Georgia-Pacific Crossett LLC
AR0001210 - Wastewater Treatment System Timeline
November 3, 2016

1899 – Crossett Lumber Company was founded and lumber operations began.

1937 – Paper mill operations began. Effluent was conveyed to the Ouachita River via an intermittent stream known as Coffee Creek. (Slide 1)

1940s/1950s - Mill started using Mossy Lake for wastewater treatment by building water control structures and levees around Mossy Lake to isolate it from the river and other nearby lakes. (Slide 4) During this time, wastewater was discharged from the mill into Coffee Creek, then Mossy Lake, then Coffee Creek to the Ouachita River.

1956 – To provide additional treatment and improve water quality, a dam was constructed across Coffee Creek above the floodplain to form the existing stabilization basin (known as R1). (Slide 5)

1956/57 – Two parallel settling basins were constructed upstream of stabilization basin to remove solids. (Slide 6)

1963 – Levee raised on Mossy Lake to 62 feet elevation to increase detention time and provide more efficient treatment of effluent. (Slide 4)

1968 – Primary clarifier and sludge basin were constructed. Two effluent channels from the mill were constructed, conveying one effluent stream to the clarifier and other to the settling basins. (Slide 7) At the time, these effluent channels also received storm water drainage that historically fed the Coffee Creek drainage area. Mechanical aerators were added to R1 to improve BOD removal.

1970 – Effluent ditch constructed from R1 to the upper reaches of Mossy Lake. This removed effluent leaving R1 from Coffee Creek. (Slides 8, 9, 10, 11)

~1981 – A new effluent channel was constructed from settling basins to the R1 inlet, separating the mill's effluent from the Coffee Creek drainage in this area. (Slide 12)

~1981 – A storm water diversion ditch was constructed along the south side of R1, which captured storm water and directed it to Coffee Creek, downstream of R1. This improved performance in R1 by diverting storm water flow away from the WWTS. (Slide 13, 14)

1990 – Two additional storm water diversion ditches were constructed to further separate storm water runoff from the WWTS. One diversion ditch was constructed north of the WWTS, from Highway 82 to the constructed effluent channel downstream of R1 to capture storm water drainage from the north. Another diversion ditch was constructed from Highway 82 to the southern side of the settling basins. This ditch captures storm water flow south of the WWTS and directs it to Coffee Creek south of the settling basins. This was the final step to separate the runoff that historically fed Coffee Creek from the WWTS. (Slide 15)

1995 – Storm water surge basin was constructed to manage hydraulic loading from storm water flow from the mill site. (Slide 16)

1996-97 – Sludge pond operation discontinued and sludge dewatering facility installed.

2000 – Both effluent channels leaving the mill were enclosed from Highway 82 towards the clarifier (approximately 4000 feet each). (Slide 17, 18)

2011 – Additional surge basin constructed. (Slide 16)

2013 – Remaining 900 feet of effluent channels upstream of the clarifier were enclosed. (Slide 19) Enclosed additional sewers on the mill site. Security enhanced around the wastewater treatment system.

Georgia-Pacific's treated wastewater discharges to the upper reaches of Mossy Lake, then into Coffee Creek, then into Ouachita River in Segment 2D of the Ouachita River Basin pursuant to AR0001210.

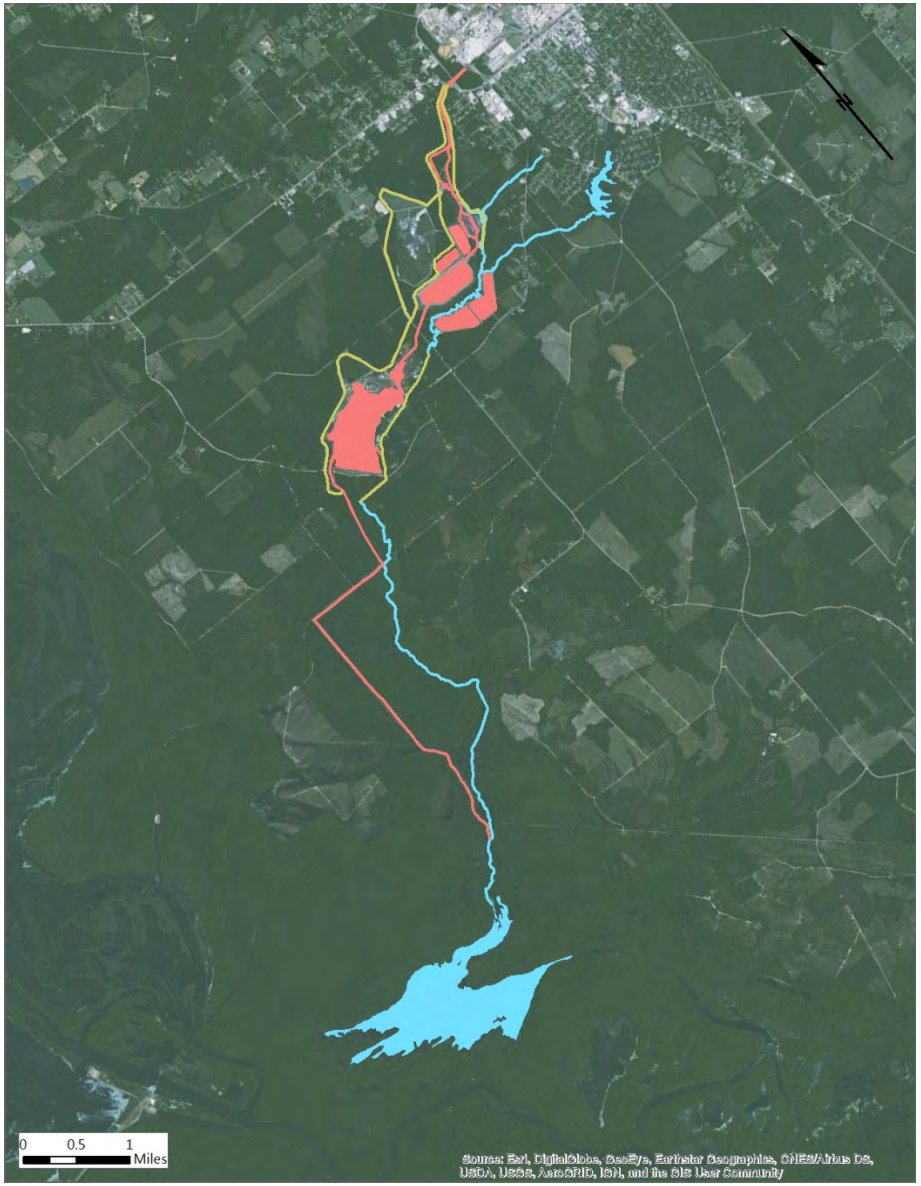
Georgia-Pacific Crossett LLC
AR0001210 - Wastewater Treatment System Time line
November 3, 2016 [Timeline 2016]

Coffee Creek -Mossy Lake Use Attainability Analysis, 1984, ADEQ [UAA 1984]

Map 1 on the right shows water flow as interpreted from the timelines. Flow lines and waterbody outlines are from NHD geometries, traced from imagery, or drawn as inferred from the timeline.

In all maps, blue shows natural water flow, red shows effluent flow, and yellow shows storm water flow. Conditions from each time point are overlain on current imagery.

Subsequent maps show the progression of stream alterations.

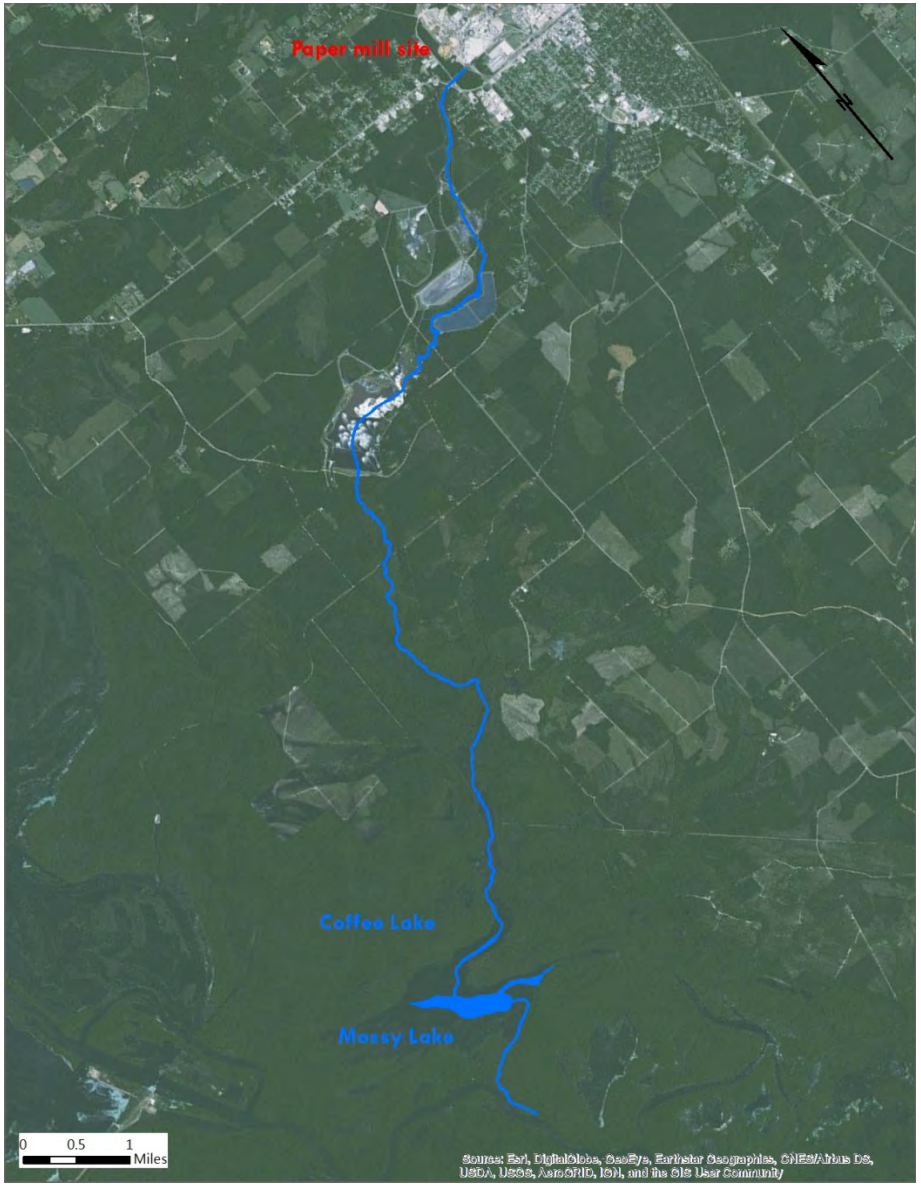


1899
"Crossett Lumber Company was founded and lumber operations began."
(Timeline 2016)

1937
"Blasting to widen, straighten, and deepen creek."
(UAA 1984)

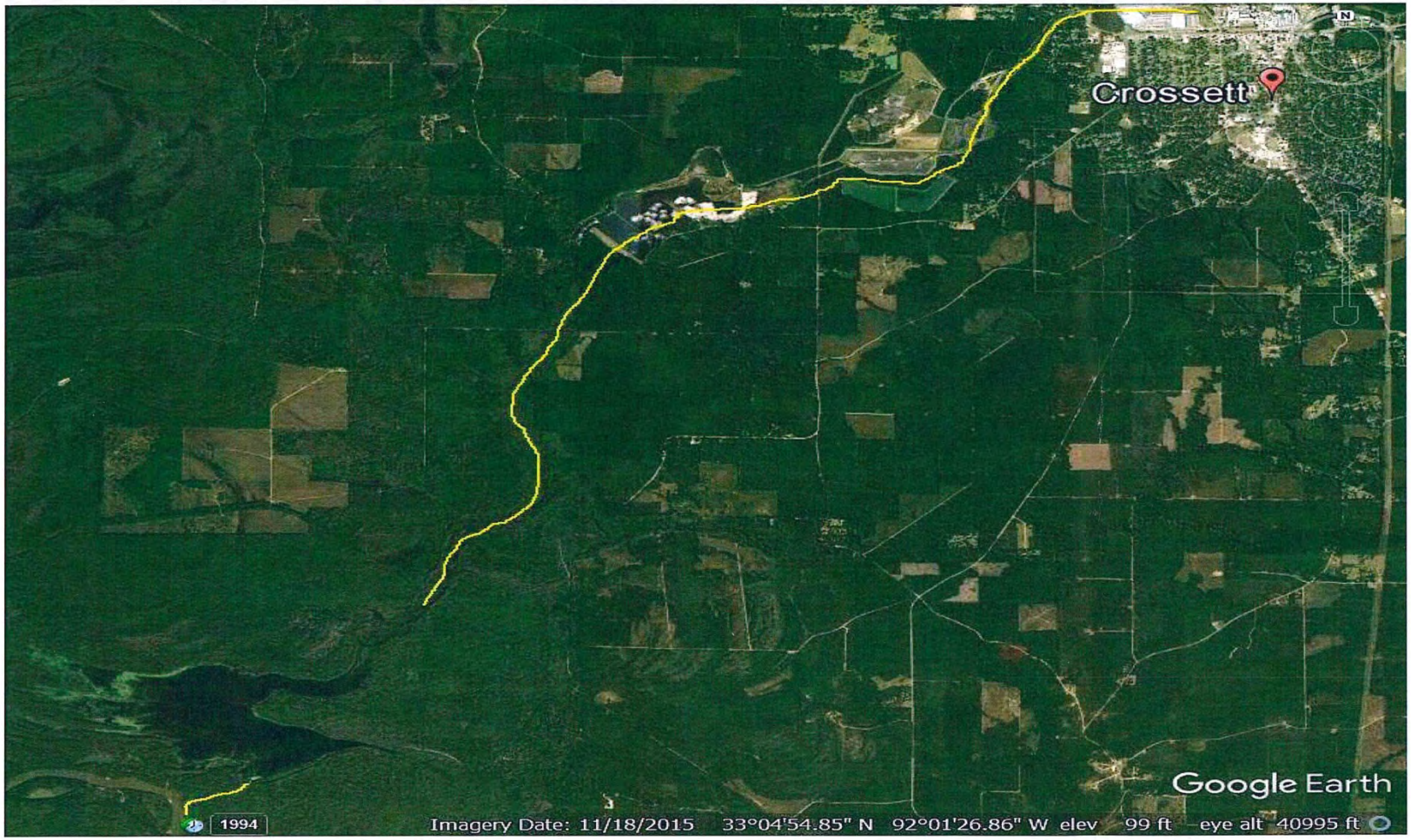
1937
"Paper mill operations began. Effluent was conveyed to the Ouachita River via an intermittent stream known as Coffee Creek. (Slide 1)"
(Timeline 2016)

