Table 8 summarizes the number of crashes by harmful event along the US 1 corridor. It was concluded from the analysis that the predominant crash type was Rear End (51.5%) crashes. The second and third most predominant crash types were Sideswipe (9.8%) and Off Road (9.2%), which account for significantly lower percentages than the first.

Table 8
US 1 Crash Summary by Harmful Event

Crash Type	2014	2015	2016	2017	2018	2014-2018	Average Per Year	Percent
Bicycle	1	0	2	0	1	4	1	0.5%
Pedestrian	0	1	2	0	1	4	1	0.5%
Right Turn	2	1	1	1	3	8	2	1.0%
Unknown	4	3	1	6	3	17	3	2.1%
Head On	6	11	4	1	1	23	5	2.8%
Rollover	4	7	6	6	2	25	5	3.0%
Angle	6	7	9	5	5	32	6	3.9%
Other	15	13	10	14	9	61	12	7.4%
Left Turn	18	9	13	14	17	71	14	8.6%
Off Road	13	24	13	14	12	76	15	9.2%
Sideswipe	16	12	17	21	15	81	16	9.8%
Rear End	65	88	89	76	109	427	85	51.5%
Total	150	176	167	158	178	829	166	100%

Table 9 provides a break-down of crashes by location, showing that 21% of crashes occurred at the Viera Boulevard intersection and 16% of crashes occurred at the Suntree Boulevard intersection. Crashes at the study intersections account for 65% of the total crashes, with the remainder of crashes occurring in the roadway segments between and other minor intersections.

Table 9
Crash Summary by Location

Intersection	2014	2015	2016	2017	2018	2014- 2018	Average Per Year	Percent of Total Crashes
SR 404	15	17	19	14	17	82	16	10%
Suntree Blvd	24	25	29	19	39	136	27	16%
Viera Blvd	35	38	25	33	40	171	34	21%
Barnes Blvd	17	18	23	25	18	101	20	12%
Gus Hipp Blvd	6	4	5	10	9	34	7	4%
Total	99	106	104	102	125	536	107	65%

From the crash data collected for SR 404, **Table 10** details the number of crashes per year that were recorded at the US 1 and SR 404 interchange. A total of 72 crashes were reported within the five-year period (Note that **Figure 12** includes these 72 crashes in the crash distribution along the project corridor).

Table 10 SR 404 Crash Data-Crash Summary for US 1 and SR 404 Interchange

Year	Number of crashes
2014	15
2015	13
2016	12
2017	14
2018	18
Total	72

6.12.3. Fatal Crashes

A total of nine crashes along the project corridor between 2014 and 2018 were fatal. **Table 11** below summarizes the data for these crashes, with more detailed narratives on their individual causes following.

Table 11 Summary of Fatal Crashes

Crash Type	Report Number	Location on US1	Number of Additional Injuries	Weather Condition	Lighting Condition	Alcohol/Drug Related	
Angle	84857484	Carver Road	3	Clear	Daylight	No	
Bicycle	85288188	Carver Road	1	Clear	Daylight	No	
Bicycle	85288231	SR 404 Interchange	0 Clear		Dark - Not Lighted	No	
Left Turn	84494321	Viera Boulevard	0	Clear	Daylight	No	
Left Turn	85399146	McIver Lane	1	Cloudy	Daylight	No	
Other (Bicycle)	85425990	Helmsman Place	0	Clear	Daylight	No	
Pedestrian 8654718	86547181	Magruder	0	Cloudy	Dark - Not	Yes -	
reuestriaii	0034/101	Avenue	U	Cloudy	Lighted	Pedestrian	
Pedestrian	87151220	Helmsman Place	0	Clear	Dark - Lighted	No	
Rear End	85389964	Friendship Place	1	Clear	Dark - Not Lighted	No	

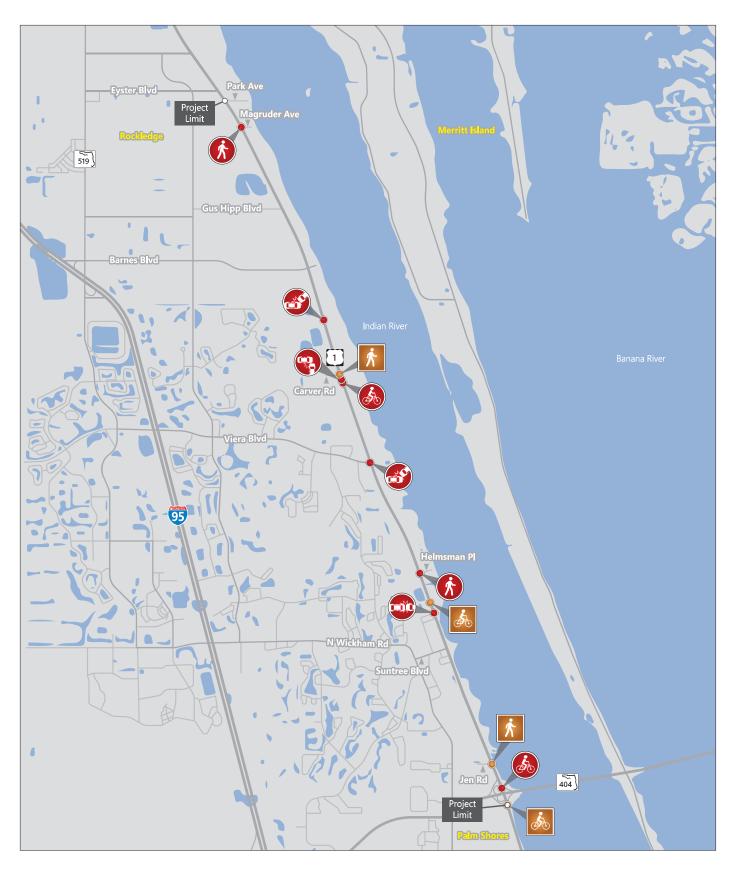
Fatal Crash Narratives:

