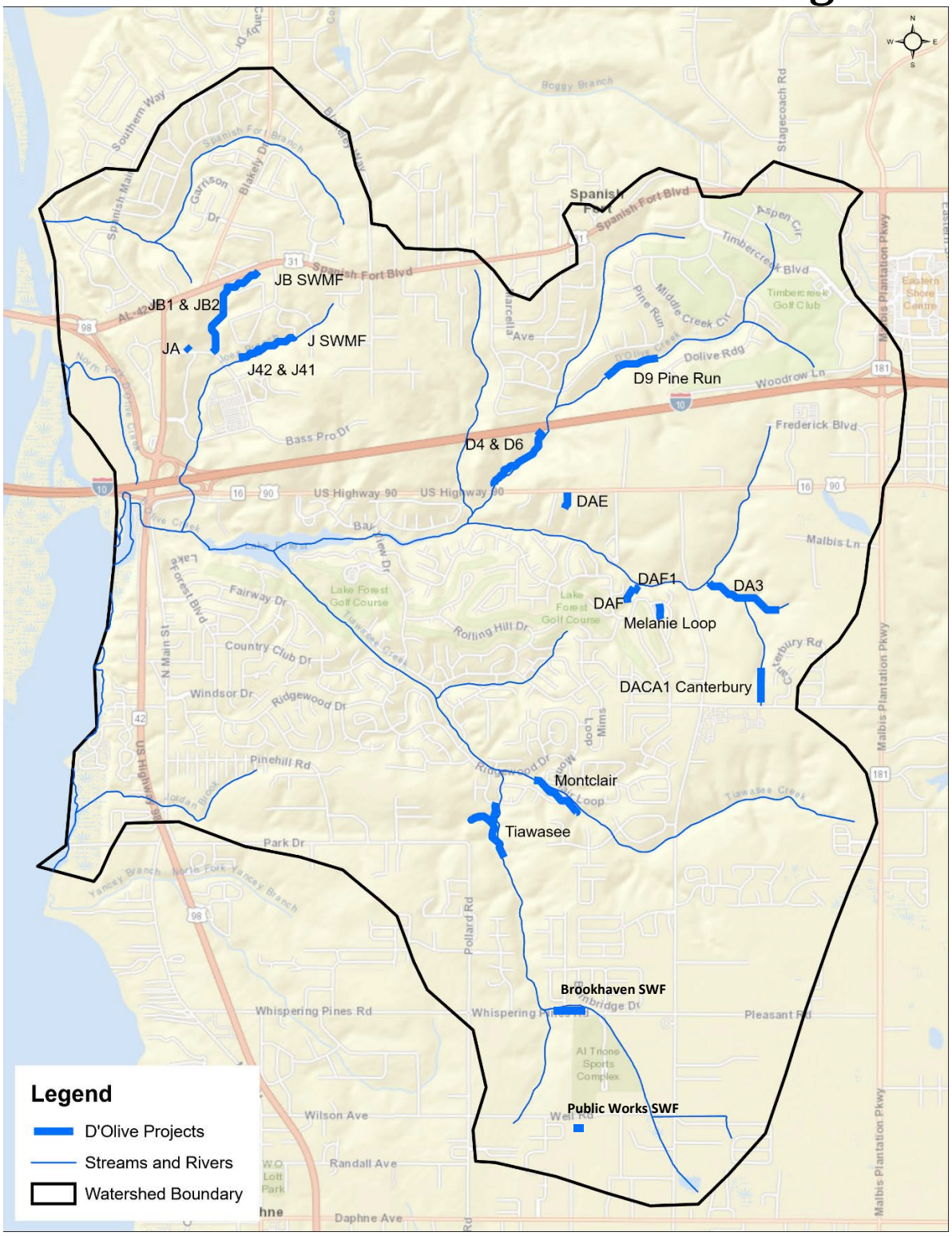
D'Olive Watershed Restoration Program



Mobile Bay National Estuary Program
118 North Royal Street, Suite 601
Mobile, Alabama 36602
www.mobilebaynep.com
August 2022

The *Watershed Management Plan for the D'Olive Creek, Tiawasee Creek, and Joe's Branch Watersheds- Daphne, Spanish Fort, and Baldwin County Alabama* (D'Olive WMP) was published in August 2010. At the time, the D'Olive WMP was developed, approximately 45% of the Watershed was covered in forest and agriculture, and planners anticipated most of the remaining undeveloped land would be converted to urban development, primarily in residential uses. The D'Olive WMP was updated in 2022.

