SUMMARY OF FINDINGS: APALACHICOLA RIVER

Mike Harvey

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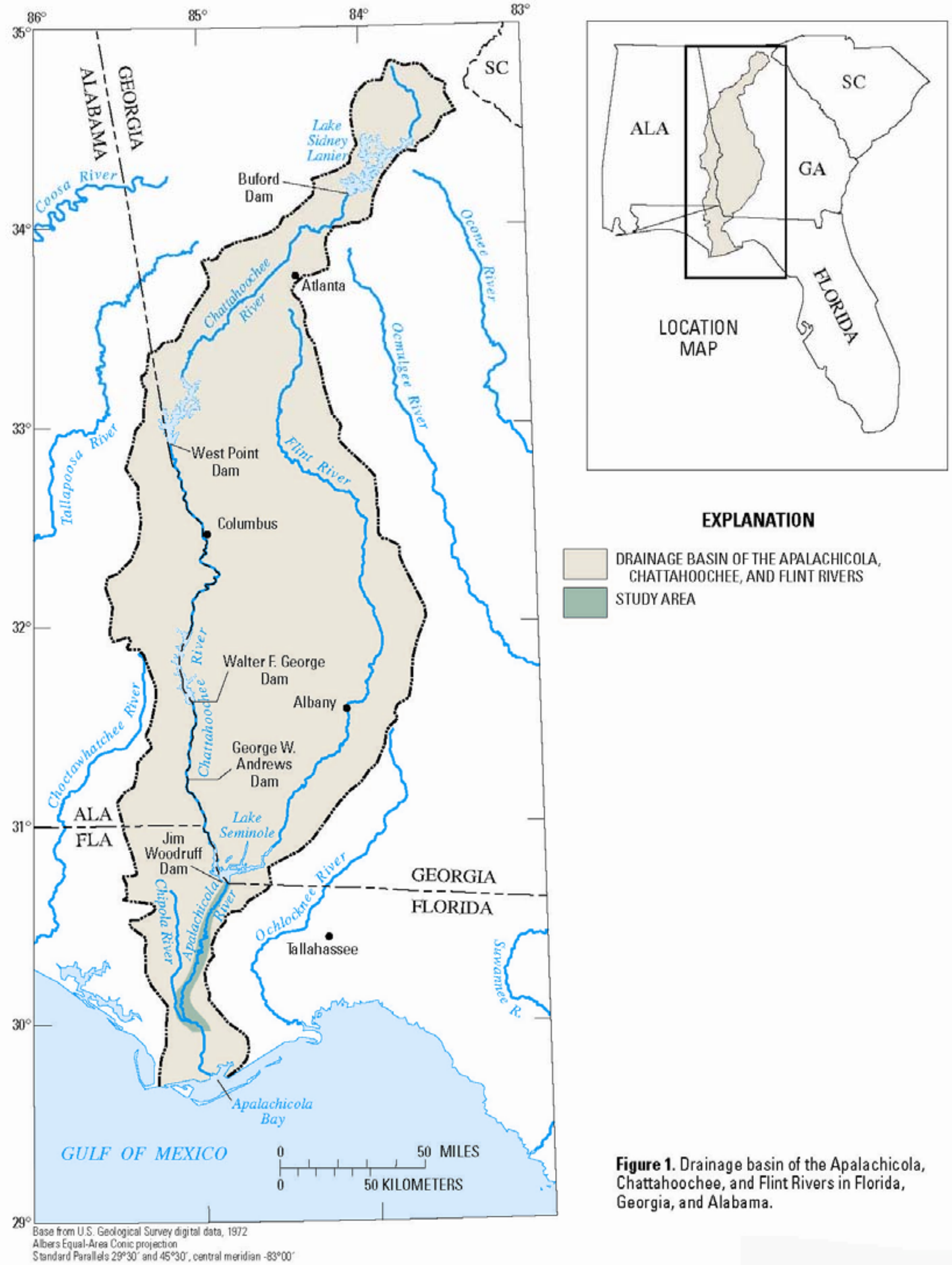

Figure 1. Drainage basin of the Apalachicola, Chattahoochee, and Flint Rivers in Florida, Georgia, and Alabama.

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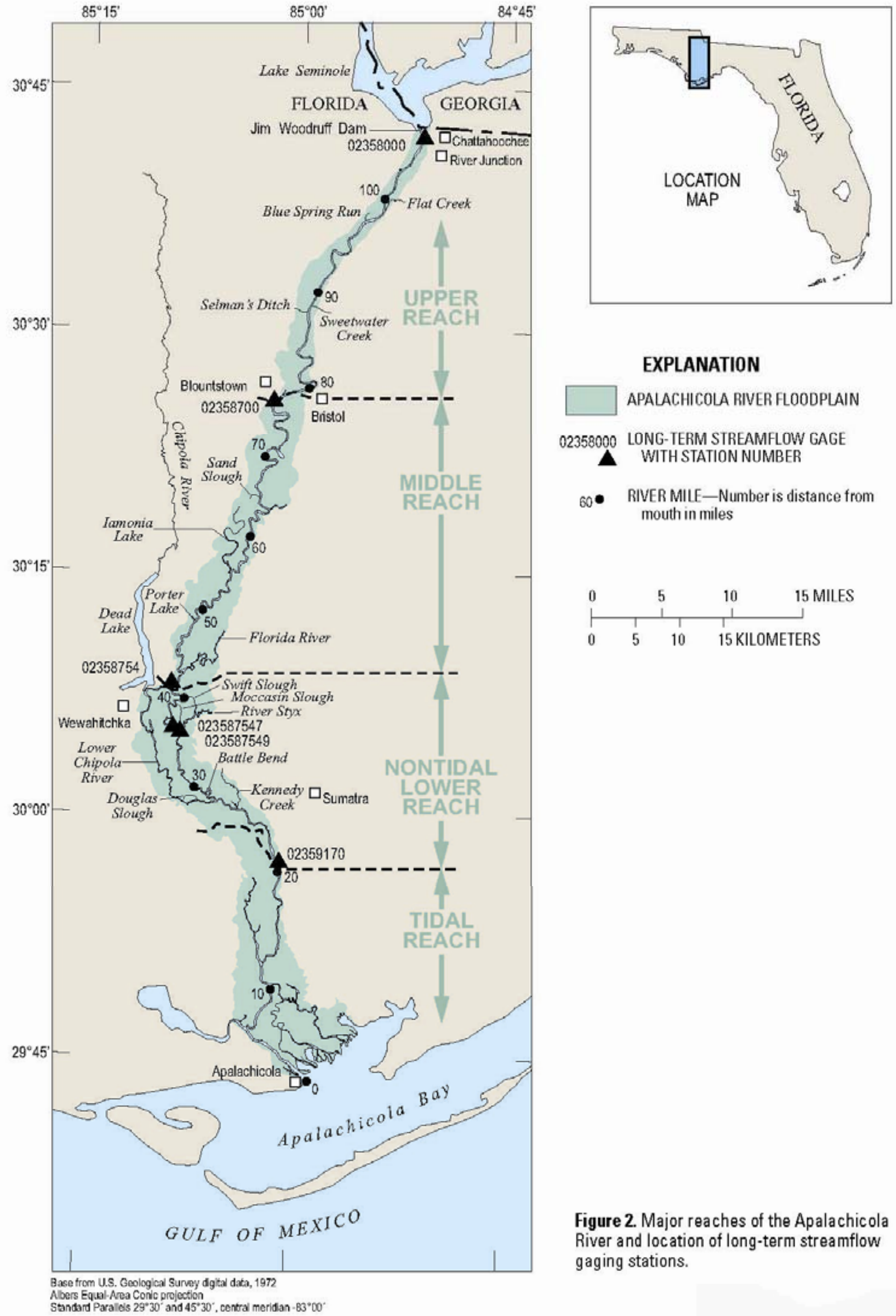

Figure 2. Major reaches of the Apalachicola River and location of long-term streamflow gaging stations.

