region(Mobile-Tombigbee) - Mobile Bay-Tombigbee(Lower Tombigbee)  
South Atlantic-Gulf Region(Mobile-Tombigbee) - Mobile Bay-Tombigbee(Mobile-Tensaw)  
South Atlantic-Gulf Region(Mobile-Tombigbee) - Mobile Bay-Tombigbee(Mobile Bay)  
South Atlantic-Gulf Region(Choctawhatchee-Escambia) - Florida Panhandle Coastal(Perdido)  
South Atlantic-Gulf Region(Pascagoula) - Pascagoula(Lower Leaf)  
South Atlantic-Gulf Region(St. Johns) - St. Johns(Oklawaha)  
South Atlantic-Gulf Region(St. Johns) - St. Johns(Lower St. Johns)  
South Atlantic-Gulf Region(Suwannee) - Aucilla-Waccasassa(Waccasassa)  
South Atlantic-Gulf Region(Suwannee) - Aucilla-Waccasassa(Econfina-Steinhatchee)  
South Atlantic-Gulf Region(Suwannee) - Suwannee(Lower Suwannee)  
South Atlantic-Gulf Region(Suwannee) - Suwannee(Santa Fe)  
South Atlantic-Gulf Region(Ochlockonee) - Ochlockonee(Lower Ochlockonee)  
South Atlantic-Gulf Region(Apalachicola) - Apalachicola(Apalachicola)  
South Atlantic-Gulf Region(Apalachicola) - Apalachicola(New)  
South Atlantic-Gulf Region(Apalachicola) - Apalachicola(Apalachicola Bay)  
South Atlantic-Gulf Region(Choctawhatchee-Escambia) - Florida Panhandle Coastal(St. Andrew-St. Joseph Bays)  
South Atlantic-Gulf Region(Choctawhatchee-Escambia) - Florida Panhandle Coastal(Choctawhatchee Bay)  
South Atlantic-Gulf Region(Choctawhatchee-Escambia) - Florida Panhandle Coastal(Pensacola Bay)  
South Atlantic-Gulf Region(Apalachicola) - Apalachicola(Chipola)  
South Atlantic-Gulf Region(Choctawhatchee-Escambia) - Florida Panhandle Coastal(Yellow)  
South Atlantic-Gulf Region(Choctawhatchee-Escambia) - Florida Panhandle Coastal(Blackwater)  
South Atlantic-Gulf Region(Choctawhatchee-Escambia) - Choctawhatchee(Pea)  
South Atlantic-Gulf Region(Choctawhatchee-Escambia) - Choctawhatchee(Lower Choctawhatchee)  
South Atlantic-Gulf Region(Choctawhatchee-Escambia) - Escambia(Escambia)  
South Atlantic-Gulf Region(Suwannee) - Aucilla-Waccasassa(Aucilla)  
South Atlantic-Gulf Region(Ochlockonee) - Ochlockonee(Apalachee Bay-St. Marks)  
Lower Mississippi Region(Lower Mississippi) - Lake Pontchartrain(Eastern Louisiana Coastal)  
South Atlantic-Gulf Region(Pearl) - Pearl(Bogue Chitto)  
South Atlantic-Gulf Region(Pascagoula) - Pascagoula(Upper Leaf)  
South Atlantic-Gulf Region(Pascagoula) - Pascagoula(Pascagoula)

South Atlantic-Gulf Region(Pascagoula) - Pascagoula(Black)  
South Atlantic-Gulf Region(Pearl) - Pearl(Middle Pearl-Silver)  
South Atlantic-Gulf Region(Pascagoula) - Pascagoula(Lower Chickasawhay)  
South Atlantic-Gulf Region(Pascagoula) - Pascagoula(Escatawpa)  
South Atlantic-Gulf Region(Pascagoula) - Pascagoula(Mississippi Coastal)  
South Atlantic-Gulf Region(Pearl) - Pearl(Lower Pearl)

*State(s):*

Alabama  
Mississippi  
Florida

*County/Parish(es):*

AL - Baldwin  
AL - Clarke  
AL - Conecuh  
AL - Covington  
AL - Dale  
AL - Escambia  
AL - Henry  
AL - Houston  
AL - Mobile  
AL - Monroe  
AL - Washington  
AL - Coffee  
FL - Escambia  
AL - Geneva  
FL - Calhoun  
FL - Clay  
FL - Columbia  
FL - Dixie  
FL - Franklin  
FL - Gadsden  
FL - Gilchrist  
FL - Putnam  
FL - Suwannee  
FL - Taylor  
FL - Union  
FL - Wakulla  
FL - Alachua  
FL - Baker  
FL - Bay  
FL - Bradford  
FL - Gulf  
FL - Hamilton  
FL - Santa Rosa  
FL - Walton  
FL - Washington  
FL - Holmes

FL - Jackson  
FL - Lafayette  
FL - Leon  
FL - Levy  
FL - Liberty  
FL - Madison  
FL - Okaloosa  
MS - Hancock  
MS - Harrison  
MS - Forrest  
MS - George  
MS - Greene  
MS - Jackson  
MS - Lamar  
MS - Marion  
MS - Pearl River  
MS - Perry  
MS - Stone  
MS - Walthall

*Congressional District(s):*

FL - 3  
AL - 2  
MS - 3  
AL - 1  
FL - 5  
MS - 4  
FL - 1  
FL - 2  
AL - 7

## **Narratives**

### *Introduction and Overview:*

The Gulf Region is dominated by forest cover. In Mississippi, Alabama, and Florida alone there are more than 23 million acres of forest and 66% of those forests are privately owned (Hewes et al., 2017). Decades of research (Jackson et al., 2004; Lockaby et al. 2013) show that forests provide the cleanest and most stable water supply compared to other land uses (Giri et al., 2016; Brogna et al., 2018). The Gulf of Mexico's forests, when healthy, reduce sediment and nutrient runoff, regulate surface water flows, and improve groundwater recharge relative to other land uses (Sun et al., 2004; Lockaby et al. 2013). They offer recreational opportunities, wildlife habitat, improved air quality, support for the region's economy, and are an integral part of the carbon cycle. Protecting forests at risk of conversion to more intensive uses (Klepzig et al., 2014), restoring native species (Brantley et al., 2018), controlling invasive species, managing for resilience against catastrophic loss (e.g., wildfire, hurricane, drought, pests, etc.), and restoring forested wetlands, floodplains and riparian areas are vital to the health of the Gulf (Vose et al., 2011).

