BANKLINE DIGITIZING AND IDENTIFYING BLUFF EROSION

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DISCLAIMER

Hand digitization along with hard to decipher images, there is spots of doubt and error. With that said, the presentation will hope to convey the rapidly changing and eroding river; which are still very clear and obvious between the years of 1939 and 2017.

BANK LINES

Bankline erosion is a serious issue on the Le Sueur river, in southern Minnesota.

It is a risk to many homeowners, from flooding, to serve erosion and loss of land. In some cases, houses have become victim to falling into the river having to be abandoned and removed.

In the upcoming slides, sections of severe erosion will be highlighted and shown. This information is critical for current homeowners, the future of the river system, and prospective land use planning.

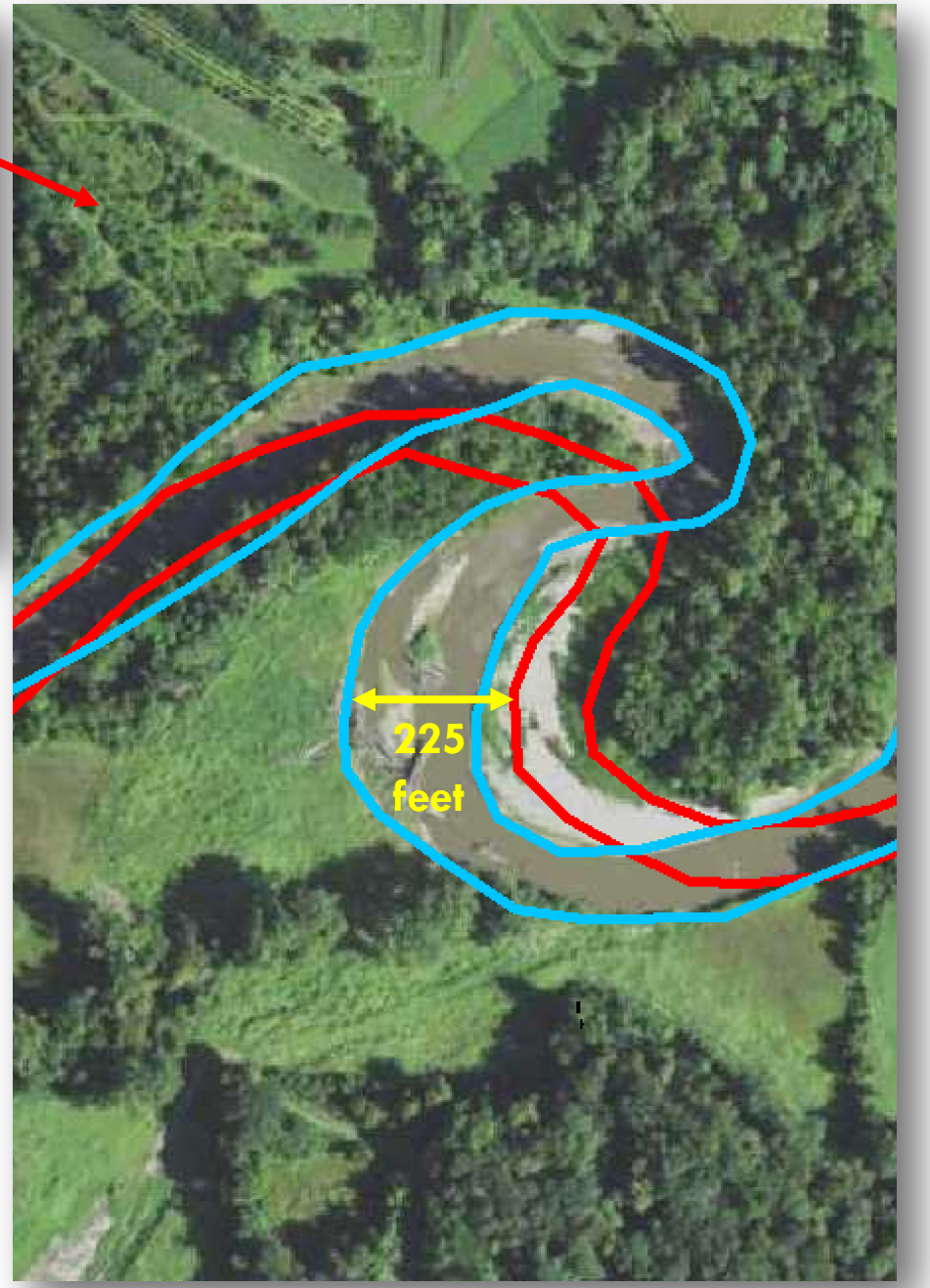
*House on the banks of the Le Sueur river, later demolished due to impacts of erosion

