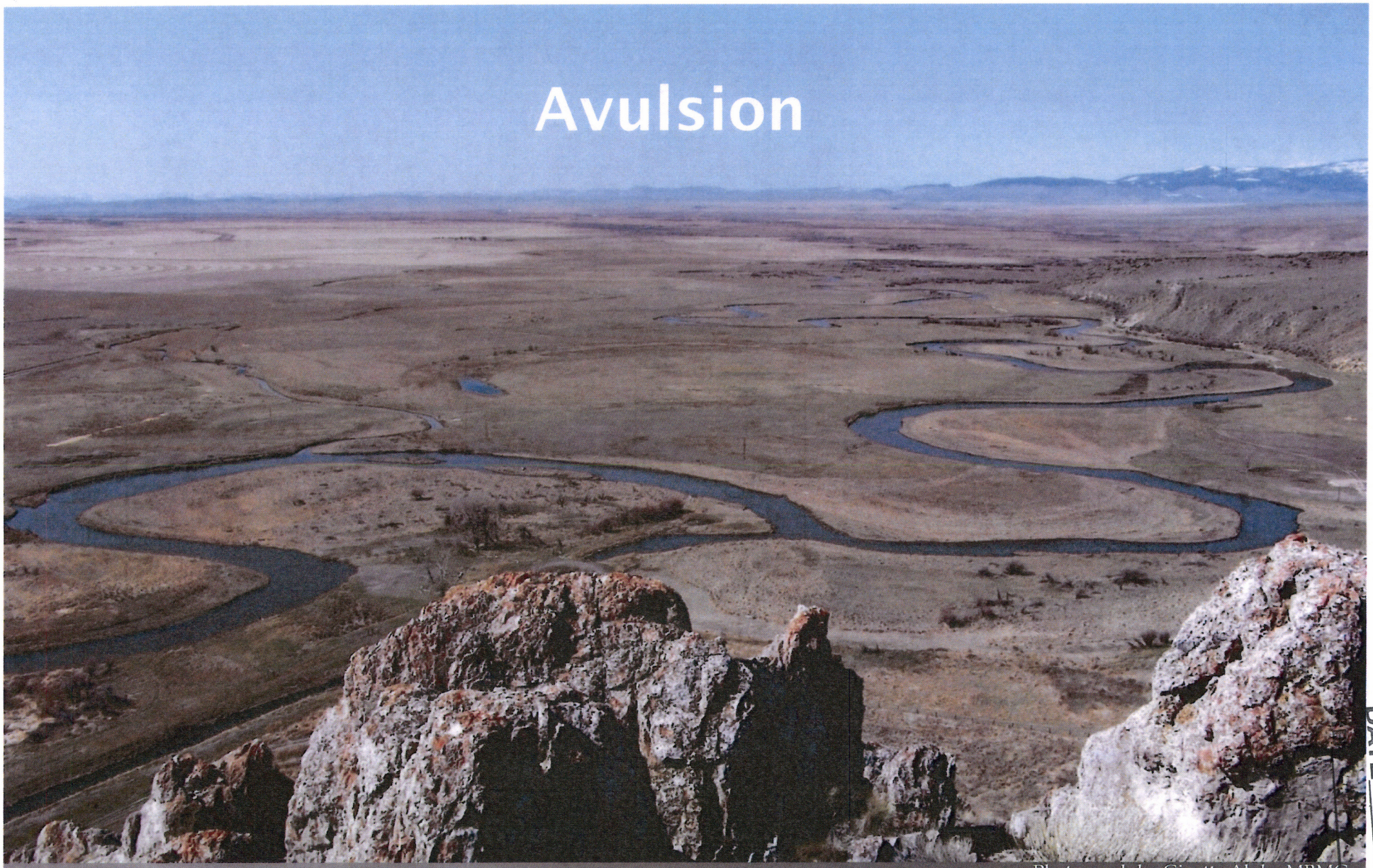
Avulsion



Photograph by Ginette Abdo, MBMG

John Metesh, Director and State Geologist
Presented to House Natural Resources
March 13, 2013
Helena, MT

