Fischer Landing
Town of Century
Sedimentation Study
June 2022

Prepared by:

Water Resource Associates, LLC

Funded by:

Pensacola and Perdido Bay Estuary Program Grant #FY2022-04

Contents

Introduction

The purpose of this report is to provide a base of information that can be used to pursue a full engineering analysis of issues with sedimentation at Fischer Landing, a boat ramp park owned by the Town of Century. The current issue with sedimentation is that at various times of the year, sediment gets deposited at the foot of the new boat ramp. The deposited sediment can prevent same launch of watercraft and is a financial burden for the City to use heavy equipment and personnel to remove sediment and relocate it, either on or off site.

The efforts expended for this study were aimed at examining potential sources of sediment in the vicinity of the existing boat ramp, to provide some documentation of potential sources of sediment, and to provide some further steps to address sediment deposition at the ramp.

Background

Water Resource Associates, LLC began review of the Escambia River in the vicinity of the Fischer Landing boat ramp upon notice to proceed for this project. The goal of the review was to understand the processes that could make the boat ramp vulnerable to sediment deposition and determine potential sources of additional sediment that exacerbates the natural sediment deposition conditions within the river, particularly at this location. The presence of sediment is a natural and necessary part of a healthy stream (**Cook et al., 2004**).

Excess sedimentation is detrimental to water quality, destroys biologic habitat, reduces storage volume of water impoundments, impedes the usability of aquatic recreational areas, and causes damage to structures. Sediment loads in streams are primarily composed of relatively small particles suspended in the water column (suspended solids) and larger particles that move on or periodically near the streambed (bedload) (**Cook, et al. 2004**).

Riverine Sediment Transport

Sediment transport is an important part of the landscape renewal that make rivers important. General processes within a river system have been described in terms of the upper course, middle course and lower course (**Hydrosedinet, 2021**).

In the upper course, the steep gradients and river channels provide for an erosion and sediment production regime that that includes rapids and waterfalls that initiate sediment transport downstream.

The middle course of the river has more energy and volume than the upper course. The topographic gradient is gentler and the river channel is deeper. This area of the river is where both erosion and sediment deposition occur.

The lower course of a river is marked by lower elevation, a wider flatter floodplain, wider and deeper river channels, and greater water volume (**Hydrosedinet, 2021**). The primary sediment movement is toward storage and deposition.

Escambia River Basin Sediment Transport

Based on these general definitions and study of the Escambia River System using topographic mapping and aerial photography the river has been divided into the three Courses (Upper, Middle, and Lower) (**Exhibit 1 – Escambia River Watershed – River Courses**).

For the purposes of this study the Upper Course of the River System will be considered from the beginning of the Conecuh River near Union Station (elevation near 600 feet) to the Gantt and Point A reservoirs near Andalusia (**Outdoor Alabama, 2022**), elevation 150 feet. At the Point A dam, the water surface drops from 200 feet to approximately 150 feet. Upstream of the reservoirs the floodplain is approximately 150 feet wide. For the Escambia River system, the Conecuh River and tributaries above the Gantt and Point A dams represent the upper course landscape.

The Middle Course will be defined from the end of the Upper Course on the Conecuh River to McDavid, Florida on the Escambia River. In the Middle Course the Escambia River System includes the Escambia, Sepulga and Conecuh Rivers. The land use is mostly rural and includes farmlands and forests as well as improved/unimproved roadways within the river and tributary stream floodplains. Throughout this part of the river system there are erodible soils that greatly contribute to the overall sediment load for the River System (**ADEM, 2005**). The elevation changes in the Middle Course range from 150 feet elevation to around 70 feet.

In this stretch of the river, the deposition and erosion processes appear as sandbars at bends in the river. From a point east of Brewton where the Conecuh River crosses Bradley Road (Alabama County Road 4), sandbars and oxbow features become more prominent. The river elevation near Bradley Road is around 80 feet within the floodplain. The floodplain fluctuates between 500 and 2,000 feet wide.

The Lower Course of the Escambia River System will be defined as beginning near McDavid. At this point the floodplain is wide and flat with an elevation approximately 30 feet. The floodplain is very marshy and the river has lost the large sandbar signature within the mainstem. At the 30-foot elevation the flood plain is approximately 1.3 miles wide.

At this point the wide flood plain contains numerous tributary creeks that run parallel to or intersect the river forming a ribboned waterway with numerous water channels. The Escambia River delta is located approximately 24 miles downstream. The floodplain widens considerably to the point of discharge where the floodplain stretches to approximately 3.3 miles wide and contains several named river segments.

Project Location

Based on this categorization scheme, Fischer Landing is within the middle course of the Escambia River System (**Exhibit 2 – Sedimentation Study Area**). The area of study includes the northern limit at Fannie Road, where the Big Escambia Creek is adjacent to the western sand mine area. The eastern limit of the study is at the mouth of Big Escambia Creek where it discharges into the Escambia River. The southern extent of the sedimentation study area is at the State Road 4 bridge crossing of the Escambia River. This is the location of the U.S. Geological Service National Water Information System River Gauge (USGS 02375500: Escambia River Near Century, FL). This gauge measures the river flow (cubic feet per second) and the river elevation (feet). The river mainstem is approximately 300 feet wide and sinuous upstream and downstream of the Landing. The floodplain is approximately 1 mile wide at this point.

The landing is just downstream from a full reversal of river flow around a sharp bend in the river (**Exhibit 3 – Fischer Landing**). A large sandbar is located on the left bank (looking downstream) along the inside of the river current. This is a relatively permanent feature, although it is not visible during flood events. Sediment deposition in this area of the river is primarily on the inside curve of the river mainstem. The appearance of sediments outside the normal landscape positioning is considered to be an anomaly.

The confluence of Big Escambia Creek is located approximately 1.22 river miles and the Little Escambia Creek is 5.88 river miles upstream. A waterway is located just upstream of the property. Google Earth has labelled the waterway as the Conecuh River. This is a mapping error. Local users refer to it as Big Escambia Creek.

For a period between 1973 and 2004 Big Escambia Creek flowed through sand mines just south of Fannie Road and merged into the Escambia River adjacent to Fischer Landing. The historic channel for Big Escambia Creek near Fannie Road became clogged with sand, stopping all flow through the creek channel. A break in the sand mine berms during high water events resulted in flooding through open sand areas. This periodic flooding in the sand mine areas redirected the main flow of Big Escambia Creek through the western sand mine area.

Open sandy areas seen in aerial photography from 1940 are active sand mining operations. The footprint of the mining operation is now approximately 1.6 square miles extending to the Railroad yard in Flomaton, Alabama and

parallel to Big Escambia Creek. Much of the open sands are revegetating, but no restoration of the mine areas is apparent from aerial photography.

Big Escambia Creek was returned to its historic channel in 2004 as part of the construction of the Fannie Road bridge over the Creek (Bridge 484217; USGS Gauging Station 02375000). With the construction of a large river control berm, the flow of Big Escambia Creek was reestablished to the historic, natural channel and no more direct flow through the sand mine area has been seen in aerial photography since. It should be noted, however, that flood waters in Big Escambia Creek do appear to raise the water elevation in the old erosion channel. This could be due to the overall rise in groundwater level resulting from local rainfall that also contribute to flood conditions on the Escambia River. It could also be due to floodwaters filling the old sand mine location and flowing through the old channel. There is no indication that flood waters back up the channel into the sand mines from the river since the existing sand bars in the lower erosion channel do not move north past the dam at Flossie Road.

Sediment Sources

Based on study of aerial photography from 1940 to the present, there appear to be three potential/active sediment sources leading to sediment deposition in the vicinity of the existing boat ramp. These sources are: the Escambia River; Big Escambia Creek; or the western sand mine area. There is also a contributary blockage that appears to exacerbate existing sediment travel and deposition – the remains of the old SR 4 bridge abutment on the west side of the Escambia River, south of Fischer Landing.

No current measurements were performed for this study. All proposed sources are based solely on aerial photographic examination and observation of currents in the river during field reviews for this project. Descriptions of the study area in the next sections reference aerial photography from 1940 to the present (**Attachment - Annotated Aerial Photography of Sedimentation Study Area - 1940 to 2019**).

The sources for the aerial photography are:

- 1940 to 1970 – The University of Florida Aerial Photography Archive - UFDC Search - Aerial Photography: Florida (ufl.edu) –
- 1968 – 2007 – Florida Department of Transportation (APLUS) - APLUS - Request Photography (state.fl.us)
- 1994 – 2021 – Google Earth Pro

Source 1 – Escambia River

As defined above, in the middle course of the Escambia River sediment movement can be both erosional and depositional. The main stem river through the project area has banks with both steep erosional character and large sandbars indicating sediment deposition.

The primary source of sediment has been attributed to normal riverine flow. Sediments in the river are derived from flooding through erodible soils adjacent to the river and within the floodplain influence of the tributaries to the Escambia River (ADEM, 2005). These erodible soils are primarily in rural areas where farming and forestry are dominant parts of the active land use. In addition, for many of the rural areas, unpaved roadways are believed to be a large contributor of sediments into creeks and streams feeding the Escambia River system.

While natural river processes include soil erosion, farming techniques that include annually plowing under vegetation and exposing bare soil to the elements has been determined to be a major source of erosion in agricultural lands. Timber harvesting is also a known source of erosion. Clear cutting of large tracts of forest area leaves the erodible soils open to weathering that results in erosion and deposition into the lower elevation stream and creek beds. In Florida, the rules governing forestry do not prohibit clear cutting, but they do require a 200-foot buffer around creeks and streams to remain as a measure to reduce erosion. Clear evidence of adhering to those guidelines is not easily determined from aerial photography.

We have not been able to find a study of the sediment burden in this part of the Escambia River. The ADEM report (2005) looked at the Conecuh and Sepulga Rivers. Similar conditions are present in this part of the Escambia River, so we believe that similar sediment loading occurs in the project area.

The normal deposition of sediments in the middle course of the river is along the inside curve of the river (looking down stream). In the vicinity of the Fischer Landing boat ramp, a large sand bar is located on the east side of the river just upstream and a small area on the west side of the river just downstream of the State Road 4 bridge. The Boat ramp is located in a short, primarily straight section of the river.

Aerial photography indicates that during normal flow within the river banks, the location of the sand bars remains stable in the project vicinity. Their visible width is dictated by the river water elevation. During times of high water the east bank sand bar is not visible. During low water, the sand bar can extend to a location even with the Fischer Landing boat ramp.

During a February 7, 2022 site visit, the river elevation was approximately 17.5 feet and the river overtopped its banks coming to rest near the old SR 4 bridge embankment approximately 2,000 feet from the Boat ramp. Water at that location appeared to be greater than 3 feet deep and had swift currents running through the surrounding floodplain forest.

The old bridge abutment remains in place because it is the location of the outfall/oxygenation station for the Town of Century Waste Water Treatment Plant (WWTP). Water flows through the stair-step oxygenation structure and enters an underground outfall pipe that discharges into the Escambia River near the old bridge rubble that remains in the river from one of the bridge piers for old SR 4..

On a subsequent site review with schoolchildren to the landing on March 7, 2022, the river was back in its banks (7 feet elevation). A crew was working to remove sand from the existing boat ramp area that had been deposited between February 5 and 13, 2022 when the river remained above flood stage.

While no on-site measurements were made to confirm the amounts, it does appear that high water does bring excess sediment to the boat ramp area as part of the normal erosion and deposition process in this part of the river. Future studies could correlate river stages with documented sedimentation episodes, or county dredging operations at the boat ramp.

Source 2 – Big Escambia Creek

While this section will discuss processes in Big Escambia Creek that could affect sedimentation in the vicinity of the Fischer Landing boat ramp, it must be understood that this does not include any of the time when Big Escambia Creek changed its flow pattern between 1973 and 2004. The Big Escambia Creek discharge point discussed is located approximately 1.22 river miles upstream of the boat ramp location.

Aerial photography from December 12, 1940 is the earliest available from the University of Florida data archive. The Big Escambia Creek channel is visible as a winding small tributary discharging upstream of the boat ramp site. There are sand bar signatures in the Creek that represent alternating erosion and sedimentation processes.

The bottom of the photograph does have a white sand signature at the discharge point and what appears to be a “delta” type sandbar across the discharge point. The standing sand bars down river along the inside curves (looking downstream) are indicative of a middle course river section as are some visible ox-bow features in both floodplains for Big Escambia Creek and Escambia River.

The signature of the SR 4 corridor at the boat ramp location indicates open soils along the corridor, possibly indicating recent construction. The large area of open soil near the river might also indicate the primary construction location for the bridge crossing.

In the January 5, 1951 aerial photo, the delta at the mouth of the Creek is still in place, but the mouth of the Creek is wider than prior with open water visible. Sandbars are in the same locations along the river, but not as large. This indicates higher water level than the 1940 aerial.

Development in and near the Creek floodplain are sand mines. The west mine near a bend in the Creek just south of Fannie Road is very close to the Creek channel in both the 1951 and 1958 aerials. There are more locations for sand mining in 1958, but the Creek is still discharging into the Escambia River.

Using measurement tools on the 1970 aerial photograph, the west sand mining area visible in this aerial amounts to approximately 1.6 square miles. High water in 1970 inundated the sand mine areas and appears to overtop the berm between the west sand mine and Big Escambia Creek just south of Fannie Road.

Near the east sand mine, there are no visible sand bars and the Creek discharge point contains submerged trees within the confluence with the river. The sand mine near the discharge point is so full of water that the floodwaters are entering the river at several points west of the normal Creek confluence. These discharges are directly connected to the east sand mine operation . Overall, from Fannie Road to the Escambia River, the Creek is less distinct, possibly due to high water flooding the entire area.

The 1973 aerial is again a high water event and indicates several breaches from the Creek into existing sand mines between Fannie Road to the discharge point of the Creek into the Escambia River. There is a small area south of Fannie Road that appears to be a sediment blockage to the main channel of the Creek, but not a total occlusion. Water remains in the east and west sand mines, and there is evidence of some sediment entering the Escambia River near the east sand mine area.

By 1978, Big Escambia Creek has rerouted through the west sand mine area south of Fannie Road. A sand occlusion is visible in the historic Creek channel. The remainder of the historic Creek channel also does not appear to have any open water visible. This new flow channel remained in place until approximately December 2004.