This large-scale Program will substantially enhance and maintain water quality and quantity by managing and restoring forested ecosystems in a three-State region, at a total cost of \$23 million. The logic model for this Program rests on the fact that a healthy Gulf stems from healthy estuaries, healthy estuaries depend on healthy watersheds, healthy watersheds flow from healthy forests, and healthy forests require active landowners and managers. Investing in the region's forests, at a landscape scale, will advance the RESTORE Council's Goal 2: Restore Water Quality and Quantity; and Objective 2: Restore, Improve and Protect Water Resources. However, benefits will accrue in all goals, especially habitat.

The stressors addressed by this Program include water quality and quantity issues related to the conversion of the Gulf Region's forests to agricultural and urban land uses and the need for more active forest management. Indeed, among the major challenges in the 21st century will be to manage forests and water resources under development pressures and other environmental factors (NRC, 2008; Vose et al., 2011; Sun et al., 2016; Vose et al., 2016; Vose et al., 2019). Providing landowners with financial and technical assistance helps them effectively and efficiently manage their forest resource, making it less attractive to sell or convert the land to other uses. They have more options and those options help avoid conversion by making ownership more economically and environmentally sustainable.

Changes to more intensive land use increase point and non-point pollution, reduce aquifer recharge, accelerate stormwater release, and increase the amount of runoff. In addition, forest fragmentation negatively impacts wildlife habitat, limits forest management options, and reduces economic viability of forest ownership and reduces community resilience. For example, smaller forested tracts can be impractical and costly to apply prescribed fire solutions while few if any loggers find it profitable to harvest small and/or disconnected parcels. The reduced economic activity leads to instability of forest-dependent communities, leading to mill closings and loss of jobs.

Over a 7-year timeline, the Program will emphasize managing and restoring forests, including urban forests, in priority watersheds in Alabama, Florida and Mississippi where the need is great, and partners stand ready to assist and leverage investments. Priority will be driven by state-level plans, strategies, and assessments such as each State's Forest Action Plan and Wildlife Action Plan. It is a scalable, science-based approach implemented on public and private lands. It involves planning, coordination, and implementation activities, including:

- Coordinated landscape-scale delivery led by State Forestry Agencies.
- Focused recruitment of forest landowners in targeted watersheds.

- Verification, maintenance, and expansion of ongoing landowner activity by helping family forest landowners through American Tree Farm System, Forest Stewardship, Treasure Forest, etc., and community forests through Tree City USA.
- Science-based decision support from the USDA Forest Service Southern Research Station using the Soil and Water Assessment Tool (SWAT) model and other tools to inform priorities, assess and monitor project impacts, and inform adaptive-management decisions.
- Potentially using a portion of funding for an open and competitive RFP to attract more partners and leverage; extending the reach of these efforts and cultivating more innovation.
- Alignment with federal, state, and non-federal programs as a program multiplier to conduct similar work upstream of the RESTORE coastal area.
- Use of USDA practices and standards to ensure compliance with environmental and cultural resource requirements.

These activities are designed to address the identified stressors and result in improved water quality and quantity, avoided land conversion and increased forest cover, increased use of forest BMPs, improved landowner understanding of the connection between good forest management and the restoration of the Gulf, improved wildlife habitat, and added community resilience.

The Program advances the Council's commitment to leveraging resources and partnerships by building on the relationships, skills, capacities, programs, and authorities of multiple partners across the region. It involves the collaborative efforts of three State Forestry Agencies and their State Forestry Associations; USDA's Natural Resources Conservation Service and Forest Service; the American Forest Foundation, the National Fish and Wildlife Foundation, the U.S. Endowment for Forestry and Communities, and The Nature Conservancy. It leverages the funding and activities of these organizations that operate in the RESTORE Council zone and multiplies the impact of forest restoration. It is designed to accommodate financial leverage through emerging carbon programs and biodiversity efforts.

The Council's commitment to increase public engagement, inclusion, and transparency will be advanced through direct contact with private forest landowners and communities. The Program will heighten awareness of the inter-connectedness that forest-resource decisions have on the Gulf of Mexico. Enhanced technical assistance, outreach, and education will build on existing techniques and incorporate newer proven social and electronic marketing techniques. Further connecting this audience to the health of the Gulf will attract new stakeholders committed to the sustainability and resilience of forested watersheds and, therefore, lasting improvements to the water quality and quantity, wildlife habitat, community resilience, and economy of the Gulf Region.

