

PUBLIC NOTICE

**CHARLESTON DISTRICT, CORPS OF ENGINEERS
69A Hagood Avenue
Charleston, South Carolina 29403-5107**

REGULATORY DIVISION
Refer to: P/N SAC-2022-01316

December 30, 2022

Pursuant to the Final Rule on Compensatory Mitigation for Losses of Aquatic Resources (33 CFR Parts 325 and 332 and 40 CFR Part 230), a prospectus for a proposed In-Lieu Fee Compensatory Mitigation Program (ILF) has been submitted to the Department of the Army (Corps) and the South Carolina Interagency Review Team (IRT) by

**The Nature Conservancy in South Carolina
1417 Stuart Engals Boulevard
Mount Pleasant, South Carolina 29464**

As proposed the ILF would provide third party compensatory mitigation options for unavoidable impacts to aquatic resources in the following sub-basins within the state of South Carolina: Seneca HUC 03060101, Saluda River HUC 03050109, Tyger River HUC 03050107, Upper Broad River HUC 03050105, Lower Broad River HUC 03050106, Enoree River HUC 03050108, Upper Savannah River HUC 03060103, Middle Savannah HUC 03060106, Stevens Creek HUC 03060107, Lower Pee Dee River HUC 03040201, Lynches River HUC 03040202, Black River HUC 03040205, North Edisto River HUC 03050203, South Edisto River HUC 03050204, Salkahatchie HUC 03050207, Broad-St. Helena HUC 03050208, Santee HUC 03050112, Lake Marion HUC 03050111, Cooper River HUC 03050201, Four Hole Swamp HUC 03050206, Calibogue Sound-Wright River HUC 03060110, and Lower Savannah HUC 03060109. (A map of the proposed service areas is attached to this public notice.)

In order to give all interested parties an opportunity to express their views

NOTICE

is hereby given that written statements regarding the proposed work will be received by the **Corps** until

30 Days from the Date of this Notice

from those interested in the activity and whose interests may be affected by the proposed work.

A complete copy of the proposed *The Nature Conservancy in South Carolina (TNC-SC) ILF Program* prospectus is available online in the Regulatory In-Lieu Fee and Bank Information Tracking System (RIBITS) at <https://ribits.ops.usace.army.mil/>. This prospectus provides a summary of the information regarding the proposed ILF program in accordance with the Final Rule on Compensatory Mitigation for Losses of Aquatic Resources (33 CFR Parts 325 and 332 and 40 CFR Part 230) (the 2008 Rule).

As stated by the Program Sponsor, the proposed TNC-SC ILF program seeks to:

1. Provide compensatory mitigation options for impacts to rivers, streams, and wetlands by designing and implementing high-quality mitigation projects with high potential success.
2. Provide ecologically significant river, stream, and wetland projects that are consistent with a watershed-based mitigation approach.
3. Provide benefits to the natural environment in South Carolina consistent with overall TNC-SC goals and objectives.

Oversight of the ILF program would be by an existing group of Federal and State agency representatives collectively referred to as the South Carolina Interagency Review Team (IRT). This IRT shall be chaired by the Charleston District, Corps.

Under the proposed ILF program, TNC-SC would develop a site-specific Mitigation Plan for each proposed ILF mitigation project site in accordance with the 2008 Compensatory Mitigation Rule (§332.4 (c)(2) through (c)(14)). Plans would be submitted to the IRT for review and approval prior to development and/or implementation of the mitigation project. Specific projects would be treated as modifications to the program instrument and processed in accordance with the provisions at 33 CFR 332.8 (g). Each specific project would require a public notice and site-specific assessments of compliance with all applicable laws and regulations including the Magnuson-Stevens Fishery Conservation and Management Act, Section 7 of the Endangered Species Act of 1973 (as amended), and Section 106 of the National Historic Preservation Act.

Mitigation requirements associated with permitted impacts to aquatic resources could be met by a permittee paying fees into an established TNC-SC ILF program account. Fees would be based on the number of credits needed to compensate for permitted aquatic resource losses; credits would be calculated using the current version of the Charleston District Guidelines for Preparing a Compensatory Mitigation Plan. Mitigation fees paid into the ILF Program Account may only be used for the direct replacement and management of aquatic resources. This means selection, design, acquisition (e.g., appraisals, surveys, title insurance), implementation, management and monitoring of ILF compensatory mitigation projects. Use of fees is explicitly prohibited for activities such as upland preservation (other than buffers), research, or education and outreach programs. The IRT has the authority to audit the program account records at any time.

Mitigation sites would be selected based on a pre-determined prioritization strategy as outlined in the attached Compensation Planning Framework.

As stated by the sponsor, the goal of the ILF is to provide compensatory mitigation within the primary service area of the impacted aquatic resource. Should a secondary service area become necessary the TNC-SC would seek projects within the secondary service areas prescribed by the USACE Charleston District. Corps and IRT approval for use of secondary service areas would be required on a case-by-case basis.

Approval of an ILF instrument does not provide DA authorization for specific projects impacting waters of the United States; nor does it exclude such future projects from any applicable statutory or regulatory requirements; or preauthorize the use of credits from the ILF program for any particular project. If approved the work required to complete the proposed

activities on specific mitigation sites may be authorized under Nationwide Permit #27 after review by the Corps, the South Carolina Department of Health and Environmental Control, and the Interagency Review Team.

Use of this ILF for a specific project would be at the discretion of the Corps pursuant to Section 404 of the Clean Water Act and the 2008 Rule. The Corps provides no guarantee that any particular individual or general permit would be granted authorization to use the ILF program to compensate for unavoidable impacts to aquatic resources, even though compensatory mitigation from the ILF may be available within the defined service area. While the 2008 Rule allows for the use of ILF to provide compensatory mitigation for impacts to waters of the U.S., the Rule also establishes a mitigation hierarchy. If approved the TNC ILF program could be used to provide mitigation for unavoidable impacts to waters of the U.S. in accordance with the mitigation hierarchy as outlined in the 2008 rule.

In accordance with the Essential Fish Habitat (EFH) consultation requirements of the Magnuson-Stevens Fishery Conservation and Management Act, the District Engineer's final determination relative to site specific project impacts and the need for mitigation measures associated with individual site development plans would be subject to review by and consultation with the National Marine Fisheries Service (NMFS). Each mitigation site proposed under the ILF would be placed on public notice and consultation requirements of the Magnuson-Stevens Fishery Conservation and Management Act would be met prior to any Corps authorizations, or approvals.

Pursuant to Section 7(c) of the Endangered Species Act of 1973 (as amended), the District Engineer's final determination relative to site specific project impacts associated with individual site development plans would be subject to review by and coordination with the U.S. Fish and Wildlife Service (USFWS) and/or the National Marine Fisheries Service (NMFS), as appropriate. Consultation with USFWS and/or NMFS would be conducted for each individual site development plan prior to any Corps authorizations, or approvals. Each mitigation site proposed under the ILF would be placed on public notice and consultation requirements of Section 7(c) of the Endangered Species Act of 1973 (as amended) would be met prior to any Corps authorizations, or approvals.

In accordance with the National Historic Preservation Act (NHPA), the District Engineer's final eligibility and effects determination for individual site development plans would be based upon coordination with the SHPO and/or THPO, as appropriate and with full consideration given to the proposed undertaking's potential direct and indirect effects on historic properties within the Corps-identified permit area. Each mitigation site proposed under the ILF would be placed on public notice and consultation requirements of the NHPA would be met prior to any Corps authorizations, or approvals.

NOTE: This public notice and associated plans are available on the Corps' website at:
<http://www.sac.usace.army.mil/Missions/Regulatory/PublicNotices> .

Any person may request, in writing, within the comment period specified in this notice, that a public hearing be held to consider this proposal. Requests for a public hearing shall state, with particularity, the reasons for holding a public hearing. The decision whether to approve or deny the proposed In-Lieu Fee Program will be based on an evaluation of the probable impact including cumulative impacts of the activity on the public interest. The benefit which reasonably may be expected to accrue from the project must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the project will be considered including the cumulative effects thereof; among those are conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, flood plain values, land use, navigation, shoreline erosion and accretion, recreation, water supply and

conservation, water quality, energy needs, safety, food and fiber production and, in general, the needs and welfare of the people.