STUDY SCENE

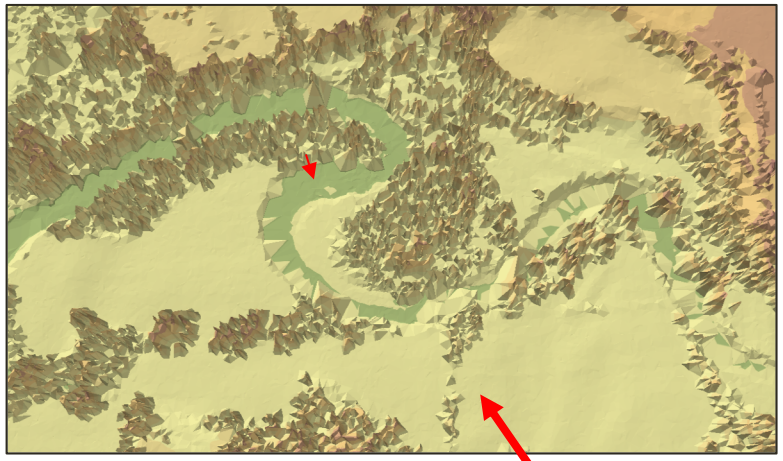
SITE ONE 1939-2017

Between 1939 and 2017, there was a **225 foot change** in the river banks. This is one of the more severe cases, that has cut into the land, removing an obvious amount of land and sediment.

Many accredit this is to increased water flow due to tiling, and other human activities.



SITE ONE
1939-2017



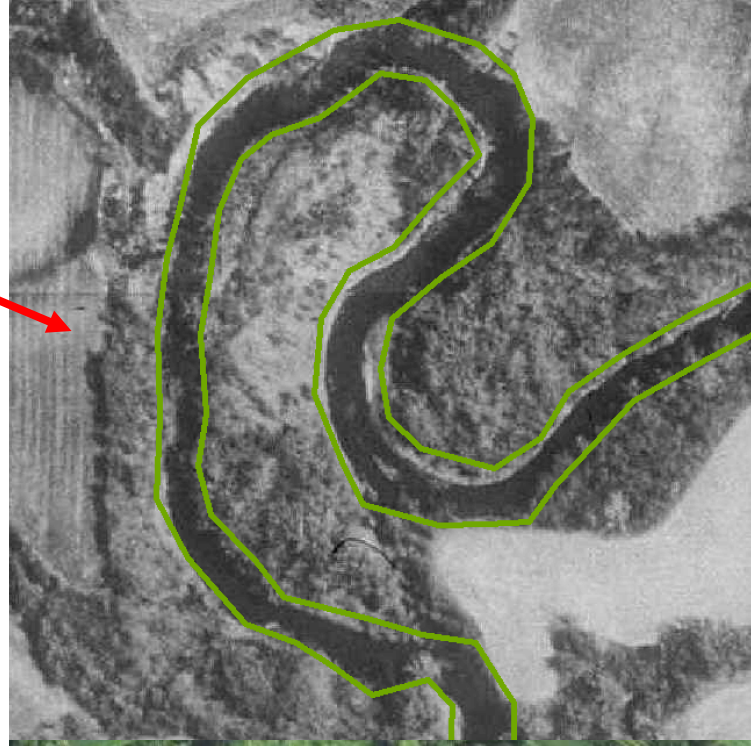
*2012 LiDAR 3D Scene

N

1939 1949 1973 1991 2011 2017

SITE TWO
1991-2011

Between the times of 1991 and 2011, the river cut through a thin piece of land, creating an **oxbow lake** (remnants of a past river) and changing the river direction, flow, etc.