The Council's commitment to science-based decision making will be advanced through the application of the state-of-the-art Soil and Water Assessment Tool (SWAT, Arnold et al., 2012) and other related data. SWAT has been well tested in more than 250 peer reviewed publications (Gassman et al., 2007) and has been included in the USEPA Better Assessment Science Integrating Point and Nonpoint Sources (BASINS) modeling framework for Clean Water Act Total Maximum Daily Load (TMDL) program development (DiLuzio et al., 2007). It is a daily timestep hydrologic and water quality model that can assist land managers in making informed decisions regarding the potential benefit of both the type and location of watershed restoration activities on hydrology and water quality. The Forest Service Southern Research Station will use SWAT to provide a framework for evaluating the potential water resource benefits of restoration activities such as reforestation, increased riparian buffer widths, species conversions, etc., for priority watersheds and will ensure that this work is subject to evaluation in peer-reviewed scientific journals. The SWAT model will be used to monitor impacts and inform adaptive management.



The Council's commitment to deliver results and measure impacts will be achieved through standardized restoration and monitoring techniques. The States have agreed to a recognized suite of best management practices (BMPs) that are time tested, scientifically proven, and overseen by trained professional foresters. Technical and financial assistance to landowners and communities will be used to encourage and incentivize such BMPs as timber stand improvement, mechanical or chemical underbrush treatment, prescribed burning, treatment of invasive exotic plants, native understory establishment, environmentally-sensitive harvests in stream management zones, and other well-established restoration practices. Forest treatments will follow NRCS practice standards to ensure technical adequacy and compliance with environmental and cultural resource requirements. In addition, a standard set of metrics will be used to measure and report progress.

Generally, there are limited risks and uncertainties associated with this Program. However, amongst them are private landowner willingness to participate which can cause delays and require strategic adjustments; catastrophic events (e.g., hurricanes, wildfires) can alter the landscape and impact expected outcomes or staff availability; and weather extremes (e.g., droughts, excessive rain) can delay implementation.

All of the work in this Program will be limited to priority watersheds or the segments of watersheds that are within the geographic area of the RESTORE Council Planning Framework (see Program Map for more details). The Program is consistent with the Framework's restoration approaches and techniques.

#### *Methods:*

The Program will use an all-lands (private and public) strategy to address the stressors in the Gulf to make significant and lasting contributions to the goals and objectives of RESTORE Council's Comprehensive Plan. While the Program will engage public lands in forest restoration opportunities and communities around green infrastructure options, the focus will be on private landowners who are critical to the overall success of the restoration effort. The level and extent of targeting will be part of the adaptive management process. Below are the method and activities that will be used to restore the health of the working forests of the Gulf and help assure their contribution to the restoration of the Gulf of Mexico.

#### Private Forest Restoration:

A proven combination of technical and financial assistance will be the principle method for encouraging private landowners and communities to restore and manage their forests. This approach centers on providing the knowledge, tools, services, and incentives necessary to restore and maintain forests. Cost effectiveness is achieved through 1) a landowner's interest in achieving the best result at the least cost, and 2) a field forester's professional opinion as to what would be most effective treatment. This design has been a cornerstone of successful programs for decades (e.g., the NRCS's Environmental Quality Incentives Program, Forest Service's State and Private Forestry Program, the American Tree Farm System, and State-funded forestry programs) and will complement ongoing efforts.

Dedicated RESTORE funds will allow State Forestry agencies and aligned partners to increase the availability of professional services and incentives directed toward improving forest health in important coastal watersheds; enhancing water quality and quantity of the Gulf of Mexico.

Activities include:

A. Providing assistance to private landowners that promotes sustainable healthy working forests and protects water quality and quantity. Such as:

- providing professional management recommendations that build toward the common goal of sustainable working forests and improved water quality/quantity
- providing cost-share incentives to help cover the cost of essential BMPs (e.g., forest establishment, timber stand improvements, fire breaks, controlling nonnative invasive species, prescribed burning, and native understory establishment)
- identifying nonnative invasive species and provide control alternatives
- identifying critical habitats (e.g., gopher tortoise, red cockaded woodpecker, and USFWS strategic habitat units for aquatics)
- identifying potentially sensitive cultural resources
- drafting forest management plans that inventory forest resources, pinpoint restoration and management challenges, provide alternative solutions, and identify the BMPs that will achieve the goals and objectives of both the landowner and RESTORE Council's Comprehensive Plan.
- assisting landowners in achieving forest certification in Nationally recognized programs such as the American Tree Farm System (AFTS)
- monitoring active forest management sites for adherence with State BMPs for forestry, wildlife habitat, and water quality/quantity

B. Outreach and education tools, events, and systems, such as:

- recruiting landowners with assistance from traditional partners like State and County Forestry Associations, holding informational meetings and field days, deploying proven technology tools and public relations efforts
- using volunteers or call agents to screen responding landowners and connect them to the right resource
- providing agency access and information to landowners
- providing landowner education relating to forest stewardship and BMPs
- training loggers in the use of water quality BMPs for forestry during silvicultural operations
- encouraging landowners to utilize professional forestry assistance in managing their forests
- introducing landowners to forest product companies that may be interested in buying the wood produced in active management or in helping with tree planting and further leverage RESTORE investments
- making available carbon and wildlife markets to help finance landowner activities and further leverage RESTORE investments
- tracking landowner efforts through a Customer Relationship Management (CRM) system
- connecting the health of working forests to the water quality and quantity of the Gulf

Community Forest Restoration:

Healthy community forests and green infrastructure filter stormwater and regulate runoff (Kuehler et al., 2018). They do so while providing a host of social, aesthetic, climate, ecological and economic benefits (Tyrväinen et al. 2005). Activities to engage communities include:

- educate municipal leaders on the benefits of trees to the city landscape and their important ecological role as green infrastructure, especially in relation to reducing stormwater peak flows and flooding in coastal cities, resulting in cleaner water. (Inkilainen, et al. 2013)
- assist municipalities with public tree management plans and full participation in recognition programs, such as Arbor Day Foundation's Tree City USA, which promote community forest management planning; leading to improved water quality and quantity and sustained community forestry programs. (Berland, A., and Hopton, M.E. 2014)

- encourage citizens through educational events and publications to participate in Wildland Urban Interface (WUI) programs, minimizing the risk of wildfire and the concomitant erosion and watershed pollutants where forest lands are converted to urban uses.