Map 2 on the right shows the approximate flow of Coffee Creek in 1937. Flow line is from current NHD and traced from a 1934 USGS topo map (NHD generally matches the flowline as shown from 1934 to 2002 on USGS topo maps). Water flowed from the paper mill along Coffee Creek, through Coffee Lake and Mossy Lake, and into the Ouachita River.



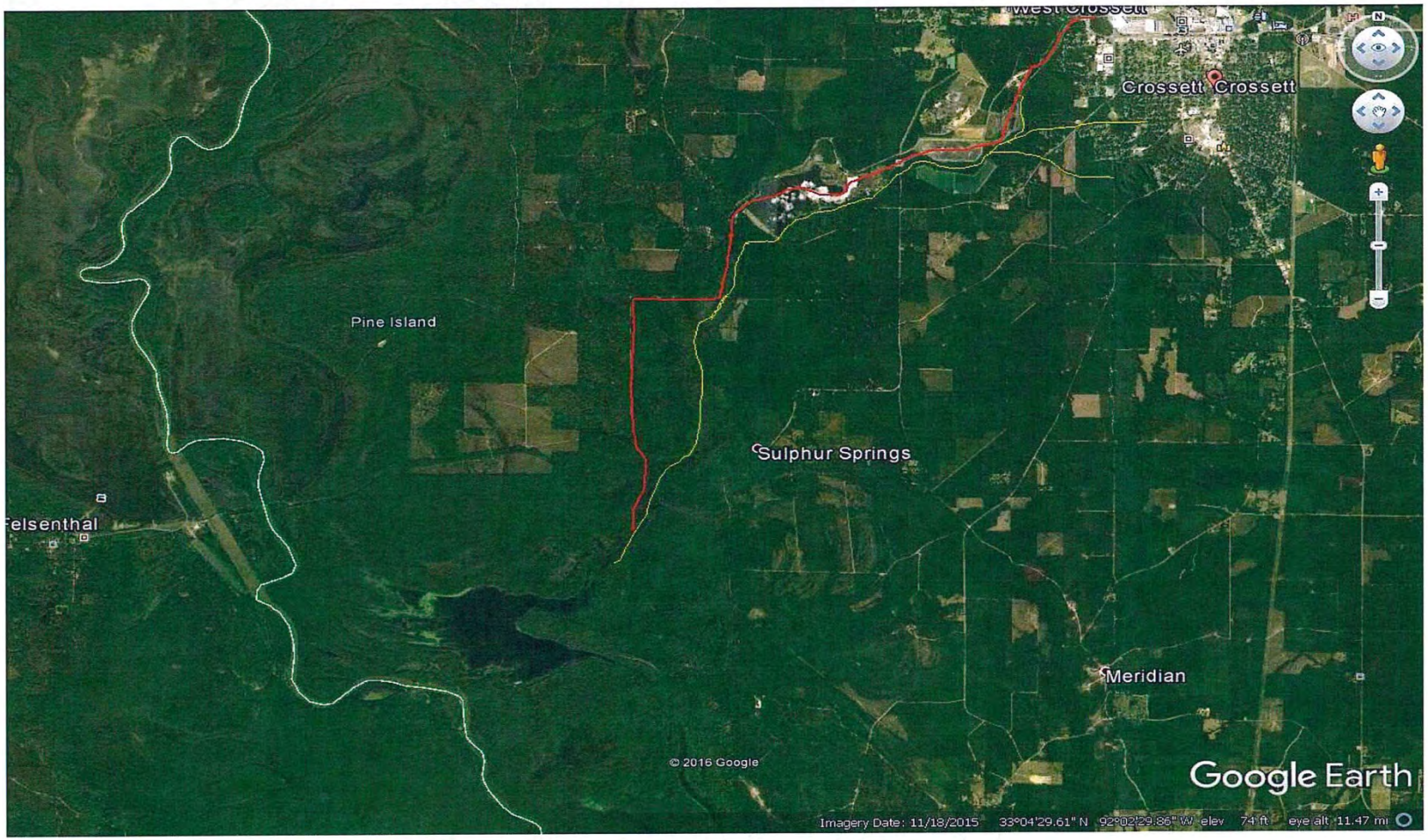
Slide 1

Path of Coffee Creek and Effluent Pre - 1956



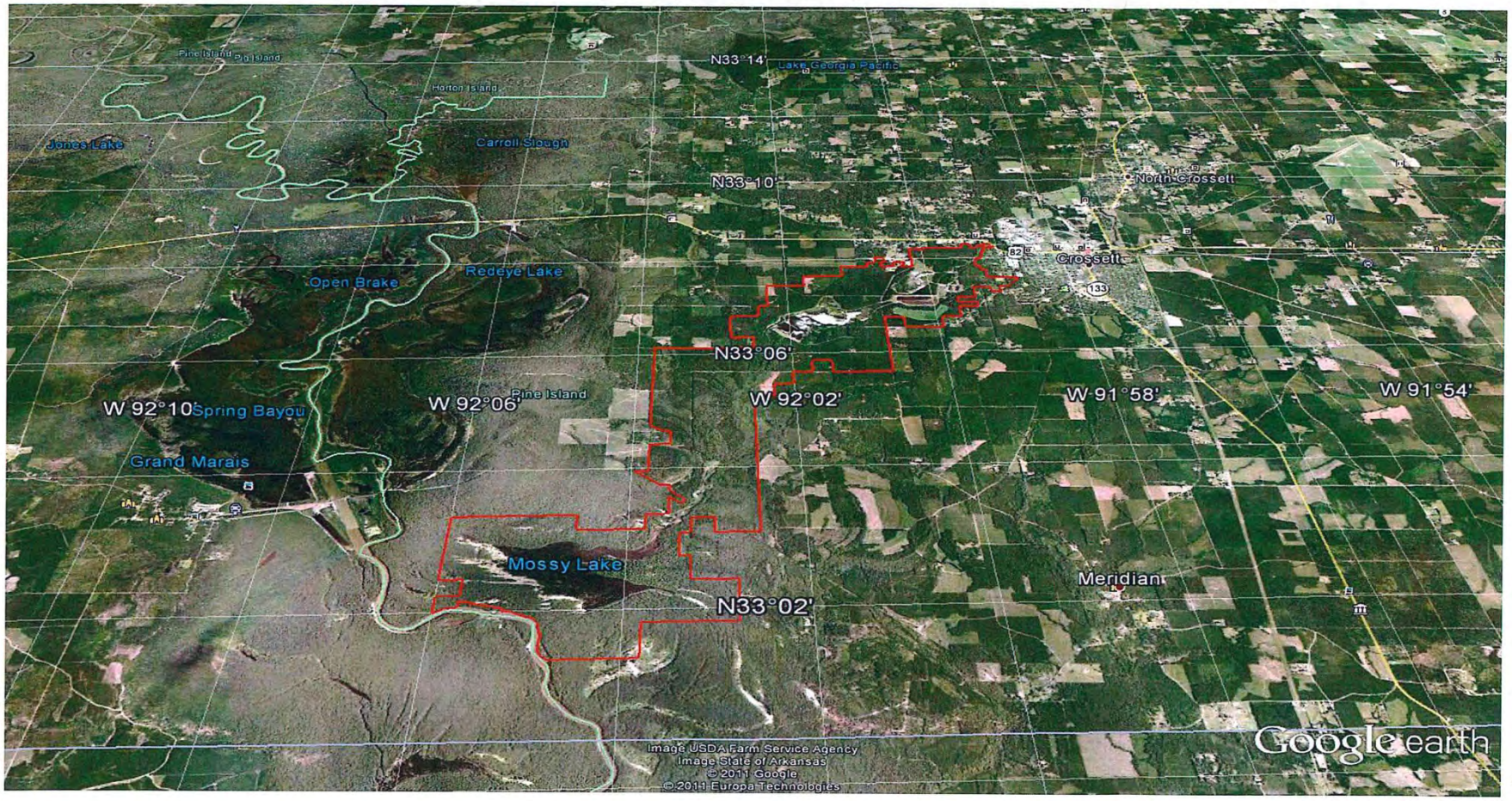
Slide 2

Path of Effluent (red) and Path of Coffee Creek (yellow) 2016



Slide 3

GP Property Boundary



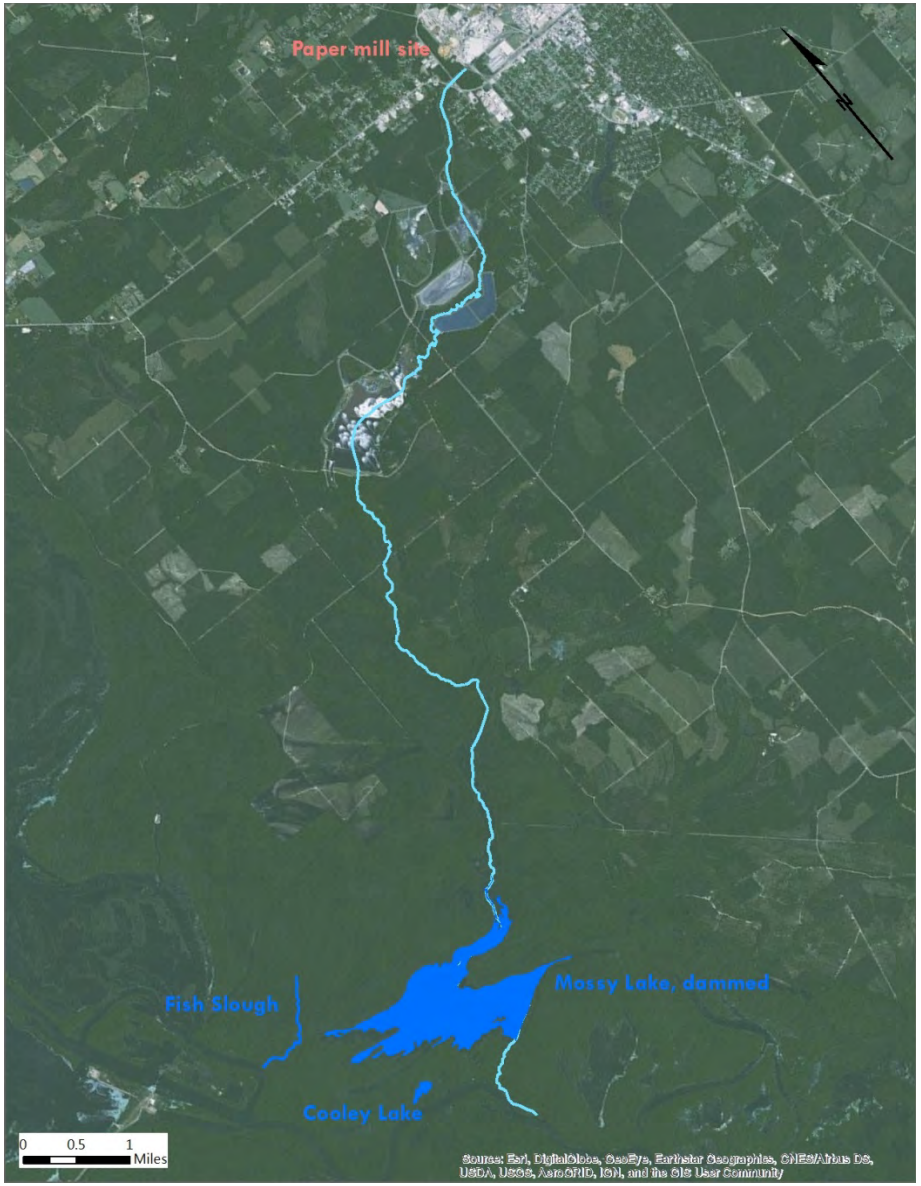
1940's
Discharge gates and canal at Mossy Lake installed."
(UAA 1984)

