No. 142, Original

In The
Supreme Court of the United States

STATE OF FLORIDA,

Plaintiff,

v.

STATE OF GEORGIA,

Defendant.

Before the Special Master
Hon. Ralph I. Lancaster

AMICUS CURIAE BRIEF OF NATIONAL AUDUBON SOCIETY, DEFENDERS OF WILDLIFE, FLORIDA WILDLIFE FEDERATION, and APALACHICOLA RIVERKEEPER

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> "The Apalachicola River is undammed and largely wild, flowing through the heart of one of the nation's six hot spots of biodiversity. Large tracts of public and protected lands feature high bluffs, abundant wildlife, rare animals and plants making this river among the most unique in Florida. The watershed is a primary spawning and nursery habitat for fish and other aquatics and is a critical migratory bird route. The river basin's varied habitats, from rare steephead ravines with the only native Torreya taxifolia found anywhere to bottomland hardwood forests, give it the highest species density of amphibians and reptiles on the continent, north of Mexico."[1]

INTRODUCTION

The doctrine of equitable apportionment, like the common law more generally, is a flexible one that evolves to meet contemporary needs. Today, there simply is no question that one of these needs is preservation of the functioning ecosystems that sustain human communities and the wildlife with which we share the planet. Nowhere is that need more evident than in the Apalachicola River and Bay watershed, a "biodiversity hotspot"[2] that "represents an unusually important example of a natural river basin that has remained relatively free of human impacts."[3]

The long-term ecological sustainability of this vital and vibrant interconnected ecosystem depends, critically, on freshwater flows moving through

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[1] *Apalachicola River Blueway*, National Recreation Trails Program, http://www.americantrails.org/NRTDatabase/trailDetail.php?recordID=3847 (last visited Oct. 18 2016).

[2] Edmiston, H. Lee, Apalachicola National Estuarine Research Reserve, A River Meets the Bay 50 (Dec. 2008), http://www.dep.state.fl.us/coastal/downloads/management_plans/A_River_Meets_the_Bay.pdf [hereinafter "Edmiston"].

[3] Livingston, Robert J., *Importance of River Flow to the Apalachicola River-Bay System,* Report to the Florida Department of Environmental Protection 15 (Sept. 2008), http://mayorvanjohnson.com/files/Livingston_Report.pdf [hereinafter "Livingston II"].

the system at the right times. Regular, periodic inundation of the Apalachicola River floodplain not only sustains local wildlife populations adapted to the natural freshwater flow regime, but also functions as the primary mechanism by which nutrients move downstream to the Bay, where these nutrient rich freshwater flows provide essential nourishment for marine organisms at the base of the food chain. In recent decades, upstream withdrawals and diversions from the Apalachicola-Chattahoochee-Flint system have depleted the Apalachicola River's natural flow, drying out the downstream ecosystem, threatening the survival of numerous species, and jeopardizing the economic vitality of local communities.

The ongoing ecological harm to the Apalachicola watershed as a result of diminished freshwater flows is fully cognizable under the Court's evolving and expansive common law of equitable apportionment, as Florida's pre-trial brief and the *amicus curiae* briefs of J.B. Ruhl and the Turner Environmental Law Clinic explain in detail. Those briefs do not, however, fully capture and convey the ecological significance of the Apalachicola watershed or the nature and magnitude of the existential threat it faces after several decades of declining freshwater flows. Here, *Amici* National Audubon Society, Defenders of Wildlife, Florida Wildlife Federation, and Apalachicola Riverkeeper – non-profit conservation organizations with an abiding interest in the long-term sustainability of the greater Apalachicola River and Bay ecosystem[4] – respectfully offer a broader contextual perspective necessary to inform the Court's fashioning of a just and equitable apportionment.

[4] *See* Motion for Permission at 3.

In particular, any apportionment should ameliorate ecological injury to the greatest extent feasible by accounting for the dynamic needs of the Apalachicola River's natural freshwater system, especially in an era of accelerating climate change.[5]

BACKGROUND

I. The Apalachicola River Floodplain System Is Unique and Special.

The Apalachicola River, floodplain, estuary, and Bay comprise an incredibly rich and diverse system of exceptional ecological importance. Formed by the merger of the Chattahoochee and Flint Rivers at the Florida border, the Apalachicola River nourishes a 144,000-acre floodplain[6] as it flows 106 miles south to the Apalachicola Bay and Eastern Gulf of Mexico.[7] From the state border to the Gulf, the River forms a complex system of upland, floodplain, riverine, estuarine, and barrier island environments, sustaining a lush range of habitats and the marine waters of the downstream Bay.[8]

The River's vital floodplain supports one of the last unbroken bottomland hardwood communities in the nation and provides a protected north-south plant and wildlife dispersal corridor stretching from the southern Appalachian Mountains

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[5] Consistent with the Court's direction in its Order on Motions for Leave to File *Amicus* Briefs (Dkt. No. 488), *Amici* offer factual information about the watershed contained in official government reports and scientific articles of which the Court may take judicial notice. To the extent that further factual development is necessary regarding widespread ecosystem disruption and ecological harm now occurring in the Apalachicola River watershed, *Amici* respectfully encourage the Court to use its extraordinary authority to request additional briefing from the Parties and *Amici*.