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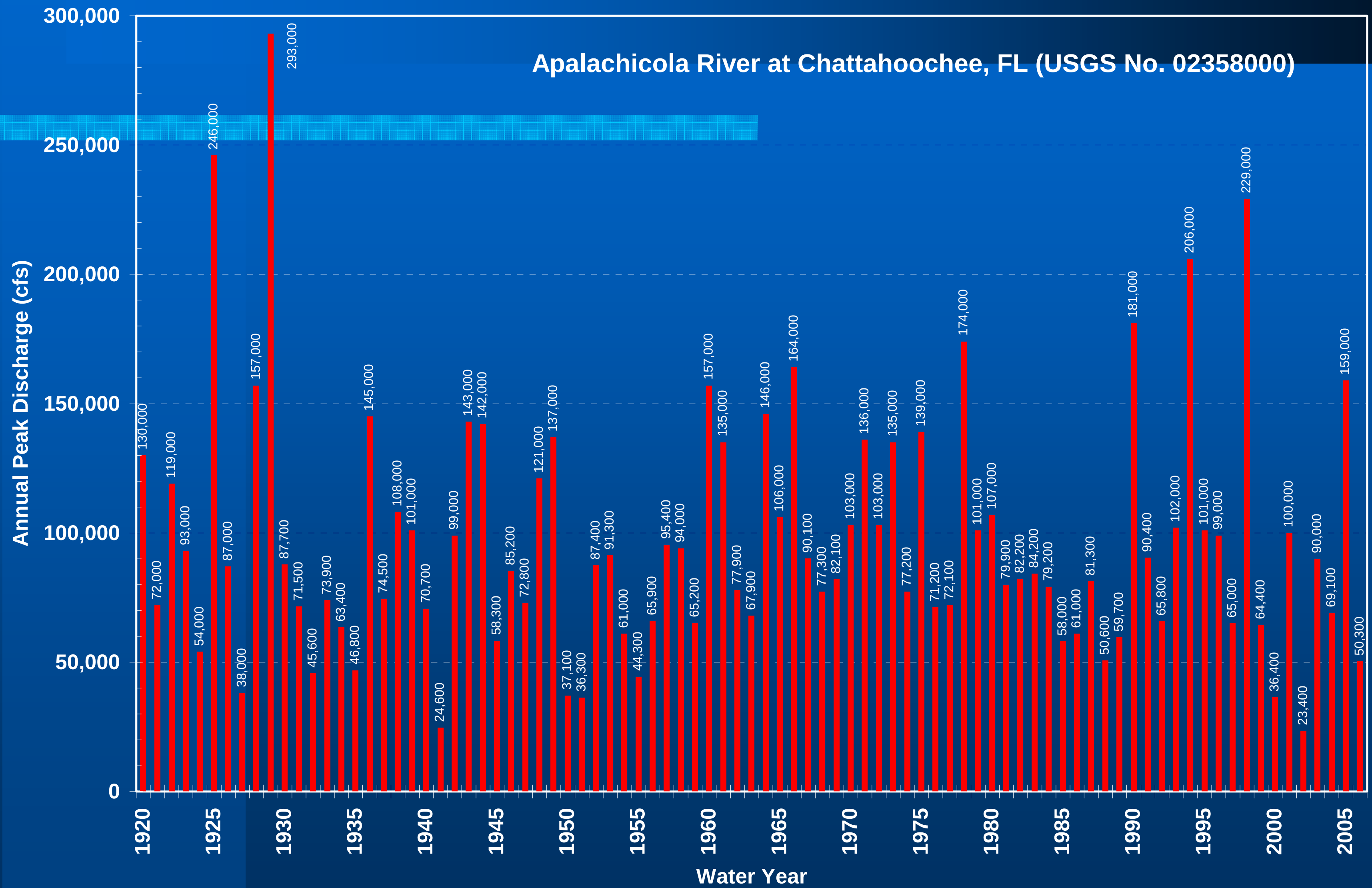

Apalachicola River at Chattahoochee, FL (USGS No. 02358000)
Annual Peak Discharge (cfs)
300,000
250,000
200,000
150,000
100,000
50,000
0
130,000
72,000
119,000
93,000
54,000
246,000
87,000
38,000
157,000
293,000
87,700
71,500
45,600
73,900
63,400
46,800
145,000
74,500
108,000
101,000
70,700
24,600
99,000
143,000
142,000
58,300
85,200
72,800
121,000
137,000
37,100
36,300
87,400
91,300
61,000
44,300
65,900
95,400
94,000
65,200
157,000
135,000
77,900
67,900
146,000
106,000
164,000
90,100
77,300
82,100
103,000
136,000
103,000
135,000
77,200
139,000
71,200
72,100
174,000
101,000
107,000
79,900
82,200
84,200
79,200
58,000
61,000
81,300
50,600
59,700
181,000
90,400
65,800
102,000
206,000
101,000
99,000
65,000
229,000
64,400
36,400
100,000
23,400
90,000
69,100
159,000
50,300
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
Water Year

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ALABAMA
GEORGIA
CHATTAHOOCHEE ANTICLINE
GULF TROUGH
SOUTHEAST GEORGIA EMBAYMENT
NASSAU NOSE
JACKSONVILLE BASIN
ST. JOHNS PLATFORM
SANFORD HIGH
APALACHICOLA EMBAYMENT
OCALA PLATFORM
BREVARD PLATFORM
OSCEOLA LOW
GULF OF MEXICO
FLORIDA
OKEECHOBEE BASIN
N
0 50 100 150 MILES
0 80 160 240 KILOMETERS
SCALE

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Reach	Sv	Sc	P
Upper RM 106-78	0.00012	0.000094	1.3
Middle RM 78 - 35	0.00018	0.000093	1.9
Lower RM 35 - 6	0.00012	0.000095	1.3


Jim Woodruff Dam


Tributary sediment supply


Low sediment storage in dikes


Limestone outcrop


Cohesive banks


Alum Bluff Fm.


