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Hydraulic Aspects of the Project Design Flood & Risk-Based Analysis

David P. Berretta, P.E.

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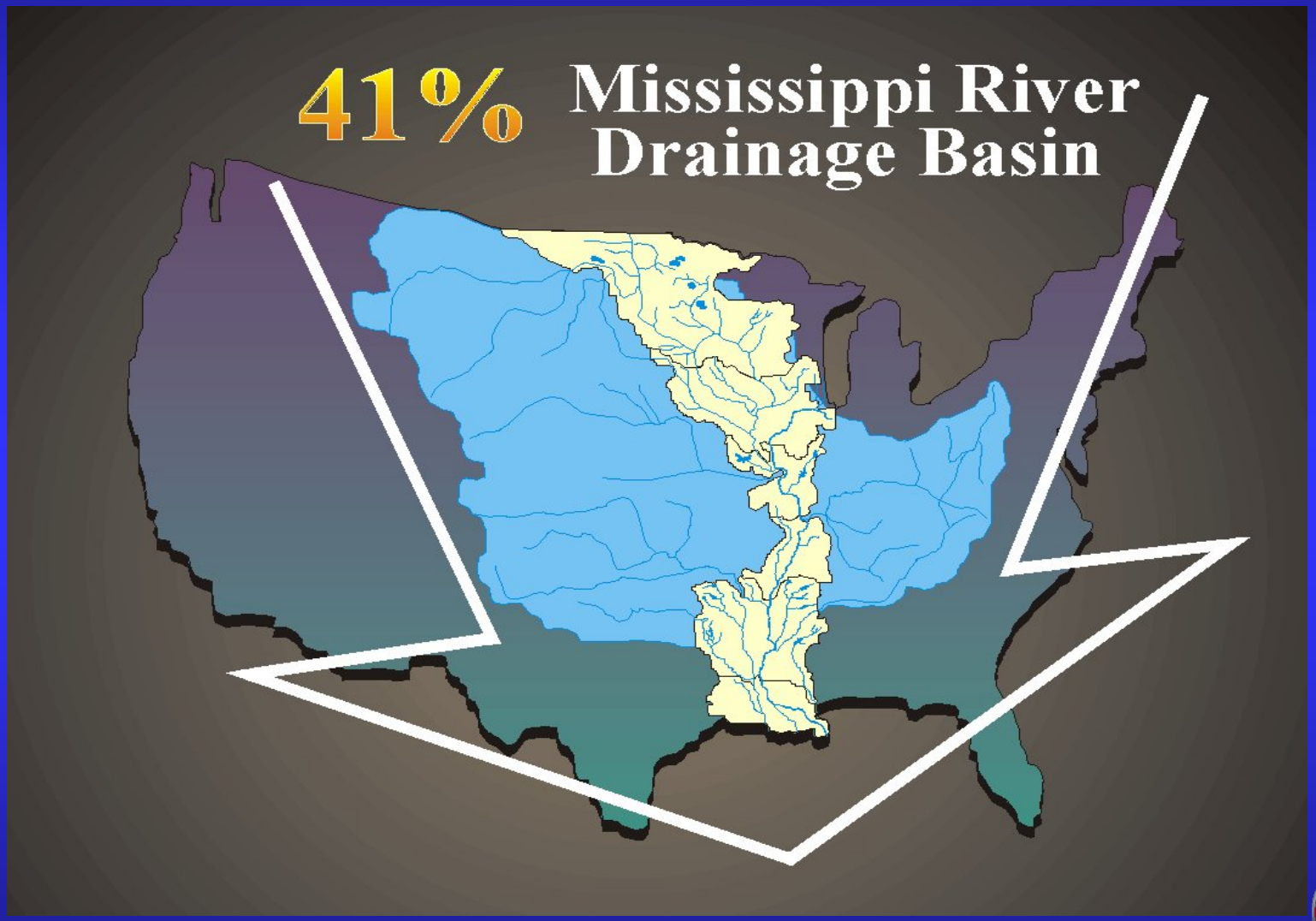

