

2.0 Geographic Overview of Peace River Basin

The study area includes nine sub-basins, which are described in this chapter. More detailed descriptions can be found in the *Peace River Cumulative Impact Study-Summary*.

Upper Peace River

Peace River at Bartow Sub-Basin (233,761 acres)

Located in the northernmost portion of the Peace River basin, the Peace River at Bartow is the largest of the nine sub-basins, covering 17% of the watershed (Figure 2.1). This sub-basin encompasses Lakeland, Winter Haven, and Bartow and contains the greatest area of urban development of all the sub-basins. In the 1940s, this sub-basin was predominantly (61%) undeveloped wetlands and native uplands; by 1999, the land uses were predominantly (63%) urban, improved pasture, intensive agriculture, and mined lands. The major permanent streams and surface drainage systems associated with the Peace River at Bartow are the headwaters in the Green Swamp, Peace Creek, Saddle Creek, and Bear Branch. All of these systems have been severely and adversely modified through urbanization, including flood control, along with mining and agriculture—few natural functions or habitat remain. Figures 2.2 and 2.3 illustrate the dramatic changes that have occurred in this sub-basin over the last 60 years.

Peace River at Zolfo Springs Sub-Basin (197,668 acres)

This basin includes the Peace River south of Bartow in Polk County to Zolfo Springs in Hardee County (Figure 2.4). The towns of Fort Meade, Bowling Green, Wauchula, and Zolfo Springs are along this portion of the river. Numerous creeks drain to the Peace River between Fort Meade and Zolfo Springs, including Little Charlie, Whidden, and Bowlegs creeks and Sink Branch. Agriculture and phosphate mining have structurally modified the majority of the natural drainage systems in this sub-basin. Six Mile Creek, formerly one of the larger Peace River tributaries in this sub-basin, was totally eliminated as a natural system by phosphate mining. Little Charlie and Bowlegs creeks remain the most intact systems. Figures 2.5 and 2.6 illustrate the changes in this sub-basin between the 1940s and 2004.

Along the Peace River upstream of Fort Meade, the terrain and geology are of karst origin; large sinks and solution features occur and during periods of low flows the river has flowed into the crevices of the streambed. Kissengen Spring near Bartow was a significant feature until it ceased flowing in the early 1950s, attributable primarily to groundwater withdrawals (Figures 2.7 and 2.8). Seventy-seven percent of the Peace River at Zolfo Springs sub-basin is developed, with mining comprising 33% of the land use. Improved pasture (22%), intensive agriculture (15%), and urban areas (7%) make up the remainder of developed land uses.



Figure 2.7 Kissengen Spring: 1947



Figure 2.8 Kissengen Spring: June 2006 (M. Harmeling)

Payne Creek Sub-Basin (79,561 acres)

Payne Creek and its large tributary, Little Payne Creek, are the defining water features in this sub-basin. Payne Creek enters the Peace River from the west, upstream of Wauchula (Figure 2.9).

Although it is the second smallest sub-basin, the Payne Creek sub-basin has been heavily mined for phosphate and contains 41% of the mined lands within the entire Peace River basin. Agriculture makes up only 18% of the Payne Creek sub-basin but in 2002 used 4.83 million gallons per day compared to the 3.82 million gallons per day used by phosphate mine operations (Basso, 2006). The conversion of 90% of the native upland habitat, from approximately 52,000 acres in the 1940s to some 5,200 acres by 1999, represents the largest change in land use in the Payne Creek sub-basin. Wetlands experienced similar dramatic losses, decreasing from 24% of the basin in the 1940s to only 9% by 1999 (PBS&J, 2007).

Middle Peace River

Peace River at Arcadia Sub-Basin (128,186 acres)

The Peace River at Arcadia sub-basin, located almost directly in the center of the watershed, extends from Zolfo Springs in Hardee County south into mid-DeSoto County (Figure 2.10). Arcadia is the only municipality in this sub-basin, with the smaller community of Brownville located upstream. Troublesome, Hickory, and Oak creeks are among the main tributaries in this sub-basin. The majority of the principle natural streams remain intact, although most headwater areas have been modified to accelerate drainage. Large areas of native upland habitats have been converted to agricultural land uses, typical of the watershed in general. Agricultural lands account for 56% of the basin, while native upland and wetland habitats still comprise 41%. Urban land use is negligible, covering only 3% of the total area. There has been only a minimal amount of phosphate mining in the extreme northwestern portion of the Peace at Arcadia sub-basin, with outfall drainage to Payne Creek in the Payne Creek sub-basin. Additional mining planned in the Troublesome Creek watershed will also drain to Payne Creek.

Charlie Creek Sub-Basin (173,573 acres)

Nearly all of the Charlie Creek sub-basin is located in Hardee County, with smaller portions situated in Polk, Highlands, and DeSoto counties (Figure 2.11). Charlie Creek is the largest tributary, by discharge volume, of the Peace River, joining the river from the east just north of the Hardee-DeSoto county line, near Gardner. This sub-basin is dominated by agricultural uses, with improved pasture encompassing 45% and intensive agriculture, primarily citrus, comprising 19%. Undeveloped wetlands and native uplands make up an additional 35% of the area, while urban land use is limited and no phosphate mining has occurred.

Horse Creek Sub-Basin (128,435 acres)

With its headwater areas in Hillsborough, Polk, and Manatee counties, Horse Creek is second only to Charlie Creek as a tributary in the amount of discharge to the Peace River watershed. Horse Creek extends southwesterly through Hardee and DeSoto counties, paralleling the western border of the Peace River. While Horse Creek extends into southwestern DeSoto County prior to joining the Peace River just north of the State Road 761 bridge near the town of Fort Ogden, the Horse Creek sub-basin is truncated at the State Road 72 bridge in west-central DeSoto County because of the lack of long-term gages south of this point (Figure 2.12).

Undeveloped wetlands and native uplands cover 54% of this sub-basin, while urban development (1%) and intensive agriculture (10%) have expanded toward the southern end in DeSoto County. Improved pasture, covering 37% of the sub-basin, is the predominant developed land use in this sub-basin. Most of the alterations to drainage patterns in the Horse Creek sub-basin have been due to historical agricultural modifications of the headwater streams and wetlands. For example, the West Fork of Horse Creek within Manatee County has been canalized since the mid-1950s. Other wetland areas, such as the ultimate headwater streams of Horse Creek north of State Road 37, have been eliminated by phosphate mining and reclaimed as a wetland flow-way. Phosphate mining, covering 6% of the lands in the Horse Creek sub-basin, has been present since the mid-1980s at three mines in the northern portion: the Four Corners and Fort Green mines, both owned by Mosaic Fertilizer, L.L.C.; and the South Pasture Mine, owned by C.F. Industries. Although phosphate companies own land south of State Road 64, existing and proposed phosphate mining has been exclusively north of this boundary.

Lower Peace River

Coastal Lower Peace River Sub-Basin (164,571 acres)

This sub-basin includes parts of Charlotte, DeSoto, and Sarasota counties and contains the transition area of the Peace River from a freshwater system to an estuarine system (Figure 2.13). The Coastal Lower Peace River sub-basin is one of only two sub-basins in the watershed with large urban land use components, with Port Charlotte and Punta Gorda both located near the mouth of the Peace River as it enters Charlotte Harbor. The sub-basin is bisected by the Peace River, with Horse Creek entering the river from the west side and Joshua Creek and the tidal portion of Shell Creek entering the river from the east. Urban development, improved pasture and intensive agriculture make up 51% of the sub-basin, with urban areas expected to extend northward along the river corridor in the future. No phosphate mining has occurred or is anticipated in this sub-basin. Undeveloped wetlands and native uplands comprise 45% of the area. Figures 2.14 and 2.15 illustrate the dramatic changes that have occurred in this sub-basin between the 1940s and 2004.

