

**WHEN FLOODED**



**IMPROVEMENT OF  
RIVER SERVICES FOR OCEOLA, AR  
MISSISSIPPI COUNTY, AR  
LAUDERDALE COUNTY, TN**

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**THANK YOU FOR  
DATA AND HELP**

**US ARMY CORPS OF ENGINEERS  
MEMPHIS DISTRICT  
167 N. MAIN, B202  
MEMPHIS, TN 28103-1894**



**AERIAL VIEW OF MAJOR MISSISSIPPI RIVER  
FLOODING IN LAUDERDALE COUNTY, TENNESSEE -  
APRIL, 2008** **37 FEET ON OSCEOLA GAGE**

LAUDERDALE COUNTY, TN

PHOTO: PHIL BAKER

# AREA OF CONCERN

ARKANSAS

CARUTHERSVILLE GAGE

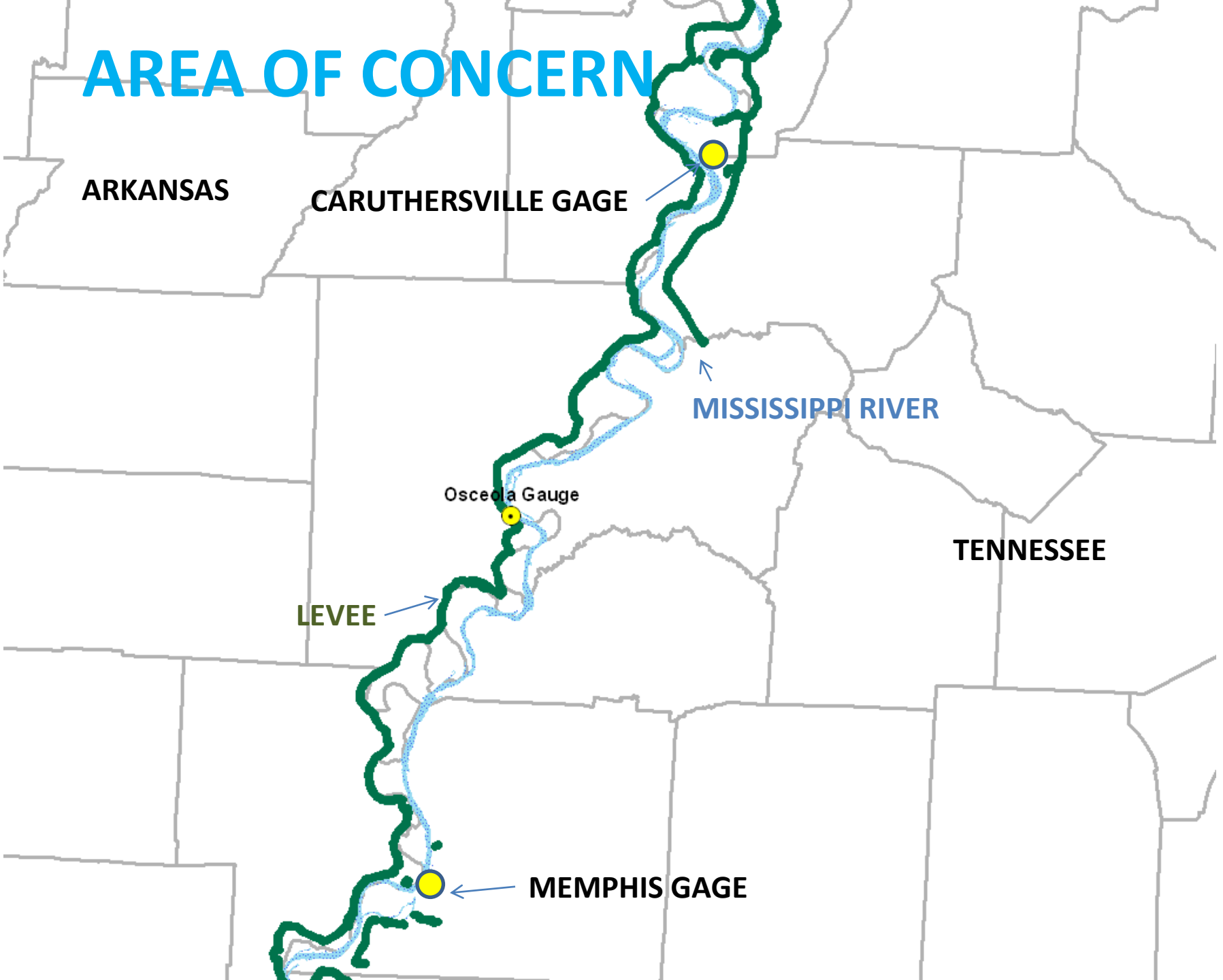
MISSISSIPPI RIVER

Osceola Gauge

TENNESSEE

LEVEE

MEMPHIS GAGE



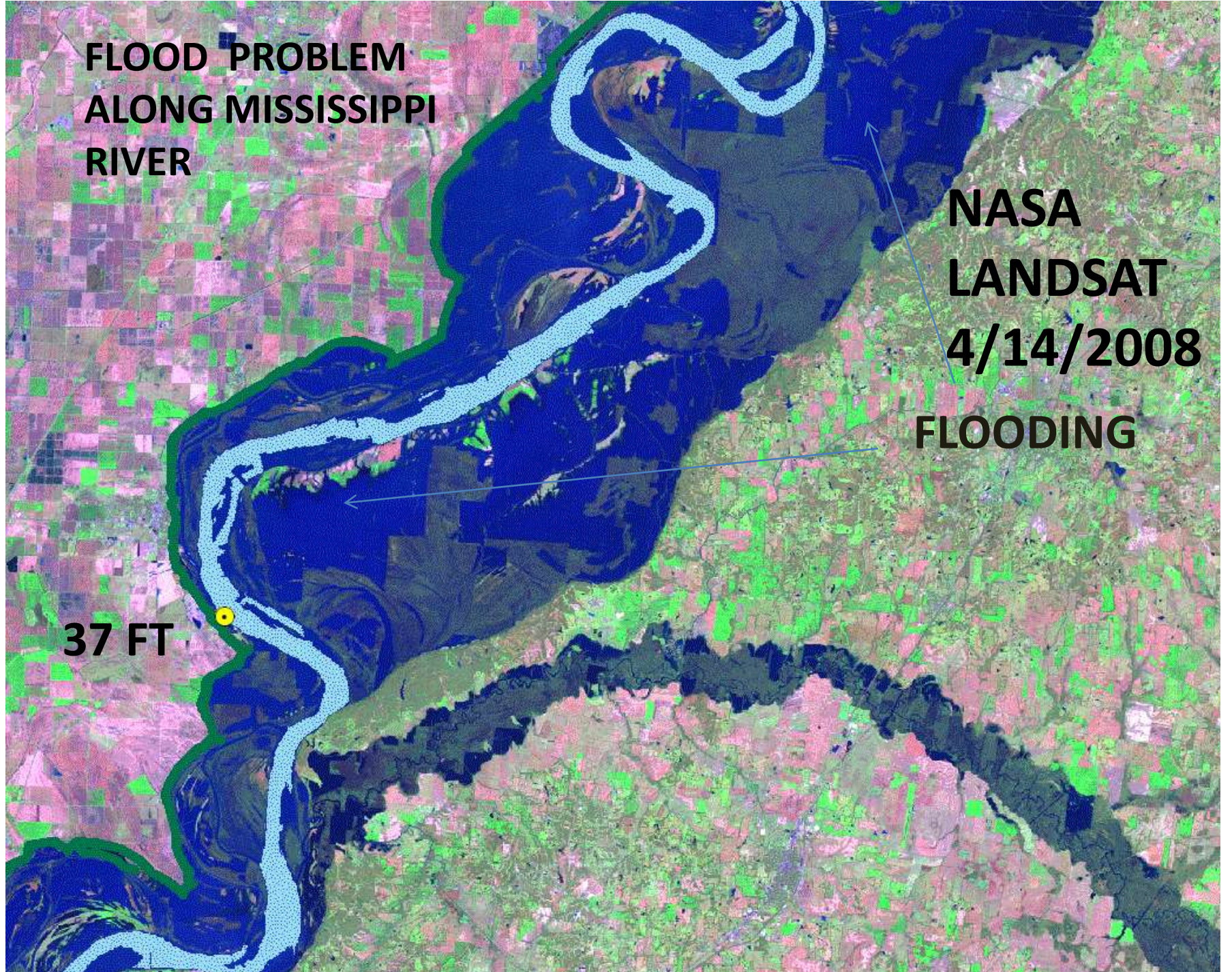


**FLOOD PROBLEM  
ALONG MISSISSIPPI  
RIVER**

**NASA  
LANDSAT  
4/14/2008**

**FLOODING**

**37 FT**





# **GOALS**

**ESTABLISH FLOOD STAGES**

**START FORECAST SERVICE**

**MAP POSSIBLE FLOODING**

# Land Use

**AGRICULTURE**

**WOODS**

Number 25, Island

Teller Island

Forked Deer Island

Lauderdale

Number Twentyseven, Island

Number 28, Island

Tow Head Island (historical)

**AGRICULTURE**

Fletcher Towhead

Ashport Towhead

**WOODS**

Number Thirty, Island

Bullerton Towhead

Osceola

Flour Island Number Thirtythree

Image USDA Farm Service Agency

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Image State of Arkansas

© 2010 Google

©2009 Google

Imagery Dates: Jan 11, 2006 - Jun 6, 2007

35°43'49.89" N 89°48'01.16" W elev. 246 ft

Eye alt 18.87 mi



# THE REACH COKER SLOUGH HUNTING CAMP

OPEN  
LAKE  
ROAD

Image State of Arkansas  
© 2010 Google

©2009 Google



# HOMES AND FARMSTEADS

TENNESSEE RT 19





# ASHPORT, TN

FARM HEADQUARTERS

FULLEN RD.