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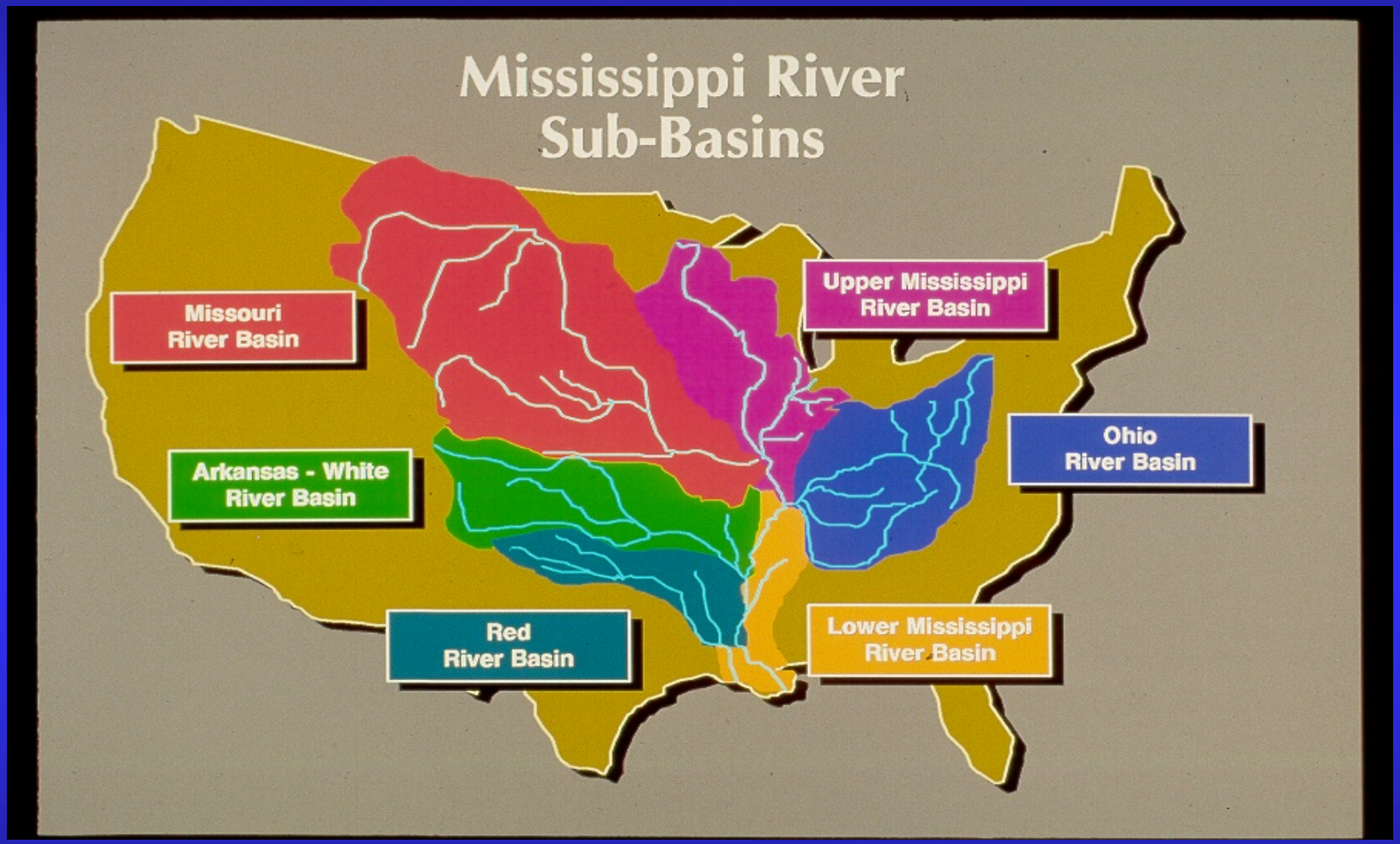