- 84857484 Angle: Vehicle 1 a sedan was travelling eastbound on Carver Road as Vehicle 2 a motorcycle was travelling southbound on US 1. The sedan attempted to turn left across the southbound travel lanes to join northbound US 1, pulling directly into the path of the motorcycle. The motorcyclist applied the brakes and skidded 35 feet before hitting the left side of the sedan with the front of his motorcycle. Upon impact, the motorcyclist was ejected from his motorcycle and hit the hood and windshield of the sedan his final resting place is unknown. He was pronounced dead approximately one hour after the time of the accident.
- **85288188 Bicycle:** The bicyclist was originally travelling on the west paved shoulder of southbound US1 but cut across two lanes to move into the path of the driver who was also travelling southbound. The driver stated that he attempted to swerve but was unable to avoid colliding with the bicycle. The bicyclist was thrown from his bicycle and killed instantly.
- 85288231 Bicycle: The driver struck the rear tire of the bicycle as both were travelling southbound on the overpass over SR 404. The bicyclist was thrown from his seat, suffering multiple blunt force injuries and passing away about 15 minutes after the crash occurred. Based on toxicology reports, neither the bicyclist nor the driver had any function impairing substance in their bloodstream.
- 84494321 Left Turn: A sedan was travelling southbound on US 1 towards the intersection at Viera Boulevard/River Way. A motorcycle was travelling northbound on US 1. The driver of the car began to turn left onto River Way, and for reasons unknown, did not notice the motorcycle approaching. The front of the motorcycle collided with the right side of the sedan, the motorcyclist fell off, suffering multiple blunt force injuries; he was taken to hospital for treatment but passed away approximately 34 hours after the time of the crash due to his injuries.
- **85399146 Left Turn:** A pickup truck was travelling southbound on US 1, approaching the median opening at McIver Lane. The truck began to turn left across the northbound travel lanes, directly into the path of a motorcycle. The motorcyclist had been travelling northbound on US 1; when he saw the truck, he took evasive actions and applied the brakes, skidding for 98 feet before striking the right rear of the truck with the front of his motorcycle. The motorcycle came to final rest 15 feet east of the impact point, with the motorcyclist being thrown a further 10 feet northwest. He was pronounced deceased three hours after the time of the collision.
- **85425990 Other (Bicycle):** The vehicle was travelling in the outside lane of southbound US 1; the bicycle was travelling on the paved shoulder of the same lane. When passing the bicyclist, the driver failed to allow enough space between the car and the bicycle and struck

the rear tire of the bicycle with the front bumper of the vehicle. The bicyclist came to final rest on the grass shoulder; he passed away 17 days after the accident.

- 86547181 Pedestrian: The pedestrian was inebriated and failed to notice the vehicle
 approaching him prior to stepping out into the street and into its path. The driver of the
 vehicle was determined not to be at fault for the collision which caused the pedestrian
 fatality.
- **87151220 Pedestrian**: The pedestrian was walking in the outside travel lane of US 1 northbound when they were struck by the driver who was travelling in the same lane. Blood toxicology/coroner's reports have not yet been provided; however, it was noted that the driver did not appear to be impaired at the time of the collision.
- **85389964 Rear End:** A passenger car was travelling southbound in the outside lane on US 1 at an unsafe speed through a work zone. A medium/large truck was travelling inside a construction lane closure on southbound US 1 on the inside lane. The truck pulled out of the lane closure and into the outside travel lane, at which point the driver of the passenger car applied the brakes and steered left, hitting the back left of the truck with the front right of the car. The passenger seated in the front seat of the car passed away due to injuries and was pronounced deceased on the scene within ten minutes of the collision.

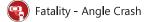
The locations of these crashes (along with the bicycle and pedestrian crashes discussed in section 2.4) can be found in **Figure 13**.