RT 19



# GOLDDUST, TN AREA

RT. 19

© 2010 Europa Technologies

Image State of Arkansas  
© 2010 Google

© 2009 Google

Imagery Date: Jan 11, 2006

35°44'04.00" N 89°50'40.29" W elev 245 ft

Eye alt 9300 ft



# KEYES POINT, TN AREA

CRUTCHER LAKE ROAD

© 2010 Europa Technologies

Image State of Arkansas

© 2010 Google

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Imagery Date: Jan 11, 2006

35°42'57.08" N 89°54'41.05" W elev 239 ft

Eye alt 8519 ft



# FT. PILLOW PARK AREA



Image State of Arkansas  
© 2010 Google

©2009 Google

Imagery Date: Jan 11, 2006

35°38'57.22" N 89°49'39.72" W elev 252 ft

Eye alt 6589 ft



# OSCEOLA RIVER GAUGE LOCATION

**BUNGE GRAIN TERMINAL**

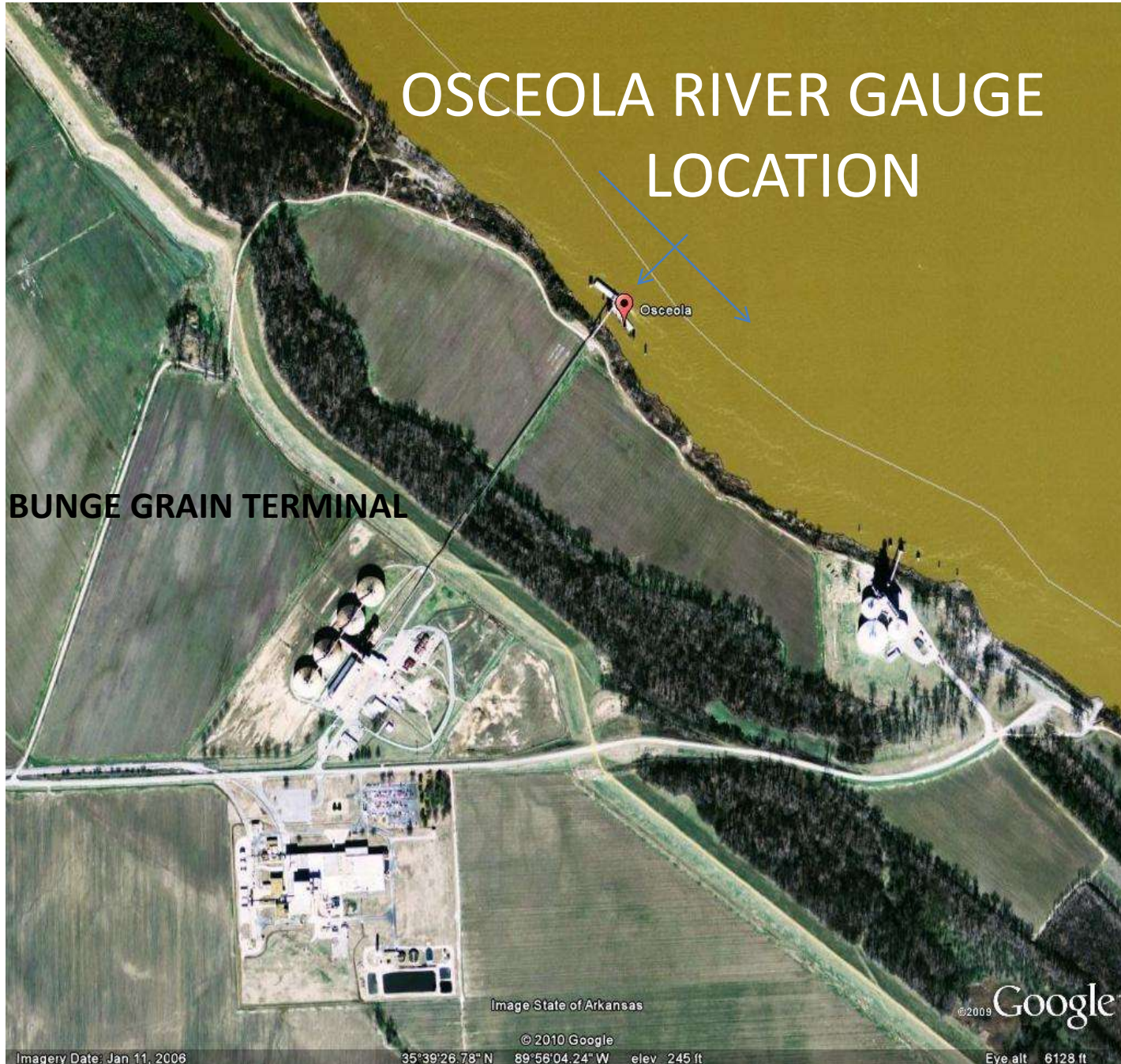


Image State of Arkansas

© 2010 Google

Imagery Date: Jan 11, 2006

35°39'26.78" N 89°56'04.24" W elev 245 ft

©2009 Google

Eye alt 6128 ft



# CORPS GAGE ON BUNGE GRAIN LOADING DOCK



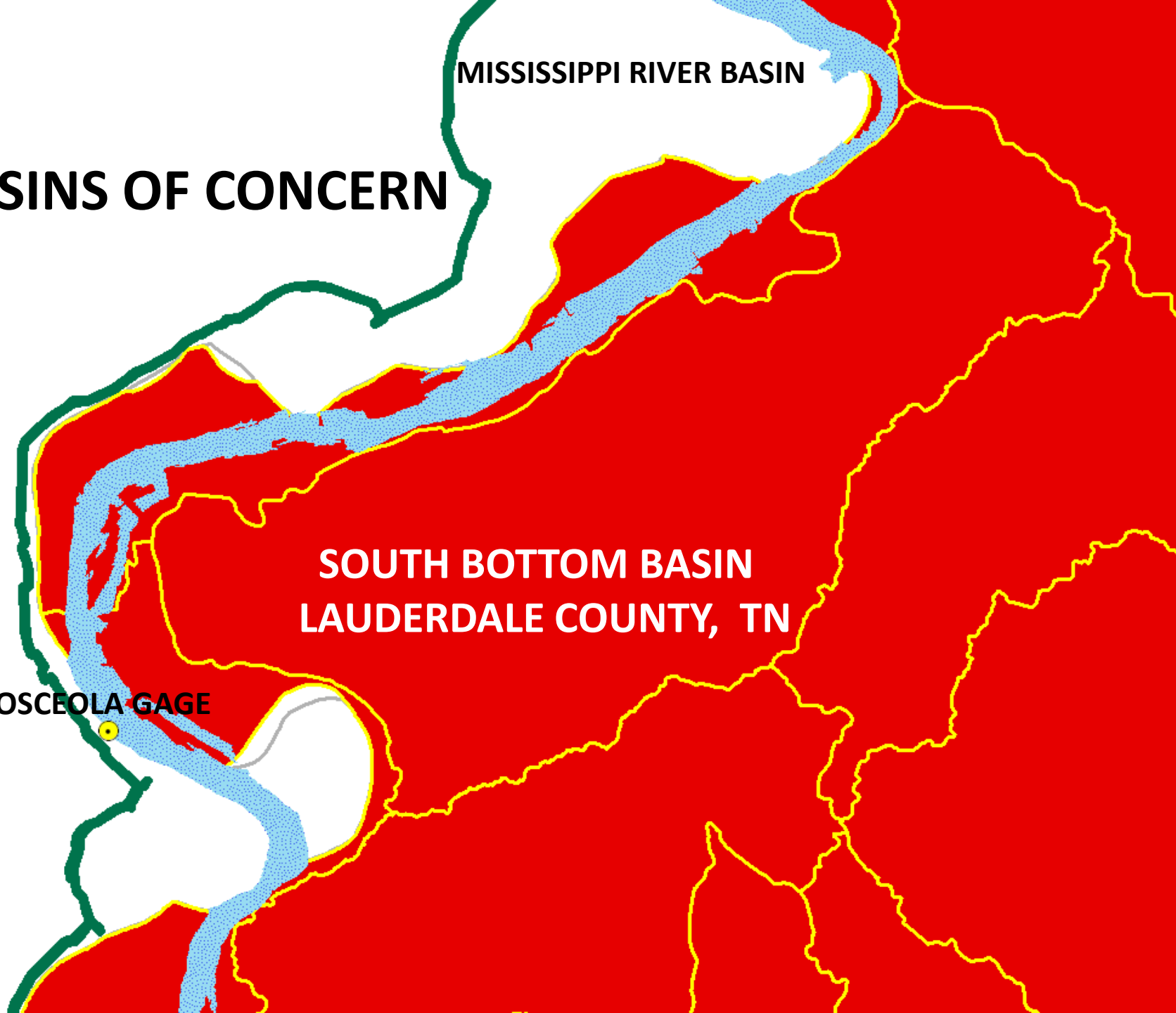


# BASINS OF CONCERN

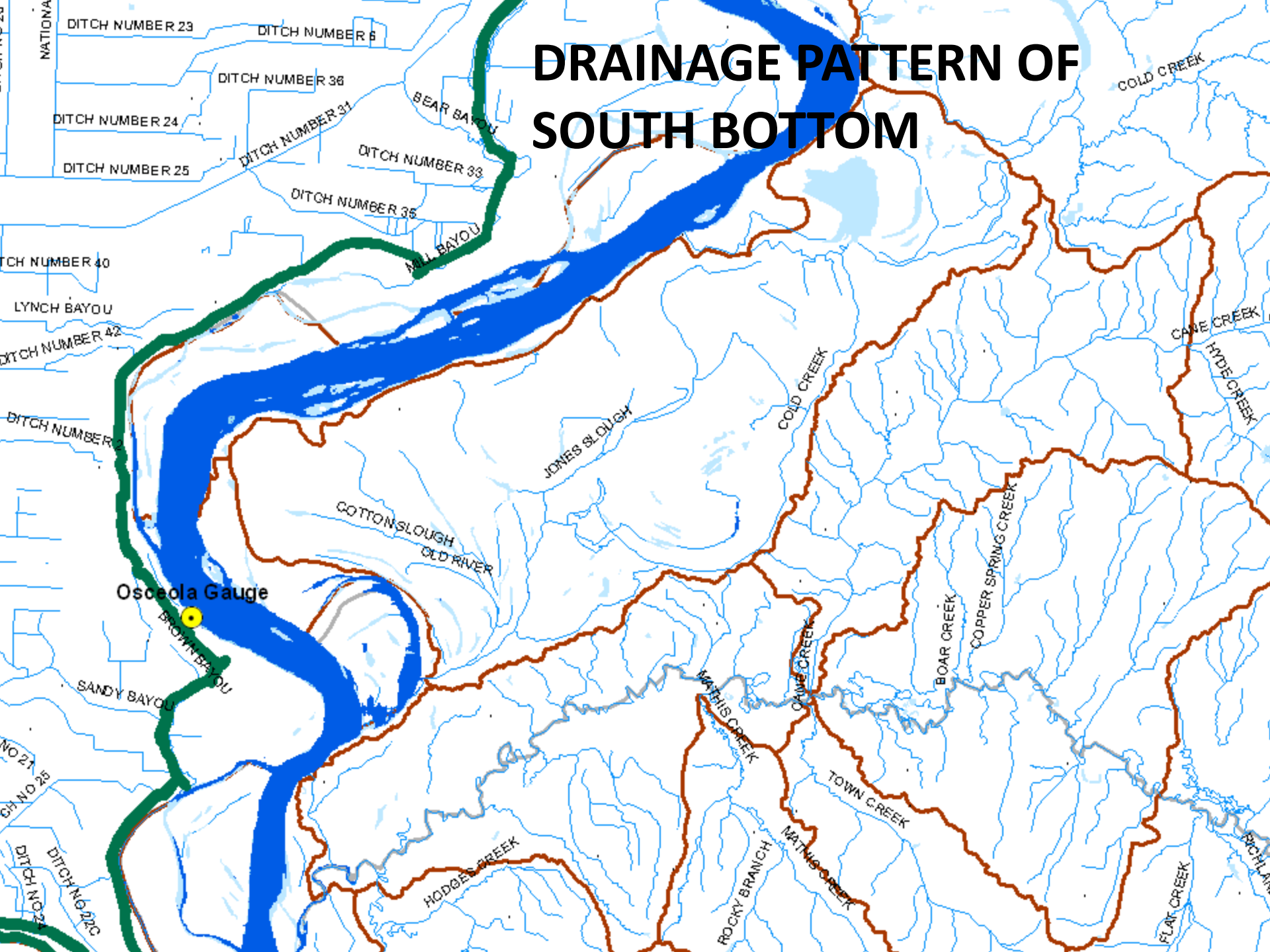
MISSISSIPPI RIVER BASIN

SOUTH BOTTOM BASIN  
LAUDERDALE COUNTY, TN

OSCEOLA GAGE



# DRAINAGE PATTERN OF SOUTH BOTTOM



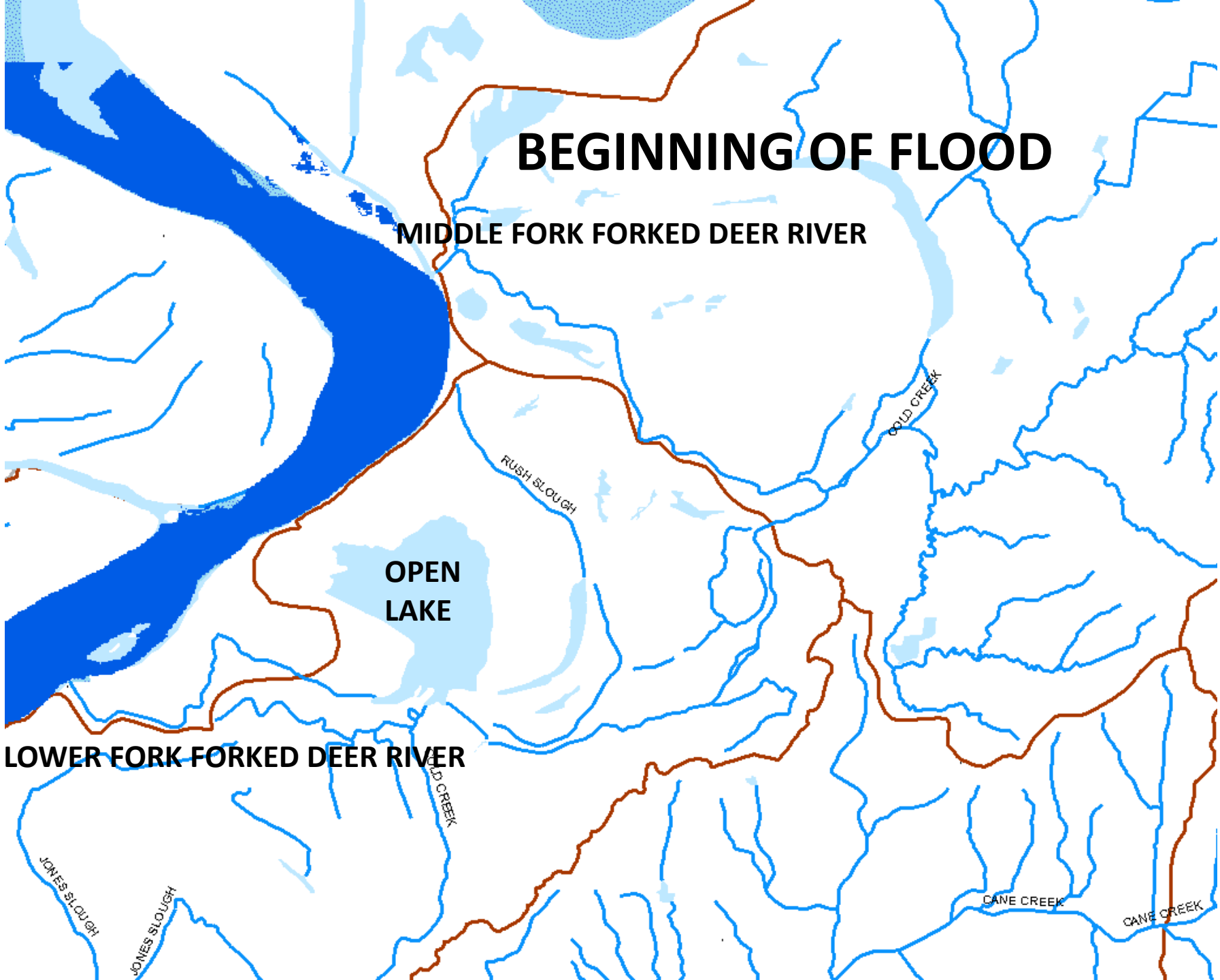


# BEGINNING OF FLOOD

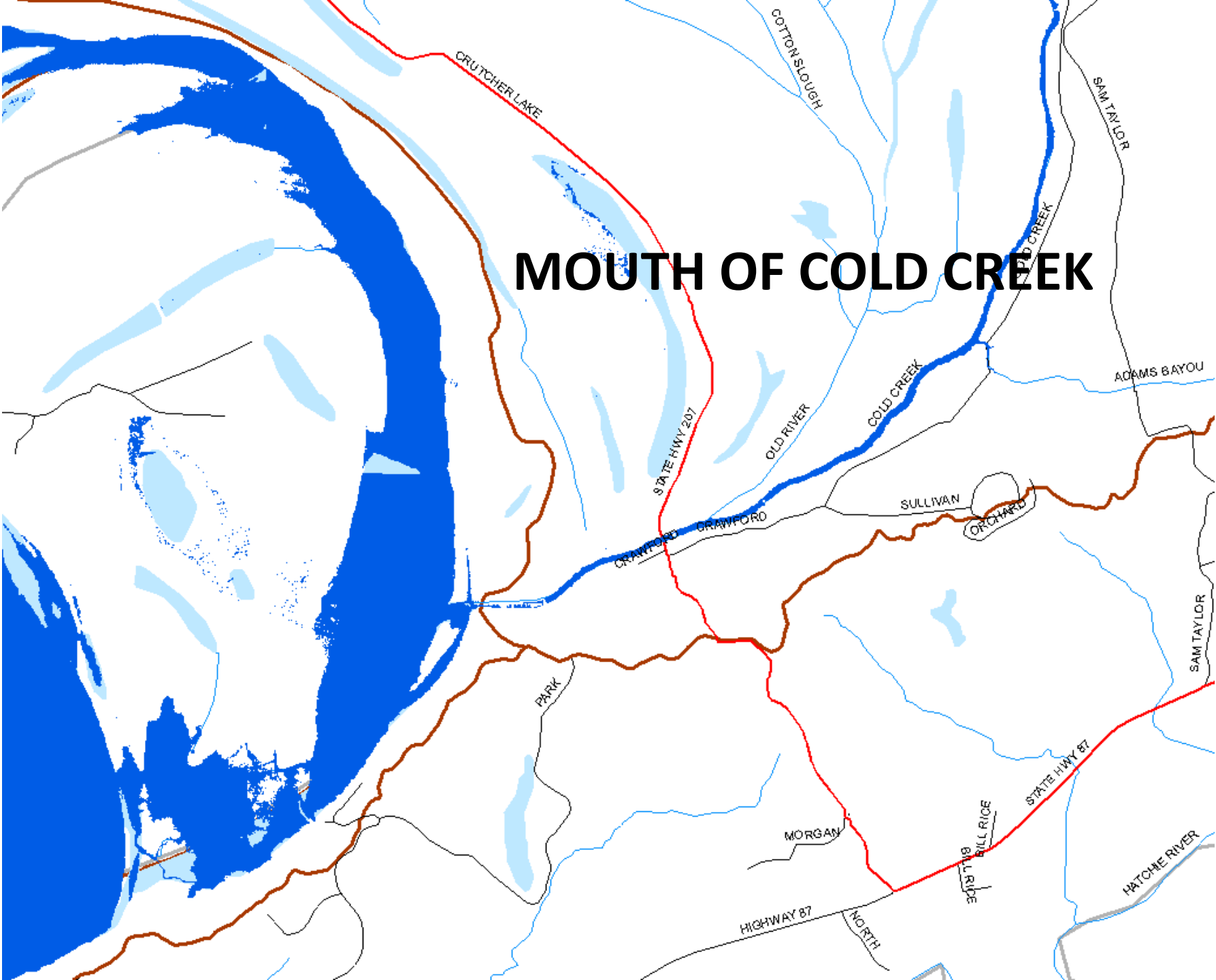
MIDDLE FORK FORKED DEER RIVER

OPEN  
LAKE

LOWER FORK FORKED DEER RIVER



# MOUTH OF COLD CREEK

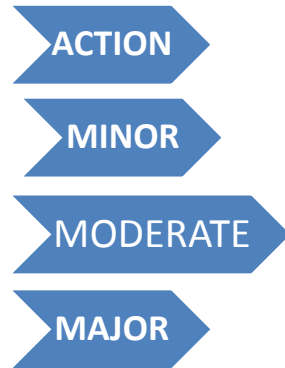




A map showing a network of waterways. A large blue area on the left represents a bay or estuary. Several blue lines represent rivers and sloughs, including Cotton Slough, Jones Slough, Old River, Adams Bayou, and Cold Creek. A brown line follows the coast. The Mississippi River is partially visible at the bottom. A text overlay in the lower right quadrant reads: "COLD CREEK IS SWELLING AT IT'S MOUTH WHEN THE MISSISSIPPE RIVER IS AT 15 FEET ON THE OSCEOLA GAGE".

**COLD CREEK IS SWELLING AT  
IT'S MOUTH WHEN THE  
MISSISSIPPE RIVER IS AT 15  
FEET ON THE OSCEOLA GAGE**

# DETERMINE STAGES

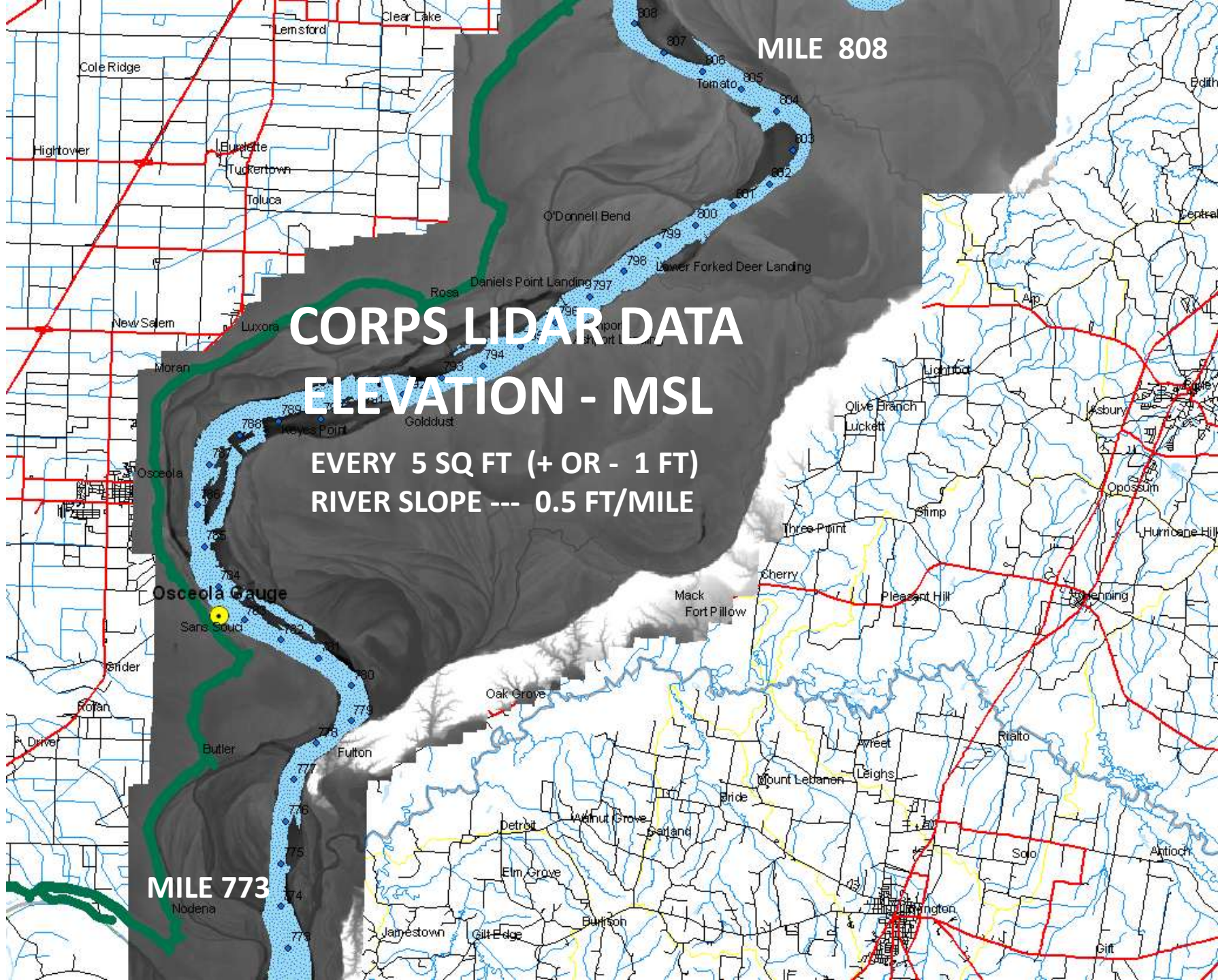




# **NWS MINOR FLOOD STAGE**

**NWSM 10-950**

**MINIMAL OR NO PROPERTY DAMAGE,  
BUT POSSIBLY SOME PUBLIC THREAT.**



MILE 808

# CORPS LIDAR DATA ELEVATION - MSL

EVERY 5 SQ FT (+ OR - 1 FT)  
RIVER SLOPE --- 0.5 FT/MILE

MILE 773



**CORPS**

**LIDAR CALIBRATION**

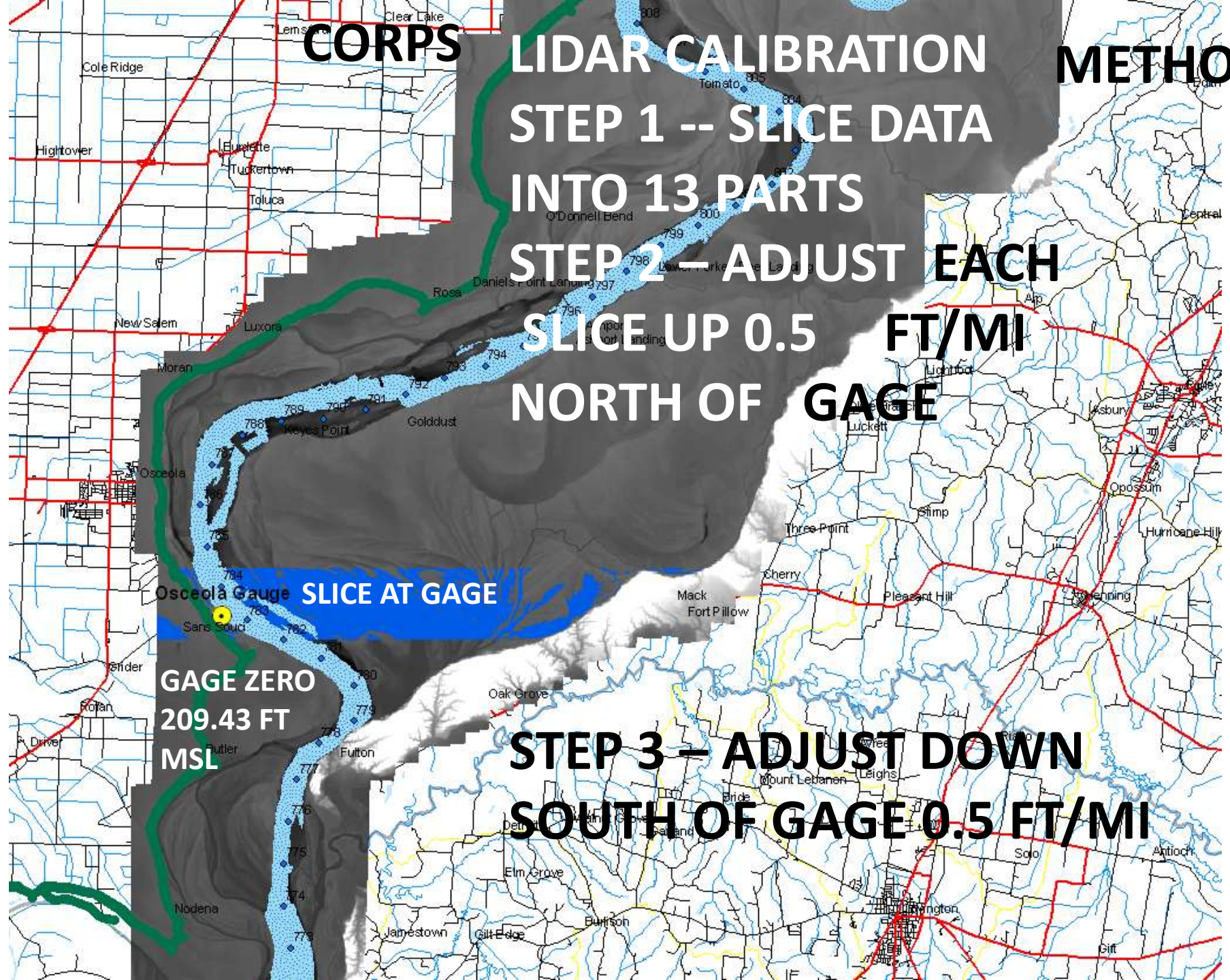
**METHOD**

**STEP 1 -- SLICE DATA  
INTO 13 PARTS**

**STEP 2 -- ADJUST EACH  
SLICE UP 0.5 FT/MI  
NORTH OF GAGE**

**Osceola Gauge SLICE AT GAGE**  
**GAGE ZERO  
209.43 FT  
MSL**

**STEP 3 -- ADJUST DOWN  
SOUTH OF GAGE 0.5 FT/MI**





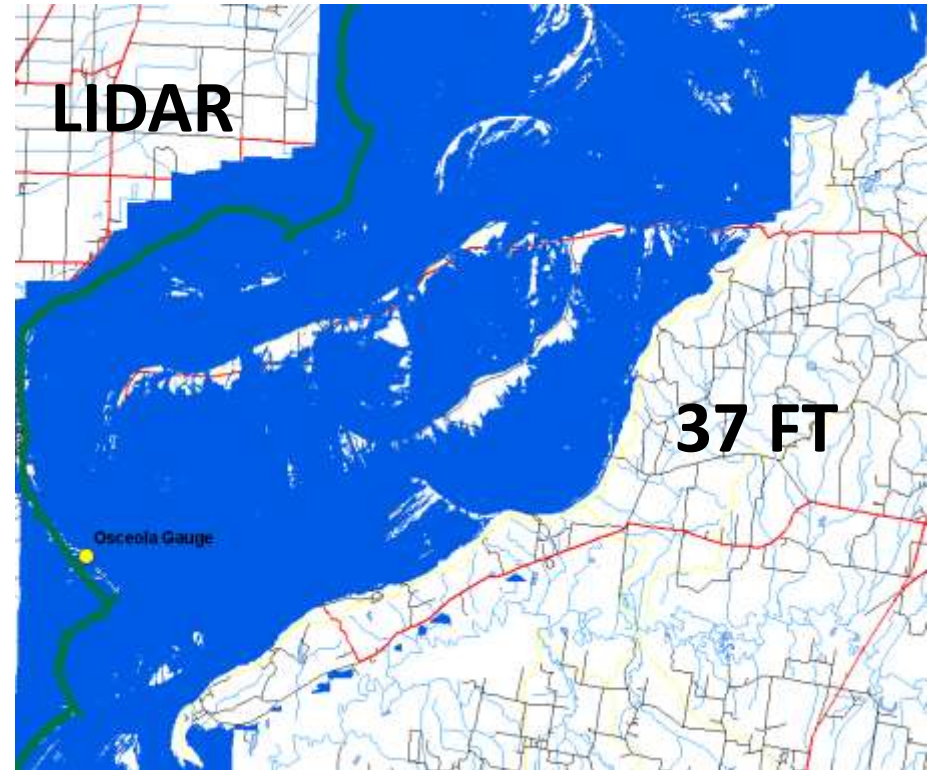
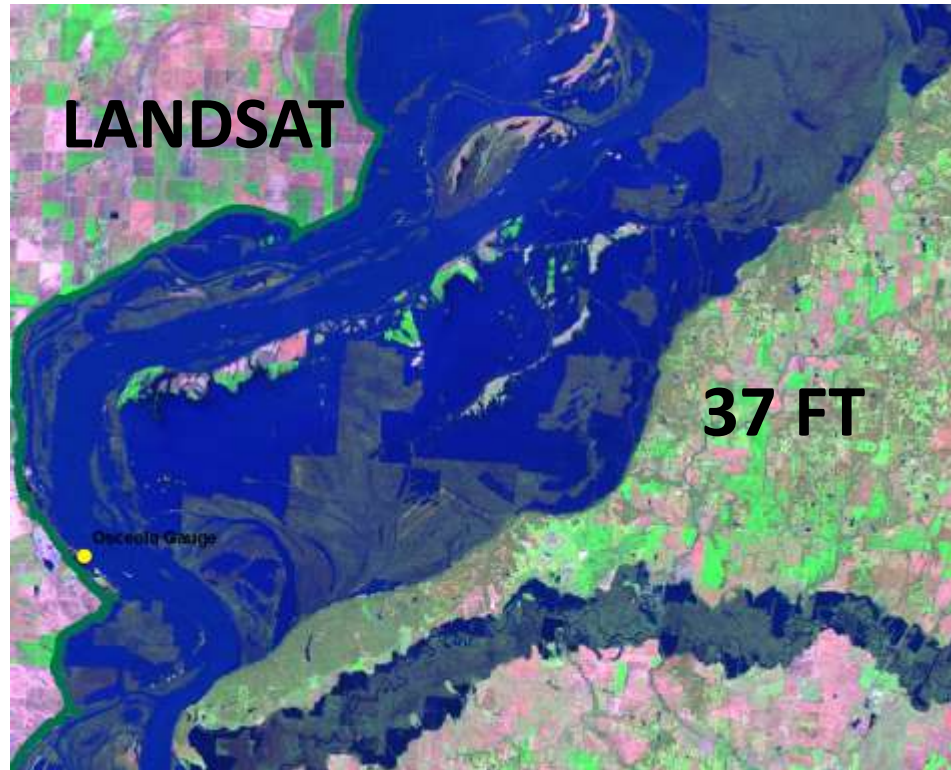
**CALIBRATION OF  
LIDAR DATA  
STEP 4 – ADJUST TO  
LANDSAT PICTURE  
(37 FEET)**