Draining a total area of over 7,700 acres, the Watershed drains to the three principal tributaries addressed in the Plan. Governmental control of the Watershed is shared by the cities of Daphne and Spanish Fort and by Baldwin County. The Watershed name is shortened to reflect D'Olive Creek, the drainage's primary stream. D'Olive and Tiawasee Creeks flow into Lake Forest Lake, while Joe's Branch joins D'Olive Creek downstream of the Lake. The entire Watershed empties into Mobile Bay by way of a small embayment known as D'Olive Bay.

A combination of 1) steep and rolling topography, 2) highly erodible soils, 3) an average of nearly five feet of hard rain annually, and 4) urbanized surfaces with covering half its area make this Watershed "the perfect storm of stormwater impacts." The D'Olive Watershed contains over a total of almost 23 miles of streams. A total of 2.2 miles of streams have already been substantially degraded by past headcutting and sediment accumulations, 3.9 miles of streams are currently being degraded, and an additional 5.9 miles of streams have the potential to experience degradation in the future. Thus, slightly over half of the Watershed's total stream mileage has been, currently are being, and/or have the potential of being adversely affected by conditions created by excessive stormwater runoff.

The D'Olive WMP recommended opportunistic and strategic stream and floodplain restoration to reduce sediment loads impacting fishery nursery habitats in D'Olive and Mobile bays. Implementation of recommended restoration projects began in 2012 with the installation of the step pool stormwater conveyance on Joe's Branch Tributary JB and continues today with a project on D'Olive Creek under engineering and design. Locations of the completed projects within the Watershed are shown in the map on the cover page. A spreadsheet with details (including start and completion dates; project engineers and construction contractors; restored stream length; pond retention capacity; number of property owners involved; floodplain area; load reductions for sediment, nitrogen, and phosphorus; and total project cost) follows, as do photos showing "before and after" conditions of the following projects:

- Joe's Branch JB Restoration
- Joe's Branch JB2 Restoration
- Phase 2 Joe's Branch Restoration projects
- Tiawasee Creek TC1 and TC2 Restoration
- D'Olive Tributary D4-D6 Restoration
- D'Olive Tributary DA3 Restoration
- D'Olive Tributary DAE Restoration
- D'Olive Tributary DAF-1a Melanie Loop Restoration
- D'Olive Tributaries DAF and DAF-1 Golf Course Tributary Restoration
- Tiawasee Montclair Tributary Restoration
- Tiawasee Stormwater Facilities Retrofit
- D'Olive Tributary DACA1 Canterbury Restoration

Year Begun	Project	Engineer	Construction Contractor	Substantial Completion Date	Stream Length (LF)	Retention Capacity (Cu Ft)	# of Impacted Landowners	Floodplain Area (acres)	Erosion Reduction (tons/year)	Nitrogen Reduction (tons/year)	Phosphorus Reduction (tons/year)	Total Project Cost
2012	JB Restoration	Thompson	Southern Excavating	April 2013	1,000		1	2.2	22,150	27.2	14.2	$1,184,000
2015	JB-2 Restoration	Thompson	North State	August 2015	1,600		3	7.8	304	2.4	0.5	$1,307,679
2016	JB SWMF	Thompson	Southern Excavating	November 2016		53,400	5	1	NA	NA	NA	$332,397
	J SWMF	Thompson	Southern Excavating	November 2016		35,000		1	NA	NA	NA	$91,611
	J4-1 Restoration	Thompson	Southern Excavating	November 2016	700			2	143	1.2	0.3	$126,198
	J4-2 Restoration	Thompson	Southern Excavating	November 2016	400			1	100	0.9	0.2	$773,780
	JA Restoration	Thompson	Southern Excavating	November 2016	600			5	200	1.8	0.4	$445,237
2016	TC1	GMC	North State	April 2016	573		2	7	206	10.7	1.4	$250,000
	TC2	GMC			573			7	207	12.3	1.6	$621,379
	Tiawasee Tributary	GMC		April 2018; Adaptive Management April 2020	578			2	72	3.2	0.4	
2016	D4-D6	GMC	North State	September 2017; Adaptive Management April 2019	2,714		1	15	1,880	19	4	$3,313,724.00
2016	DA3	Volkert	North State	February 2017	1,100		1	7	547	0.6	0.2	$1,092,432
2017	SWMF - Lake Forest	Integrated Science	NA	NA			NA					$72,300
2017	DAE	Integrated Science	Southern Excavating	September 2017	420		2	4	300	0.5	0.2	$433,706
2018	DAF-1A Melanie	GMC	North State	May 2018	490		9	4	254	1.3	0.3	$493,706
2019	DAF	Mott MacDonald	North State	June 2019	292		3	1	351	2	0.6	$792,595
	DAF-1 Golf Trib	Mott MacDonald	North State	June 2019	243			1	106	1.3	0.3	
2019	D'Olive WMP Update	Baya Consulting	Geosyntec									$145,000
2019	Tiawasee Montclair	Volkert	Streamline Environmental	February 2020	1,050		17	3	602	1.6	0.4	$825,589
2020	Stormwater Retention	Jade	Clark Co Oil Field Services	November 2021		206,000		4				$564,038
2022	D9 Pine Run Emergency Repair	Volkert	Streamline Environmental	March 2022	300		3		N/A	N/A	N/A	$49,958
2022	DACA1 Canterbury	Mott MacDonald	Streamline Environmental	May 2022	272		1	0.5	31	2.4	0.1	$272,795
	MBNEP Project Delivery											$1,239,572
	Monitoring Activities											$219,662
					12,905	**294,400**	**44**	**75**	**27,453**	**86**	**25**	**$14,647,358**