Fatality - Left Turn Crash







Figure 13

Fatal Crashes & Bicycle/Pedestrian Crashes

6.12.4. Crash Rate Analysis

Segment crash rates in crashes per million vehicle-miles traveled were calculated for the US 1 corridor in order to compare the actual crash rate of the corridor to the statewide average crash rate for similar facilities during the study period. Each transition in crash rate category or AADT requires a break in the segment crash rate calculation, resulting in four segments for the study corridor. The first segment extends from the southern end of the project corridor at SR 404 to Suntree Boulevard; the second extends from Suntree Boulevard to Viera Boulevard; the third from Viera Boulevard to Gus Hipp Boulevard; and the fourth from Gus Hipp Boulevard to the northern end of the project corridor at Park Avenue. Segments are defined as including the 'from' intersection, but not including the 'to' intersection (with the exception of the northernmost segment from Gus Hipp Boulevard to Park Avenue which includes the crashes recorded at the Park Avenue intersection). The statewide average crash rate was extracted from the FDOT CAR system. Table 12 below provides a summary of crash rates along the corridor.

Table 12 Crash Rate Analysis Summary

From/To	Number of Crashes ¹	Length (miles)	AADT ⁴	ACR ²	Crash Rate Category	AVG ³	High Crash Segment?
1 - SR 404 (Pineda Park Causeway) to Suntree Boulevard	244	1.982	36,000	1.874	Urban 4-5 lane 2 way Divided	3.413	No
2 - Suntree Boulevard to Viera Boulevard	192	2.394	31,000	1.418	Urban 4-5 lane 2 way Divided	3.413	No
3 - Viera Boulevard to Gus Hipp Boulevard	384	3.163	27,000	2.464	Urban 4-5 lane 2 way Divided	3.413	No
4 - Gus Hipp Boulevard to Park Avenue	81	1.306	26,000	1.307	Urban 4-5 lane 2 way Divided	3.413	No

- 1. Number of crashes from January 1, 2014 to December 31, 2018.
- 2. Average Crash Rate = (N*1,000,000)/(365*Y*AADT*L), where N = number of crashes, Y = number of years, AADT
- = Annual Average Daily Traffic, and L = Length of the segment in miles.
- 3. AVG = Statewide Average Crash Rate for Corresponding Category.
- 4. Data obtained from existing traffic conditions section.
- 5. Segment counts include "from" intersection, but do not include "to" intersection.

As shown in **Table 12**, all segments within the US 1 study corridor experience an average crash rate lower than the statewide average for similar facilities, with the segment from SR 404 to Barnes boulevard having an average crash rate that is less than half of the statewide average. No abnormal trends were identified

with the exception of the large number of rear end crashes. This could be a product of the high speeds and speed limit within this urban area.

6.12.5. Bicycle and Pedestrian Crashes

Five crashes involving bicycles and four crashes involving pedestrians occurred on the US 1 study corridor from 2014 to 2018. Of the nine crashes involving bicycles or pedestrians, five resulted in fatalities. **Table 13** provides detail of the bicycle and pedestrian crashes. **Figure 13 (above)** shows where these crashes occurred alongside the other fatal crashes along the project corridor.

Table 13
Bicycle and Pedestrian Crash Summary

Crash Type	Severity	Report Number	Location on US1	Weather Condition	Lighting Condition	Alcohol/ Drug Related	Bike/ Ped Facility at Location?
Pedestrian	Fatality	86547181	Magruder Avenue	Cloudy	Dark - Not Lighted	Yes - Pedestrian	No
	Fatality	87151220	Helmsman Place	Clear	Dark - Lighted	No	No
	Injury	85224190	Jen Drive	Clear	Dusk	Yes - Pedestrian	No
		85363018	Carver Road	Clear	Dark - Not Lighted	No	No
	Fatality	85288188	Carver Road	Clear	Daylight	No	Yes
Bicycle		85288231	SR 404 Interchange	Clear	Dark - Not Lighted	No	No
		85425990	Helmsman Place	Clear	Daylight	No	No
	Injune	83777400	SR 404 Interchange	Clear	Dawn	No	No
	Injury	87194576	Suntree Boulevard	Cloudy	Daylight	No	Yes

6.13. Intelligent Transportation Systems Infrastructure

Existing Intelligent Transportation Systems (ITS) infrastructure was identified based on reviews of the Space Coast Transportation Planning Organization (SCTPO) ITS Master Plan (2015) and the existing dataset of fiber locations within Central Florida, as provided by FDOT District Five.

6.13.1. Fiber Optic Communications

Fiber optic cables allow for increased bandwidth, increased range, and improved signal resistance compared to standard cabling (copper or coax) methods. This facilitates the implementation of advanced ITS/TSM&O strategies that require larger data volumes and video transmissions for real-time traffic monitoring and communications.

Upon review of the US 1 corridor and surrounding area, fiber optic communication lines were identified in the following locations:

- Along US 1 from Coquina Road to McIver Lane
- Along US 1 from Suntree Boulevard to approximately 250 feet north of intersection
- Along North Wickham Road from I-95 to Suntree Boulevard, and
- Along Suntree Boulevard from North Wickham Road to US 1

6.13.2. Closed-Circuit Television

Closed-circuit television (CCTV) allows agencies to actively monitor traffic conditions in real-time. This includes monitoring recurring and non-recurring issues, such as congestion, traffic incidents, work zones, special events, incident response, emergency vehicles, and weather conditions, among other issues. Having real-time video of a given situation provides operators with the necessary information to coordinate/communicate the proper response in a given scenario.