The Corps is soliciting comments from the public; Federal, state, and local agencies and officials; Indian Tribes; and other interested parties in order to consider and evaluate the impacts of this activity. **This is not an application for work in Waters of the United States.** Any comments received, in response to this Public Notice, will be considered by the Corps to determine the potential of the proposed ILF program to provide compensatory mitigation for activities authorized by Department of the Army permits. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of any future Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the activity. **Please submit comments by email, identifying the project of interest by public notice number, to Erica.L.Stone@usace.army.mil or in writing to the following address:**

US ARMY CORPS OF ENGINEERS
Conway Regulatory Field Office
Conway Agricultural Center
1949 Industrial Park Road; Room 140
Conway, South Carolina 29526

The Prospectus for the proposed ILF is also available for review upon request. If there are any questions concerning this public notice, please contact Erica Stone, project manager, at (843) 817-7188 or by email at Erica.L.Stone@usace.army.mil.

**APPENDIX A:
COMPENSATION PLANNING
FRAMEWORK
THE NATURE CONSERVANCY IN SOUTH CAROLINA
IN-LIEU FEE PROGRAM PROSPECTUS**

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INTRODUCTION

The Nature Conservancy of South Carolina Interest within the Program Area. The Nature Conservancy in South Carolina (TNC-SC) is an integral part of The Nature Conservancy (TNC), a global conservation organization working in all 50 United States and in 72 countries. Guided by science, TNC creates innovative, on-the-ground solutions to the world's toughest challenges so people and nature can thrive together. Its mission is to conserve the lands and waters on which all life depends.

Since its inception in 1974, TNC-SC has protected over 400,000 acres in South Carolina including many of the most iconic natural features and now-public places in the state. TNC currently owns and manages 30,000 acres of ecologically sensitive lands directly, and also stewards over 150,000 acres of conservation easements on private lands. The 220,000-acre balance are lands that have largely been transferred to public agencies such as the state's Department of Natural Resources, State Parks, and the United States Forest Service and Fish and Wildlife Service. These lands are foundational to the excellent public recreation that South Carolinians enjoy, and are the foundation of many of the state's core habitats.

The proposed Program Area reflects much of the area of South Carolina where TNC-SC has standing conservation interests and activities. These interests span the range of land protection, habitat restoration, water quality and quantity, adaptation to climate change and more. TNC-SC uses a collaborative approach engaging local communities, governments, the private sector, NGO partners and many others. TNC-SC will employ a collaborative engagement approach to implementing mitigation projects within the Program Area and continue its history of using science-based planning to execute quality projects.

COMPENSATION PLANNING FRAMEWORK ELEMENTS

Element 1. Program Area and Service Areas.

The proposed Program Area includes the service areas listed below (Table 1, Figure 1). These service areas are selected directly from the Charleston District's Compensatory Mitigation website-based maps found under [Service Area Maps](#). The service areas (Figure 2) were selected for TNC action based on a cross-sectional analysis of the following criteria:

- current protected land area, reflecting our desire to append mitigation to current protected networks, or address restoration needs within those networks
- resilient and connected land in need of further protection, reflecting a desire to build climate resilience into our mitigation actions
- knowledge of key areas of wetland and aquatic biodiversity, many of which are aligned with areas currently protected or mapped as resilient.
- TNC partnerships, project history, and on-the-ground knowledge of the landowners and siting opportunities.

Table 1: TNC-SC In Lieu Fee Program Area Hydrologic Unit Code Designations	
PROPOSED GEOGRAPHIC SERVICE AREAS (WITH 8-DIGIT HUC DESIGNATIONS INCLUDING PARTIAL HUC AREAS)	6-DIGIT HUC DESIGNATION
Blue Ridge Ecoregion	
Saluda -Tyger -Broad: 03050109, 03050107, 03050105	Santee -- 030501
Piedmont Ecoregion	
Upper Broad: 03050105	Santee -- 030301
Lower Broad: 03050106	
Tyger: 03050107	
Enoree: 03050108	
Upper Savannah: 03060103	Savannah -- 030601
Stevens Creek: 03060107	
Southeastern Plains Ecoregion	
Lower Pee Dee: 03040201	Yadkin - Pee Dee -- 030402
Lynches: 03040202	
Black: 03040205	
North Edisto: 03050203	Edisto - South Carolina Coastal -- 030502
South Edisto: 03050204	
Salkahatchie-Combahee: 03050207	
Middle Atlantic Coastal Plain Ecoregion	
Black: 03040205	Yadkin - Pee Dee -- 030402
Santee River / Bulls Bay / Lower Coastal Plain: 03050112	Santee -- 030501
Cooper: 03050201	Edisto - South Carolina Coastal -- 030502
Edisto: 03050206	
Salkahatchie-Combahee: 03050207	
Broad-St Helena: 03050208	Savannah -- 030601
Calibogue Sound - Wright River: 03060110	
Lower Savannah: 03060109	

Table 1: Primary service areas selected for the TNC-SC In-Lieu Fee Program Area

Element 3. Loss of Aquatic Resources in the Program Area.

Accounting of aquatic resource loss prior to the Clean Water Act of 1972 is typically qualitative and does not tally acreage or stream mile loss according to the source of loss. Perhaps the first major aquatic resource loss in South Carolina was extensive conversion of tidal bottomland swamps into impoundments for rice production. Conducted primarily through slave labor, this conversion constituted approximately 500,000 acres across South Carolina. As rice growing declined in importance however, many of these impoundments naturalized into high quality habitat for various wading birds and other wildlife.

Other major losses likely occurred due to widespread conversion of land to agriculture over the 1800's, which leveled off in the early to mid-1900's. After World War II, much of area cleared for agriculture in the Piedmont had been reclaimed by second-growth forest. From 1936 to 2010, statewide forest cover grew slowly to 13.0M acres. Forest cover expansion in South Carolina showed a first-time decline since the 1930's to 12.8M acres in 2015 (Khanal et al., 2017). This reversal is accompanied by an estimated 5% (236,000 acres) agricultural land loss since 2001 (Freedgood et al., 2020), the combination of trends pointing at increasing urbanization as our current most active source of land loss and, likely, the

wetlands associated with them. Urban development is also accompanied by hydrologic alterations and impervious surface additions like roads and parking lots, so these losses accrue to streams as well.

Quantitative aquatic resource inventories emerged following the passage of the Clean Water Act in 1972. Estimated wetland extent in South Carolina circa 1780 was 6,414,000 acres (Dahl, 1990). In 1989, South Carolina had retained 4,104,850 wetland acres (-36%). This was a substantial loss though not as dramatic as many states, 10 of which lost over 70% of their wetland acreage in the same period. Post-1972 losses have varied in source and rate. From 1972-1982, wetland loss rate was estimated at 6,100 acres per year (Hefner et al., 1994). From 1982-1989, loss rate slowed to 2,920 acres per year (Dahl, 1999). Comparative analysis of losses during these time periods revealed a reduction in agriculture-driven losses toward losses due to urbanization and conversion to upland pine plantation (Dahl, 1999). Specialized wetland types like Carolina bays were especially hard-hit. By 1991, the number of Carolina bays found to be relatively intact was approximately 10% of the original 4000+ examples in the state (Bennett and Nelson, 1991).

Aquatic resource loss due to stream and river channelization, bank stabilization, dams, and other hydrologic alterations have not received the same detailed accounting as wetland losses. To say many miles of streams have been lost to these activities is a fair assumption. For example, there are 2,300 regulated dams in South Carolina as of 2020, and this number omits a far greater number of small dams which fall below regulatory thresholds and accounting. cursory reviews of light detection and ranging (LiDAR) images or aerial photos in South Carolina readily reveal many straight-line drainage features which reflect aquatic resource loss through stream channelization and / or wetland drainage.

There have also been demonstrable losses in water quality across the service areas. Early settlers regularly reported drinking directly from South Carolina streams and rivers, which would be strongly advised against today. Currently, SCDHEC's Watershed Atlas lists 1,040 stream segments and water bodies in the state as water quality impaired. The impairments cover a wide array of chemical and biological aspects including turbidity, dissolved oxygen, pH, bacteria, mercury, and many others. Some impairments like bacteria have unclear impacts on aquatic resource function and health, but most others can be directly connected to a loss of function and health. The degree of loss varies by the impairment versus the particular organism or group of organisms considered. Water quality and physical impacts are often linked as well. For example, cattle access to streams can cause both bacterial pollution, and considerable physical damage to streambanks and riparian vegetation.