[6] Edmiston, *supra* note 2 at 54.

[7] Edmiston, *supra* note 2 at 6.

[8] Edmiston, *supra* note 2 at 2.

to the Gulf of Mexico.[9] This corridor supports a vast array of fish, wildlife, and plants. Over 130 species of fresh and estuarine fish live in the Apalachicola River – more than in any other river in Florida – and over 140 fish species are found in the Bay.[10] More than 50 species of mammals, including the Florida black bear and the endangered West Indian Manatee, reside in the Apalachicola drainage basin.[11] Over 40 species of amphibians and 80 species of reptiles live within the Apalachicola region, the highest diversity of amphibians and reptiles in the United States and Canada.[12] At least 282 avian species, including 164 migratory bird species, spend time in the lower 52 miles of the Apalachicola floodplain and Bay.[13] Finally, more than 1,300 plants species, including 103 that are threatened or endangered, inhabit in the region.[14]

As of 2012, there were more than 30 federally threatened or endangered animal species in the Apalachicola River Basin and Apalachicola Bay, including bird species such as the Piping Plover and Wood Stork.[15] The rich environment of

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[9] Richard J. Blaustein, *Biodiversity Hotspot: The Florida Panhandle*, 58 BIOSCIENCE 785 (Oct. 2008), http://bioscience.oxfordjournals.org/content/58/9/784.full.

[10] *See* U.S. Army Corps of Engineers, *Draft Environmental Impact Statement for the Update of the Water Control Manual for the Apalachicola-Chattahoochee-Flint River Basin, Volume 1* 2-205 (Oct. 2015), http://www.sam.usace.army.mil/Portals/46/docs/planning_environmental/acf/docs/ACF%20DEIS%20Vol1.pdf [hereinafter "*ACF Draft EIS*"].

[11] *ACF Draft EIS, supra* note 10 at 2-205.

[12] *ACF Draft EIS, supra* note 10 at 2-205.

[13] *Edmiston, supra* note 2 at 100.

[14] *ACF Draft EIS*, *supra* note 10 at 2-205.

[15] U.S. Fish and Wildlife Service, *Biological Opinion on the US Army Corps of Engineers, Mobile District, revised interim operating plan for the Jim Woodruff Dam and the associated releases to the Apalachicola River* (2012),

the Apalachicola River basin provides the necessary habitat for these endangered or threatened species of mammals, birds, fish, mussels, amphibians, reptiles, and plants to survive.[16] In fact, the entire Apalachicola River is designated critical habitat for the federally threatened Gulf sturgeon, and portions of the River are designated critical habitat for three federally endangered and threatened species of mussels.[17] The larger region is designated critical habitat for several other species, including the fat threeridge and purple bankclimber.[18] The basin also provides refuge to a number of vulnerable mammalian species, including the federally listed West Indian manatee, Indiana bat, and gray bat.[19] Likewise, the Apalachicola estuary is home to a number of birds recognized by the state of Florida as threatened or "of concern," including the Least Tern, Black Skimmer, and American Oystercatcher.[20]

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https://www.fws.gov/southeast/news/2012/pdf/woodruffBOFinal.pdf [hereinafter "BiOp"].

[16] *ACF Draft EIS*, *supra* note 10 at 2-213.

[17] *ACF Draft EIS*, *supra* note 10 at 2-215.

[18] BiOp, *supra* note 15.

[19] *ACF Draft EIS*, *supra* note 10 at 2-205.

[20] *See* Florida Fish and Wildlife Conservation Commission, *Black Skimmer Biological Status Review Report*, (Mar. 31, 2011), http://myfwc.com/media/2273268/Black-Skimmer-BSR.pdf; Florida Fish and Wildlife Conservation Commission, *Biological Status Review for the Least Tern*, (Mar. 31, 2011), http://myfwc.com/media/2273337/Least-Tern-BSR.pdf; Florida Fish and Wildlife Conservation Commission, *American Oystercatcher Biological Status Review Report*, (Mar. 31, 2011), http://myfwc.com/media/2273253/American-oystercatcher-BSR.pdf; Kathy C. Molina and R. Michael Erwin, *The Distribution and Conservation Status of the Gull-billed Tern (Gelochelidon nilotica) in North America,* 29 Waterbirds 271, 272 (2006).

The Apalachicola basin's quilted landscape of bottomland hardwood forest and tupelo-cypress swamps were created, and are maintained, by the Apalachicola River's natural flow regime.[21] Historically, seasonal high water flows regularly inundated the surrounding floodplain, supporting forest and wetland habitats and bringing nutrients and organic detritus back into the River channel.[22] The River ultimately deposited these nutrients downstream into the Bay and Eastern Gulf, where they fed the brackish, nutrient-rich estuary[23] and supported marine life in the wider Eastern Gulf.[24] The River's flows traditionally contributed 35 percent of the freshwater input to the northeastern Gulf of Mexico, regulating salinity and nutrient concentrations miles offshore.[25] Thus, the Apalachicola River floods and baseline flows created and maintained the inextricably interconnected network of ecosystems that stretch from the Florida border into the Eastern Gulf of Mexico.[26]

The River's historic flow regime also sustained the coastal economy of the Apalachicola Bay. This region remains an old-style working waterfront that relies on the delicate mixture of rich fresh and saltwater at the mouth of River creating

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[21] J. Anthony Stallins *et al.*, *Biogeomorphic Characterization of Floodplain Change in Response to Reduced Flows Along the Apalachicola River, Florida*, 26 River Research and Applications 242, 244 (Mar. 2010), http://onlinelibrary.wiley.com/doi/10.1002/rra.1251/epdf [hereinafter "Stallins"].