Alum Bluff Fm. sands


Bluff sediment supply

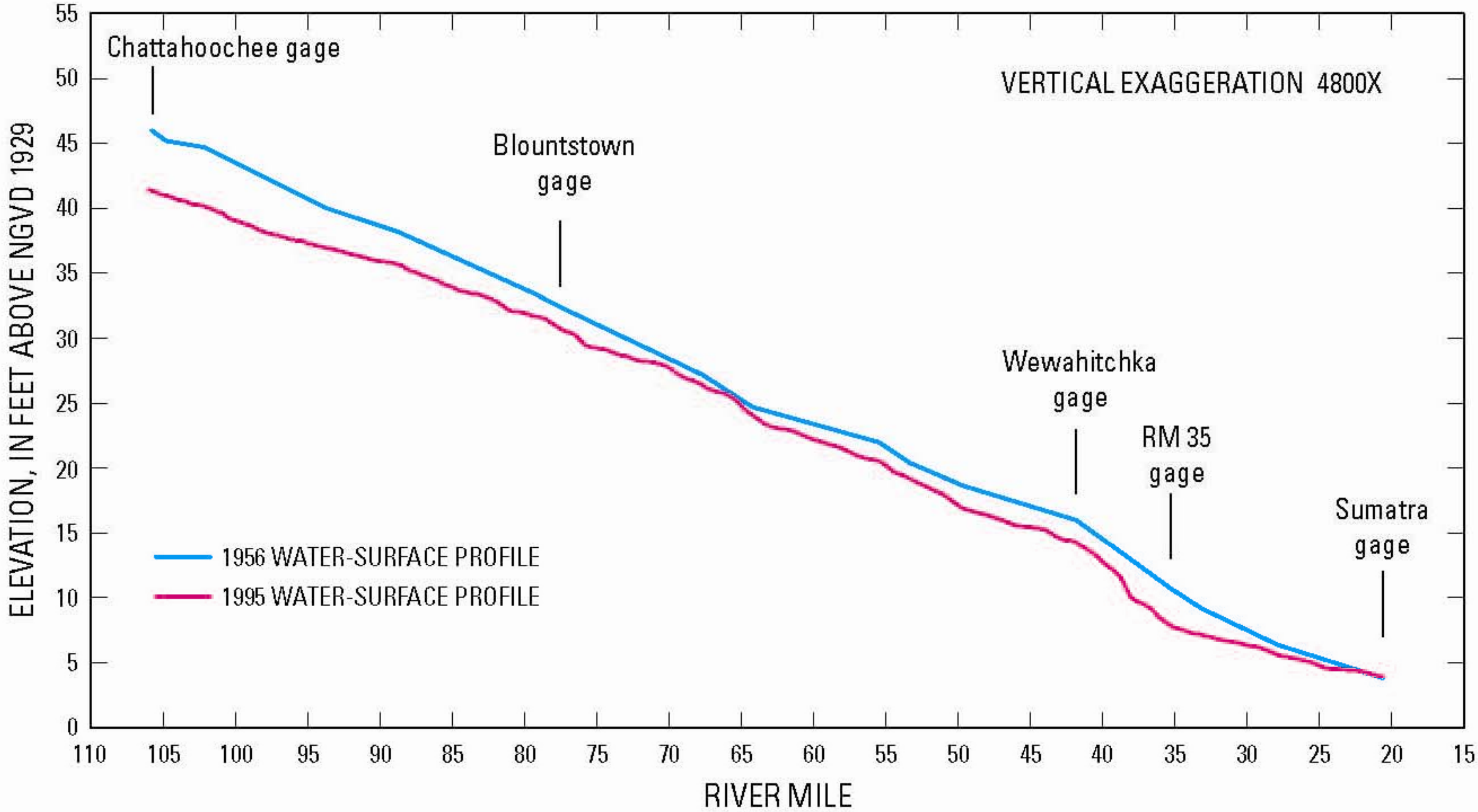

Figure 4. Water-surface profiles developed in 1956 and 1995 for the nontidal reach of the Apalachicola River, Florida, for a discharge of 9,300 ft^3/s at Chattahoochee streamgage. The 1956 water-surface profile is from Plate 43A of Design Memorandum No. 1 (U.S. Army Corps of Engineers, 1955). Design Memorandum No. 1 is dated December 15, 1955 (with transmittal to the Division Engineer December 23, 1955); however, Plate No. 43A is dated March 1956 with the notation: "This Plate is a supplement to Plate No. 43". Apparently computations for this water-surface profile were completed after the report was transmitted and were made an official supplement to the report after-the-fact. The 1995 water-surface profile is provisional (USACE, Mobile District, unpublished data, 2005).