Finally, aquatic resources have also been lost to historical fire suppression, though specific extent and effects are poorly quantified. Government-sponsored fire suppression began in the early 1900's, interrupting millennia of fire processes on the landscape. The error of this approach was only recently realized, and natural resource managers are still working against this legacy. Many wetland and stream ecotones are shaped by fire to produce specialized floral and faunal communities. For example, critically rare species like the threatened frosted flatwoods salamander depend on fire-managed upland-wetland ecotones to produce their desired pond-breeding environment. Grass growth for egg mass setting, and dissolved oxygen for emergence and early growth are facilitated by fire-driven control of pond-side tree growth. The salamander is an umbrella for many other ecotonal fauna, and many of our rarest plants like Boykin's lobelia are also wetland-fire ecotonal species.

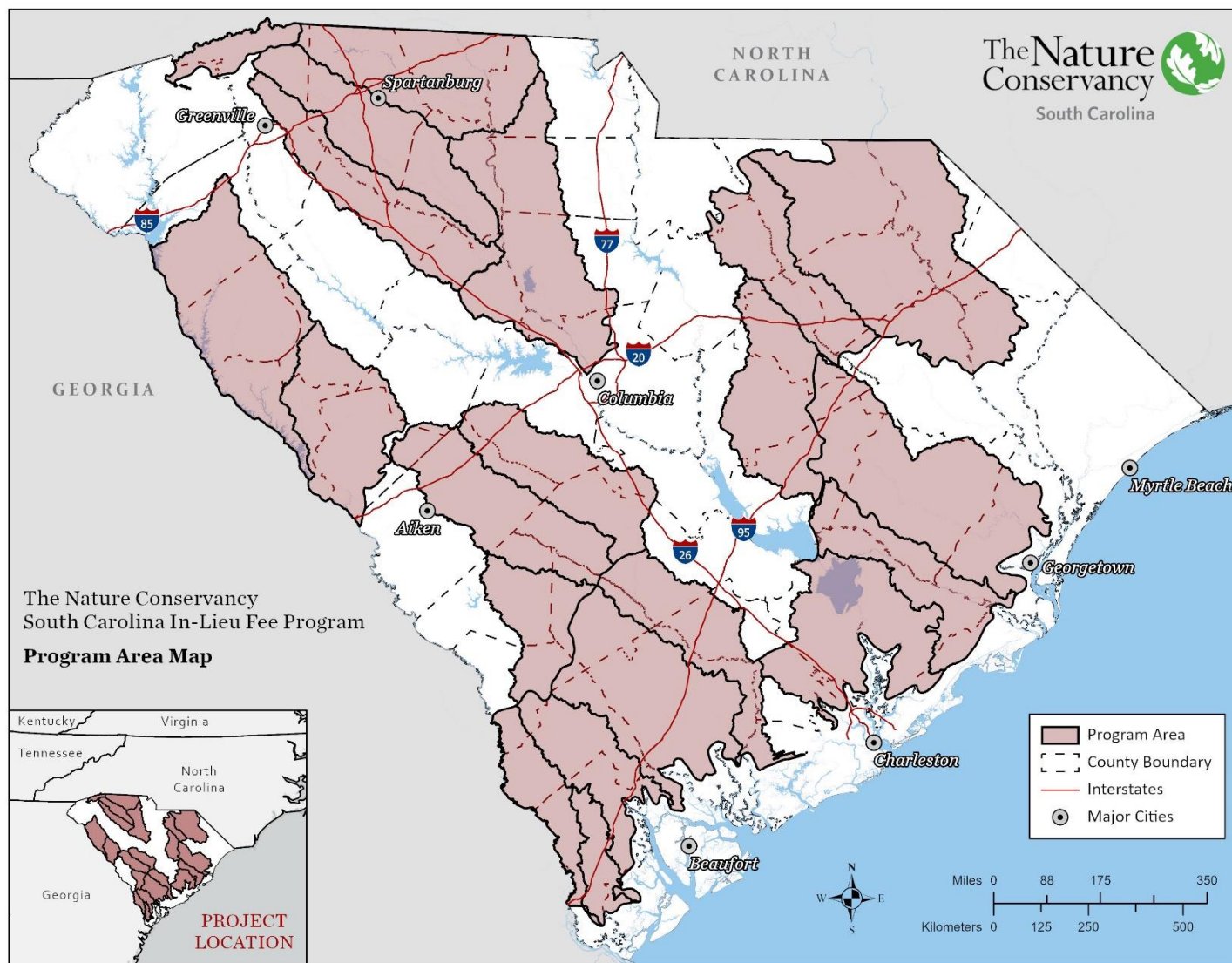


Figure 1: The Nature Conservancy in South Carolina In-Lieu Fee (ILF) Program Area composed of 20 primary service areas of the USACE Charleston District

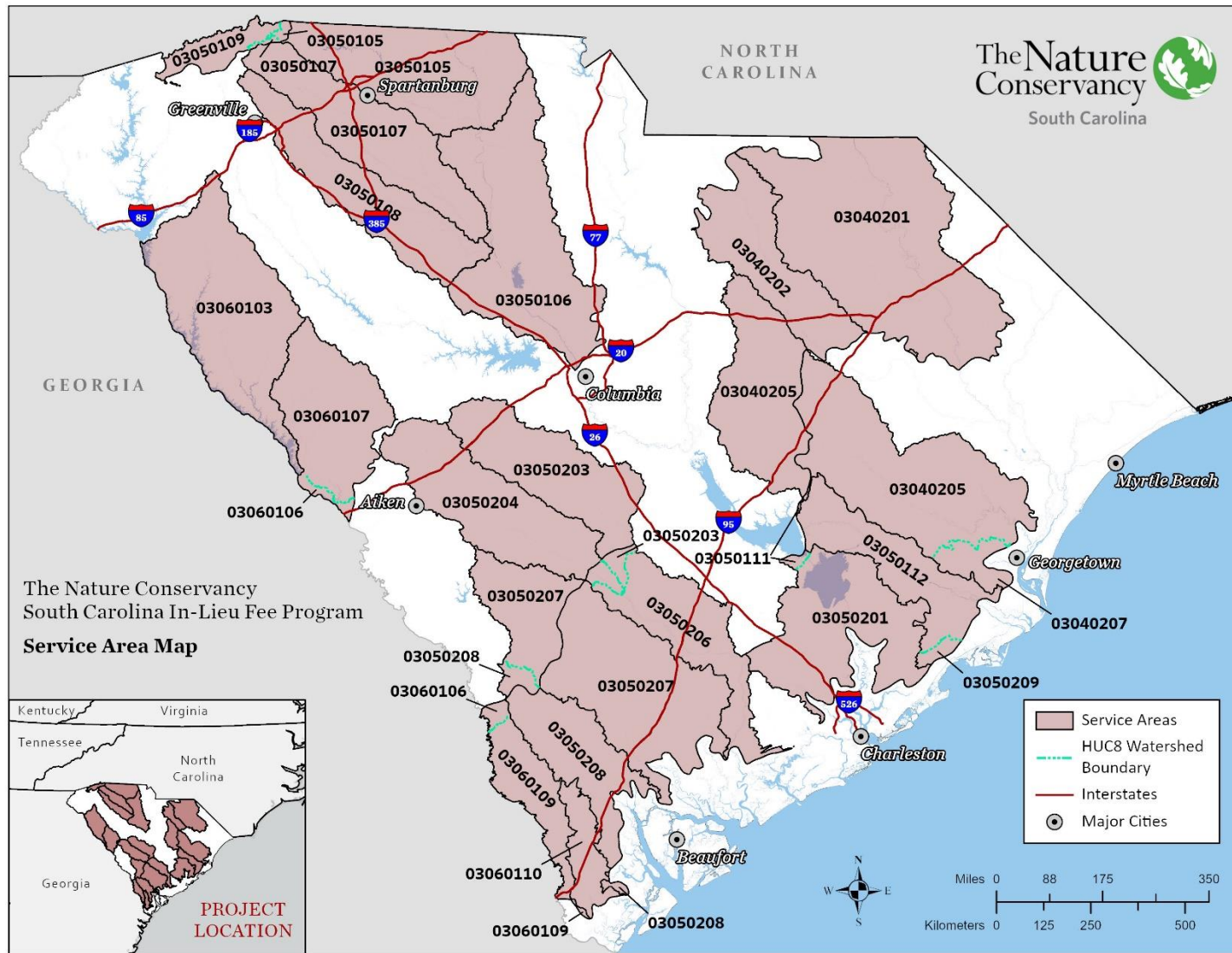


Figure 2: The Nature Conservancy in South Carolina In-Lieu Fee (ILF) Service Areas with Hydrologic Unit Codes

Fire-managed landscapes also produce demonstrable water yield subsidies to their wetlands and streams, extending hydroperiods and supplementing base flow, a critical factor for drought resilience. This clearly has special relevance to the health of streams and wetlands, and their restoration. The broad-scale expansion of loblolly pine plantations in South Carolina from the 1930's to present has improved some elements of runoff water quality, but has had a counter-impact in removing a significant amount of water yield from the landscape. The evapotranspiration (ET) budget of loblolly pine plantations can exceed 90%, compared to ET budgets of fire-maintained pine flatwoods of 75-80% (McLaughlin et al 2013; also see p. 297 in Brantley et al, 2018).