[22] Edmiston, *supra* note 2 at 14.

[23] *ACF Draft EIS, supra* note 10 at 2-190.

[24] Edmiston, *supra* note 2 at 14.

[25] Robert J. Livingston, *The Ecology of the Apalachicola Bay System: An Estuarine Profile* 13 (Sept. 1984), http://www.nwrc.usgs.gov/techrpt/82-05.pdf [hereinafter "Livingston I"].

[26] Stallins, *supra* note 21.

"one of the most productive estuaries in the northern hemisphere."[27] As the State of Florida's briefing explains in greater detail, the Apalachicola estuary produces approximately 90 percent of Florida's commercial oysters and 10 percent of the total U.S. production.[28] The estuary also serves as a critical nursery for a range of other commercial species. including shrimp, blue crabs, bass, grouper, red fish, speckled trout, and flounder.[29]

In sum, the Apalachicola River is not just another river. It is a unique and special place[30] that forms the backbone for "what can be considered one of the least polluted, most undeveloped, resource rich systems left in the United States."[31]

II. The Apalachicola River Floodplain System Depends on Receiving the Right Amount of Water at the Right Times and Disruption of the Natural Flow Regime Threatens Its Survival.

The amount of water flowing through the Apalachicola River is the fundamental driver for the ecological health and extraordinary biodiversity of the River, floodplain, and Bay. Indeed, as with all river systems, flow is the "master variable" for the Apalachicola River, driving the River's form and function and the

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[27] *ACF Draft EIS*, *supra* note 10 at 2-205.

[28] See Edmiston, *supra* note 2 at 41.

[29] *ACF Draft EIS*, *supra* note 10 at 2-205.

[30] Among other designations, the Apalachicola area has been recognized as a National Estuarine Research Reserve (designated by the National Oceanic and Atmospheric Administration), a Man and the Biosphere Reserve (designated by the United Nations UNESCO Programme), a Bay Aquatic Preserve (designated by the State of Florida), an Outstanding Florida Water (designated by the State of Florida), and a Biodiversity Hotspot (designated by The Nature Conservancy). Edmiston, *supra* note 2 at 2, 4, 50, 126.

[31] Edmiston, *supra* note 2 at 2, 4, 50, 126.

ecology of the fish and wildlife that evolved in the Apalachicola ecosystem.[32] Because over 80 percent of the Apalachicola's water flow originates from the upstream Chattahoochee and Flint Rivers,[33] this Court's equitable apportionment decision will have tremendous and long lasting consequences for this ecological treasure.

The Apalachicola's natural flow regime is characterized by seasonal highs and lows, with high water events historically occurring in the winter and early spring.[34] Across these cycles, the Apalachicola River's "width varies from several hundred feet, during low flow, to nearly 4.5 miles during high flow."[35] The productivity and biodiversity of the region depend on the regular seasonal inundation of the floodplain and the natural variability in freshwater flow.[36] For example, for the 80 to 85 percent of fish species in the Apalachicola River that use the floodplain as a food source, floodplain inundation is critical.[37] "Over the long term, the system is dependent on annual spring floods and a healthy, productive, bottom-land hardwood forest in the flood plain to maintain nutrient and detritus

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[32] U.S. Army Corps of Engineers, *Draft Environmental Impact Statement for the Update of the Water Control Manual for the Apalachicola-Chattahoochee-Flint River Basin, Volume 3 Appendices J-N*, Appendix J 15 (Oct. 2015), http://www.sam.usace.army.mil/Portals/46/docs/planning_environmental/acf/docs/ACF%20DEIS%20Vol3_Appendix%20J-N.pdf.

[33] Edmiston, *supra* note 2 at 9.

[34] Livingston I, *supra* note 25 at 9.

[35] Edmiston, *supra* note 2 at 49.

[36] Livingston I, *supra* note 25 at 29-30.

[37] Livingston II, *supra* note 3 at 16.

flow to the bay."[38]

Unfortunately, upstream human activities have dramatically altered the area's natural flow cycle with significant impacts.[39] Since the 1970s, the Apalachicola's freshwater flows have declined significantly below the natural range, reducing the extent of seasonal flooding and "substantially chang[ing] long-term hydrologic conditions in" the basin.[40] "Periods of low water levels are now more frequent and longer in duration . . . resulting in longer periods during which floodplain streams are dewatered, isolated, or not flowing, and swamps and bottomland hardwood forests are dry."[41] Because river, floodplain, and bay ecosystems are intricately linked –and species across those systems are adapted to specific flow regimes – reduced water levels have resulted in measurable ecological stress and harm throughout the system, as detailed below.