Joshua Creek Sub-Basin (77,391 acres)

The Joshua Creek sub-basin, the smallest in the watershed, is located in the southeastern portion of the Peace River basin entirely within DeSoto County (Figure 2.16). Hawthorne Creek and Hog Bay flow into the lower reaches of Joshua Creek immediately upstream of its confluence with the Peace River, downstream of Arcadia. This sub-basin has no phosphate mining and limited amounts of urban development. In 1999, approximately 73% of the land use was agriculture, with 29% of that in citrus. The amount of land devoted to intensive agriculture with its heavy use of more mineralized groundwater is at least part of the cause of degraded surface water quality in the Joshua Creek sub-basin.

Shell Creek Sub-Basin (213,537 acres)

The Shell Creek sub-basin is the second largest in the Peace River watershed, located primarily in DeSoto and Charlotte counties with minor portions in Highlands and Glades counties on the eastern extent (Figure 2.17). Prairie Creek, which drains the north and northeastern portion of the sub-basin, and Shell Creek, which flows more through the southeastern portion, are the two primary

stream channels in the Shell Creek sub-basin. These two creeks merge in the 840-acre Shell Creek reservoir formed by the Hendrickson Dam, which provides drinking water for the City of Punta Gorda and its immediate surroundings. Wetlands and native upland habitats comprise 42% of this sub-basin, while improved pasture and intensive agriculture make up 25% and 31%, respectively. Like the Joshua Creek sub-basin, no phosphate mining has occurred here; also as in the Joshua Creek sub-basin, the use of mineralized groundwater to support agriculture has adversely affected surface water quality.

Peace at Bartow

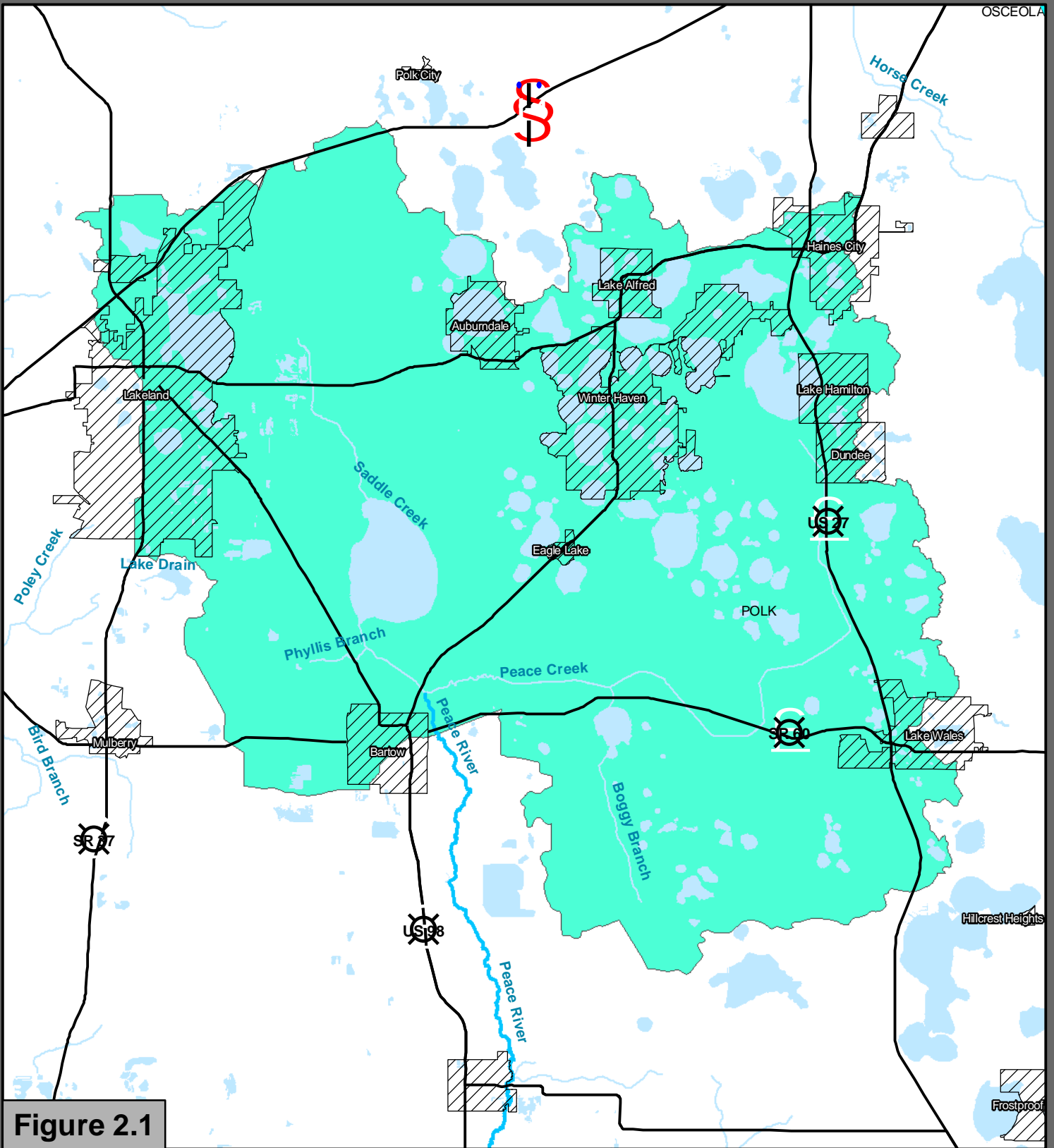


Figure 2.1

- Peace at Bartow
- Interstates and Routes
- City Limits
- Lakes
- Rivers or Streams