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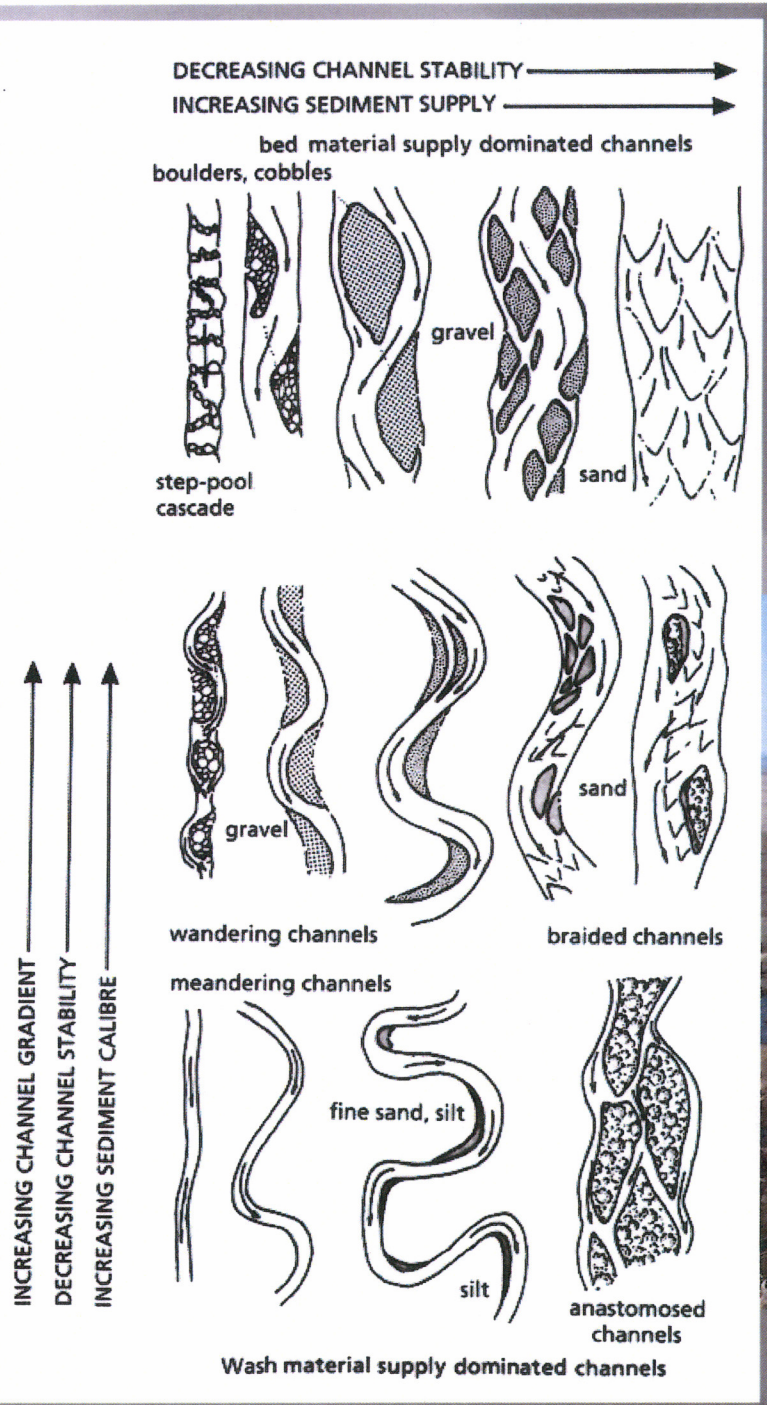