A. Low Flows Are Already Having Significant Adverse Impacts on the Apalachicola River and Floodplain.

Low flows in the Apalachicola River have reduced the River's connectivity to its floodplain, causing significant damage to the vital habitat provided by the

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[38] Elder, John F. and Mattraw, Jr., Harold C., U.S. Geological Survey, *Nutrient and Detritus Transport in the Apalachicola River, Florida* C57 (1984), http://pubs.usgs.gov/wsp/2196c/report.pdf.

[39] *See, e.g.*, Edmiston, *supra* note 2 at 18, 41, 43, 82, 150, 154, 155.

[40] Helen M. Light et. al., U.S. Geological Survey, U.S. Dep't. of the Interior. *Water-Level Decline in the Apalachicola River, Florida, from 1954 to 2004, and Effects on Floodplain Habitats* 1 (2006), http://pubs.usgs.gov/sir/2006/5173/pdf/sir2006-5173.pdf [hereinafter "Light"].

[41] Light, *supra* note 40 at 48.

River's rich tangle of sloughs, wetlands, and floodplain forests.[42] The U.S. Geological Survey has concluded that:

> Water-level declines in the river have substantially changed long-term hydrologic conditions in more than 200 miles of off-channel floodplain sloughs, streams, and lakes and in most of the 82,200 acres of floodplain forests in the nontidal reach of the Apalachicola River.[43]

The floodplain is, quite literally, drying out.[44] And that phenomenon is causing significant harm. From 1976 to 2004, the density of trees in the swamplands decreased by 37 percent, a loss of more than 4.3 million trees. Four critically important swamp species – water tupelo, pop ash, Ogeechee tupelo, and bald cypress – account for the vast majority of the loss.[45] More than 200 miles of floodplain sloughs, streams, and lakes that "provide extensive habitat for fishes and other aquatic organisms" have also been degraded.[46]

Reduced flows and the resulting damage to the River's vital habitats create cascading impacts on fish and wildlife throughout the system. For example, when the River is disconnected from the floodplain, fish cannot access this vital habitat. "More than 80 percent of the freshwater and anadromous fish species found in the Apalachicola River are known to spend some part of their life cycle in floodplain

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[42] Stallins, *supra* note 21 at 242-47.

[43] Light, *supra* note 40 at 1-2.

[44] Darst, M.R., Light, H.M., U.S. Dep't of the Interior, U.S. Geological Survey, *Drier Forest Composition Associated with Hydrologic Change in the Apalachicola River Floodplain, Florida* 81 (2008), https://pubs.usgs.gov/sir/2008/5062/pdf/sir2008-5062_low-rez.pdf [hereinafter "Darst"].

[45] Darst, *supra* note 44 at 1.

[46] Light, *supra* note 40 at 1-2.

habitats."[47] Many of these species rely on access to, and inundation of, the floodplain to spawn, making low flow levels particularly detrimental to the lifecycle of those species.[48] Federally protected species such as Gulf sturgeon are also dependent on natural river flows.[49]

Critically vulnerable species can be extirpated locally by conditions occurring in the driest years.[50] For example, the endangered fat threeridge mussel, while still extant, is no longer present in numerous localized potions of its historical range in the Apalachicola.[51] Likewise, the endangered purple bankclimber mussels were eliminated from certain river stretches during recent low flow years and have not re-colonized the affected areas.[52]

Reduced flows and floodplain drying also have reverberating effects on nutrient cycling and food webs across the system:

> Drier conditions are detrimental for the growth of swamp species . . . . The loss of canopy density in swamps may result in the swamp floor being exposed to more light with an increase in the amount of ground cover present, which in turn, would reduce tree replacement. The microclimate of the swamp floor would become warmer due to the decrease in shade and inundation. Soils would become dehydrated more quickly in dry periods and debris would decompose more quickly. A loss of tree density in swamps would lead to a decrease in tree and leaf litter biomass, which would have additional effects on swamp organisms. The loss of litter would result in a loss of substrate for

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[47] Light, *supra* note 40 at 1-2.

[48] See *ACF Draft EIS*, *supra* note 10 at 2-199; Livingston II, *supra* note 3 at 16-17.

[49] See *ACF Draft EIS*, *supra* note 10 at 2-206; Livingston II, *supra* note 3 at 4.

[50] Light, *supra* note 40 at 26.

[51] *ACF Draft EIS*, *supra* note 10 at 2-214.

[52] Livingston II, *supra* note 3 at 5.

> benthic organisms in the floodplain and, ultimately, in the downstream waters of the river and estuary.[53]

Indeed, these effects have already been observed across the system. The decreased inundation of the floodplain has led to a decline in the quantity and quality of floodplain habitats for fish, mussels, and other freshwater aquatic organisms.[54] The drier conditions have caused reductions in organic detrital matter that feeds the bacteria and soil dwelling species like worms and caterpillars, which condition the soil and provide food to birds, fish, crawfish, reptiles, and mammals that inhabit the floodplain.[55]

Changing forest floodplain habitats, and the loss of the fish and invertebrate populations they support, have also put the region's migratory birds at risk. The bottomland hardwoods of the Apalachicola River floodplain provide an abundant food source and important habitat for migrating and overwintering birds.[56] Forests with a natural flood regime are particularly valuable because they have disturbed patches that support a set of species not found in the interior of old-growth forests.[57] Many of the bird species that use the Apalachicola River floodplain corridor,

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[53] Darst, *supra* note 44 at 2.