A 2000 aerial clearly indicates that the old channel is no longer functional from Fannie Road to the confluence with the Escambia River. The opening at the Creek confluence with the Escambia River is greatly diminished from the 1978 aerial photograph. The opening remained, possibly due to water flowing out of the east sand mine adjacent to the Creek channel that was breached in previous years. It should also be noted, however, that the floodplain for Big Escambia Creek appears to extend from the sand mine channel south of Fannie Road to a point at Flossie Road where the river bank has breached. Flossie Road was built in 1997 with two bridges. The western bridge is over the erosion channel, the eastern bridge is over a breach in the river bank that drains from the creek floodplain between the two existing mine locations.

The former Creek channel was relocated by the construction of a large berm across the floodplain starting at the Fannie Road bridge. Between 2004 and 2020, only two instances of sediment deposition from Big Escambia Creek into the Escambia River are visible. Starting in June of 2006, during a low water period a large sediment deposition sand bar is visible at the mouth of Big Escambia Creek. Remnants are seen in a November 2007 aerial, but it is not visible thereafter. In September of 2011 another deposition event at the mouth of the Creek is visible in aerial that lasts until an aerial from November 2014. The USGS monitoring station near the project site (on SR 4 bridge) indicates an increase in the river flow from approximately 5,000 cubic feet per second (cfs)to approximately 12,700 cfs occurred between June 11 and June 18, 2006. For the 2011 aerial signature there were three successive high water periods in January 2010 through 2013 where the river staged up at or near flood elevation which could explain the multiple year appearance of a sand deposition signature at the mouth of Big Escambia Creek.

Generally, Big Escambia Creek does contribute sediment to the Escambia River and could have some effect on the Fischer Landing boat ramp due to its proximity.

Source 3 – Sand Mine Area

Based on the aerial photography assembled for this report, sand mining operations adjacent to and within the Big Escambia Creek floodplain have been in operation for the entire period of aerial photography (1940 to present). Operations in 1940 were located south of Flomaton and east of Old Flomaton Road approximately 0.5 miles west of the Creek. By 1951, the sand mining operations had increased to a large area closer to the creek and located south of Fannie Road. The mine just south of Fannie Road was located adjacent to the Creek and appears to be separated by a berm. The mining operations extended down to near the current boat ramp location near the Escambia River.

Over time, the extent of sand mining impacted approximately 1.6 square miles (1,035 acres) on the west side of Big Escambia Creek and an additional 169 acres further downstream ending at the confluence of Big Escambia Creek and the Escambia River.

The area of sand mining that appears to have had the greatest effect on the Project area is between the Fannie Road bridge and the Escambia River in a long section of sand mining on the west wide of the creek. The aerial photography annotated in Attachment 1 indicates instances when the flow of the Big Escambia Creek erosion channel resulted in a sediment “delta” at the outfall of the channel just upstream of the future and current Fischer Landing Boat Ramp.

In the 1983 aerial, the delta extends into the river even on the outer curve of the river. This could indicate the force of sediment being put into the river or the large amount deposited. At the same time, the eastern sand mine has a large deposit of sediment at the mouth of the Creek as it enters the river. The sand mine upstream of the mouth was also breached allowing high water to move sediment downstream.

The 1988 aerial photograph is similar to previous years. The width of the Escambia River and Big Escambia Creek floodplains and their shared flows are indicated on the aerial. The north side of the Escambia River floodplain has numerous areas of standing water that represent possible oxbows or sloughs that capture and retain water due to the high groundwater table.

The east sand mine has a breach that has water that appears to originate within the Creek floodplain and flows through the entire sand mine area along its west side. It does appear as though the outfall from that mine reenters the lower portion of the main Creek channel and flows toward the river.

The 1993 aerials include the landscape scale of the other photographs and close-up examination of the two sand mine areas with discharges directly to the river. The erosion channel that holds the flow of Big Escambia Creek indicates strong flow through the sand mine with a large delta extending into the river against the prevailing current and moving downstream toward the SR 4 bridge. The entire area where the boat ramp will be placed is extremely shallow indicating heavy sand burden carried from the sand mine.

The Big Escambia Creek confluence with the Escambia River is nearly shut off with very little water entering the river. The former channel of the Creek is nearly occluded with sand from the upstream east sand mine that has built up over the years (since 1973) and become vegetated. The erosion from the east mine also appears to be flowing overland into the river just to the west of the old Creek mouth creating a sand bar along the north bank of the river.

Aerials from 1994 and 1997 clearly show the primary flow out of the Erosion channel that holds Big Escambia Creek as a large amount of clearer water. As it flows through the sand mine the suspended sediments are dropped out and the clearer water remains along the west bank of the river to the new SR 4 bridge. The former main channel of Big Escambia Creek is closed off by 1997 by erosion from the eastern sand mine area and the buildup of sand sediment along the north shoreline of the river.

Flossie Road was built between 1994 and 1997 and it provides a direct connection over the Creek floodplain to the eastern sand mine area. The roadway crosses over two separate inflows to the Escambia River. The western bridge is over the erosion channel through the west sand mine area. The eastern bridge is over a breach in the river bank at the northernmost part of the bend in the river. The breach appears to have resulted from water buildup during

high water events that included areas of the eastern sand mine once the natural Creek confluence was blocked. Water coming down the Creek floodplain and from the sand mine would appear to have overtopped and eroded the bank in this location. Both bridges span the open water beneath them and do not restrict the flow of sediments from adjacent sand mine areas.

The 1999 aerial photograph shows that the eastern sand mine area operations have diminished or stopped. Vegetation is growing in with the former mouth of Big Escambia Creek nearly shut. A white reflective surface at the mouth indicates that sand is still being deposited there. The sand mine erosion channel through the west sand mine near the Project is still carrying sand into the River. The low water shows the shadow of a sand bar jutting into the mainstem river flow. Sand is being deposited at the old bridge pier rubble pile. The channel below Flossie Road is nearly filled with sand deposits.

Between 2000 and 2004 work on the Fannie Road bridge included the construction of a large berm and the reestablishment of Big Escambia Creek into its former Channel. The 2004 aerial photograph shows the new Fischer Landing with the old boat ramp in use. The erosion channel in the western sand mine is highly turbid, which is in contrast to the river which has a much lower load of suspended solids.

It also appears that the east side of the eastern sand mine has a newly built berm separating it from the Creek. The creek is running clearer and the discharge into the river is reestablished.

The 2006 aerial is a low water period where the normal sand bar locations are visible. Additionally, the erosion channel is filled with sand to near occlusion. Sand has entered the river and formed a large sand bar that is located at Fischer Landing. The old SR 4 bridge pier rubble has formed a downstream blockage of flow that has resulted in the deposition of sand extending past the boat ramp for Fischer Landing.

Both Flossie Road Bridges have been modified from previous conditions to block direct sand deposition into the river. In the closeup, the western bridge has an upstream dam that extends across the entire opening. The sand downstream of the dam is extensive. In this low water period, the standing sand nearly occludes the flow out of the sand mine area. The eastern bridge also has a flow restricting dam upstream of the bridge. Both dams allow high water to overflow the dams.

The 2007 aerial also indicates a low water period where sand has built upstream of the old SR 4 bridge pier rubble. Fischer Landing boat ramp is not physically blocked. However, the lower erosion channel still carries a sand burden into the river. The sandbar downstream of the rubble pile appears to be the result of sand from the lower erosion channel. Open water just downstream of the dam on Flossie Road would appear to indicate that high water events still move sand over the dam and into the lower erosion channel.

In the September 2011 aerial, there appears to be a large discharge of sediment into the Escambia River at the Creek confluence. The photograph is a low water period. A reading of the USGS river height gauge for 2011 indicates early year rains and a rain event in September, but the river height is not above eight feet during September (Flood stage is 17 feet).

The visible sediment deposition at the mouth of Big Escambia Creek could be the result of earlier high water in the system that gradually built over time. However, the lobes at the Creek mouth suggest that the sediment is new (within the year).

The 2019 aerial photograph is the most recent high water event documented. What is most striking is the inundation of the entire area including the Escambia River, Big Escambia Creek and the east and west sand mines. It would appear that while the river does carry sediment as part of its normal flood cycle, the interconnectedness of the Creek and River floodplains with the nearby sand mining areas can result in sedimentation that can deposit sand at the Fischer Landing boat ramp.

Conclusion

This sedimentation study was performed solely through historic aerial photographic review and site visits to Fischer Landing, Flossie Road, and Fannie Road. No site visits were made to the sand mine areas as they are private property. No stream monitoring or current measurements were performed as part of this study.

During site reviews at different water stages when the river was within its banks, WRA did notice a counter current in the vicinity of the boat ramp. The water movement of the river is downstream within the main channel in this location. However, the counter current originates at the bridge rubble that deflects part of the current up stream close to the east bank. The counter current rejoins the downstream flow around the location of the old boat ramp. During low water periods, this counter current could provide conditions for sediment to settle in the area of the new boat ramp. This will need to be further researched.

Fischer Landing is just downstream of the old erosion channel and a shoreline anomaly that appears to deflect the current in the main stem toward the east bank rather than straight down the channel. There appears to be some scouring of the east bank across from the boat ramp that would suggest that the counter current area could act as a catchment for heavy sediments (sand) and potentially build up until the water level exceeds the elevation of the bridge rubble.

Recommendations

- Correlate river stages with documented sedimentation episodes, or county dredging operations at the boat ramp.
    - This can be hindcast using information from the USGS gauging station on SR 4 to obtain river stage information prior to the work commencing.
- Perform hydrologic studies to determine actual processes that can lead to sediment deposition at Fischer Landing.
    - For example, monitor water levels in the river and sand mines and the depth of accumulation of sediment on the boat ramp to determine if there is a relationship between these factors;
- Work with partners to permanently close the former erosion channel and repair the breach in the riverbank.
- Pursue efforts to remove the bridge rubble downstream of Fischer Landing.
- Repair the banks on either side of the existing boat ramp to prevent sediment from sloughing into the boat ramp opening during high water events.

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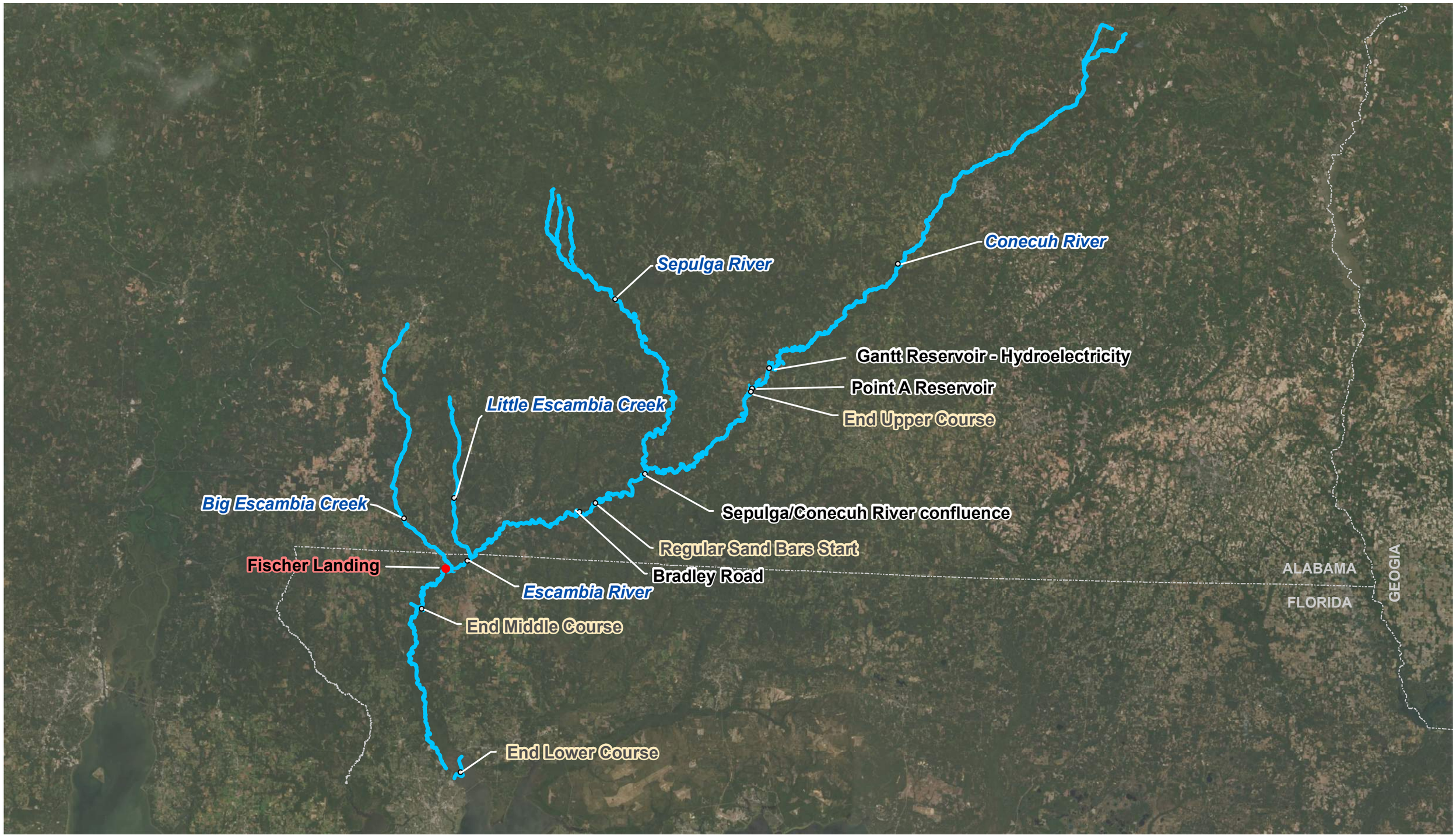
Exhibit 1: Escambia River Watershed – River Courses



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Water Resource~Survey
4260 West Linebaugh Avenue
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Phone: 813-265-3130
www.wraengineering.com

PROJECT: Fischer Landing Boat Ramp

Escambia River Watershed - River Courses
Escambia County, FL
Fischer Landing Boat Ramp

ORIGINAL DATE: 6/15/2022
REVISION DATE:
JOB NUMBER: 2232
FILE NAME: Escambia River System Focal Map
GIS Operator: LB