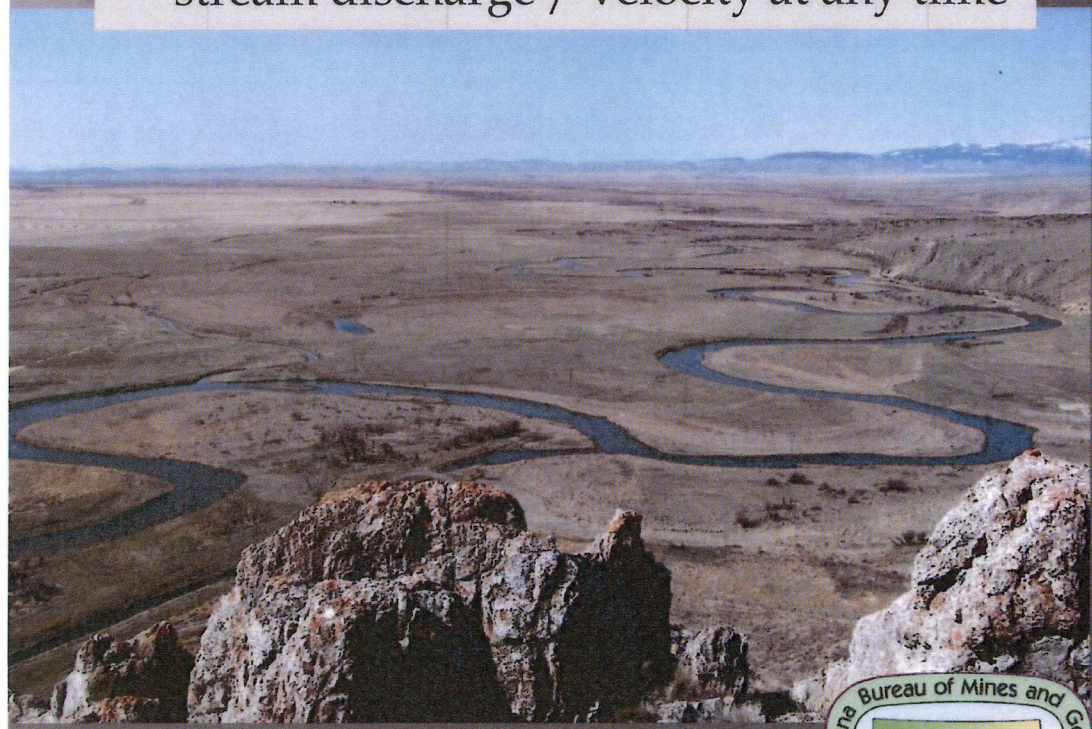
EXHIBIT 4
DATE 3-13-13
SB 18