Osceola Gauge

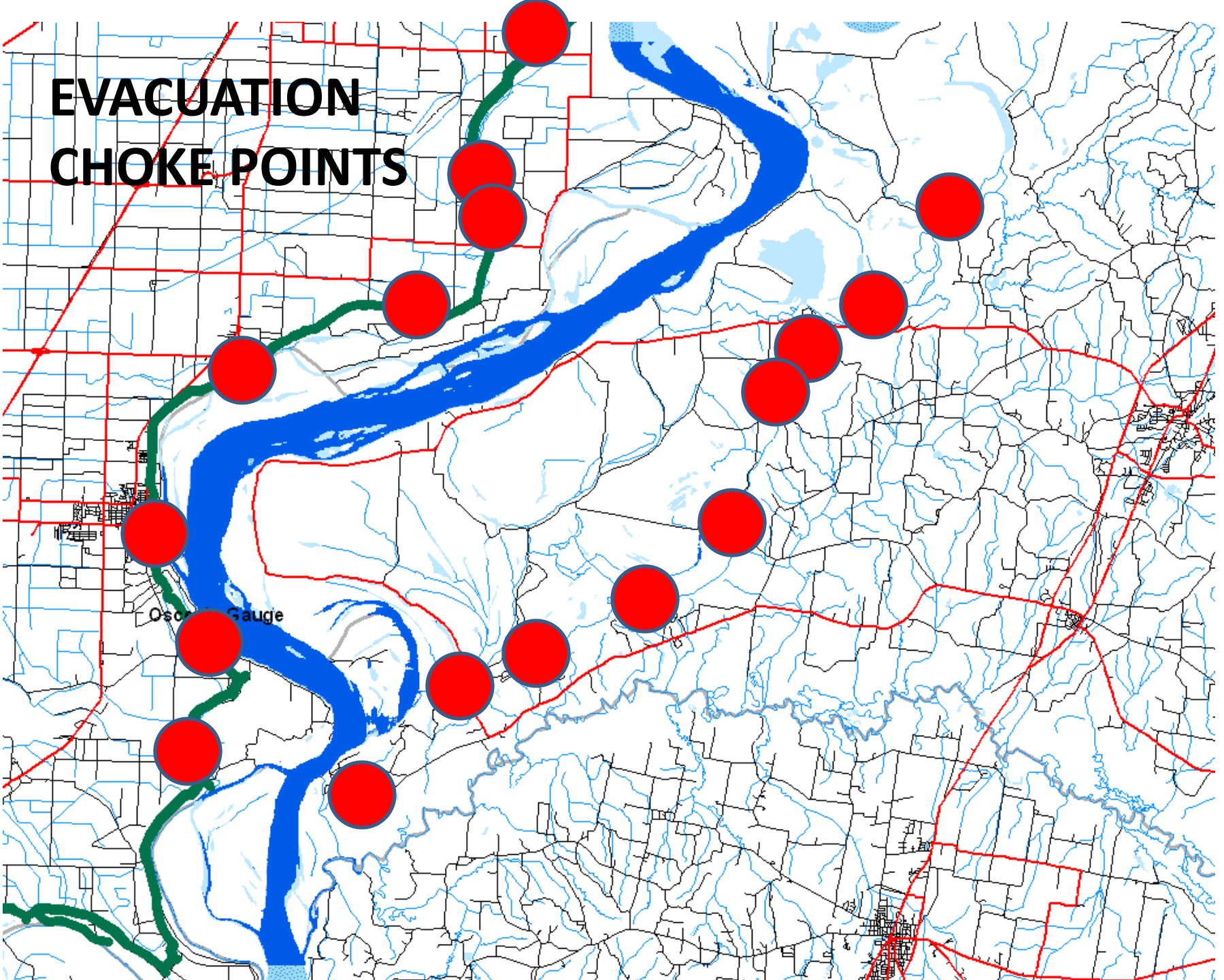




# CALIBRATE LIDAR TO LANDSAT

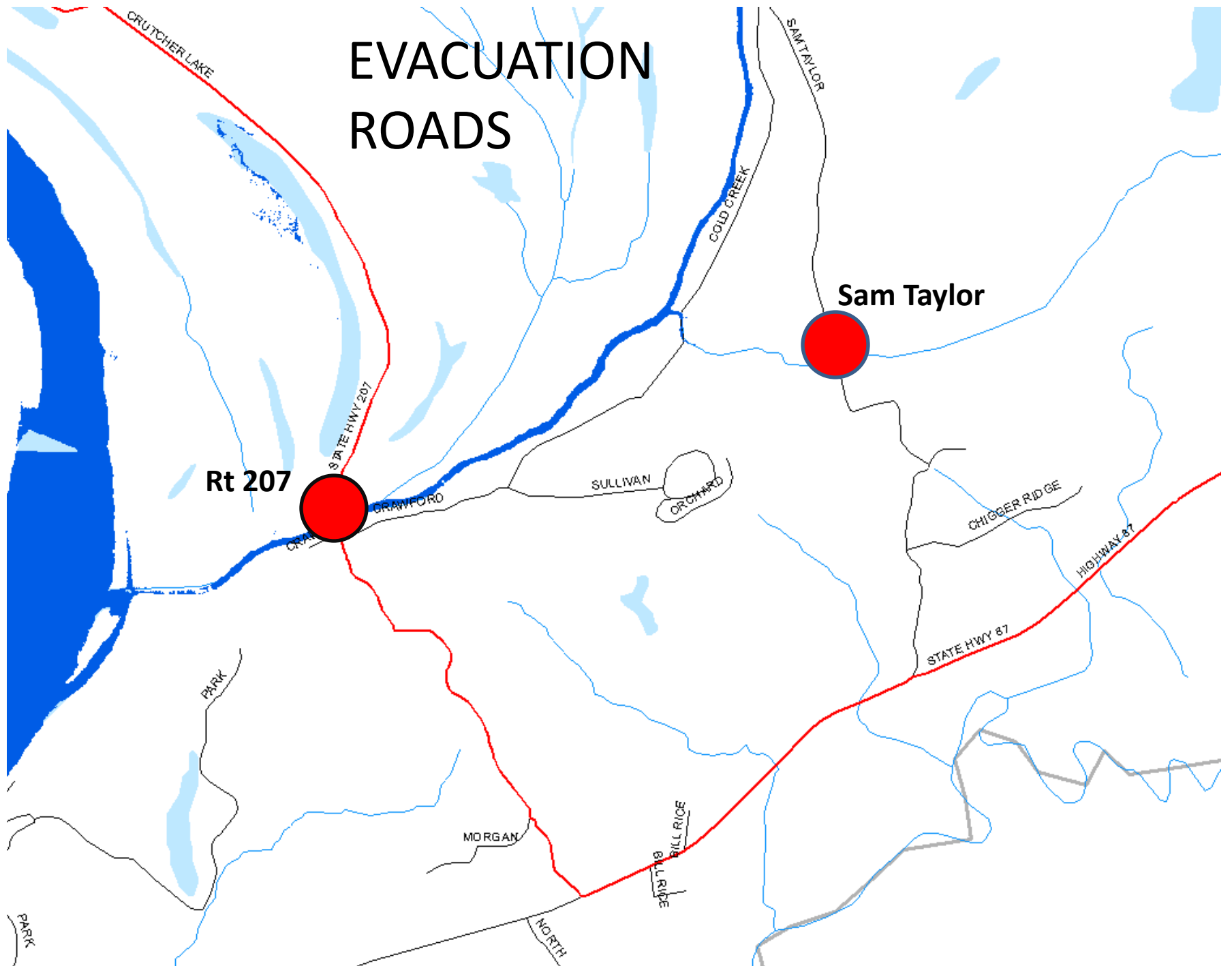


# EVACUATION CHOKE POINTS





# EVACUATION ROADS



# EVACUATION ROADS

LONG HOLE ROAD

SUNK LAKE ROAD

JIM FULLEN

T ROSSIGER

CONNEL

LONG HOLE

JACK RABBIT

POLLY WALKER

L JOHNSON

NOAH

SUNK LAKE

SAND FORD

LIGHT FOOT LUCKETT

HIGHWAY 87

SUNK LAKE



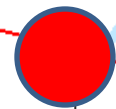
**OPEN LAKE**

**EVACUATION ROADS**

NIX

OPEN LAKE

STATE HWY 19



**HIGHWAY 19**

HIGHWAY 19

CONNOR

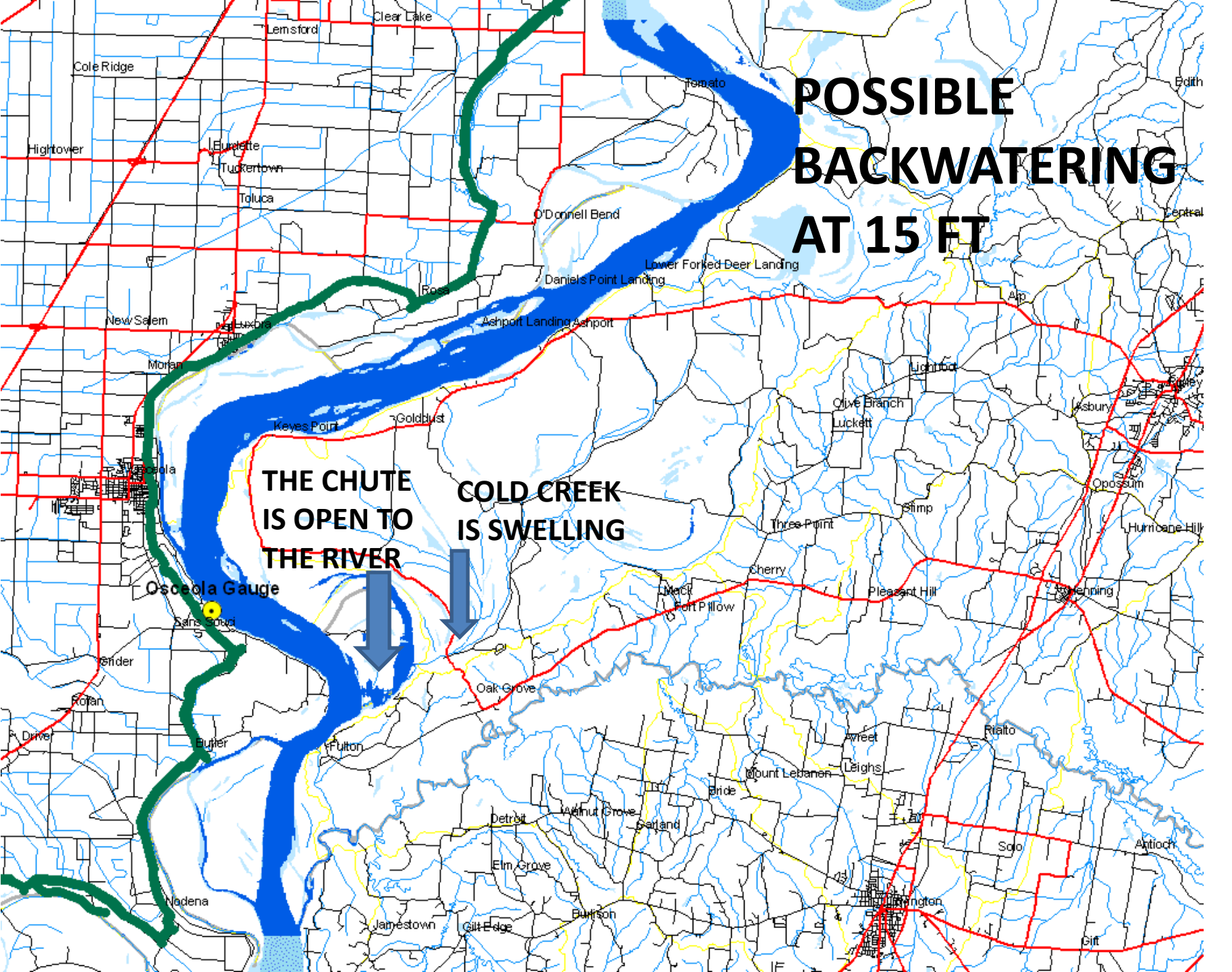
SNYDER BLUFF

**SNYDER BLUFF RD**

# POSSIBLE BACKWATERING AT 15 FT

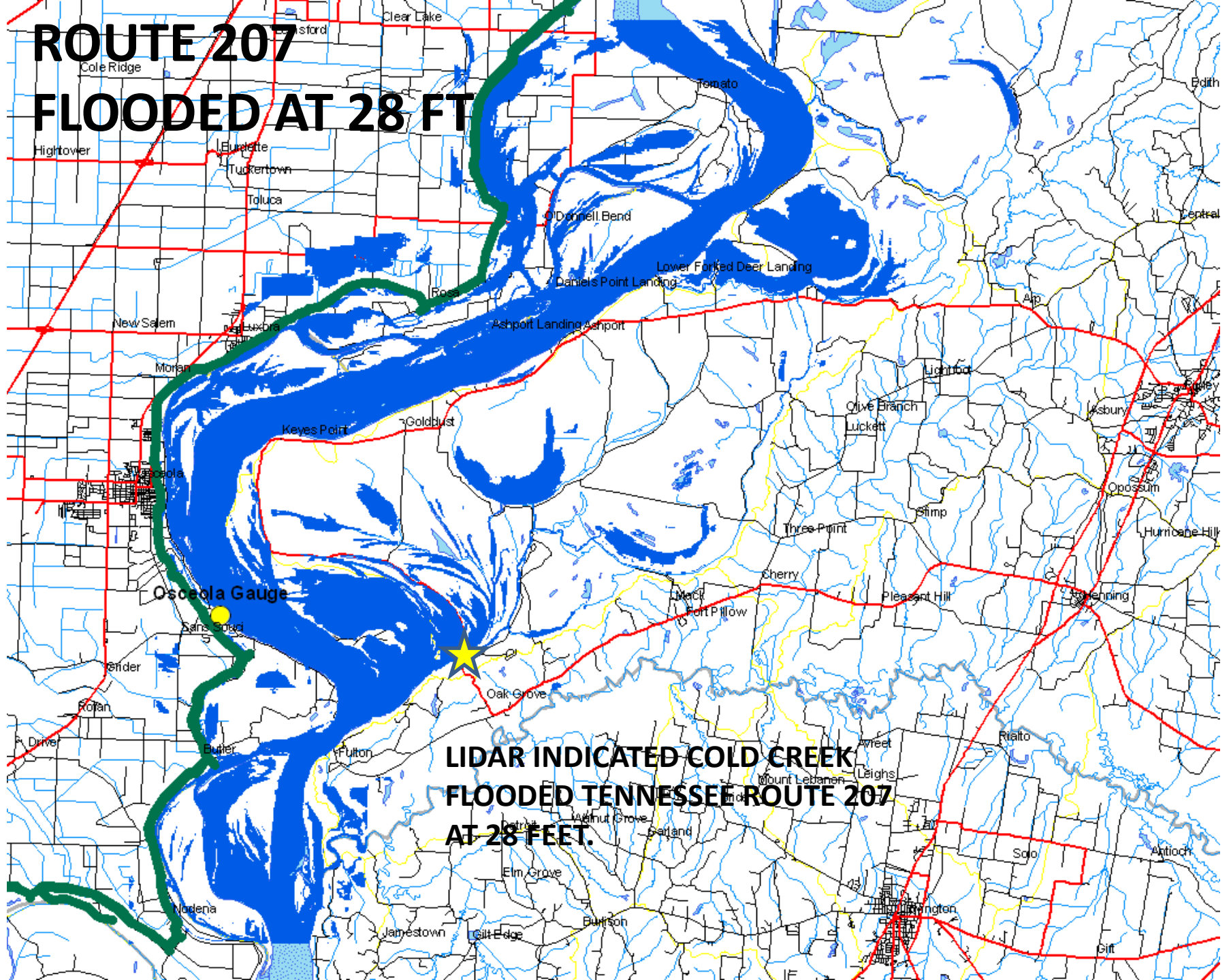
THE CHUTE  
IS OPEN TO  
THE RIVER

COLD CREEK  
IS SWELLING





# ROUTE 207 FLOODED AT 28 FT



**LIDAR INDICATED COLD CREEK  
FLOODED TENNESSEE ROUTE 207  
AT 28 FEET.**

# FIRST MAJOR EVACUATION ROAD TO FLOOD - TN ROUTE 207 AT 28 FEET JUST NORTH OF COLD CREEK AT FORT PILLOW

FLOODING  
HERE

CRAWFORD ROAD EAST

ROUTE 207

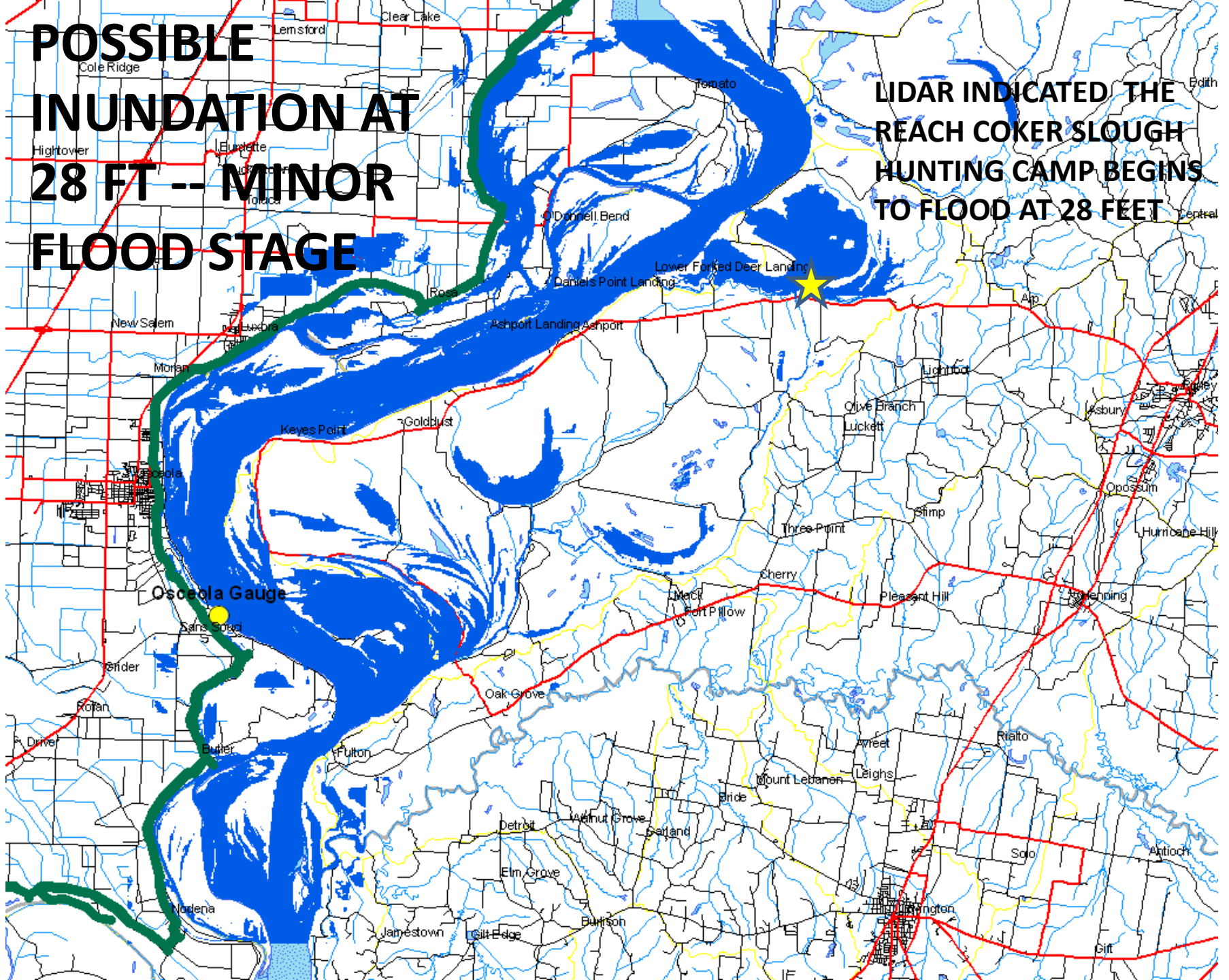
FT PILLOW AREA





**POSSIBLE  
INUNDATION AT  
28 FT -- MINOR  
FLOOD STAGE**

**LIDAR INDICATED THE  
REACH COKER SLOUGH  
HUNTING CAMP BEGINS  
TO FLOOD AT 28 FEET**

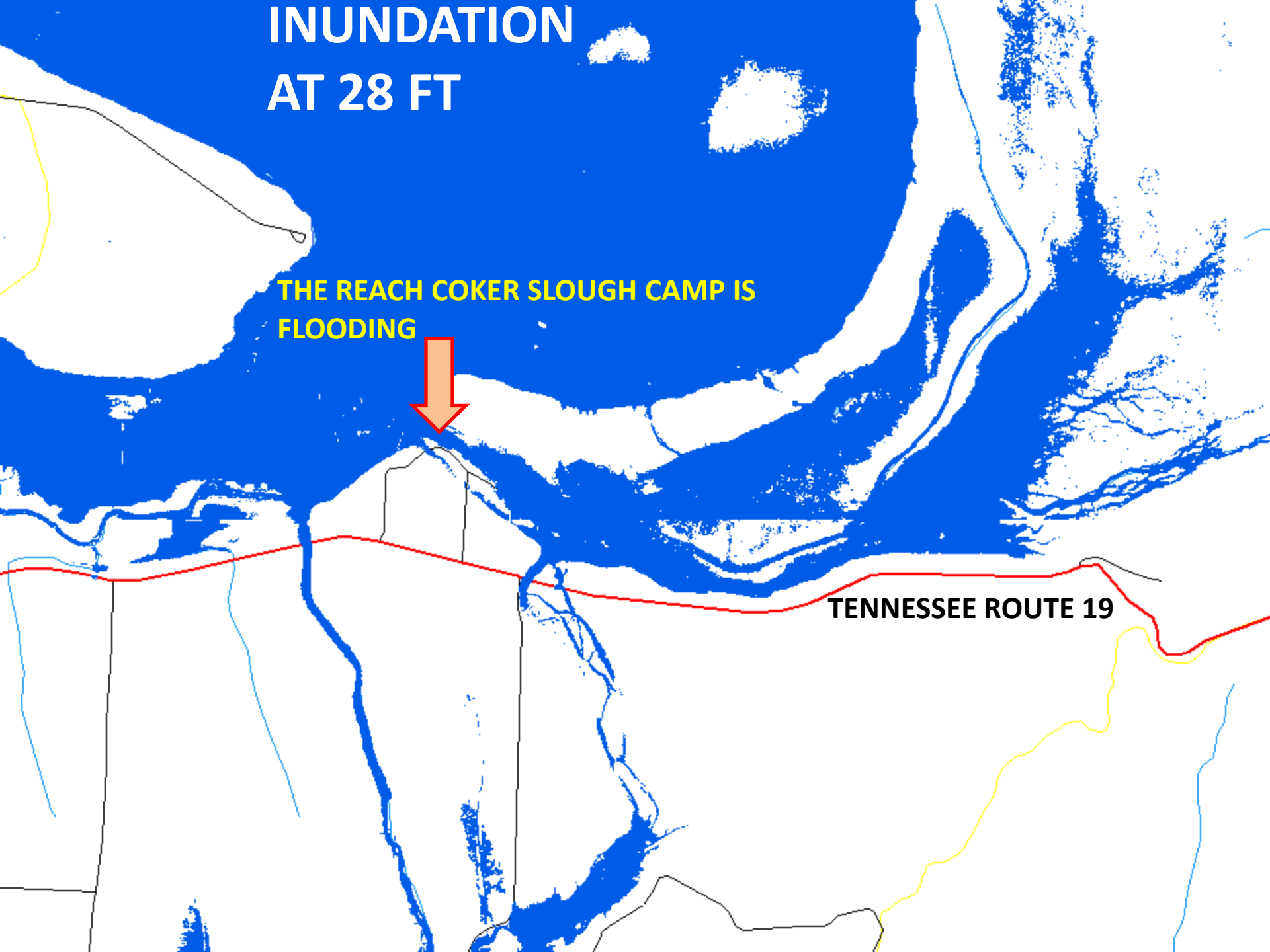


# INUNDATION AT 28 FT

THE REACH COKER SLOUGH CAMP IS  
FLOODING



TENNESSEE ROUTE 19





**LIDAR DATA ANALYSIS**

**IMPLIED THE FLOOD STAGE**

**SHOULD BE SET TO???**

**28 FEET !!!!!**



**RECOMMENDATION !!!**  
**MINOR FLOOD STAGE =**  
**28 FT**

**WHAT ABOUT ACTION STAGE???**

**IT IS LOWER THAN MINOR FLOOD**

**IT'S THE STAGE WHERE RESIDENTS  
NEED TO TAKE APPROPRIATE ACTION  
TO AVOID THE FLOOD.**

**AT LEAST A DAY IS NEEDED TO MOVE  
OUT PEOPLE AND PROPERTY**