**Public Forest Restoration:**

A forested watershed program that approaches the work at a landscape scale must consider restoration of public land in the Gulf Region to achieve multiple RESTORE Council goals and objectives. Restoration of public forests such as those that are managed by State Forest Agencies (e.g., State Forests and Section 16 school trust forests), will focus on treatments that offer long-term improvements to water quality and quantity, and wildlife habitat. Activities include:

- Documenting resource conditions and priority resource needs within the targeted forests,
- Determining which BMPs will contribute to the long-term water quality and quantity of the Gulf,
- Implementing treatments such as prescribed fire, control and eradication of exotic and invasive species, forest establishment, and timber stand improvement, and
- Where possible, highlighting activities, where forests are accessible and visible by the public, with on-site displays that educate visitors and connect restoration activities with the Gulf of Mexico.

**Decision Factors for Project Selection:**

- Contribution to the RESTORE Council’s Comprehensive Plan and Planning Framework
- Consistency with the goals and objectives of the State’s Forest Action, State and local watershed management plans, State Wildlife Action Plans, and other plans as appropriate.
- Geography – sites located within the designated priority watersheds
- Technical and financial assistance will be provided to landowners and communities, factoring in readiness and anticipated outcomes.
- Applications for financial assistance will be ranked using criteria that aligns with the Council’s Planning Framework, such as:
  - Proximity to a stream, lake, or wetland
  - Connectivity to protected land
  - Impacts to water quality
  - Impacts to water quantity
  - Wildlife habitat variables
- SWAT modeling, landowner participation, progress toward achieving targets, on-the-ground feedback from landowners and private-sector forestry professionals; and other variables will be used to determine how more focused targeting would be beneficial and how such targeting could be most effectively achieved.

Complementary to the work of State Forestry agencies, a National Fish and Wildlife Foundation Led Competitive Grant Fund is envisioned that:

- Offers an additional path for attracting partners and investors, including conservation organizations, universities, local governments and others beyond the core partners whose expertise and resources are needed to expand the impact.
- Creates leverage beyond that which is currently identified
- Increases potential for innovative solutions
- Multiplies positive outcomes of forest restoration for the Gulf Region

***Environmental Benefits:***

The Program will directly impact approximately 15,000 acres of forested acres that are vital to the health of the Gulf Region. The work will increase landowner understanding of the benefits of forest

management and its importance to Gulf waters. In addition, it will improve forest health and productivity, strengthen the viability of forest-dependent community resilience, and hence, the likelihood of keeping forested lands on the landscape. Quantifiable environmental benefits include increases in forest cover, forest management, and wildlife habitat; improvements in the magnitude and distribution of stream flows; and reductions in the nutrients and sediment that are degrading water quality in the Gulf Region. (Note, planting of invasive species is prohibited by policy in each state.)

Decades of research (Jackson et al., 2004; Lockaby et al. 2013) show that forests provide the cleanest and most stable water supply compared to other land uses (Nagy et al., 2011; Figuepron, 2013; Giri et al., 2016; Brogna et al., 2018). For example, in a study of 37 mixed-use watersheds across the United States, Warziniak et al. (2017) found that increasing forest cover in a watershed by 1% reduces turbidity by 3% while increasing development by 1% increases turbidity by 3%. In addition to water quantity and quality benefits, forest lands in the region provide wildlife habitat and contribute to local economies.

While the potential of forest restoration to reduce water yield may have some impact on human water supply, there are benefits to forest restoration-driven changes to the water cycle, including regulation of high flows and reduced freshwater pulses that negatively affect estuary oyster populations (Parker et al., 2013) that far outweigh the risks, especially in high rainfall areas such as the southern US. In addition, baseflows are much more stable from forests, meaning that while overall annual flow may be lower in forests, forested watersheds are more likely to provide continuous streamflow even during low precipitation years (Vose et al. 2016).

Furthermore, while flows from highly urbanized and agricultural watersheds may be higher in some cases, drinking water facilities (and reservoirs that support them) may have a limited capacity to utilize the extra flow (Gorelick et al. 2020). In addition to examining potential responses in water quality, the spatially explicit SWAT modeling approach will enable us to evaluate the potential change in water yield and streamflow regime in light of multiple watershed characteristics and restoration techniques applied as part of the decision support system.

In the priority watershed restoration areas of the three States, there are 12.2 million acres of forest land (73% of the restoration areas), and 72% of these forested lands are privately owned (Hewes, et al., 2017). Private landowners are increasingly bearing the financial burden for the critical ecosystem services that their forests provide, and thus these forested lands are at risk of conversion to other land uses. Indeed, projections suggest that developed land use in the southern Gulf Region could increase by 2.8 million acres (+166%) by 2060, resulting in a loss of forest land of 2.2 million acres (-10.2%) over the region and more than 25% in some coastal counties (Wear and Greis, 2013).

#### *Metrics:*

Metric Title: COI003: Outreach/ Education/ Technical Assistance - # people enrolled - BMPs

Target: 500

Narrative: Landowner participation is a derivative of the estimated total acres treated and the average size (30 acres) of a family forest in the South. (For 5-year Program. Calc: 20,000 acres divided by 30ac average size of family forest in the South.) Combined prior experience with private landowner programs across the partnering agencies and organizations has proven landowner interest in assistance programs, particularly cost-shares, remains high. For example, yearly applications from landowners for a NFWF-funded and state-administered cost-share to re-establish and restore longleaf pine forests in northern Florida consistently outpace available

funding by 50-80%. This metric aligns with Goals 1: Restore and Conserve Habitat and 2: Restoring Water Quality Quantity of the Comprehensive Plan, and Objective 6: Promote Natural Resource Stewardship and Environmental Education. The number of landowners who enroll in BMP programs will add important information and compliment the acreage numbers collected in metric HM006. It will provide a measure of the individuals reached and engaged in the restoration of the Gulf. Data will be continuously collected. Results will be reported annually.