Element 4. Current Aquatic Resource Conditions in the Program Area

Perhaps the most recent and comprehensive assessments of aquatic resource conditions in the service areas are found in the EPA's 2011 National Wetland Condition Assessment (NWCA) and 2013-14 National Rivers and Streams Assessment (NRSA). These are nationwide assessments are based in a statistically valid sampling approach which included multiple wetland, stream and river sites in South Carolina. The statistical approach was designed to extrapolate the sample sites and reaches to a *representative area* – the total of wetland acres or river and stream miles to which the results apply.

Though nationwide in scope, the assessments were stratified by aggregated ecoregions, yielding an overlap with the ecoregional basis of the service areas. An exception was estuarine wetlands, whose results were only given for a nationwide sampling stratified within the Cowardin system. All results were developed from field surveys using local aquatic professionals trained in the survey methodology. The wetland assessments address conditions of vegetation, soils, hydrology, water chemistry, algae, and habitat conditions in buffer areas around sample sites. The rivers and streams assessments address a full range of stream orders and evaluated a variety of biological, chemical, physical, and human health indicators. See the assessment design sections beginning on pages 11 and 12 of the wetland and rivers and streams reports, respectively, for more detail.

We propose the ecoregional stratification and statistically driven approach of the assessments allows extrapolation of the results to our proposed service areas. The field assessments of stress and degradation indicators provide insights on the restoration needs of South Carolina's aquatic resources. These can be interpreted as opportunities for mitigation uplifts and broadly suggesting a set of restoration priorities. For example, documenting substantial wetland stress from vegetation removal or replacement, damming, ditching, hardening, chemical pollution, soil phosphorous, and invasive species cover all suggest remedies (e.g. vegetative enhancement, dam removal, ditch plugging, etc.) to be implemented through compensatory mitigation.

Finally, we also note the findings of the EPA assessments comport well with our over 50-year history of land evaluation and restoration in South Carolina. The imprints of an over-400 year settlement history are abundant in South Carolina's environment. Dams, ditches, non-native species, road prisms, underfit bridges and culverts, old rail beds, phosphorous mines, agricultural and urban infringements, and fire suppression are just a sample of resource impacts we readily find on the landscape across all ecoregions.

4a. NWCA Results and Implications

The relevant NWCA ecoregions for South Carolina are the Coastal Plain and Eastern Mountain / Upper Midwest. The ensuing discussion will report the results from those two ecoregions as well as those from the nationwide Estuarine assessment. Note also that *wetland condition* values reflect conditions *within* a 40m radial (0.5 hectare) sample plot, while *wetland stressor* values reflect stressors present in a 100m radial buffer area around the sample plot. Non-wetlands were excluded from these buffer surveys, so the reported impacts accrue to wetlands only.

The assessment results are provided in Table 1 as percent of acres in good-fair-poor condition and the combined percentage of area under very high, high, and moderate impact from various stressors. We have chosen to report wetland stressor results only as the combined percentage of very high, high, and moderate stress acreage to constrain the size of the table, and because the stressed areas relate directly to the nature and extent of the mitigation needs in the service areas. Low-stress area can be quickly derived by subtracting the tabulated result from 100. Note also for our ecoregions, the only “very high” stressor ranks were for non-native plants ranging from 2% to 20% of area for various categories. See pages 60-69 and 84-86 of the [National Wetland Condition Assessment](#) for more detail.

The detailed needs of mitigation sites selected under this program will be determined on a site-specific basis, and the NWCA or other broad-scale assessments may not capture the full extent of aquatic conditions or potential mitigation needs. Of course, remaining high-quality, low stress areas might also be incorporated into our mitigation actions as a consequence of acquiring property rights to implement restoration actions.

4a.i) Eastern Mountains

The aggregated Eastern Mountains ecoregions includes the Blue Ridge and Piedmont of South Carolina. Wetland condition expressed by a multi-metric vegetation index was rated as good for 62% and 50% of inland herbaceous and inland woody wetland area, respectively. This leaves respective balances of 38% and 50% in fair or poor condition, and potentially benefitting from vegetation enhancements. All measured stressors are present to some degree, with vegetative removal or replacement, hardened surfaces, soil phosphorous, heavy metals, and non-native plants the most extensive stressors. Damming, ditching, and fill / erosion are also present in lesser extents but could still be important stressors to mitigate at site-specific scales. Many of these stressors are consistent with urban development, which is currently the state’s greatest generator of new impacts to extant wetlands. The ubiquity of these stressors also testify to the need to identify mitigation opportunities proximal to or within currently intact and / or protected areas.

4a.ii) Coastal Plains

The aggregated Coastal Plains ecoregions includes the Middle Atlantic Coastal and Southeastern Plains of South Carolina. Wetland condition expressed by a multi-metric vegetation index was rated as good for 39% and 50% of inland herbaceous and inland woody wetland area, respectively. This leaves respective balances of 61% and 50% in fair or poor condition, and potentially benefitting from vegetation enhancements. All measured stressors are present to some degree, with vegetative removal or replacement, ditching, hardened surfaces, and non-native plants the most extensive stressors. Damming and fill / erosion are also present in lesser extents but could still be important stressors to mitigate at site-specific scales. Many of these stressors are consistent with urban development, which is currently the state’s greatest generator of new impacts to extant wetlands. The higher vegetative

alteration stress levels may reflect the extensive conversion of coastal plain lands to row-planted loblolly pine plantations. The lower soil phosphorous and heavy metal impacts may reflect the more rural history of the coastal plains.

4a.iii) Estuarine Wetlands

Estuarine wetlands were sampled coast-wide across the 48 coterminous US states and divided into herbaceous and woody categories. The nationwide sampling basis limits the extent we can extrapolate these results to South Carolina, as other assessments and abundant field experience has determined South Carolina has some of the nation's best remaining estuarine wetland resources. Nonetheless, wetland condition expressed by a multi-metric vegetation index was rated as good for 58% and 59% of estuarine herbaceous and estuarine woody wetland area, respectively. This leaves respective balances of 42% and 41% in fair or poor condition, and potentially benefitting from vegetation enhancements. Ditching and soil phosphorous were the most prevalent stressors across all estuarine wetlands, while hardening and heavy metals were substantial stressors to estuarine woody wetlands. Estuarine herbaceous wetlands were substantially stressed by non-native plants, a stressor we see regularly in South Carolina in the form of Phragmites and Chinese tallow. The high heavy metal stress reported for estuarine woody wetlands may reflect the nationwide sampling profile, where heavily industrialized estuaries of the northeast and Gulf Coast may skew the sampling results.

4b. NRSA Results and Implications

The National Rivers and Streams Assessment used a similar statistical approach as the NWCA (see pages 12-16 of the Assessment). In total, 1,853 miles of rivers and streams were sampled for a broad set of biological, chemical, physical, and human health indicators. The 1,853-mile sample set represents over 1.2M miles of flowing waters and contained 20 fairly well distributed sites in South Carolina. Biological, chemical and physical indicator results were classified into percent of sampled reach values falling into good-fair-poor categories based on a set of reference site values. Results in the upper 75% of the reference result distribution were classed as "good", while results in the lowest 5% of the reference distribution or lower were classed as "poor". Results falling between 5-25% of the distribution were classed as fair. See pages 38-42 for result details. Human health indicator results were classed as at or below benchmark, or exceeds benchmark where the benchmark values are EPA's advisory limits to protect human health.

The aggregation of upstate ecoregions in the NRSA differ somewhat from the NWCA, with the Southern Appalachians composed of southern and central Appalachians aggregated with the Allegheny and Interior Plateaus, Ozark and Ouachita highlands, and the Piedmont. The NRSA aggregated Coastal Plain ecoregions are the same as the NWCA. The basic sampling design was to survey a reach 40x the width of the stream or river and proceed upstream (wadable sites) or downstream (boated sites), sampling at 11 perpendicular transects. See page 16 for a schematic of the sampling approach and links to more detailed information.