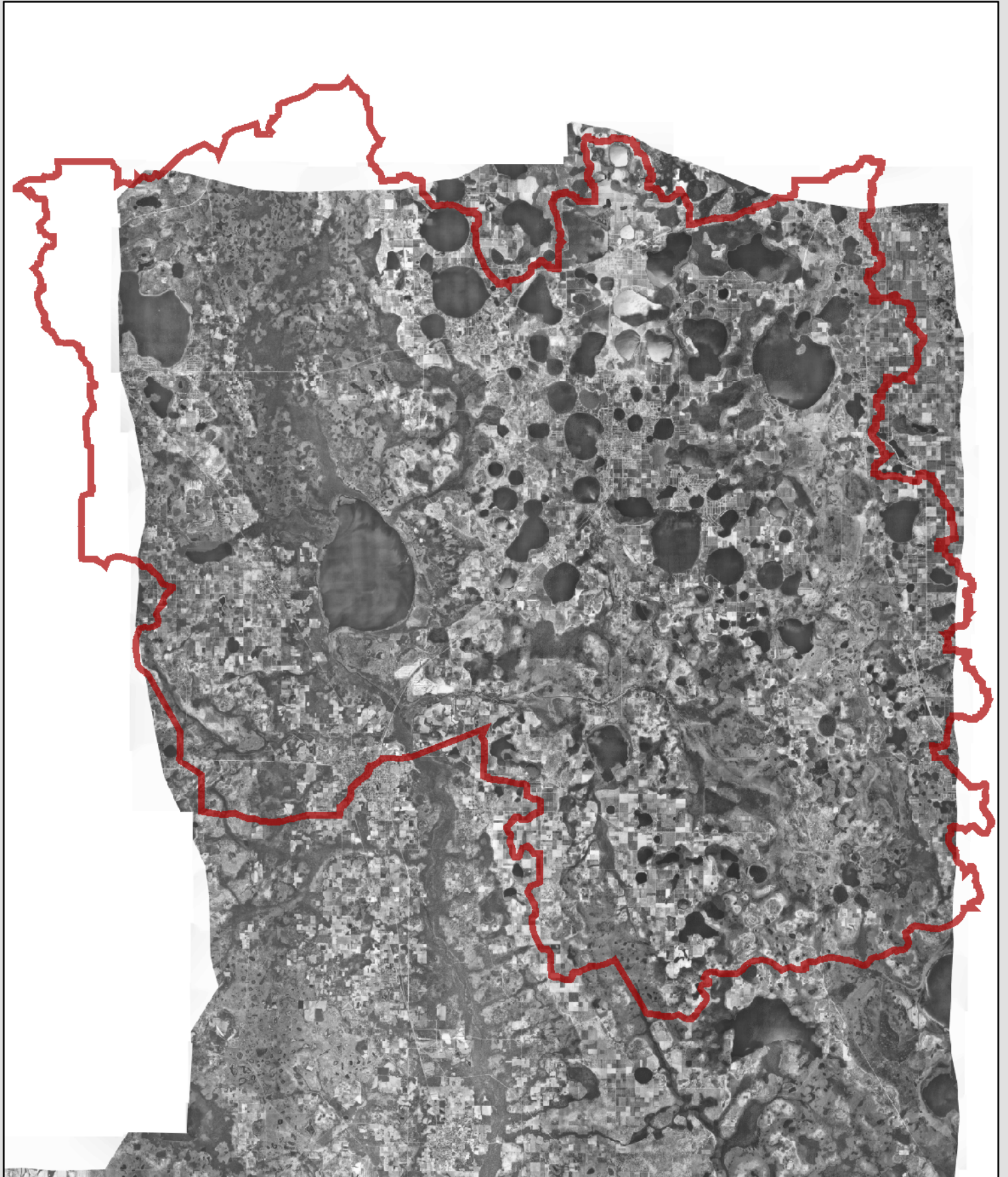
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Peace at Bartow 1940s Aerial



Historical Aerials obtained from the National Archives.