Metric Title: HM004: Sediment reduction - Lbs. sediment avoided or removed

Target: 2,000

Narrative: Calc: up to 90 lb/yr of sediment per acre of land reforested or kept in forest land use with 20% of the total 20,000 restored acres accrued each year over 5 years. The 90.0 lb/ac/yr loading estimate was calculated as the difference in loading between forest and agricultural land uses in the restoration areas, based on the US Geological Survey Spatially Referenced Regression On Watershed attributes estimated 2012 total suspended sediment load delivered from catchments (~600 acres) in the priority watersheds to their respective stream not accounting for in-stream losses (Roland and Hoos, 2019). This metric aligns with Goal 2 of the Comprehensive Plan: Restore Water Quality and Quantity, Objective 2: Restore, Improve, and Protect Water Resources. Benefits to water quality will be quantified using a combination of modeling and analysis of monitoring data collected by State and federal agencies to quantify the effects of key management actions on sediment loading (e.g., reforestation, riparian buffer establishment, etc.). In addition, sediment loading avoided by keeping forest land forested will be projected by comparing modeled sediment loading from restoration areas under forest land use to that of alternative land uses (e.g., agriculture or urban). The outcomes will be a reduction in sediment loading and an improved quantification of forest management benefits to Gulf water quality now and in the future.

Metric Title: HR004: Habitat restoration - Acres restored

Target: 7,500

Narrative: Based on a \$1,300 per acre estimated cost of restoration when applying a suite of forest treatments that are typical for the region (i.e., prescribed fire, timber stand improvement, etc.). Treatments are based on the standards established in the NRCS Technical Guide and costs were corroborated with NRCS's payment schedules. This metric aligns with Goal 1: Restore and Conserve Habitat, Objective 1: Restore, Enhance, and Protect Habitats of the Comprehensive Plan and Goal 2: Restore Water Quality and Quantity, Objective 2: Restore, Improve, and Protect Water Resources. The purpose of the metric is to track implementation of improved forest management within the designated priority watersheds that serves to restore wildlife habitat. Acres of habitat restoration will be tracked monthly and reported annually. The outcome will be an increase in forest land that contributes to enhancements and the restoration of wildlife habitat in the Gulf.

Metric Title: HM005: Agricultural BMPs - acres under contracts/agreements

Target: 7,500

Narrative: This metric aligns with Goal 2: Restore Water Quality and Quantity, Objective 2: Restore, Improve, and Protect Water Resources; and Goal 1: Restore and Conserve Habitat, Objective 1: Restore, Enhance, and Protect Habitats of the Comprehensive Plan. The purpose of the metric is to track the progress of forestry BMP implementation within the designated priority watersheds. Acres under contracts/agreements will be tracked monthly and reported annually. The outcome will be an increase in forested acres under management in the region and resulting in reductions to nutrient and sediment loads to the Gulf.

Metric Title: COI002: Outreach/ Education/ Technical Assistance - # people reached

Target: 17,000

Narrative: This metric aligns with Goals 1: Restore and Conserve Habitat and 2: Restoring Water Quality Quantity of the Comprehensive Plan, and Objective 6: Promote Natural Resource Stewardship and Environmental Education. The number of stakeholders in attendance at informational meetings, workshops, or other events will be tracked. It will also include the number of participants in workshops, classes, field days, and/or webinars used to inform forest resource managers, timber purchasers, loggers, vendors, forest engineers, arborculturalists, etc., about the Program and the linkages to the health of the Gulf Region.

### *Risk and Uncertainties:*

There are limited risks and uncertainties associated with the activities in the Program. Of those limited risks, some are the result of mega factors that would likely impact the long-term success of the entire Gulf restoration effort. Others are mid or short-term in nature and may require adaptive management to guide changes to the Program.

It should be noted that State Forestry Agencies have extensive experience dealing with short and midterm risks, with an established institutional framework and reciprocal agreements in place for addressing unforeseen events. In addition, by supporting multiple landowners and a variety of forest management practices, all efforts do not rest on the success of one project, meaning risk is dispersed across a diverse portfolio of projects and sites. The healthy and resilient forests created and supported by the Program will enhance and protect habitat and water resources in the Gulf region in the face of large-scale and uncertain stressors over the long term. In general, the Program, and its landscape scale multi-landowner approach, should be considered as a hedge against risk and uncertainty.

Relatively short-term delays may be caused by weather extremes (e.g., droughts, excessive rain). Localized events such as hurricanes and wildfires can alter the landscape and shift priorities for landowners and communities. Damage assessments, funding limitations, and other programmatic concerns (i.e., staff availability) related to such an event, could delay implementation or reshape expected outcomes. For example, the Program's emphasis in the affected area may need to shift from prescribed fire to hurricane clean-up and reforestation for a limited time.

If an event occurs during a critical time of the year or if an event is wide-spread, delays may be compounded by limitations on the availability of staff, contractors, materials, and equipment. An example would be heavy landowner demand for foundational treatments, such as invasive species controls or prescribed fire, that is driven by favorable conditions after a drought. However, by adjusting the type and schedule of forest treatments for the conditions, most short-term delays can be ameliorated. For example, tree planting delayed by drought can be rescheduled for the next planting season, while other treatments, such as timber stand improvements, can be accelerated. In addition, the landscape scale of the Program provides the flexibility needed to address short-term risks by shifting resources to address Program needs.