Upon review of the US 1 corridor and surrounding area, CCTVs were identified in the following locations:

- At US 1 and Barnes Boulevard
- At US 1 and Suntree Boulevard
- At US 1 and Eyster Boulevard (immediately north of US 1 study limits)
- At US 1 and Barton Boulevard (approximately 4,000 feet north of US 1 study limits)
- At several intersections along North Wickham Road, including at Suntree Boulevard

6.14. Bluetooth Devices

Bluetooth detection devices search for in-range Bluetooth devices (e.g., cell phones and many newer-model vehicles) and capture the unique media access control (MAC) address of each device. The device must be turned on with its "discoverable" mode activated so that it can broadcast its MAC address. As a vehicle passes a series of Bluetooth devices deployed along a corridor, the MAC address is captured by each consecutive device, allowing for real-time calculation of travel times and speeds. This information can be used by traffic operators to adjust operations in real-time or identify particular roadway segments or intersections for additional study and potential improvements.

Upon review of the US 1 corridor and surrounding area, Bluetooth devices were identified in the following locations:

- Along US 1 at Eyster Boulevard (immediately north of US 1 study area)
- Along US 1 at Barton Boulevard (approximately 4,000 feet north of US 1 study area)
- Along US 1 at Florida Avenue (approximately 1.25 miles north of US 1 study area)

Fiber optic cable, closed-circuit television, and Bluetooth device locations are shown on Figure 14.

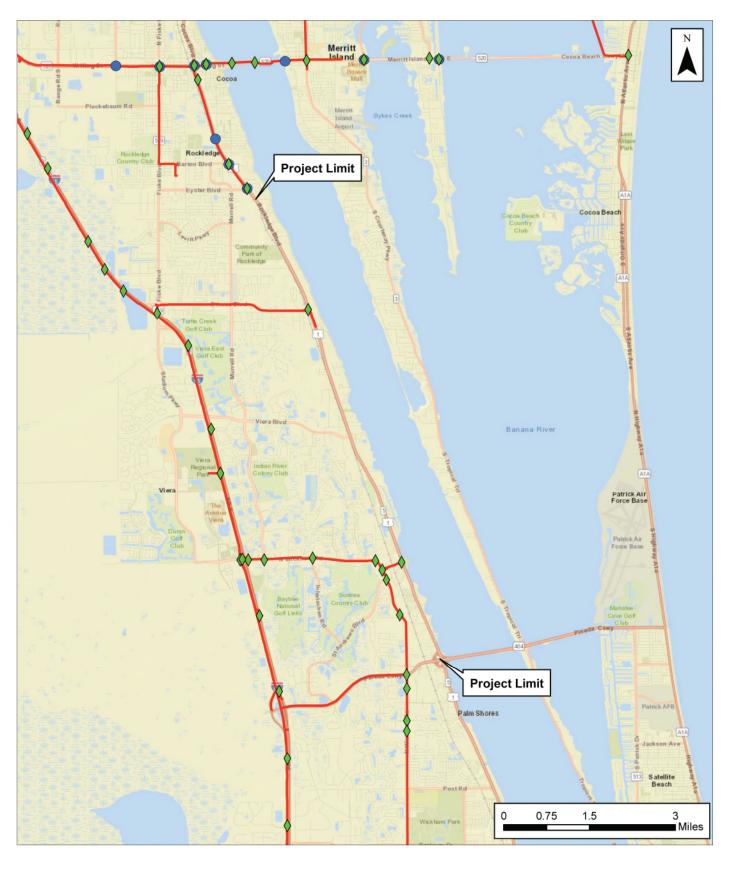








Figure 14
Existing ITS

6.15. Utilities / Railroads

A design ticket was requested on April 15, 2019. The evaluation included the identification of utilities within a quarter mile of US 1. The following utilities were identified:

- Resurgence Infrastructure Group Fiber
- AT&T and AT&T Distribution Fiber and Communication Lines
- Brevard County Water Resources Water, Sewer, Reuse Lines
- Brevard County Public Works Engineering Division Fiber and Traffic Signals
- City of Cocoa Water
- City of Rockledge Reclaimed Water and Sanitary Sewer
- Florida City Gas Gas
- Florida Power and Light (FP&L) Electric
- CenturyLink Fiber
- MCI Fiber and Communication Lines
- Brighthouse Networks (Spectrum) Fiber
- Sprint Fiber

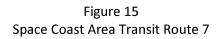
In addition to requesting a design ticket, research was done to identify potential gas transmission and hazardous material pipelines. However, neither of these pipelines were found to exist within a quarter mile of US 1.