N W E S
1 inch = 66,650 feet

Exhibit 2: Sedimentation Study Area

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PROJECT: Fischer Landing Boat Ramp

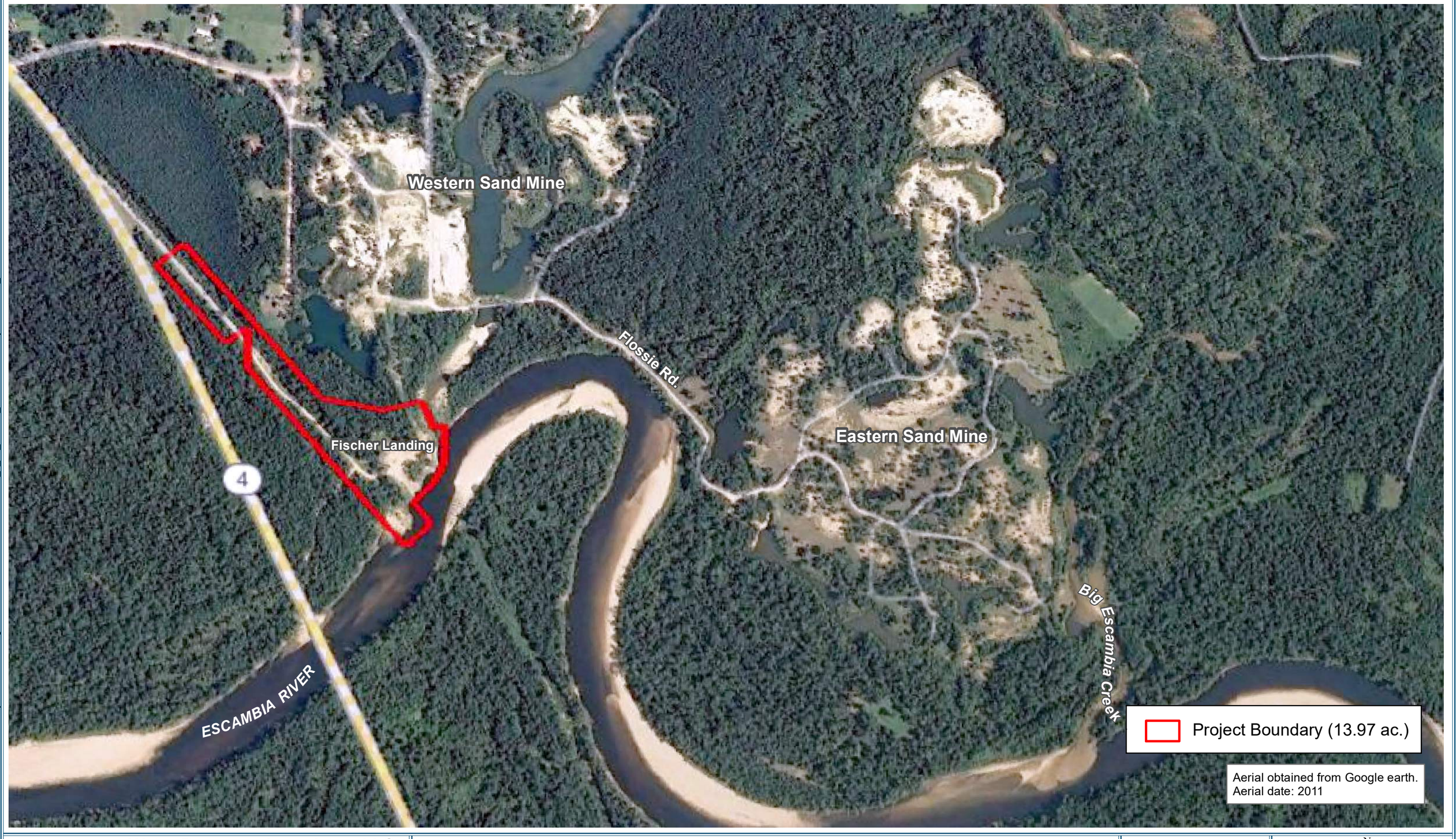
Sedimentation Study Area Map
Escambia County, FL
Fischer Landing Boat Ramp

ORIGINAL DATE: 6/15/2022
REVISION DATE:
JOB NUMBER: 2232
FILE NAME: Sedimentation Study Area Map
GIS Operator: LB

W S N E

1 inch = 550 feet

Exhibit 3: Fischer Landing



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PROJECT: Fischer Landing Boat Ramp

Fischer Landing Area Map
Escambia County, FL

ORIGINAL DATE: 6/15/2022
REVISION DATE:
JOB NUMBER: 2232
FILE NAME: Fischer Landing Area Map
GIS Operator: LB

N W E S

1 inch = 500 feet

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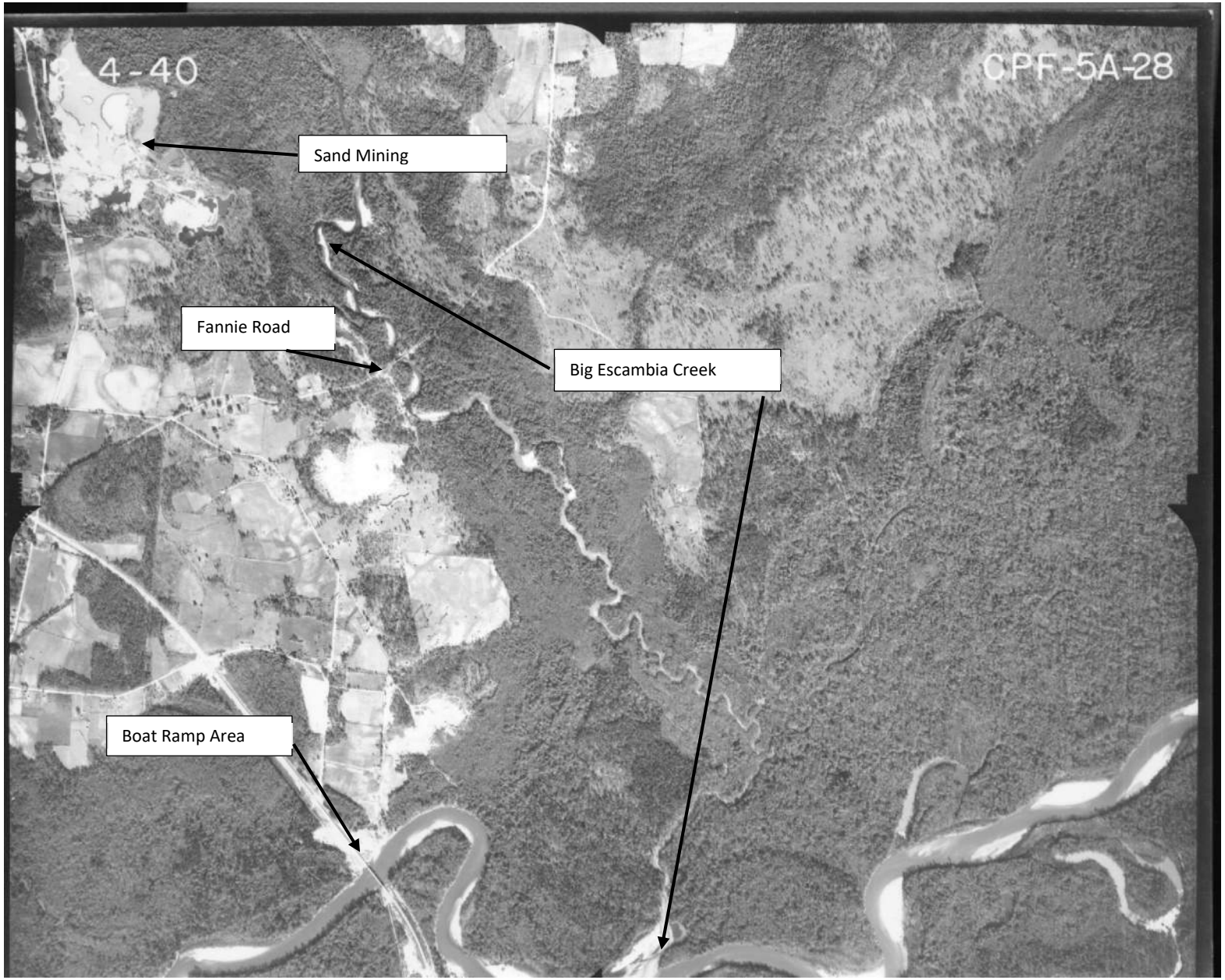
Annotated Aerial Photography
of
Sedimentation Study Area

