SECTION 2: Charlotte County's Past and Present Water Story

To understand how to best move forward in ensuring Charlotte County can maintain sufficient water quantity and quality for future generations, we must understand the history of water in our county and how the actions of the past shape the challenges of our present.

As the receiver of drainage from over 224,000 acres of watershed, Charlotte Harbor and the county's waters are inexorably tied to the activities of those upstream. Charlotte County's waters are also a direct reflection of the residential lot sales boom of the 1950s–1980s and how those activities directly affect our capacity to manage water quality and quantity.

Charlotte Harbor lies within five regional basins: Charlotte Harbor, Lemon Bay, and the Peace, Myakka, and Caloosahatchee River Basins (**Figure 7**). The majority of Charlotte County's population resides close to Charlotte Harbor, Lemon Bay, and the Peace and Myakka Rivers. The bulk of Charlotte County's lands in the Caloosahatchee River basin consists of agriculture and parks/wildlife management areas. The only significantly populated area in Charlotte County's portion of that watershed is Babcock Ranch, a relatively young and fast-growing development near the west boundary of the basin. General flow directions from these areas are shown in **Figure 8**.

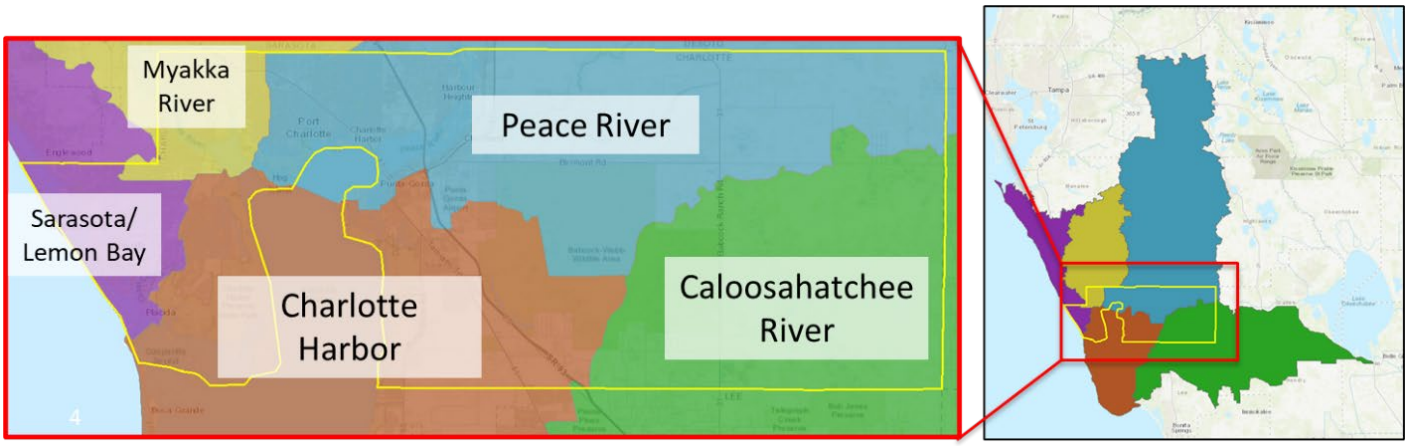

Figure 7. Watersheds in Charlotte County.