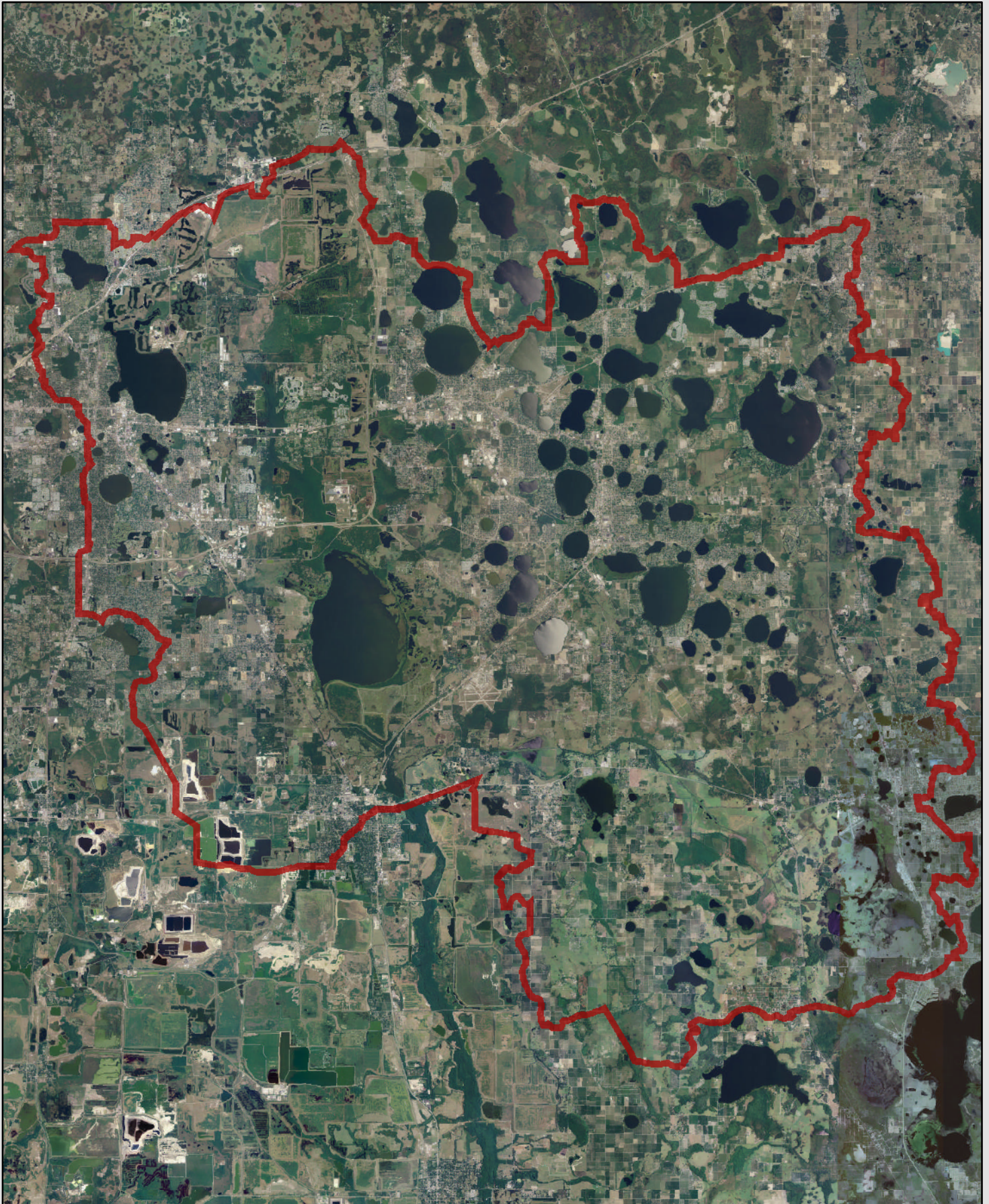
Author: Braulio Fernandez

Date: December 19, 2006

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Figure 2.2

Peace at Bartow 2004 Aerial



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Figure 2.3

Peace at Zolfo Springs

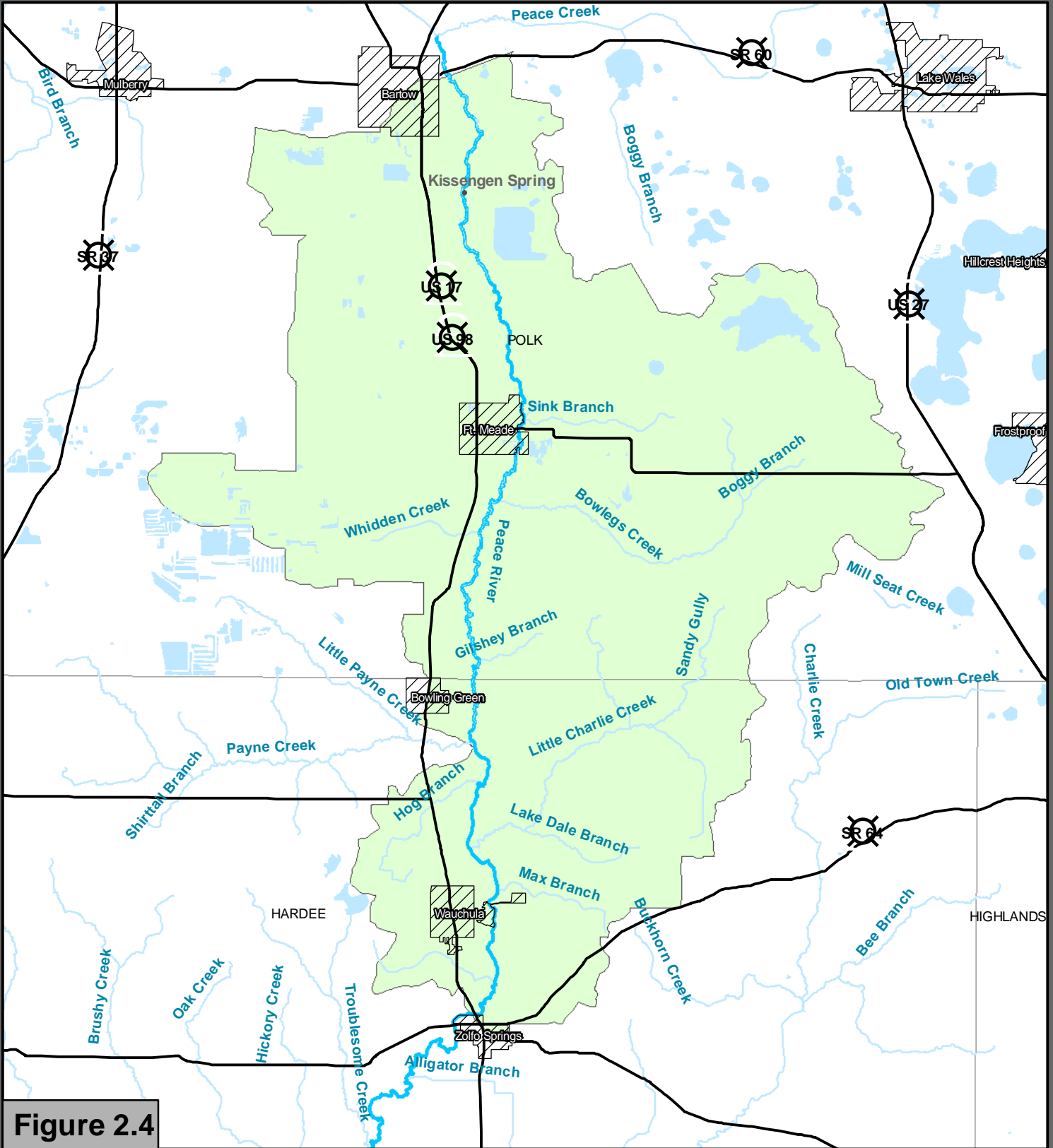


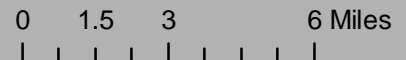
Figure 2.4

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Peace at Zolfo Springs 1940s Aerial

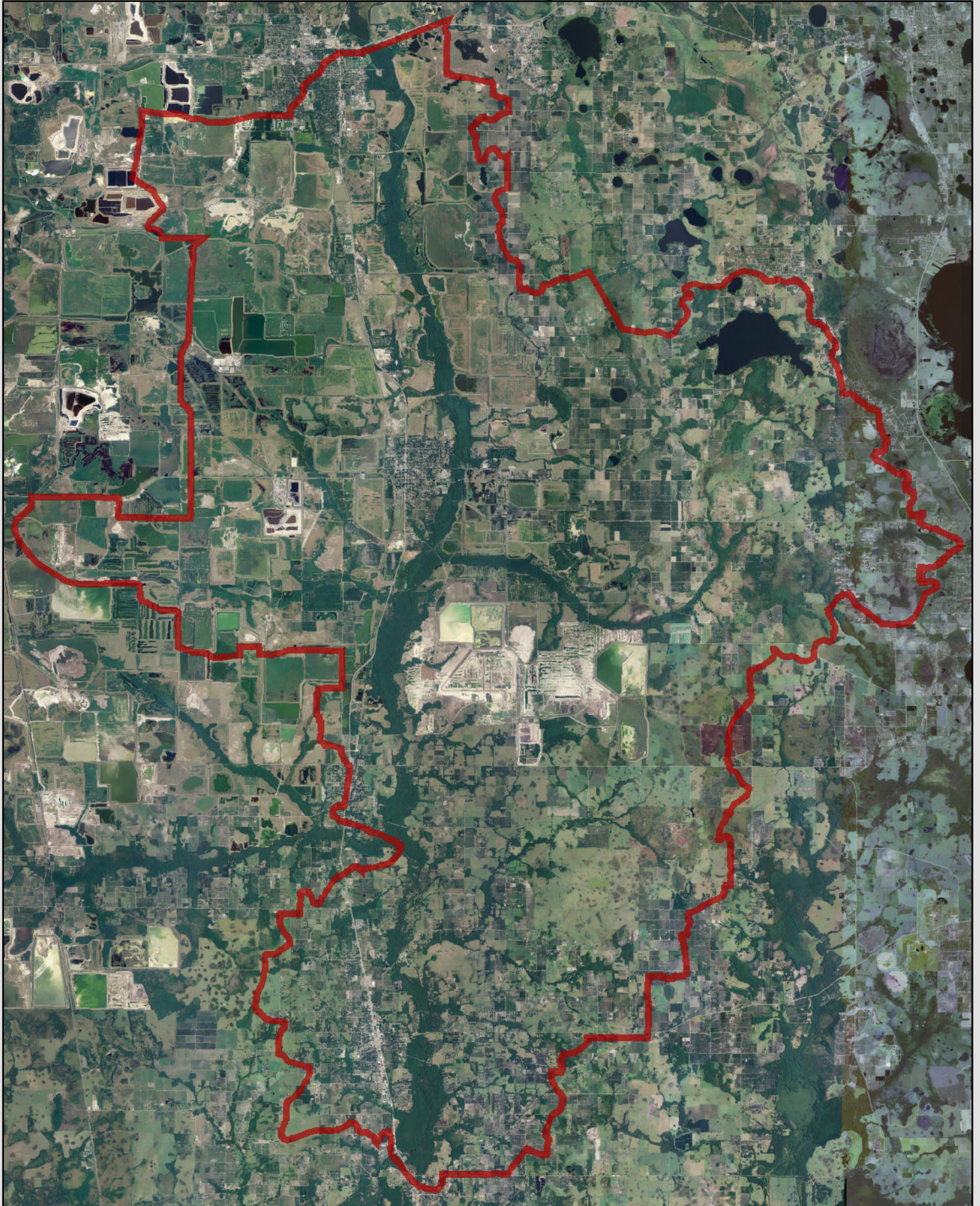


Historical Aerials obtained from the National Archives.

