# Lower Suwannee National Wildlife Refuge

## Proposed Hydrology Restoration Project

Lower Suwannee National Wildlife Refuge (NWR or Refuge) is located on the west coast of Florida, at the southern end of the Big Bend Region and within both the South Atlantic and Penisular Florida Landscape Conservation Cooperative . The refuge is located in southern Dixie County and western Levy County, approximately 50 miles southwest of Gainesville, near the town of Chiefland, Florida. The Refuge was established on April 10, 1979 under the authority of the Fish and Wildlife Act of 1956 to protect, enhance and restore habitats in the Lower Suwannee River ecosystem. The purpose of the Lower Suwannee National Wildlife Refuge is…"for the development, advancement, management, conservation, and protection of fish and wildlife resources…." 16 U.S.C. §742f(a)(4) and "…for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to terms of any restrictive or affirmative covenant, or condition of servitude…" 16 U.S.C §742f(b)(1) (Fish and Wildlife Act of 1956, 16 U.S.C. § 742f(a)-754). In addition to the overall purpose of the refuge, the refuge's Comprehensive Conservation Plan outlines a central vision, mission, and specific objectives tied to the conservation, protection, restoration, and education relating to, the riverine, wetland and upland habitats associated with the Suwannee River ecosystem (USFWS 2001).

The refuge helps protect one of the largest undeveloped river delta-estuarine systems in the continental U.S., with over 20 miles of the lower Suwannee River and 30 miles of coastal marsh habitat along the Gulf coast. Besides salt marsh and tidal flats, additional habitats within the refuge include bottomland hardwood floodplain forest, cypress sloughs, cabbage palm and cedar islands, cypress domes, hydric, mesic and xeric hardwood hammocks, and low pine flatwoods. As of May 2013, the refuge had acquired 52,935 acres within an 88,001-acre approved acquisition area. Within the refuge acquisition boundary, there are 51 named creeks and rivers, totaling 125.8 miles, as well as 393.1 miles of unnamed streams. The Suwannee River flows through the refuge approved acquisition boundary for 32.8 miles, varying from 450 to 1,250 feet in width and an average depth of 10 to 12 feet.

There are approximately 143 miles of roads and trails within the Lower Suwannee NWR. These roads include primary and secondary refuge roads and refuge roads that are not in use. There are 101 miles of roads and trails maintained by the refuge staff and 42 miles of roads that are not maintained or no longer used. All of the roads maintained by the refuge are former logging roads and were built to access timber stands for harvest. The roads were built with on-site material excavated from either side of the road bed creating ditches on the sides of the roads. There are 114 culverts on the refuge that are maintained by refuge staff, 5 concrete improved bridges and 46 low water crossings.

Out of the 101 miles of maintained historic roads within the refuge impact the hydrology of the river and the associated floodplain. Natural hydrologic function and connectivity to the Suwannee River's floodplain are being negatively impacted by portions of this road and ditch network which impedes or disrupts the natural hydrology. This has been verified by Lower Suwannee NWR, USGS, and UF staff. These roads act as functional levees or dikes even though they are not intended or designated as such. The most significant area, the California swamp area east of the Dixie Mainline Road, was likely tidal in the early 1900s prior to road construction. When water levels rise in the California swamp the Dixie Mainline Road floods due to the road serving as a dike. Additional areas in the refuge are being affected by the road network by the impeding landscape sheet flow of water. While some sheet flow water is channelized into roadside ditches and directed underneath the roads through culverts and in a few cases, bridges, there are instances where this flow can be restored through the placement of improved water-flow structures.

While there are no intended or designed dikes or levees on the Lower Suwannee NWR, the existing historic refuge road infrastructure affects surface hydrology in a similar manner. Roads may cause the temporary impoundment of water or redirect flow into culverts. Bed rows, (a site preparation method used by former timber company land owner) typically found in upland and wetland planted pine areas, are found on the refuge in areas that have been previously clearcut and replanted in slash pine. Bed rows are used to promote the initial establishment of the pine seedlings planted by channelizing sheetflow. Ponds on the refuge have been altered in the past. Timber company upland site prep methods have deposited soil mounds along the shoreline, creating a berm. The berm alters the hydrology of the pond by disconnecting the pond from landscape sheetflow.

Decline of oyster reefs in this area has been linked to repeated episodes of reduced freshwater inputs, resulting in high salinity and associated mortality events from disease and predation (Seavey et al. 2011). While eastern oysters are capable of enduring wide variation in salinity (5-30 practical salinity units) for long portions of each year, there are temporal limits to their physiological endurance. In this region the major source of freshwater and estuarine conditions is the Suwannee River, and its levels also determine seepage and spring flow of fresh water across a wide section of coastline. Offshore oyster reefs in the Big Bend Coast of Florida have declined by 88% during the last 30 years, with the most likely mechanism being repeated die-offs due to predation and disease during high-salinity periods, driven by episodic and increasing periods of reduced freshwater input to estuaries. Restoring the natural sheet flow through hydrologic connectivity of the forested swamps will moderate the impacts of changing salinity on oyster bars.

The proposal is to work with key partners (SRWMD, UF, USGS, and FWS) and identify the areas that can be targeted for low water crossings, culverts, low bridges, and/or road removal to restore natural water flows and improve the natural hydrology of this valuable ecosystem.