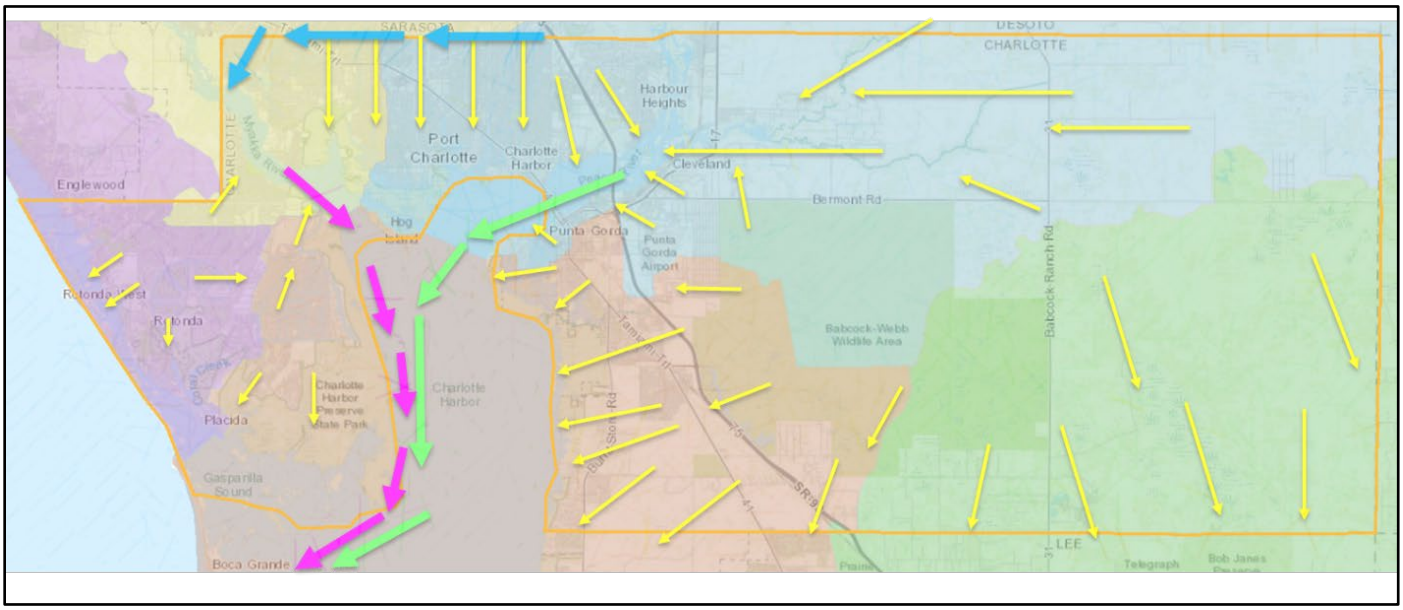

Figure 8. Direction of flow in Charlotte County. General Peace River flow is represented by green arrows, Myakka River by pink arrows, and drainage from Big Slough/City of North Port in blue arrows.

Water quality and quantity of the Peace River are influenced by urbanization, agriculture, and industrial activities such as phosphate mining. The Myakka River basin is home to agricultural and urban land uses. A 34-mile segment of the Myakka River (from the Charlotte/Sarasota County line to County Road 780) was designated a Florida Wild and Scenic River in 1985; this applies additional protections and restrictions to land use in this region. In addition, the 1988 Grizzle-Figg Bill requires Advanced Wastewater Treatment (AWT) for all wastewater reclamation facilities (WRFs) in the Myakka River basin (note a provision of this bill grandfathered facilities that were permitted by February 1, 1987).

Water management in Charlotte County north and west of Charlotte Harbor was shaped by residential and agricultural development beginning in the early 1900s, with most of the current configuration occurring during and immediately following the lot sales booms of the 1950s–1990s. As thousands of acres across the west portion of the county were platted and sold to individual homeowners, disconnected community clusters emerged in various sections of the county. In many cases, these communities established their own drinking/wastewater treatment system because no central public authority was available to provide such services. In fact, the county's Utilities Department and the Peace River Manasota Regional Water Supply Authority were created after the collapse of General Development Corporation (GDC) in the late 1980s, which previously supplied water services to a significant portion of the east Port Charlotte region of the county. Over the years, as many of these community systems reached end of life or fell into substantial disrepair, the county absorbed their facilities and communities into its service area.

Canals and stormwater conveyance systems began to form in the late 1800s to early 1900s in response to drainage needs for pasture operations and early residential areas such as Murdock Village (shown in **Figure 9** below) and what eventually became the City of Punta Gorda. Ditching and draining of the landscape accelerated dramatically from the 1950s onward, establishing flood control networks throughout the then-platted residential communities in the county. In addition, sections of what is now within the boundaries of the City of North Port was platted in parallel to the communities in Port Charlotte, and thus the stormwater conveyance system is designed such that North Port's stormwater system can discharge water directly into many of Port Charlotte's canals. More details on stormwater pathways and treatment processes may be found in the Stormwater section of this document.