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Figure 2.5

Peace at Zolfo Springs 2004 Aerial



Payne Creek

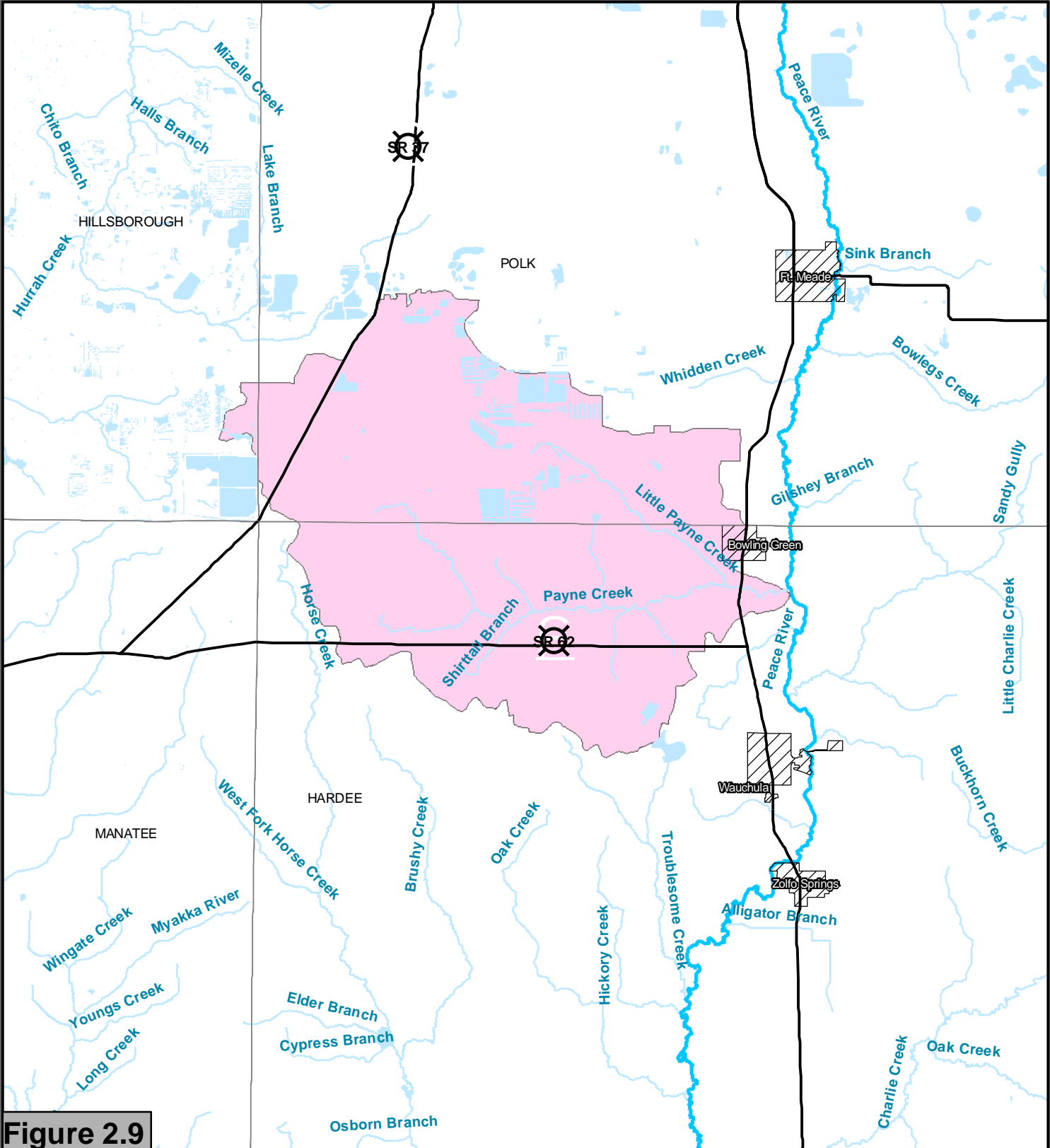


Figure 2.9

- Payne Creek
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Peace at Arcadia

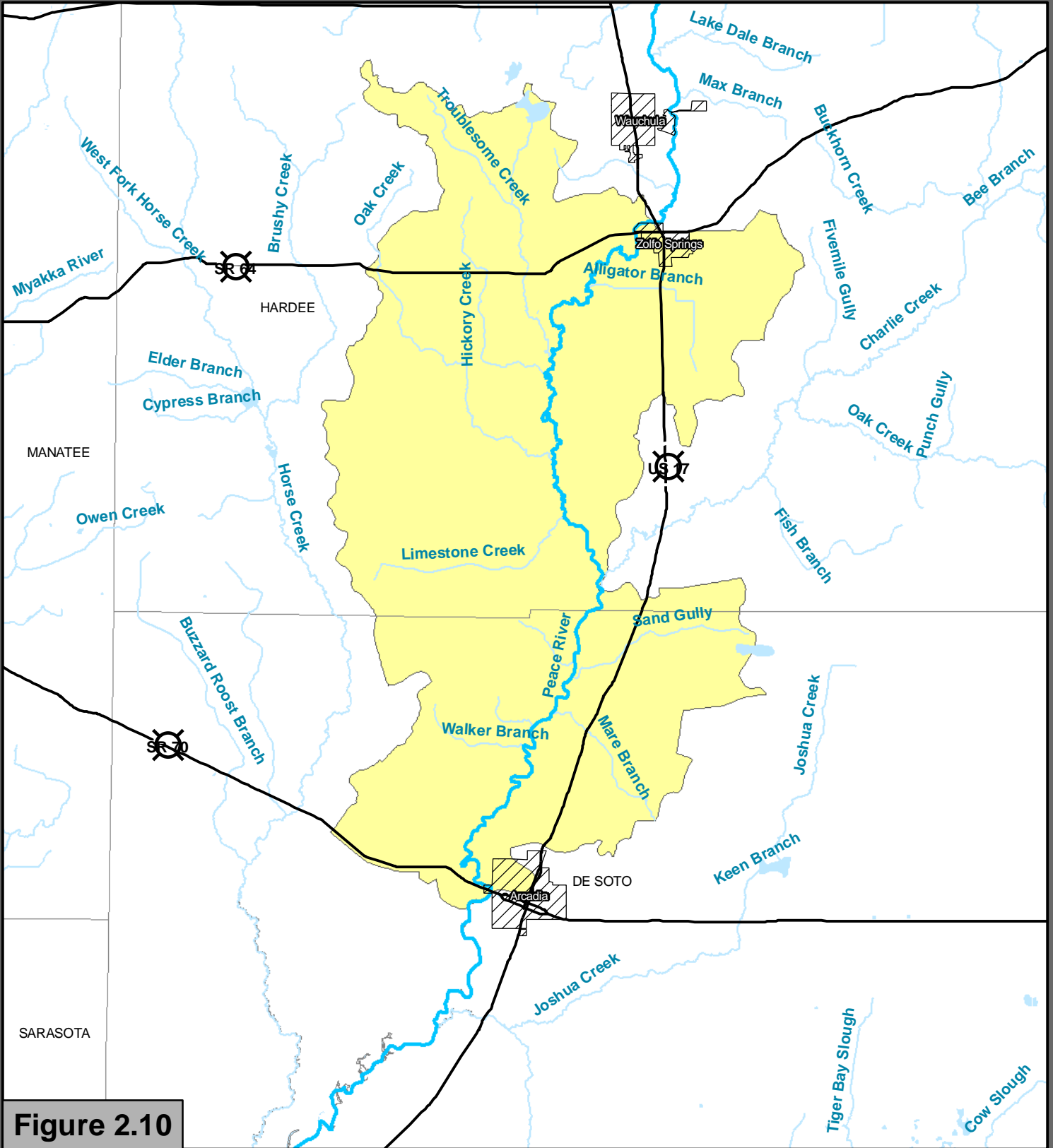


Figure 2.10

- Peace at Arcadia
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Charlie Creek