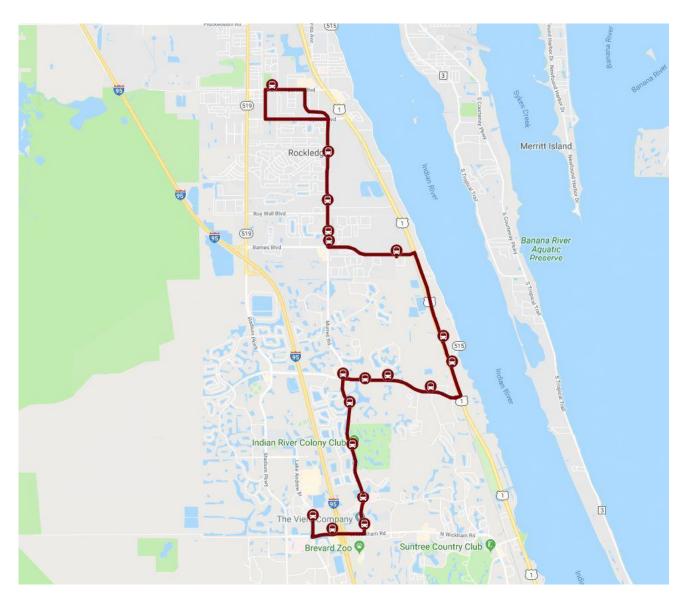
A 138 kV FP&L transmission line is present on the east side of US 1 beginning south of Pineda Causeway (SR 404). The transmission lines crosses US 1 twice in the vicinity of Wickham Road and continues on the east side of US 1. Approximately, 2,750 feet north of Viera Boulevard the transmission line crosses US 1 and continues north and west of US 1.

6.16. Transit Data / Routes

Space Coast Area Transit (SCAT) has one route within the proposed corridor, Route 7-Rockledge/Viera, which runs along US 1 from Viera Boulevard to Coquina Road, as shown in **Figure 15**.

Virgin Trains USA, formerly All Aboard Florida passenger-rail system and Brightline, has a planned expansion that will utilize the existing railroad system that currently runs parallel to US 1 from Park Avenue to south of Viera Boulevard within the project area. Currently, there are no stations planned for Brevard County.





6.17. Existing / Planned and Trails

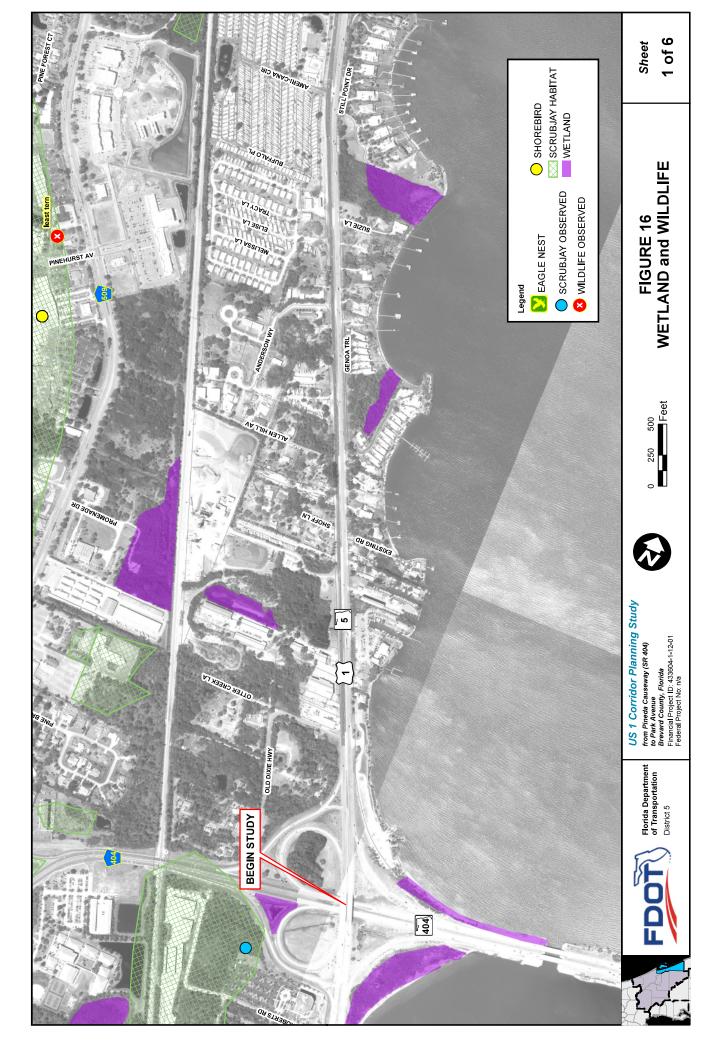
The East Coast Greenway Trail, a 3,000-mile spine route that traverses from Key West Florida north to the Canadian border in Maine, travels along a segment of US 1 from Pineda Causeway to Rockledge Drive within the project area; moreover, the section of US 1 from US 192 to SR 528 is considered an unfunded gap in FDOT's SUN Trail network. No funding has been identified for this section of SUN Trail.