## **ACTION STAGE**

**A BIG RISE OR FALL IN THE  
MISSISSIPPI RIVER FOR ONE DAY  
IS 4 FEET. THUS...**

**ACTION STAGE=MINOR STAGE – 4 FT  
OR**

**24 FEET**

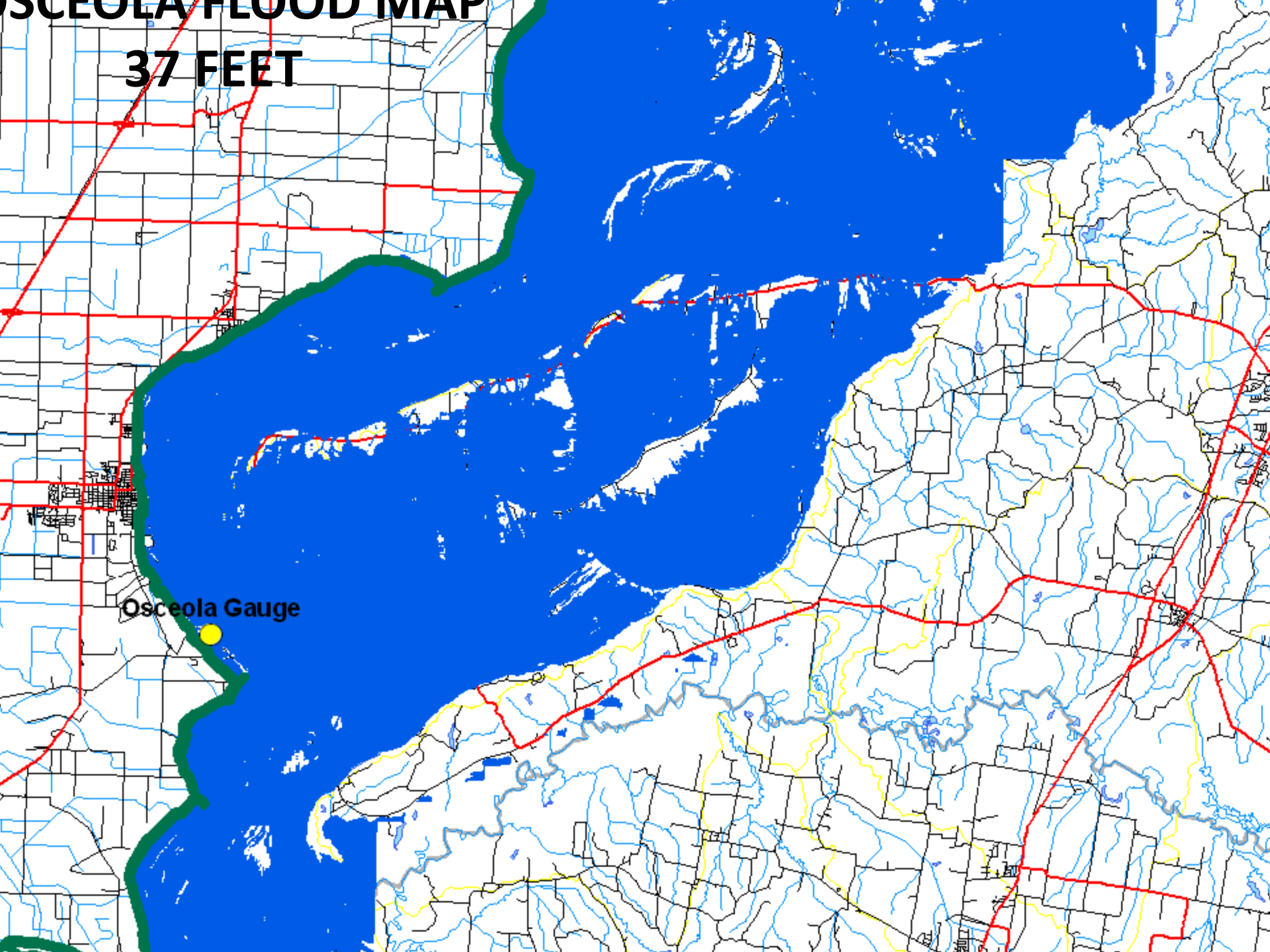


# **MAJOR**

**FLOOD STAGE**

# OSCEOLA FLOOD MAP

37 FEET



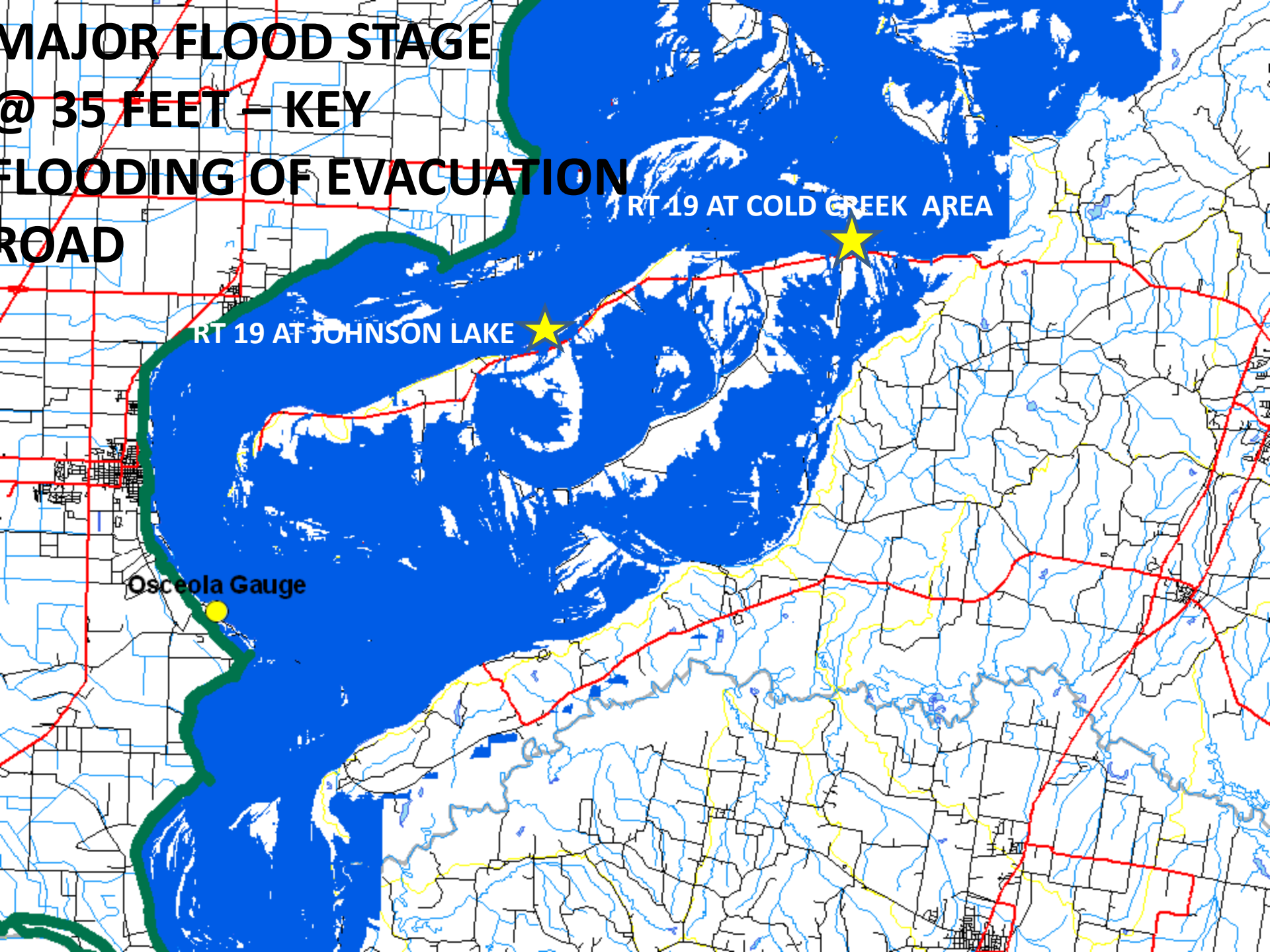
Osceola Gauge

**MAJOR FLOOD STAGE  
@ 35 FEET – KEY  
FLOODING OF EVACUATION  
ROAD**

RT 19 AT COLD CREEK AREA

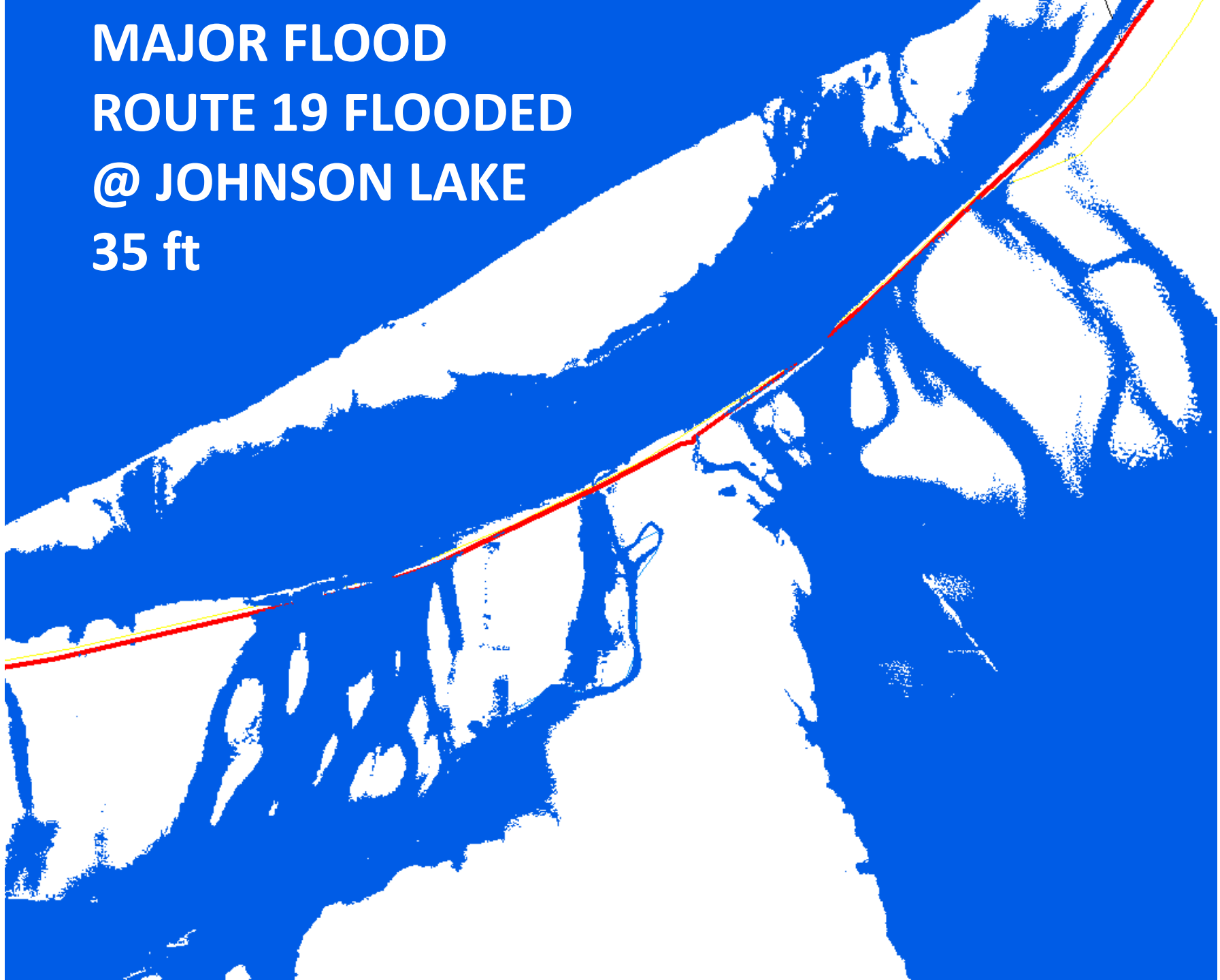
RT 19 AT JOHNSON LAKE

Osceola Gauge





**MAJOR FLOOD  
ROUTE 19 FLOODED  
@ JOHNSON LAKE  
35 ft**



Tow Head Island (historical)

# FLOOD MARKS NEAR JOHNSON LAKE

Ashport Towhead

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© 2010 Europa Technologies  
Image State of Arkansas

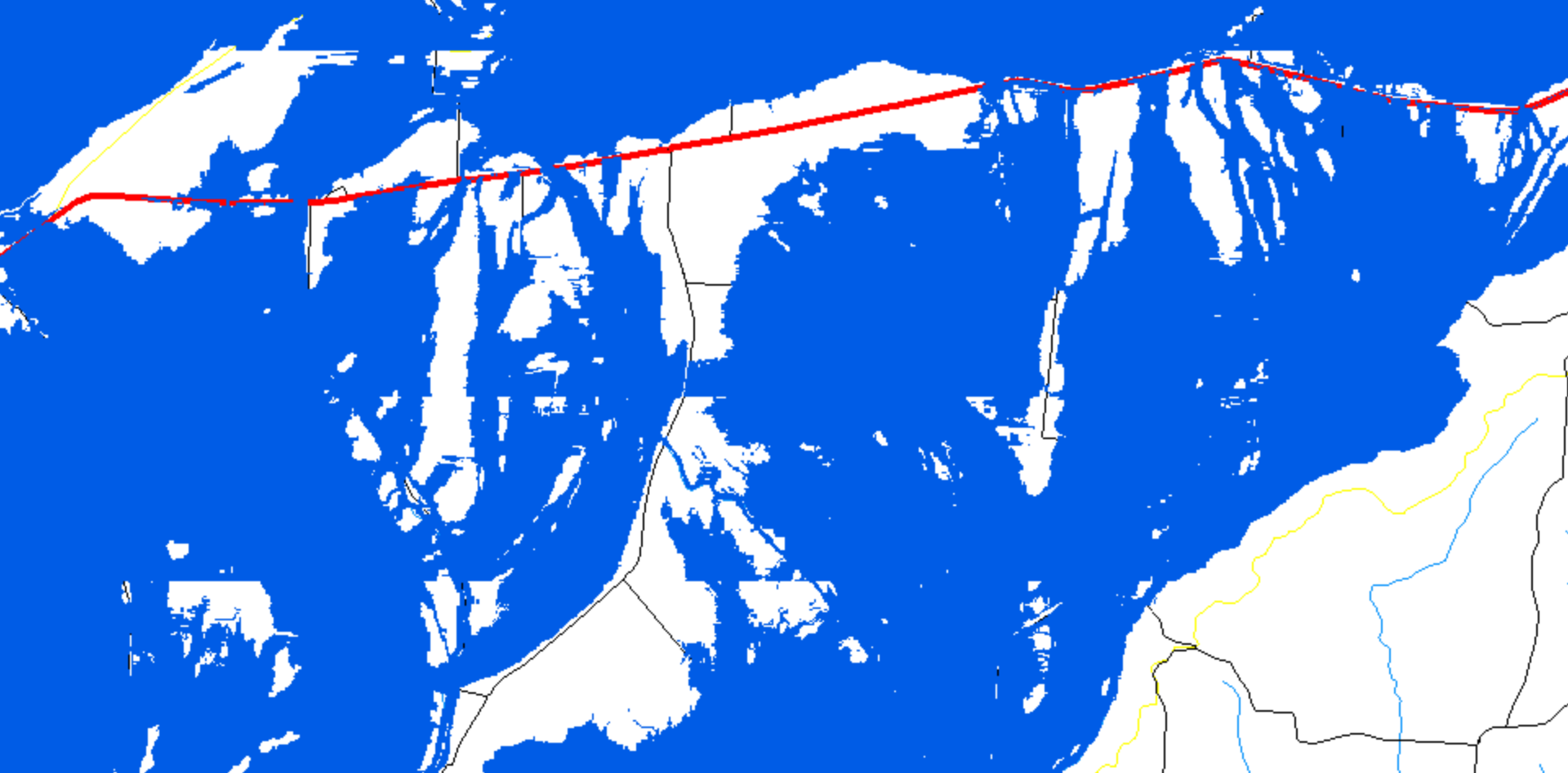
©2009 Google

Imagery Date: Jan 11, 2006

35°44'42.58" N 89°48'39.33" W elev 234 ft

Eye alt 11964 ft

# MAJOR FLOODING ALONG ROUTE 19 AT 35 FT





**MODERATE FLOOD ???**

# **MODERATE FLOOD SET AT 31 FEET**

**OUT-OF-BOUNDS ROAD CLOSED**

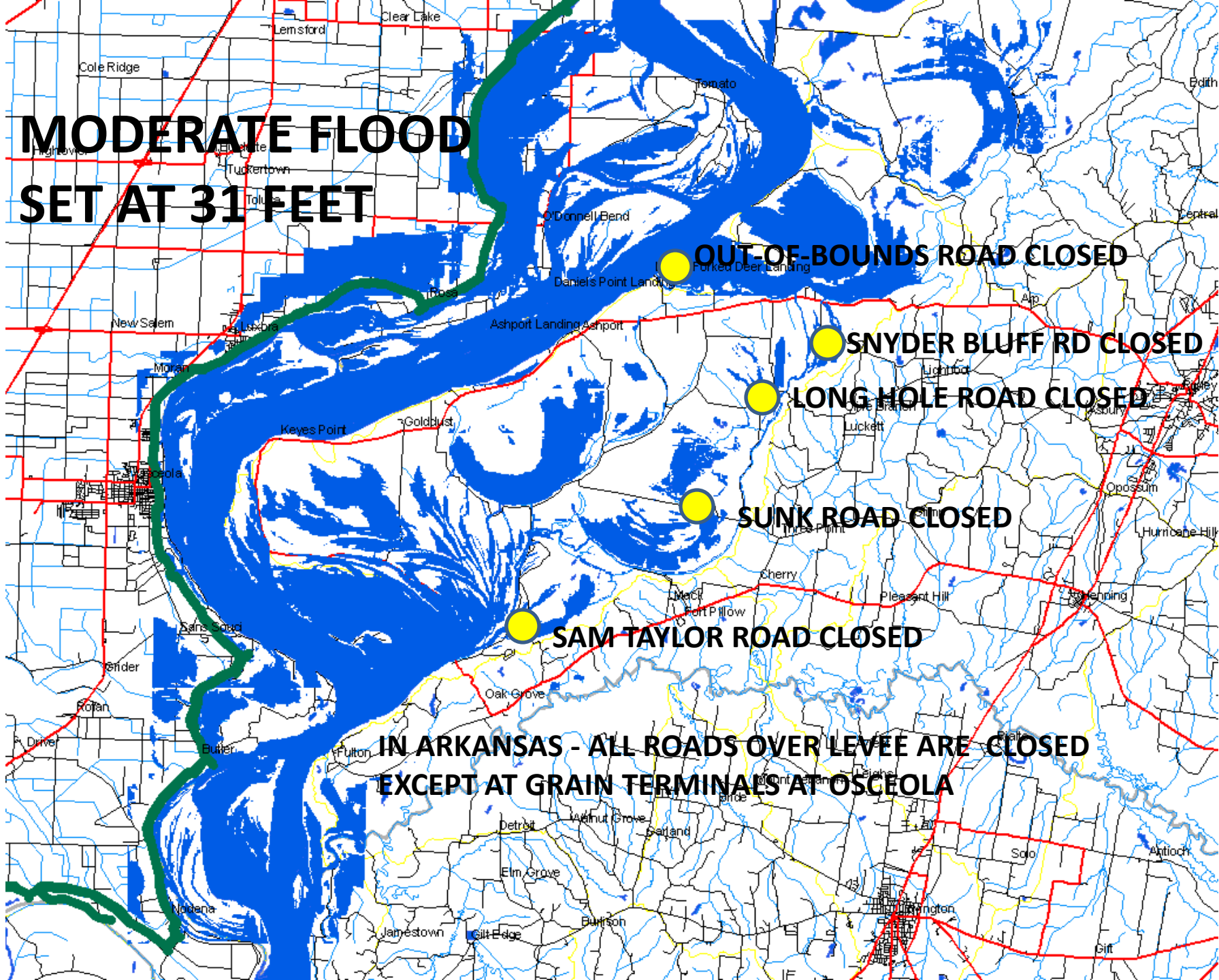
**SNYDER BLUFF RD CLOSED**

**LONG HOLE ROAD CLOSED**

**SUNK ROAD CLOSED**

**SAM TAYLOR ROAD CLOSED**

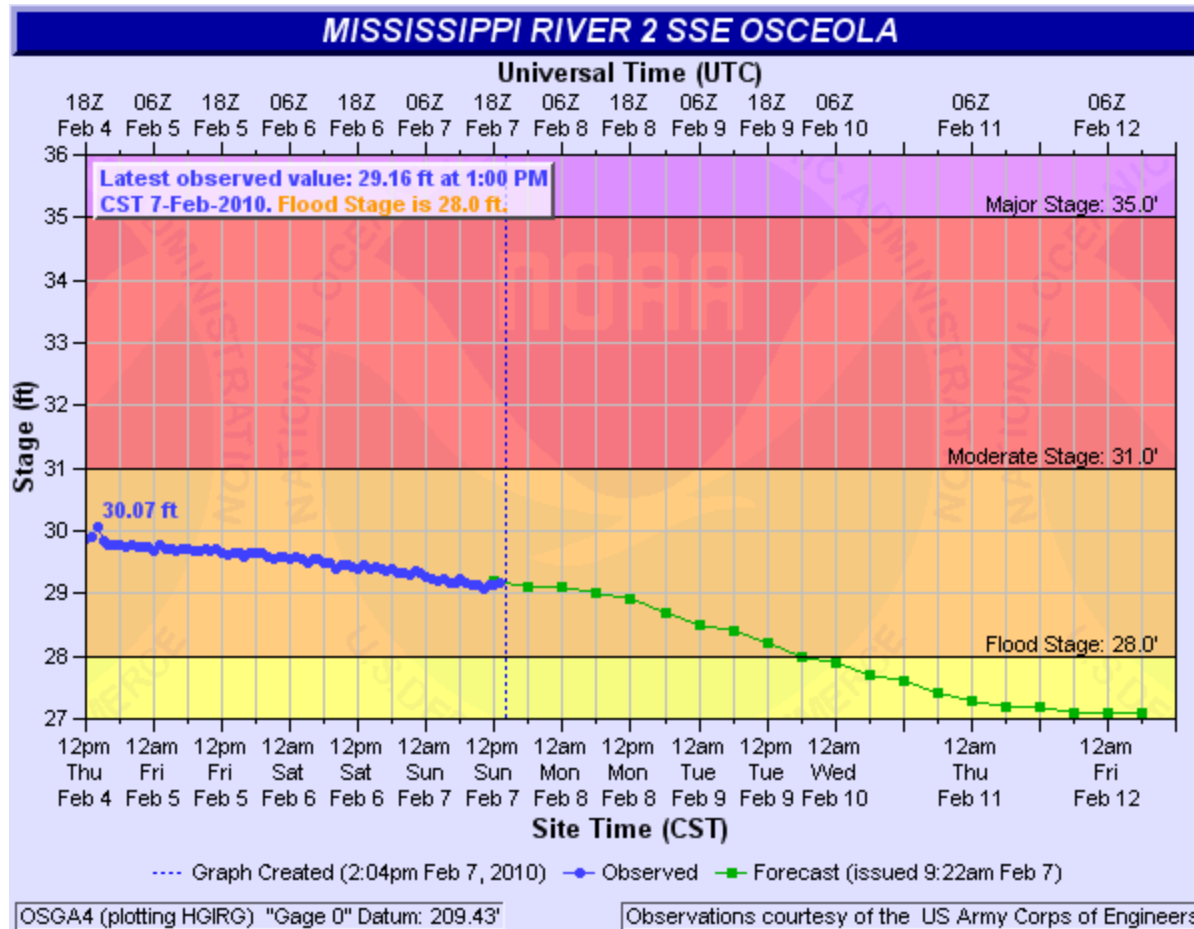
**IN ARKANSAS - ALL ROADS OVER LEVEE ARE CLOSED  
EXCEPT AT GRAIN TERMINALS AT OSCEOLA**



**RIVER FORECASTS  
FOR THE OSCEOLA GAGE**



# RIVER FORECAST SERVICE FROM LOWER MISSISSIPPI RIVER FORECAST CENTER



# **GOALS**

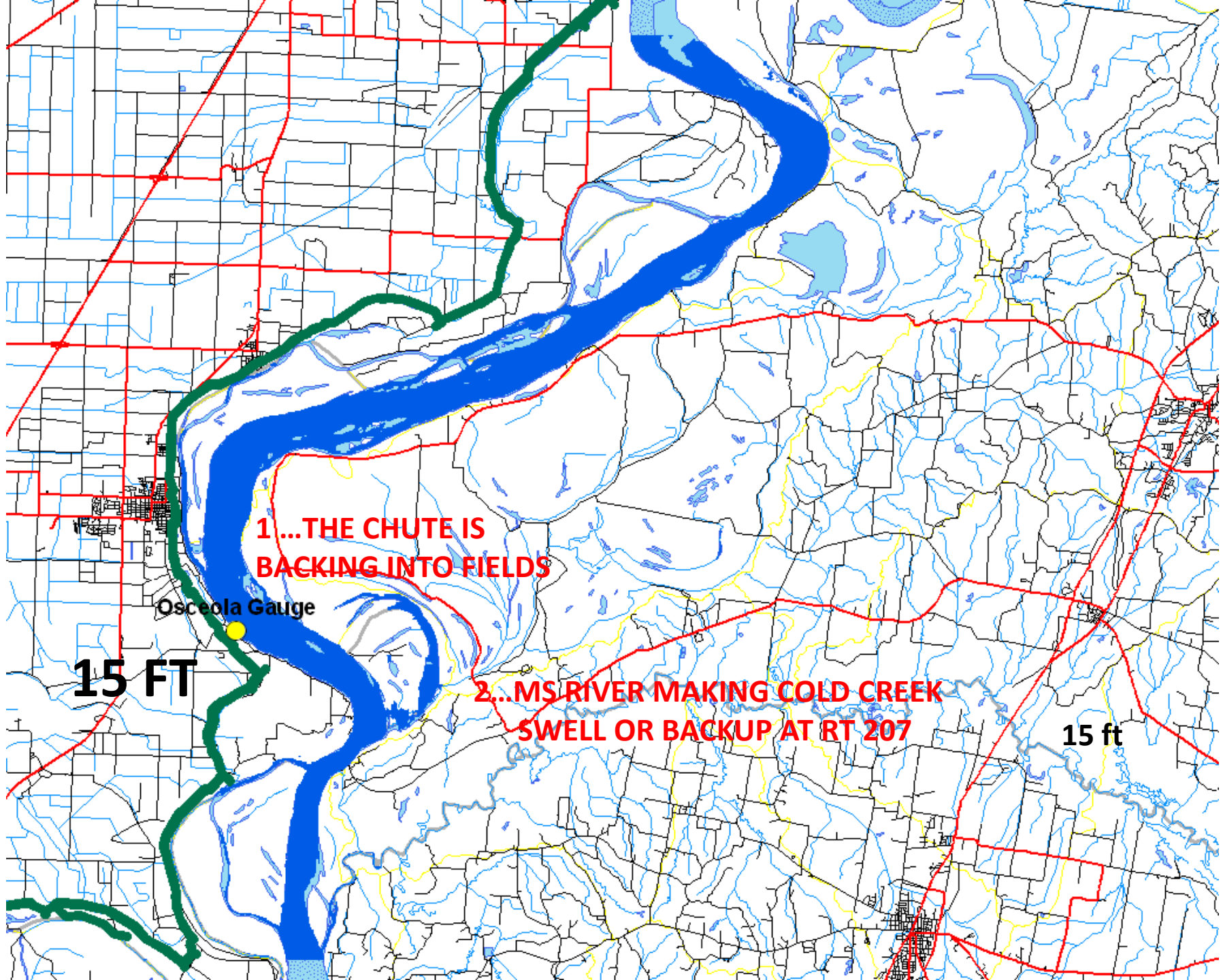
**ESTABLISH FLOOD STAGES**

**START FORECAST SERVICE**

**MAP POSSIBLE FLOODING**

# **INUNDATION AND FLOOD MAPS**





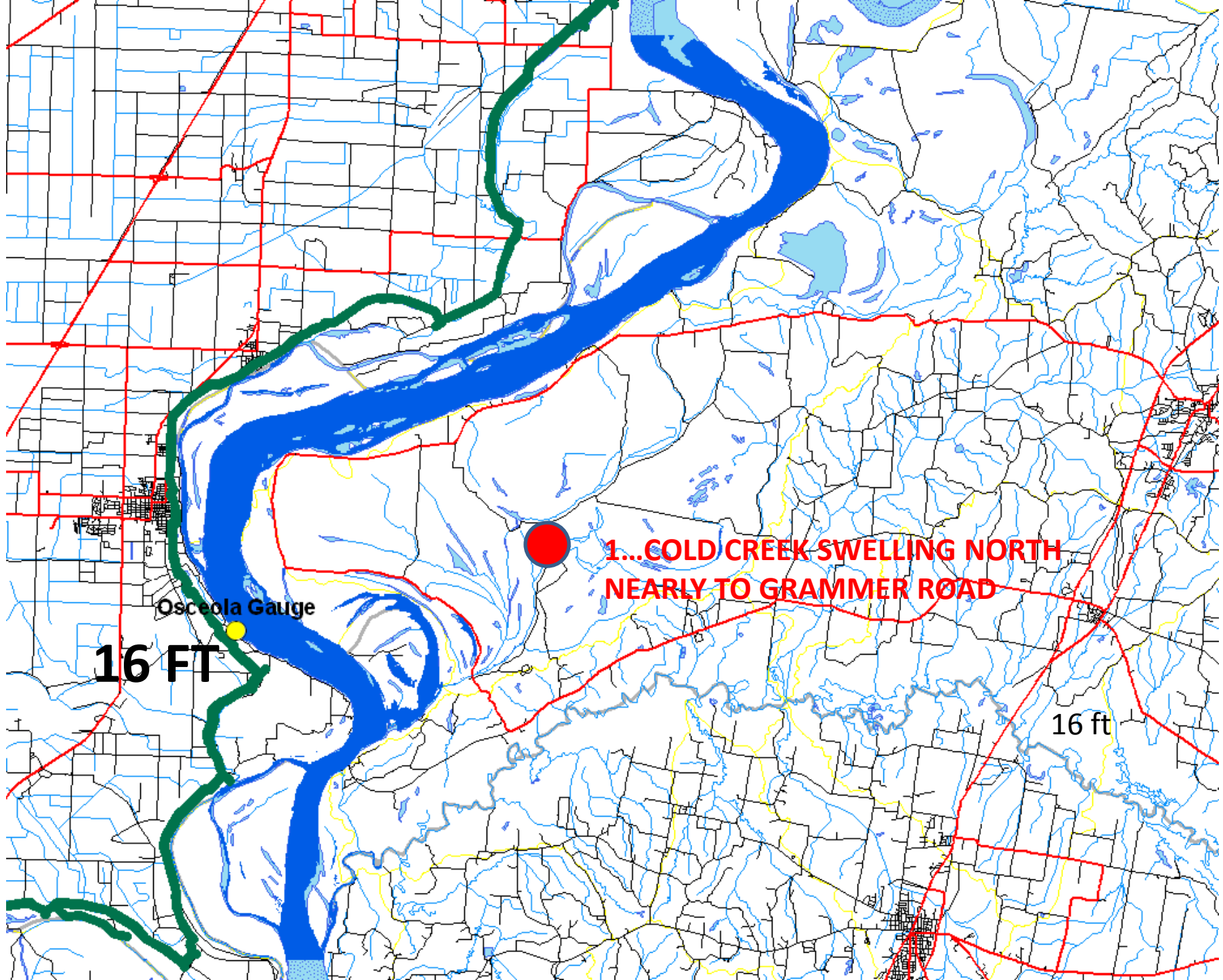
**1...THE CHUTE IS  
BACKING INTO FIELDS**