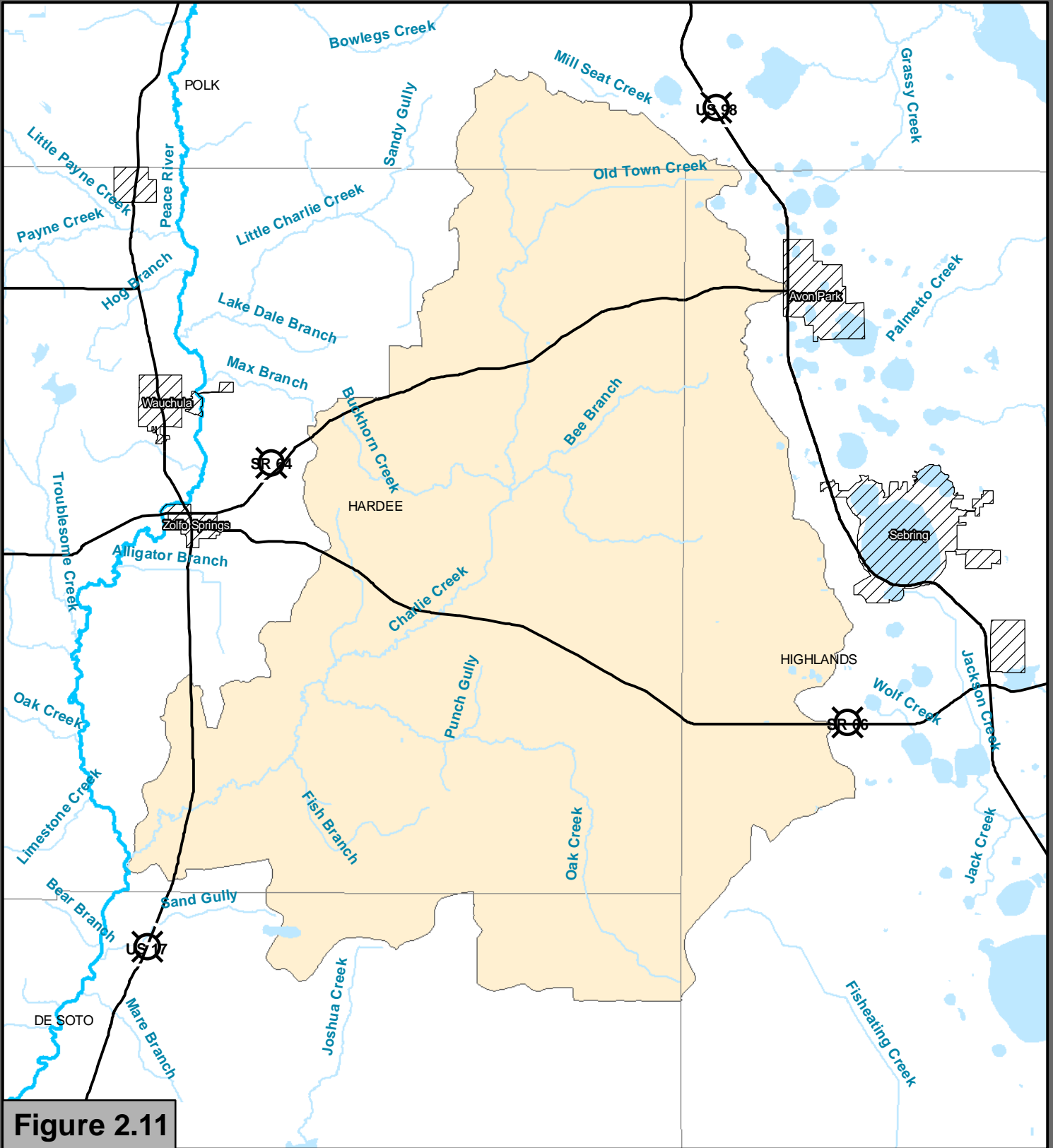


Figure 2.11

- Charlie Creek
- Interstates and Routes
- City Limits
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Horse Creek

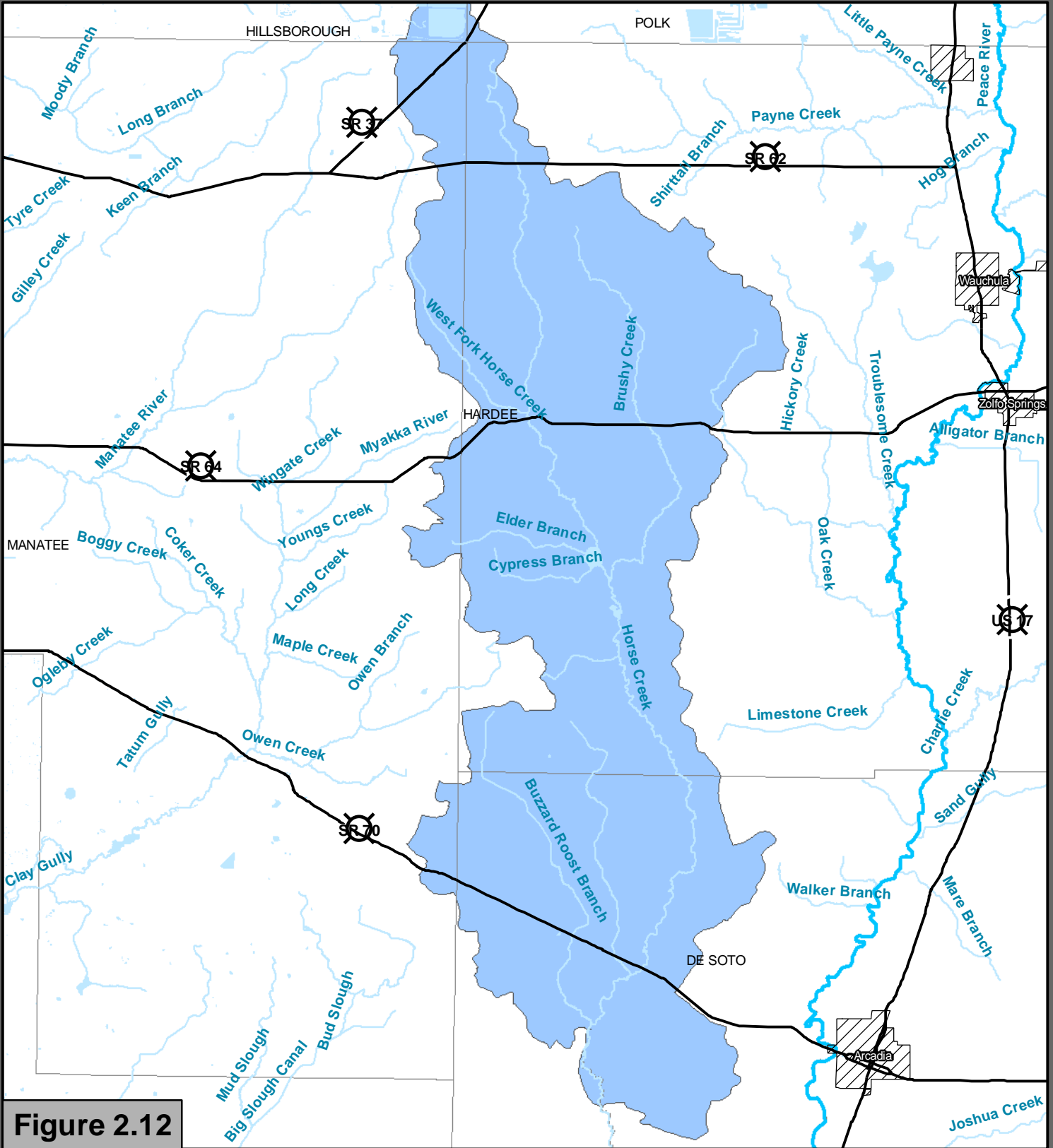


Figure 2.12

- Horse Creek
- Interstates and Routes
- City Limits
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Coastal Lower Peace