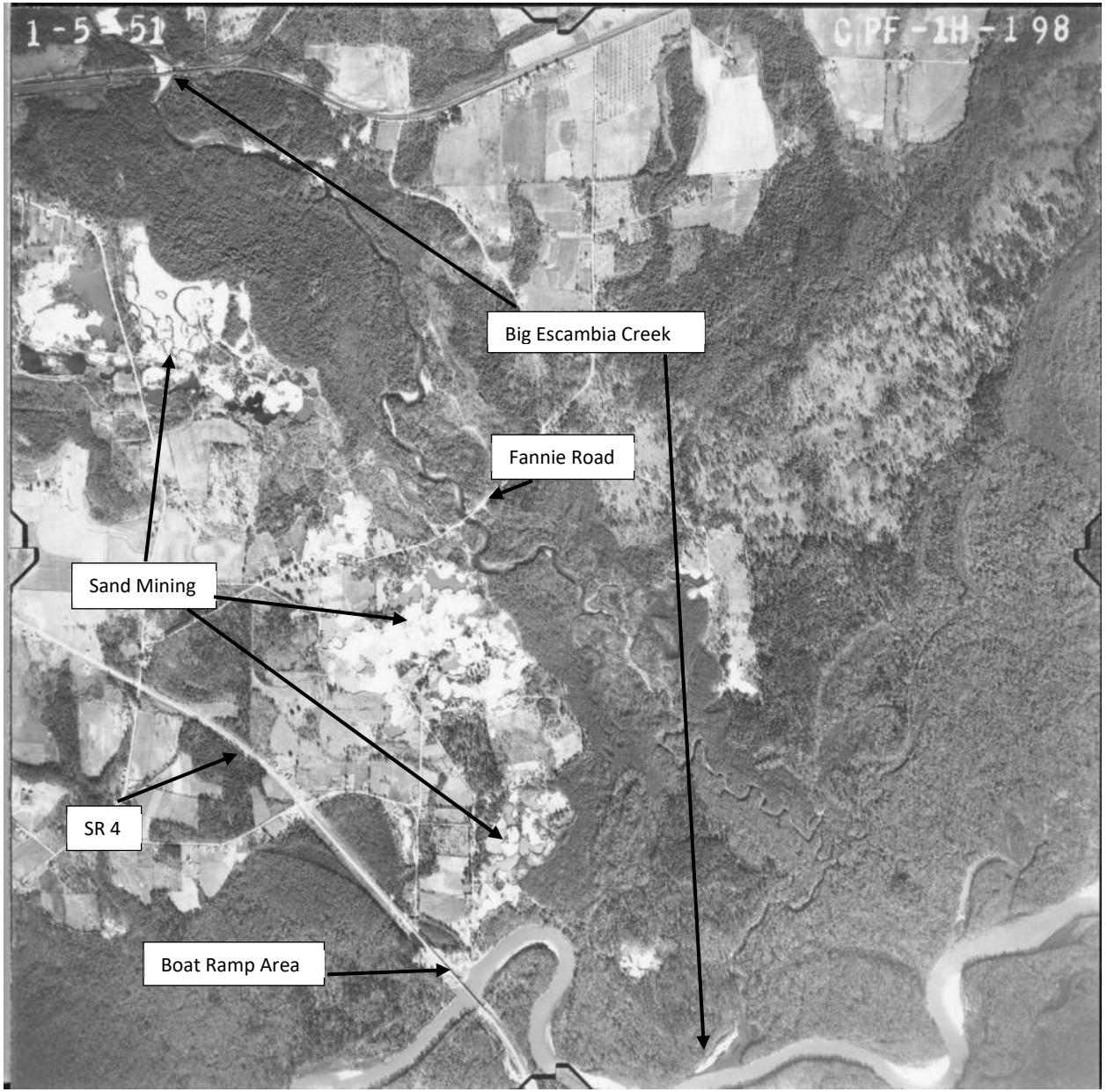
1940 to 2019

1940 Aerial Photograph



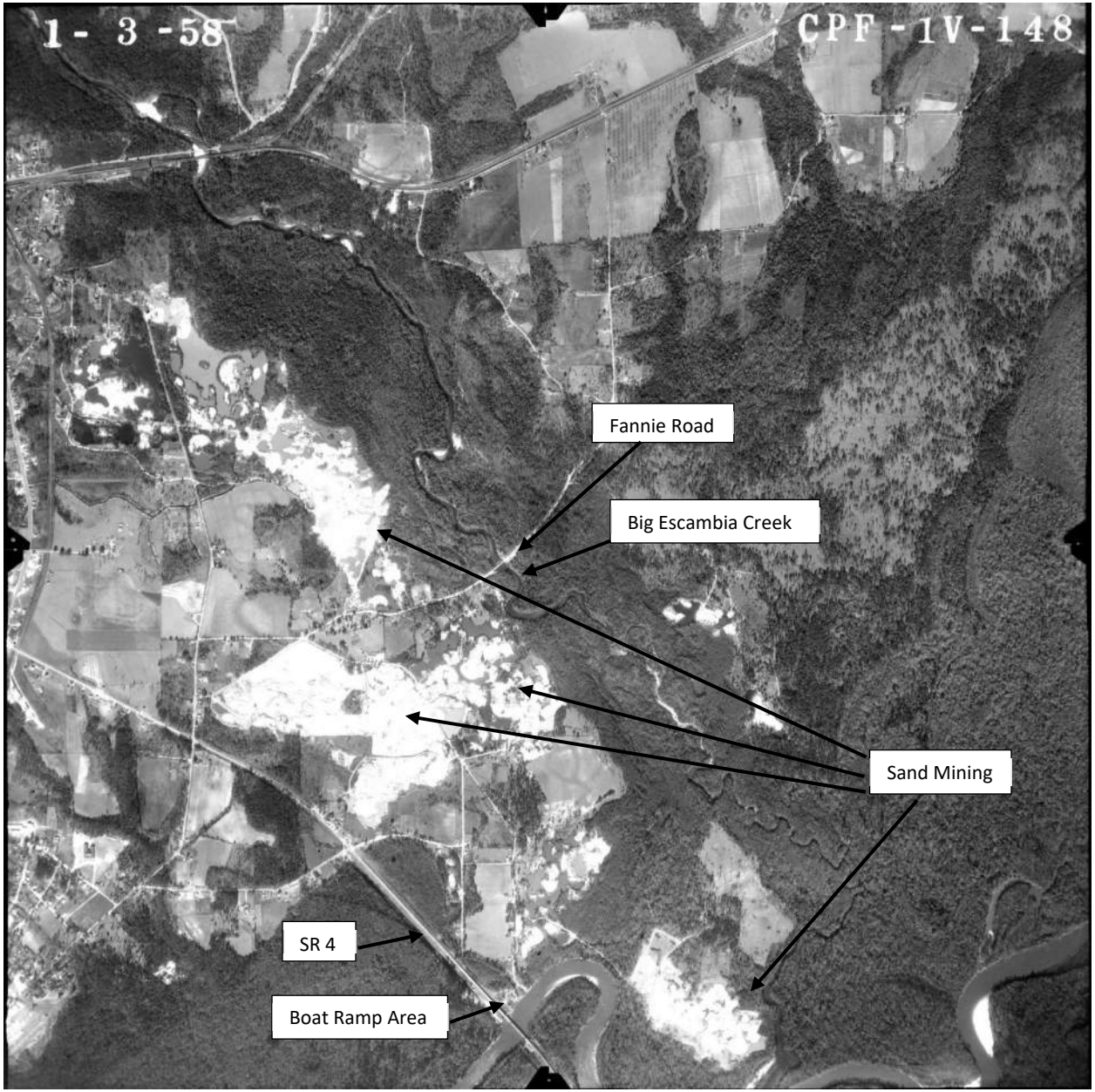
1940 Aerial Photograph

1951 Aerial Photograph



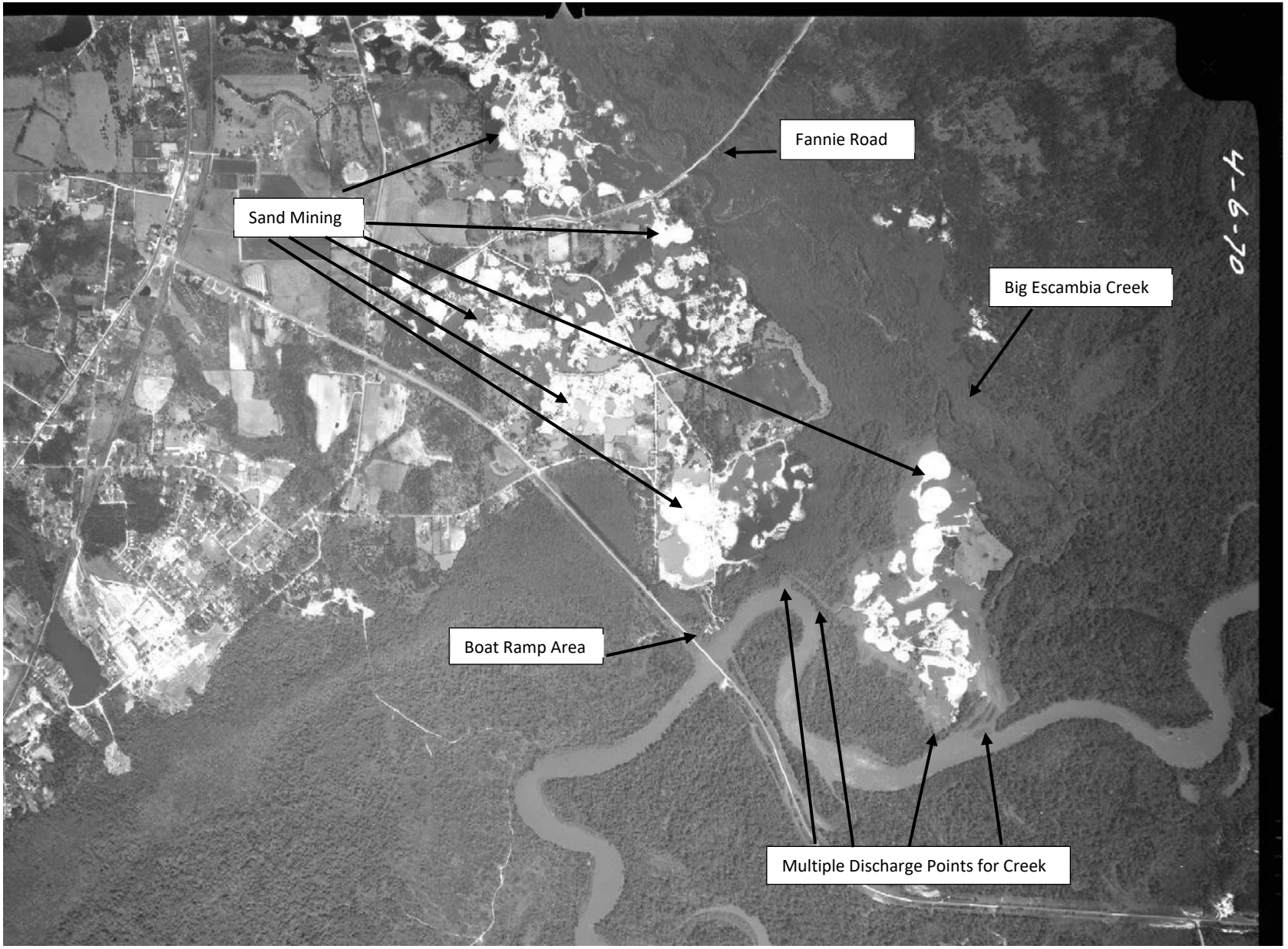
January 5 1951 Aerial Photograph

1958 Aerial Photograph



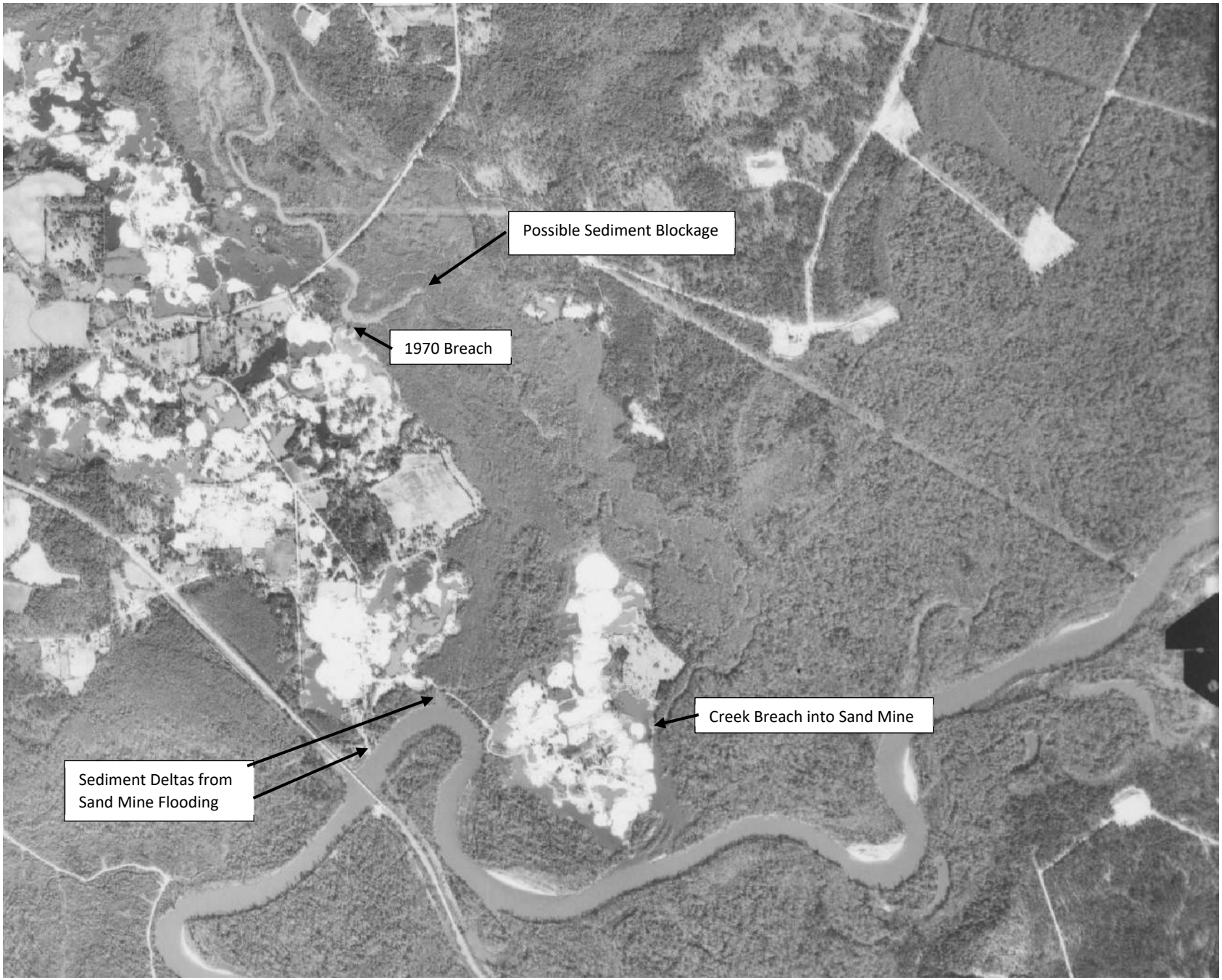
January 3 1958

1970 Aerial Photograph



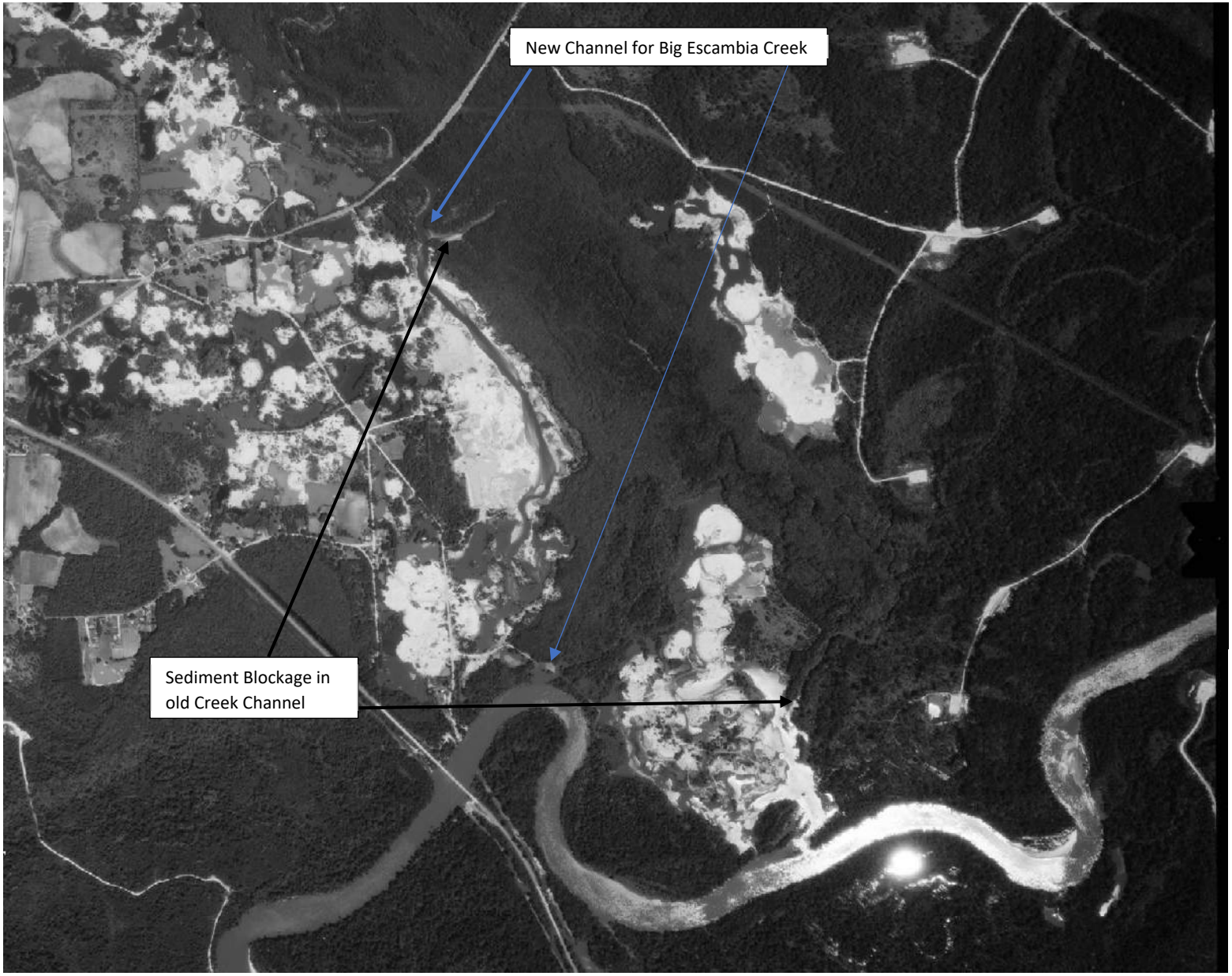
April 6, 1970: High Water Event – Sand Mines Flooded

