



NWK/ERDC, Effectiveness and Longevity of Cedar Tree Revetments

BLUF: Determine the effectiveness and longevity of cedar tree revetments for bank stabilization

Challenge/Objectives

- How much sediment erosion do they prevent?
- How long do they last?
- Under what conditions are they most effective?

Approach

Revisit projects of varying ages

Are they still there?

Is the bank stable?

What makes them work in some places but not others?

Quantify pre and post erosion rates



FY20 RSM IPR



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District/Other USACE PDT Members

Chris Haring (ERDC-CHL)

John Shelley (NWK)

Aaron Williams (NWK)

Nathan Chrisman (NWK)

Stakeholders/Partners

Missouri Department of Conservation

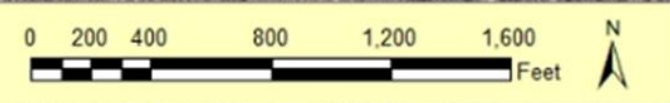
Kansas State University

Obed Watershed Conservation District

Leveraging/Collaborative Opportunities

Free help and accompanying on site visit, landowner permissions, background information, historic surveys, etc.





Locust Creek Conservation Area

| Project | Date Built | Stabilization Method |
|---------|---------------|--|
| Site 1 | May 1988 | Hardwood tree revetment |
| Site 2 | October 1988 | Stream bank revegetation/Cedar Grade Control |
| Site 3 | April 1988 | Cedar tree revetment |
| Site 4 | August 1997 | Hardwood tree revetment |
| Site 5 | March 1992 | Willow Pole Revetment |
| Site 6 | August 1994 | Hardwood tree revetment |
| Site 7 | November 1993 | Cedar tree revetment |
| Site 8 | October 1989 | Cedar tree revetment |
| Site 9 | October 1989 | Cedar tree revetment |



Average year: 1991 Development Center



Summer of 2019- Flood of record (> 100 year)