Joe's Branch Tributary JB. The first project implemented based on the D'Olive Watershed Management Plan recommendations. Head cutting and mass wasting delivered coarse sediments to downstream wetlands and silt to D'Olive Bay. A step pool stormwater conveyance was completed in 2013.

Downstream of the JB-1 step pool stormwater conveyance, the 1,600-foot **Joe's Branch Tributary JB2,** overlying sanitary sewer infrastructure, was restored beginning in spring 2015.

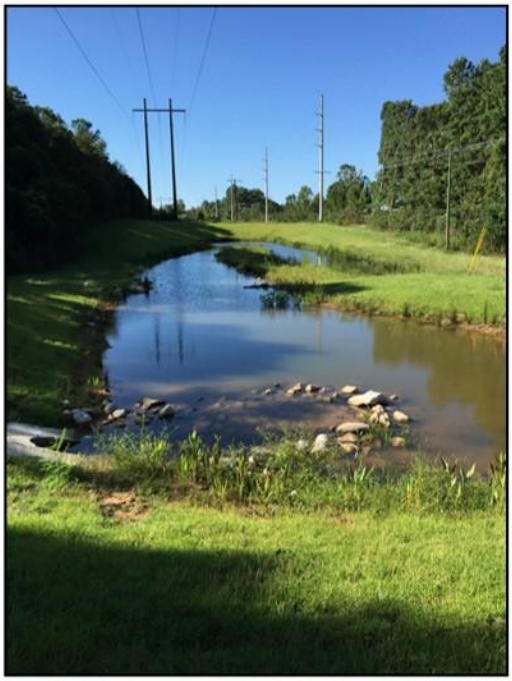
J SW Management Pond upstream of Tributary segment J4-2 at Westminster Gates.

Rock used to stabilize a hillside steep impacting **tributary segments J4-2 and J4-1.**

Lots of rock at **Joe's Branch Tributary J4-2** downstream of Westminster Gates.

Components of Phase 2 of Joe's Branch Restoration

A more natural approach at **Joe's Branch Tributary J4-1** downstream of J4-2.