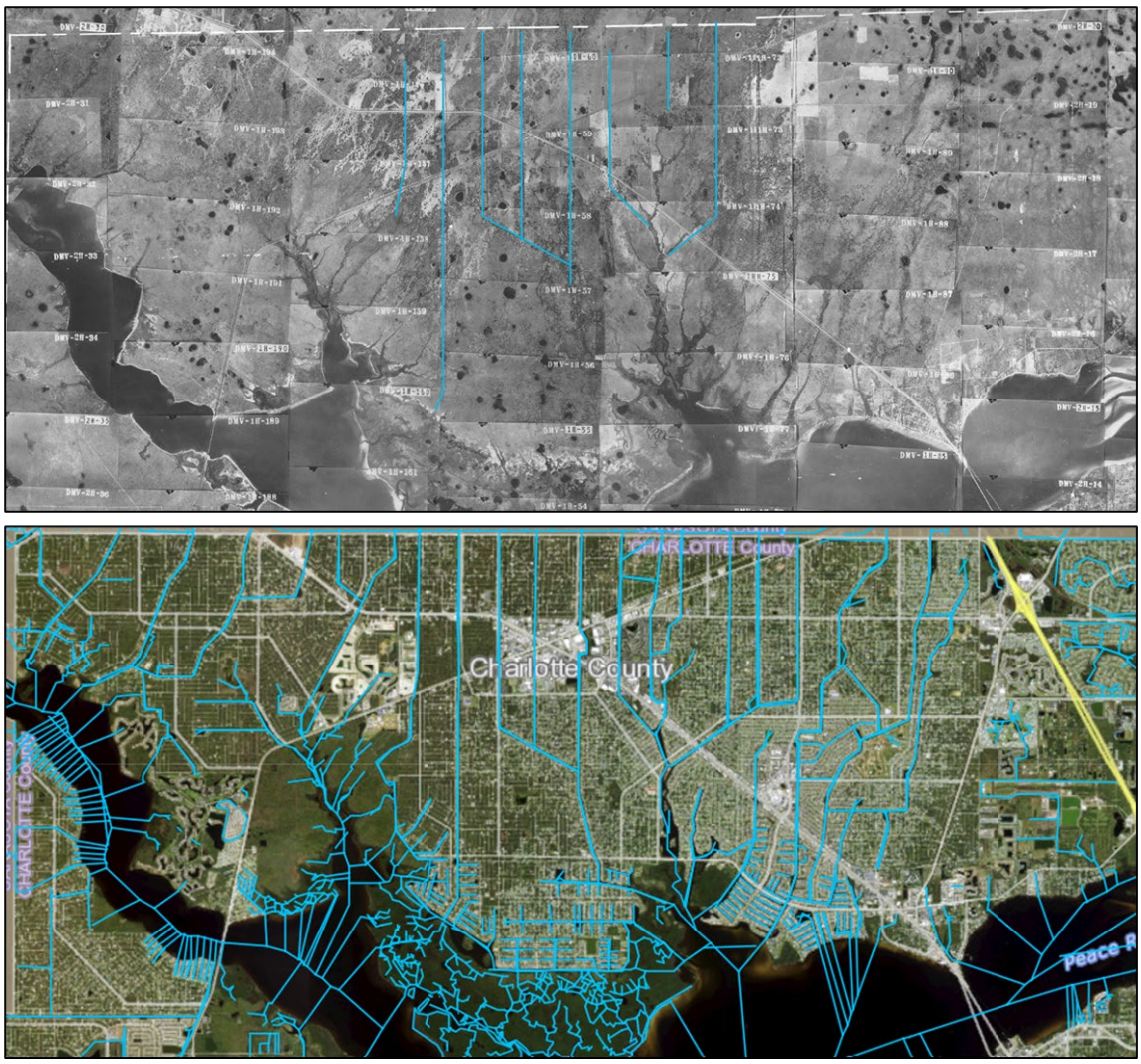

Figure 9. Comparison of artificially channelized waterways in the early 1950s (upper panel) versus present day (lower panel) in the Port Charlotte region of Charlotte County. 1950s imagery courtesy of UF Digital Imagery Collections.