Oxbow Lake
(nearly dried out)

SITE ONE
1991-2017

1991

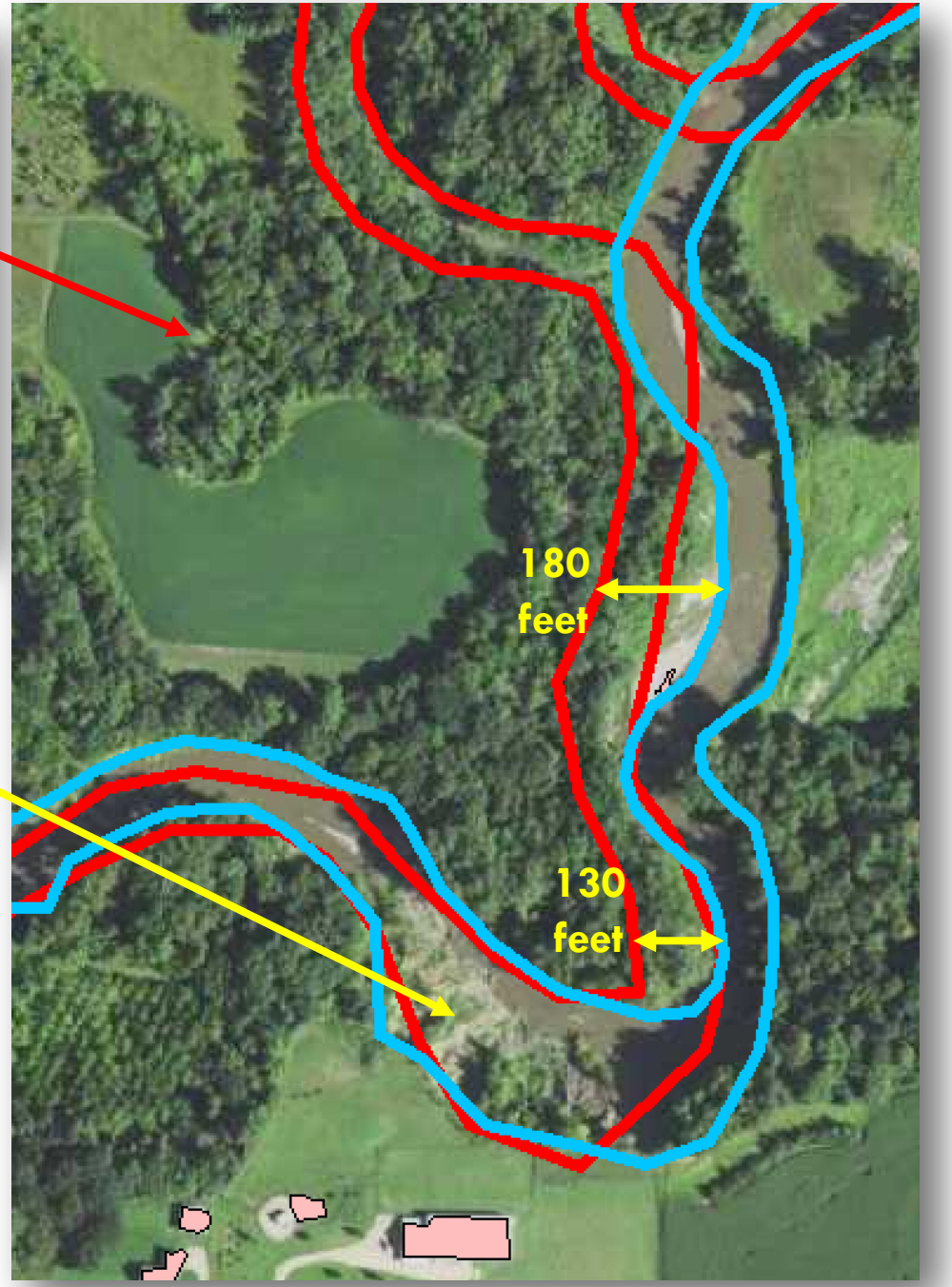
2011 (break through)