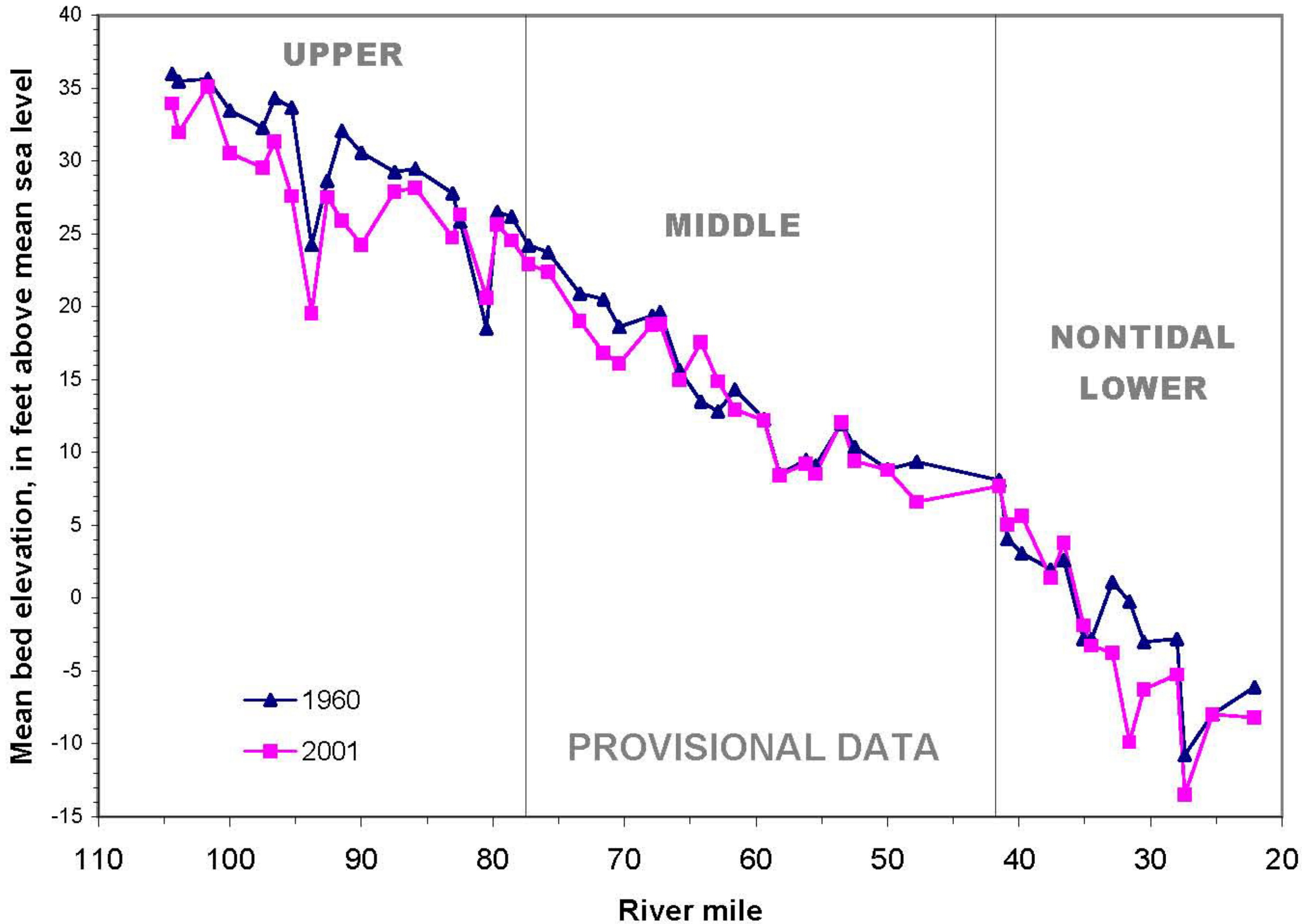

Figure 4. Mean bed elevation of low-flow channel of the nontidal Apalachicola River, Florida, in 1960 and 2001. Data was derived from U.S. Army Corps of Engineers cross-sections surveys. At each cross-section, the water-surface elevation at a lagged discharge of 10,000 cubic feet per second at the Apalachicola River gage at Chattahoochee, Florida, was used to calculate mean bed elevation. River miles represent those depicted on the most recent USGS quadrangle maps available in 2005.

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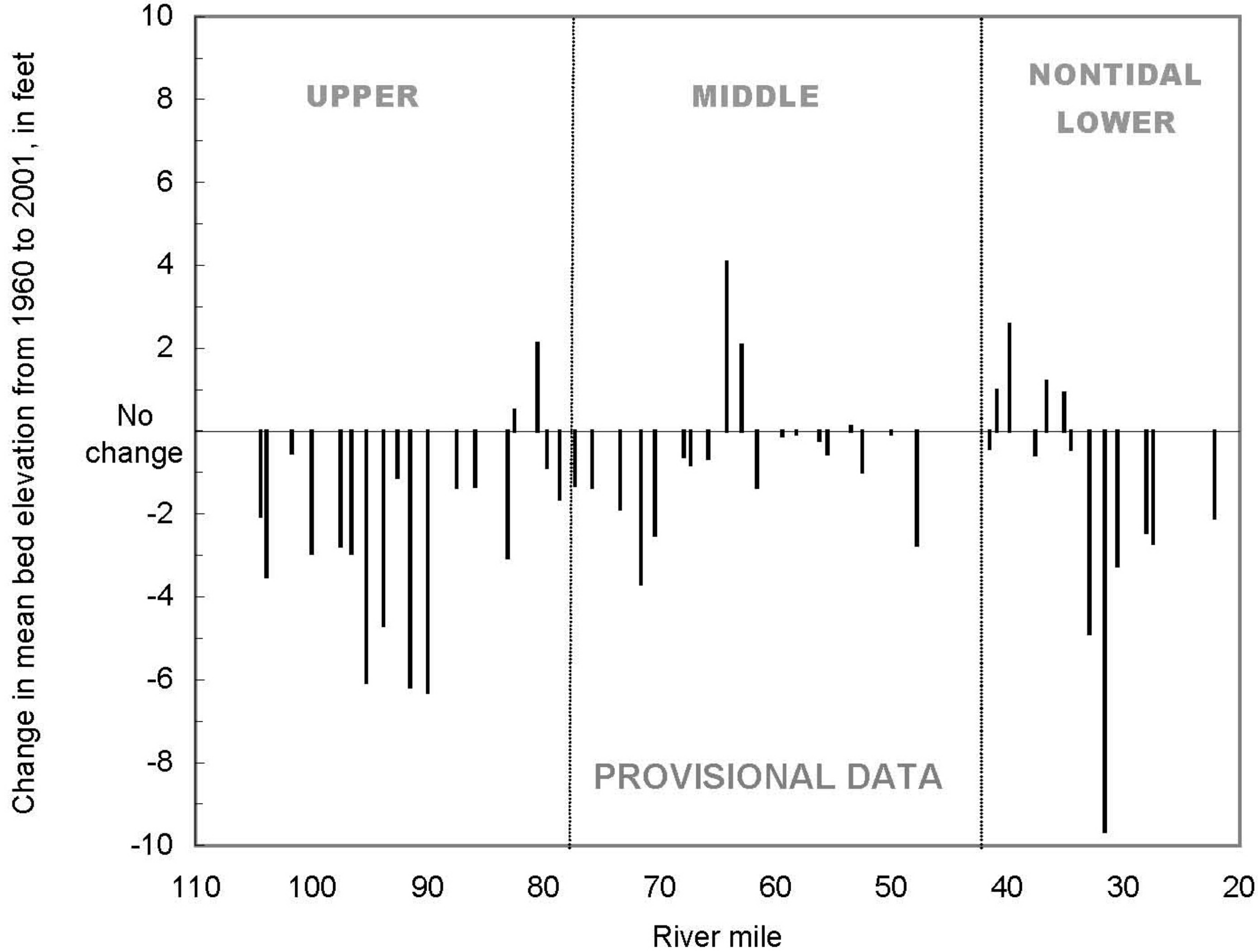

Figure 5.--Change in mean bed elevation of low-flow channel of the non-tidal Apalachicola River, Florida, from 1960 to 2001. Data was derived from U.S. Army Corps of Engineers cross-sections surveys. At each cross-section, the water-surface elevation at a lagged flow of 10,000 cubic feet per second at the Apalachicola River gage at Chattahoochee, Florida, was used to calculate mean bed elevation. River miles represent those depicted on the most recent USGS quadrangle maps available in 2005.