National Wetland Condition Assessment Results													
		Condition			Stressors								
		Vegetation Index (% of Area)			Physical		Hydrologic				Chemical		Biological
Wetland Type	Assessment Area (Acres)	Good	Fair	Poor	Veg Removal	Veg Replace	Damming	Ditching	Hardening	Fill / Erosion	Soil P	Heavy Metals	Non-native Plants
Eastern Mountains	19,956,668	52	11	37	32	19	10	23	45	15	35	35	26
Inland Herbaceous	3,762,089	62	17	22	26	8	12	16	31	6	50	36	42
Inland Woody	16,165,406	50	9	41	34	21	9	24	51	16	32	34	22
Coastal Plain	30,893,304	50	21	29	46	34	20	26	32	20	23	9	35
Inland Herbaceous	3,750,551	39	2	59	62	27	35	61	67	33	13	6	21
Inland Woody	21,859,265	50	26	25	52	43	20	20	30	21	25	8	32
Estuarine (Nationwide)	5,485,646	<i>Note: The Assessment did not report rolled-up totals for Estuarine wetland classes</i>											
Estuarine Herbaceous	4,987,824	58	17	26	7	3	10	23	14	7	30	9	37
Estuarine Woody	497,821	59	20	22	9	12	0	21	24	17	22	55	12

Table 2: National Wetland Condition Assessment results by ecoregion, condition, and stressors.

Results are reported by relevant ecoregion in Table 2. Condition indicator results are not broken out by stream size or type. This loses some resolution, but also allows us to report the results fully while maintaining readability.

4b.i) Southern Appalachians

Results for the Southern Appalachians represent 289,341 miles of streams and rivers in the aggregated ecoregion. Generally, streams and rivers here are substantially in good or fair condition for instream habitat, riparian vegetation cover, and excess stream sediments. Salinity and acidification were in dominantly good condition at 85 and 96% of reaches respectively. Biological conditions have been impacted across the ecoregion, with only 23% of reaches reporting good results for fish and macroinvertebrate communities. This comports well with our field experience: it is not uncommon to find streams with good or fair physical habitat conditions but lacking their representative biology. This may represent legacy effects from extensive conversion of the landscape to agriculture over the 1800's into the 1930's. Dams and other hydrologic barriers may also be hindering the natural re-population of recovering stream segments.

Total phosphorous emerged as the greatest chemical impact, with 80% of reaches classed as poor. This may also be part of the agricultural legacy or reflecting the impact of wastewater or septic system discharges which are typically high in phosphorous. Riparian disturbance levels were a notable physical impact, with a combined 74% of reaches classed as fair or poor. The NRSA defines these as roads, dams, mines, grazing, clearings, maintained lawns, and other human activities detected within a 10m long by 20m deep riparian survey plot. These impacts also offer opportunities for mitigation uplifts under our proposed program.

While lower in prevalence, impacts to instream fish habitat, riparian vegetative cover, and from excess stream sediments are all present (combined fair-poor values of 36, 55, and 43% respectively). These also suggest opportunities for mitigation uplifts under our proposed program.

Enterococci bacteria levels were the most prevalent human health impact, with 37% of reaches showing levels above benchmark. Mercury in fish tissue was relatively low with 4:1 reaches below versus above benchmark (24% vs 6%), although the NRSA reports 71% of reaches as unassessed for mercury. Chemical contamination of fish tissue may be more widespread in South Carolina than these numbers would suggest. Mercury and PCB consumption advisories are common across the Piedmont of South Carolina, and even reach into the otherwise-pristine waters of Lake Jocassee (see SCDHEC's Watershed Atlas for examples). In any case, these issues are extremely difficult to ameliorate through mitigation. However, the data suggests legacy contamination barriers to implementation could be encountered during site searches and site planning.

	Aggregated Ecoregions (Represented Miles)							
	Southern Appalachians (289,341)				Coastal Plains (198,824)			
	Good	Fair	Poor	Unassessed	Good	Fair	Poor	Unassessed
Biology	<i>Percent of Represented Reach Miles</i>				<i>Percent of Represented Reach Miles</i>			
Macroinvertebrates	23	29	47		14	22	64	
Fish	23	32	28	16	16	18	60	6
Chemistry								
Total Phosphorous	6	13	80		21	31	48	
Total Nitrogen	24	32	45		33	25	41	
Salinity	85	10	5		94	4	2	
Acidification	96	0	4		98	1	1	
Physical Habitat								
Instream Fish Habitat	64	22	14		57	24	18	1
Riparian Disturbance	26	44	30		36	42	22	1
Riparian Vegetative Cover	55	23	22		55	15	29	1
Excess Stream Sediments	54	15	28	2	53	18	14	15
Human Health								
	Below Benchmark	Above Benchmark	Not Assessed		Below Benchmark	Above Benchmark	Not Assessed	
	<i>Percent of Represented Stream Miles</i>				<i>Percent of Represented Stream Miles</i>			
Enterococci	62	37			59	39	2	
Microcystins	100	0			100	0		
Mercury in Fish Tissue	24	6	71		17	19	64	

Table 3: National Rivers and Streams Assessment results by ecoregion, indicator type, and condition

4b.ii) Coastal Plains

Results for the Coastal Plains represent 198,824 miles of streams and rivers in the aggregated ecoregion. Generally, streams and rivers here are in good or fair condition for physical habitat parameters. Salinity and acidification were in dominantly good condition at 94 and 98% respectively. Biological conditions have been impacted across the ecoregion, with 60 and 64% of reaches reporting poor results for fish and macroinvertebrate communities. The low scoring for macroinvertebrates may be a reflection of the metric design, as traditional EPT and community metrics do not always translate well to slower-flowing and often braided coastal plain streams.

Total phosphorous and total nitrogen were both notable with 48 and 41% of reaches rated poor, respectively. This again may reflect agricultural legacies, wastewater or septic system discharges, or possibly the accumulation of upstream inputs from faster flowing transport reaches in the Piedmont. Remedies to degraded reaches through mitigation may be difficult, though siting projects in or proximal to already protected areas could buffer sites from future or additional nutrient impacts.

Similar to Appalachian rivers and streams, impacts to instream fish habitat, riparian vegetative cover, and from excess stream sediments are all present at lower but still significant prevalence (combined fair-poor values of 42, 44, and 32% respectively). These also suggest opportunities for mitigation uplifts under our proposed program.

Again, enterococci bacteria levels were the most prevalent human health impact, with 39% of reaches showing levels above benchmark. Mercury in fish tissue was reported at 19% of reaches above benchmark with 64% of reaches unassessed. This result clearly conflicts with the abundance of mercury-

driven fish consumption advisories across most fishable coastal plain waters. The large unassessed value may be skewing this result.

4c. SC Water Quality Review

SCDHEC's SC Watershed Atlas is the primary source of the following information. The Atlas is an extremely rich data source covering a wide range of aquatic resource conditions in the service areas. The information covers a full range of current water quality conditions, watershed management priorities, essential regulatory boundaries, and more. We conducted the following overview of aquatic resource conditions in the service areas as informed by the Atlas data layers and sub-layers. Details of the review findings are found in Appendix A1: Service Area Descriptions

The Atlas layer summaries below are of the data categories most directly relevant to aquatic resource conditions and relevance to mitigation. For example, we omit categories like county parcel websites, groundwater withdrawals, shellfish management areas, and the like. Note that excluding a layer or sub-layer from the list below is not a statement that the information therein will *never* be consulted or relevant to our mitigation work.

The summaries below follow the order of datasets listed in the atlas, and the data subcategory order.

4c.i) SCDHEC Regulated Permits

Livestock Operations: Most of the service areas contain at least a small number of livestock operations. Several service areas are notable for their high number of operations including the Upper Coastal Plain service areas of the Lynches, Black, and North and South Edisto watersheds. Poultry and swine are the dominant operation type. Livestock operations can be sources of nutrient and fecal contamination and are identified in multiple watershed plans and TMDL documents as sources of water quality impairment.