1940s/1950s
"Mill started using Mossy Lake for wastewater treatment by building water control structures and levees around Mossy Lake to isolate it from the river and other nearby lakes. (Slide 4) During this time, wastewater was discharged from the mill into Coffee Creek, then Mossy Lake, then Coffee Creek to the Ouachita River."
(Timeline 2016)

1950
"Dams on Fish Slough at edge of Ouachita River installed to prevent river from changing course through Mossy Lake."
(UAA 1984)

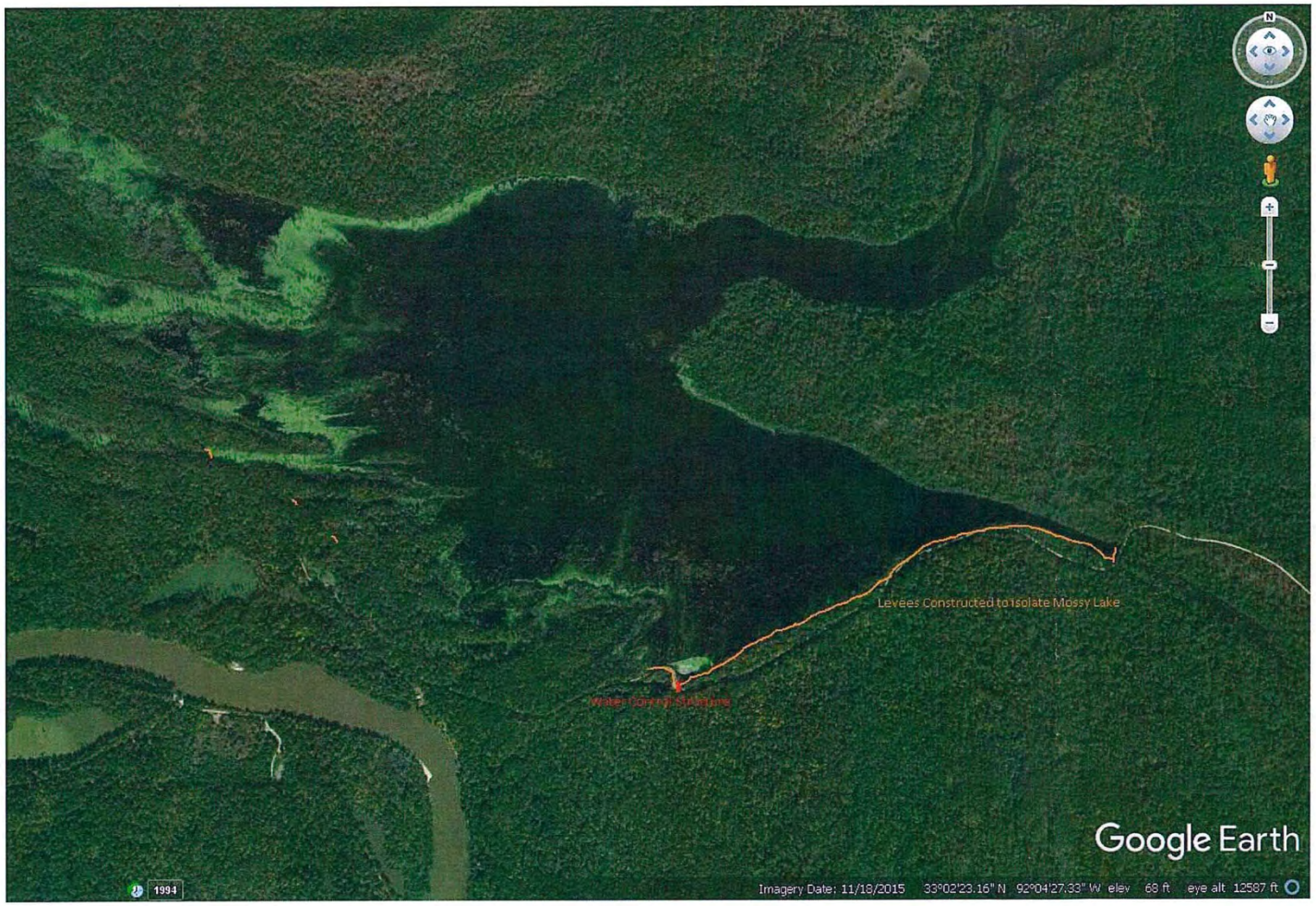
1950's
"Dams on Slough connecting Cooly Lake and Mossy Lake installed to isolate Cooly Lake from the System." [Cooly Lake is Cooley Lake in GNIS]
(UAA 1984)

Map 3 on the right shows the expansion of Mossy Lake (current extent) and locations of Fish Slough and Cooley Lake. Due to the damming, Coffee Lake merges with Mossy Lake.



Slide 4

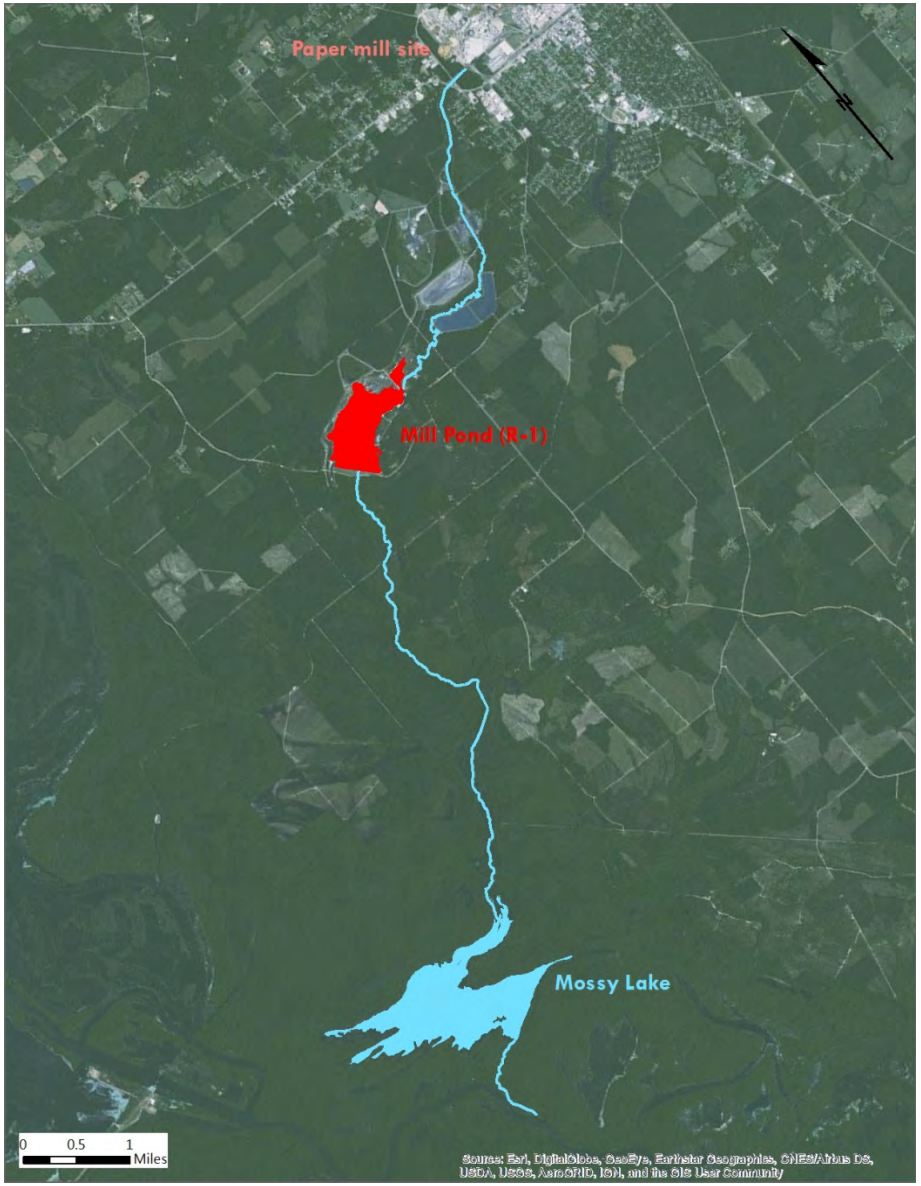
Mossy Lake Control Structures/Levees 1940s-1950s



1956
"Stabilization basin (R-1) installed to upgrade wastewater treatment." [R-1 is Mill Pond.]
(UAA 1984)

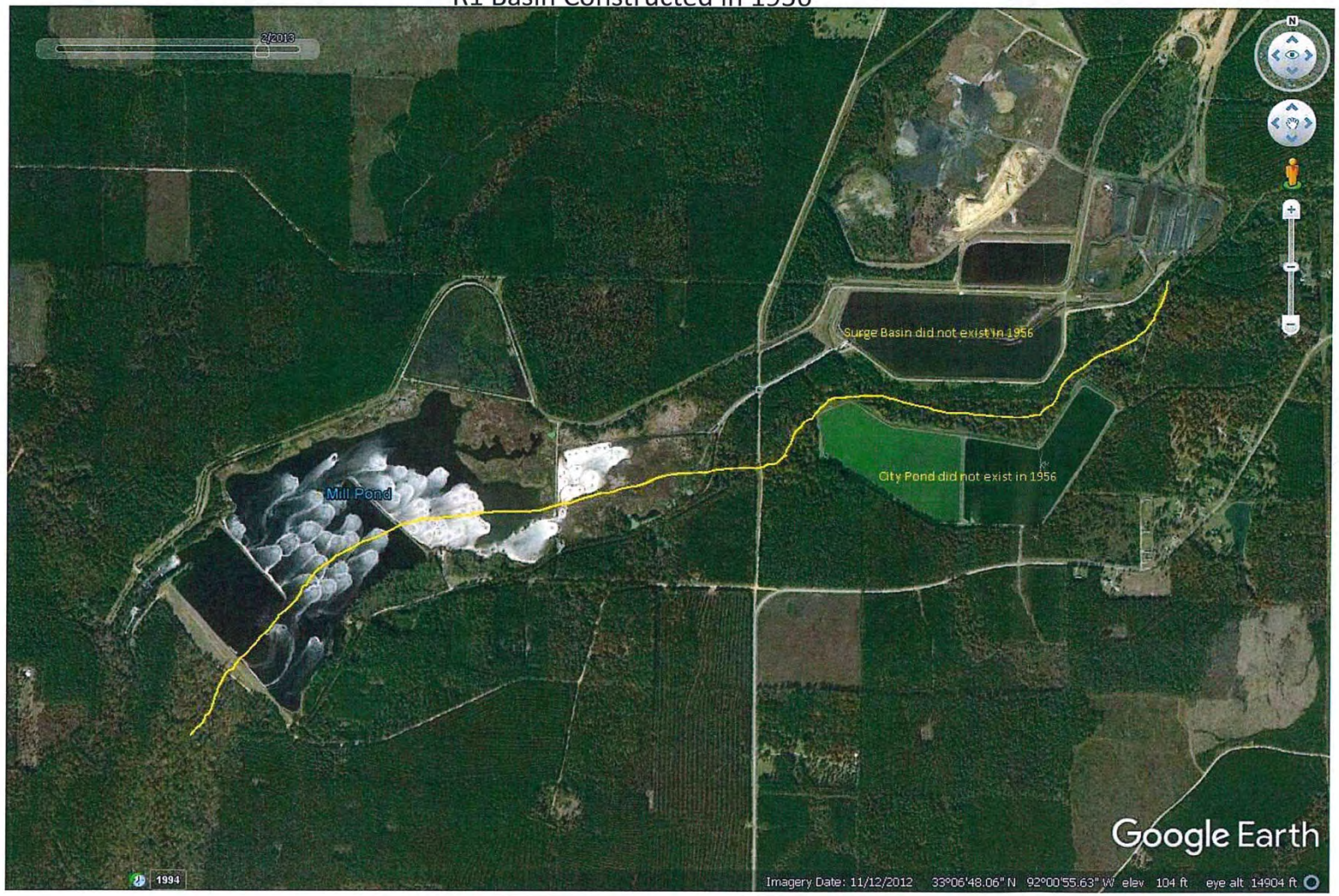
1956
To provide additional treatment and improve water quality, a dam was constructed across Coffee Creek above the floodplain to form the existing stabilization basin (known as R1). (Slide 5)"
(Timeline 2016)

Map 4 on the right shows the construction of Mill Pond (R-1).