Osceola Gauge

**15 FT**

**2...MS RIVER MAKING COLD CREEK  
SWELL OR BACKUP AT RT 207**

**15 ft**

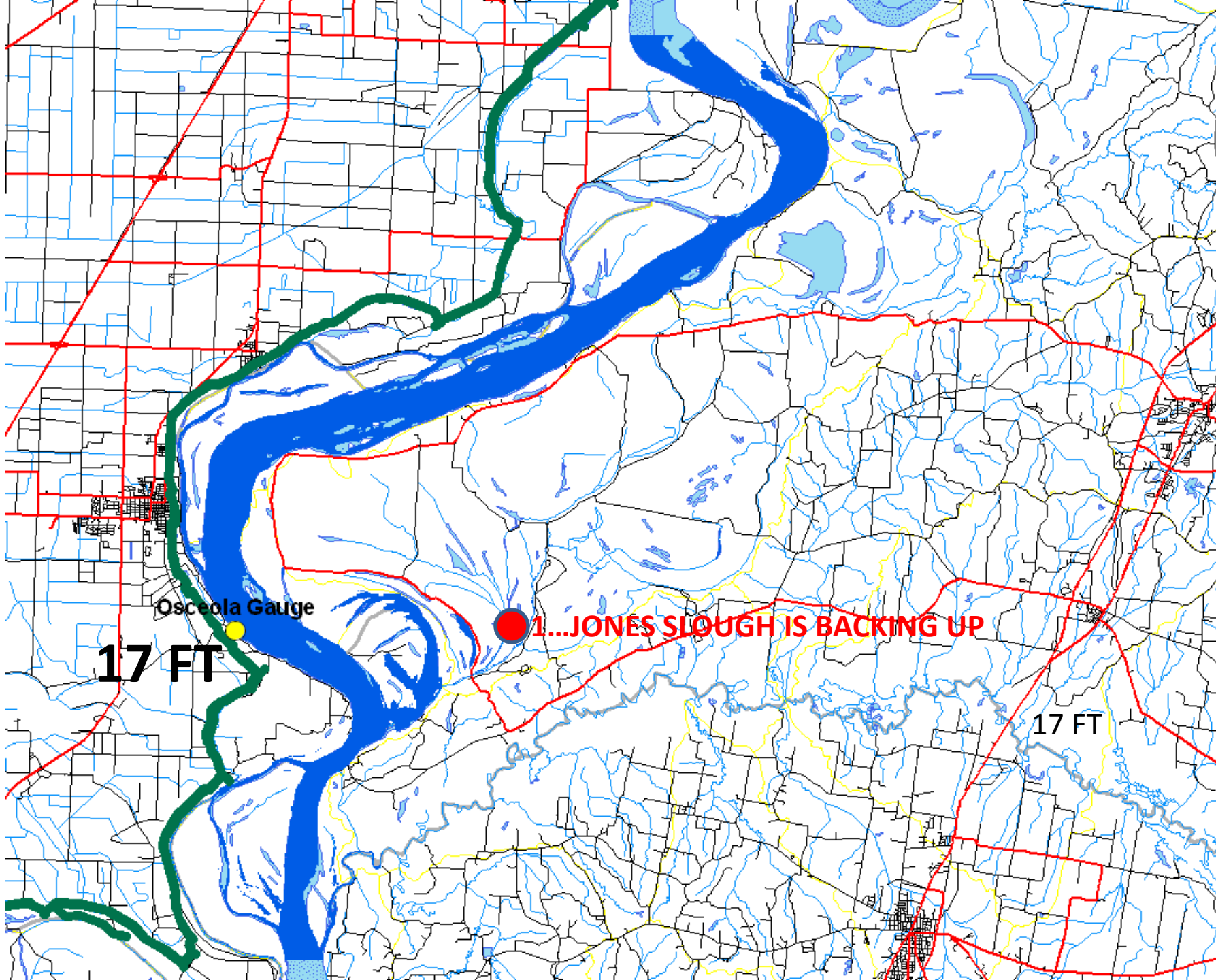


**1...COLD CREEK SWELLING NORTH  
NEARLY TO GRAMMER ROAD**

Osceola Gauge

**16 FT**

16 ft



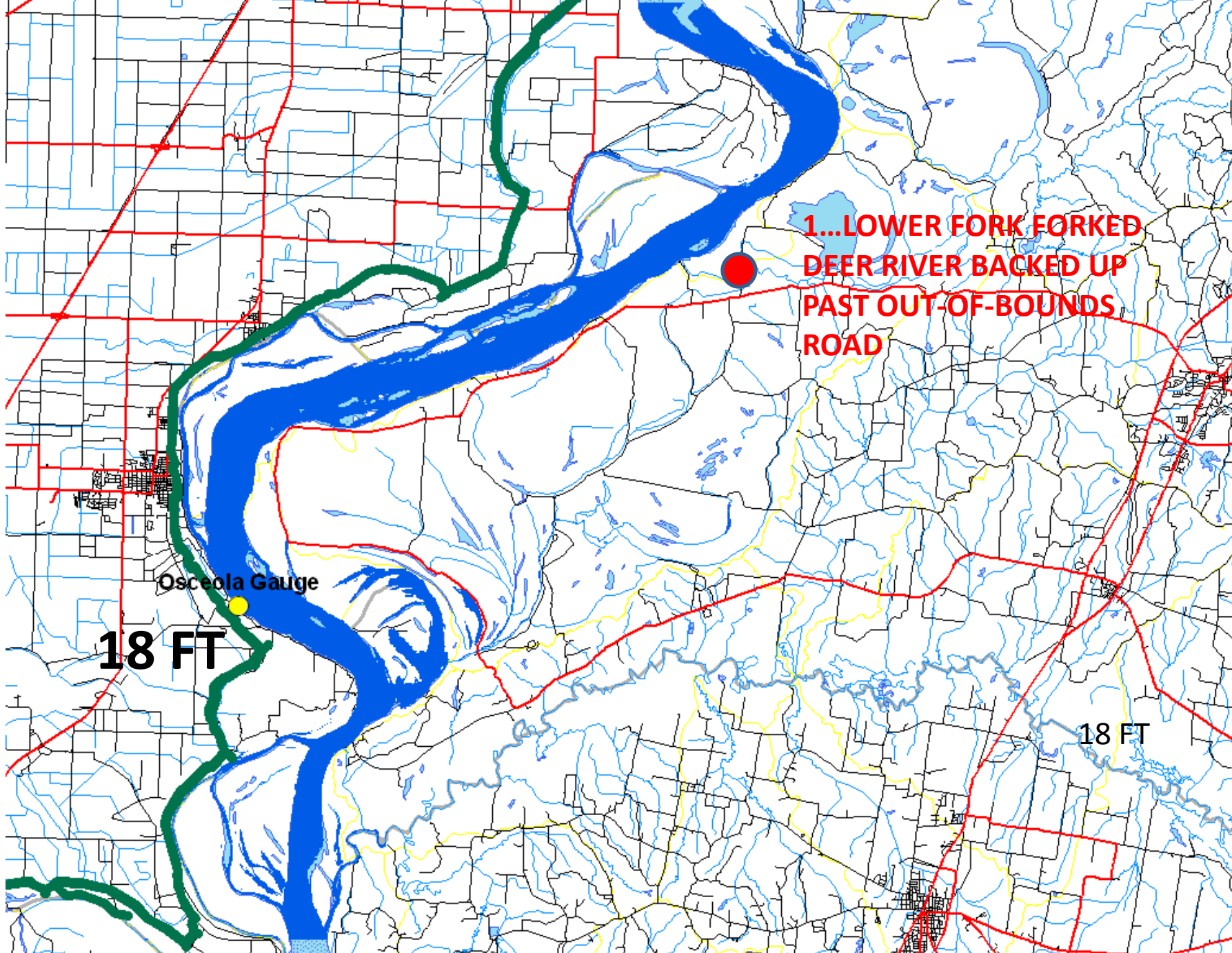
Osceola Gauge

17 FT

1...JONES SLOUGH IS BACKING UP

17 FT



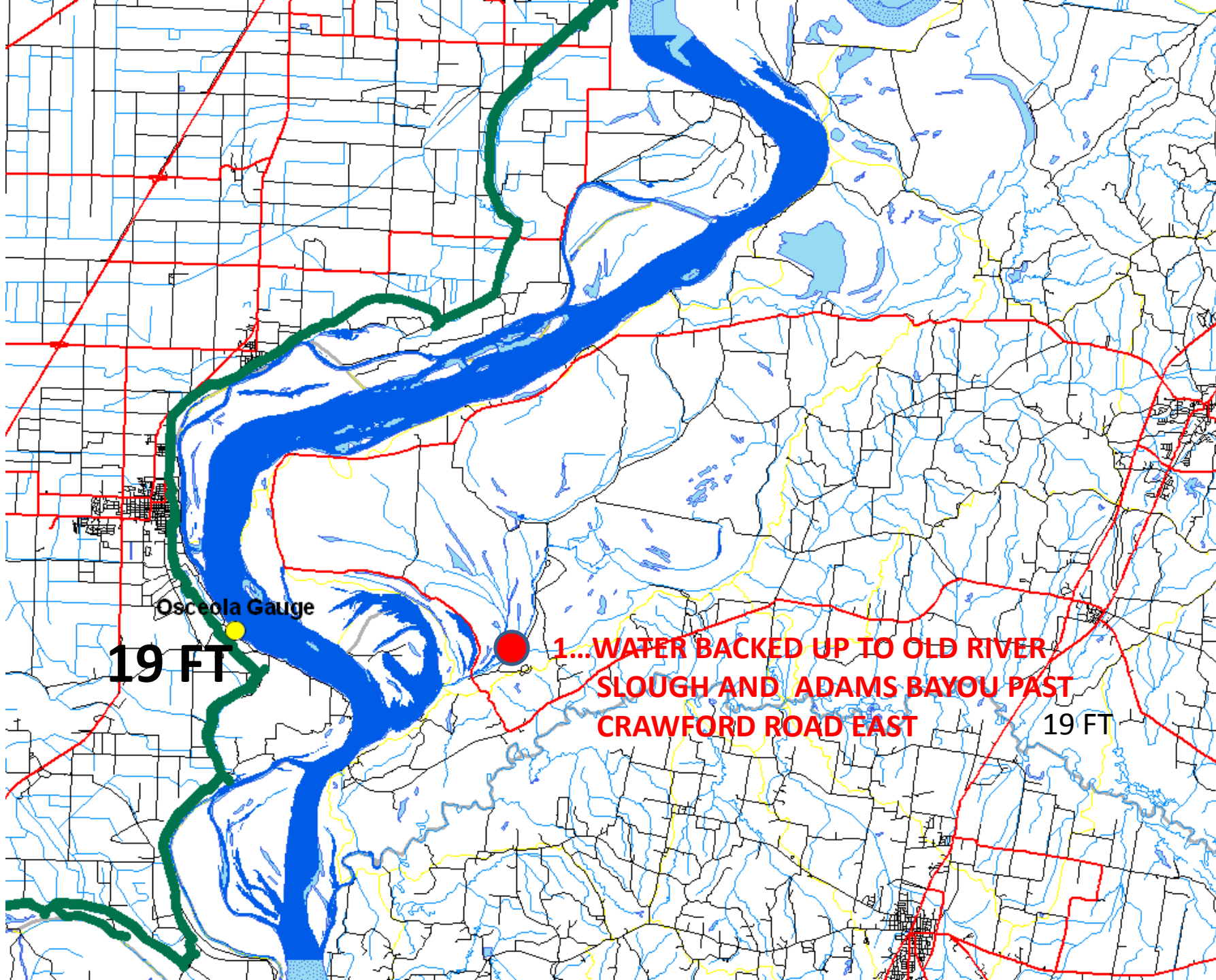


**1...LOWER FORK FORKED  
DEER RIVER BACKED UP  
PAST OUT-OF-BOUNDS  
ROAD**

Osceola Gauge

**18 FT**

18 FT

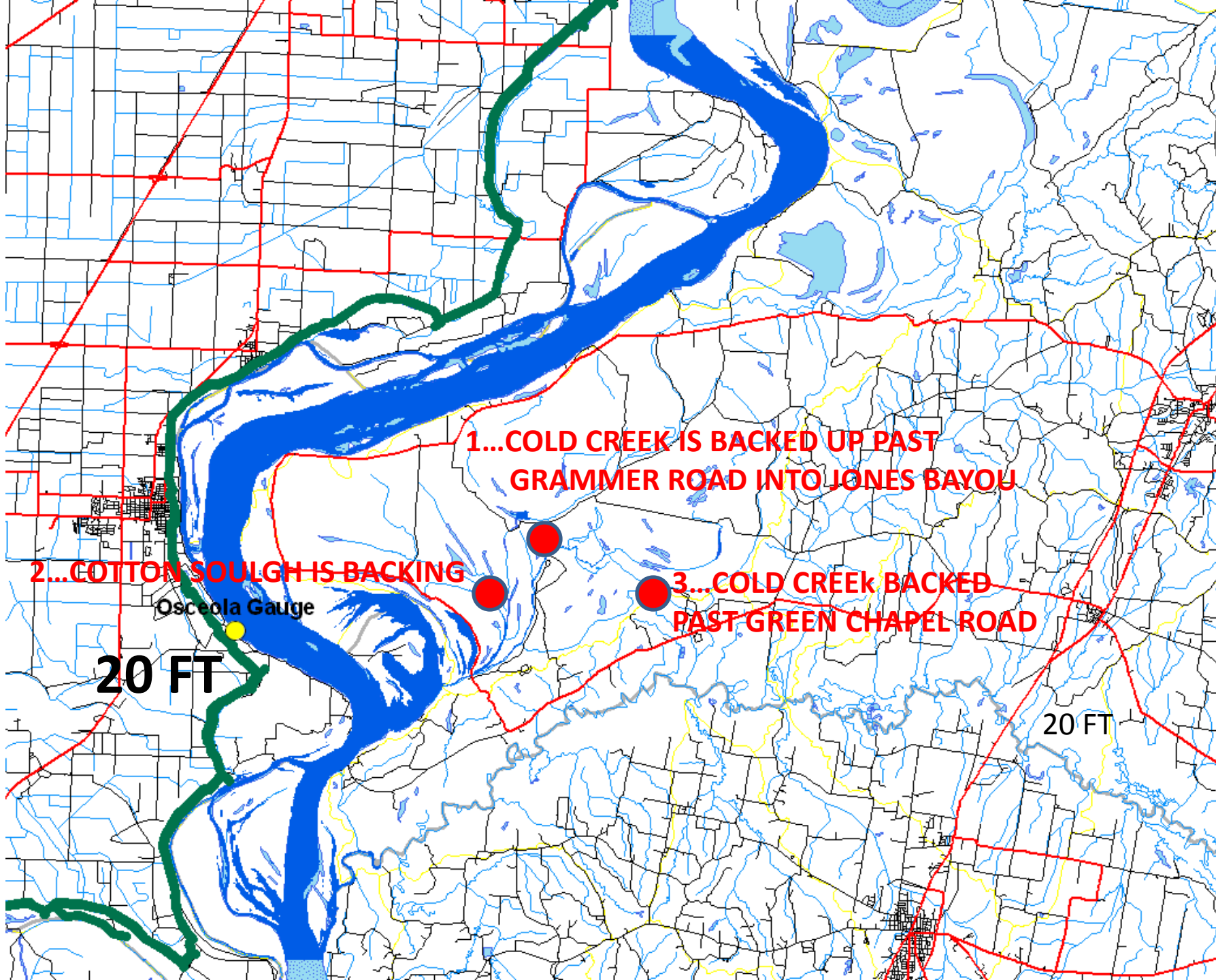


Osceola Gauge

19 FT

1...WATER BACKED UP TO OLD RIVER/  
SLOUGH AND ADAMS BAYOU PAST  
CRAWFORD ROAD EAST

19 FT



**1...COLD CREEK IS BACKED UP PAST GRAMMER ROAD INTO JONES BAYOU**

**2...COTTON SOULGH IS BACKING**

**3...COLD CREEK BACKED PAST GREEN CHAPEL ROAD**

Osceola Gauge

**20 FT**

**20 FT**



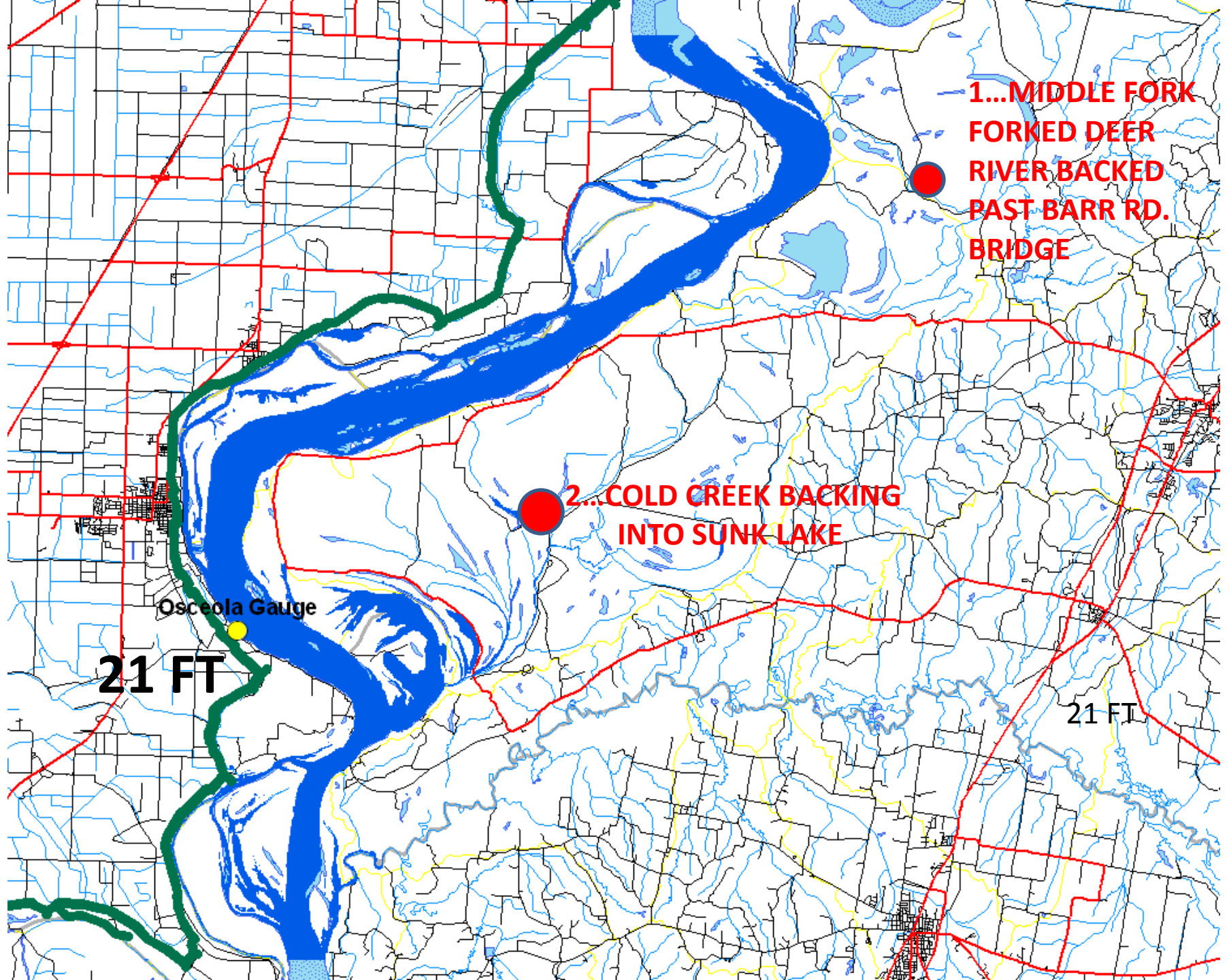
1...MIDDLE FORK  
FORKED DEER  
RIVER BACKED  
PAST BARR RD.  
BRIDGE