In the 2010s, FDEP established Numeric Nutrient Criteria for the Charlotte Harbor/Lemon Bay estuaries, much of which was based on a "reference period" approach of measured nutrient concentrations between 2003–2007. This timeframe corresponds to that point when seagrass abundance was observed at their highest levels in the harbor and bay since seagrass surveying efforts began in the 1980s. The logic was that, by maintaining nutrient concentrations at or below what was measured during this reference period, the estuaries should be able to support healthy seagrass populations.

Upon FDEP's initial assessment of Charlotte Harbor and Lemon Bay in 2016, much of the harbor was determined to be impaired for excess nutrients. This coincided with reports of increased algae and cyanobacteria blooms in the region beginning around 2012–2013. For the most part, blooms were initially localized, first identified in and around the Hog Island region near Port Charlotte and pockets of Lemon Bay subject to low rates of flow and flushing from tidal waters. Evidence of habitat degradation in these estuaries accelerated shortly after Hurricane Irma and the subsequent protracted red tide bloom of 2017–2019. Since then, waterbodies in the region have remained on FDEP's impaired list, with few exceptions (see **Figures 10** and **11**).

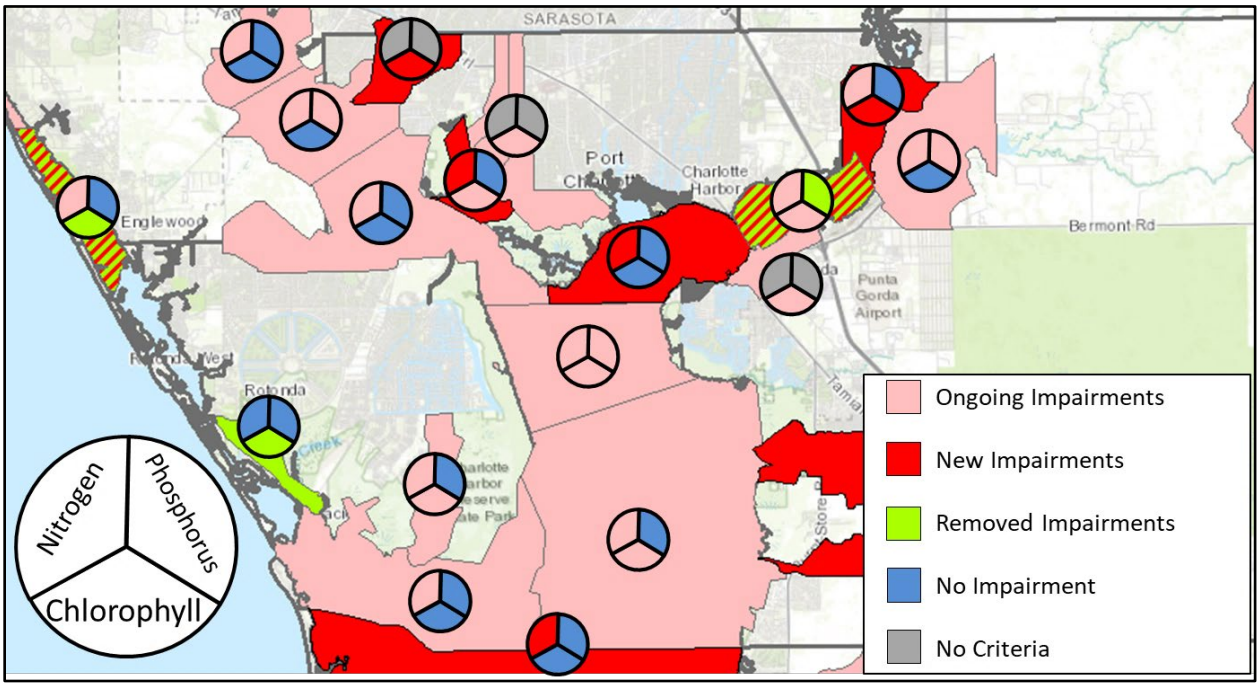

Figure 10. Distribution of nutrient impairments in Charlotte Harbor, Lemon Bay, and Charlotte County, as determined by FDEP (from IWR Run 64).