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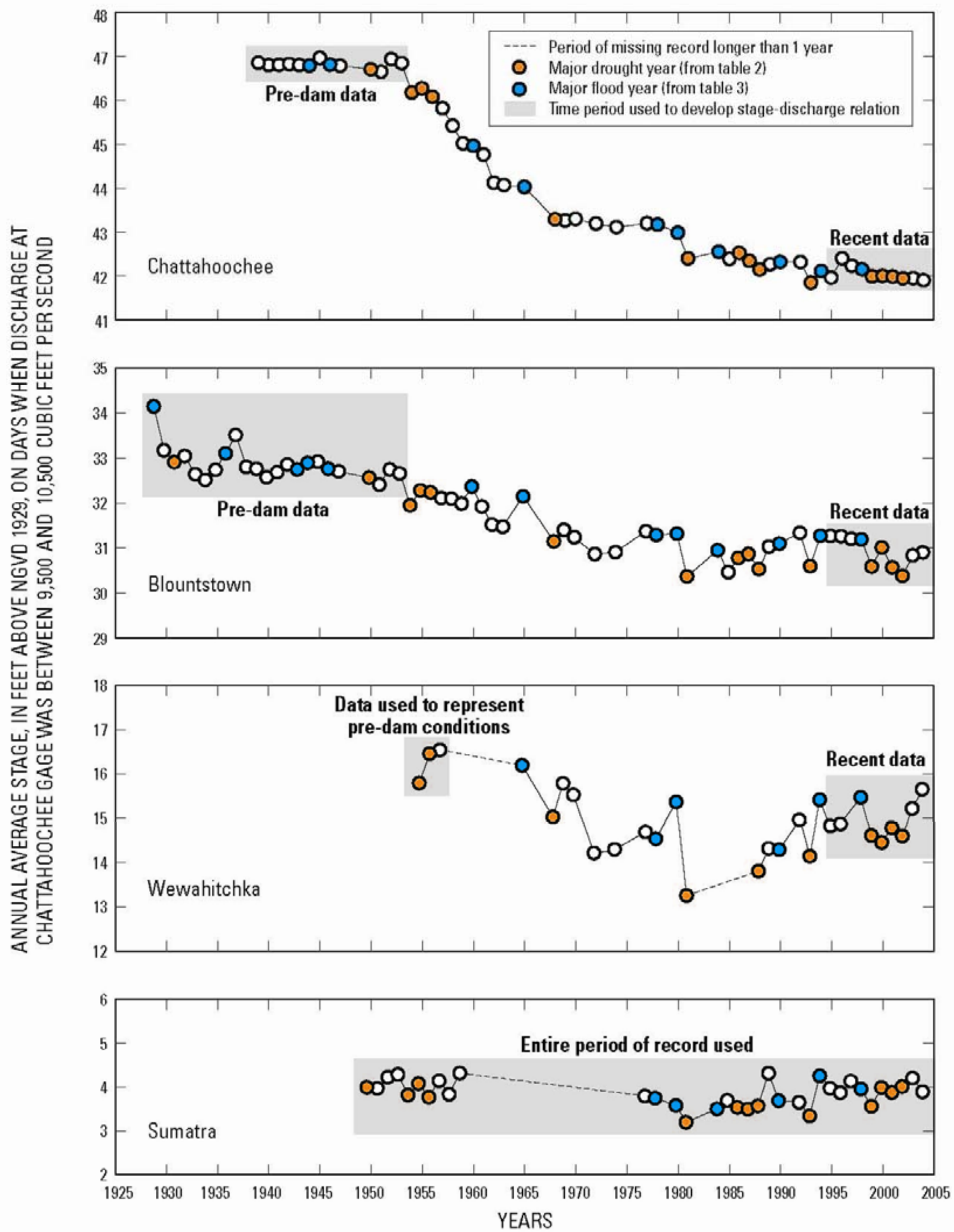
Period of missing record longer than 1 year
Major drought year (from table 2)
Major flood year (from table 3)
Time period used to develop stage-discharge relation
Pre-dam data
Recent data
Chattahoochee
Blountstown
Data used to represent pre-dam conditions
Wewahitchka
Entire period of record used
Sumatra
ANNUAL AVERAGE STAGE, IN FEET ABOVE NGVD 1929, ON DAYS WHEN DISCHARGE AT CHATTAHOOCHEE GAGE WAS BETWEEN 9,500 AND 10,500 CUBIC FEET PER SECOND
YEARS

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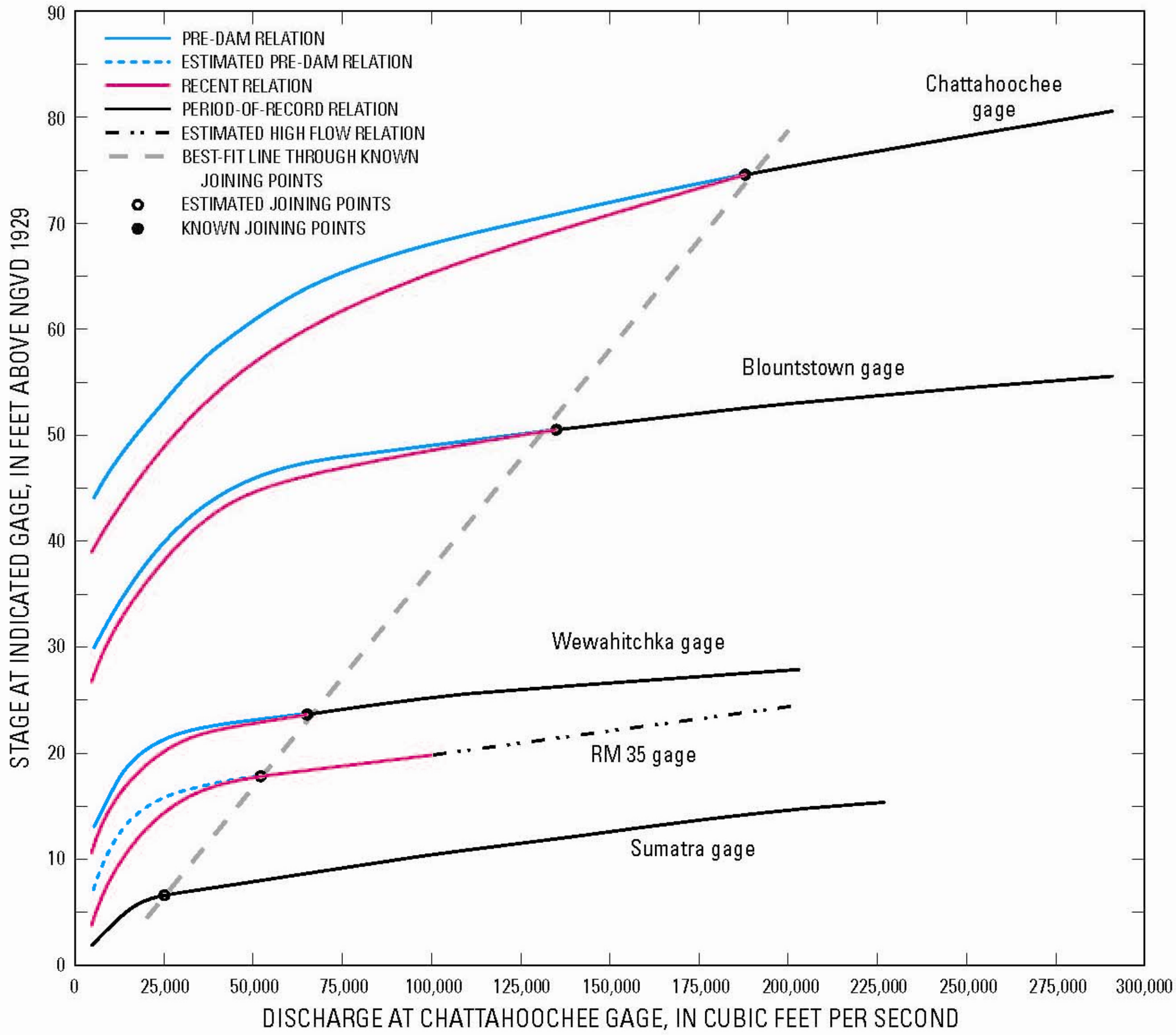

Figure 6. Stage at five streamgages on the Apalachicola River in relation to discharge at Chattahoochee, Florida, with known and estimated joining points for pre-dam and recent relations. Relations at streamgages downstream from Chattahoochee were developed using lag times as defined in glossary. An estimated joining point was needed for Sumatra, even though there is only one curve at that site, so that interpolated pre-dam and recent relations could be developed between RM 35 and Sumatra.