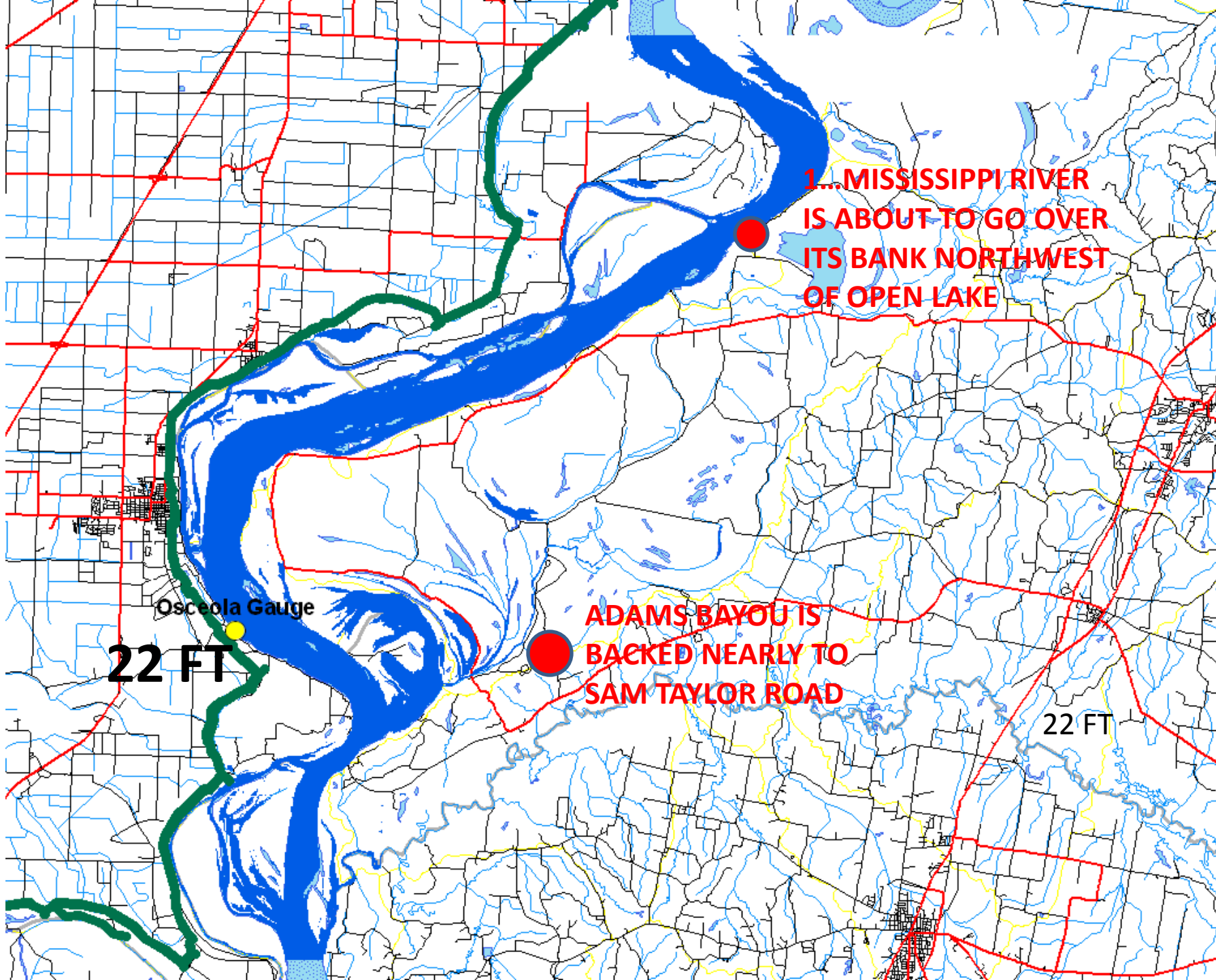
2...COLD CREEK BACKING  
INTO SUNK LAKE

Osceola Gauge

21 FT

21 FT





**1...MISSISSIPPI RIVER IS ABOUT TO GO OVER ITS BANK NORTHWEST OF OPEN LAKE**

**ADAMS BAYOU IS BACKED NEARLY TO SAM TAYLOR ROAD**

Osceola Gauge

**22 FT**

**22 FT**

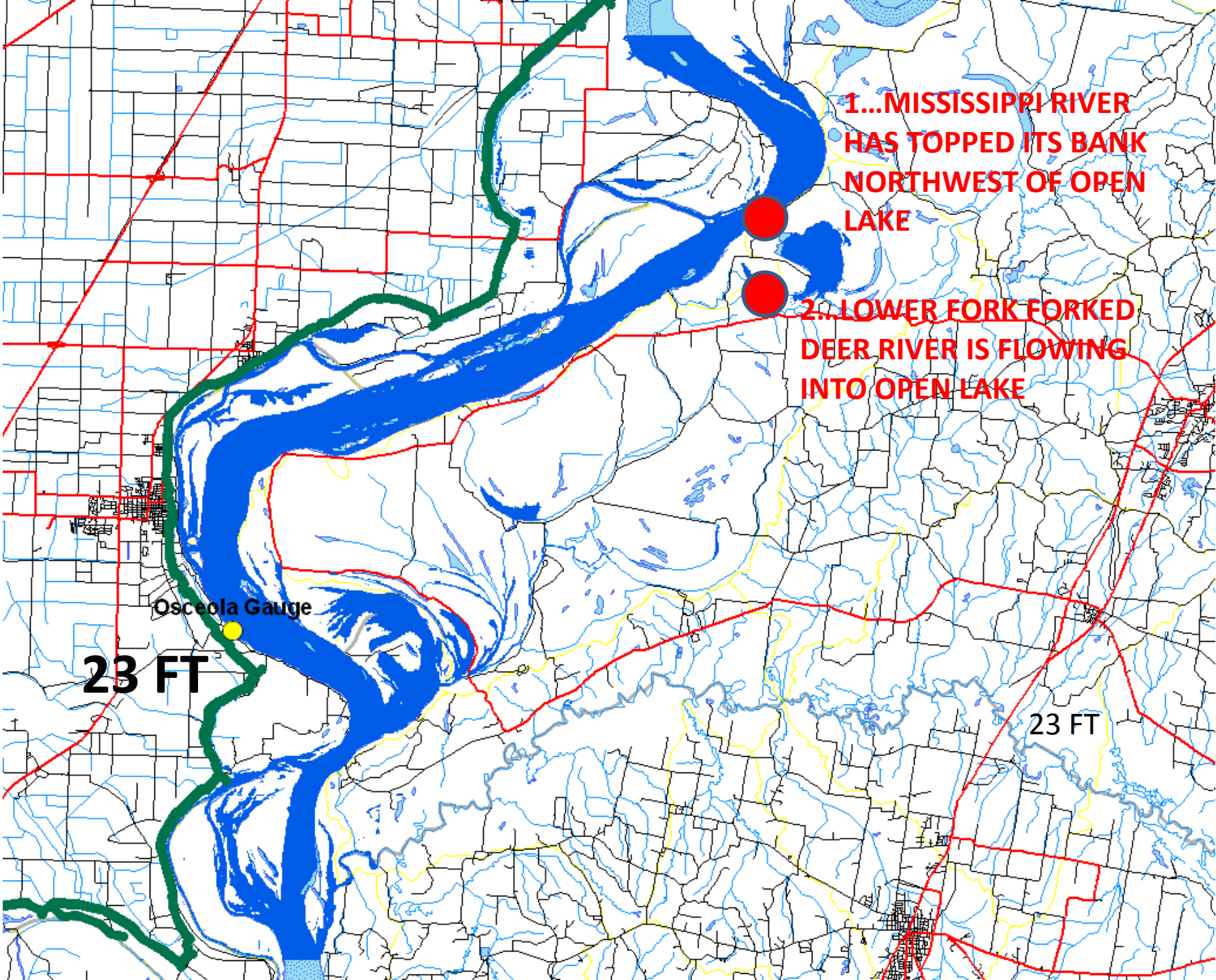
**1...MISSISSIPPI RIVER  
HAS TOPPED ITS BANK  
NORTHWEST OF OPEN  
LAKE**

**2...LOWER FORK FORKED  
DEER RIVER IS FLOWING  
INTO OPEN LAKE**

Osceola Gauge

**23 FT**

23 FT





**ACTION STAGE  
24 FT**

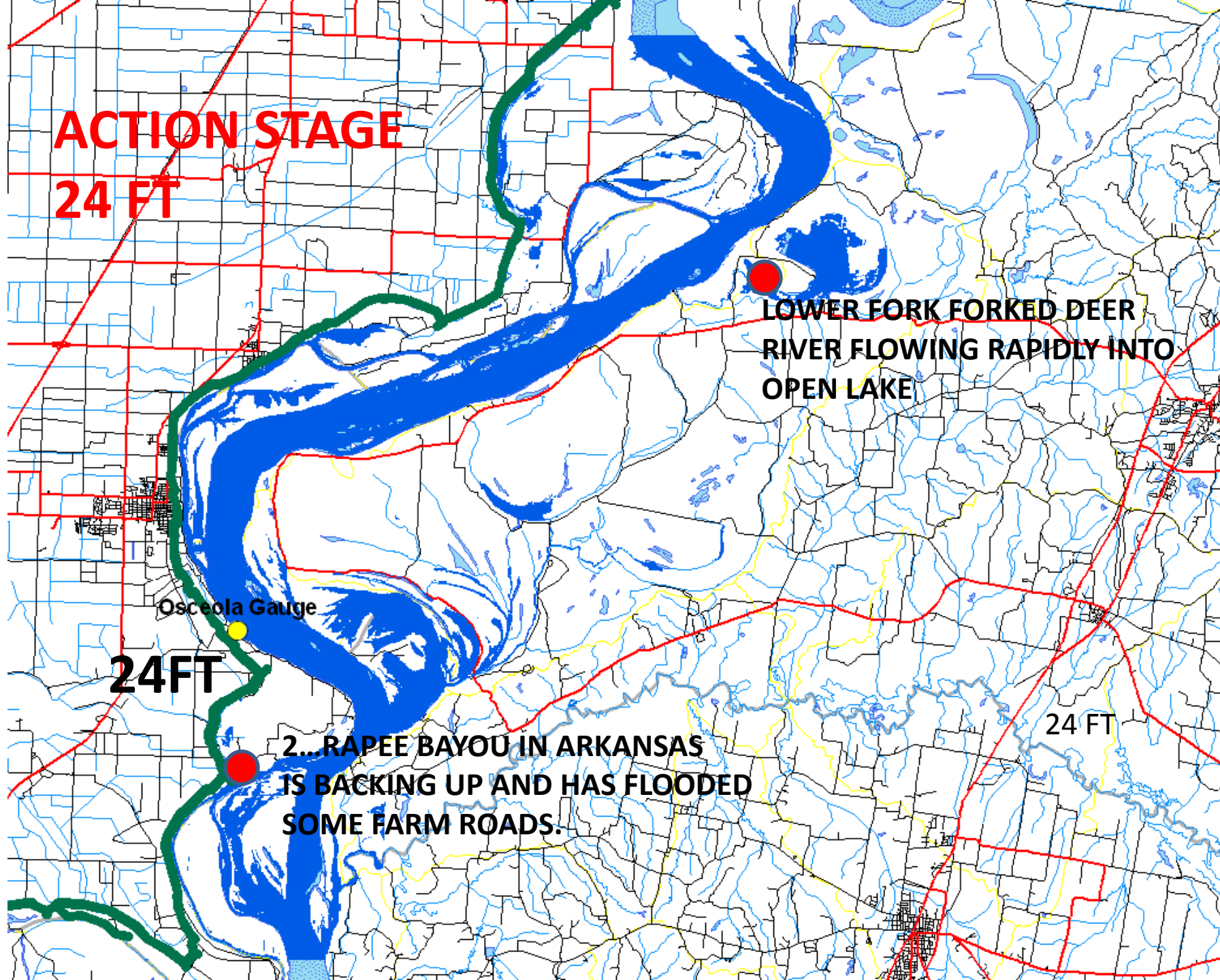
**LOWER FORK FORKED DEER  
RIVER FLOWING RAPIDLY INTO  
OPEN LAKE**

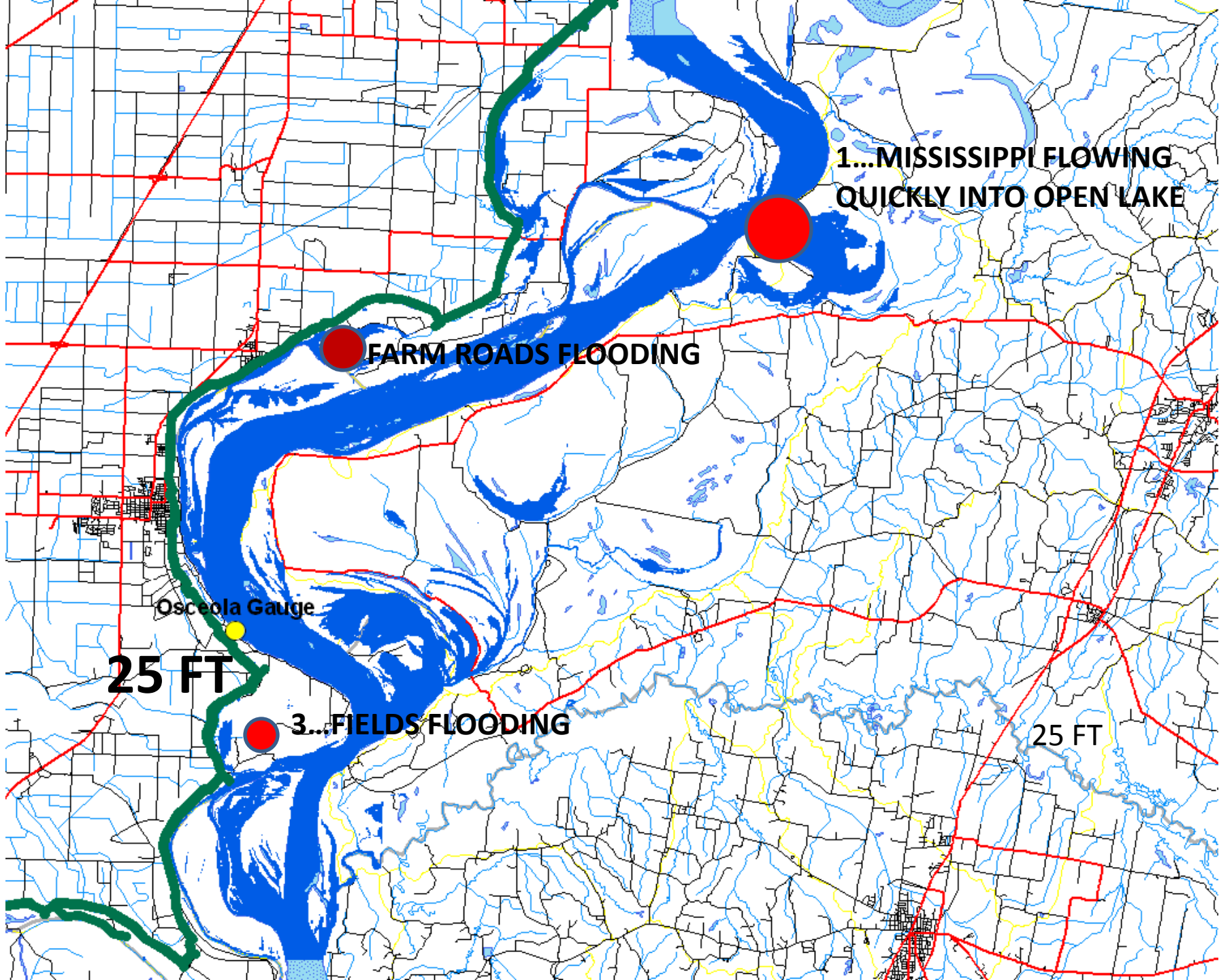
Osceola Gauge

**24FT**

**2...RAPEE BAYOU IN ARKANSAS  
IS BACKING UP AND HAS FLOODED  
SOME FARM ROADS.**

24 FT





**1...MISSISSIPPI FLOWING QUICKLY INTO OPEN LAKE**

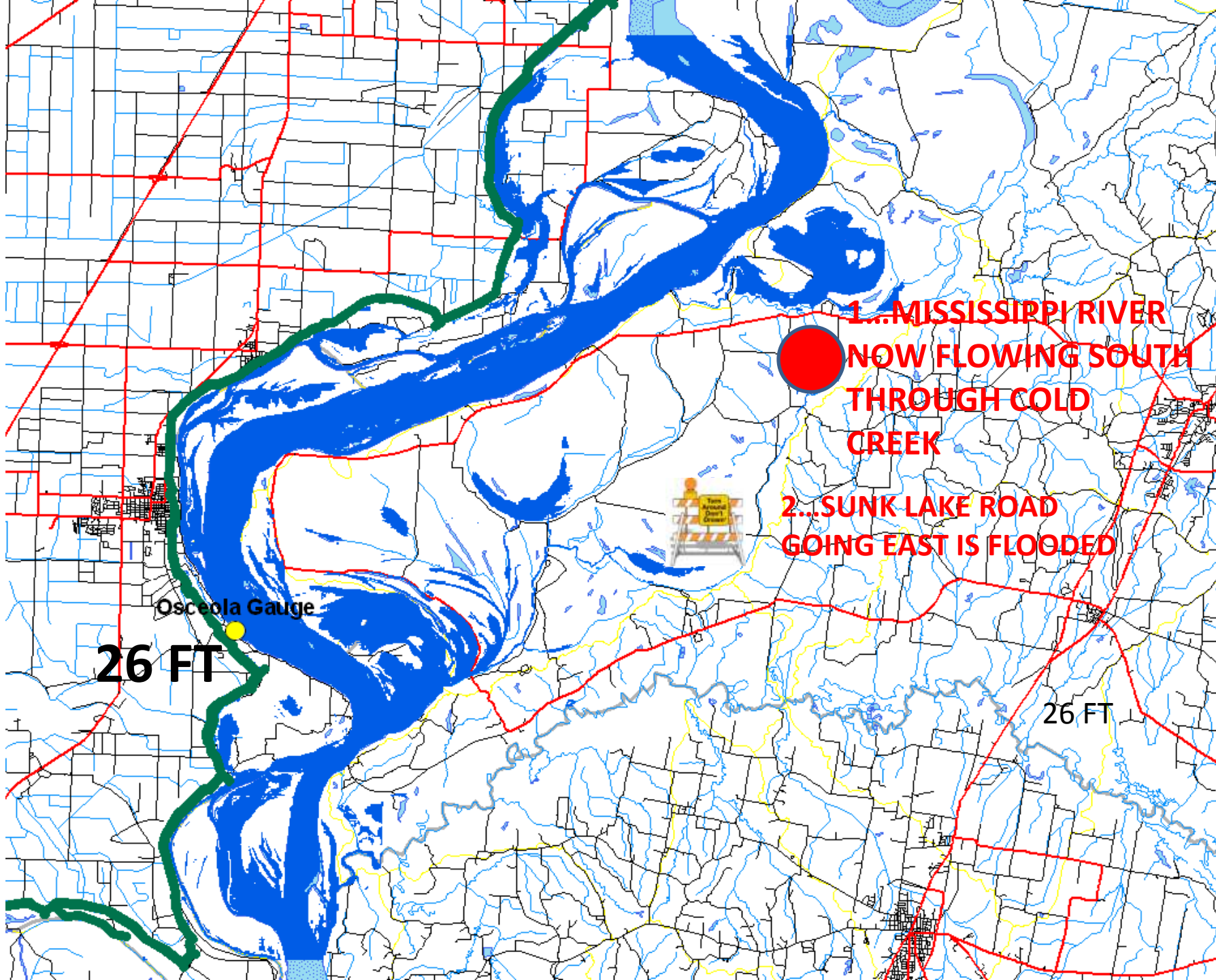
**FARM ROADS FLOODING**

Osceola Gauge

**25 FT**

**3...FIELDS FLOODING**

**25 FT**



**1...MISSISSIPPI RIVER  
NOW FLOWING SOUTH  
THROUGH COLD  
CREEK**

**2...SUNK LAKE ROAD  
GOING EAST IS FLOODED**

Osceola Gauge

**26 FT**

**26 FT**



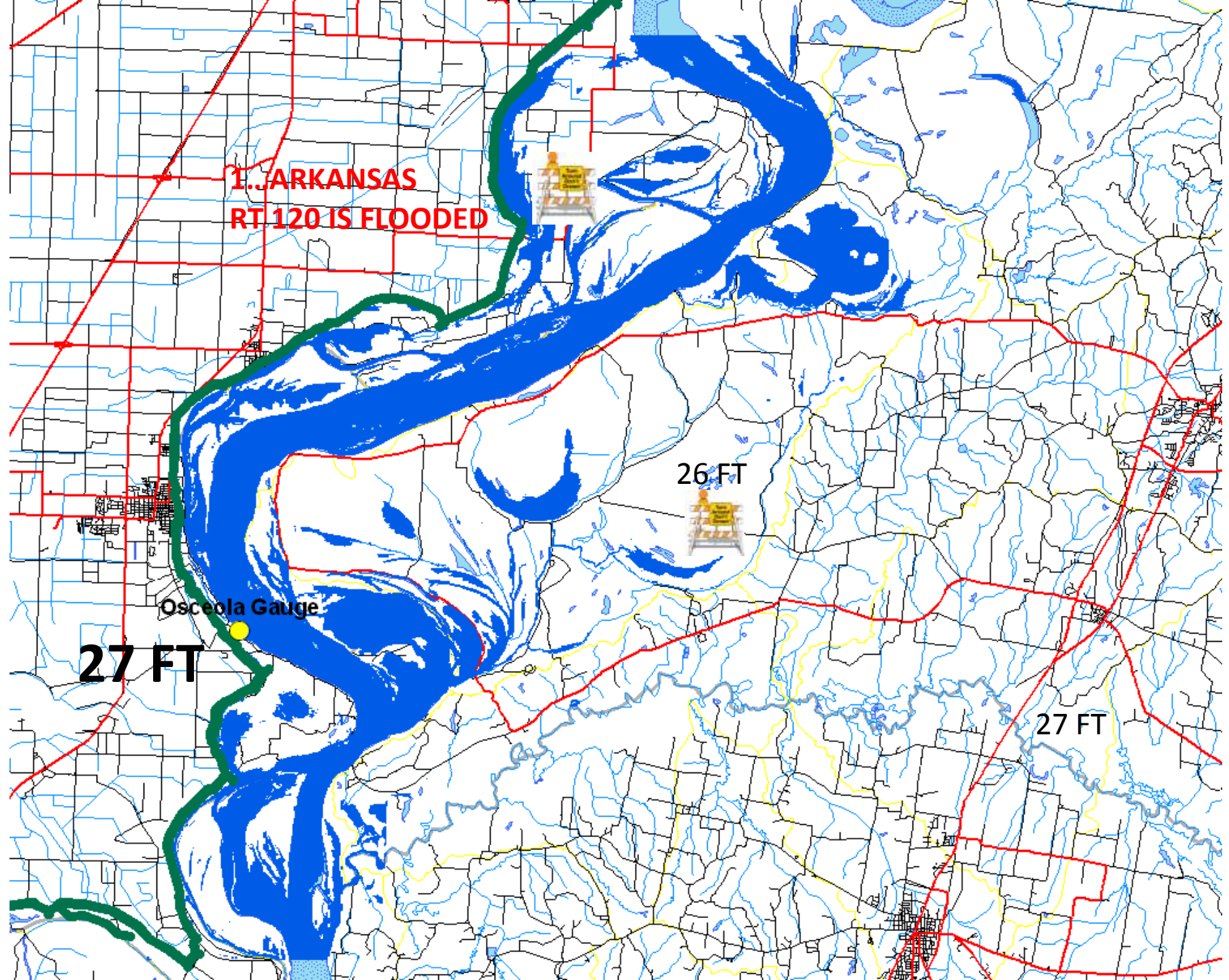
**1. ARKANSAS  
RT 120 IS FLOODED**