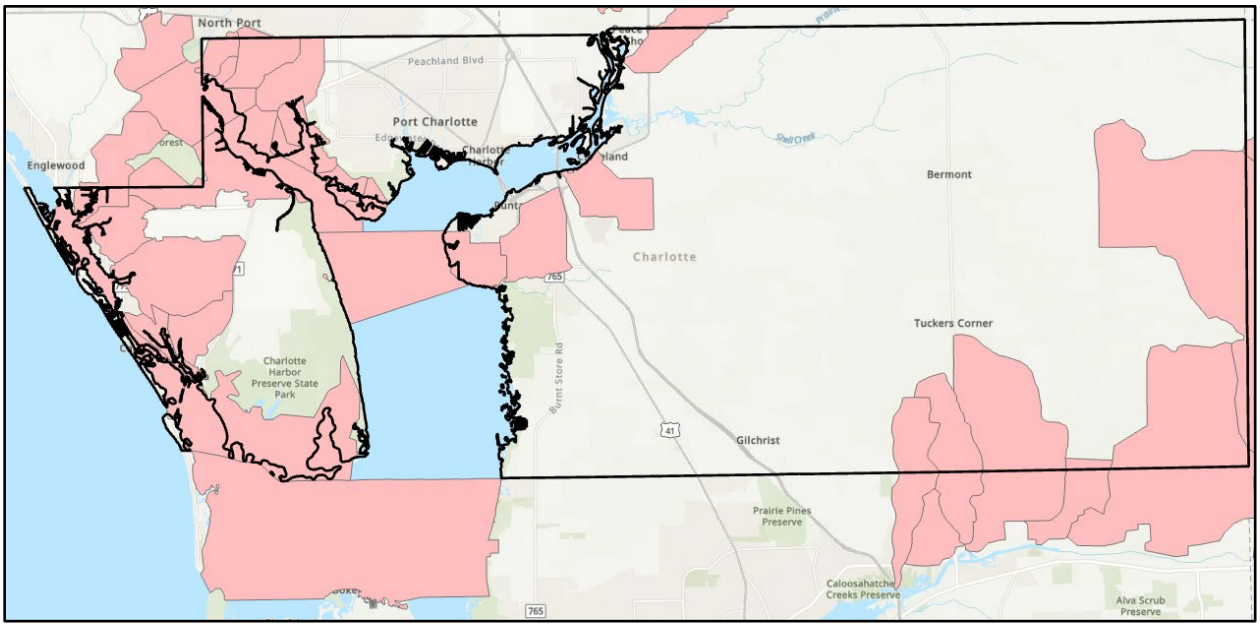

Figure 11. Distribution of bacteria impaired waterways, as determined by FDEP (from IWR run 64).