From a mid-term outlook, if the willingness and/or ability of private landowners and communities to engage in the restoration effort are diminished, the implementation of the Program could be significantly delayed and require strategic adjustments or timeline modifications. For example, if the Region or the Nation suffers a severe economic downturn or, as is currently the case, experiences a pandemic disease outbreak the rate of forest restoration would be impacted; resulting in significant

delays but not necessarily threatening the expected outcome of the restoration. Such delays could be mitigated by employing adaptive responses to landowner needs and agility in restructuring program resources to meet changing demands.

From a long-term perspective, shifts in climate patterns and accompanying increases in air temperature and precipitation variability could result in changes to species ranges, diversity, and forest productivity (Fei et al., 2017). Insects, diseases, wildfires, and invasive species could also cause long-term changes in forest composition and condition, either directly or through interactions with climate change (Wear and Greis, 2013). Forests in the Gulf region and the benefits they provide will be impacted by these long-term stressors with or without active management, however the trajectories of forest change and associated risks could be minimized with active management supported by the Program.

As for anticipated sea level rise, most Program activities will be performed in areas away from the coast and are not likely to be impacted. That said, sea level rise and additional impacts of climate change have been anticipated and are addressed in each State's Forest Action Plan. Mitigation strategies (i.e., selecting the correct tree species that can thrive in future conditions) have been developed and will be refined as States employ adaptive management.

In addition to climate and natural disturbances, the Region's population and economic growth have and likely will continue to drive a loss of forests to more intensive land uses. Policy decisions, outside the scope of the Program, could play an important role in determining the trajectory of continued growth and its long-term impact on forest restoration. Recent projections suggest that developed land use in the southern Gulf Region could increase by 2.8 million acres (+166%) by 2060, resulting in a loss of 2.2 million acres (-10.2%) of the forest land across the region and more than 25% in some coastal counties (Wear and Greis, 2013).

Private landowners are increasingly bearing the financial burden for the critical ecosystem services that their forests provide, and thus these forested lands are at risk of conversion to other land uses. Providing private forest landowners with technical and financial assistance as described will help them make a viable living on their forest land and will reduce the risk that their land will be converted to other land uses. Keeping these forests in forest, so they continue to provide vital water quality, habitat, and economic benefits is critical to the health of the Gulf Region.

Without the Program, passive or a lack of management could lead to undesirable forest conditions during periods of transition that will have a negative impact on forest health, productivity, wildfire potential, and water resources. Alternatively, active and adaptive forest management, such as the activities described here, could facilitate a more rapid and smooth transition to a new and perhaps novel future forest condition with lower risk to forests, habitat, and local economies, while providing water-related benefits (Vose and Elliott, 2016; Sun and Vose, 2016). Taken together, the potential benefits of the Program far outweigh the risks and implementing the Program as planned at a landscape across a variety of public and private ownerships will help mitigate the effects indeed include mitigation of future risks.

#### ***Monitoring and Adaptive Management:***

Data collection and monitoring will track implementation and guide adaptive management of the Program on private, public, and community forests. Site level data, collected on the quality (as compared to practice standards) and the extent of individual treatments, will feed Program metrics and provide a finer measure of progress. Water quality BMP monitoring (SGSFWRRC, 2007) will be used to

track compliance with Clean Water Act requirements and ensure that silvicultural activities, including timber harvesting, site preparation, and associated road construction, are conducted in a way that takes into account potential nonpoint source pollutant delivery to surface waters.

SWAT modeling (Arnold et al., 2012) will be used to predict water quality improvements and inform adaptive management decisions. Modeling will be performed at a spatial resolution within and across watersheds to evaluate forest restoration alternatives in different locations (e.g., headwaters, uplands, riparian zones, urban areas). Each watershed will be subdivided into smaller sub-watersheds that are further divided into Hydrological Response Units (HRUs), with each HRU having similar land use, soils, topography within (Arnold et al., 2012). In this way, spatial variability within each watershed will be accounted for and the water quantity and quality effects of forest restoration implemented in various locations within the watershed will be quantified.

Publicly available sampling platforms, such as the US Geological Survey water quality and streamflow gauging network will be used to calibrate the model. The calibration ensures that the SWAT is accurately estimating water quality and quantity under current conditions, as well as providing a baseline for evaluating change. SWAT will be used as a tool to help managers make decisions (i.e., identify priority locations and best management practices) based on expected water quality and quantity outcomes from restoration and management activities. In addition, SWAT model outputs will be used to document and monitor short and long-term restoration benefits.

Once field activities have been initiated, SWAT will be applied to restored watersheds to project short (1-5 yrs.) and long-term (5+ yrs.) water resource benefits. This approach is necessary because benefits are likely to continue to accrue well past the project period. In addition to predicting water benefits as restoration acres accrue, SWAT may be used to project out 20 years into the future to show how water benefits change over time as restoration actions mature (e.g., as a forest stand develops after reforestation).

Site specific water quality monitoring and cross-checking with data from available sampling platforms will also be initiated on a subset of restored watersheds to validate model performance and quantify uncertainty. During calibration, the model parameters that govern within-watershed hydrologic processes will be adjusted, within recommended bounds, to achieve the best match between model predictions and publicly available observed streamflow and water quality measurements in the place and at the time the measurements were taken.