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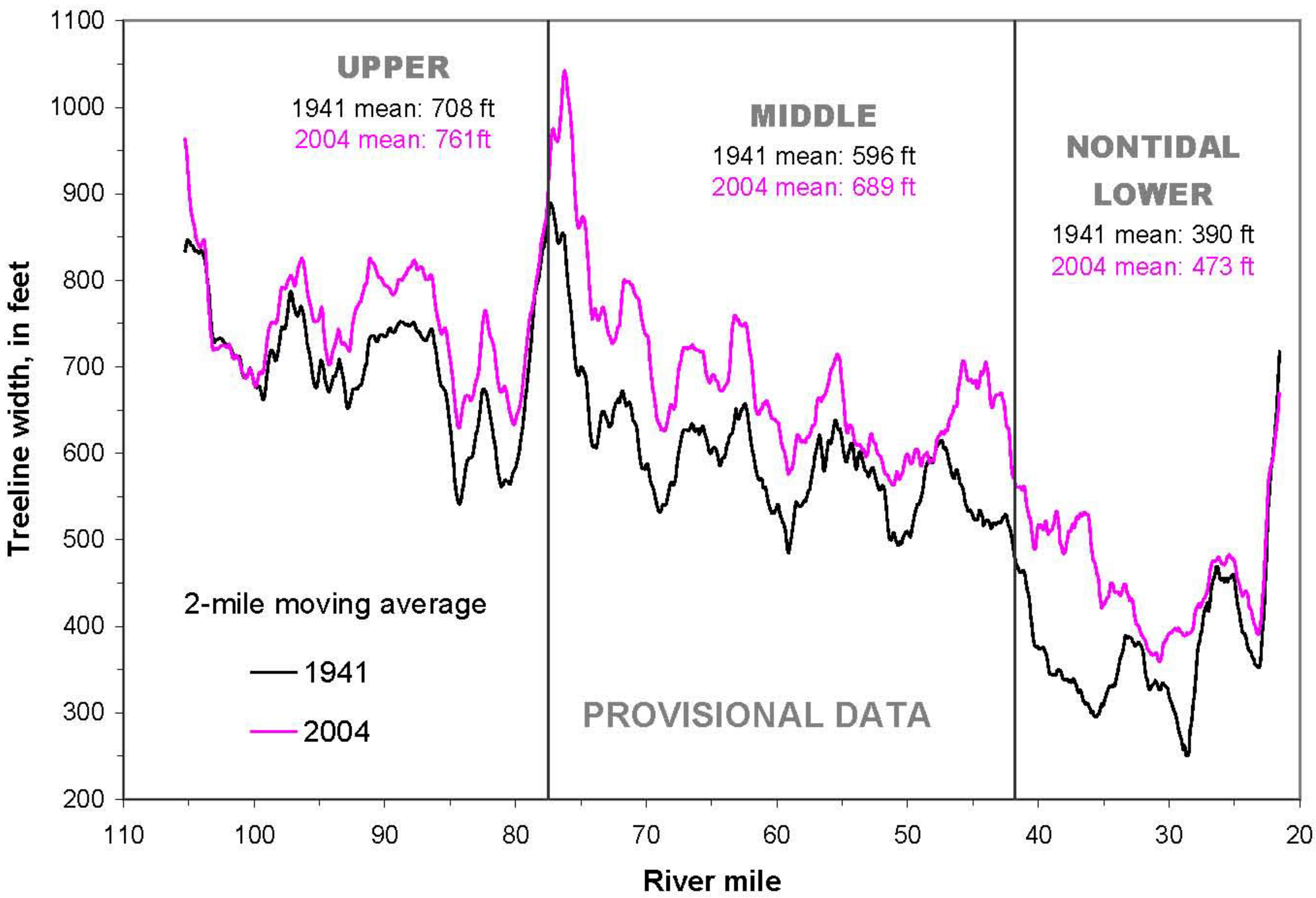

Figure 1. Treeline width of main channel of nontidal reach of Apalachicola River, Florida, in 1941 and 2004. Widths were measured at approximately 2,800 points at 164-foot intervals along the channel centerline in aerial photographs. Data shows a 2-mile (64-point) moving average. River miles represent those depicted on the most recent USGS quadrangle maps available in 2005.