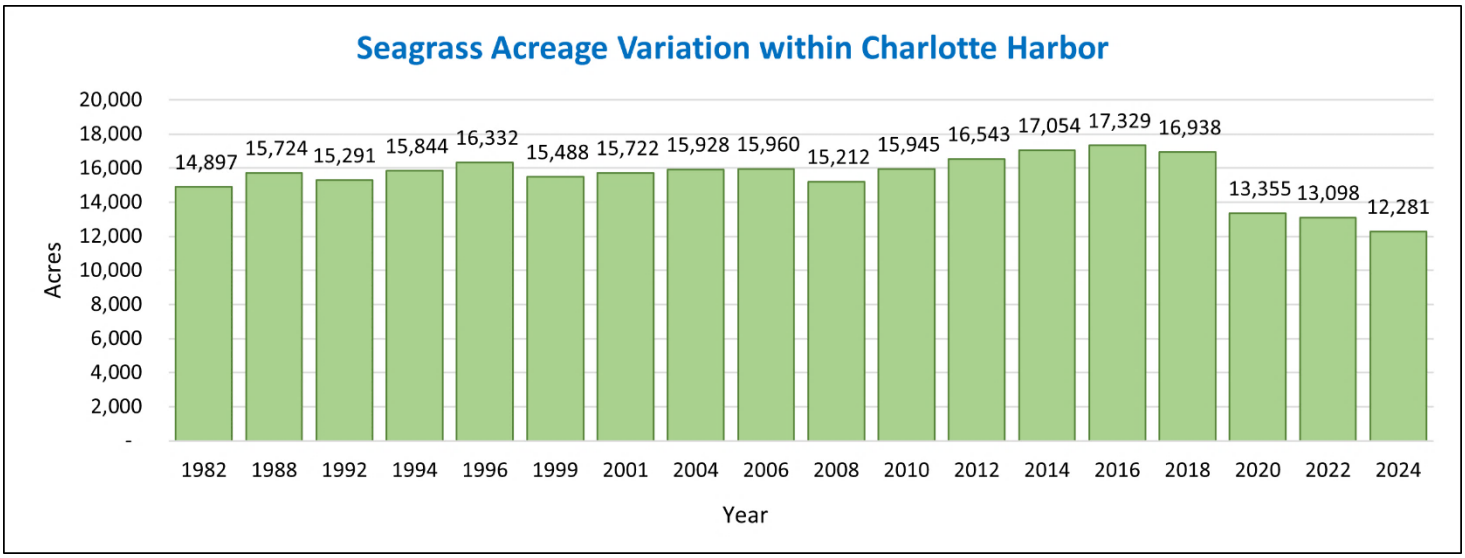

Figure 12. Mapped seagrass abundance in Charlotte Harbor from 1988–2024 (Source: SWFWMD and CHNEP).

Given the recent rapid decline of seagrass populations in portions of our estuaries (**Figure 12**), accompanied by the dramatic increase in macroalgae and cyanobacteria, a regional priority has been placed on identifying possible sources of nutrients and other factors that might contribute to increasing nutrient concentrations and algal blooms in our region. Several observations and theories have emerged during initial investigations including:

- Multiple water quality data investigations commissioned by the Charlotte Harbor Aquatic Preserves (CHAP), Southwest Water Management District (SWFWMD) and Coastal & Heartland National Estuary Partnership (CHNEP) indicate increasing trends in Total Nitrogen concentrations in portions of the harbor, and nitrogen levels in combination with other environmental factors (such as rising temperatures) may be creating conditions leading to seagrass losses.
- The recent SWFWMD Surface Water Improvement and Management (SWIM) update compared estimated nitrogen loading rates into Charlotte Harbor from the gaged portion of the Peace River during 1985–1992 vs 2009–2015. They found that average annual loading changed less than 5% between these two periods. Note that loading from the tidal portion of the system was estimated as no gauge data was available for that area. In addition, this study did not incorporate water quality information after 2015.
- Separate circulation studies by researchers with the University of Florida, Florida Gulf Coast University, and North Carolina State University indicate the possibility of discharges from the Caloosahatchee River reaching portions of the east wall of Charlotte Harbor. The probability of this occurring depends on wind, currents, and the flow rate of the Caloosahatchee River. These models predict northward flow to the east wall only during those occasions in which substantial volumes of water are being discharged from the river's S-79 structure.

For many waters within Charlotte County's jurisdiction, insufficient information has been collected to determine their impairment status and to what extent they may contribute to identified impairments in Charlotte Harbor, Lemon Bay, and the Peace/Myakka Rivers. To address this information gap, in 2022 the county implemented a monitoring program designed to examine the physical and chemical characteristics of waters discharging into Charlotte Harbor and Lemon Bay. Initial observations and next steps in this effort are discussed in subsequent sections of this plan.

The recent pervasive algal bloom conditions experienced annually in Charlotte Harbor and Lemon Bay, in conjunction with increased environmental pressures posed by ongoing and future development of surrounding lands, necessitate the creation of a plan to address today's challenges while planning for future risks. Florida's estuaries are no stranger to extensive environmental degradation, but estuary management strategies like those in Tampa and Sarasota Bays have demonstrated that, with sufficient planning, focus, and investment, we can rehabilitate and restore our harbors and bays to vibrant ecoystems for the benefit of our citizens, economy, and wildlife.