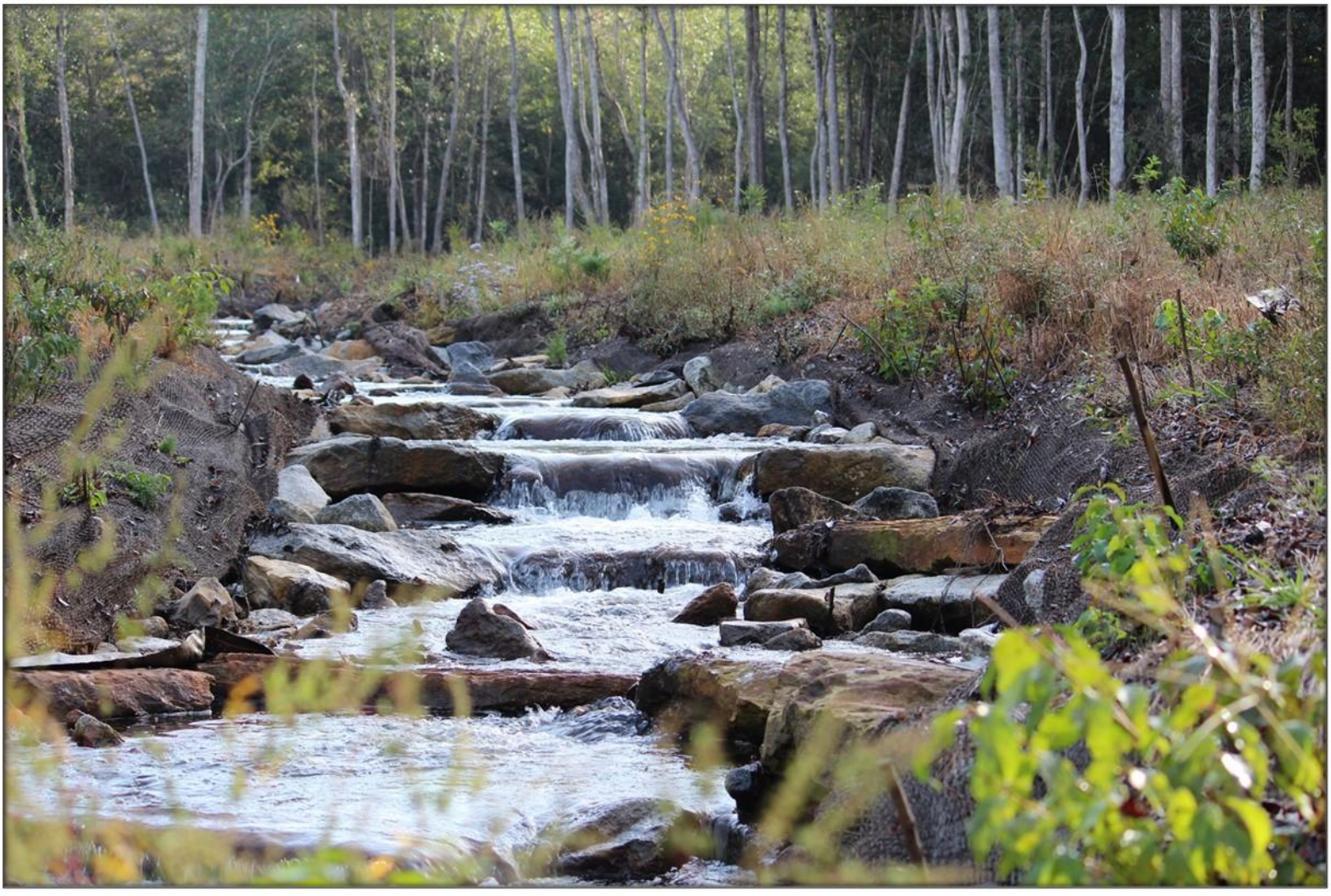
JB SW Management Pond upstream of Tributary JB-1 at Westminster Village.

Spanish Fort stormwater retention pond across Highway 31 from Westminster Village.

Tiawasee Creek tributaries TC1, TC2, & TC2-trib. This forested stream accommodated increased flows from residential and commercial development by eroding. Prior to restoration in early 2016, a total of 1,724 linear feet of tributaries delivered an average of 1,440 tons of sediment downstream each year due to headcutting, incision, and widening.

D'Olive Creek Tributary D4-D6, runs from Interstate 10 near Mile Marker 37 south over 2,000 linear feet to US Highway 90. The April 29, 2014, historic rain event pushed 3,700 cubic feet per second through four box culverts under I-10 with a firehose blast that cut the existing channel 10-15 feet deep, collapsing trees and pushing boulders hundreds of feet downstream. Initially constructed in 2016, it is the largest, most expensive coastal stream restoration project undertaken in the State.

Following an emergency restoration in 2009 to protect utility infrastructure, **D'Olive Tributary DA3** on Malbis Plantation property east of Highway 13 underwent a larger, more complete restoration beginning in 2015. In wooded tributary headwaters a natural stream design approach was pursued. On the steeper downstream reach, step pools were installed to reduce energy and slow flow.



Wooded ephemeral stream segment **D'Olive Tributary DAE**, between Oakstone Drive East and West residential properties, was experiencing incision and headcutting by runoff from Highway 90. The channel was lined with rock for stability, and runoff volumes and velocities were stabilized by construction of a stormwater detention and stilling basin in 2017-2018.

Near tributary segments DAF and DAF-1, **D'Olive Creek Tributary Segment DAF-1a/Melanie Loop** was not able to accommodate the increased runoff flows from upstream watershed development, which led to stream incision, headcutting, widening, and increased sediment loads. The 490-linear-foot reach was restored in 2018 using energy dissipation, bank stabilization, and floodplain planting.

Downstream of Tributary DA3 and across Highway 13, **D'Olive Tributaries DAF and DAF-1 ("the golf course trib")**, together totaling 535 linear feet, were undergoing progressive head cutting, incision and soil and vegetation loss until restoration/stabilization in 2018.

With no flood plain and abutting Lake Forest residences, restoration of the 750-linear-foot **Tiawasee Montclair Tributary** in 2020 was particularly challenging. Protecting exposed sanitary sewer infrastructure was one challenge, as was protecting the properties of more than a dozen adjacent landowners.