Slide 5

R1 Basin Constructed in 1956

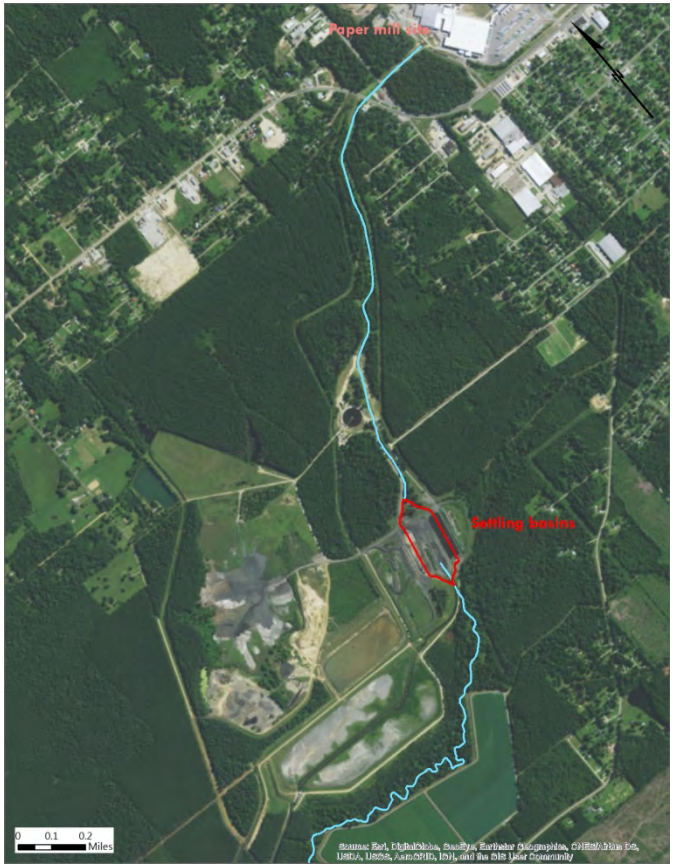


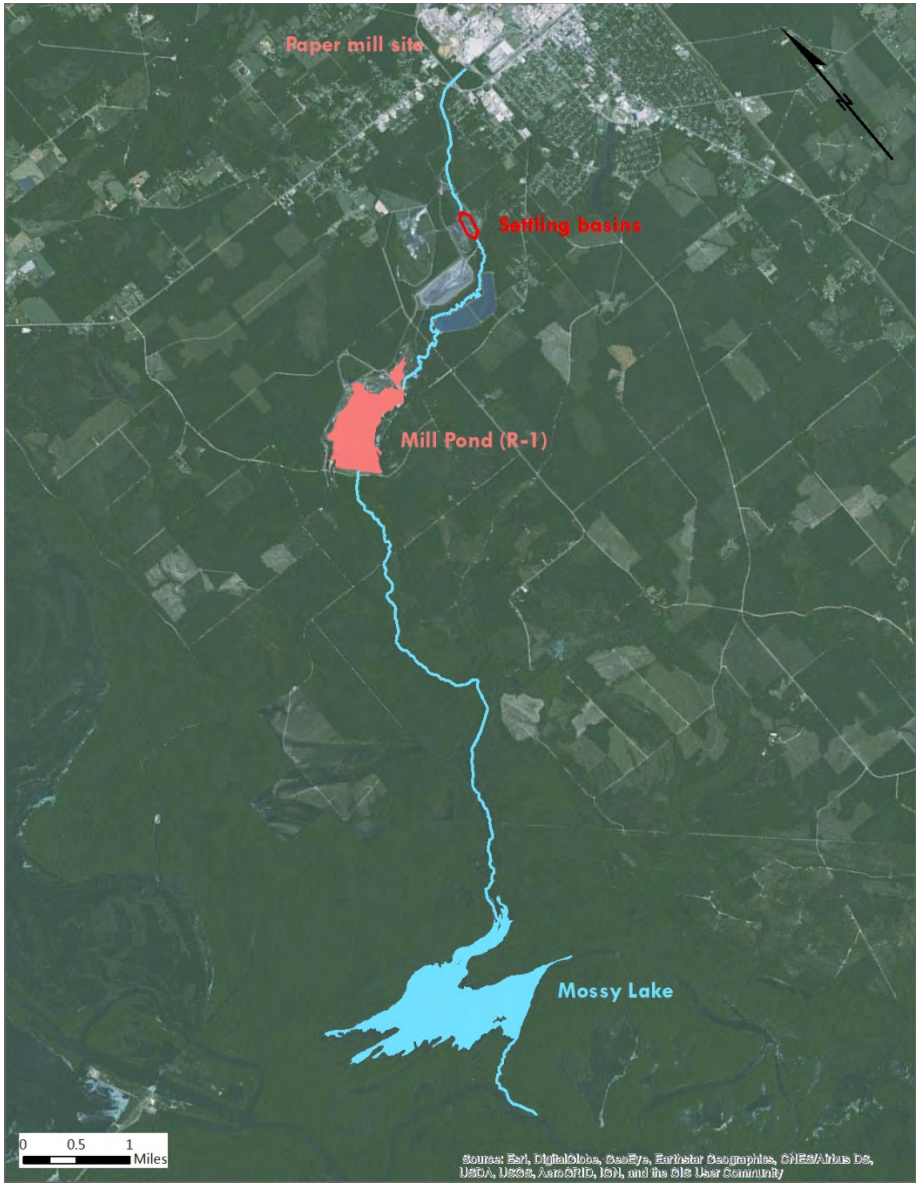
1956-57
"Settling basins installed upstream of R-1 to reduce solids loading and improve treatment efficiency."
(UAA 1984)

1956/57
"Two parallel settling basins were constructed upstream of stabilization basin to remove solids. (Slide 6)"
(Timeline 2016)

Map 5 on the right shows the settling basins.

Map 5a below shows details of the upper Coffee Creek drainage.





Slide 6

Ash Settling Basins constructed 1956/57

1963
"Levee at Mossy Lake raised to 62' MSL to increase detention time of effluent and provide more efficient treatment."
(UAA 1984)

1963
Levee raised on Mossy Lake to 62 feet elevation to increase detention time and provide more efficient treatment of effluent. (Slide 4)
(Timeline 2016)

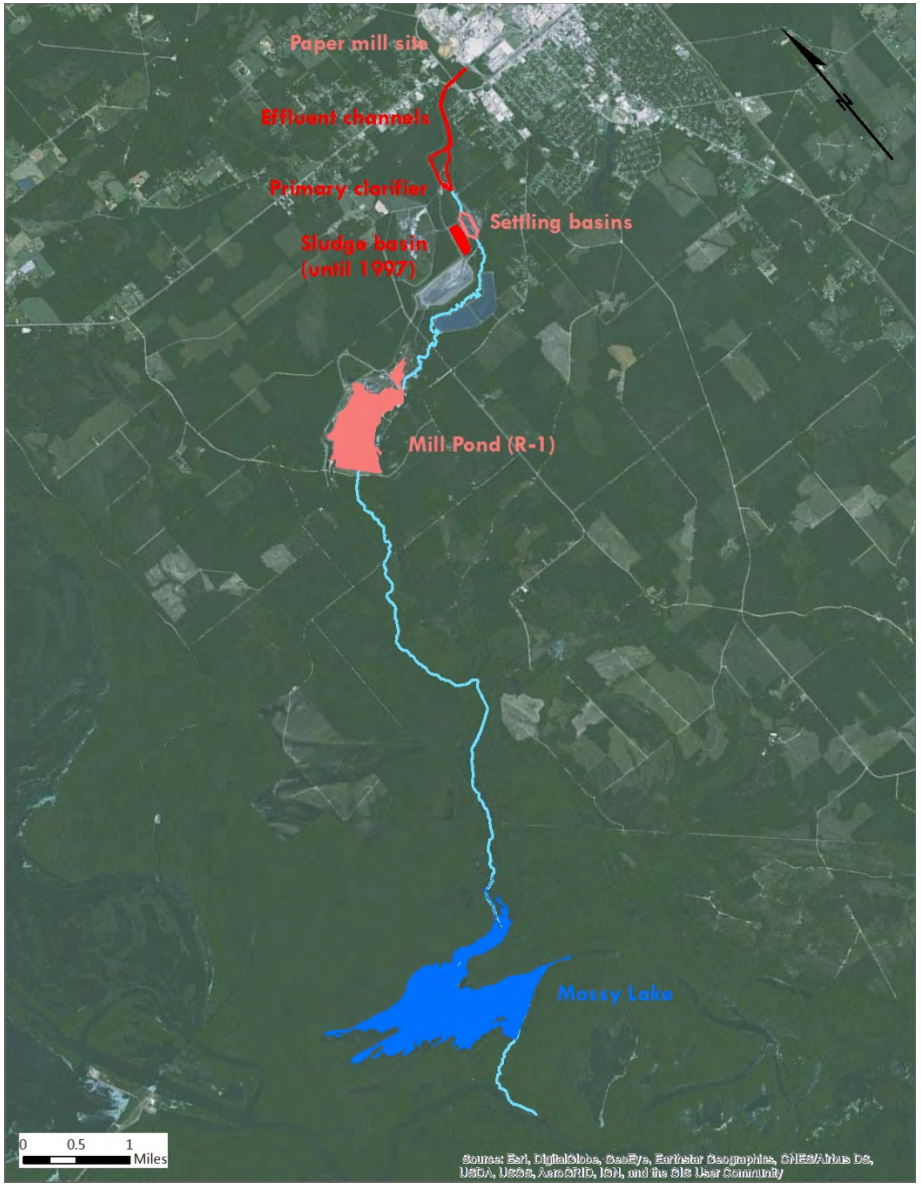
1968
"Discharge gates replaced with new weir at Mossy Lake." (UAA 1984)

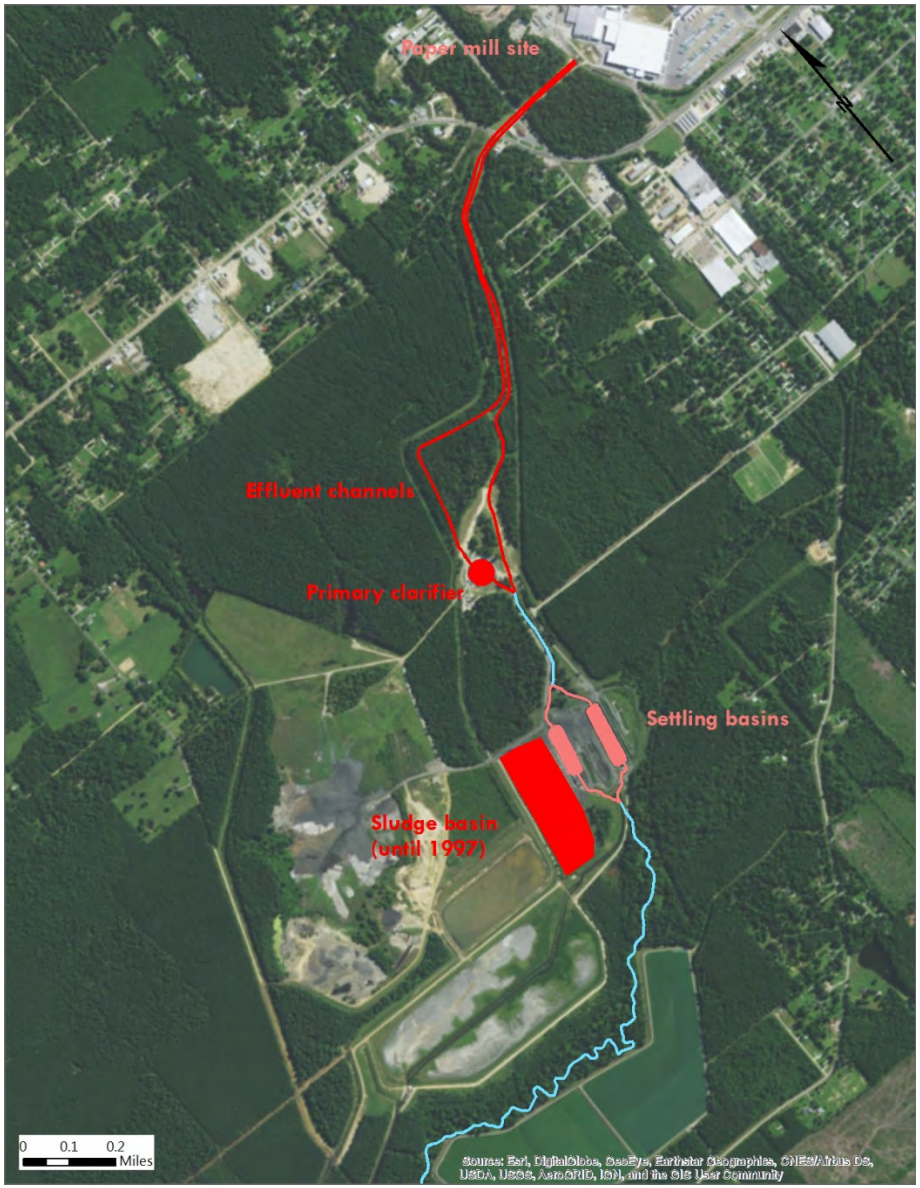
1968
"Primary clarifier and sludge storage basin installed adjacent to settling basins. Two separate parallel ditches from the mill to the clarifier installed. Mechanical aerators installed in R-1." (UAA 1984)

1968
"Primary clarifier and sludge basin were constructed. Two effluent channels from the mill were constructed, conveying one effluent stream to the clarifier and other to the settling basins. (Slide 7) At the time, these effluent channels also received storm water drainage that historically fed the Coffee Creek drainage area. Mechanical aerators were added to R1 to improve BOD removal."
(Timeline 2016)

Map 6 on the right shows Mossy Lake, the primary clarifier, the assumed location of the sludge basin, and the parallel effluent ditches.