2017

N

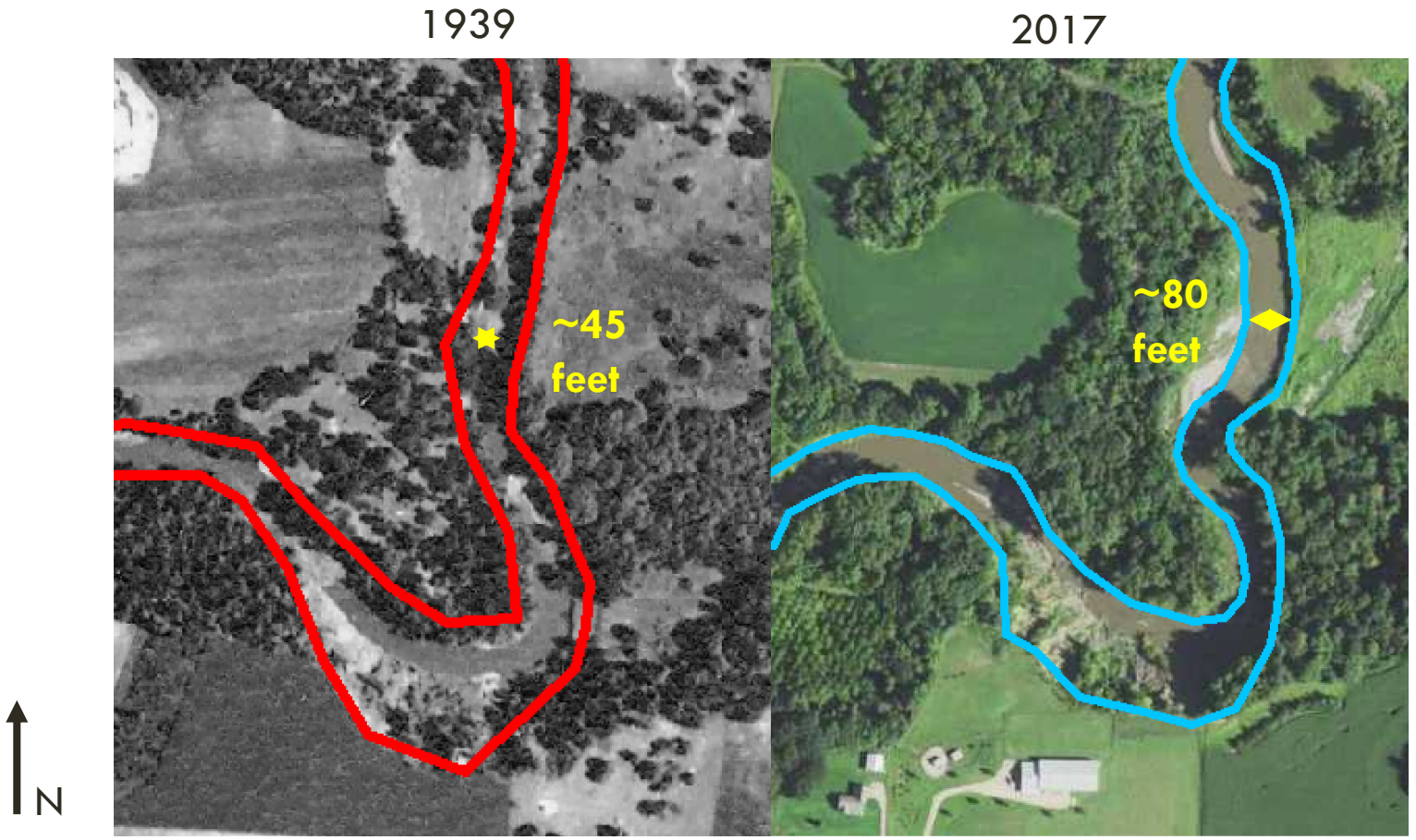
SITE THREE
1939-2017

Downstream from the now oxbow lake, the river has seen a noticeable **meander,** and alter in land. Located at a bend in the river, there is considerable bluff erosion.