Similar to the use of SWAT for monitoring water quality and quantity improvements, the National Fish and Wildlife Foundation's modeling expertise will be used to estimate the benefits of the Program on wildlife habitat and advise leadership on potential opportunities to improve program direction. NFWF investments are guided by 10-year Business Plans that set species specific goals which have to factor spatial variability into account. As NFWF sets up any competitive RFP process, those business plan goals will be factored. Example business plan. <https://www.nfwf.org/sites/default/files/2019-12/longleafforests-rivers-business-plan.pdf>.

Forest sustainability programs and certifications (e.g., Forest Stewardship, American Tree Farm System, Treasure Forest, Tree City USA etc.,) will be used to verify practices, evaluate progress toward long-term sustainability and provide resources for landowners to make further management improvements. To monitor progress toward achieving outreach and education goals, States will track the number of landowners participating or enrolled in the Program, the nature and scope of their management



activities, the number of social marketing and website engagements, and the number of stakeholders attending meetings, workshops, and training opportunities.

Program monitoring will be initiated within the first 6 months of implementation. Data will be collected continuously throughout the life of the Program. Results will be reported annually. The outcomes will be improved transparency, increased confidence in the program direction and performance, and a better understanding of the long-term benefits that forest management has on water quality and quantity, and wildlife habitat of the Gulf Region.

#### *Data Management:*

To the extent practicable, all field data such as site-specific treatment recommendations, BMP standards and specifications, environmental and cultural resource assessments, and data generated during monitoring activities will be documented using standardized field datasheets. If standardized forms are unavailable or not readily amendable to record project-specific data, then project-specific datasheets will be drafted prior to conducting project implementation and monitoring. Electronic files of field sheets, notebooks, GIS data, photographs, certifications, authorizations, and payments will be retained by the State Forestry Agency. Data will be available to the public and retained for a minimum of 5 years.

State Forestry Agencies must comply with State Records Management requirements. They collect and digitize large amounts of data in the general course of doing business and report their activities to various funders and stakeholders (e.g., State leadership and federal agencies). The amount of data and level of detail could easily exceed the public's and the RESTORE Council's expectations and need. Additional information and a data management plan can be provided in the future.

#### *Collaboration:*

This cross-boundary program involves the collaborative efforts of State Forestry Agencies in Alabama, Florida, and Mississippi; USDA, the American Forest Foundation, the National Fish and Wildlife Foundation (NFWF), the U.S. Endowment for Forestry and Communities, and The Nature Conservancy. It leverages the funding and activities of these organizations that operate in the RESTORE Council zone and multiplies the impact of forest restoration in the program area. Conservative estimates place the value of leverage at nearly \$55 million. In addition, enhanced collaboration with NFWF may offer significant co-funding leverage. With sufficient RESTORE funds, NFWF would provide leadership to establish a competitive RFP that could leverage sub-grantee contributions and provide a vehicle for partner investments to maximize outcomes. The funding would target priority landowners, both private and public, and forest management practices that improve water quality/quantity and wildlife habitat.

#### *Public Engagement, Outreach, and Education:*

To align the key services of the Program with the resource needs of a priority watershed, traditional partners (i.e., State and County Forestry Associations, forest industry interests, and conservation organizations) will be asked to assist with meetings, workshops, and other public information efforts. The State forestry agencies and their partners (including the Sustainable Forestry and African American Land Retention Network) will also work to ensure historically underserved populations and communities are aware of and engaged in the Program. Landowners and communities will be encouraged to engage resource professionals and their peers through such programs as the American Tree Farm System, the Forest Stewardship Program, and the Tree City USA Program. These programs offer technical assistance through planning and implementation, verification of practices, third-party certification to nationally

and internationally recognized standards, and landowner recognition for their contributions to sustainability. Among other planning tools, Landscape Management Plans will be used to help guide landowners and professionals in prioritizing water quality and quantity; and wildlife habitat conservation needs. These plans will assist in unifying the efforts of many family landowners towards a larger conservation goal of improving the health and resiliency of the Gulf Region. The American Forest Foundation's WoodsCamp platform, which employs proven social media and innovative marketing tools, will be used to identify key landowners and connect them with qualified resource professionals and opportunities for forest management and restoration. An integrated Customer Relationship Management tool will track each landowner's journey towards measurable conservation improvements while supporting natural resource professionals in delivering a more rapid, complete and satisfying experience for landowners. The States will collaboratively develop a shared message regarding the importance of keeping forest in forest and the role of professional forest management in supporting the health of the Gulf Region promote this message within priority watersheds. Key touch points (i.e., community meetings, site visits with resource professionals, and State forest entrances) will be used as opportunities to educate landowners, communities, and the public about the connection between forest resource management and the water quality/quantity and wildlife habitat resources of the Gulf Region.

*Leveraging:*

Funds: \$250,000.00

Type: Adjoining

Status: Received

Source Type: Other Federal

Description: An early investment showing commitment to the Program which helped establish a pilot project in Mississippi. This project is helping the partners refine attributes and learn while demonstrating the ability of States and partners to deliver meaningful results.

Funds: \$1,500,000.00

Type: Adjoining

Status: Received

Source Type: Other Federal

Description: GOMESA funding is being used to jump start the Enhancing Gulf Waters through Forested Watershed Restoration RESTORE Program in Alabama. The Project leverages existing funding from USDA, and/or tools from various partners including the American Forest Foundation, the National Fish and Wildlife Foundation, and the Mobile Bay National Estuary Program.

Funds: \$1,100,000.00

Type: Adjoining

Status: Received

Source Type: Not For Profit

Description: Ongoing activities and initiatives that are included as elements in the Program such as: WoodsCamp, landscape management plans, and American Tree Farm System implementation.

Funds: \$3,900,000.00

Type: Adjoining

Status: Received

Source Type: Not For Profit

Description: Existing grants to communities in and near the priority watersheds of the Program.