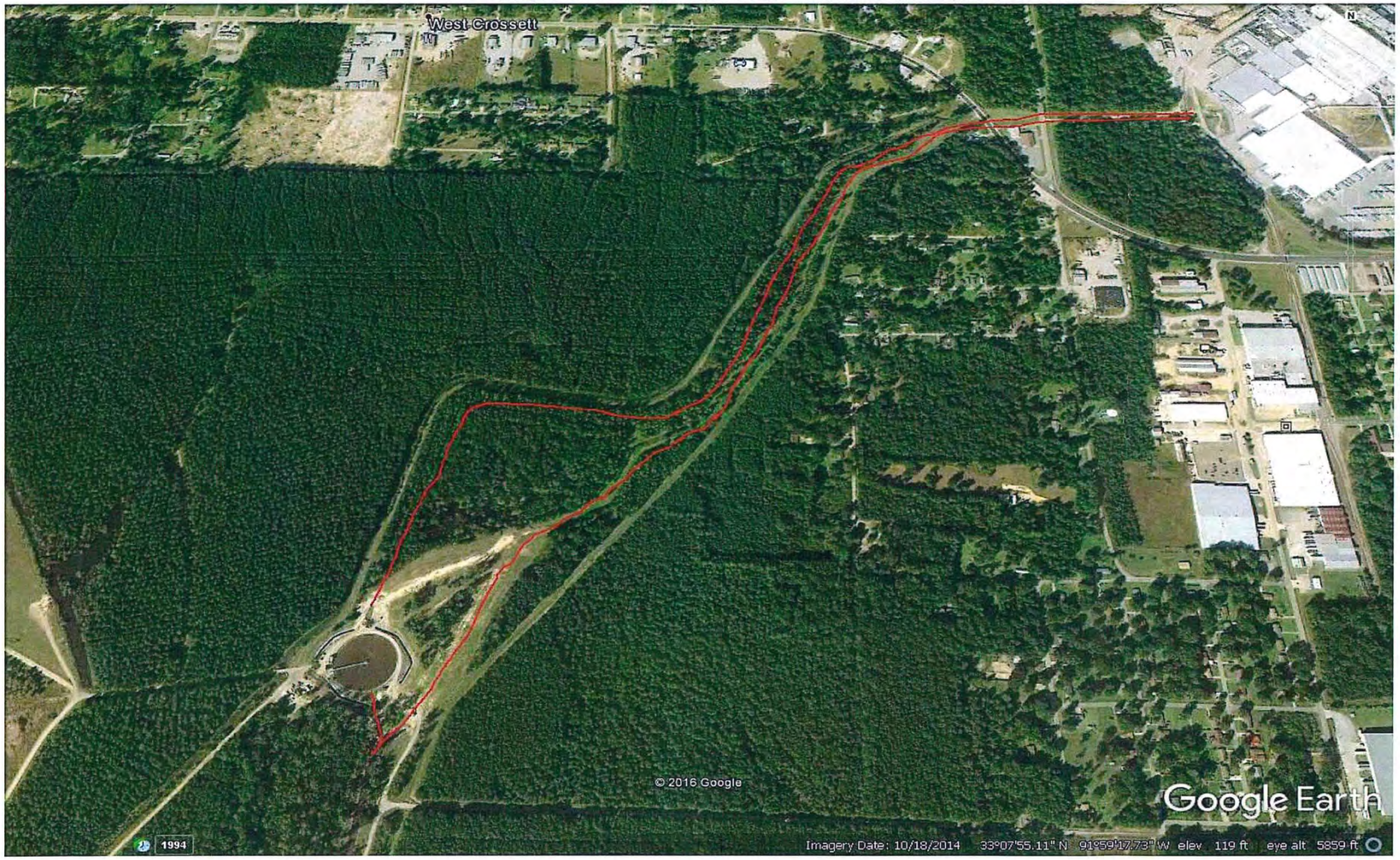
Map 6a (next page) shows details of the upper Coffee Creek drainage.




Paper mill site
Effluent channels
Primary clarifier
Settling basins
Sludge basin
(until 1997)
0 0.1 0.2
Miles
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Slide 7

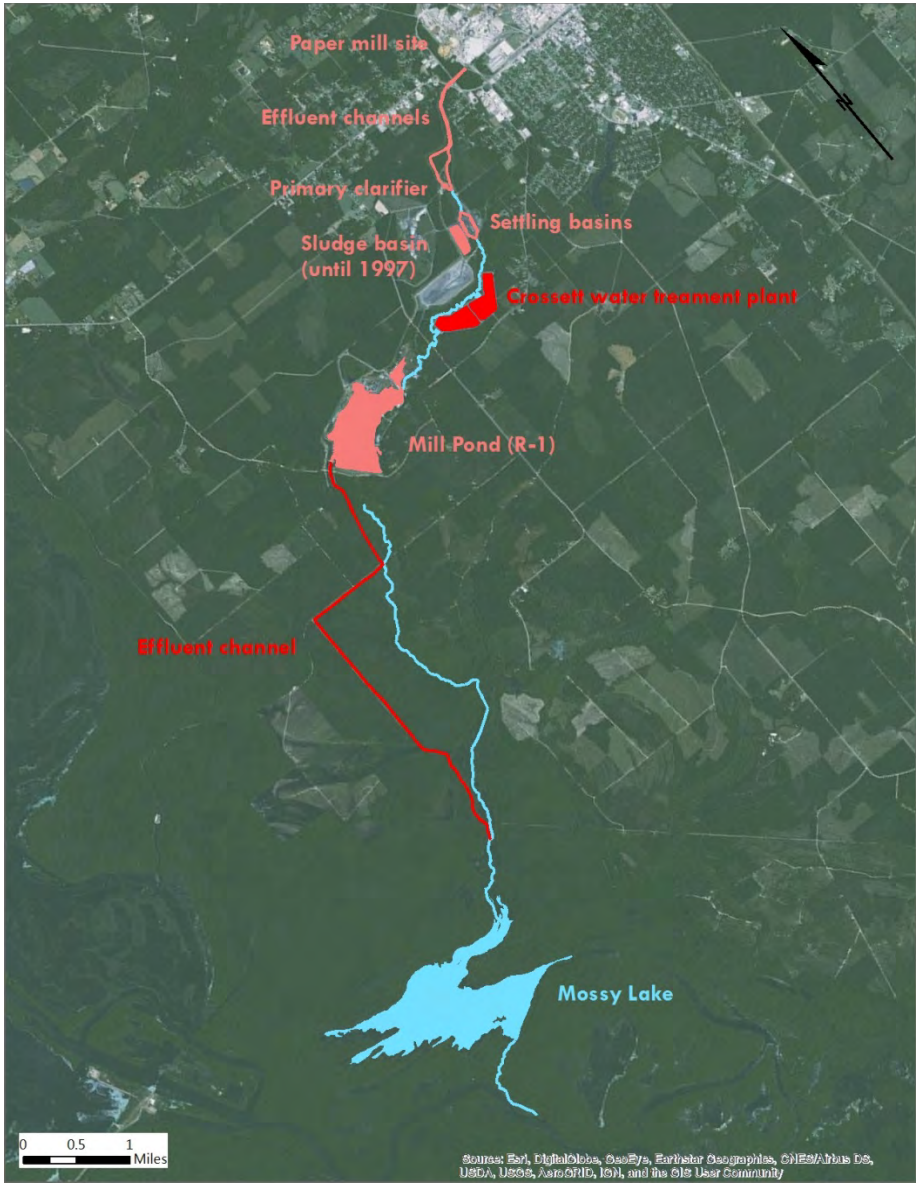
Clarifier and 2 effluent channels constructed 1968



1970
"A new channel from R-1 to the abandoned railroad just upstream of Mossy Lake was installed." (UAA 1984)

1970
"Effluent ditch constructed from R1 to the upper reaches of Mossy Lake. This removed effluent leaving R1 from Coffee Creek. (Slides 8, 9, 10, 11)" (Timeline 2016)

Map 7 on the right shows the effluent channel from Mill Pond to the lower Coffee Creek drainage. In GNIS, the upper part of this channel is called Coffee Creek Relief, though field mapping notes suggest the name might apply to more of the channel. Natural water flow from Mill Pond into Coffee Creek apparently ceases. The Crossett water treatment Plant is constructed prior to 1973 and is separate from the Coffee Creek drainage.



Slide 8

Effluent Channel from R1 to Mossy Lake constructed 1970

Slide 9

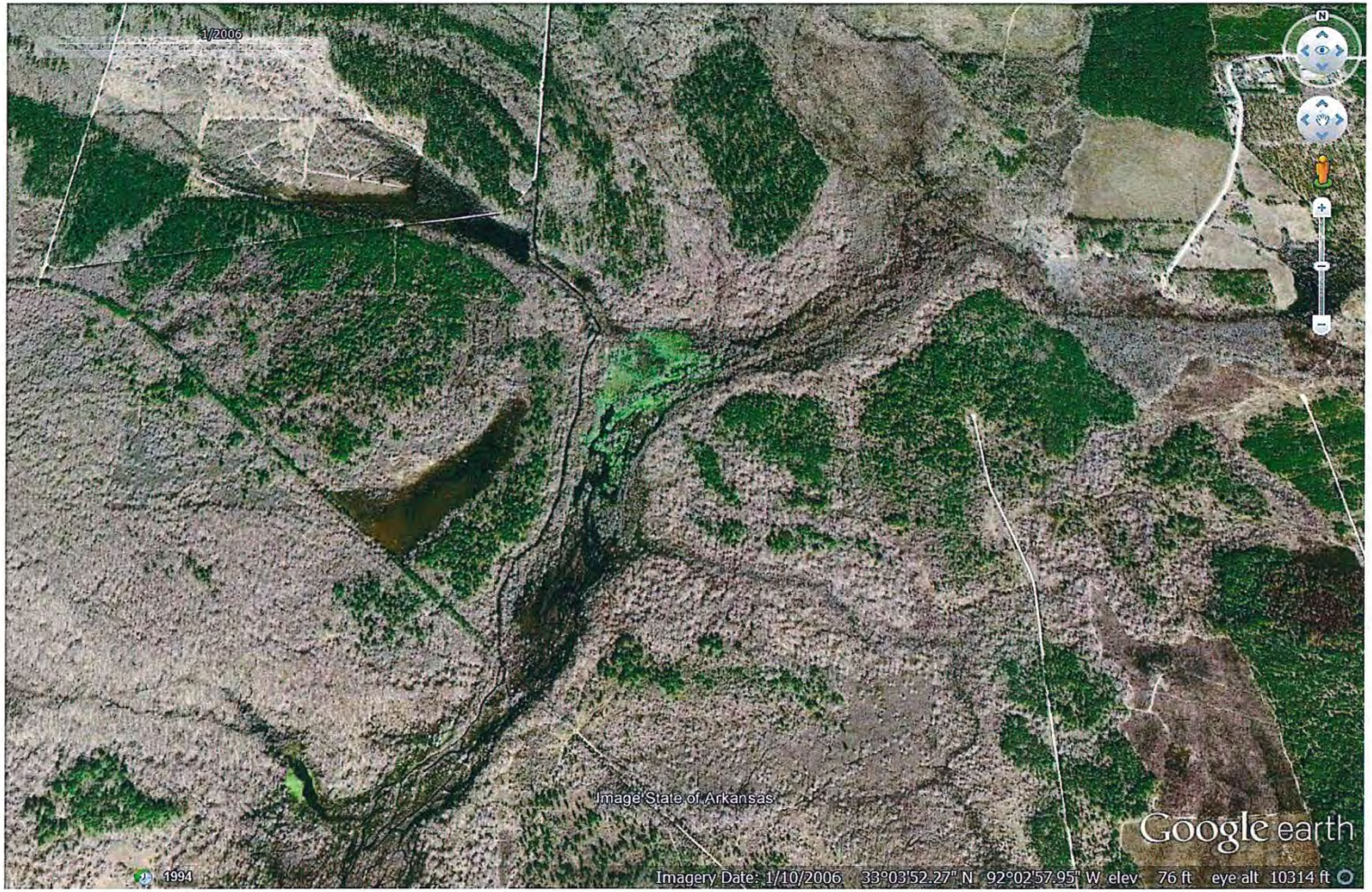
Separating Effluent From Coffee Creek 1970