[54] Darst, *supra* note 44 at 48-49.

[55] *See, e.g.*, Darst, *supra* note 44 at 52.

[56] Edmiston, supra note 2 at 100.

[57] R.A. Askins, *Restoring North America's Birds: Lessons from Landscape Ecology* 96 (2002). It should be noted that three species that inhabit bottomland forests have already been extirpated – the Ivory-billed Woodpecker, the Carolina Parakeet, and the Bachman's Warbler. *Id.* at 88-97.

including species on the North American Bird Conservation Initiative Watch list,[58] depend on rivers with wide strips of bottomland forests.[59]

B. Low Flows are Already Having Significant Adverse Impacts on the Apalachicola Bay and Eastern Gulf of Mexico.

The adverse impacts of a drying watershed do not stop at the mouth of the Apalachicola River; they extend into the Bay, stretching miles into the Eastern Gulf of Mexico. Freshwater flows from the Apalachicola River are the primary driver of biodiversity in the Apalachicola Bay. Indeed, "[t]he importance of the Apalachicola River to the productivity of Apalachicola Bay cannot be overemphasized."[60] The quantity of freshwater has a direct correlation with salinity and nutrient levels in the Bay, which in turn determine the species, distribution, and density of organisms.

First, extended periods of low flow have a direct impact on salinity levels in the Apalachicola estuary, with significant impacts to oysters and other species. "River flow is the primary determinant of salinity concentrations in the estuary . . ."[61] Salinity levels are "one of the major limiting factors in oyster production. Prolonged high salinities due to drought or other factors affect freshwater flow and

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[58] K. V. Rosenberg et. al., *The State of the Birds 2014 Watch List* (2014), http://www.stateofthebirds.org/2014/extinctions/watchlist.pdf.

[59] J.C. Kilgo et. at., *Effect of Stand Width and Adjacent Habitat on Breeding Bird Communities in Bottomland Hardwoods,* 62 Journal of Wildlife Management 72-83 (1998).

[60] Edmiston, *supra* note 2 at 50.

[61] *ACF Draft EIS*, *supra* note 10 at 2-206.

allow for increased predation . . . and decreased food availability."[62] In recent years, low water flows and drought conditions have caused increased salinity levels in the Bay, leading to a host of negative impacts.[63] For example, increased salinity levels have adversely affected the East Bay grass beds that represent an important habitat and source of productivity for the upper Bay.[64] High salinity levels have also damaged Bay and Gulf fisheries for white shrimp, blue crab and sciaenid fish populations.[65] In addition, salinity increases have led to increases in oyster predation and mortality, as evidenced in the crash of the Bay's oyster industry in 2012.[66] The impacts to marine species can reverberate on coastal birds like the American Oystercatcher, which feeds on marine bivalves and is thus dependent on the ecological health of the Bay.

Second, low flows affect the transport of vital nutrients and detritus from the Apalachicola River floodplain to the Bay and Eastern Gulf.[67] As discussed above, the River is the engine for nutrient transport from the floodplain to the Bay. Nutrient loading from the Apalachicola River creates the conditions for very high phytoplankton productivity that forms the basis of the Bay's food webs.[68] Organisms that feed on phytoplankton, in turn, support high numbers of anchovies and other small fish that are critical for the coastal water birds and other larger

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[62] *ACF Draft EIS*, *supra* note 10 at 2-206.
[63] Livingston II, *supra* note 3 at 2.
[64] Livingston II, *supra* note 3 at 7.
[65] Livingston II, *supra* note 3 at 12.
[66] *See* FL brief at 25; *see also*, Edmiston, supra note 2 at 43.
[67] *See, e.g.*, Edmiston, *supra* note 2 at 50; Livingston II, *supra* note 3 at 2.
[68] *See, e.g.*, Edmiston, *supra* note 2 at 46; Livingston II, *supra* note 3 at 2.

fish.[69] Nutrients transported throughout the River system impact commercially important species in the Apalachicola estuary, including oysters, blue crabs, penaid shrimp, and sciaenid fish (also known as drums and croakers).[70] Beyond nourishing the Bay's vital nursery, the Apalachicola River contributes 35 percent of the freshwater flow to the Eastern Gulf, delivering nutrients into the Gulf and affecting habitats and spawning far beyond the Bay.[71] Thus, overall, "nutrients and detritus carried from the [Apalachicola] floodplain by river floods contribute significantly to the relatively high productivity of Apalachicola Bay" and beyond.[72]

Lowered Apalachicola River flows reduce detritus loading from wetland areas and inflow to the Bay. The associated reductions of nutrients, along with low flow-induced water quality changes, lead to altered phytoplankton productivity.[73] These alterations in turn disrupt Bay food webs and reduce overall productivity in the Bay. For example, loss of phytoplankton in Florida's coastal waters lead to declines in small nutrient-rich fish that feed on the plankton. The schooling behavior and abundance of these smaller fish make them ideal prey for much larger coastal predators such as terns, pelicans, and ospreys. Declines in these small fish exacerbate the declines of the much larger predators that feed on them, including

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[69] *See, e.g.*, Livingston II, *supra* note 3 at 2.