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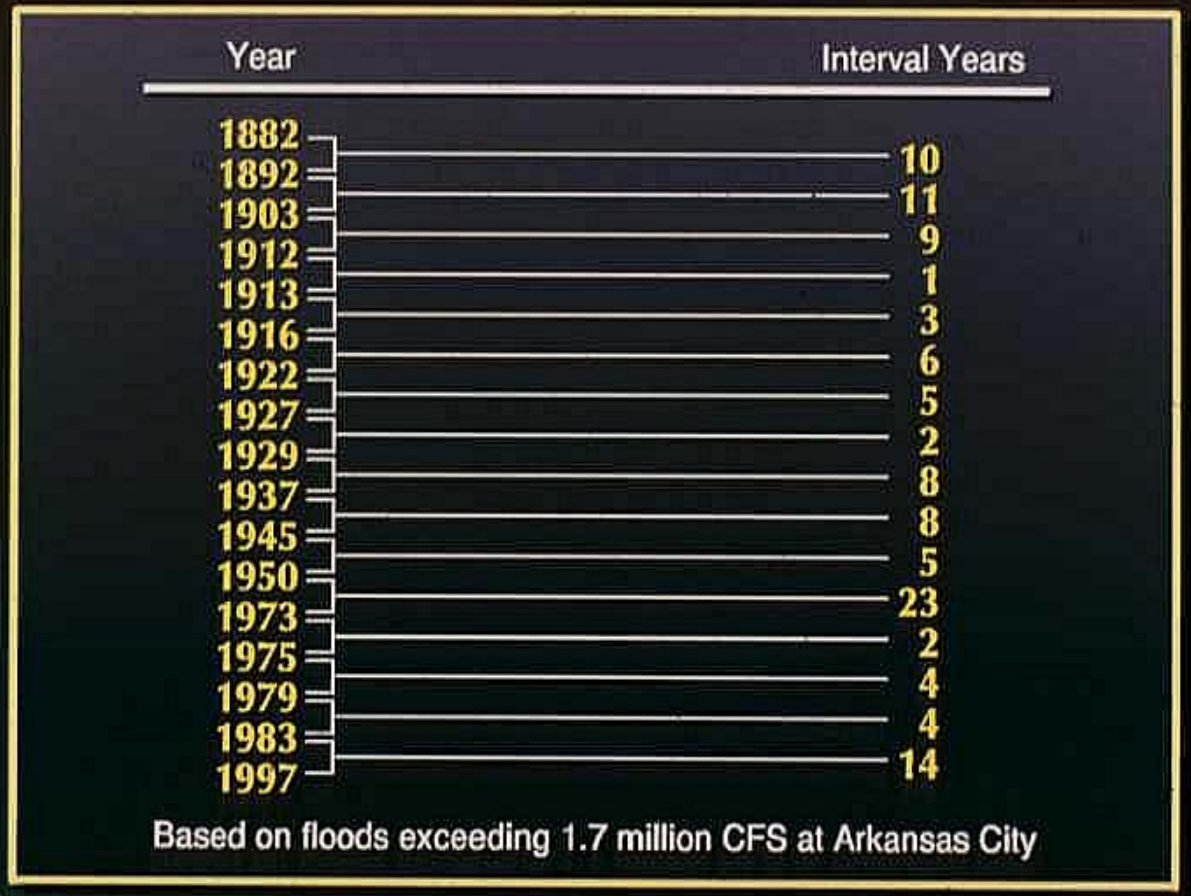
Major Floods Since 1879 - Lower Mississippi Valley



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Project Design Flood

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What is it?

- Design flood for the MR&T Project
  - Developed in 1956
- Has a reasonable chance of occurrence

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Project Design Flood

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- Storm sequence developed by the NWS
  - Investigated 35 hypothetical storm series
  - Selected the series that produced the greatest runoff
  - NWS reviewed in 1990
- No frequency assigned to the PDF
  - Adopted in 1956
  - Reviewed following the 1973 Flood

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Project Design Flood

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Purpose of the PDF for the MR&T Project:

- Basis for establishing levee grades
- Planning other flood control features
- Evaluating the benefits of flood control reservoirs on tributaries