For example, a “Nine Healthy Watershed Consortium Grant” that was awarded to Alabama, Florida, and Mississippi; and NRCS Regional Conservation Partnership Program award for working forests conservation easements and longleaf Pine restoration.

Funds: \$25,000,000.00

Type: Adjoining

Status: Committed

Source Type: Not For Profit

Description: Existing and future grants to partners (federal, state, local units of government, non-profit, academic institutions and others) that further the goals of this RESTORE Forestry Program. These monies have either already been awarded under existing NFWF grants and have yet to be spent or are expected to be awarded during the performance period of this RESTORE grant (in other words, there may be future opportunities to leverage and expand the Program benefits through complimentary investments under the GEBF and perhaps other DWH funding). Work includes similar activities on forestlands (financial and technical assistance on private and public lands) or is building on related water quality work.

Funds: \$10,000,000.00

Type: Adjoining

Status: Received

Source Type: Other Federal

Description: Existing and future grants from NRCS through NFWF to improve water quality practices (such as riparian restoration, head cutting gully restoration, and other forest and agricultural BMPs on cropland, pasture, and forestland in the coastal counties of the three-state region. These monies have either already been awarded under existing NFWF grants and not spent yet or are expected to be awarded during the performance period of this RESTORE grant.

Funds: \$5,000,000.00

Type: Co-funding

Status: Proposed

Source Type: Not For Profit

Description: NFWF would like to put forward a competitive RFP that could extend impact and innovation by further leveraging sub-grantee contributions and provide a vehicle for other outside partner investments. The funding would target priority landowners, both private and public, and provide assistance for forest management practices that improve water quality/quantity and wildlife habitat. This funding is contingent upon a similar matching level from RESTORE and NFWF will strive to co-fund that amount up to \$5 million.

### *Environmental Compliance:*

USDA has advised the Council that this program is covered by USDA Categorical Exclusions (CEs). The Council is using these CEs and the associated environmental compliance documentation to support the funding approval of this program, consistent with Section 4(d)(4) of the Council’s National Environmental Policy Act (NEPA) Procedures, which enables the Council to use member CEs, where appropriate. In making this decision, the Council has considered potential extraordinary circumstances,

including potential negative effects to threatened and endangered species, essential fish habitat, Tribal interests and historic properties, where applicable.

In using these CEs, USDA will employ the mitigation measures included in the CE documentation pertaining to aquatic resources, protected species, and cultural and archaeological resources. Forestry practices will be implemented according to NRCS conservation practices standards and specifications (covered by the aforementioned CEs). State Agencies will complete on-site environmental evaluations (EE) and performance monitoring to identify practices that are not installed to standards. The EE will be documented on Form NRCS-CPA52, "Environmental Evaluation Worksheet." State Forestry Agencies will then work with landowners to address deficiencies and offer adaptive management options to ensure that all practices are functioning as planned and contributing to positive environmental outcomes. Based on the EE, avoidance and minimization measures will be outlined to address potential environmental concerns.

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- <http://www.stateforesters.org/forest-action-plans/mississippi>
- <http://www.stateforesters.org/forest-action-plans/florida>
- <http://www.stateforesters.org/forest-action-plans/alabama>

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## **Budget**

### *Project Budget Narrative:*

The budget request for this program is \$23,000,000. It is estimated that 85% of the funds will be used for conservation practice implementation.

### *Total FPL 3 Project/Program Budget:*

\$ 23,000,000.00

*Estimated Percent Monitoring and Adaptive Management: 4 %*

*Estimated Percent Planning: 5 %*

*Estimated Percent Implementation: 85 %*

*Estimated Percent Project Management: 0 %*

*Estimated Percent Data Management: 3.5 %*

*Estimated Percent Contingency: 2.5 %*



## **Environmental Compliance**

<b>Environmental Requirement</b>	<b>Has the Requirement Been Addressed?</b>	<b>Compliance Notes (e.g., title and date of document, permit number, weblink etc.)</b>
<b>National Environmental Policy Act</b>	Yes	These program activities are covered by USDA-NRCS Categorical Exclusions referenced above.
<b>Endangered Species Act</b>	Yes	See USDA CE documentation referenced above. (FWS input pending.)
<b>National Historic Preservation Act</b>	Yes	See the USDA CEs and associated documentation referenced above.
<b>Magnuson-Stevens Act</b>	N/A	
<b>Fish and Wildlife Conservation Act</b>	Yes	See the USDA CEs and associated documentation referenced above.
<b>Coastal Zone Management Act</b>	Yes	See the USDA CEs and associated documentation referenced above.
<b>Coastal Barrier Resources Act</b>	N/A	
<b>Farmland Protection Policy Act</b>	Yes	See the USDA CEs and associated documentation referenced above.
<b>Clean Water Act (Section 404)</b>	No	In the event that a CWA Section 404 permit is required, this permit will be secured prior to implementation of the given activity.
<b>River and Harbors Act (Section 10)</b>	N/A	
<b>Marine Protection, Research and Sanctuaries Act</b>	N/A	
<b>Marine Mammal Protection Act</b>	N/A	
<b>National Marine Sanctuaries Act</b>	N/A	
<b>Migratory Bird Treaty Act</b>	Yes	See the USDA CEs and associated documentation referenced above.
<b>Bald and Golden Eagle Protection Act</b>	Yes	See the USDA CEs and associated documentation referenced above.
<b>Clean Air Act</b>	Yes	See the USDA CEs and associated documentation referenced above.
<b>Other Applicable Environmental Compliance Laws or Regulations</b>	N/A	See the USDA CEs and associated documentation referenced above.

**Maps, Charts, Figures**



Figure 1: Location map