[70] Livingston I, *supra* note 25 at 13.

[71] *ACF Draft EIS*, *supra* note 10 at 2-190.

[72] *ACF Draft EIS*, *supr*a note 10 at 2-190.

[73] *See, e.g.*, Edmiston, supra note 2 at 82; Livingston II, *supra* note 3 at 9-11.

seabirds, wading birds, and other fish-eating birds, particularly species of conservation concern such as Least Terns and Black Skimmers.[74]

C. The Dynamic Needs of the Apalachicola Ecosystem Warrant Careful Consideration, Especially in Light of a Changing Climate.

In sum, although the Apalachicola ecosystem is characterized by variable water flows, upstream human consumption has reduced River flows beyond the bounds of natural variability. Aquatic and estuarine ecosystems evolved over time in response to natural cycles during periods when human impacts were minimal, including on the climate. But increased upstream human consumption has significantly altered the natural flow regime and inflicted serious, ongoing harm to the watershed's ecological resources.

Moreover, the ecological harm currently caused by low flow through the Apalachicola River is likely to be exacerbated as the climate changes, further stressing ecological processes by increasing the intensity and frequency of extreme events like drought and rainfall. For example, heat waves are expected to become more frequent, longer, and more intense, especially in the southeastern United States.[75]

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[74] Peterson, Roger Tory. *Peterson Field Guide to Birds of North America*. New York: Houghton Mifflin, 2008. Print; Audubon Florida & the Pew Charitable Trusts, *Fins and Feathers: Why Little Fish Are a Big Deal to Florida's Coastal Waterbirds* 2 (Jan. 2014), http://www.pewtrusts.org/~/media/legacy/uploadedfiles/peg/publications/report/fins20and20feathers20reportpdf/ fins-and-feathers-report.pdf.

[75] United States Global Change Research Program, *Climate Change Impacts in the United States: The Third National Climate Assessment* (2014), http://nca2014.globalchange.gov/system/files_force/downloads/high/NCA3_Climate_Change_Impacts_in_the_United_States_HighRes.pdf?download=1; U.S.

In light of the pressing scientific evidence that climate change is occurring, and is highly likely to impact this region,[76] *Amici* respectfully urge the Court to ensure that any water apportionment decree provide a mechanism that would ensure sufficient water flows to ensure a healthy and robust ecosystem. The failure to do so may well lead to ecological collapse.

ARGUMENT

The ongoing ecological harm in the Apalachicola River watershed as a result of diminished freshwater flows is fully cognizable under the Court's evolving and expansive common law of equitable apportionment. Contrary to Georgia's argument that the Court should deny Florida's request for equitable apportionment in large part because there is "no evidence of economic harm in this case[,]" Georgia's Pretrial Brief at 6, the significant depletion of freshwater flows – resulting in harm to one of the nation's most important ecosystems – is surely among "the factors which create equities in favor of one state . . . [and] must be weighed."[77] Here, moreover, the ecological significance of the Apalachicola floodplain watershed transcends the interests of the individual states; it implicates the broader public interest in sustaining this nation's treasured ecosystems. To fashion a just and equitable remedy, therefore, the Court must consider and account

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Environmental Protection Agency, *Excessive Heat Events Guidebook* (2006), https://www.epa.gov/sites/production/ files/201603/documents/ eheguide_final.pdf.

[76] Gerald A. Meehl, *et al.*, *Disappearance of the southeast US "warming hole" with the late 1990s transition of the Interdecadal Pacific Oscillation,* 42.13 Geophysical Research Letters 5564–5570 (2015).

[77] *Colorado v. Kansas*, 320 U.S. 383, 393–94 (1943).

for the inherent value of and ongoing damage to the Apalachicola region's unique ecological resources.

I. The Court May and Should Consider the Ecological Injuries and Values at Stake in the Apalachicola River Watershed.

The Court's equitable apportionment analysis in an interstate water dispute is properly understood as a two-step inquiry: (1) the injury analysis and (2) the resulting equitable apportionment. First, a state seeking to limit diversions by another must show that the diversions cause or will cause "real or substantial injury or damage" to its interests.[78] "[I]n determining whether one state is using, or threatening to use, more than its equitable share of the benefits of a stream, all the factors which create equities in favor of one state or the other must be weighed . . . ."[79] If the complaining state demonstrates injury, the Court will proceed to apply the open-ended doctrine of equitable apportionment, which the Court has repeatedly emphasized is "a flexible" one that "calls for the exercise of an informed judgment on a consideration of many factors."[80] "[T]o secure a just and equitable apportionment without quibbling over formulas[,]"[81] the Court has stressed "that in arriving at the delicate adjustment of interests which must be made, we must consider all relevant factors . . . ."[82]

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[78] *Colorado v. New Mexico*, 459 U.S. 176, 188, n.13 (1982) (internal quotations and citations omitted).

[79] *Colorado v. Kansas*, 320 U.S. at 393–94.

[80] *Colorado v. New Mexico*, 459 U.S. at 183.