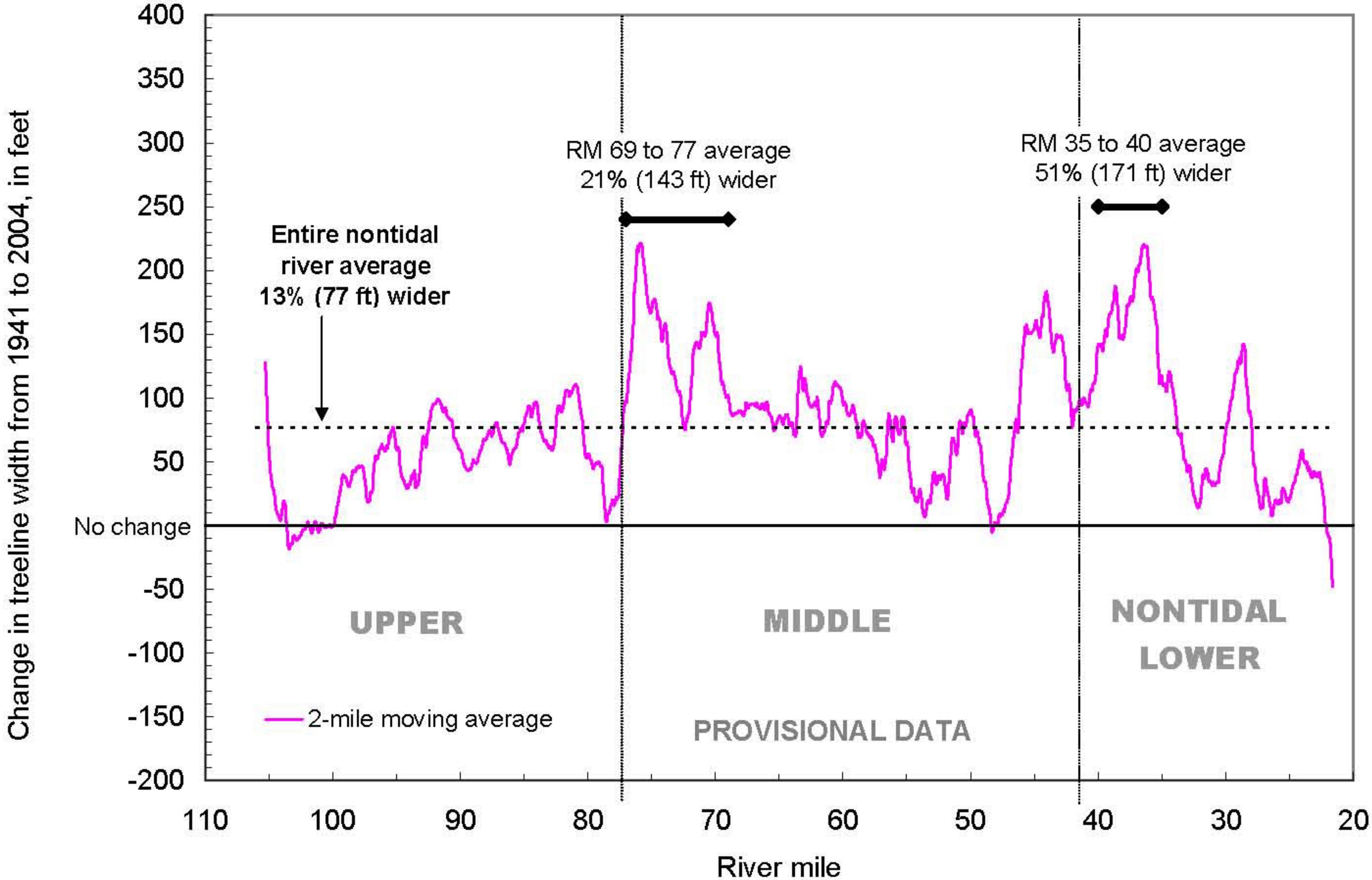

Figure 2. Change in treeline width of main channel of nontidal reach of Apalachicola River, Florida, from 1941 to 2004. Widths were measured at approximately 2,800 points at 164-foot intervals along channel centerline in aerial photographs. Data shows a 2-mile (64-point) moving average. River miles represent those depicted on the most recent USGS quadrangle maps available in 2005.

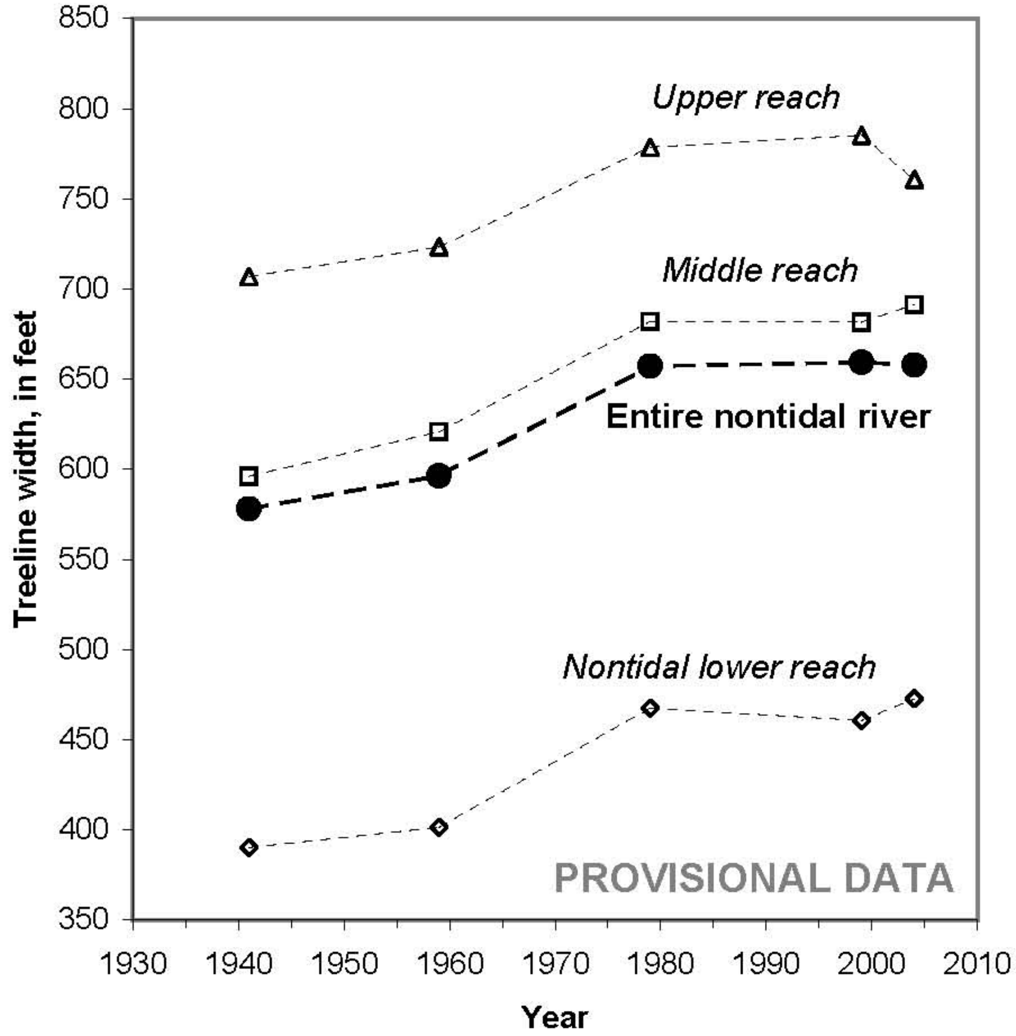

Figure 3.--Mean treeline width of main channel of nontidal reach of Apalachicola River, Florida, in relation to time. Measurements were made on aerial photographs along the river centerline at approximately 2,800 points equally spaced at 164-foot intervals.

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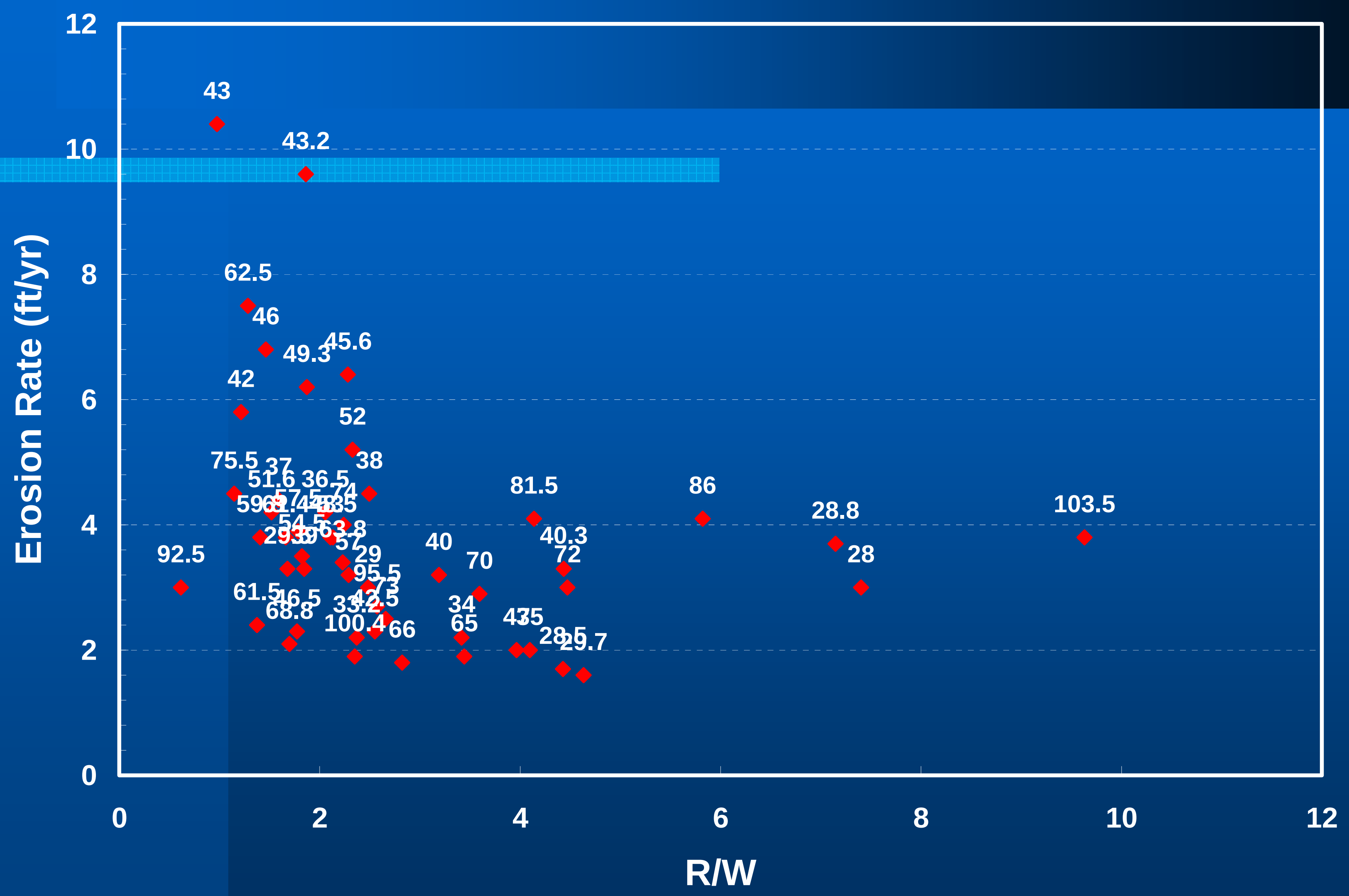
Erosion Rate (ft/yr)
R/W
0
2
4
6
8
10
12
43
43.2
62.5
46
45.6
49.3
42
52
75.5
38
81.5
86
28.8
103.5
92.5
40
70
40.3
72
28
61.5
68.8
100.4
66
34
65
29.7