1973 Aerial Photograph



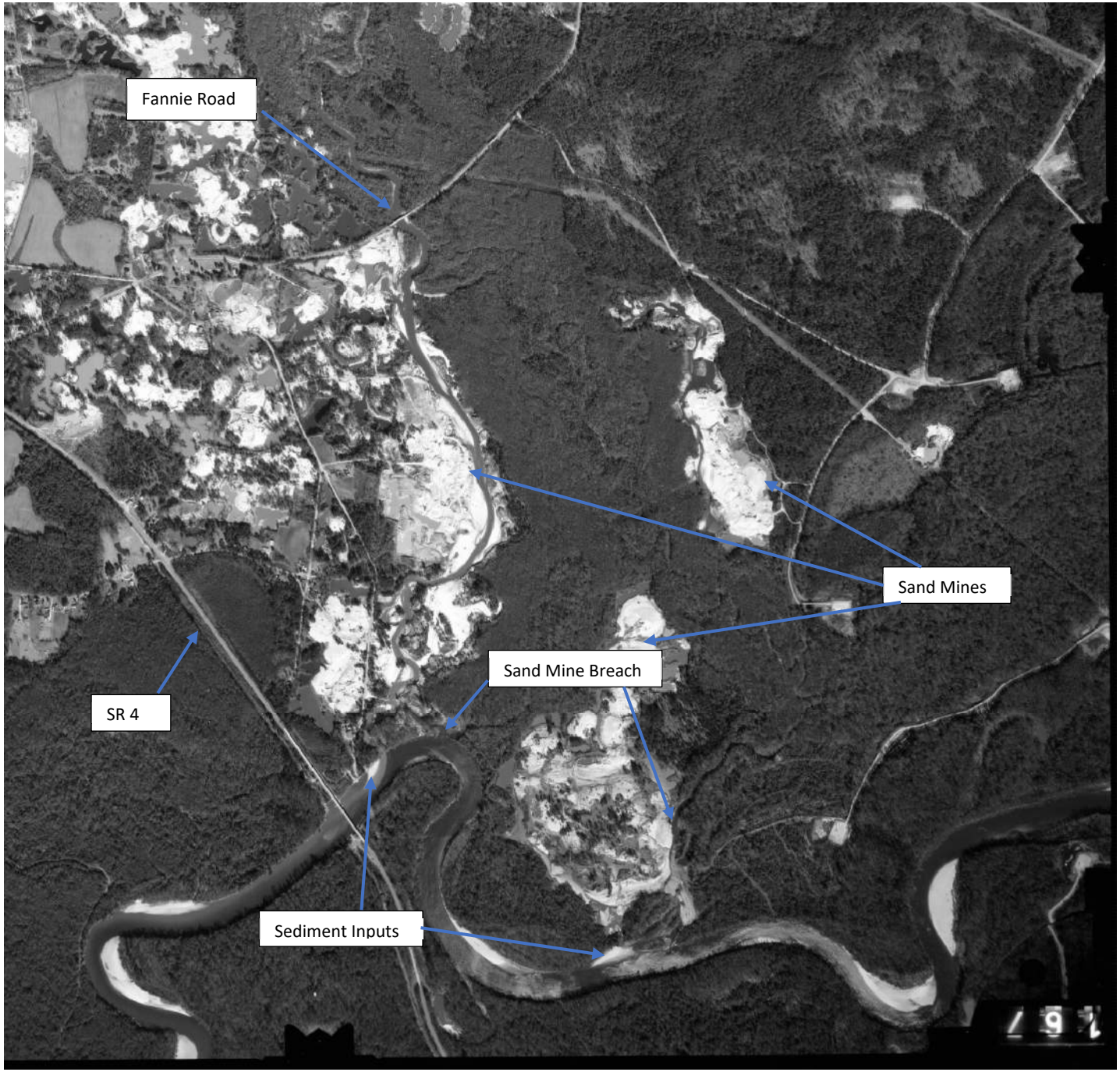
January 22, 1973: Big Escambia Creek Breech into Eastern Sand Mine Area. Sediment blocking Historic Big Escambia Creek Channel near Fannie Road- flooding western sand mine.

1978 Aerial Photograph



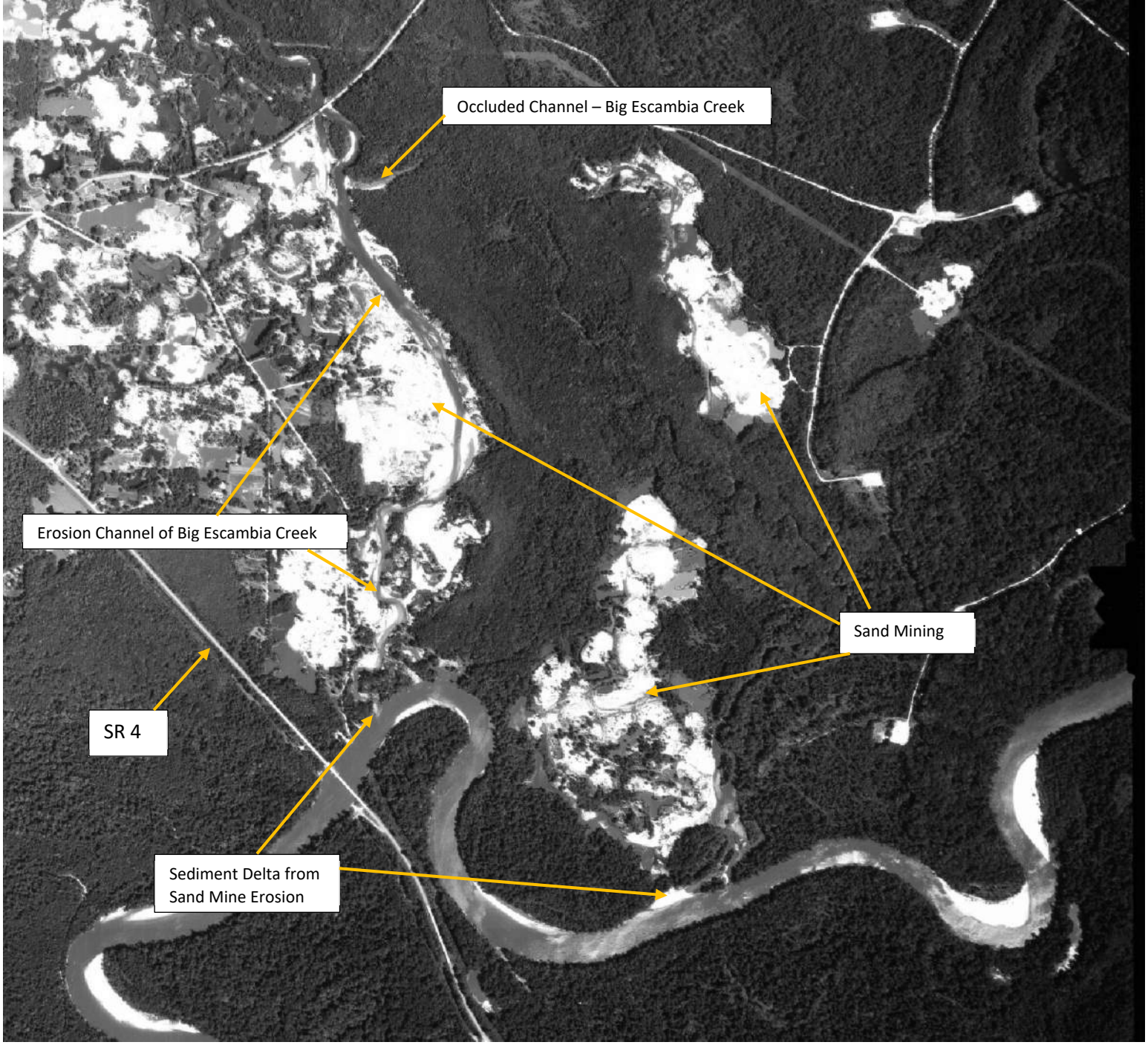
April 21 1978: Erosion Channel for Big Escambia Creek in Western Sand Mine

1981 Aerial Photograph



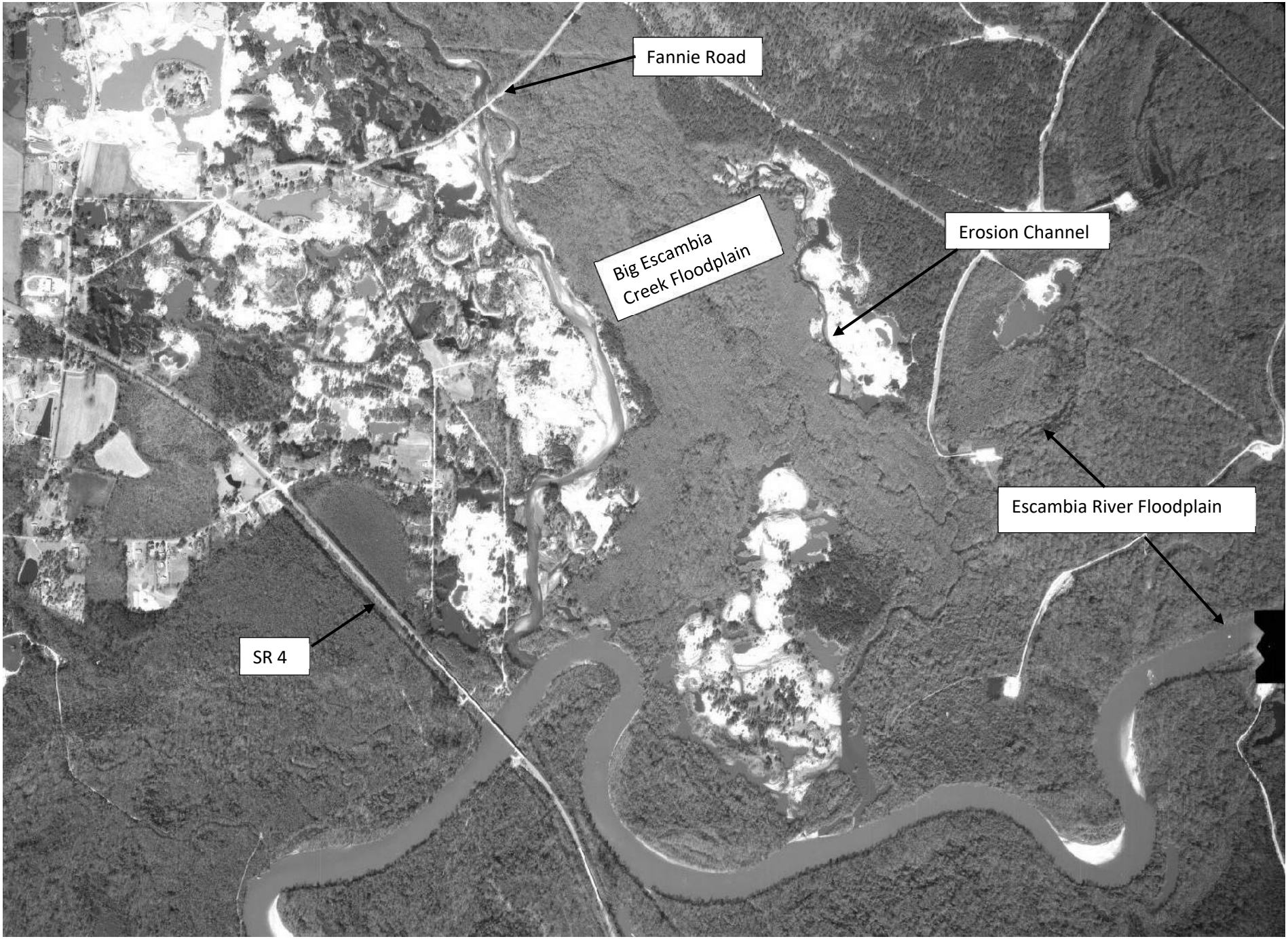
February 2, 1981 – Low Water Event with Visible Sand Deposits.

1983 Aerial Photograph



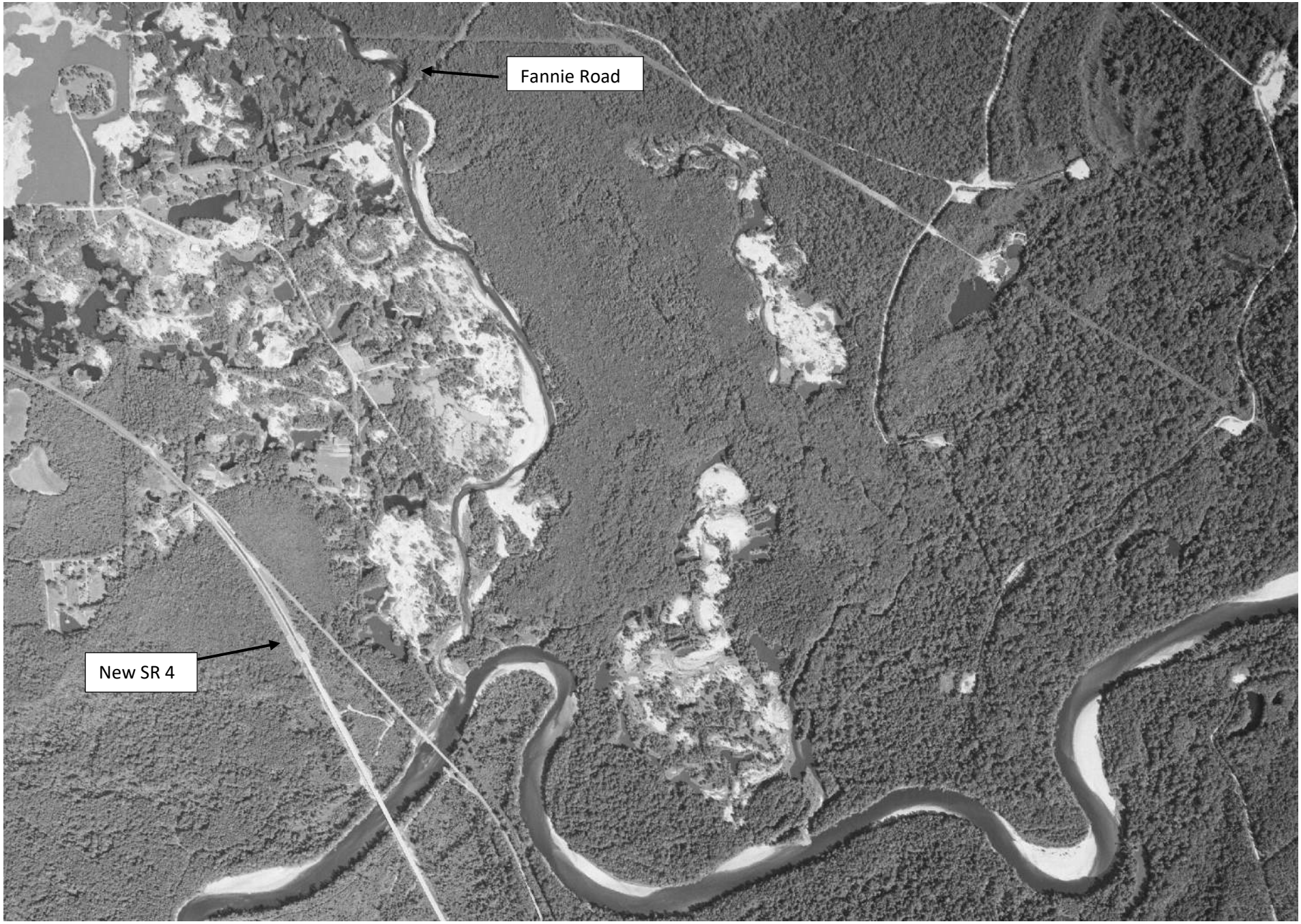
September 22, 1983

1988 Aerial Photograph



February 12, 1988: Illustrating the extent of the floodplain areas for Big Escambia Creek and Escambia River. Overland water flow in these areas during high water events.