State Regulated Dams: All of the service areas contain state-regulated dams. The numbers are particularly high in Upper Coastal Plain, Piedmont, and Blue Ridge service areas. Dams are important sources of hydrologic and water quality impairment and may occasionally provide mitigation opportunity through dam removal. They also produce offsite flow and connectivity effects which must be taken into account as mitigation sites and actions are considered. State regulated dams do not include many smaller dams falling below regulatory thresholds. They too can present mitigation opportunities themselves, or present limits on aquatic uplifts expected up- or downstream from them.

4c.ii) Public Water Supply

Source Water Protection Areas: Most of the service areas house at least one source water protection area. Service areas with none include the Upper Coastal Plain Lynches, Black and Salkahatchie-Combahee watersheds, and the Lower Coastal Plain Black, Santee, Salkahatchie-Combahee, Broad-St Helena, and Calibogue-Wright River. Source water protection areas present opportunity for multiple benefits, as mitigation projects can restore water quality and provide buffers against future water quality impacts from runoff and transportation spills.

Public Water Supply Well (PWSW) Protection Zones: All service areas contain PWSW Protection Zones. Zones for low volume wells are as small as 18 acres, but zones for large municipal and industrial wells can be well over 1000 acres. At these larger scales, mitigation projects can offer multiple benefits by protecting land and restoring aquatic impacts within these zones.

4c.iii) Water Quality Monitoring

Multiple Sub-layers: All service areas contain at least one form of water quality monitoring station. The information gathered at the station is not immediately accessible through the Atlas but nonetheless points to important sources of information to characterize sites and identify potential challenges to mitigation implementation.

4c.iv) Water Quality Assessments

2016 Use Support and Trends: All service areas contain use support determination sites and display a range of determinations from fully, partially, or not supporting designated uses. The sites allow one to identify reaches of river and / or stream in a full, partial, or non-use supporting condition. Reaches with strong use support may be where mitigation implementation can further bolster conditions or address emerging threats to that support. Use support information may also identify partially impacted areas with high uplift potential, or highly impacted areas with low chance of success.

Impaired Waters – 303(d) 2018: All service areas contain 2018 303(d) listed waters, covering a wide range of impairments including but not limited to dissolved oxygen, phosphorous, nitrogen, pH, enterococci bacteria, macroinvertebrate community impairments, metals, mercury, and PCB's. Waters with multiple significant impairments may have a low probability of mitigation success but, in many cases, mitigation actions can partially address impairments. For example, restoration of riparian cover can ameliorate dissolved oxygen impairments; exclusion fencing for cattle can ameliorate nutrient impairments. Opportunity to assist improvements to listed waters will be a factor in our site selection and project activities.

Approved TMDL Watersheds: Twenty of the 21 service areas contain, in whole or part, at least one TMDL watershed. The majority of the TMDL watersheds are listed for fecal bacteria contamination. Siting of mitigation projects within TMDL watersheds can assist with meeting TMDL goals. For example, cattle exclusion fencing is an effective strategy to reduce fecal contamination while also producing uplifts in mitigation projects. The associated TMDL documents also provide important insights on types and locations of aquatic resource threats and can assist with targeting mitigation within the watersheds. Our program will endeavor to overlap project siting and activities with TMDL goals when possible and consistent with other required mitigation activities.

4c.v) Nonpoint Source Program

Priority Watersheds: A limited number of service areas in the Broad-St Helena, Edisto, Santee, and Pee Dee watersheds overlap or contain a NPS priority watershed. These 8-12 digit watersheds were selected as priorities for non-point source pollution BMP funding and response monitoring. Mitigation activities can in many cases be complimentary to projects funded under this program and often employ similar BMPs. Siting mitigation projects within these priority watersheds can enhance the effectiveness of the NPS program. Our program will endeavor site projects within these watersheds when possible and consistent with other required mitigation activities.

Watershed-based Plans: Several service areas overlap or contain drainages with completed watershed-based plans. These plans contain an abundance of detailed information on aquatic resource conditions in those drainages. Many of the issues addressed in these plans can be ameliorated through mitigation

4c.vi) Water Classifications – PROVISIONAL

Water Classification – Provisional: All intermittent and permanent streams, and reservoir shorelines in the service areas have a provisional water classification (see [Regulation 61-68](#)). Classifications in the service areas span the range of freshwater classifications, and include special

aquatic resources like Outstanding National Resource Waters, Outstanding Resource Waters, and trout waters (natural and put-grow-take). The classifications represent an umbrella set of aquatic resource conditions that must be maintained, or a set of aquatic impacts which will not be permitted, in order for the uses implied by the classification to be fully supported. The classifications can be informative to mitigation implementation. For example, the project type or considerations in trout waters could be different from projects in the more general freshwater categories. The classifications can also suggest priorities within a watershed. For example, a mitigation project restoring aquatic resources adjacent to an Outstanding Resource Water reach may be highly desirable.

4c.vii) National Flood Hazard Layer

National Flood Hazards – FEMA 2017: This layer depicts the 100-year flood zone, wherever present. All of the service areas encompass some amount of FEMA flood hazard areas, with many Coastal Plain service areas hosting extensive flood hazard zones. In many cases, these areas are riparian corridors and bottomland hardwood forest habitats exhibiting a broad range of habitat quality and hydrologic integrity. They bear many of the riparian impacts documented under the NRSA and described above. Intact healthy floodplains absorb water and slow water flow velocities. Mitigation can restore the natural function of these flood zones by restoring vegetation and hydrologic function. The flood zones are also important connectors of climate-resilient habitats. Protecting their continuity through mitigation can be an important contribution to climate resilience.

Elements 2 and 5. Threats and Aquatic Resource Goals and Objectives in the Program Area.

Threats to aquatic resources include past, current, or future human activities that directly cause degradation, impairment, or destruction of the species and habitat associated with the ecosystem, or the natural processes that support the ecosystem. The following are the current highest priority threats to aquatic resources in South Carolina.

- Habitat Loss and Fragmentation
- Altered Hydrology
- Agricultural and Grazing Practices
- Invasive Species
- Climate Change

These threats can be interdependent and synergistic. For example, habitat loss to urbanization can alter hydrology in adjoining areas and provide pathways for invasive species. Climate change may further facilitate invasive species in these disturbed areas by reducing winter frosts or enhancing growth of invasive vines through elevated CO₂ concentration.

An operational ILF program in South Carolina could mitigate these stresses by restoring degraded aquatic habitats and increasing resilience in rivers, streams, and wetlands. Establishing an ILF program would also provide additional predictability and permitting efficiencies for project proponents and provide more successful outcomes from compensatory mitigation projects at a watershed scale. The broad goals for aquatic resources include, but are not limited to the following:

- Restore and preserve sufficiently sized river, stream, and wetland areas that provide resilient and less-fragmented habitat which support native plant and animal species that are dependent on these habitat types
- Restore and maintain fluvial connections across networks of aquatic resources such as floodplains and groundwater-surface water connections such as recharge areas and seepage
- Restore and maintain fluvial connections up- and downstream of current anthropogenic physical barriers
- Address water quality degradation issues at a landscape scale as identified by South Carolina Department of Health and Environmental Control.

The TNC-SC ILF Program intends to support river, stream, and wetland restoration and protection and intends to provide opportunities to replace nonnative and/or invasive plants with native riparian and wetland vegetation. Most of the mitigation projects may require intensive management immediately after restoration activities have been carried out, but the goal of the projects is to be designed to be self-sustaining over the long term after native plants become established. After establishment, routine vegetation management measures may be necessary as part of the long-term management. The river, stream, and wetland mitigation projects are intended to restore and protect natural functions—including but not limited to providing high-quality wildlife and fish habitat, flood-storage capacity, trapping and/or treating water pollutants, slowing storm runoff, and recharging groundwater—which are currently impaired or missing completely from degraded rivers, streams, and wetlands in altered landscapes. The Service Area Descriptions (Appendix A1) provides specific details about current conditions, threats to aquatic resources, and aquatic resource goals and objectives for each service area.

2a. Habitat Loss and Fragmentation

Residential, commercial, and industrial development with its associated infrastructure, such as roads and utilities, is a significant cause of habitat loss and fragmentation in the Program Area. In addition to the loss of wetlands, streams, floodplains, and coastal areas, land development also contributes to the hardening and erosion of shorelines, and loss of hydrologic connection of wetlands and streams with their surrounding landscape. Conversion of land to agriculture and plantation forestry has also contributed significantly to wetland fragmentation and degradation. Floodplain modifications to allow development close to streams results in destruction of riparian forest and reduces the ability of riparian areas to absorb flood waters. The placement of roads can cause multiple impacts to aquatic resources by altering hydrologic connections through restricted or accelerated water flow and sediment transport, disrupting wildlife corridors, and providing pathways for the establishment of invasive species.