[81] *Id. See also*, *New Jersey v. New York*, 283 U.S. 336, 343 (1931).

[82] *Colorado v. New Mexico*, 459 at 183. (internal quotations and citations omitted).

The Court has extraordinarily wide latitude to consider a full range of equities in the two phases of an equitable apportionment inquiry. Historically, interstate water disputes have focused on consumptive uses,[83] dueling state water law doctrines,[84] economic considerations,[85] and, to a lesser extent, whether conservation measures could stretch available resources to accommodate competing human uses. Unlike prior allocations, this proceeding puts pressing ecological concerns front and center. The Court has already determined that ecological equities are cognizable in interstate water apportionments,[86] and its equitable apportionment jurisprudence shows an evolving respect for ecological injuries and interests consistent with our growing awareness about the critical importance of functioning natural systems to current and future generations.

The Court first recognized ecological interests as a relevant factor in the equitable apportionment context in the 1931 action *New Jersey v. New York*.[87] There, New Jersey sought to enjoin New York's diversion of the Delaware River and its tributaries, which New York pursued as a water source for New York City.[88] New Jersey alleged that the diversion would result in a wide array of injuries, including impaired recreational opportunities and increased salinity levels that would harm New Jersey's oyster and shad populations. The Special Master

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[83] *See, e.g.*, *New Jersey v. New York*, 283 U.S. 336, 345-48 (1931)
[84] *See, e.g.*, *Connecticut v. Massachusetts*, 282 U.S. 660, 669-77 (1931)
[85] *See Wyoming v. Colorado*, 259 U.S. 419, 469 (1922).
[86] *See New Jersey v. New York*, 283 U.S. 336, 345 (1931)
[87] 283 U.S. 336 (1931).
[88] *Id.* at 341-42.

concluded that New York's diversion would not harm the River's navigability, sanitary conditions, or use for industrial, agricultural, and fishing purposes, but would impair recreation, injure New Jersey's reputation, increase salinity levels, and harm New Jersey's oyster population to an extent "greater than New Jersey ought to bear."[89] The Court confirmed the Special Master's findings, recognizing that these environmental injuries were indeed real and substantial.[90] As many others have noted, the Court astutely explained that "[a] river is more than an amenity, it is a treasure. It offers a necessity of life that must be rationed among those who have power over it."[91]

Particularly relevant here is the ultimate remedy in *New Jersey v. New York*, where the Court did not employ a strict cost-benefit approach of comparing New Jersey's interests against New York City's need for water. Instead, the Court gave general consideration to New Jersey's environmental concerns by: (1) ordering a reduction in New York's diversions; (2) requiring New York to construct a treatment plant to prevent contamination; and (3) compelling New York to ensure a minimum flow by releasing water from its reservoirs when water levels fell below a specified minimum.[92]

More recently, the Court expressed a growing appreciation of ecological values, when both considering injury and apportioning flow, in *Nebraska v.*

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[89] *Id.* at 345.

[90] *Id.*

[91] *Id.* at 342-343.

[92] *Id.* at 345.

Wyoming.[93] There, Nebraska sought to modify a half-century-old equitable apportionment decree for the North Platte River system, in part due to alleged harm to wildlife and habitat.[94] Wyoming took exception to the Special Master's intent "to hear evidence of injury not only to downstream irrigators, but also to wildlife and wildlife habitats."[95] In particular, Wyoming complained that allegations of injury to wildlife were purely speculative and "best left to other forums."[96] The Court disagreed, noting "[i]f Nebraska is to have a fair opportunity to present its case . . . we do not understand how we can preclude it from setting forth that evidence of environmental injury, or consign it to producing that evidence in some other forum, since this is the only Court in which Nebraska can challenge the Wyoming projects."[97] The Court further acknowledged that, should injury be proven, effects on wildlife would be "one equity to be balanced in determining whether the decree can be modified."[98]

The Court's evolving equitable apportionment jurisprudence thus reflects both long-established principles about the obligations that states have to refrain from injuring their neighbors and more modern sensibilities about the pressing need to protect our increasingly imperiled natural world, especially our water resources. As the Court noted more than a hundred years ago, in the context of an

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[93] 515 U.S. 1, 12 (1995).
[94] *Id.* at 12–13.
[95] *Id.* at 12.
[96] *Id.*
[97] *Id.* at 12–13.
[98] *Id.* at 2.

interstate nuisance action, each state in its quasi-sovereign capacity has an interest "in all the earth air within its domain," and "[i]t is a fair and reasonable demand on the part of a sovereign that the air over its territory should not be polluted on a great scale by sulphurous acid gas, that the forests on its mountains, be they better or worse, and whatever domestic destruction they have suffered, should not be further destroyed or threatened by the act of persons beyond its control, that the crops and orchards on its hills should not be endangered from the same source."[99] Thus, even if New Jersey understandably focused more on the economically-oriented environmental concerns of its time, since then, our society has repeatedly recognized the independent value of our natural ecosystems and ecological resources.[100]

In conclusion, the ecological concerns at the heart of this dispute must be considered and included in any just and equitable apportionment. These concerns go beyond any particular downstream fishery or industry; they implicate the very survival of one of the nation's last remaining, biologically rich floodplain systems

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[99] *Georgia v. Tennessee Copper Co.*, 206 U.S. 230, 237 (1907).