1993 Aerial Photographs
Sedimentation Study Area
Fischer Landing Area
Big Escambia Creek Confluence

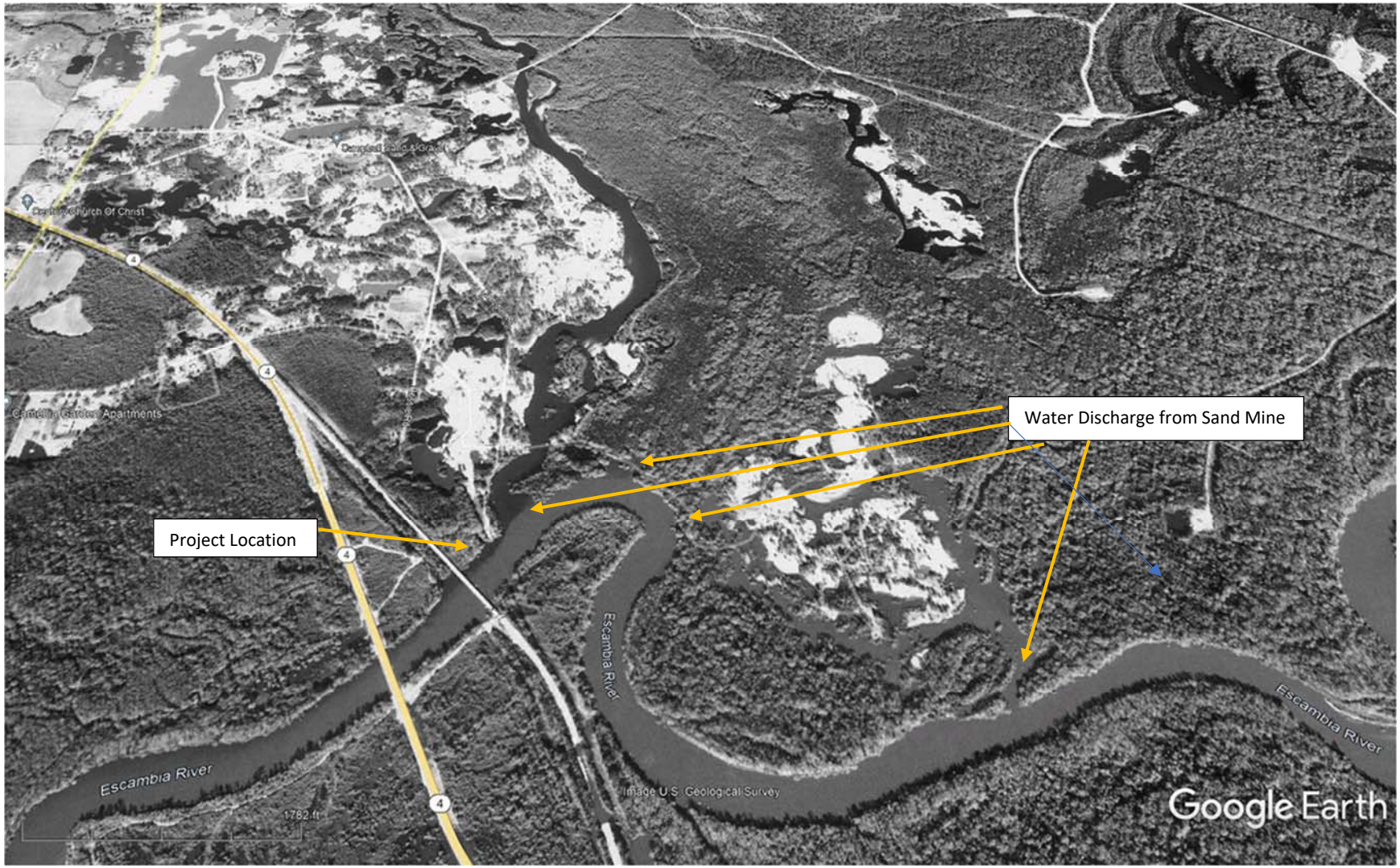


October 1, 1993: Overview of Sediment Study Area.

1993: Sand deposition out of sand mine and at old SR 4 bridge pier. Normal sand deposition is not on outside curve of river.

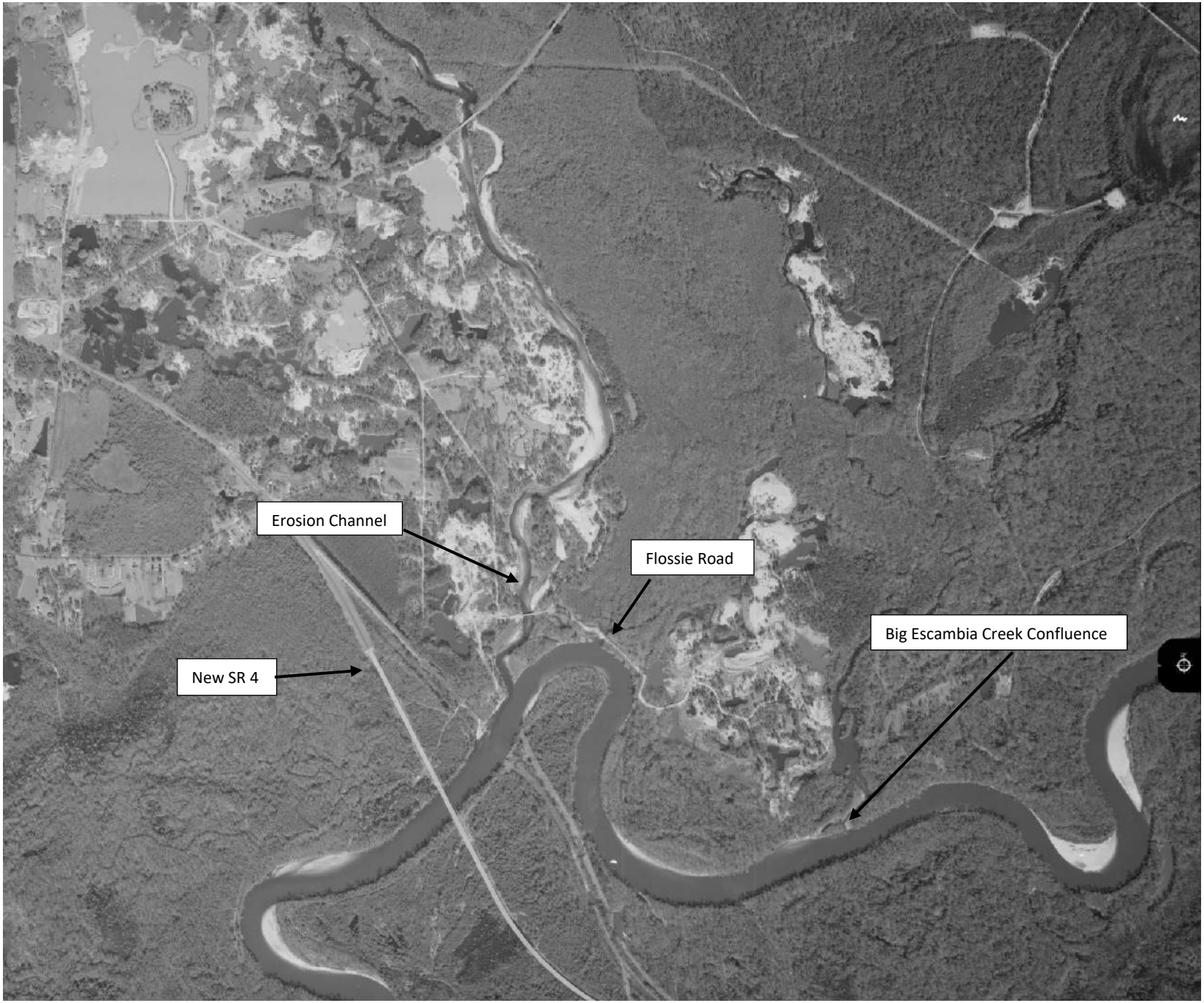
1993: Sand deposition out of sand mine at Big Escambia Creek confluence. Note areas previously with open water are silted in. Very small outfall. Sand washing overland to deposit downstream of old channel.

1994 Aerial Photograph

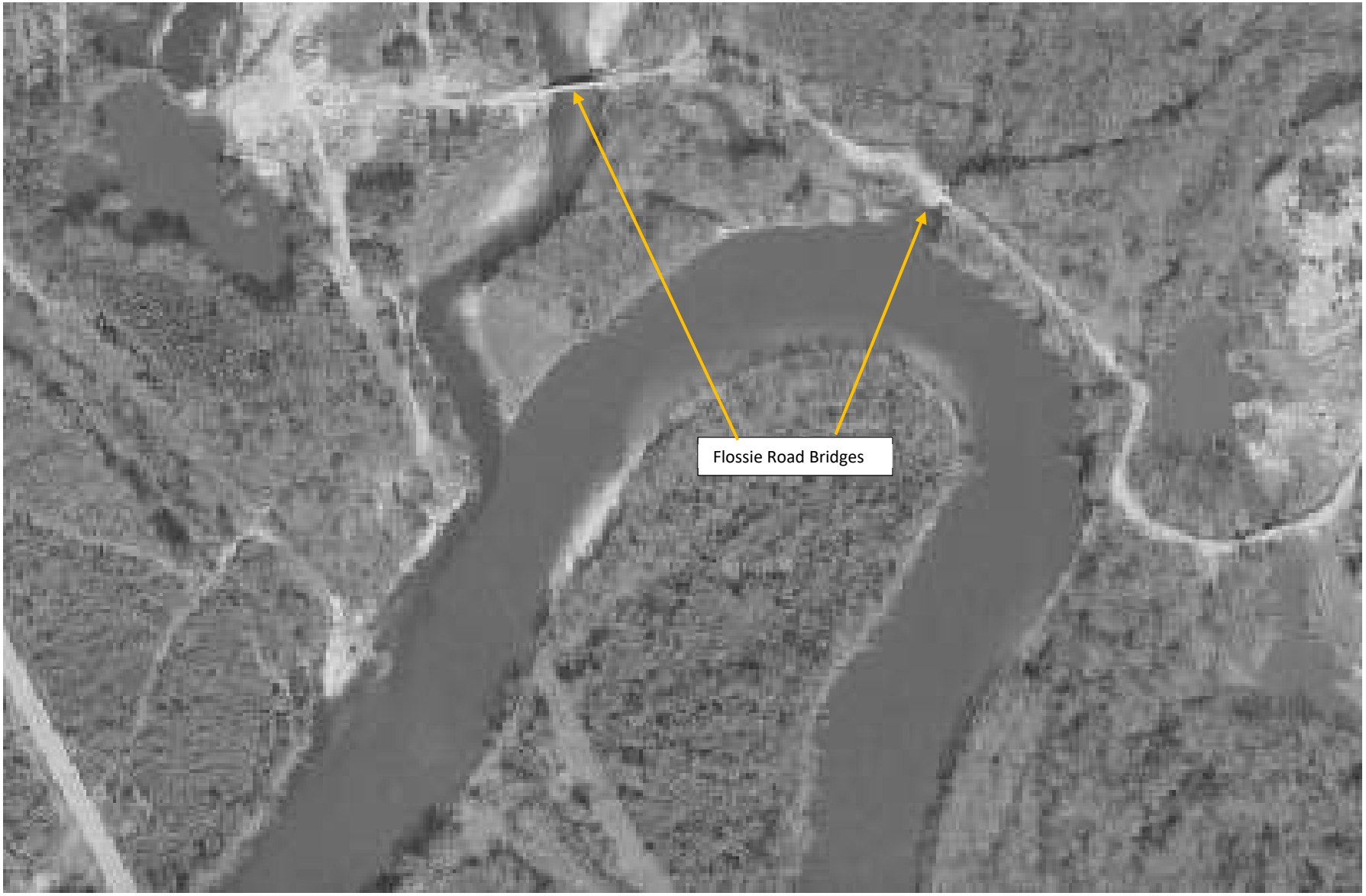


January 1994: High water event. Sand mine to the east is flooded. Erosion Channel is flowing clear, with dark flow entering river and remaining on west side. Does not fully mix until past SR 4 bridge.