Habitat loss and fragmentation interacts significantly with the climate change threat. Changes in temperature and precipitation is forcing migration of both plant and animal species, and this migration depends on adjacent undeveloped land in the forcing direction(s). See *Climate Change* below for more on how we will use mapping of spatial climate resilience to inform threats and opportunities within service areas.

5a. Aquatic Resource Goals / Potential Offsets through an ILF Program

An operational ILF program will help ensure rivers, streams, and wetlands impacted by or degraded by proximity to development will be replaced in meaningful quantities and locations. Many smaller

disturbances can be offset more effectively by combining small projects into fewer, larger projects, and placing them near to (or hydrologically connected to) existing wetlands.

Residential developments often incur small amounts of impacts to and losses of wetlands and other waters of the United States. With an ILF, developers can offset small impacts through financial contributions that support larger, contiguous, and diverse stream and wetland restoration projects. Such contributions may also help to restore active floodplains and protect communities against flood damage and increase resilience of the habitat within the floodplain. Long, contiguous, healthy riparian corridors and floodplains may also provide opportunities for recreation and improve water quality. Additionally, areas impacted from past urbanization activities can be sites for restoration projects with a high degree of aquatic uplift.

Where appropriate, projects will seek to build upon and improve existing protected land networks. Increasing the size of protected habitat patches will mitigate against many threats by eliminating edge effects and increasing offsetting functions and processes.

2b. Altered Hydrology.

Altered hydrology is often a by-product of other land use practices. Urban and rural development, agriculture, plantation forestry and other land-based activities can alter timing and volumes of surface flow and reduce or break hydrologic connections, resulting in lost or degraded aquatic resources. Channelization of streams, surface and ground water withdrawals, draining and filling of wetlands, sand and gravel removal, and dams of various sizes are examples of hydrologic alterations common in the service areas. Many hydrologic alterations are made to hasten the removal of water in service of urban, agricultural and forestry land use and exert a dewatering effect which extends beyond the site of alteration itself. The cumulative effect of many such alterations can result in longer dry periods in former or degraded streams and wetlands, and higher peak flows and flooding downstream during rain events and wet seasons. Hydrologic alterations may also increase or decrease sediment supply, change temperature regimes, prevent aquatic organism migration, or create pathways for invasive species.

5b. Aquatic Resource Goals / Potential Offsets through an ILF Program

Aquatic resource goals for offsetting hydrologic alterations include reconnecting floodplains, restoring incised channels, re-establishing natural channels in straightened reaches, small dam removals to reconnect broken stream segments, and removal or modification of culverts and bridges which create altered hydrology and barriers to aquatic organism passage.

An ILF program could also provide a significant new tool to address hydrologic restoration needs identified in existing watershed based plans and TMDL documents residing in the service areas. Many TMDL and watershed plan documents identify the same threats as described above, and recommend project types that would fit well as offsets to hydrologic alterations. However, funding is rarely dedicated to implementing these plans, and plan sponsors are rarely obligated to implement the restoration actions.

2c. Agricultural and Grazing Practices

Despite reduced agricultural footprint compared to past land use distribution, South Carolina still retains 3.3M acres of agriculture statewide. This includes 1003 confined animal operations as well, which are concentrated into service areas in the Edisto, Black, and Pee Dee River watersheds. Crop agriculture can produce many hydrologic and water quality impacts through ditching, draining, nutrient and chemical pollution, and sedimentation. Prior to regulation, wetland areas were also directly converted to farmland. Historically and currently, animal operations exert a variety of impacts on aquatic resources including riparian vegetation disturbance or removal, stream bank erosion, and nutrient and bacterial pollution.

5c. Aquatic Resource Goals / Potential Offsets through an ILF Program

Aquatic resource goals to address agricultural impacts will include reconnecting floodplains, restoring incised channels, re-establishing natural channels in straightened reaches, reducing livestock access to waterways, restoring marginal croplands to wetland, and addressing impacts to riparian vegetation. Invasive species management and removal as part of these activities will further enhance wetlands and riparian areas.

Marginal and expired agricultural sites provide opportunities for restoration and preservation to offset current and past agricultural impacts. Agricultural lands generally have a higher potential for successful restoration projects when compared to urban areas. For example, there may be more opportunity to restore and provide active floodplains where flooding can be accommodated. Current mapping of resilient and connected lands will assist the ILF program in selecting high-impact restoration projects and refining goals.

2d. Invasive Species.

Introduced non-native species, either deliberate or accidental, can pose a serious threat to the survival of South Carolina's native species. Disturbed or modified wetlands and streams can accelerate facilitate establishment of invasive species, which can quickly displace native flora and fauna. Some species like common reed (*Phragmites australis*) and cogongrass (*Imperata cylindrica*) ultimately create monocultures with little or no benefit to wildlife.

Not all introduced species become invasive, but those that do can readily displace native species through competition for food and space, predation on native species (e.g. flathead catfish on redbreast sunfish), and by transmitting diseases, thereby causing serious ecological and economic harm. Once established, it can become difficult or nearly impossible, to eradicate or control some invaders. Many destructive insects, fungal diseases, and other aquatic invaders are introduced through international trade routes or spread by infected plants sold in the commercial plant industry. Early detection and eradication are critical to preventing outbreaks by new invasive species.

5d. Aquatic Resource Goals / Potential Offsets through an ILF Program

Invasive species removal will be an important goal in some ILF projects. The likelihood of success must be thoroughly considered before incorporating invasive species goals into ILF mitigation projects. Control rather than total eradication is a more feasible goal – some invasive species impacts can be

significantly reduced by initial direct control followed by restoring overhead cover in riparian zones, for example. Some resources in the service areas are infested to the point where successful, long-term control is unlikely. An important additional program goal is to assure stream restoration projects, particularly dam removals and culvert / bridge removals or upfits, do not facilitate new pathways for instream invasive species.

2e. Climate Change.

Naturally occurring climate change is not necessarily problematic, but the rapid change we are seeing today is driven almost completely by increased greenhouse gas emissions from human sources. Overall, South Carolina has warmed by 0.5 to 1.0 degrees F over the last century, with much of the warming coming from increases in nighttime low temperatures. On the coast, sea level is projected to rise by 1-4 feet by 2100, with current trends favoring the high end of the range. The amount of precipitation during heavy rainstorms has increased by 27 percent across the Southeast, and South Carolina has been struck by a wave of multiple tropical cyclone events since 2015. The latter is reflective of broader increases in Atlantic named storms over the last 100 years.

Climate change is forcing adjustments in species' ranges and the timing of life cycle events. Tree species are shifting ranges northward and toward higher elevations to maintain their preferred temperature ranges. Mean arrival dates of migratory birds are shifting forward. Warming winters are causing breed timing of fall- and spring-breeding pond-dwelling amphibians to converge. Edge-of-range cold-water stream fauna like brook trout may be at particular risk as streams warm beyond their temperature limits. These are but a few myriad effects climate change is exerting on our native flora and fauna.

The climate change threat also intersects with other threats. Habitat loss and fragmentation cuts off spatial avenues by which species may adapt to climate change. Reducing habitat patch size may exacerbate species competitions forced by temporal resilience responses. Hydrologic alteration effects are likely magnified by precipitation shifts, and climate change is creating hospitable conditions for invasive species which previously were marginal issues. Hydrilla and Japanese climbing fern are two good examples of invasive species becoming more problematic in South Carolina as they exploit, respectively, the reduced number of winter frosts and increased CO2 in the atmosphere.

5e. Aquatic Resource Goals / Potential Offsets through an ILF Program

The TNC-SC ILF Program will build aquatic resource resilience to climate change by restoring degraded wetlands and streams. Many project types can enhance resilience and will be selected based on site-specific needs. Of particular importance for resilience is to restore severed connections between aquatic resources or segments thereof, and to site projects where landscape conditions support resilience. This means siting projects to expand and/or improve existing protected areas, and to site projects in core, hub, and connector habitats as defined by landscape resilience mapping efforts like TNC's Resilient and Connected Lands project, and the South Atlantic Landscape Conservation Cooperative mapping. A companion analysis directly addressing resilience of lotic systems is under development now by TNC, and will be incorporated in our project site selection process.