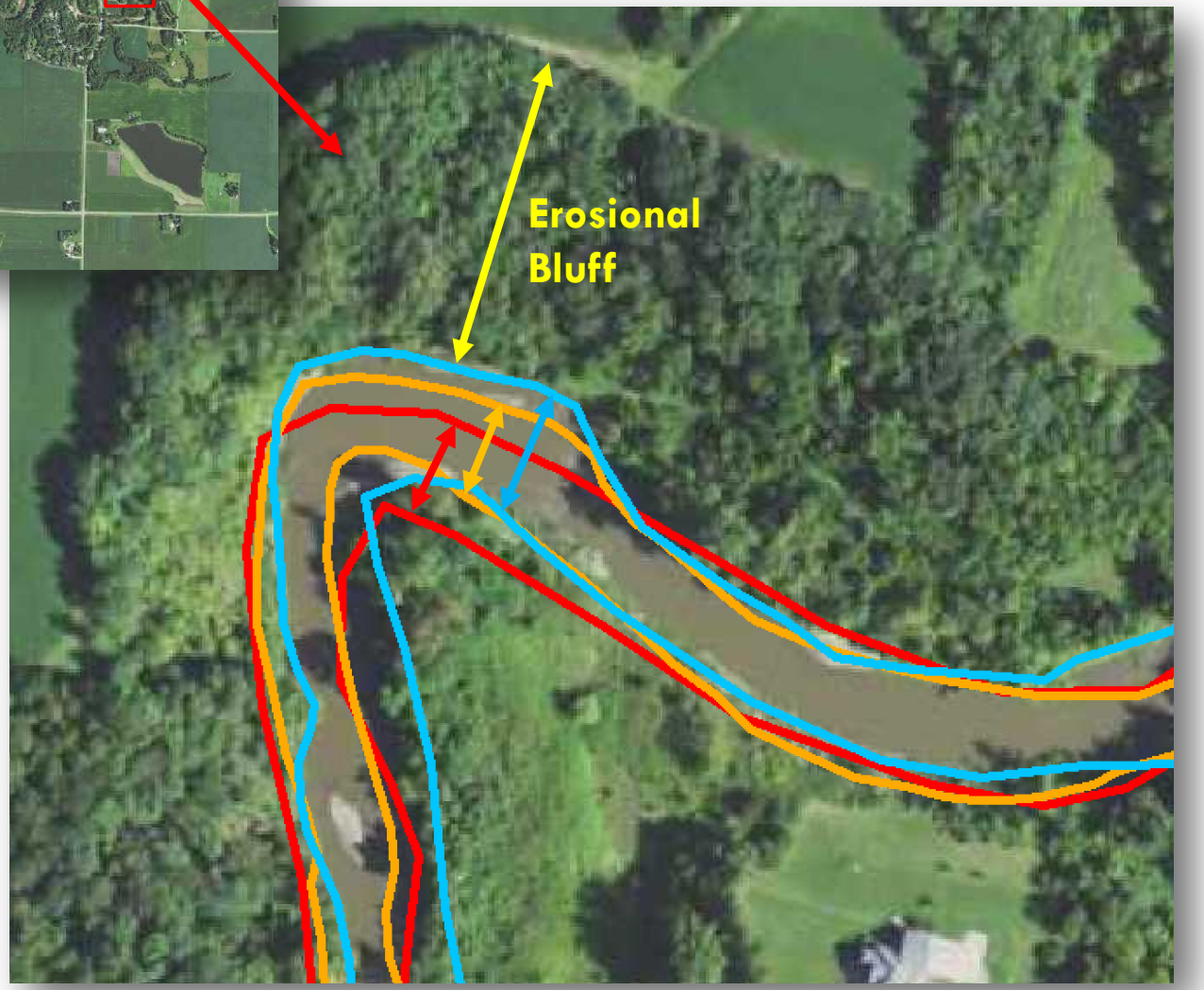
SITE THREE 1939-2017

River width has definitely seen a change over time, with almost a doubling in river width between 1939 and 2017.