26 FT

Osceola Gauge

27 FT

27 FT



27 FT

1...OUT-OF-BOUNDS ROAD IS FLOODED  
2...THE REACH COKER SLOUGH  
HUNTING CAMP IS FLOODING

3...SNYDER BLUFF ROAD  
IS FLOODING

26 FT

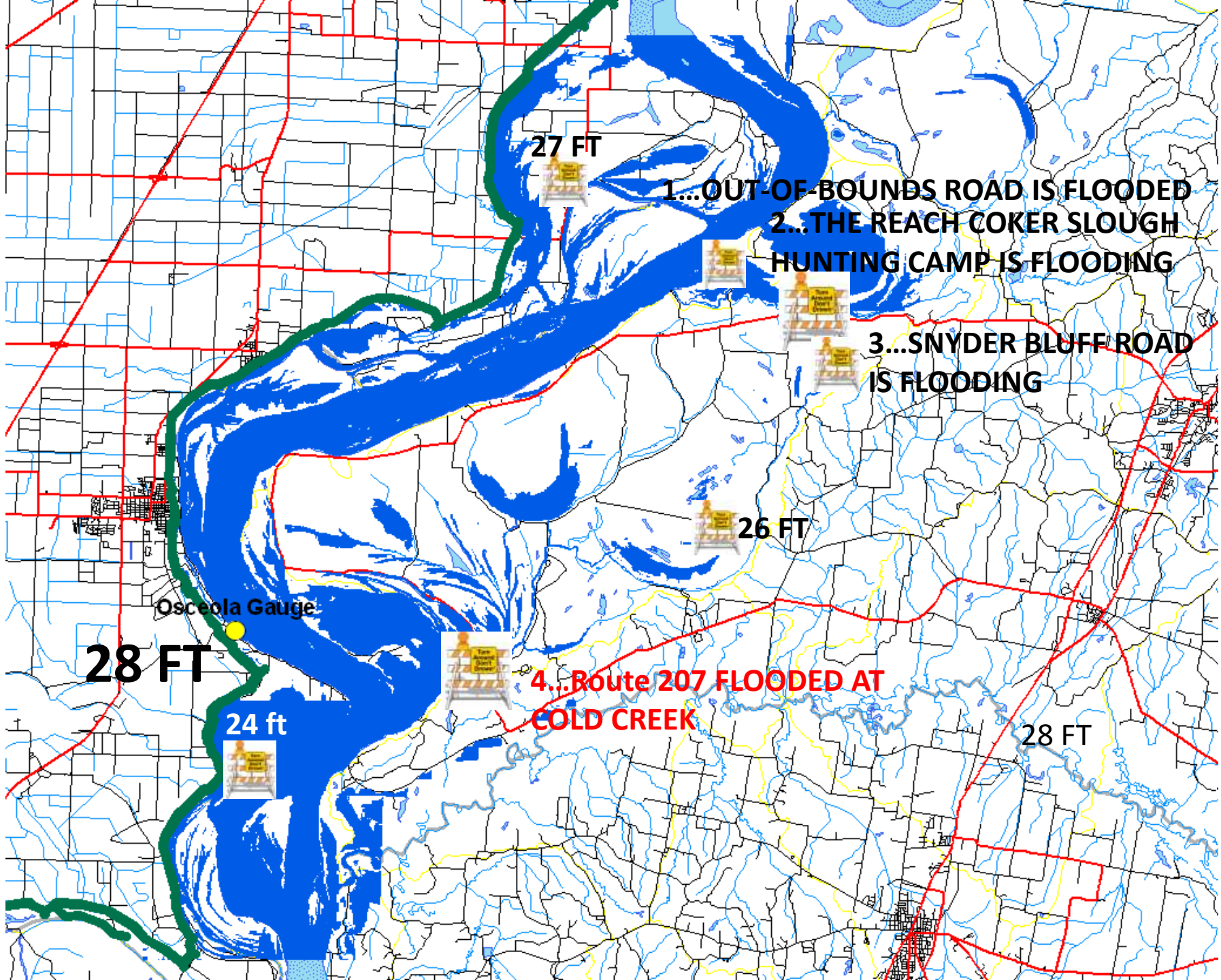
Osceola Gauge

28 FT

24 ft

4...Route 207 FLOODED AT  
COLD CREEK

28 FT



**MAIN ROAD FLOODED AND RIVER FLOWING DIRECTLY INTO MILL BAYOU FIELDS FLOODING**

27 FT

28 FT

28 FT

28 FT

26 FT

Osceola Gauge

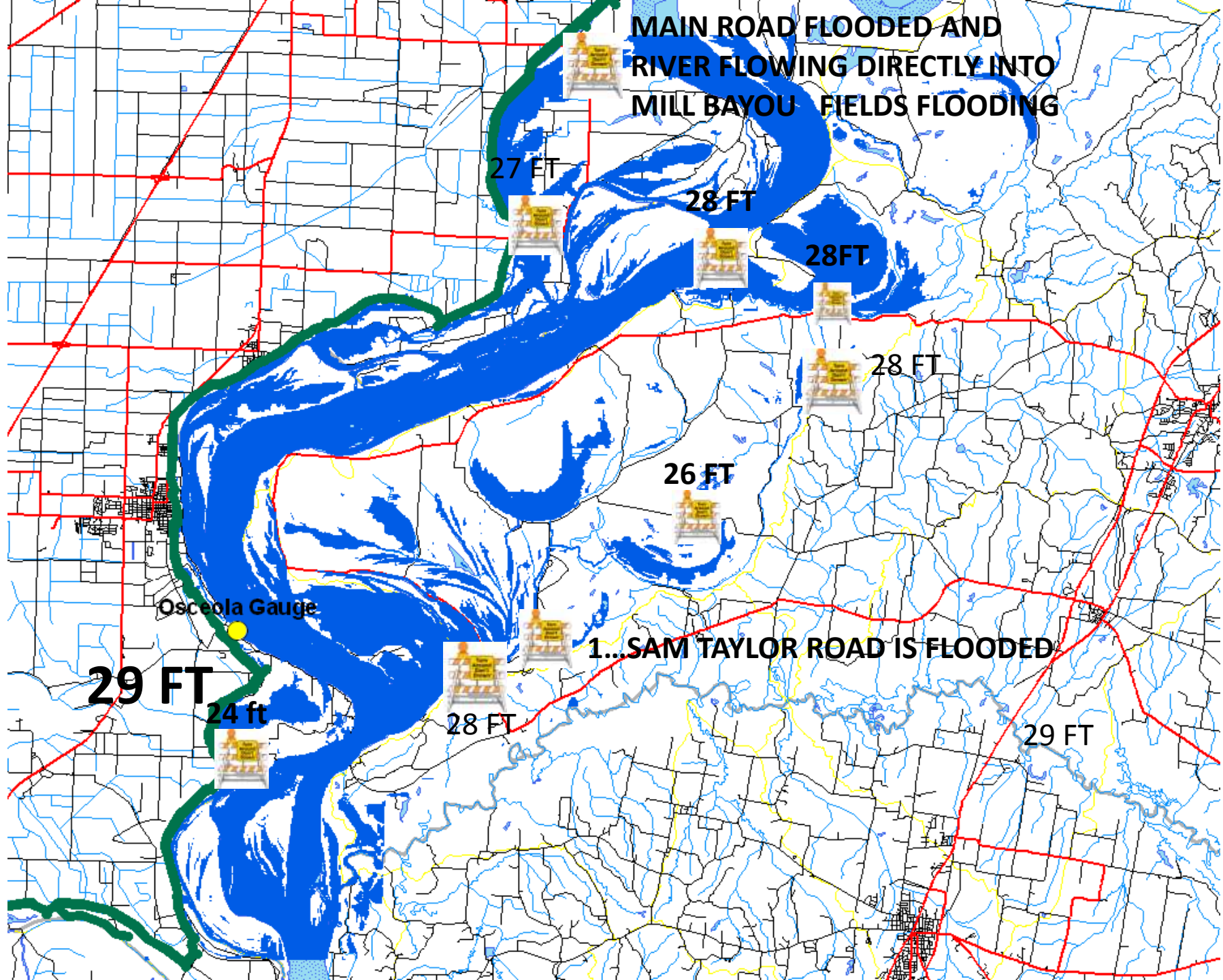
29 FT

24 ft

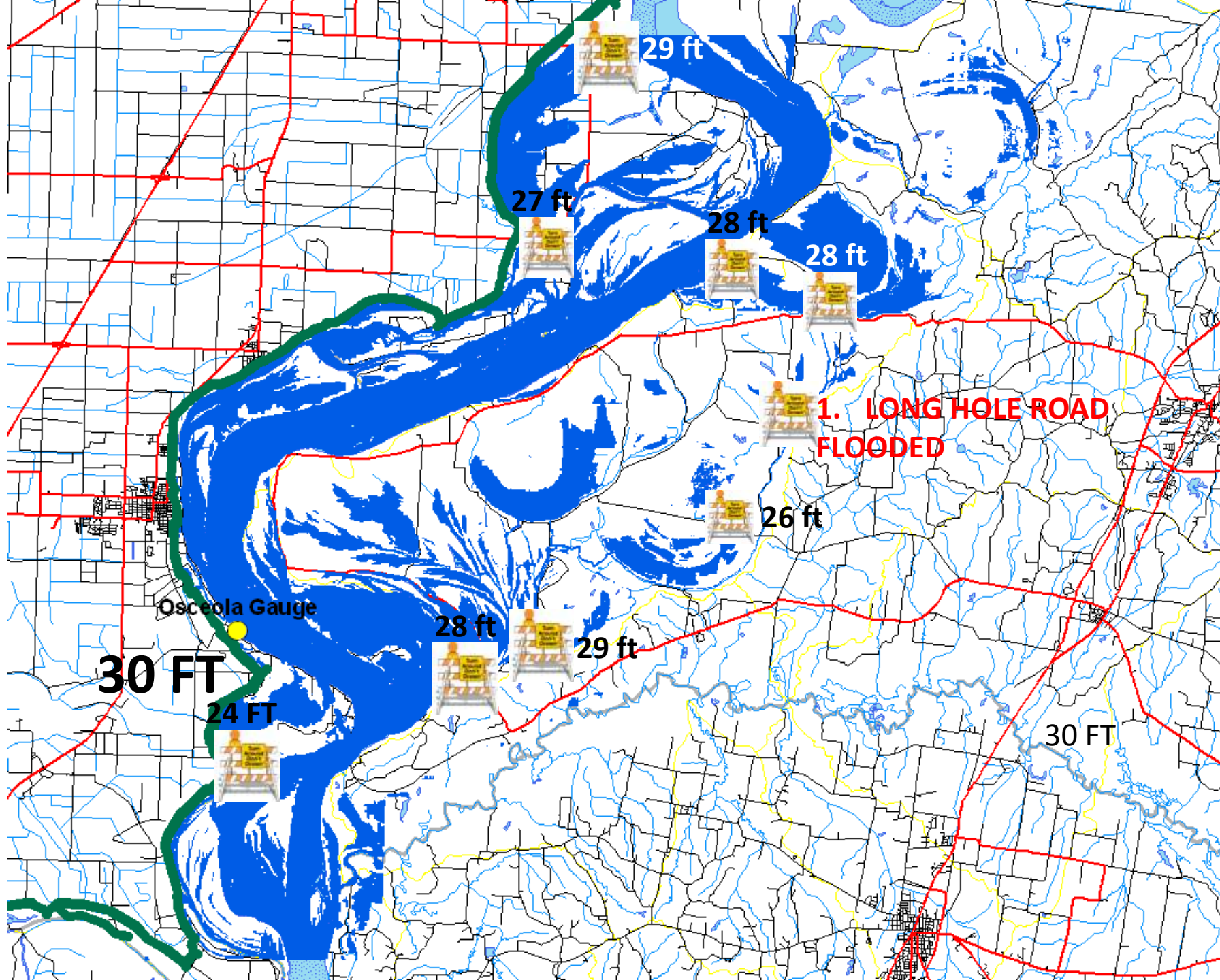
28 FT

**1...SAM TAYLOR ROAD IS FLOODED**

29 FT







29 ft

27 ft

28 ft

28 ft

**1. LONG HOLE ROAD FLOODED**

26 ft

Osceola Gauge

28 ft

29 ft

**30 FT**

24 FT

30 FT

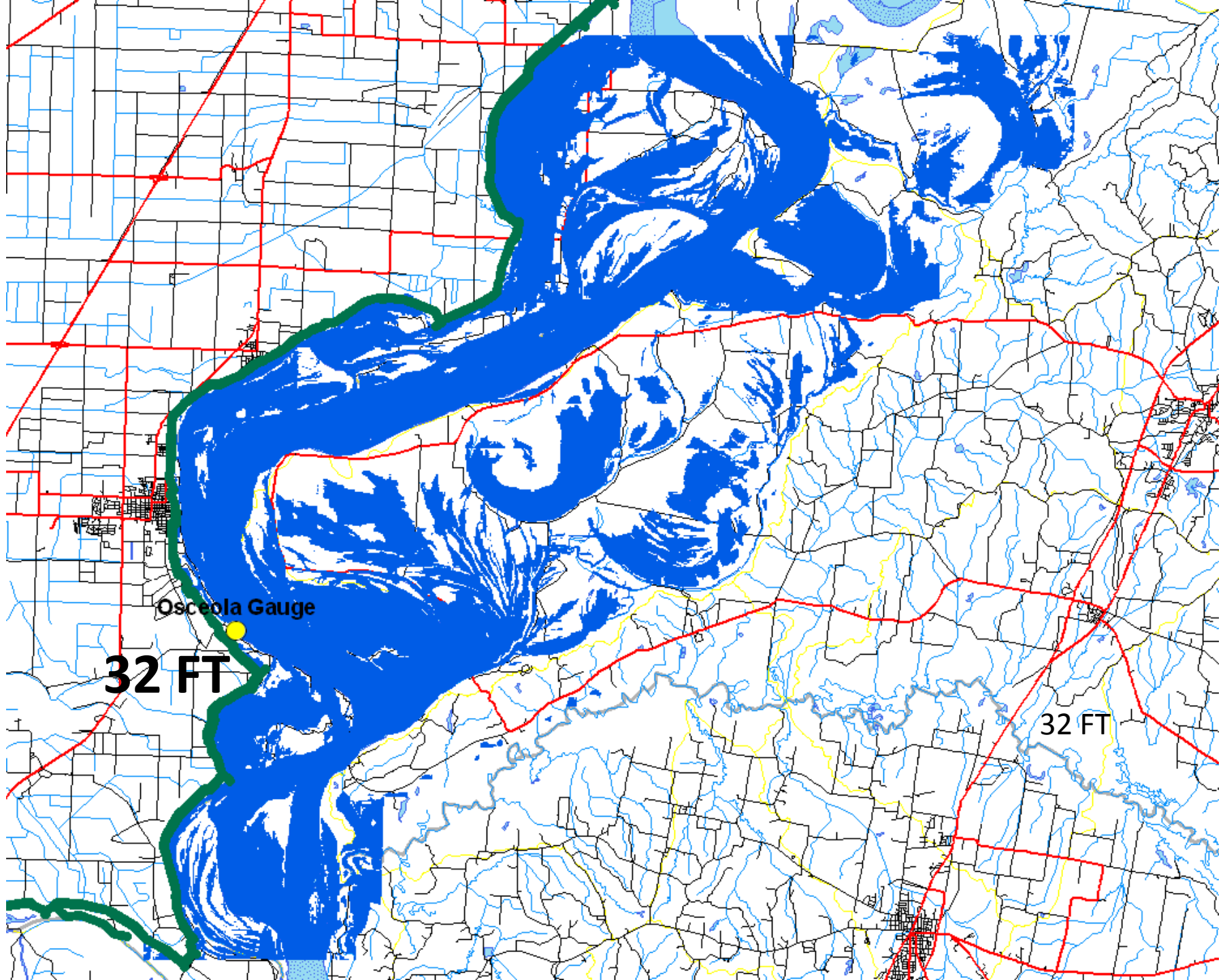


**MODERATE  
FLOOD – 31 FT**

Osceola Gauge

**1. MOST EVACUATION ROADS CLOSED 31 FT**

**2. COLD CREEK AND JONES SLOUGH  
FLOWING SOUTH DUE TO  
HEADWATER FLOODING**



Osceola Gauge

32 FT

32 FT



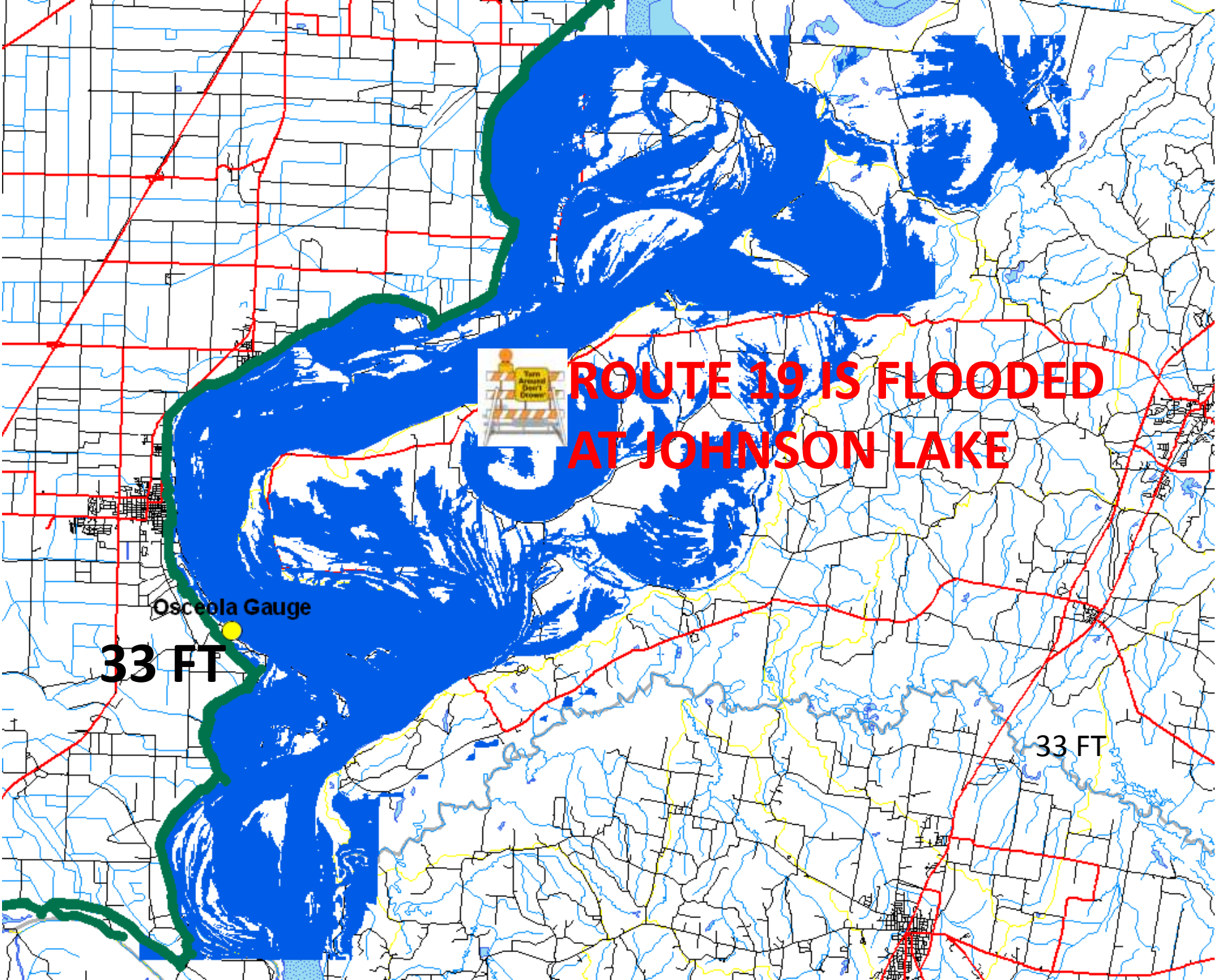


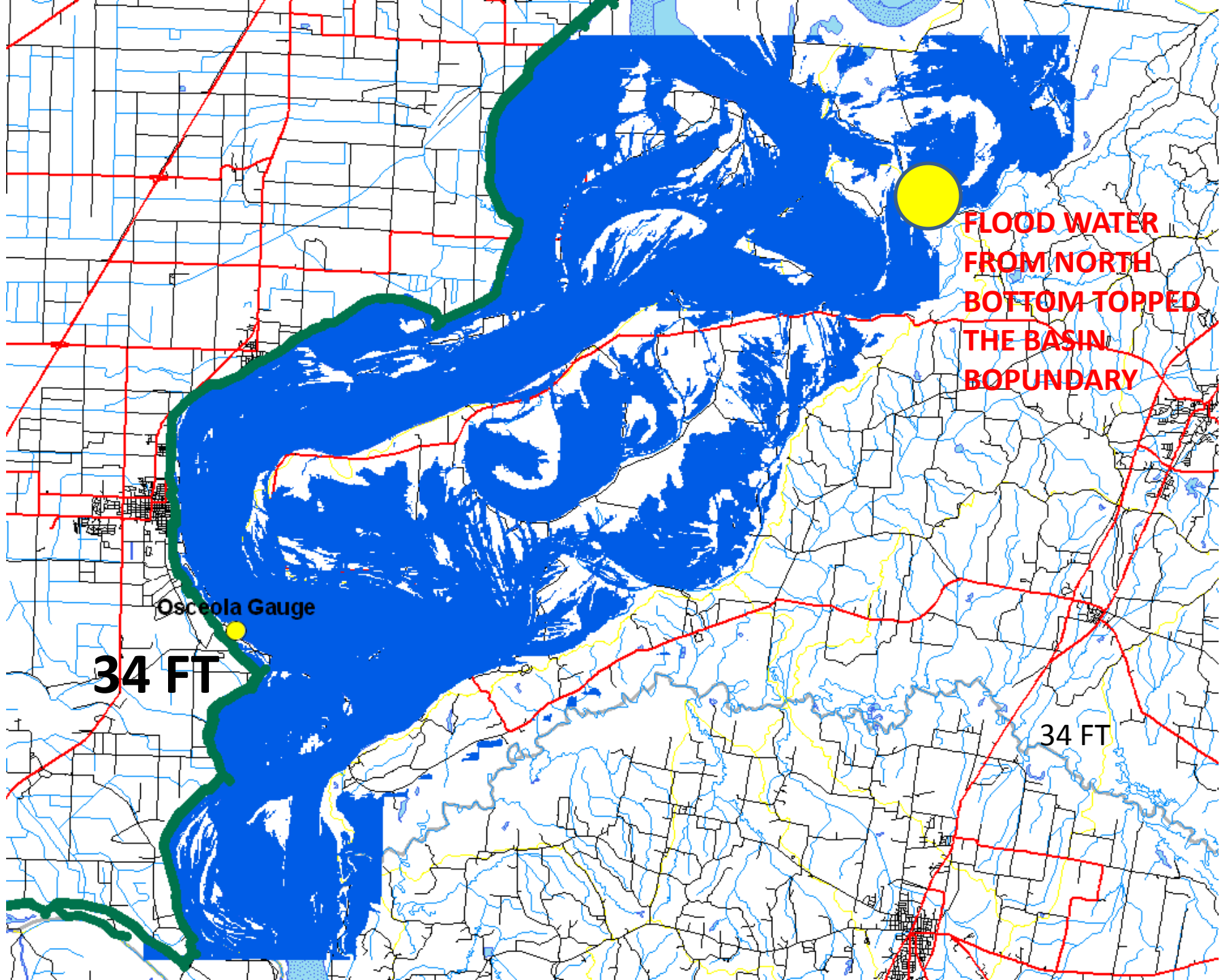
# ROUTE 19 IS FLOODED AT JOHNSON LAKE

Osceola Gauge

33 FT

33 FT





Osceola Gauge

34 FT

FLOOD WATER  
FROM NORTH  
BOTTOM TOPPED  
THE BASIN  
BOPUNDARY

34 FT

# MAJOR FLOOD

35'