SITE 6



SITE 7

July 1993



May 1994



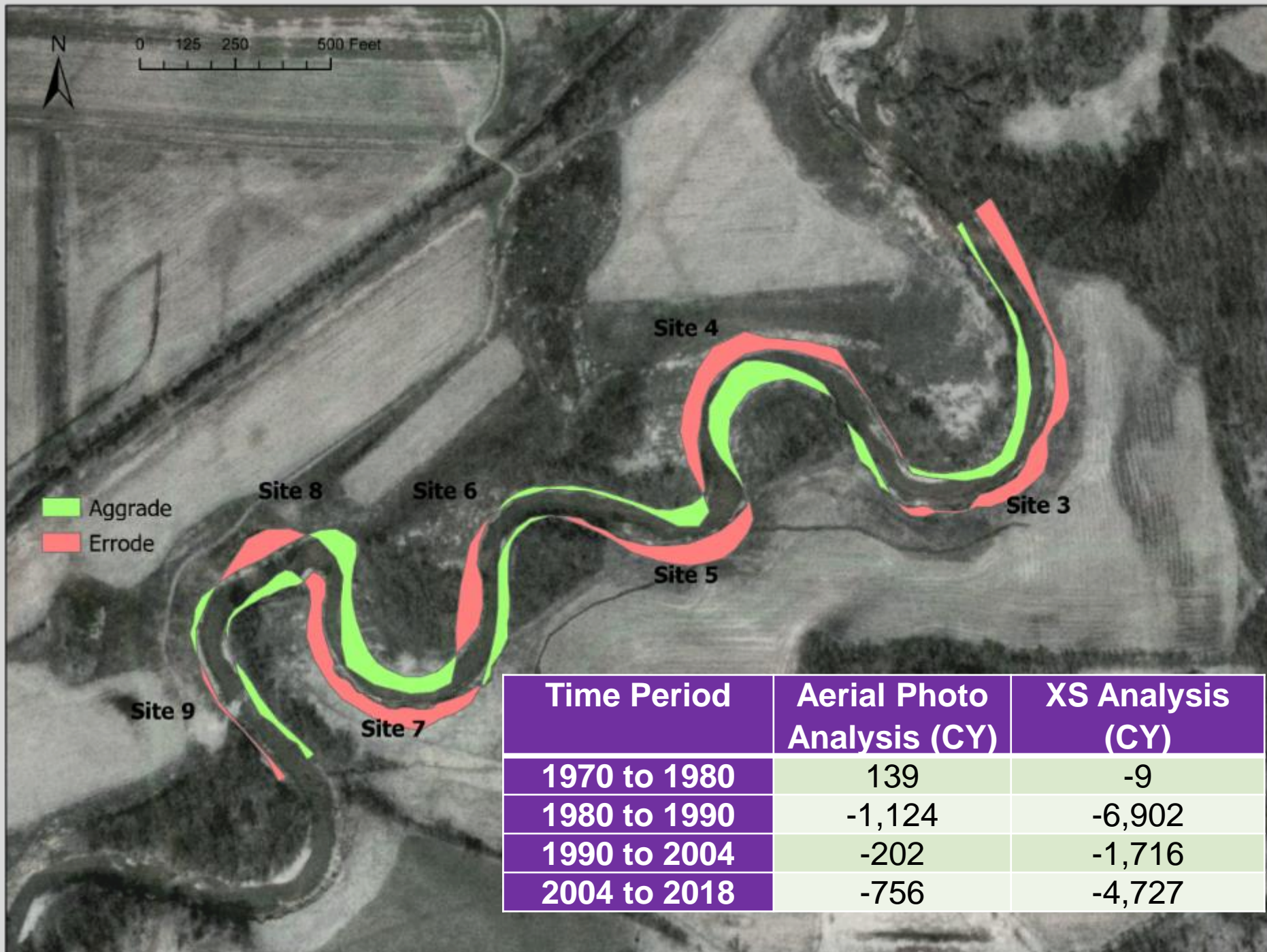
March 2000



December 2019



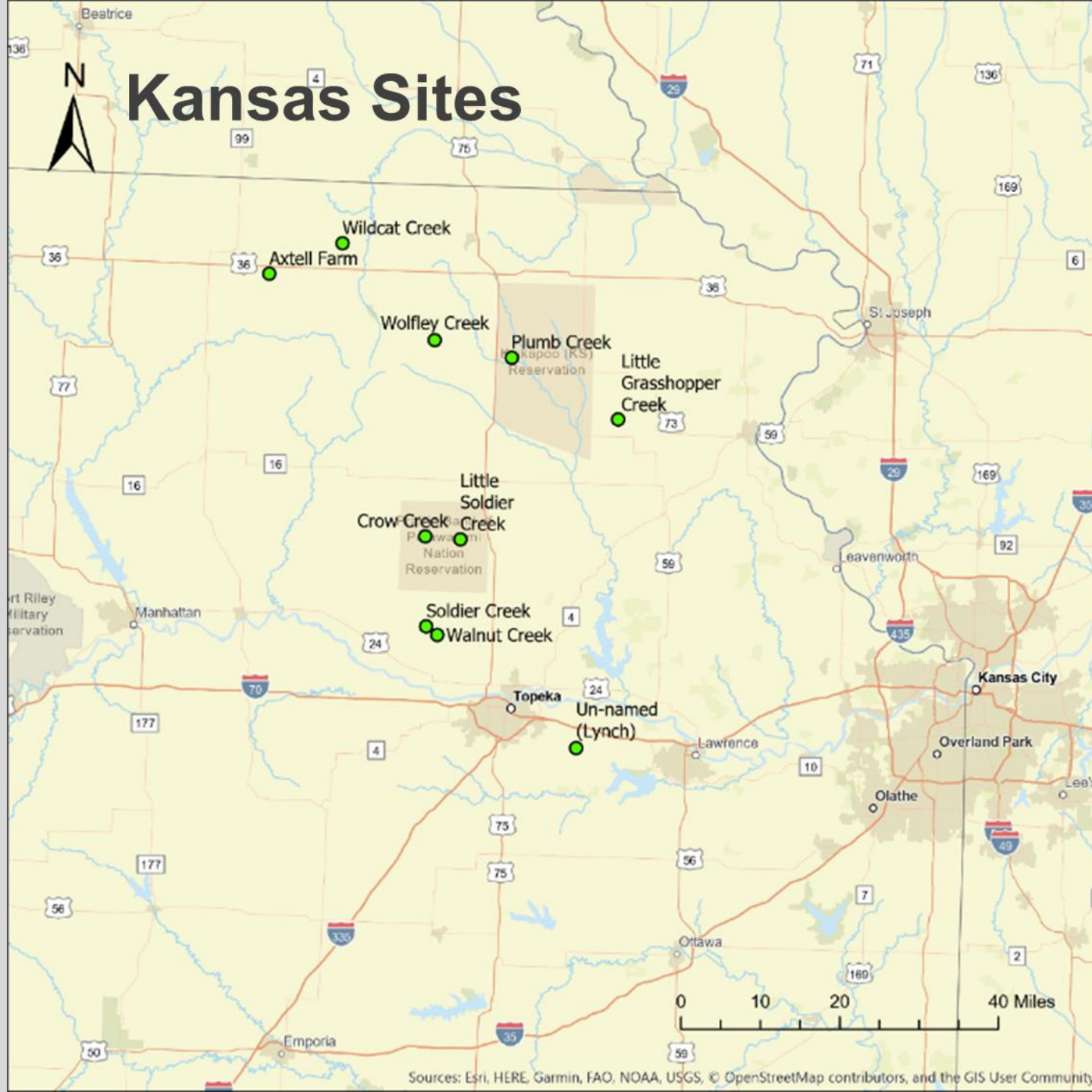






Locust Creek Conclusions

- **Larger benefit for first 14 years (75% to 82% reduction)**
- **Smaller benefit for additional 14 years (32% to 33% reduction)**
- **No residual benefit after 28 years (vertical, bare, eroding bank and no revetment)**



nt Center

Wolfley Creek 2017





Summer of 2019- Very Significant Flood Year Throughout Kansas

Wolfley Creek 2020

A photograph of Wolfley Creek in 2020. The creek flows through a landscape with a steep, eroded bank on the right. The bank is covered in dry, tangled brush and has a wooden retaining wall at the top. Bare trees line the background under a clear blue sky. A person is visible on the left bank.

Installed: 2017

Wolfley Creek 2020



↕ Degradation

Wolfley Creek 2020



Resistant
clay



Little Grasshopper Creek, 2020



Deposition

Plumb Creek, 2020

Installed: 2010



Plumb Creek, 2020



Missing revetment

Installed: 2010

Plumb Creek, 2020



Perched above bed

Installed: 2010

Plumb Creek, 2020

Tree floated up and deposited

Cable pulled out

Anchor location

Installed: 2010



Wolfley Creek, 2020

Trees snapped in half

Installed: 2017



Wolfley Creek, 2020

Cable pulled out

Installed: 2017



Wildcat Creek, 2020

Revetment missing

Installed: “Early 90s”



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Accomplishments/Deliverables

Lessons Learned

- Locust Creek report**
- Kansas sites report**
- Tennessee sites report**

To do this FY:

Calculate erosion at Kansas sites

Need more data to “fill the gap” in the 10 to 20 year old range

- Rum River**
- Others**

Lesson Learned: Bring the Local Expert



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What challenges did you face to get your project to implementation and how did you move past them? If not yet implemented, what is your path forward to construction? (Give us your lessons learned that you think might benefit other Districts)

Challenges

Lack of mid-age sites in Kansas and Missouri

Travel-heavy → COVID

Internet searching to find additional locations that are on the “Green List”

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How is this project benefiting the USACE and Nation?
(efficiency, monetary, technical, relationship building, outreach, etc.)
(Volume of sediment to be managed, Acres created, etc)

BE SPECIFIC – we are looking to more formally document these benefits

Grand River Basin Ecosystem Restoration Project– Recommends 300 bank stabilization projects to reduce downstream floodplain sedimentation