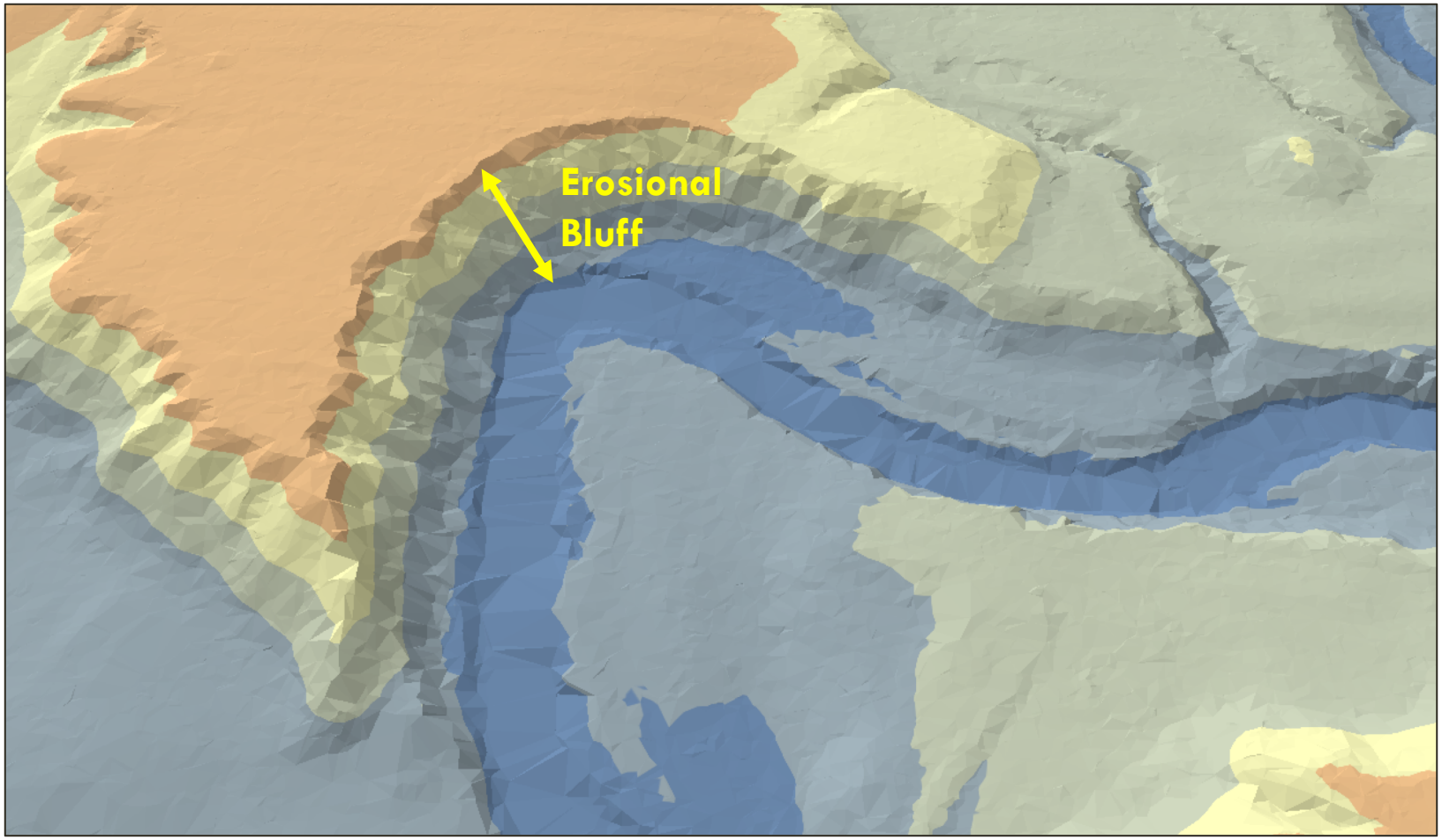


SITE FOUR 1939-2017

At the next bend in the river of the study site, there is another case of river meandering, and widening. There is a very large erosional bluff, but has seen little change over the years, compared to the river.