Slide 10

Separating Effluent From Coffee Creek 1970

Slide 11

Separating Effluent From Coffee Creek 1970



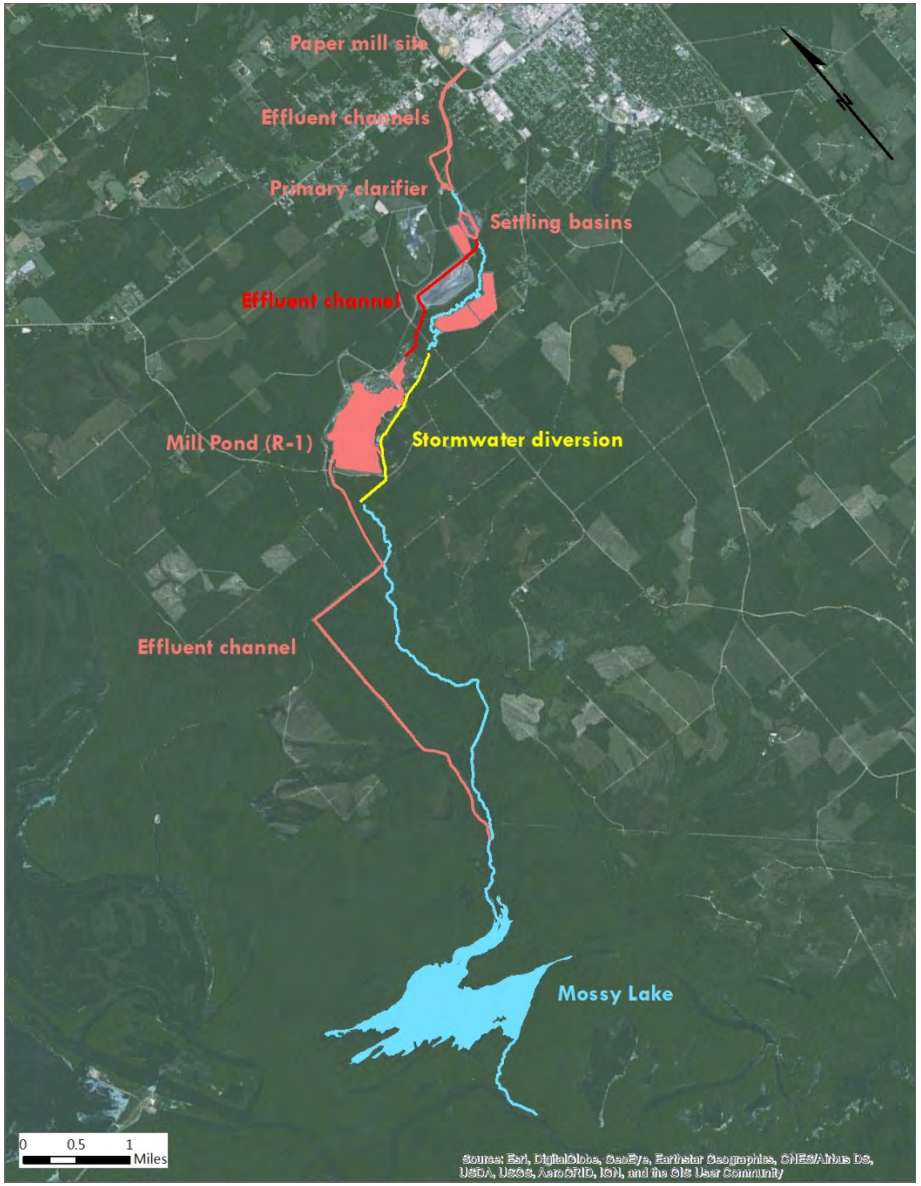
1981
"Stormwater diversion ditch installed along south side of the oxidation pond to its outfall. New effluent ditch from settling basin to R-l installed." (UAA 1984)

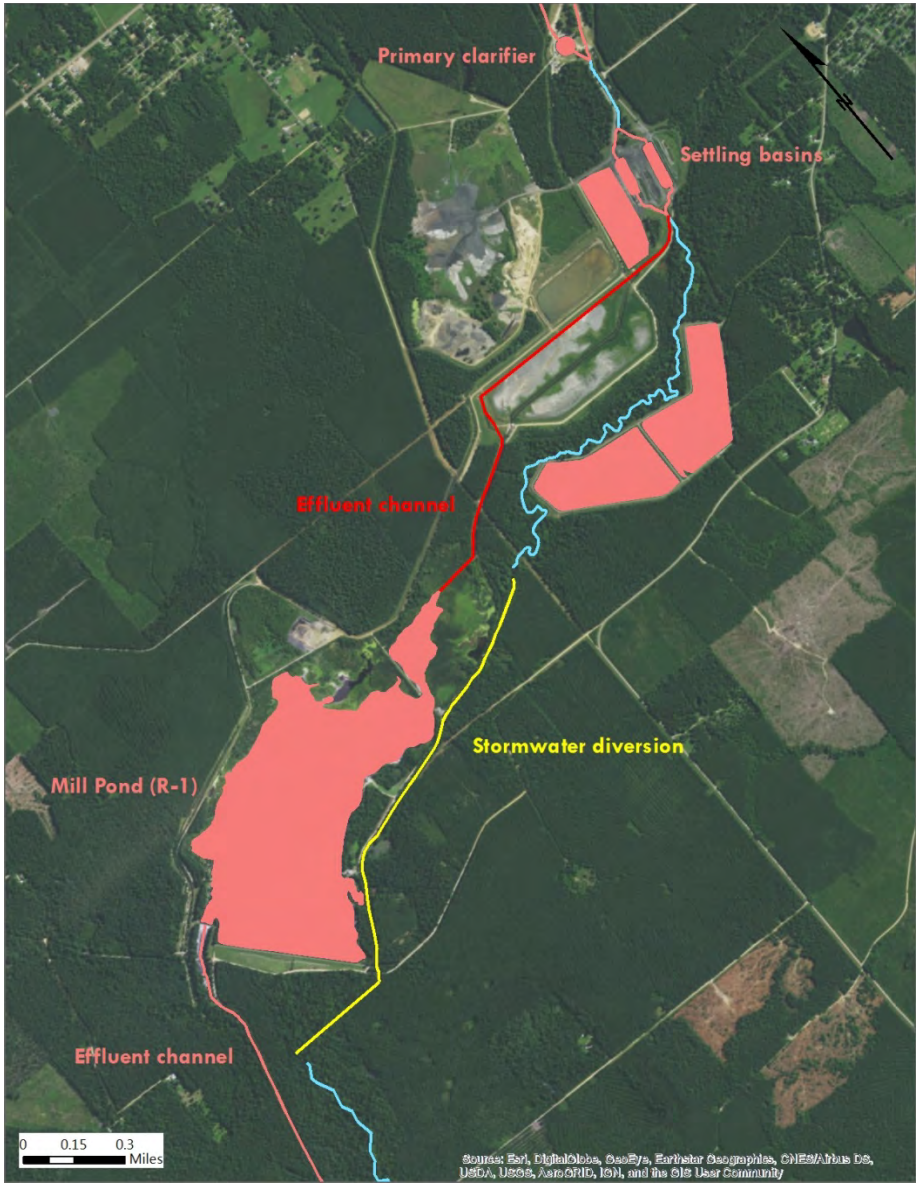
~1981
"A new effluent channel was constructed from settling basins to the R1 inlet, separating the mill's effluent from the Coffee Creek drainage in this area. (Slide 12)"

"A storm water diversion ditch was constructed along the south side of R1, which captured storm water and directed it to Coffee Creek, downstream of R1. This improved performance in R1 by diverting storm water flow away from the WWTS. (Slide 13, 14)" (Timeline 2016)

Map 8 on the right shows the new effluent channel from the settling basins to Mill Pond and the stormwater diversion bypassing Mill Pond. At this point, apparently little natural water flow enters Mill Pond other than runoff that enters the upper and middle effluent channels

Map 8a (next page) shows details of the middle Coffee Creek drainage.



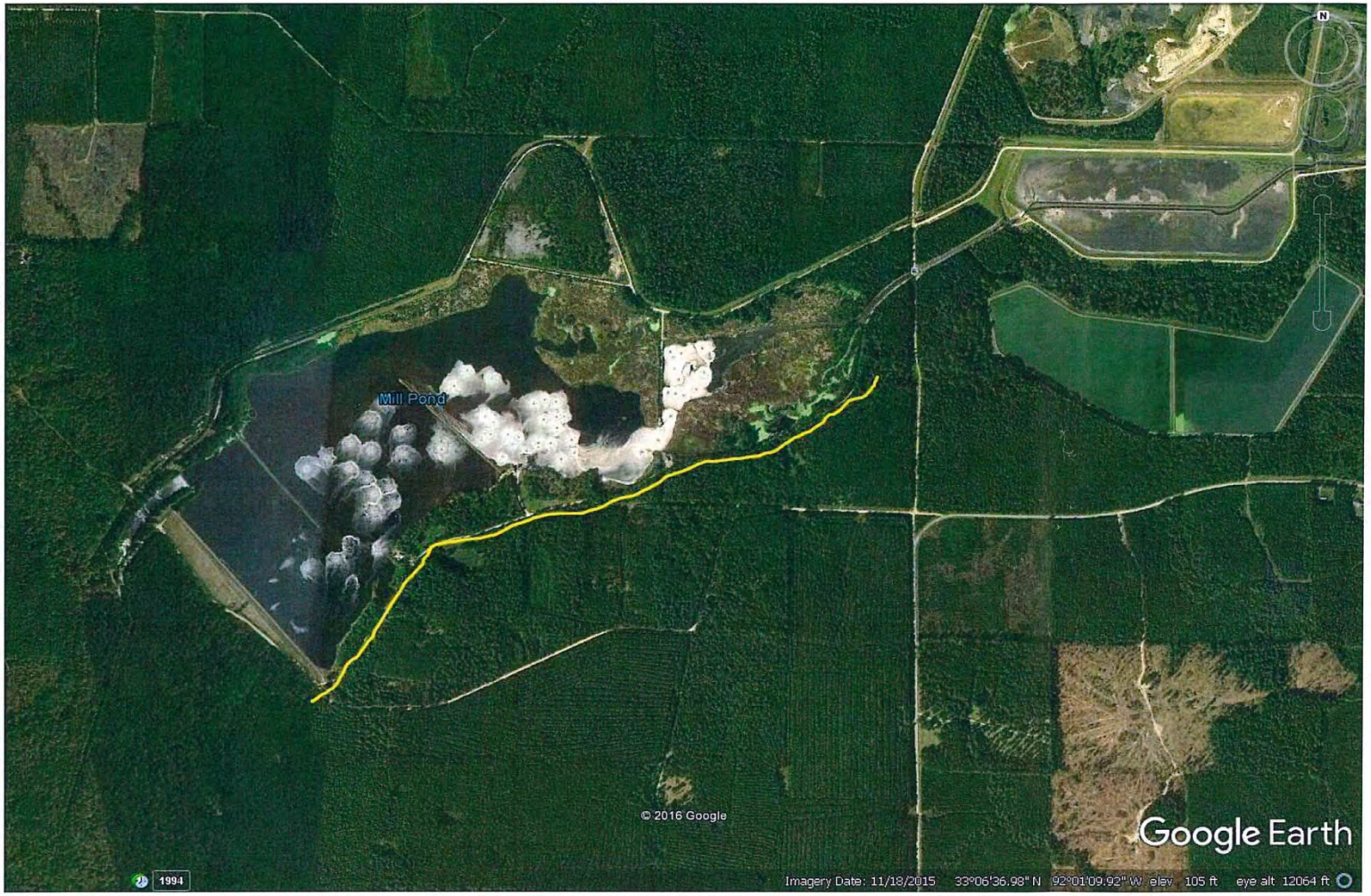

Primary clarifier
Settling basins
Effluent channel
Stormwater diversion
Mill Pond (R-1)
Effluent channel
0 0.15 0.3
Miles
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Slide 12