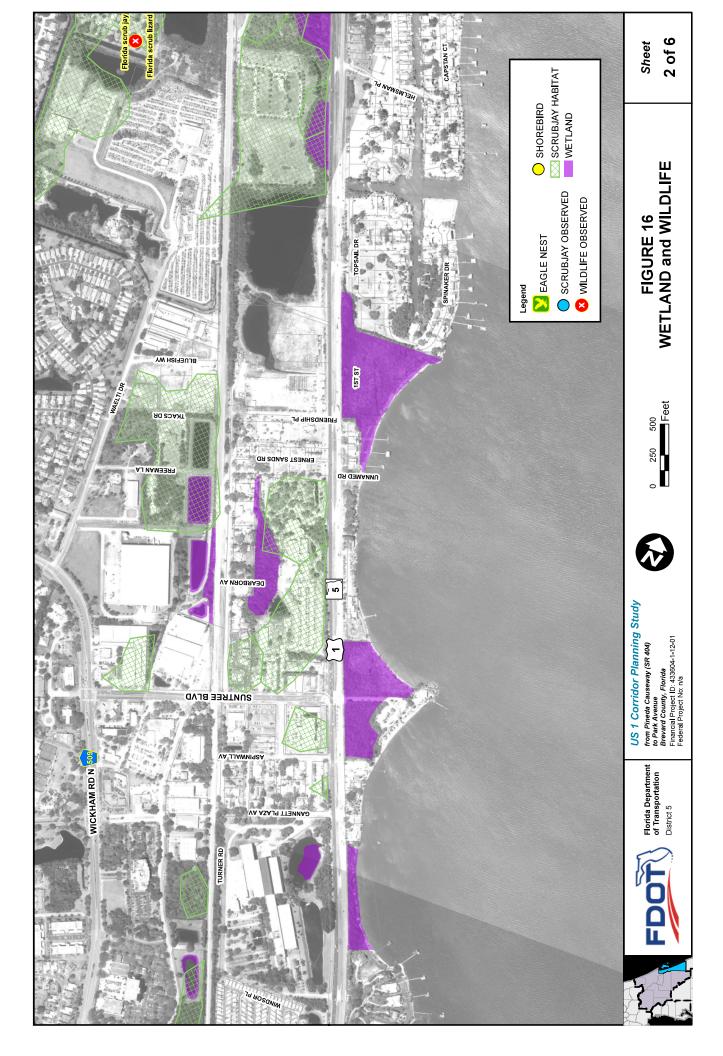
7. Environmental Setting

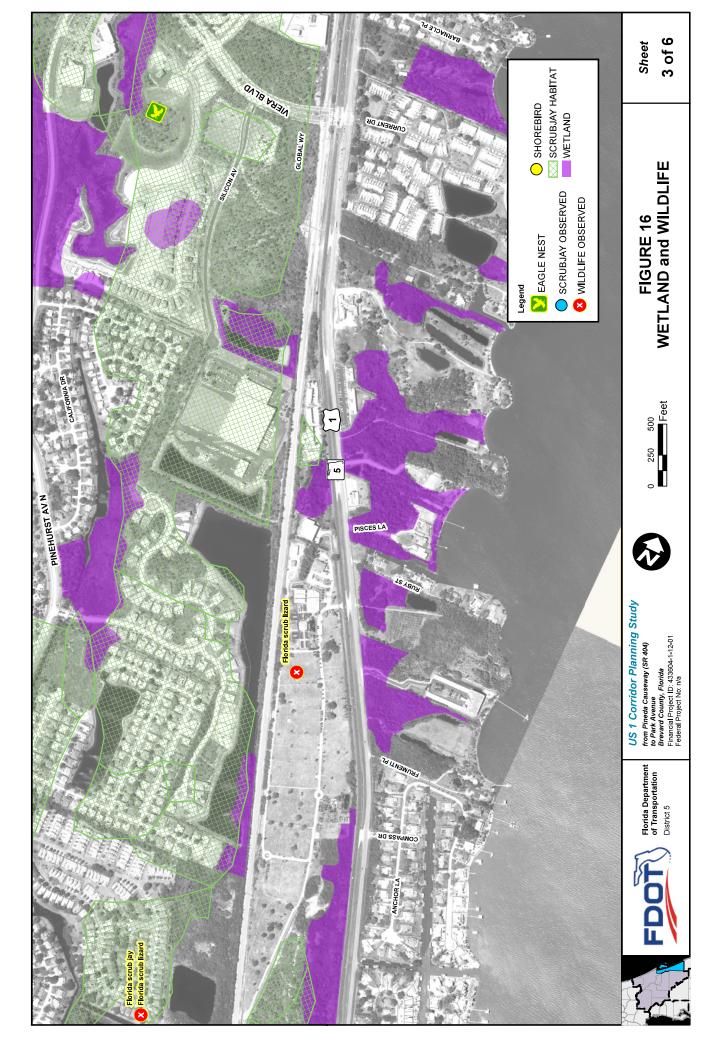
7.1. Natural Resources

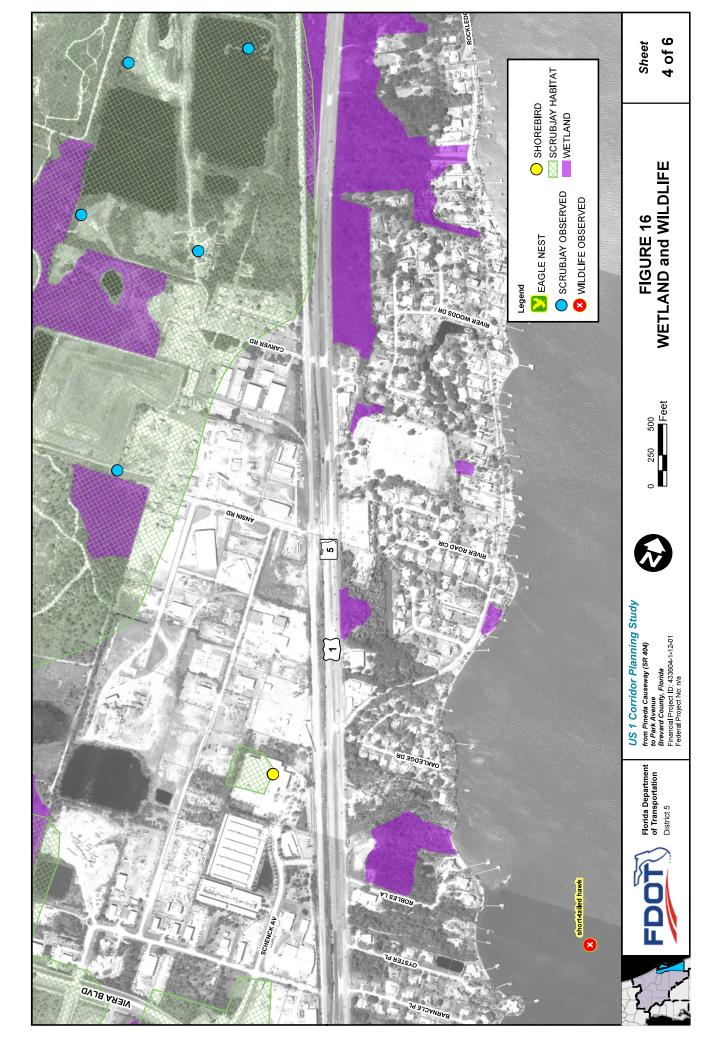
This segment of US 1 is located along the Atlantic Coastal Ridge, a geologic shoreline feature formed during comparatively high sea levels approximately 140,000 years ago. This shoreline feature influenced the biological diversity of the region, with many species of plants and animals evolved to the moderately well drained, sandy soils which contain few nutrients. The predominant feature of the relict shoreline would have been scrub habitat, often identified by an open to closed canopy, an open sandy ground layer, and dense thicket of scrub oaks suited for the soil conditions. This habitat type is rarely observed along the project corridor. Instead, it and other natural habitats have been replaced by single family and multifamily residential developments, as well as commercial land uses. Many of these developments were constructed prior to effective water resource protection criteria or the need for environmental permits.