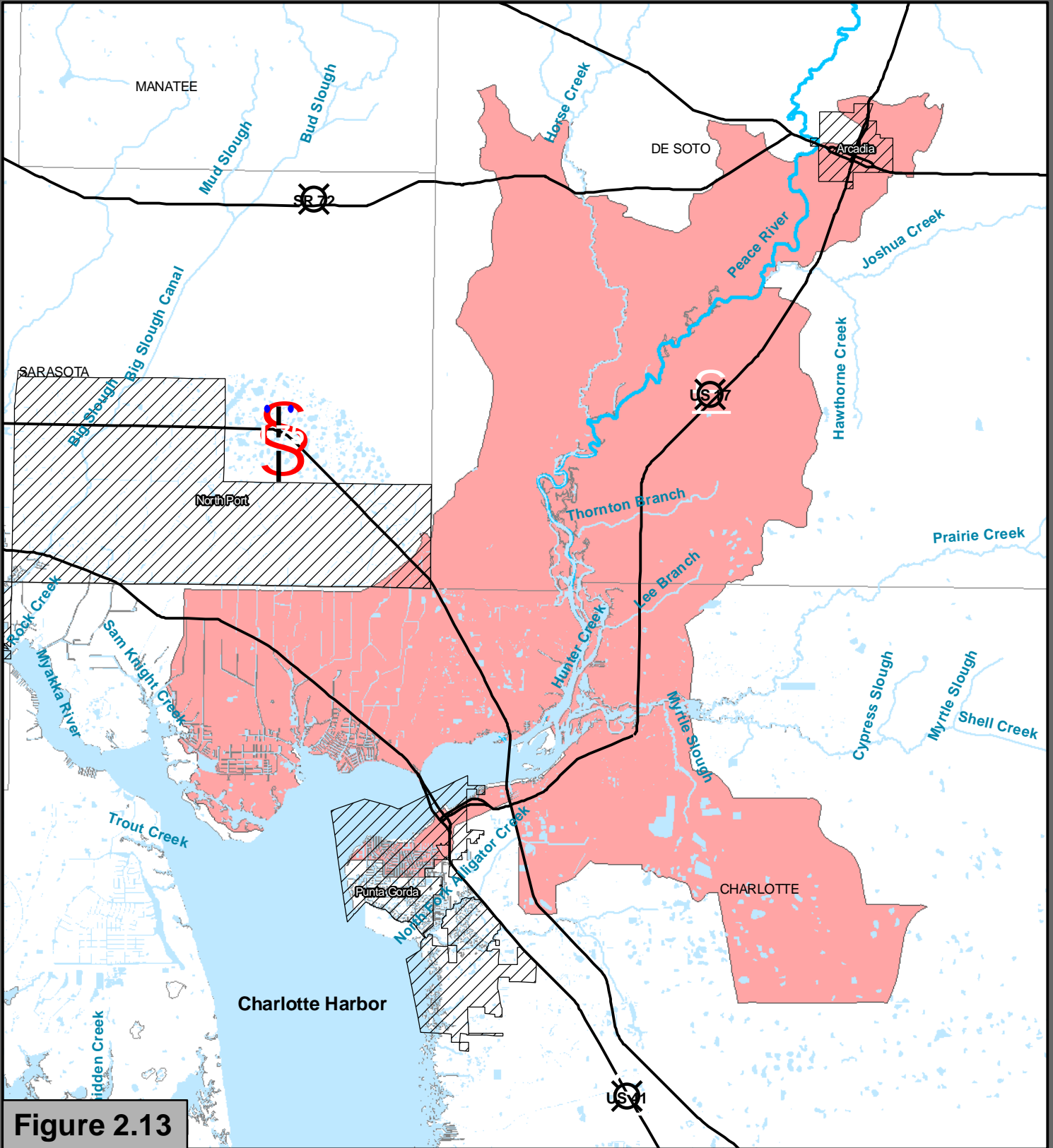


Figure 2.13

- Coastal Lower Peace
- Interstates and Routes
- City Limits
- Lakes
- Rivers or Streams

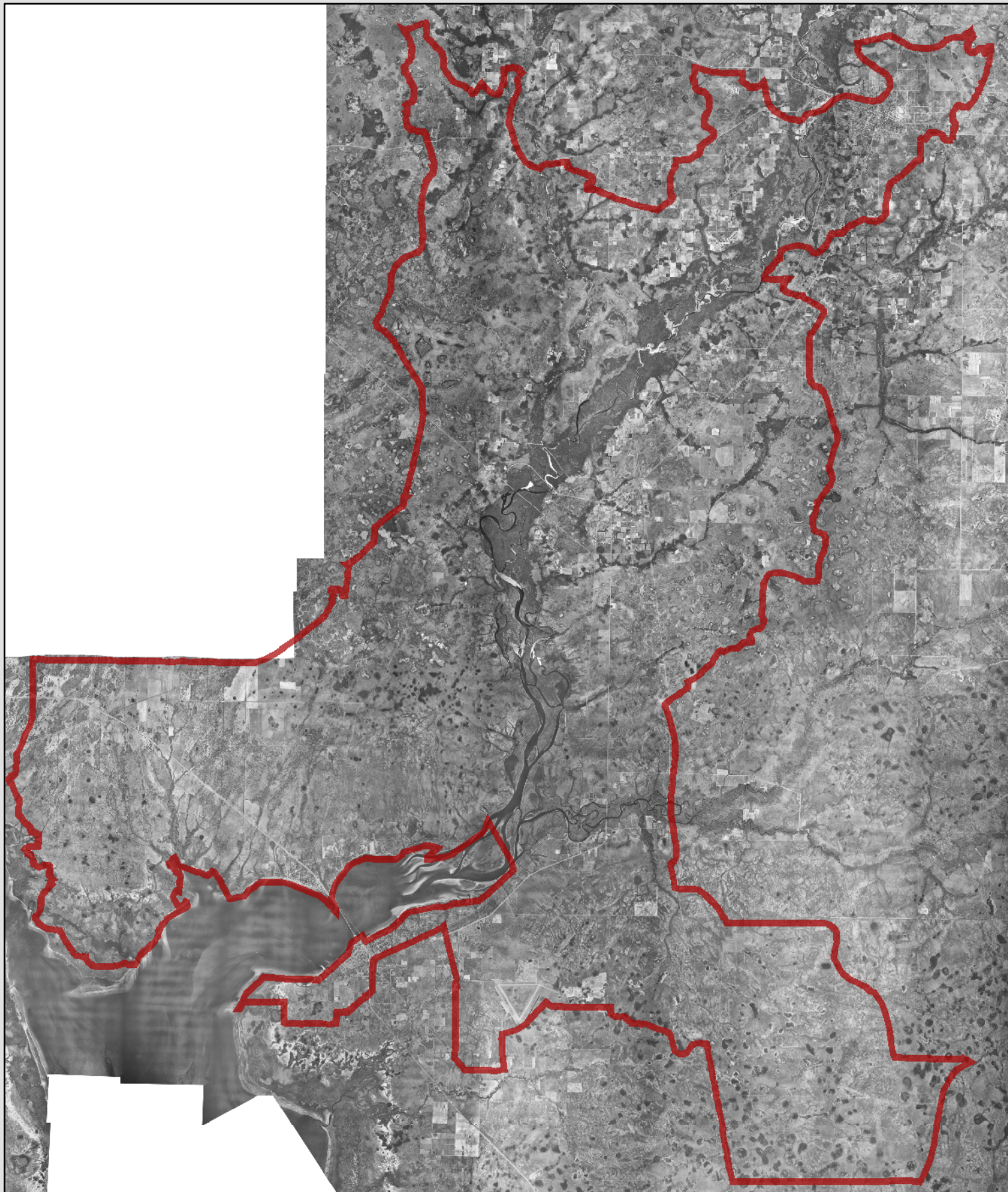
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Coastal Lower Peace River 1940s Aerial



Historical Aerials obtained from the National Archives.