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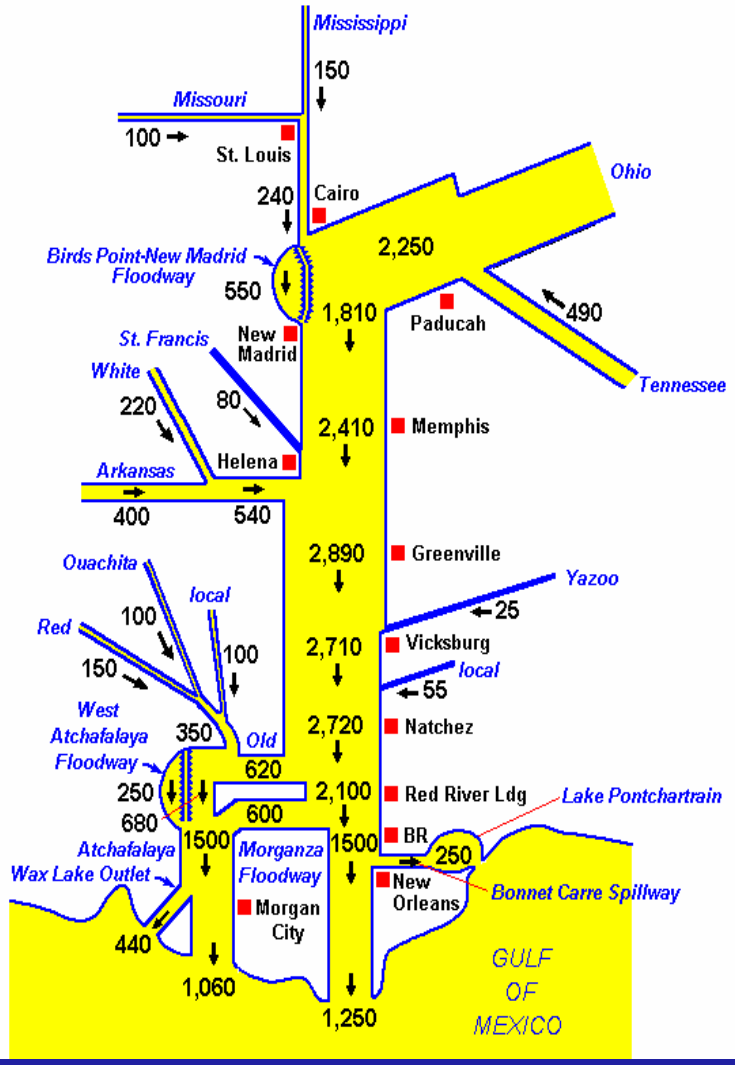
MR&T Project Design Flood

Discharge in 1,000 cfs



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PDF Flow vs. 100 Year Flow

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Gage Location	PDF Flow (CFS)	100 Year Flow (CFS)
Cairo, IL	2,360,000	1,895,000
Memphis, TN	2,410,000	1,960,000
Helena, AR	2,460,000	1,970,000

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Risk-Based Analysis

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What is Risk?

- Something you don't want to happen.
- Ranges from trivial to extremely serious
  - Dropping a cup of coffee
  - Files on your computer will be corrupted
  - Aircraft crashing into a residential area
- The acceptability of a risk depends on what is threatened by the risk, the probability of the causes of the risk arising and the probability that these causes will result in an incident.

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Risk-Based Analysis

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Corps' Role

- Inform the public about risk and uncertainty
- Long-term planning to minimize consequences
- Make the best engineering and economic decisions
- Investments will perform in the future

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Risk-Based Analysis

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What has been done?