1997 Aerial Photographs
Sedimentation Study Area
Fischer Landing Area

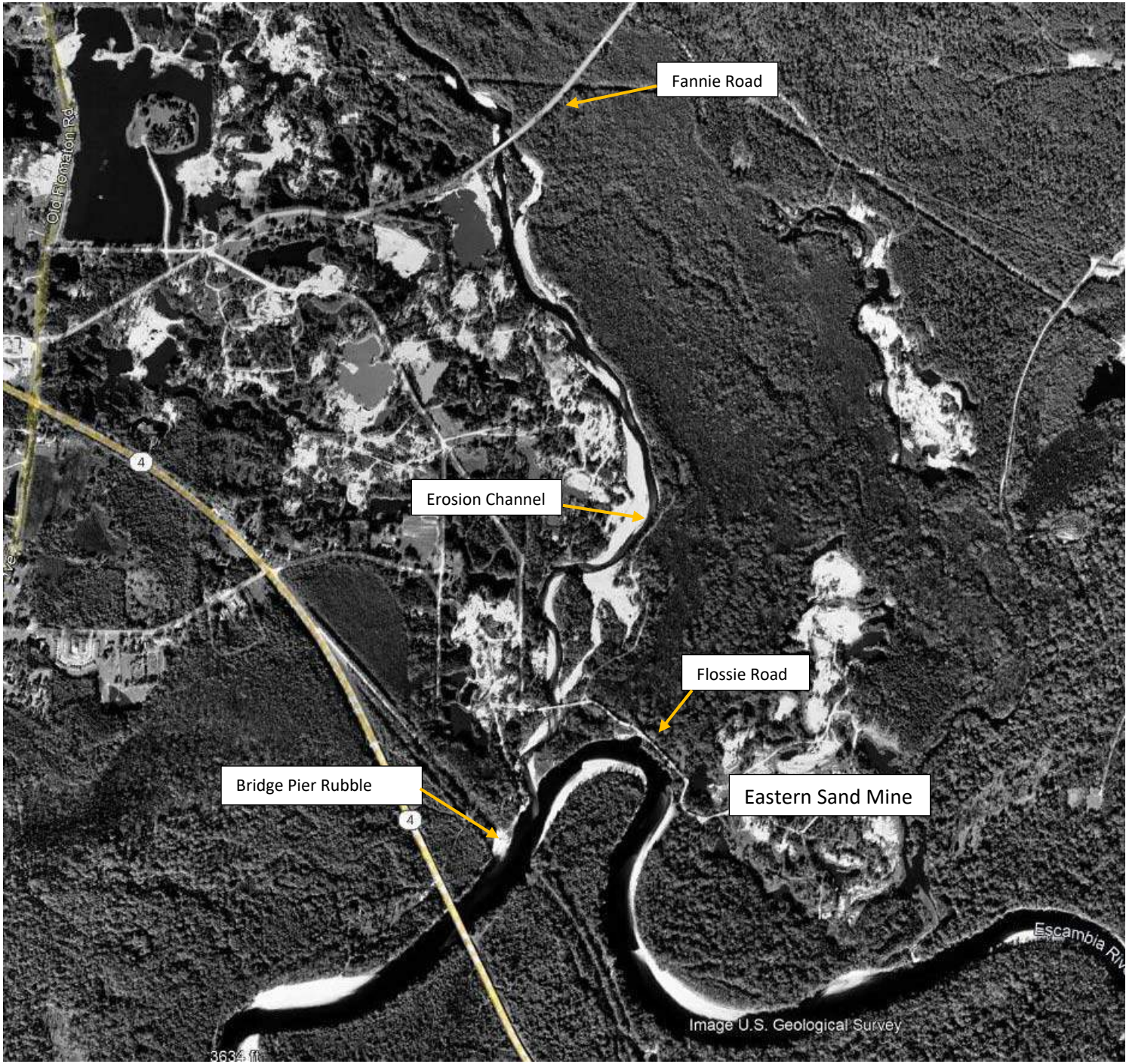


February 11, 1997: SR 4 New Alignment completed. Old bridge pilings remain in River. Flossie Road providing access to eastern sand mine area.



February 11, 1997: Closeup on Fischer Landing location. River shade indicates high suspended solids. Note low Suspended solids discharging from erosion channel (dark water along west bank) to the old bridge pier rubble on west bank. This is a high water event since sand bar on east bank is not visible. Flossie Road bridge was recently constructed. Provides direct access to eastern sand mine near mouth of Big Escambia Creek.

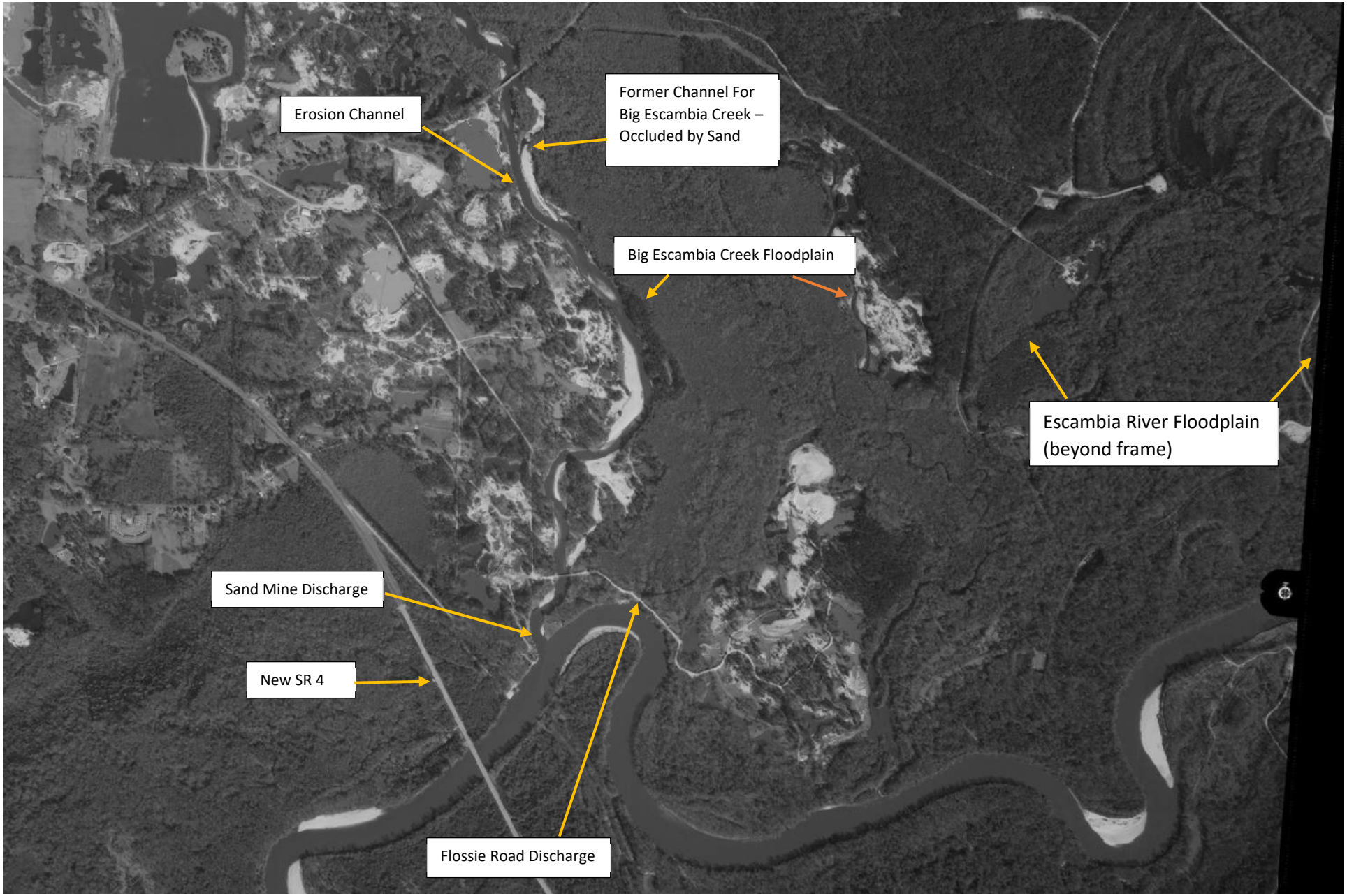
1999 Aerial Photographs
Sedimentation Study Area
Fischer Landing Area



November 1999: Eastern sand mine area is more overgrown with former downstream erosion areas becoming vegetated.

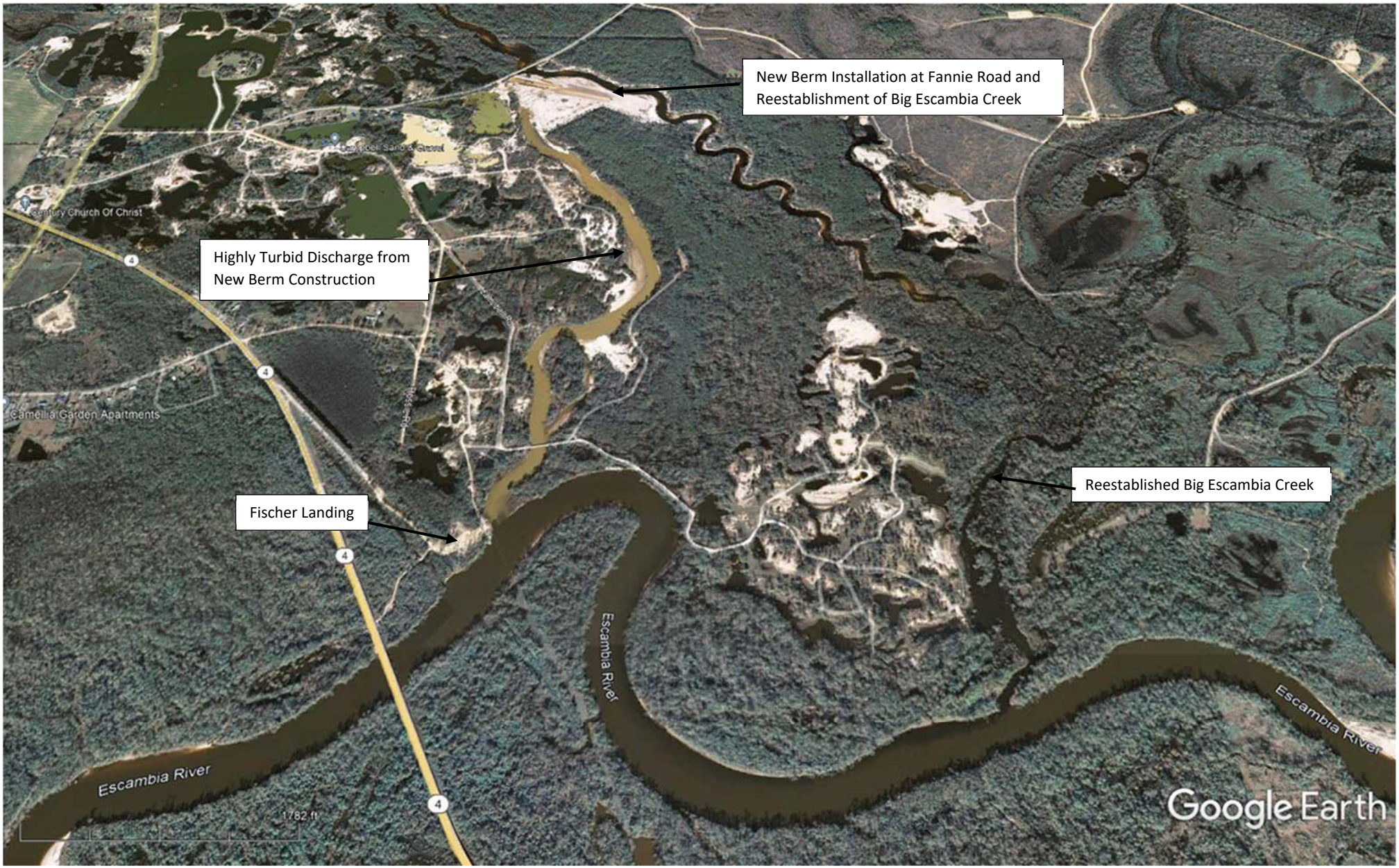
November 1999: Closeup of Fischer Landing location. Sand from western mine location has created a sub-surface sand bar at the outfall location. Sand buildup in the vicinity (upstream and downstream) of the bridge pier rubble indicate that the structure has some effect on the deposition of sediment load.

2000 Aerial Photograph



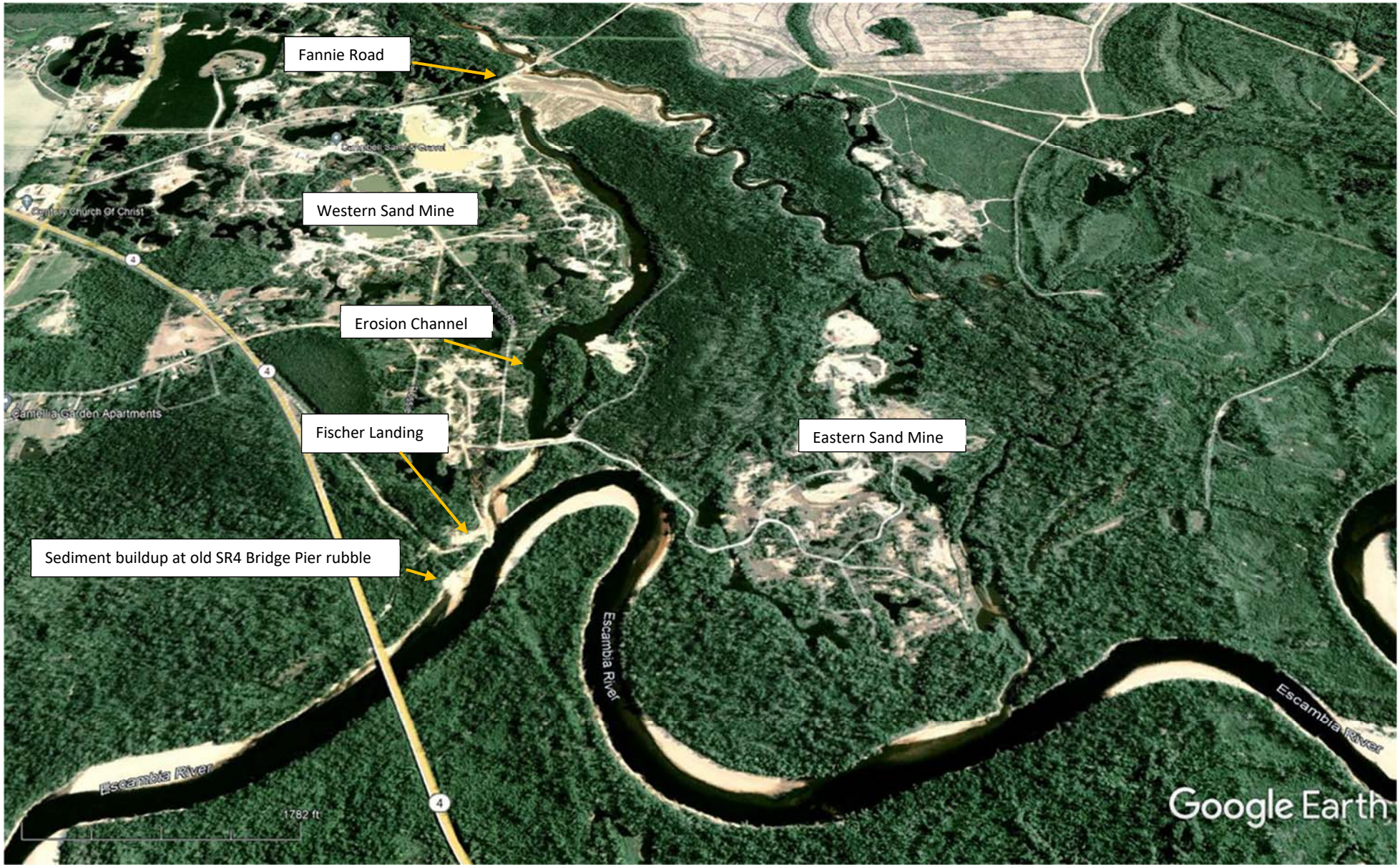
February 15, 2000

2004 Aerial Photograph



December 2004: First aerial with Fischer Landing in place. Old Boat Ramp. Berm at Fannie Road has reestablished Big Escambia Creek.