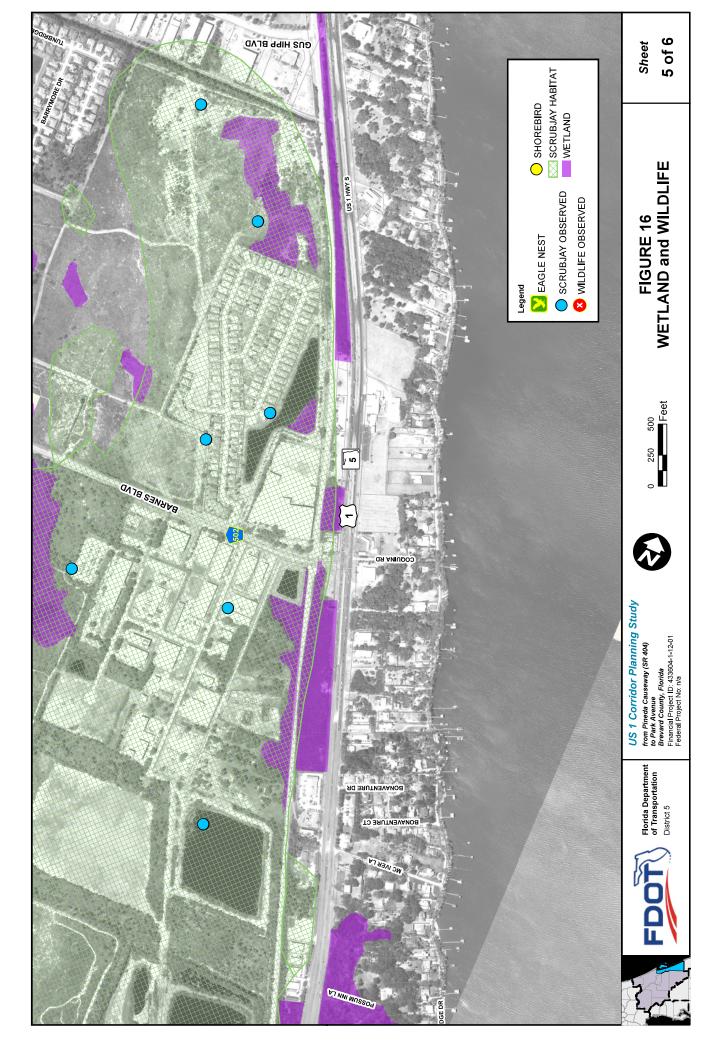
We assessed whether protected species or their critical habitat(s) have been documented along the project corridor. The U.S. Fish and Wildlife Service (USFWS) designated the Indian River Lagoon (IRL) as critical habitat for the West Indian manatee. While the project corridor does not occur in the IRL, any new proposed discharge structures from US 1 may require coordination with the USFWS and standard protection measures, including grates on discharge structures accessible by manatees. The project corridor also falls within several USFWS Consultation Areas: Audubon's crested caracara, Florida scrubjay, piping plover, and red-cockaded woodpecker. However, the project corridor only contains remnant habitat for and documented sightings of Florida scrub-jay. Proposed actions within potential scrub habitat would require additional coordination with the USFWS and potentially surveys using established protocols. The project corridor is located within USFWS core foraging habitat for five wood stork rookeries: Lake Poinsett, SW Lake Washington, Lake Washington, US 192 East, and US 192 West. Potential impacts to surface waters, including swales and ditches, would require additional coordination with the USFWS. Finally, the project corridor is not located within 660 feet of a bald eagle nest; and only the remnant uplands may contain state-listed species, particularly the gopher tortoise. Additional surveys using established protocols may be required for work in these areas. Wetlands and wildlife within the project area are shown on Figure 16.

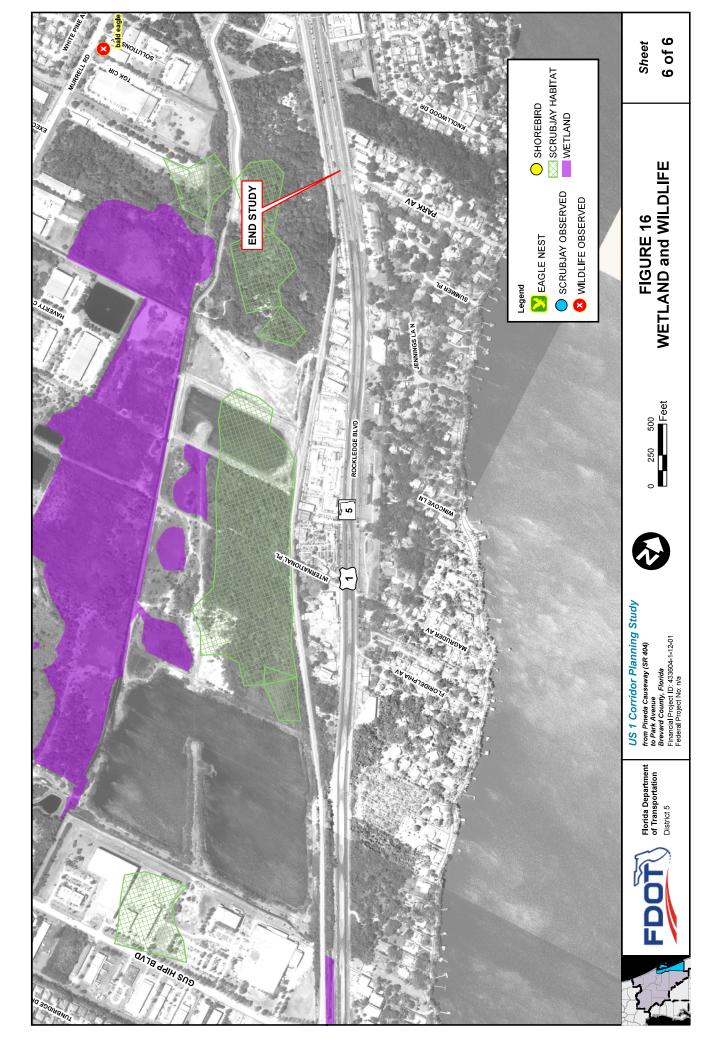












7.2. Cultural Resources

7.2.1 Historic Resources

There are several historic structures along the corridor greater than 50 years of age; however, only three of these structures are eligible for listing on the National Register of Historic Places (NRHP). These resources are presented on **Figure 17** and include Harvey's Groves located at 3700 US 1, Rockledge, Florida 32955; Victory Groves located at 2273 US 1, Rockledge, Florida 32955; and an unnamed wooden structure at Rockledge Gardens located at 2153 US 1, Rockledge, Florida 32955.