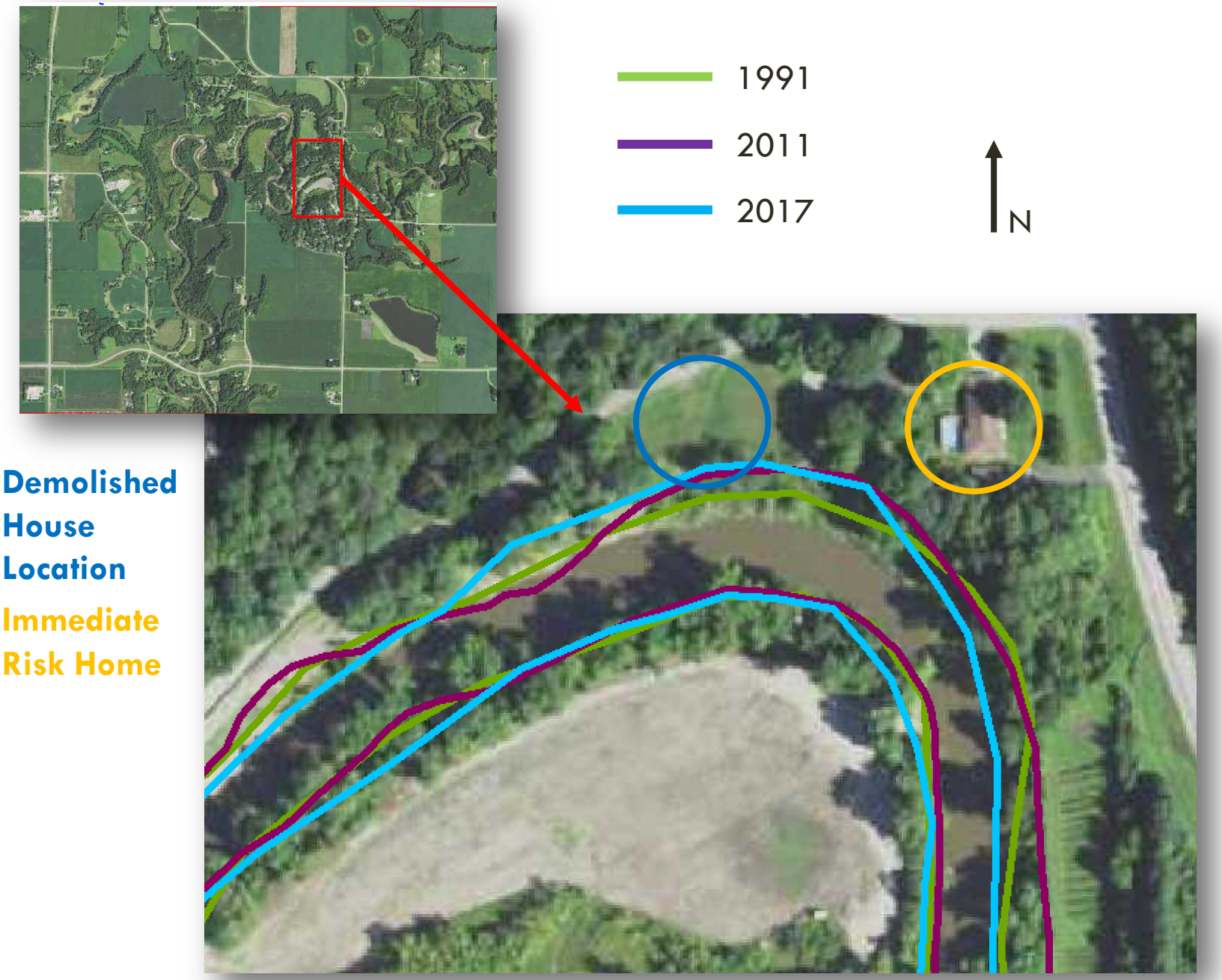
SITE FOUR (3D SCENE) 2012 LIDAR



SITE FIVE 1991-2017

This example shows the real magnitude of the effects on humans, and their built environment. A house continually lost property, mainly in the past decade.

The house has now been demolished, as the deck broke off, and foundation exposed. (see intro page for image)



SITE FIVE
1991-2017

1991

2011

2017 (house removed)

N

SITE SIX
1939-2017

At this bend in the river, there is once again considerable erosion. This area has very little to no vegetation that can be seen in the 2017 image (current) and the others (next slide).