Osceola Gauge

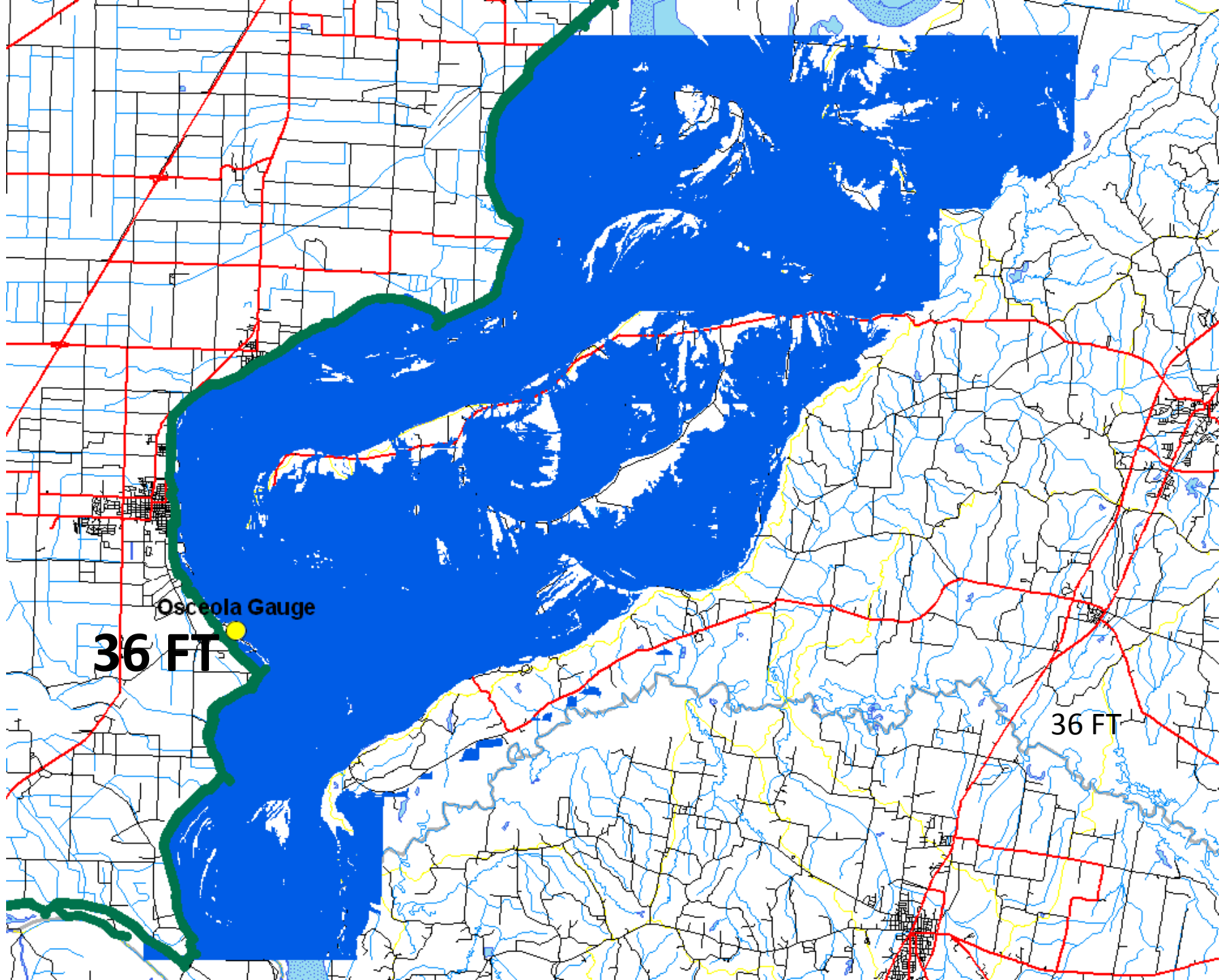
2 FT  
OVER  
RT 19



SECTIONS OF RT 19  
FLOODED

35 FT

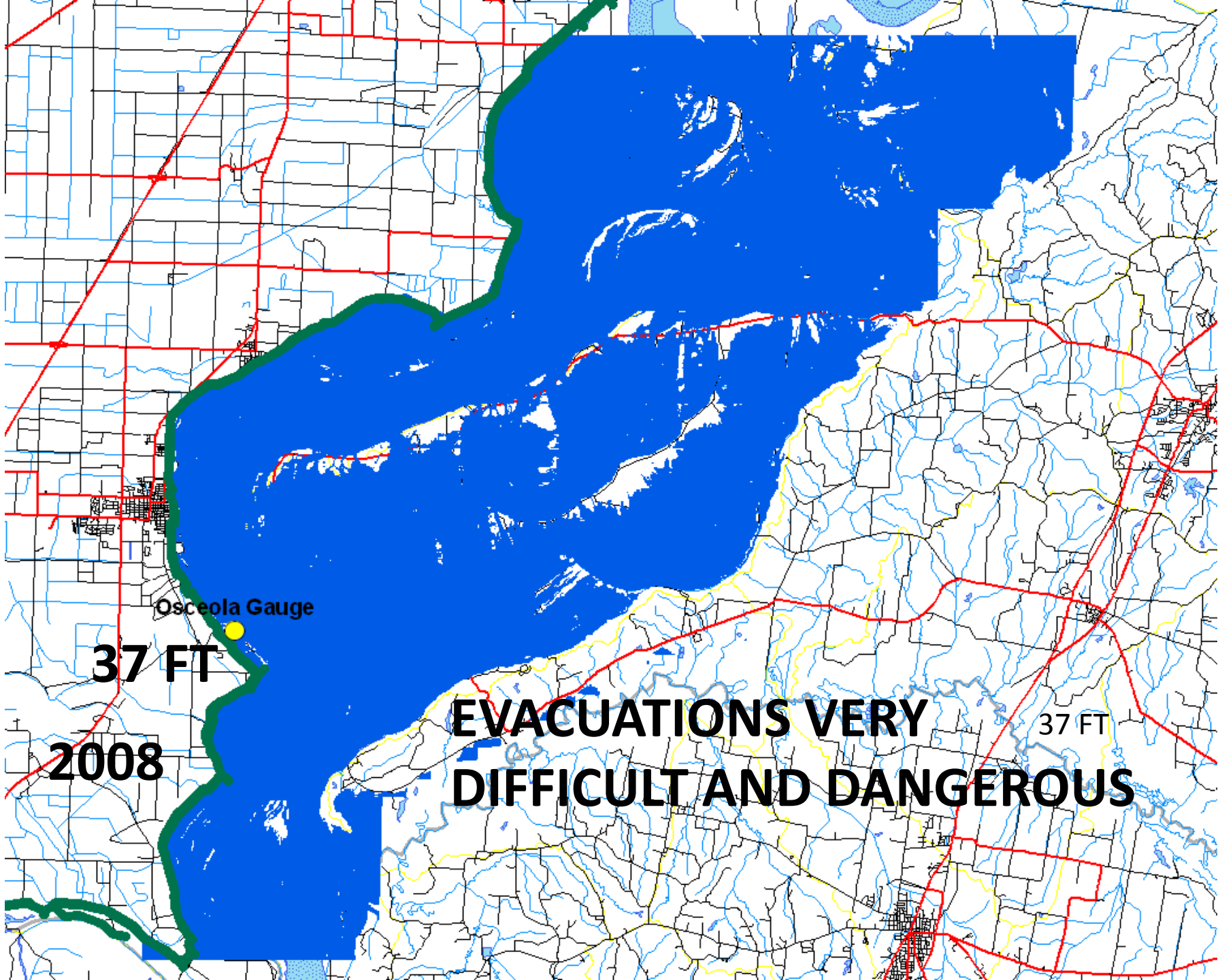




Osceola Gauge

36 FT

36 FT



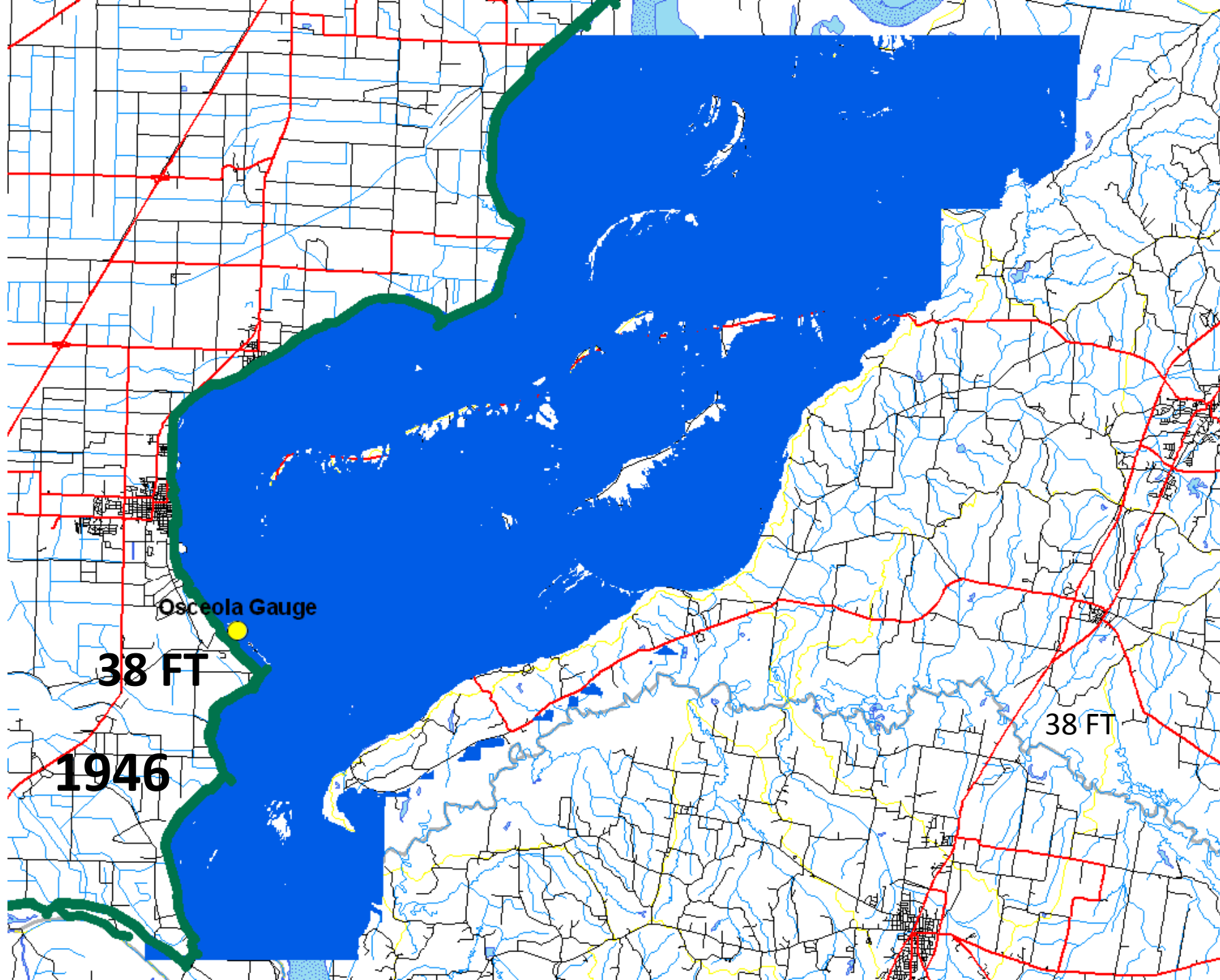
Osceola Gauge

37 FT

2008

**EVACUATIONS VERY  
DIFFICULT AND DANGEROUS**

37 FT



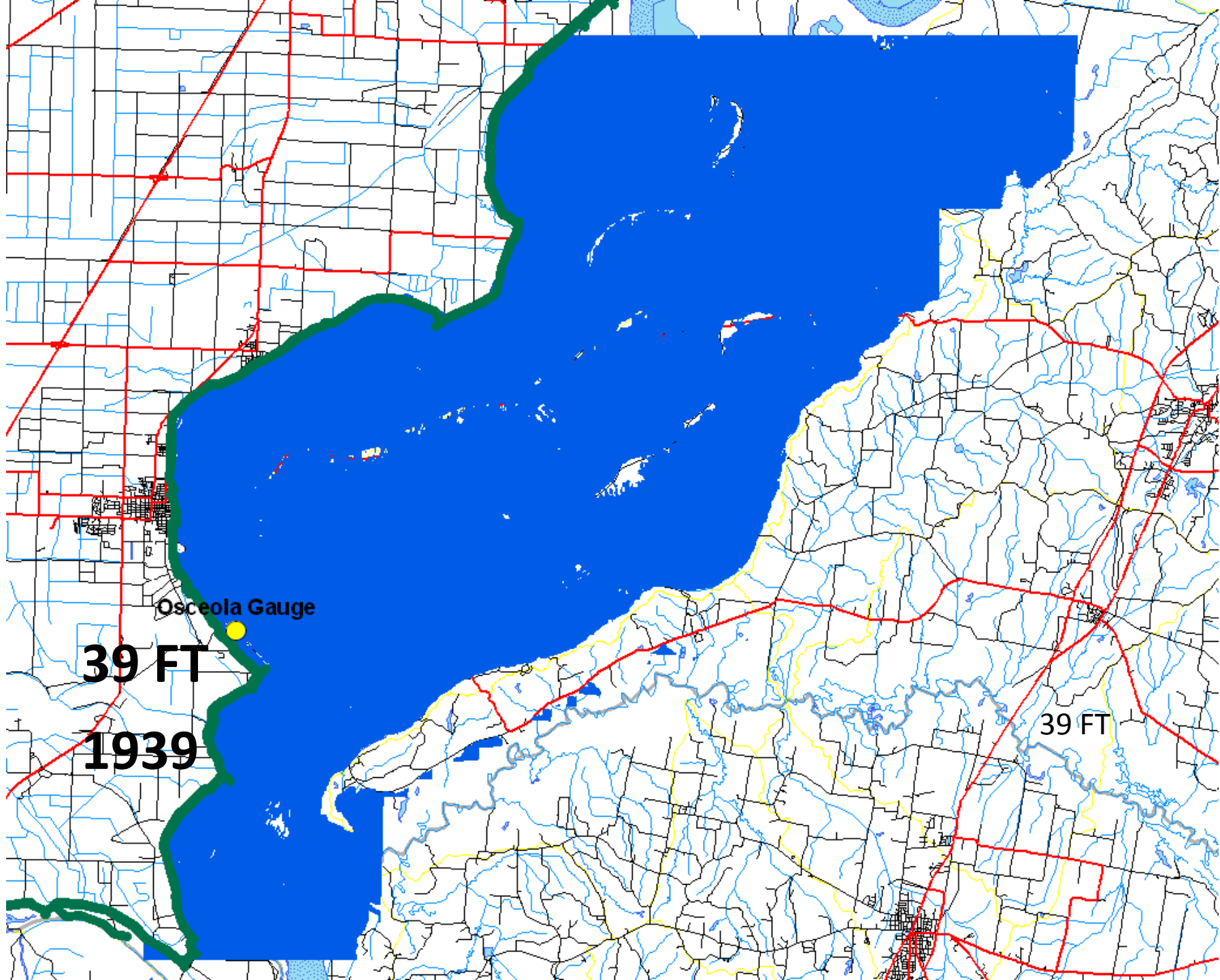
Osceola Gauge

38 FT

1946

38 FT



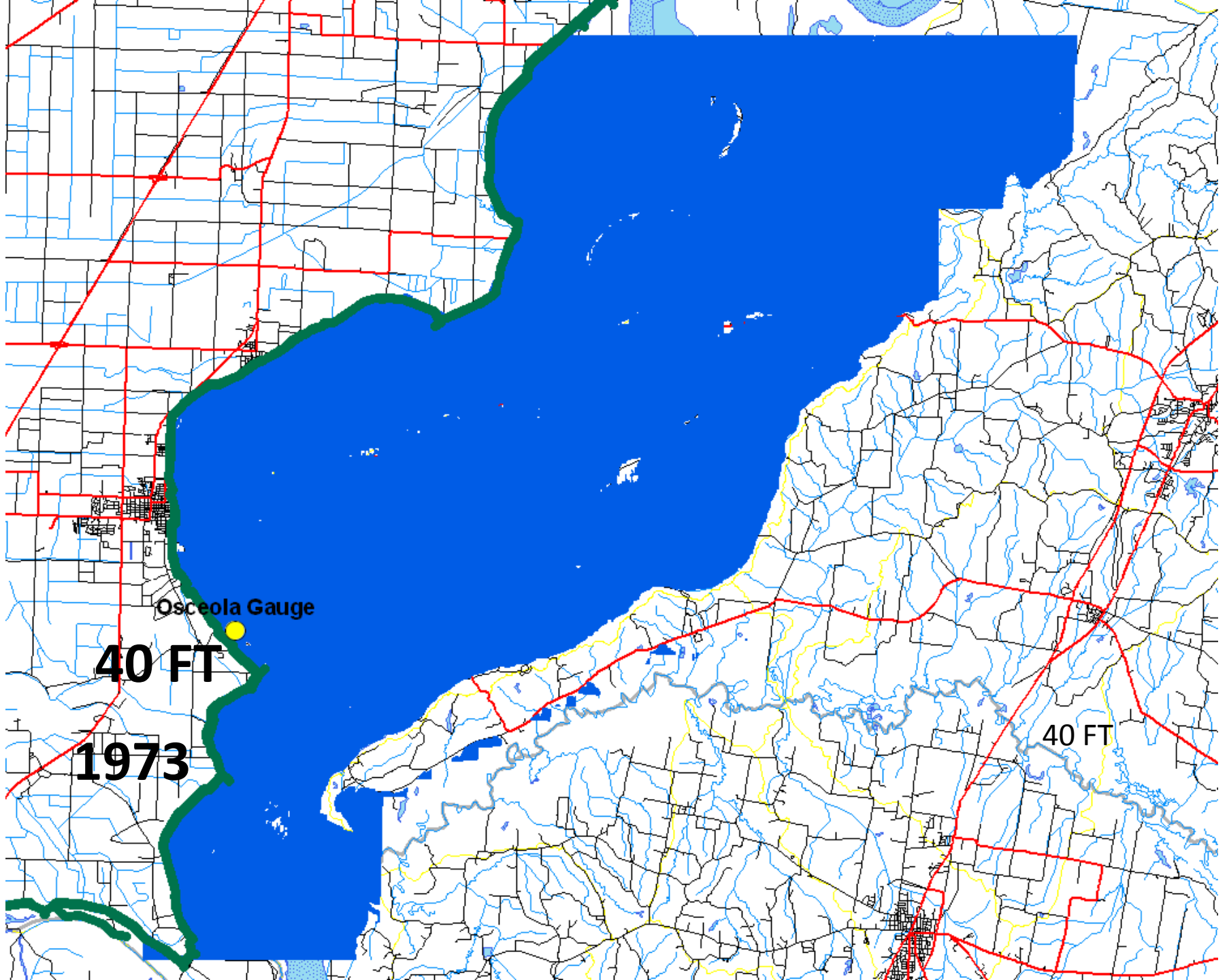


Osceola Gauge

**39 FT**

**1939**

39 FT

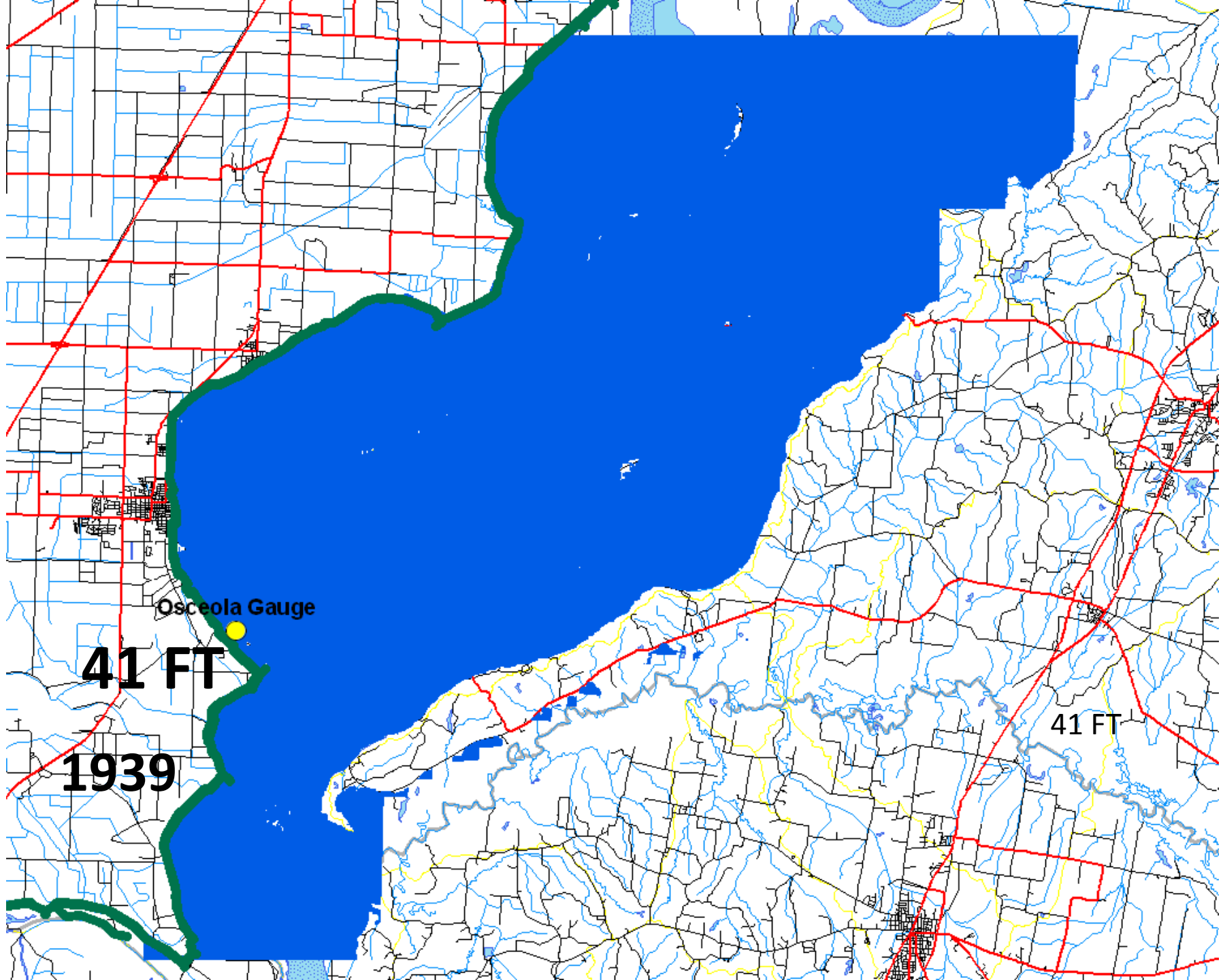


Osceola Gauge

40 FT

1973

40 FT



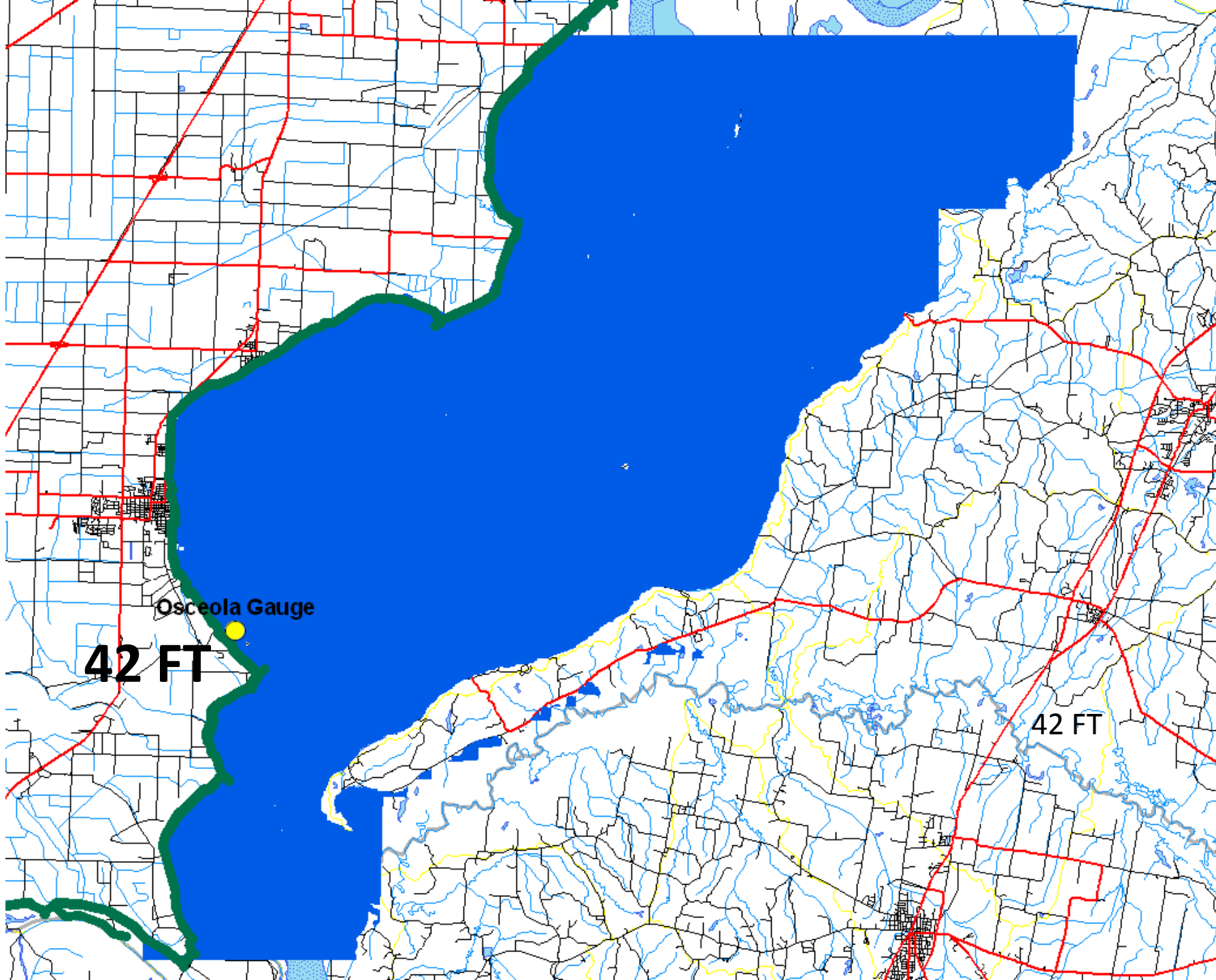
Osceola Gauge

41 FT

1939

41 FT





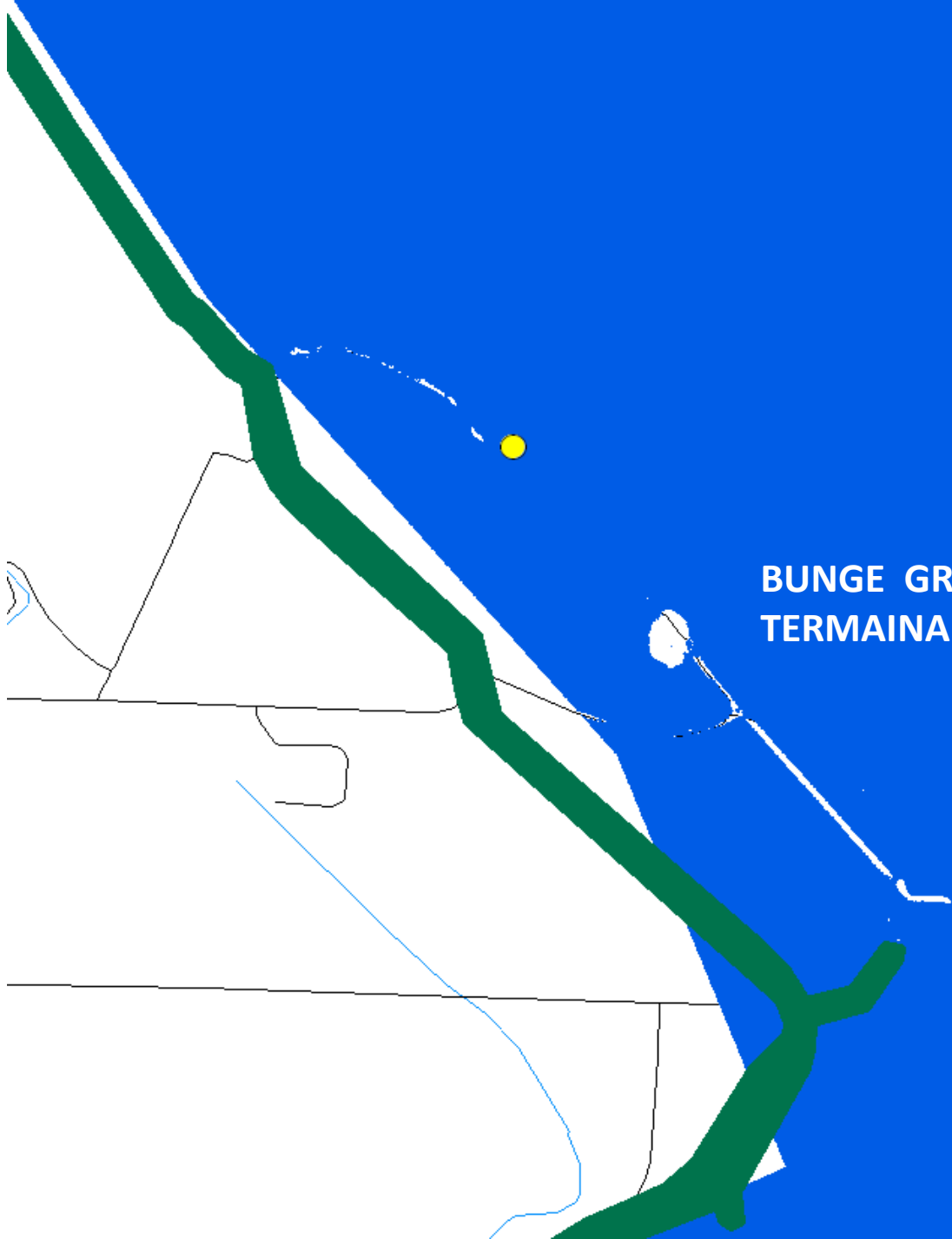
Osceola Gauge

42 FT

42 FT

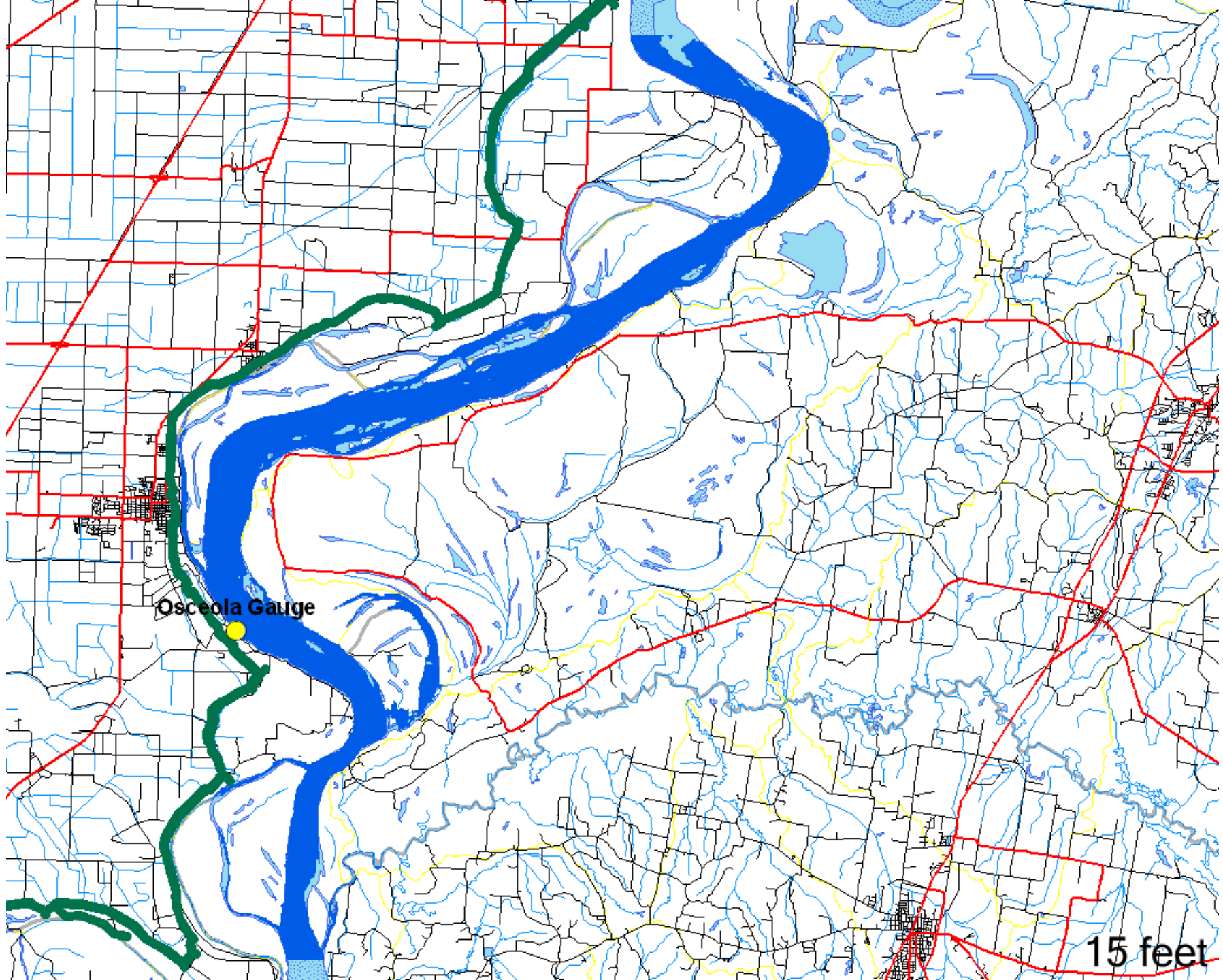
A map showing a green boundary line along a coastline. The area to the left of the line is white with a grid of roads and some buildings. The area to the right is solid blue. A small inset map shows a larger geographical context. The text 'POINSETT AND CONTENENTAL GRAIN AT OSCEOLA, AR 42 FEET' is centered on the blue area.

**POINSETT AND CONTENENTAL GRAIN  
AT OSCEOLA, AR 42 FEET**



**BUNGE GRAIN  
TERMINAL 42 FT**





Osceola Gauge

15 feet

**FEBRUARY 5, 2010 SURVEY**

# CRUTCHER LAKE ROAD AT COLD CREEK 2-5-10 29.5 FT

02/05/2010 13:33



**CRAWFORD ROAD WEST AT COLD CREEK  
2-5-10 29.5 FT WITHIN 3 FT OF FLOODING**



02/05/2010 13:40



**CRAWFORD ROAD EAST BY COLD CREEK  
ROAD IS FLOODING 2-5-10 29.5 FT**



**02/05/2010 13:48**



**SAM TAYLOR ROAD NEAR ADAMS BAYOU**  
**2-5-10 29.5 FEET**

02/05/2010 14:18



**GRAMMER ROAD UNDER SEVERAL FEET OF WATER  
NEAR THE NORTH END OF SAM TAYLOR ROAD  
AT JONES SLOUGH      2-5-10    29.5 FEET**



**02/05/2010 14:44**

**FLOODING NORTH OF GRAMMER ROAD NEAR  
THE NORTH END OF SAM TAYLOR ROAD  
2-5-10 29.5 FEET ON GAGE**



02/05/2010 14:44



**SNYDER BLUFF ROAD AWASH  
2-5-10 29.5 FEET ON OSCEOLA GAGE**



02/05/2010 15:18



**CONNER ROAD 2-5-10 OSCEOLA GAGE READING  
29.5 FEET.**



**02/05/2010 15:50**

**FITZPATRICK ROAD FLOODED BETWEEN CONNER  
AND SUNK ROAD 2-5-10 29.5 FEET ON THE  
OSCEOLA GAGE.**



**02/05/2010 15:55**



OUT – OF - BOUNDS ROAD NEAR LOWER FORK  
OF OLD FORKED DEER RIVER 2-5-10 29.5 FEET



02/05/2010 16:05



**LONG HOLE ROAD  
2-5-10 29.5 FEET**



02/05/2010 16:17

**GRAMMER ROAD IN JOHN TULLEY WOODS  
2-5-10 29.5 FEET**



02/05/2010 17:00

# RESULTS/STATUS

- 1. DERIVED WORKABLE FLOOD STAGES BASED ON EXTENSIVE STUDY OF FLOOD PLAIN USING LIDAR, GIS, LANDSAT, AND RIVER SURVEY BY AUTOMOBILE.**
- 2. COOPERATED WITH LOWER MISSISSIPPI RIVER FORECAST CENTER TO GET THEM TO FORECAST RIVER HEIGHT AT OSCEOLA, ARKANSAS. RIVER FORECASTS FOR OSCEOLA ARE NOW ON THE NOAA WEATHER RADIO AND INTERNET.**
- 3. DERIVED USABLE FLOOD MAPS FOR THE REACH OF THE OSCEOLA GAGE FOR MISSISSIPPI COUNTY, AR AND LAUDERDALE COUNTY, TENNESSEE. WE HOPE TO PUT THESE MAPS ON THE INTERNET.**



**Do you really know  
how deep and fast  
the water is?**



**Turn Around  
Don't Drown**