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Date: December 19, 2006

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Figure 2.14

Coastal Lower Peace River 2004 Aerial



Joshua Creek

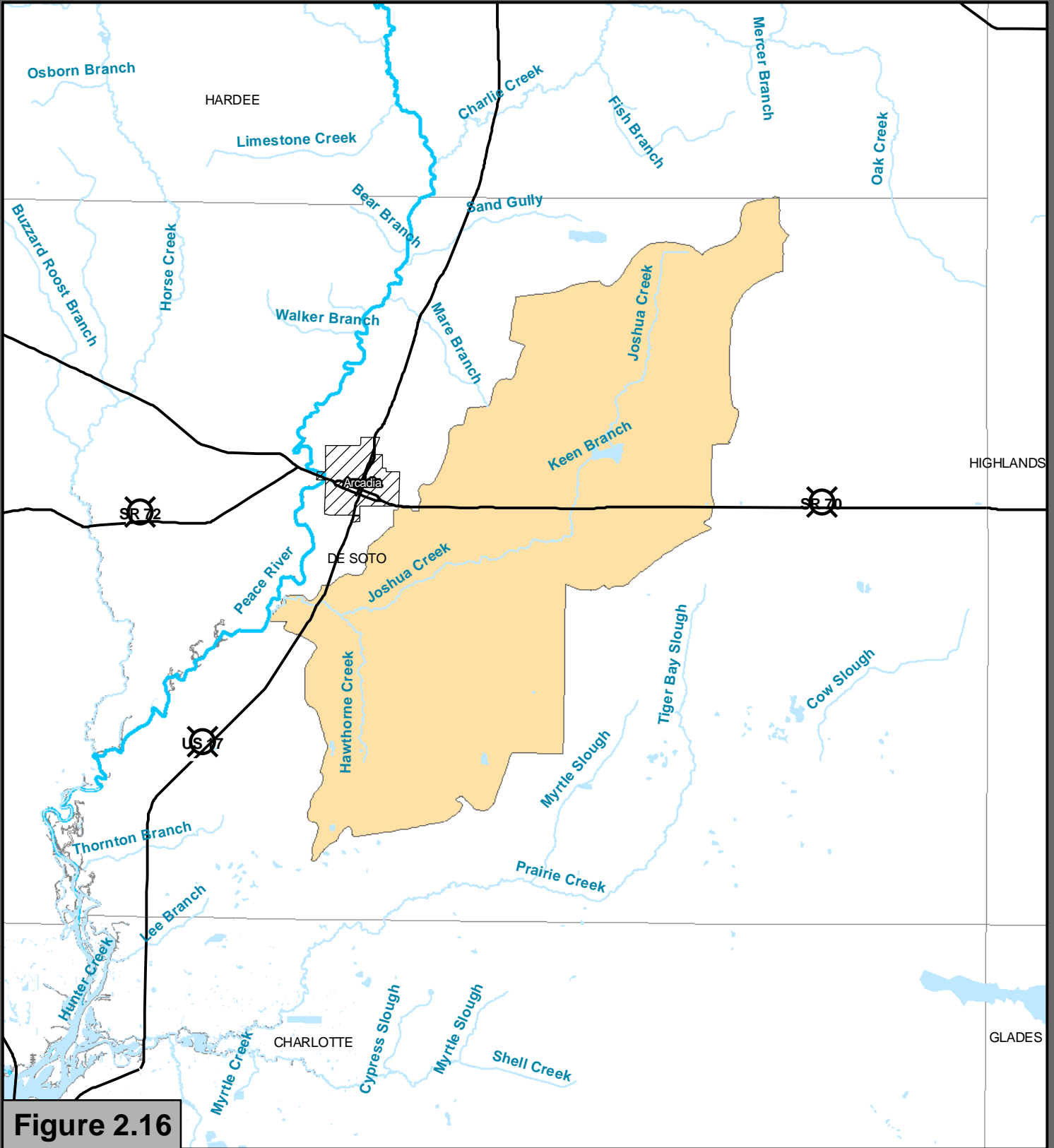


Figure 2.16

- Joshua Creek
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Shell Creek

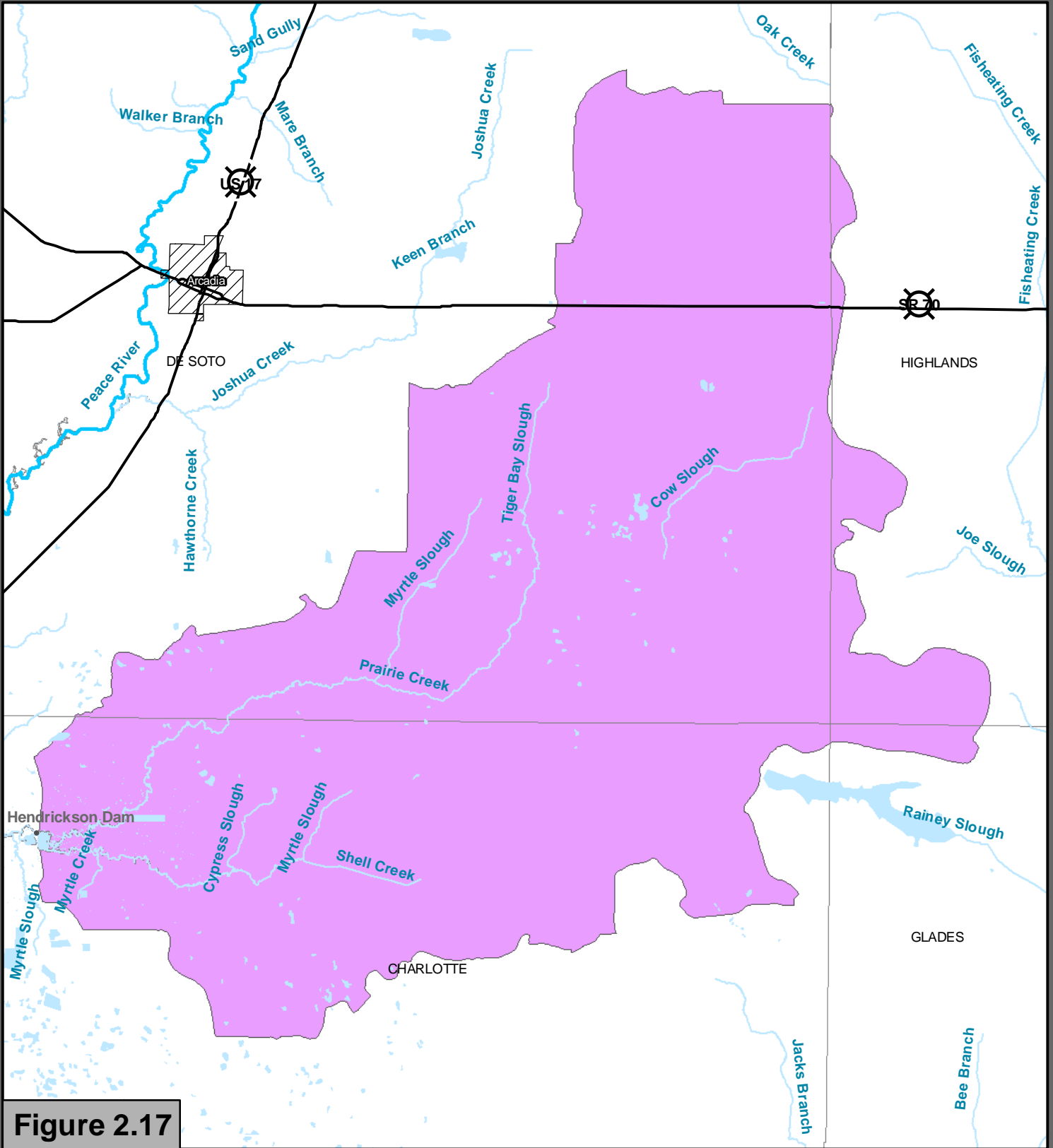


Figure 2.17

- Shell Creek
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