1939

2017

N

Deposition on opposite of erosion

120 feet

115 feet

SITE SIX
1939-2017

*Notice low vegetation on erosional slopes

N

1939 1949 1973 1991 2011 2017

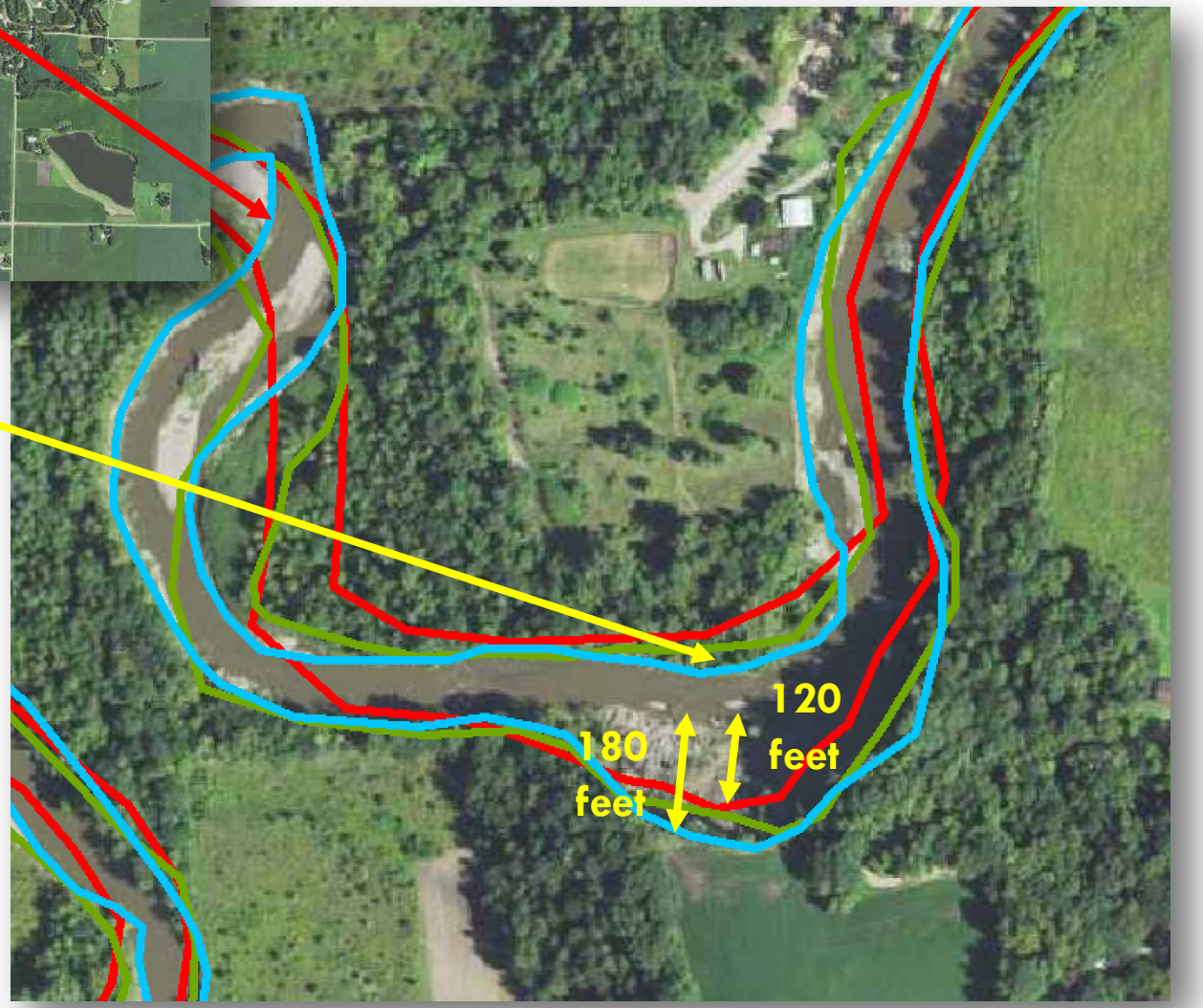
SITE SEVEN 1939-2017

Final spot of erosional concern is yet again at the bend of the river, and the erosional has increased by 60 feet (skewed by slope)

1939
1991
2017

N

Deposition on opposite of erosion



CONCLUSION

There has been significant erosion and effect on the river in the base 80+ years. Rivers meander and change natural, but in recent times, this seems to have sped up in unnatural ways. Bends in rivers are vulnerable locations for land loss and erosion due to the movement, erosion and deposition of sediment.

Increase of flow, and alternating of land use may be to blame for this issue, but this information will be helpful in future planning, and monitoring for improvement of this issue.

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