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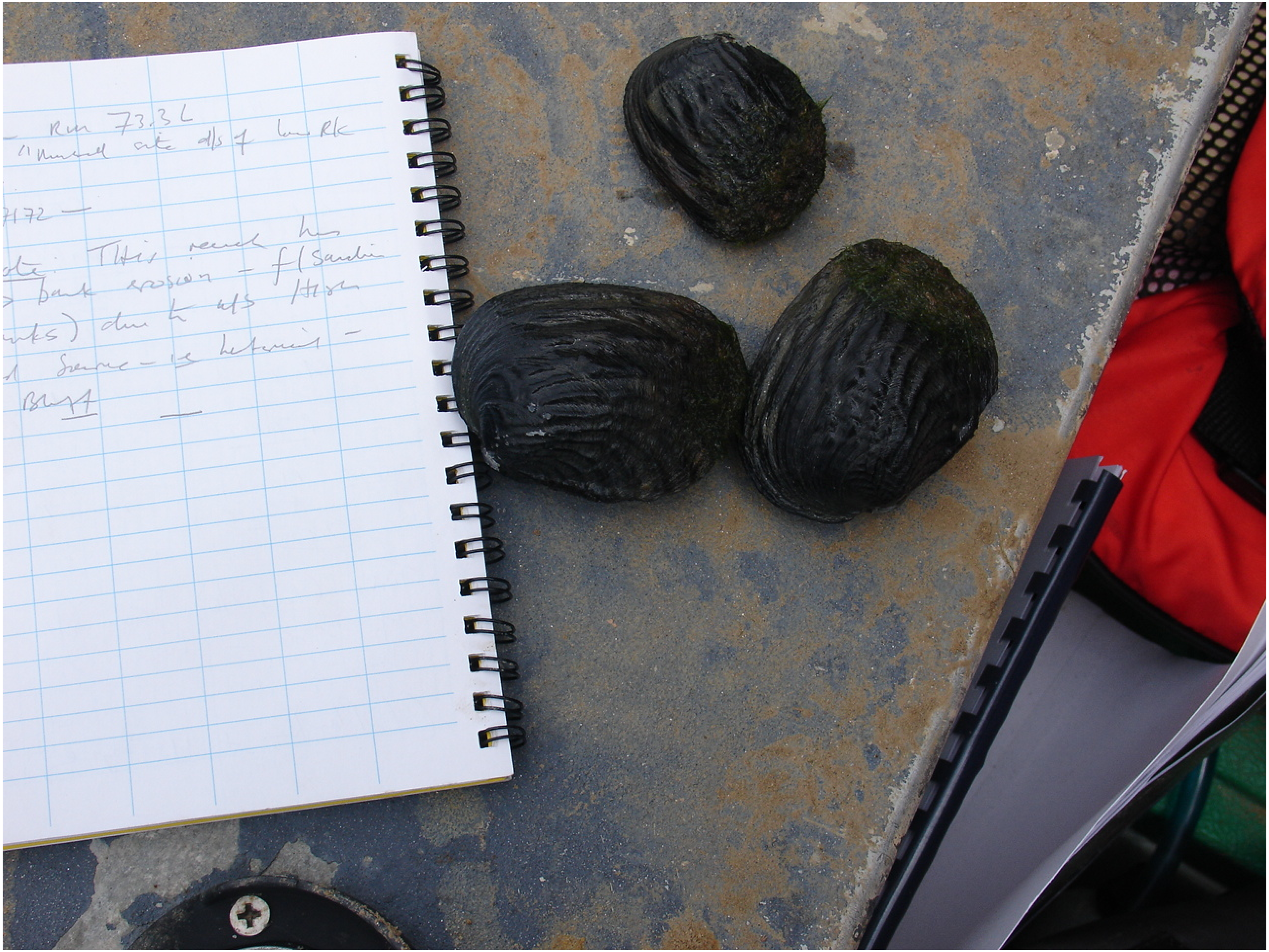


Equiloxic Creek


RM47.2R


RM 44L


Kentucky Ldg.


Swift Slough


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post-consumer recycled material.

CONCLUSIONS - 1

- **JW Dam and upstream dams have reduced sediment supply to AR, but have not changed hydrology significantly.**
- **AR has degraded: 5 ft us – 2 ft ds**
- **Not clear if AR has widened**
- **Bed slope is uniform through the reaches (0.000093-95)**
- **Very high sinuosity from RM 78 – RM 35 probably due to active tectonics**

CONCLUSIONS - 2

- **Maximum erosion rates (~ 10 ft/yr) are low in comparison to other rivers**
- **FTM habitat is associated with eddy deposits; ds end of bends, backwater bars, dikes.**
- **FTM habitat is ephemeral and changes with time and space.**
- **Rates of change are a function of the frequency and magnitude of flood events.**
- **Distributary channels (e.g. Swift Slough) are also ephemeral features.**

IDENTIFIED ISSUES

- Is the AR widening and what are the processes
- Has the AR attained a level of equilibrium or will instability move ds.
- Quantification of the relationships between meander dynamics and FTM habitat
- How much eddy habitat is available in the meandering reach (RM 78 – RM 35).

RECOMMENDATIONS

- **Thorough integrated geomorphic evaluation**
- **Development of a sediment mass balance with SIAM**
- **2-D models of different habitat types**
- **Develop process-response model for prediction of impacts of water ops. on FTM habitat.**

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NO
SWIMMING
ALLIGATORS
FREQUENT
THIS AREA !
BE SAFE
SAVE YOUR LIFE

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