Element 6. Prioritization Strategy for Selecting and Implementing Compensatory Mitigation

The following criteria will guide the ILF prioritization strategy. TNC will employ the South Carolina Watershed Resources Registry as the initial screening tool for mitigation site selection. Potential sites will be ranked according to the factors listed below. An emphasis will be placed on connection to existing conserved land and water networks to produce higher levels of watershed function. Successfully applied, these criteria will increase the quality of the aquatic resource restoration and preservation and increase efficiency of implementation.

1. **Likelihood of success:** Projects must demonstrate a high likelihood of success through a sound restoration concept. Whenever available, local or regional conservation or watershed plans or other guidance with identified priority restoration projects will be used to help in selecting projects with the highest likelihood of success. Water sources for restoration sites should be reliable and capable of functioning with little or no human intervention. Threats from invasive species should be manageable. Projects will be evaluated for their ability to result in successful and sustainable net gain of stream and wetland acreage / footage and function with limited maintenance. Restoration projects will receive priority due to the higher lift in function that can be achieved.
2. **Multiple objectives:** Projects will be evaluated for their ability to address multiple functions and services such as improvement of wildlife habitat, support for at-risk species, flood attenuation, water quality improvements, and educational values. Projects should target native plant and aquatic community diversity and natural processes. Greater functional gains should be given preference. Standing local or regional watershed plans with restoration objectives will be utilized as much as possible.
3. **Support of regional conservation initiatives and compatibility with the surrounding landscape:** Projects should be located where adjacent land uses pose minimal conflict and where they meet regional conservation priorities, address limiting factors identified in watershed assessments, provide habitat corridors, or add to the effectiveness of nearby protected natural areas.
4. **Capacity of the applicant and the project team:** TNC has a demonstrated capacity and expertise to manage ILF restoration projects and will partner with other entities such as private consultants, state and federal agencies, contractors, local land trusts, and universities. TNC SC will establish restoration project teams with the necessary expertise and capacity to carry out pre-implementation planning, restoration construction, follow-up monitoring and remediation of project problems.
5. **Long-term management:** Suitable projects must have a plan for long-term management and stewardship. TNC-SC plans to partner with land trusts and local, state, and federal agencies to establish long term management partners for completed restoration project sites.
6. **Site selection meeting 2008 Compensatory Mitigation Rule requirements:** The compensatory mitigation project site must be ecologically suitable for providing the desired aquatic resource functions. In determining the ecological suitability of the compensatory mitigation project site, the district engineer must consider, to the extent practicable, the following factors:

- a. Hydrologic conditions, soil characteristics, and other physical and chemical characteristics;
 - b. Watershed-scale features, such as aquatic habitat diversity, habitat connectivity, and other landscape scale functions;
 - c. The size and location of the compensatory mitigation site relative to hydrologic sources and other ecological features;
 - d. Compatibility with adjacent land uses and watershed management plans;
 - e. Reasonably foreseeable effects the compensatory mitigation project should have on ecologically important aquatic or terrestrial resources, cultural sites, or habitat for federally-or state-listed threatened and endangered species; and
 - f. Other relevant factors including, but not limited to, development trends, anticipated land use changes, habitat status and trends, the relative locations of the impact and mitigation sites in the stream network, local or regional goals for the restoration or protection of particular habitats.
7. **Habitat types or functions (e.g., re-establishment of habitat corridors or habitat for species of concern):** Projects that provide the greatest improvements at a watershed scale should be prioritized for restoration.
8. **Contribution to resilience:** Projects should be prioritized if they support the resilience of aquatic resources within a service area under stress from large-scale climate change (drought, temperature change, extreme events, etc.). Individual mitigation projects will be selected based on Interagency Review Team (IRT) review of proposals brought forward by TNC-SC. TNC-SC will establish a process to solicit projects from qualified applicants if required.

Element 7. How Preservation Satisfies Criteria for use of Preservation as Mitigation.

Preservation may be one compensatory mitigation method considered through this program and may be an important tool for addressing the Program Area needs. The program will, however, give greater preference to identifying and implementing projects that generate compensatory mitigation through restoration or enhancement.

Preservation will be considered an appropriate compensatory mitigation method when:

- 1. the resources to be preserved provide important physical, chemical or biological functions for the watershed;
- 2. the resources to be preserved contribute significantly to the ecological sustainability of the watershed;
- 3. preservation is appropriate, practicable, and has the support of the IRT and the USACE;
- 4. the resources are under threat of destruction or adverse modifications; and
- 5. the preserved site will be permanently protected through an appropriate real estate or other legal instrument (e.g., easement, title transfer to state resource agency or land trust).

Element 8. Public and Private Stakeholder Involvement in Plan Development and Implementation.

TNC works closely with public and private partners to develop local, state, and regional conservation visions, and uses ecoregional assessments to design and implement effective conservation strategies at multiple scales to conserve biological diversity. We depend on diverse partners from state and federal agencies, non-governmental organizations, industry, and academic institutions to inform and influence our work while supporting the alliances necessary to achieve meaningful conservation results.

Some examples include our long history of cooperative land acquisitions with local, state and federal agencies, along with our participation in local multi-partner conservation task forces across the state. TNC is also a leader in the SC Land Trust Network, and a valued partner in state conservation policy efforts like the SC Conservation Bank, state water planning, and state climate resilience policy and hazard mitigation / response efforts. We fully intend to carry these long-standing partnerships into the work of siting and implementing high-quality stream and wetland mitigation projects under the TNC-SC ILF Program

Partner support and engagement in implementing mitigation projects through this program will be critical to its success. TNC-SC will likely implement some projects under its own agency but, in many other cases, TNC-SC will request proposals from qualified partners, such as public agencies or conservation NGOs to implement mitigation projects meeting the criteria of the TNC-SC ILF Program. We anticipate a significant portion of the lands included in this program will be owned and managed by other organizations, with TNC in the role of seeking proposals, selecting those to be considered by the IRT, and playing a support role to the lead organization for the specific project. As program sponsor, TNC-SC will of course retain the ultimate responsibility for mitigation success and long-term maintenance.

Element 9. Long-term Protection and Management Strategies for Activities Conducted by the ILF Sponsor.

TNC-SC will develop a mitigation plan for each proposed in-lieu fee project in accordance with the 2008 Compensatory Mitigation Rule (§332.4 (c)(2) through (c)(14)). The mitigation plan will include:

- A description of the legal arrangements and instrument, including site ownership, that should be used to ensure the long-term protection of the compensatory mitigation project site in accordance with the 2008 Compensatory Mitigation Rule (§332.7(a)). Appropriate real estate mechanisms may include, but are not limited to, fee simple ownership, deed restrictions, and conservation easements. A management plan ensuring long-term protection and management to support the project objectives must be approved by the ILF sponsors and USACE. If a conservation easement is used, it will be in perpetuity and the conservation easement holder

must be an entity qualified by the US Internal Revenue Service to hold conservation easements, such as a land trust or an agent of local or state government.

- A long-term management plan will describe:
 - **Long-term management needs:** A description of any long-term management needs that will be carried out after performance standards have been achieved to ensure the long-term sustainability of the resource.
 - **Long-term stewardship funding:** An estimate of the funding needs for carrying out long-term management activities and a description of the funding mechanism that will be used to meet those needs. If a conservation easement is established, a separate long-term easement stewardship fund will be established to support all costs associated with easement monitoring and defense. Defense may be funded with an appropriate insurance program, such as that provided by TerraFirma (entity created by the Land Trust Alliance), but an amount equal to the deductible on any such insurance must be kept in funds that can be readily liquid.
 - **Responsible party:** TNC-SC intends to provide long-term site management until the appropriate land stewardship entity, such as a public agency, non-governmental organization, or private land manager has been identified and approved by the IRT. The long-term stewardship entity need not be identified in the mitigation plan, as long as the future transfer of long-term management responsibility is approved by the IRT. Once long-term management and associated long-term stewardship funds, as appropriate, have been transferred to a long-term stewardship entity, the long-term stewardship entity is then responsible for meeting all long-term management responsibilities outlined in the project-specific mitigation plan.
 - **Program audit:** The IRT and Sponsor intend to determine a reasonable frequency for ILF audits and an appropriate entity to conduct them.

Element 10. Strategy for Periodic Evaluation, Progress Reporting, and Revising the Planning Framework as Needed.

TNC-SC plans to submit an annual report on the TNC-SC ILF program to the IRT. This report will provide an opportunity to assess the program and recommend changes to improve implementation and ecological outcomes of mitigation projects and overall administration of the program.

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