- Always recognized the uncertainty
- Applied professional judgment
- Capitalized on technology

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Probability in Perspective

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Recurrence Interval	Probability of Occurring in any year		% Chance of Occurring In:		
"X Year"	"1in X"	"%"	30 years (mortgage)	78 years (Average US lifespan)	100 years
500	1 in 500	0.2 %	5.8 %	14.5 %	18 %
100	1 in 100	1 %	26 %	54 %	63 %
50	1 in 50	2 %	45 %	79 %	86 %
25	1 in 25	4 %	64 %	96 %	98 %
10	1 in 10	10 %	96 %	99.9 %	100 %

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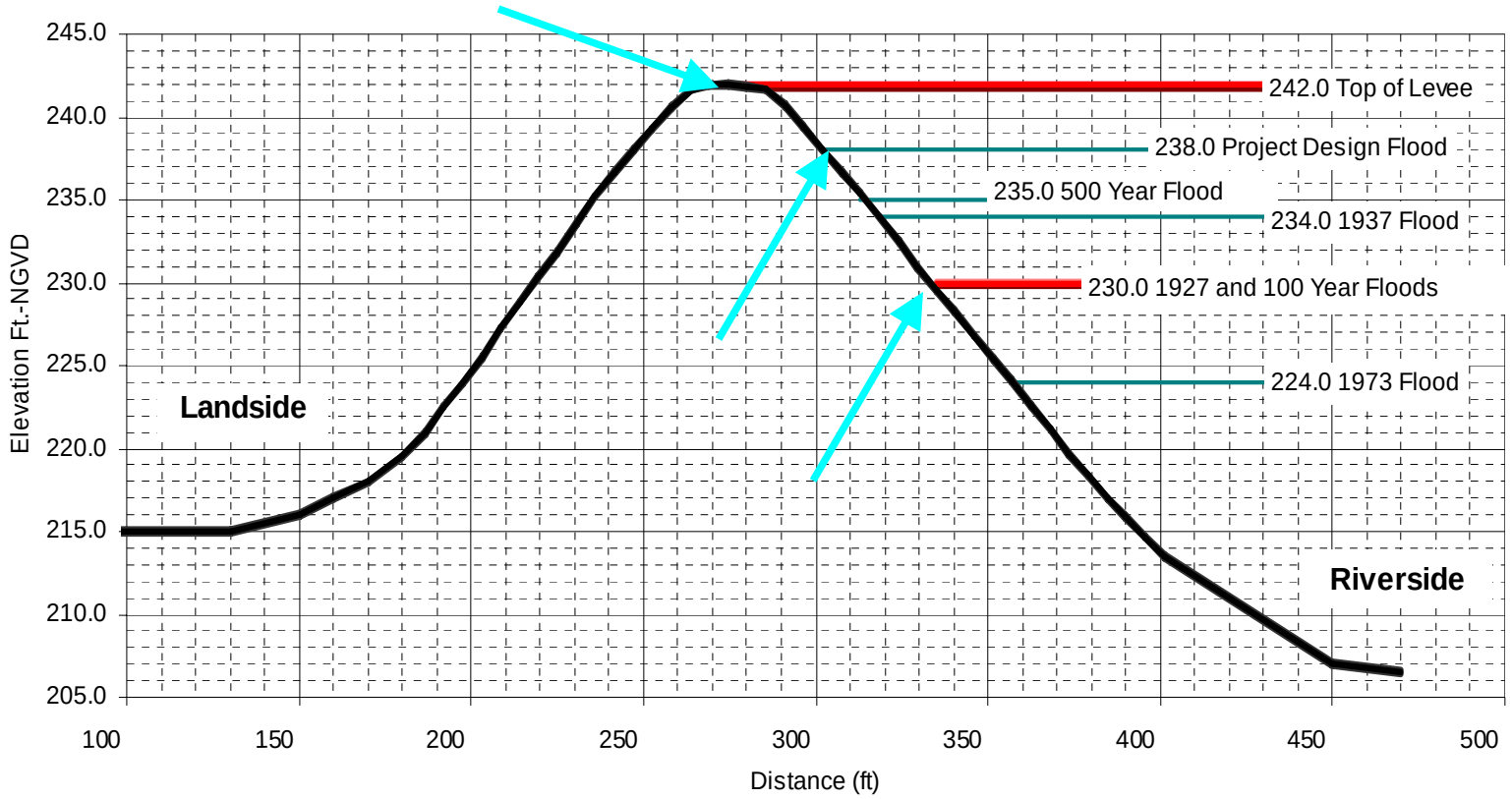
Mississippi River Levee
River Mile 734.6-LMP 150