A river's every effort is to make Montana look like Kansas, and to use Kansas to fill in the Gulf of Mexico

the shape of a rive channel depends on:

- the slope of the valley
- the amount and size of sediments
- stream discharge / velocity at any time



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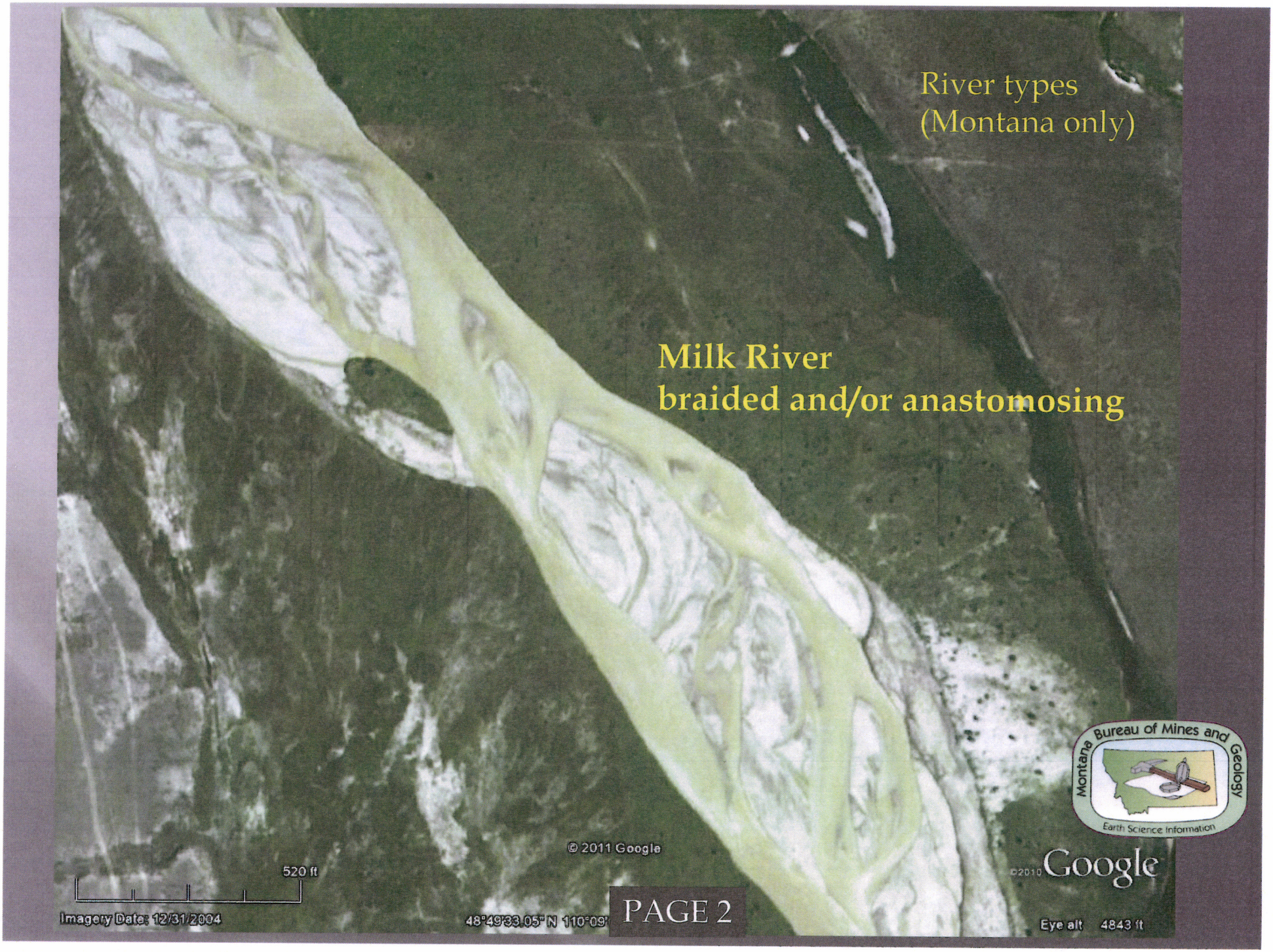
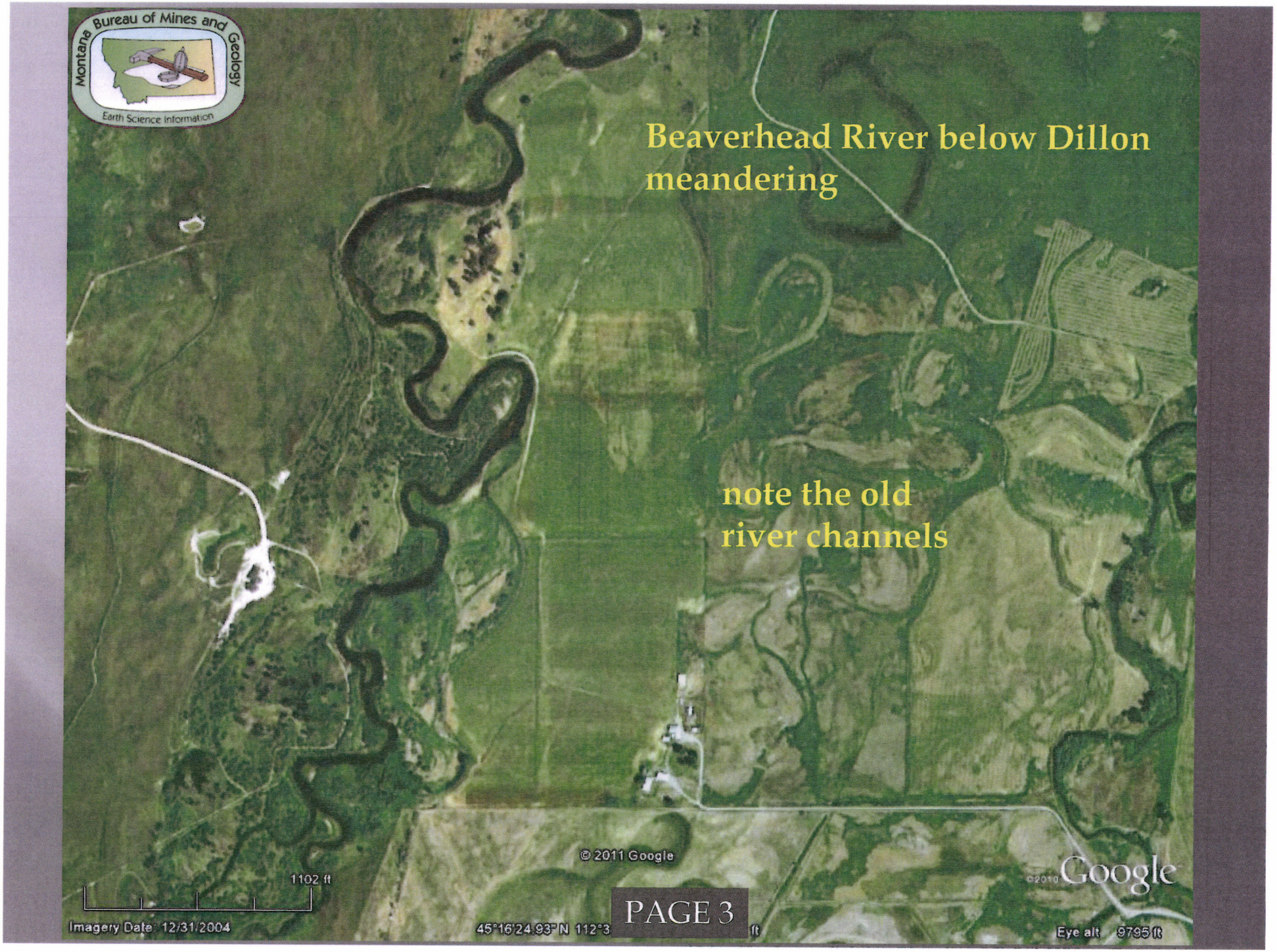