Effluent channel constructed from Ash Basins to R1 in 1981

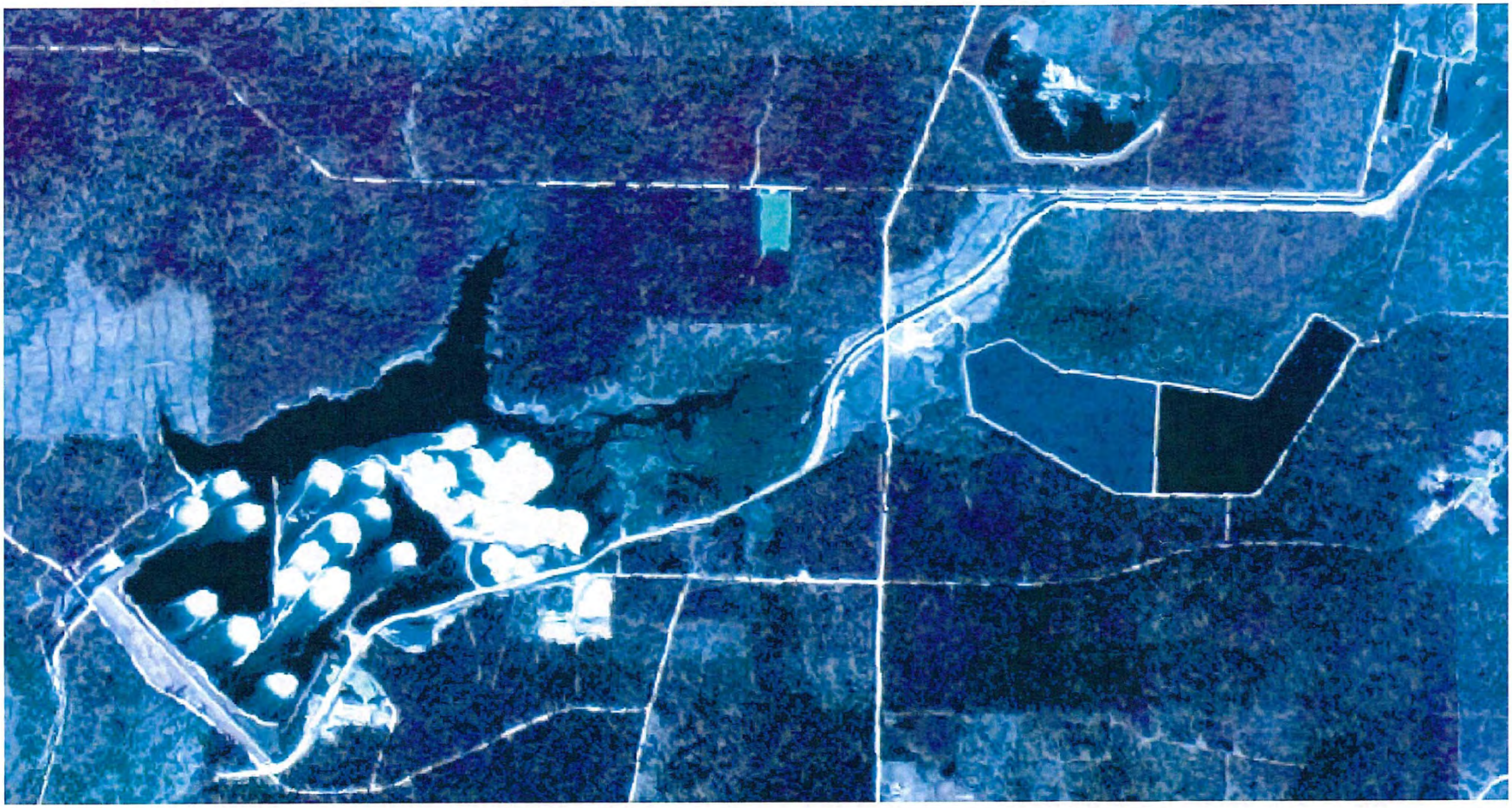
Slide 13

South Stormwater diversion constructed 1981



Slide 14

SW Diversion Channel (1981)

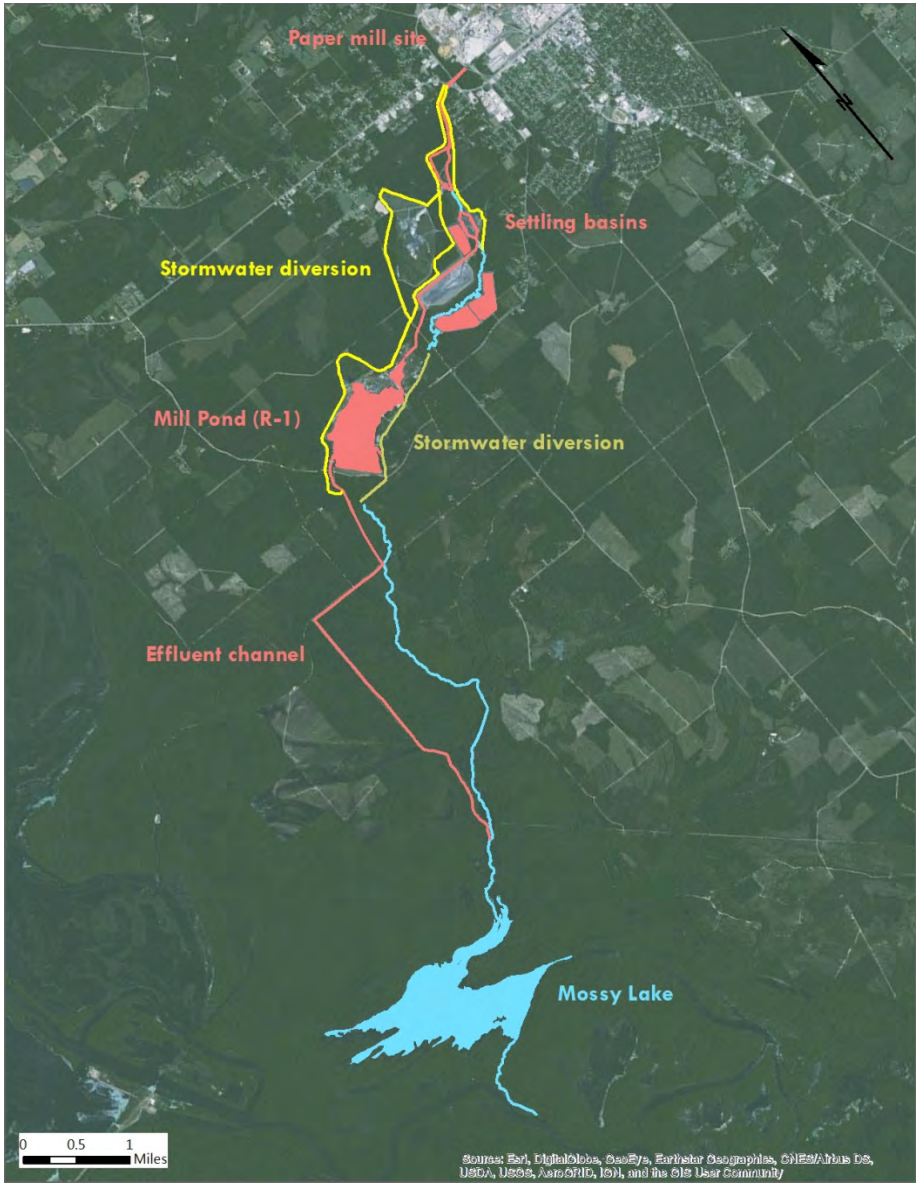


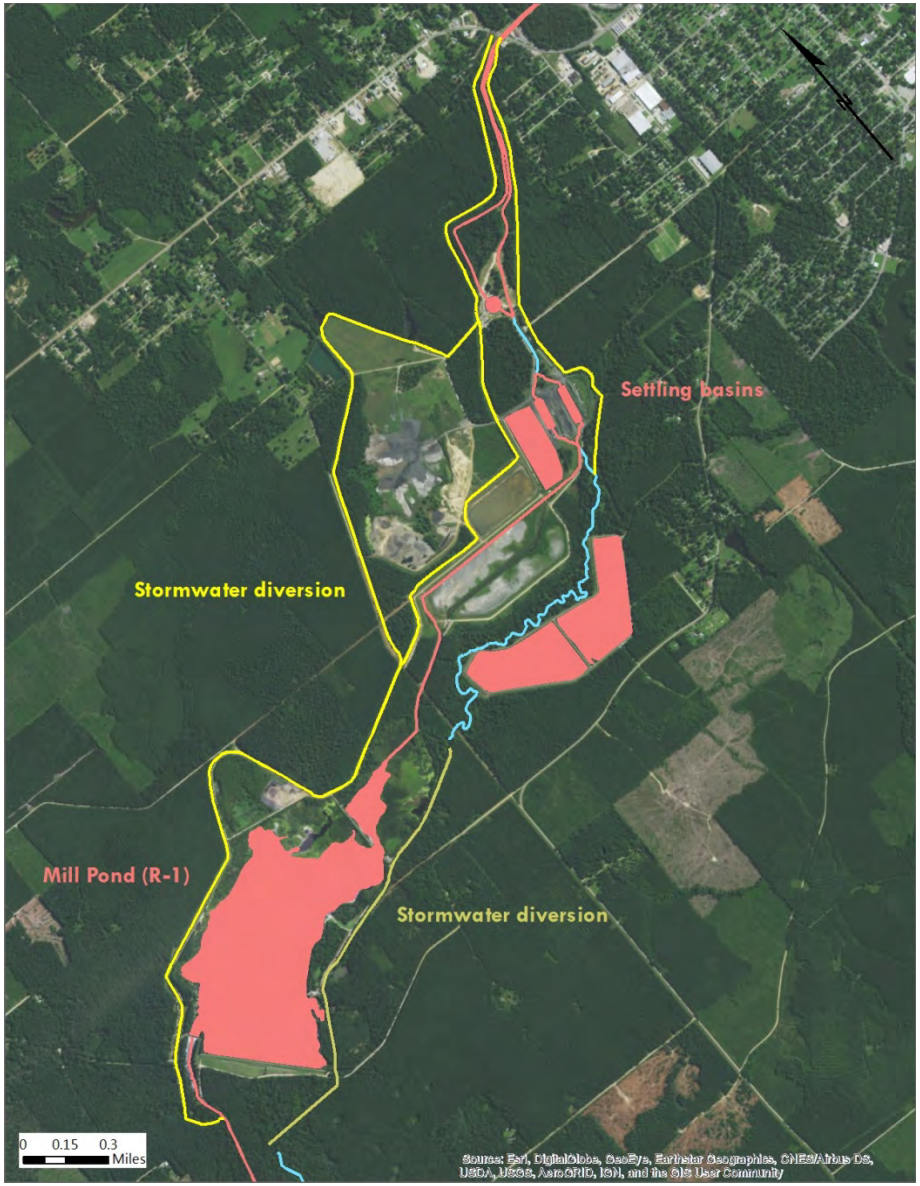
1990

"Two additional storm water diversion ditches were constructed to further separate storm water runoff from the WWTS. One diversion ditch was constructed north of the WWTS, from Highway 82 to the constructed effluent channel downstream of R1 to capture storm water drainage from the north. Another diversion ditch was constructed from Highway 82 to the southern side of the settling basins. This ditch captures storm water flow south of the WWTS [*sic*] and directs it to Coffee Creek south of the settling basins. This was the final step to separate the runoff that historically fed Coffee Creek from the WWTS. (Slide 15)"
(Timeline 2016)

Map 9 on the right shows the new stormwater diversions directing runoff from the mill site around all effluent treatment channels and basins. At this point, apparently no natural water flow enters Mill Pond other than runoff that enters the upper and middle effluent channels. However, the timeline is unclear about the flow of water from the primary clarifier to the settling basins (presumably effluent flow only) and between the stormwater diversions (see map 9a). The latter section does receive natural flow from unnamed streams (not shown).

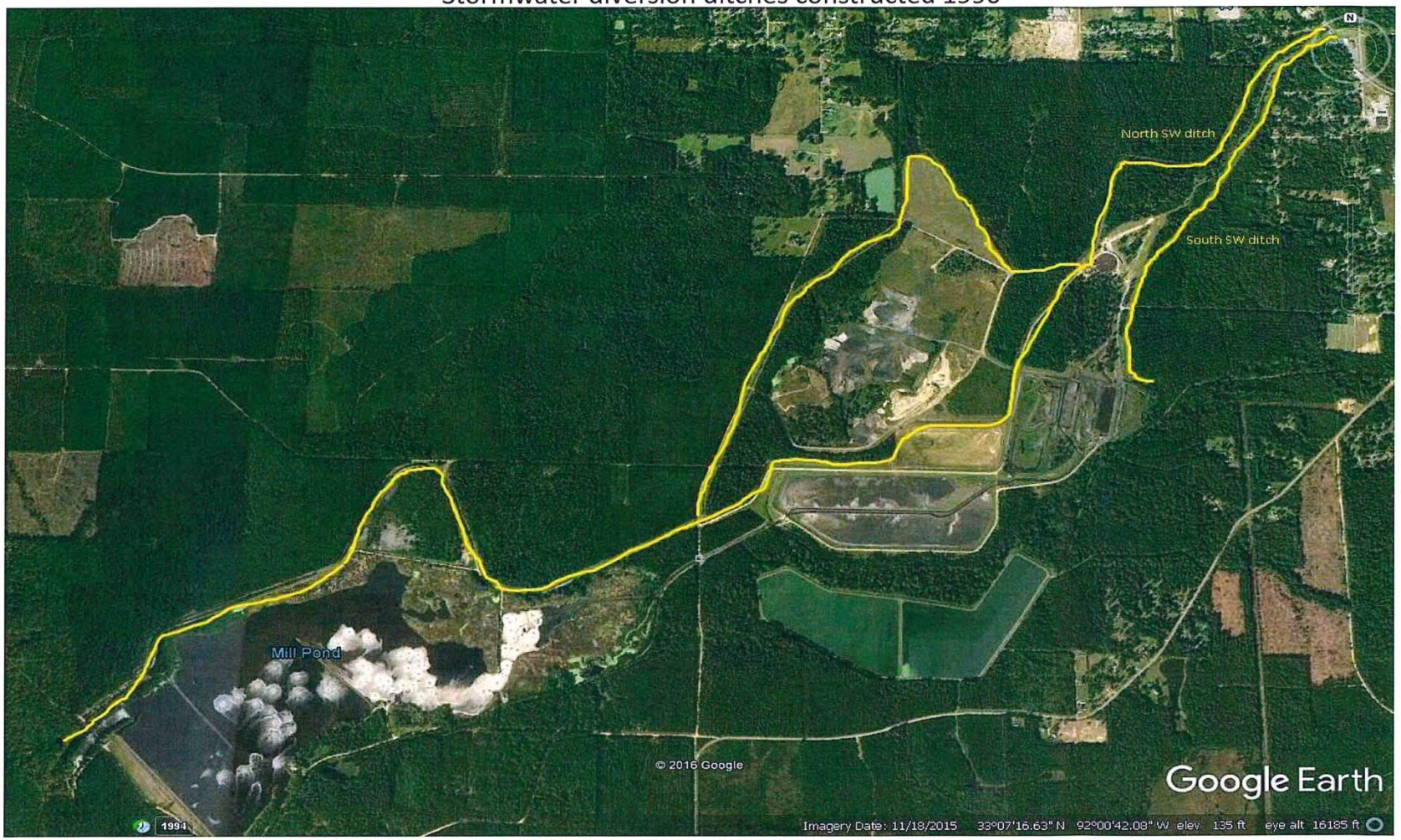
Map 9a (next page) shows details of the upper and middle Coffee Creek drainage.