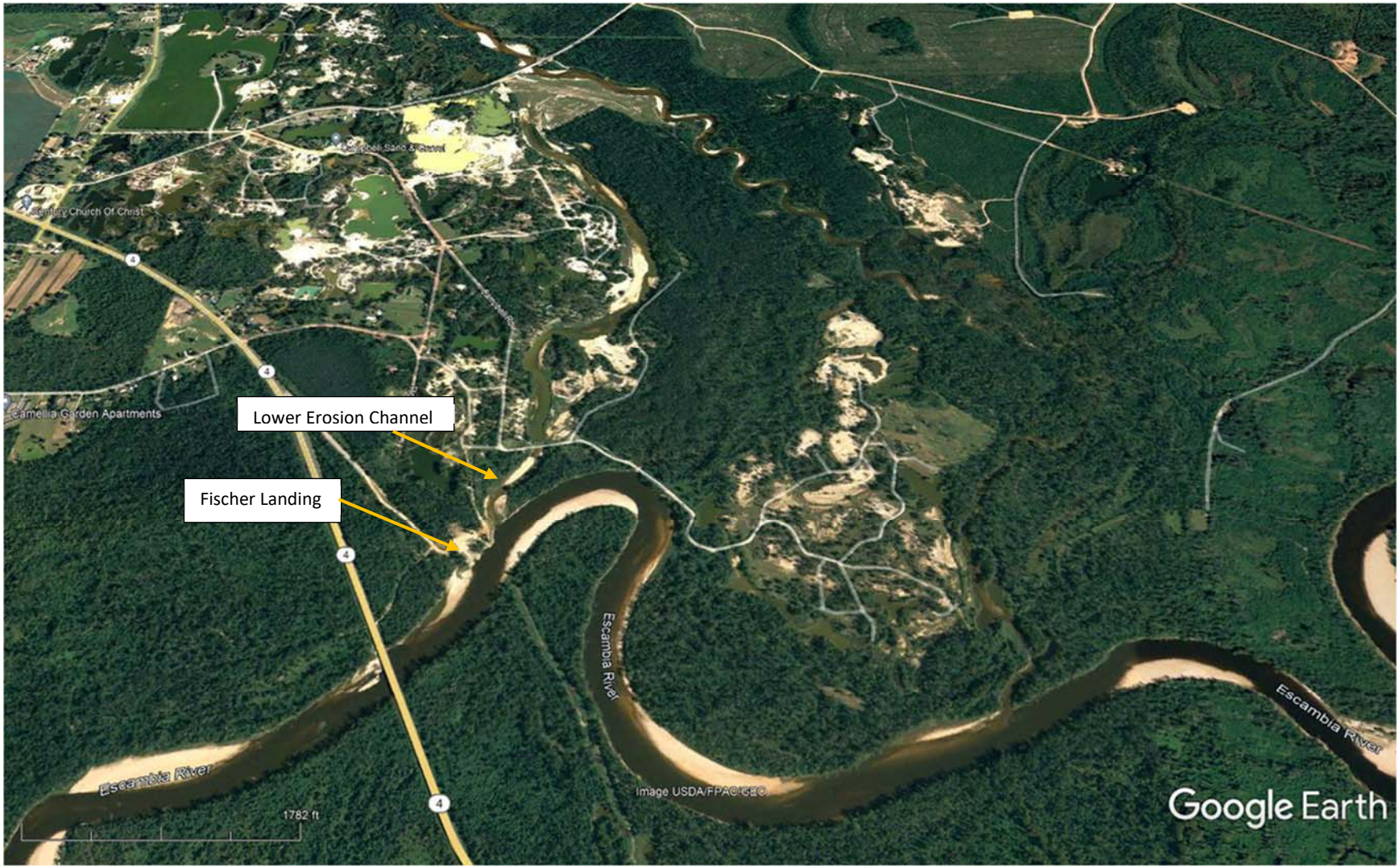
2006 Aerial Photographs
Sedimentation Study Area
Fischer Landing Area



June 2006: Big Escambia Creek has been restored to its historic channel. Erosion channel in western sand mine remains. Sand mine areas to east and west have regained vegetation indicating reduced or halted operations. Sediment is still an issue downstream of the erosion channel. Fischer Landing is impacted. Big Escambia Creek no longer flows through eastern mine area.

June 2006: Erosion Channel has been blocked by a dam upstream of Flossie Road. A dam is also in place at the eastern Flossie Road bridge. Sediment still impacting Fischer Landing from below the new dam. Bridge pier rubble presents a location for sediment deposition to extend up river to Fischer Landing.

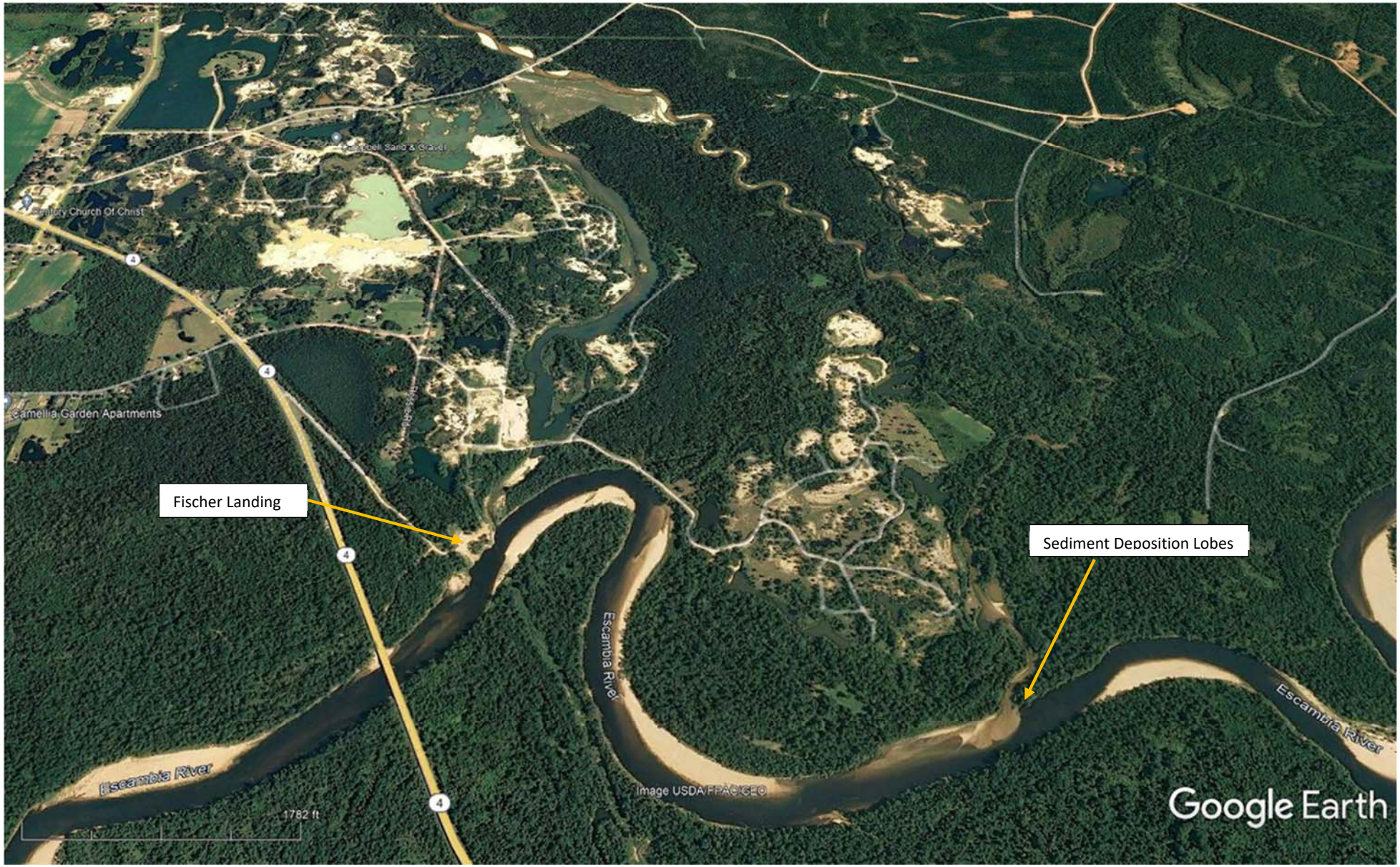
2007 Aerial Photographs
Sedimentation Area
Fischer Landing Area



November 2007: Sediment from the lower portion of the Erosion Channel has accumulated at the SR 4 bridge rubble. Fischer Landing boat ramp is not blocked, but the accumulation of sediment indicates that there is an effect on currents in the area.

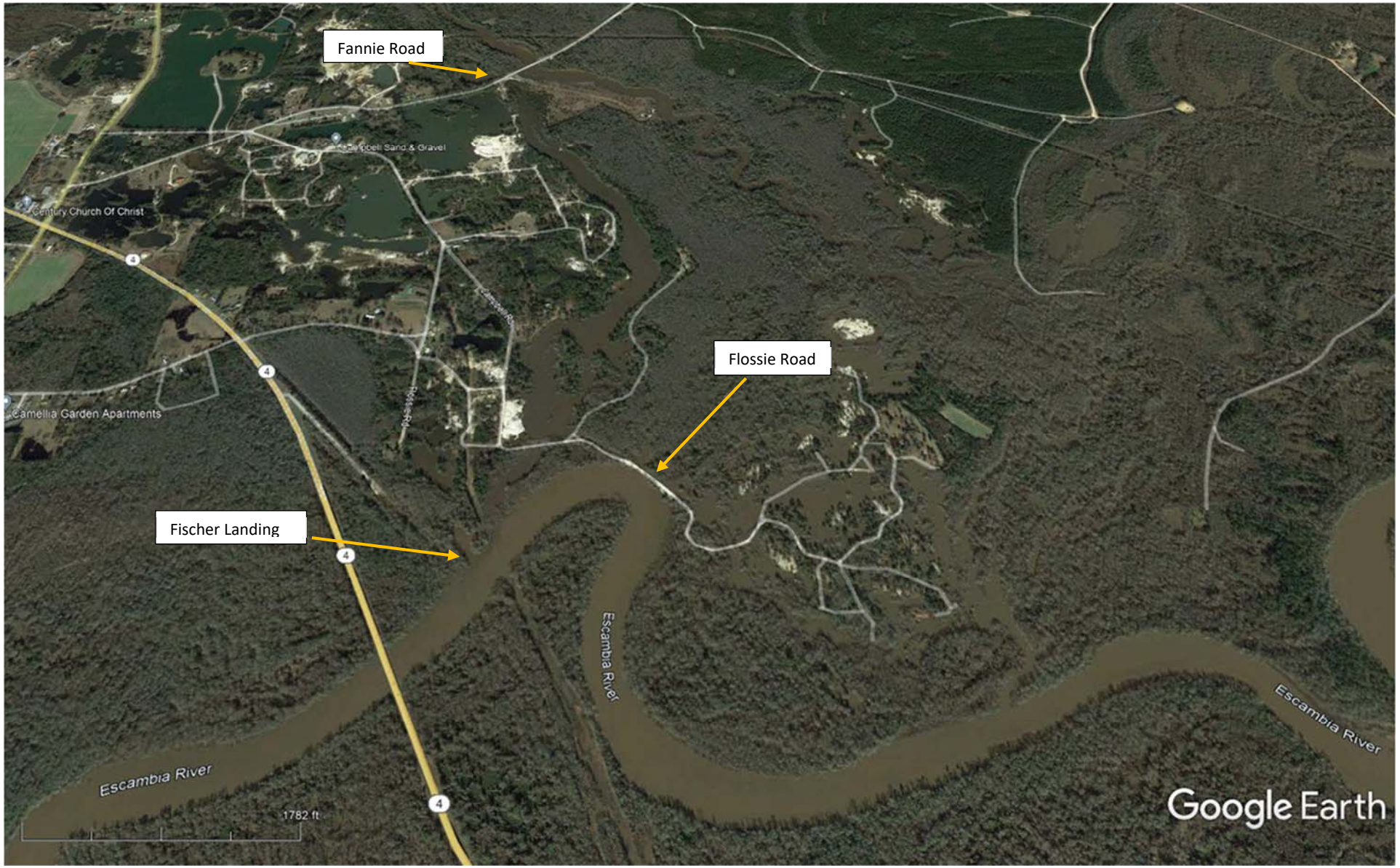
November 2007: Closeup of Fischer Landing. Sediment surrounding the old SR 4 Bridge Pier rubble. Note the open water between the Flossie Road dam and downstream. It appears to result from high water washing over the dam and depositing sand immediately upon passing over the dam.

2011 Aerial Photograph



September 2011: Low water period. New sediment at mouth of Big Escambia Creek. Bridge rubble also has sand deposited. No sand visible at Fischer Landing. Note length of sand bars within the River from the Creek to near Fischer Landing.

2019 Aerial Photograph



January 2019: High Water event. No sand bars visible. Water appears to be at flood stage or higher (> 17 feet). The Fischer landing and boat ramp is under water. The east sand mine area is under water. The west sand mine appears to remain separated from Big Escambia Creek, but the water level is still high. The Flossie Road bridges are still above water.