River types
(Montana only)
Milk River
braided and/or anastomosing
Montana Bureau of Mines and Geology
Earth Science Information
© 2011 Google
520 ft
Imagery Date: 12/31/2004
48°49'33.05" N 110°09'
©2010 Google
Eye alt 4843 ft


Montana Bureau of Mines and Geology
Earth Science Information
Beaverhead River below Dillon
meandering
note the old
river channels
© 2011 Google
1102 ft
Imagery Date: 12/31/2004
45°16'24.93" N 112°3
ft
Eye alt 9795 ft
Google

PAGE 3

Avulsion: the rapid abandonment of a river channel and the formation of a new river channel. A stream rapidly abandons a developed channel and creates a new one. Channels may avulse into an abandoned channel (second-order avulsion) or create a new channel (first-order avulsion) depending on the preexisting boundary conditions that initiate the avulsion.

Accretion: The gradual deposition of sediment along the edges of a channel by lateral migration. Accretion occurs when a stream gradually and imperceptibly changes its course over a period of time, resulting in sedimentary deposits on one bank along the water line

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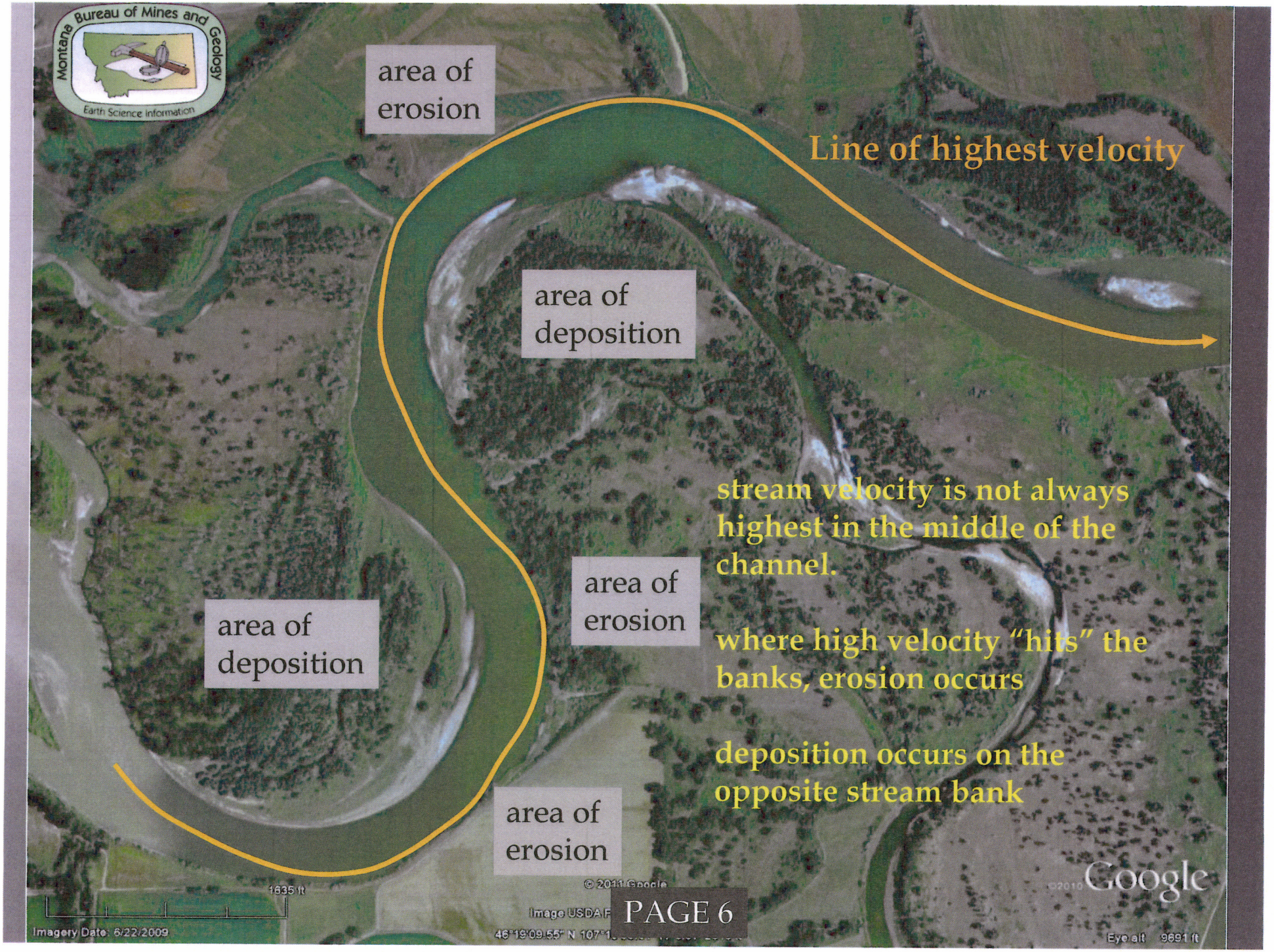
Stream Channel Vocabulary
braided stream channel
anastomosing stream channel
ox bow or slough
meandering stream channel
channel migration
accretion (slow)
avulsion (fast)
5323 ft
Imagery Date: 5/23/2004
48°10'18.10" N 114°
Eye alt 25932 ft
Google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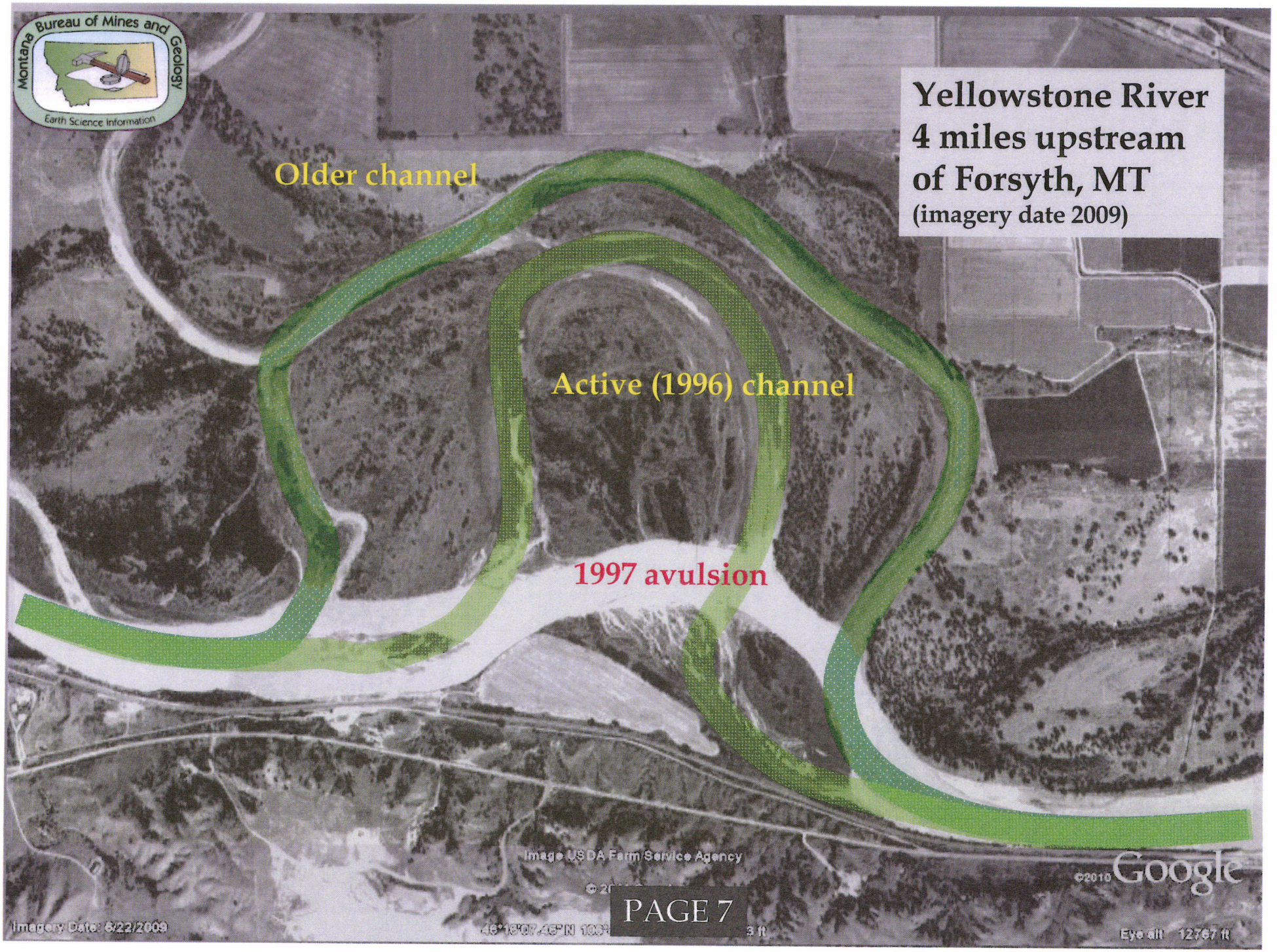
area of erosion
Line of highest velocity
area of deposition
stream velocity is not always highest in the middle of the channel.
area of erosion
where high velocity "hits" the banks, erosion occurs
area of deposition
deposition occurs on the opposite stream bank
area of erosion
1635 ft
© 2011 Google
Image USDA F
Imagery Date: 6/22/2009
Google
Eye alt 9691 ft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Yellowstone River
4 miles upstream
of Forsyth, MT
(imagery date 2009)
Older channel
Active (1996) channel
1997 avulsion
Image USDA Farm Service Agency
©2010 Google
Imagery Date: 6/22/2009
Eye alt 12767 ft