[100] Federal legislation confirms the importance of ecological resources' independent value to our nation. *See, e.g.*, Estuary Protection Act of 1968, 16 U.S.C. §§ 1221-1226 (highlighting the values of estuaries and the need to conserve their natural resources as well as recognizing the policy "to recognize, preserve, and protect the responsibilities of the States in protecting, conserving, and restoring the estuaries in the United States); Endangered Species Act, 16 U.S.C. § 1531 *et seq*. (recognizing that biodiversity is of "esthetic, ecological, educational, historical, recreational, and scientific value to the Nation and its people" and is being lost "as a consequence of economic growth and development untempered by adequate concern and conservation." *Id*. at § 1531(a)(1), (3)). These and other statutes Congress has passed over the last 50 years show a clear national policy to protect, conserve and restore the nation's ecological resources. Unfortunately, these statutes are not enough to ensure the ecological health of the Apalachicola system.

and the high productivity marine waters into which the Apalachicola River ultimately flows. Consistent with the evolving science, contemporary understanding of natural systems and their importance to human communities, the Court's equitable apportionment jurisprudence is sufficiently flexible to recognize these ecological injuries, and then take them into account when fashioning a just and equitable allocation of water.

II. A Two Step Approach May Help the Parties, and the Court, to Best Reach a Just and Equitable Apportionment.

As *Amici* have explained above, the harm that an upstream state's diversion and use of water causes to the downstream state's ecological resources is among the equitable factors that the Court may weigh when considering equitable allocation between those two states. Given the apparent disagreement between the parties on this foundational principle, *Amici* respectfully request that the Court exercise its discretionary authority to issue a preliminary recommendation finding that, as a matter of law, ecological values and harm to the environment resulting from the consumption of water by an upstream state are cognizable in an equitable allocation case.

In addition to providing clarity to the Parties, which might well assist the resolution of this matter, such a two-step approach would provide the Court with an opportunity to request additional briefing from the Parties and *Amici*, including the United States, regarding the role of ecological protection in the creation of a

remedy.[101] Additional briefing, addressing the timing and amount of water, as well as the science surrounding the water needs of the ecosystem as a whole, could assist the Court's development of a remedy that more closely reflects environmental needs as part of a just and equitable apportionment.

Amici are also prepared and willing to engage with the Court in other ways that the Court may find helpful. In *Nebraska v. Wyoming*, Original No. 108, for example, the Special Master permitted *Amici* National Audubon Society and at least one other conservation group to present affidavits, file briefs, and "upon a showing of good cause," participate more fully respecting key matters in the proceedings."[102] *Amici* respectfully request the opportunity to provide additional information and briefing to the Court as the Court finds helpful. *Amici* believe that an additional voice speaking on behalf of ecosystem values – for the flora, fauna, and biodiversity of this unique, special place – is critical to the just and equitable resolution of this case.

Finally, *Amici* invite, and would be willing to help host, the Special Master's visit to the Apalachicola River, estuary and Bay[103] to visit to the sloughs and swamps of the Apalachicola, to see the home of the many endangered birds and

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[101] J.B. Ruhl's *Amicus* brief provides a different approach (valuing ecological services), albeit an incomplete one, to answer how the Court may consider ecological values and implement these values within an equitable apportionment.

[102] *Nebraska v. Wyoming*, U.S. S. Ct. Briefs Lexis 993, *158 (1992).

[103] In *Nebraska v. Wyoming*, Special Master Olpin, reported that he "toured the North Platte River and examined the various developments along its entire course. [He] later returned to the Big Bend Reach of the Platte River in central Nebraska to observe the spring migration of the sandhill crane and other migratory bird species." *Id*. at 13.

amphibians, and to experience, first hand, the magnificence of one of our nation's last great floodplain forests**.**

CONCLUSION

The Apalachicola is "a river system that can never be rebuilt or replanted."[104] That is, "[w]e can't develop a tributary like we create a suburban neighborhood. We can't rotate the 'crops' of cypress, tupelo, white oak, and hickory trees along its course – much less the fish and oysters in the Bay. And we can't engineer a state-of-the-art swamp somewhere else."[105] Now is the time for the Court to give full weight to ecological values in exercising its equitable-apportionment authority. If the Court does not step in to protect the Apalachicola region, the ecosystem and the way of life it supports, may well be lost for generations to come.

Respectfully submitted,

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October 21, 2016

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[104] Jim McClellan, *Life Along the Apalachicola River* 108 (2014).

[105] *Id*.

CERTIFICATE OF SERVICE

This is to certify that the AMICUS CURIAE BRIEF OF NATIONAL AUDUBON SOCIETY, DEFENDERS OF WILDLIFE, FLORIDA WILDLIFE FEDERATION, and APALACHICOLA RIVERKEEPER has been served October 21, 2016 in the manner specified below:

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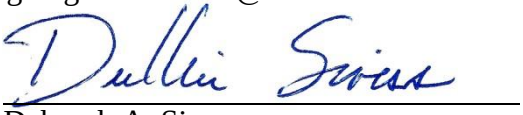

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