Settling basins
Stormwater diversion
Mill Pond (R-1)
Stormwater diversion
0 0.15 0.3
Miles
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Slide 15

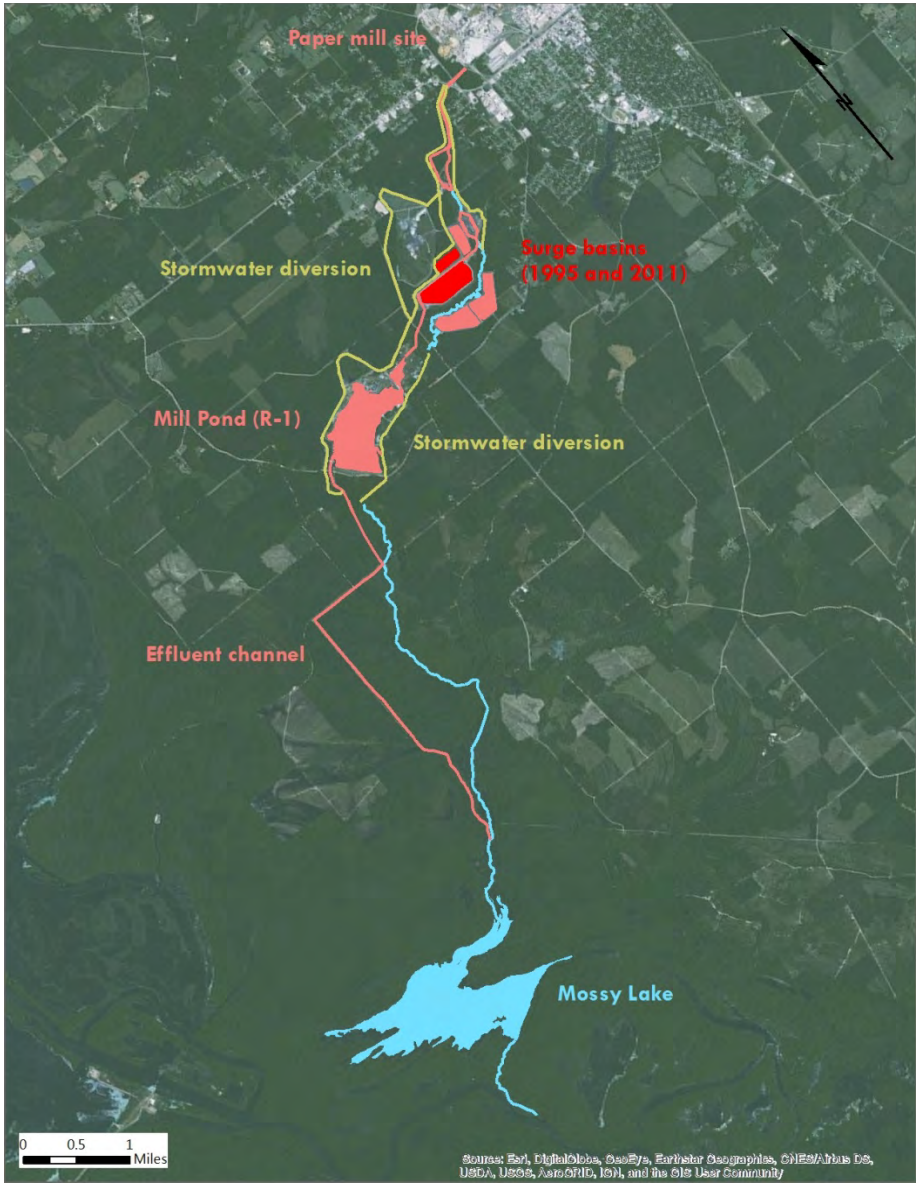
Stormwater diversion ditches constructed 1990



1995

"Storm water surge basin was constructed to manage hydraulic loading from storm water flow from the mill site. (Slide 16)
(Timeline 2016)

Map 10 on the right shows the surge basins constructed in 1996 and 2011.



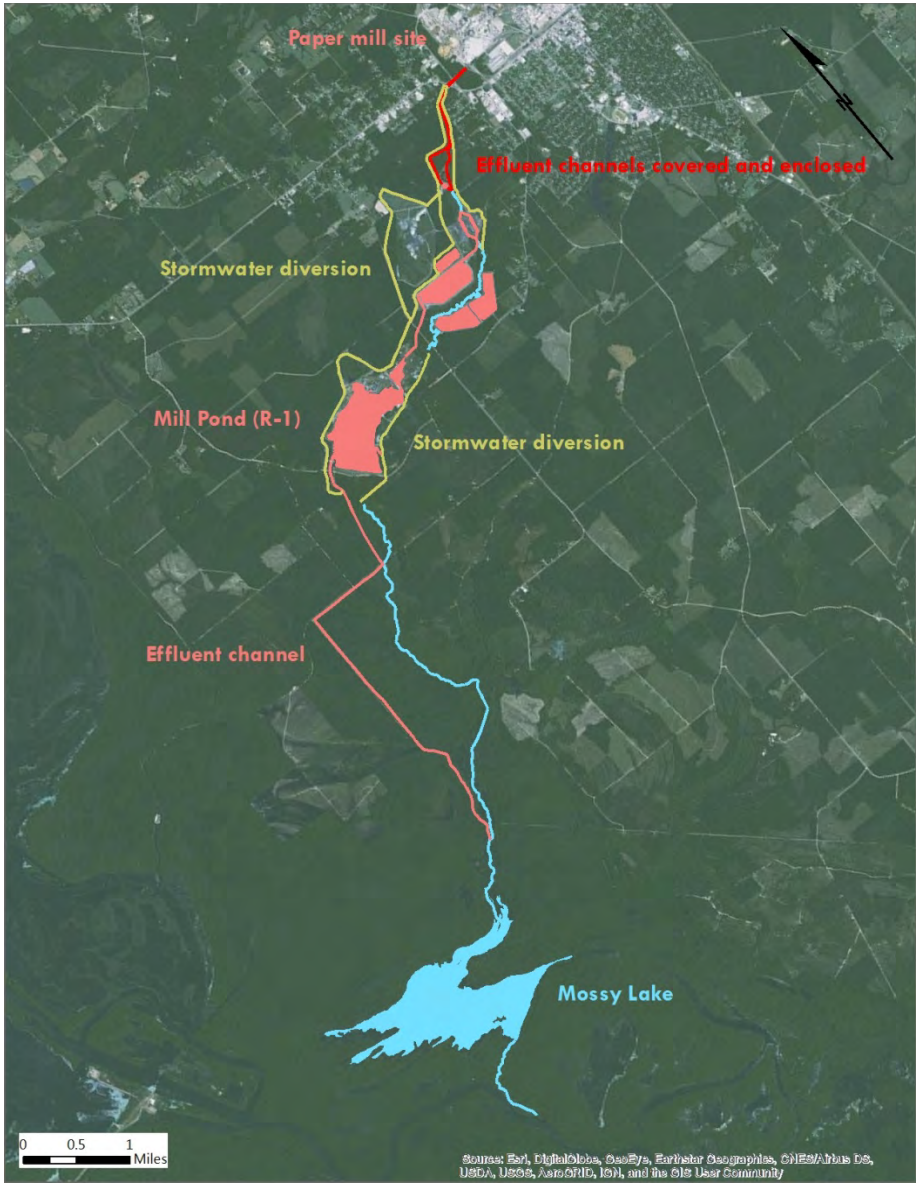
Slide 16

Surge Basin Additions

1996-97
"Sludge pond operation discontinued and sludge dewatering facility installed."
(Timeline 2016)

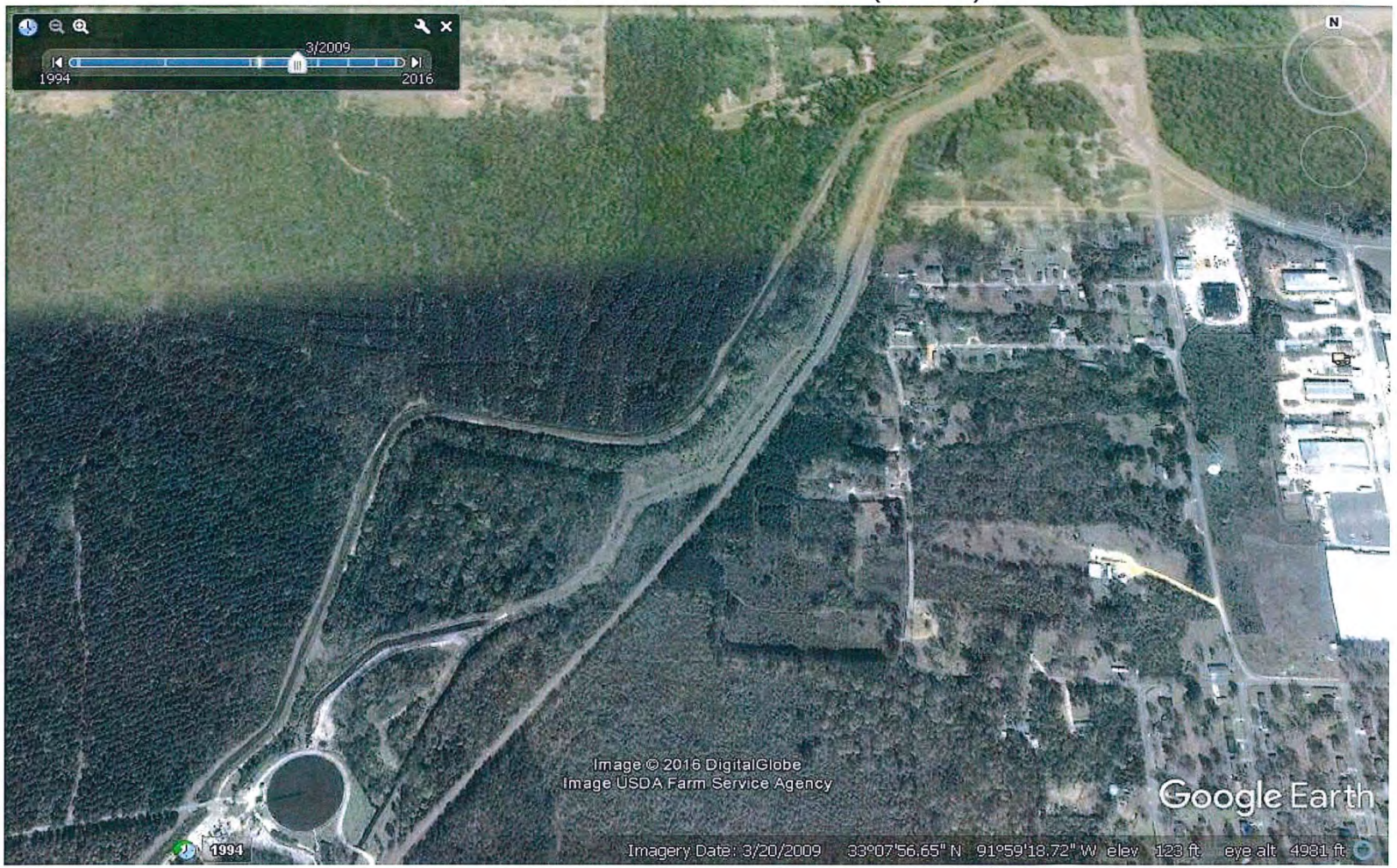
2000
"Both effluent channels leaving the mill were enclosed from Highway 82 towards the clarifier (approximately 4000 feet each). (Slide 17, 18)
(Timeline 2016)

Map 11 on the right shows the upper effluent channels that are piped and partially enclosed in 2000 and fully enclosed in 2013. At this point, presumably no natural water flow enters Mill Pond or other effluent basins.



Slide 17

Enclosed effluent channels (2000)



Slide 18

Effluent enclosure detail (2000)

2011
“Additional surge basin constructed. (Slide 16)”
(Timeline 2016)

See Map 10.

2013
“Remaining 900 feet of effluent channels upstream of the clarifier were enclosed. (Slide 19) Enclosed additional sewers on the mill site. Security enhanced around the wastewater treatment system.”
(Timeline 2016)

See Map 11.

“Georgia-Pacific's treated wastewater discharges to the upper reaches of Mossy Lake, then into Coffee Creek, then into Ouachita River in Segment 20 of the Ouachita River Basin pursuant to AR0001210”
(Timeline 2016)

Slide 19

Effluent Channels Enclosed to Clarifier (2013)