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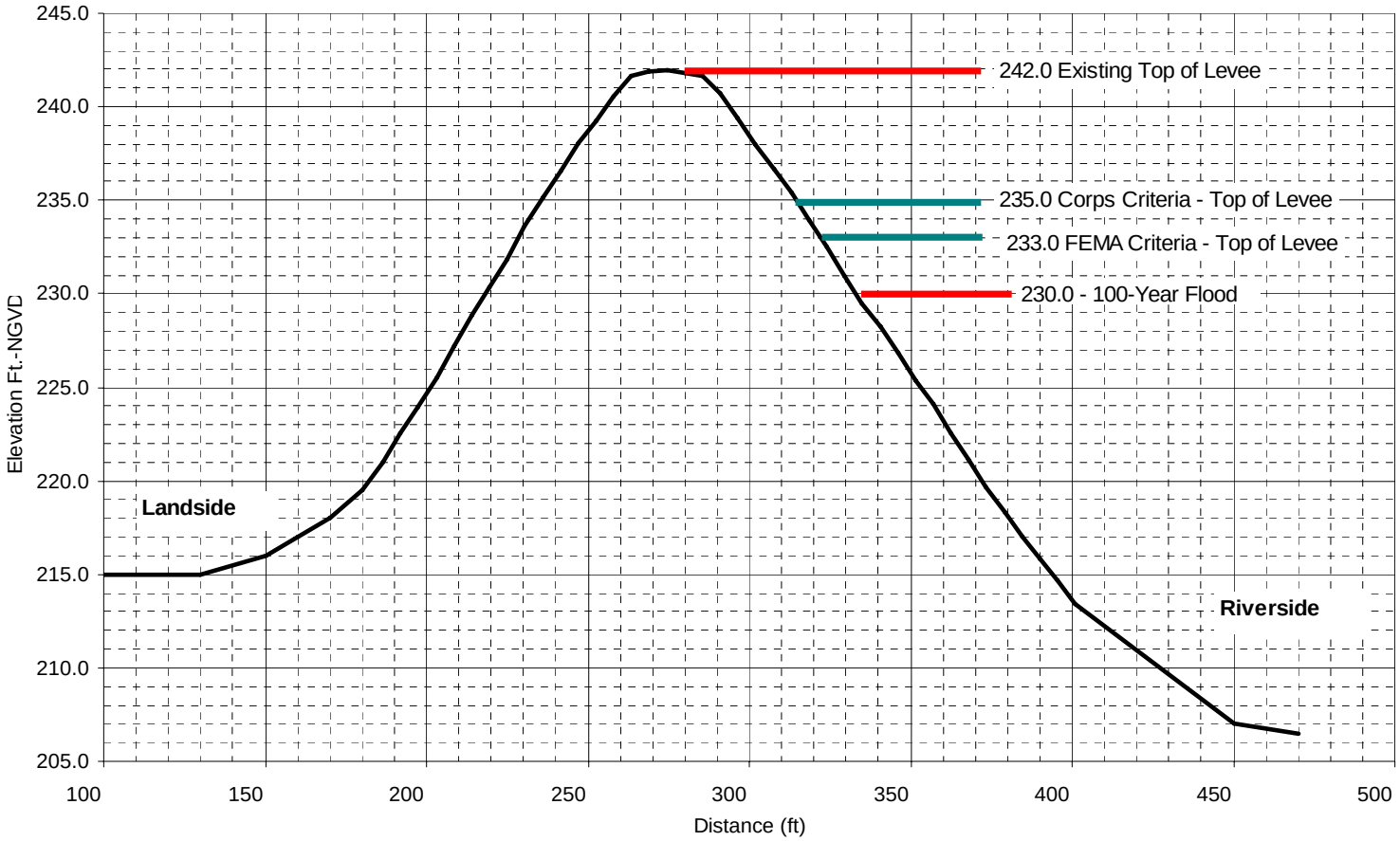

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