

Bank Swallow Response to Rock Revetment Removal on the Sacramento River, California



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Bank Swallow

Riparia riparia

Hirundinidae



Photo: Jim Dunn

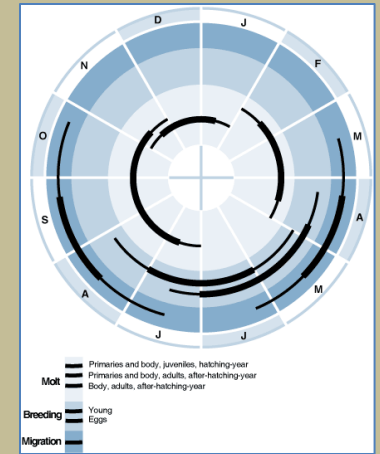
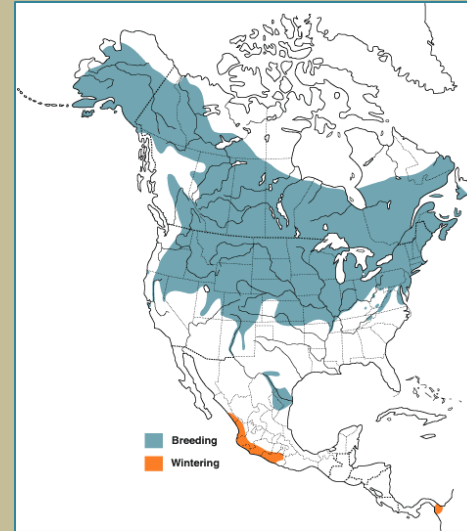


Photo: Eddie Bartley

Bank Swallow – California Populations

Riparia riparia

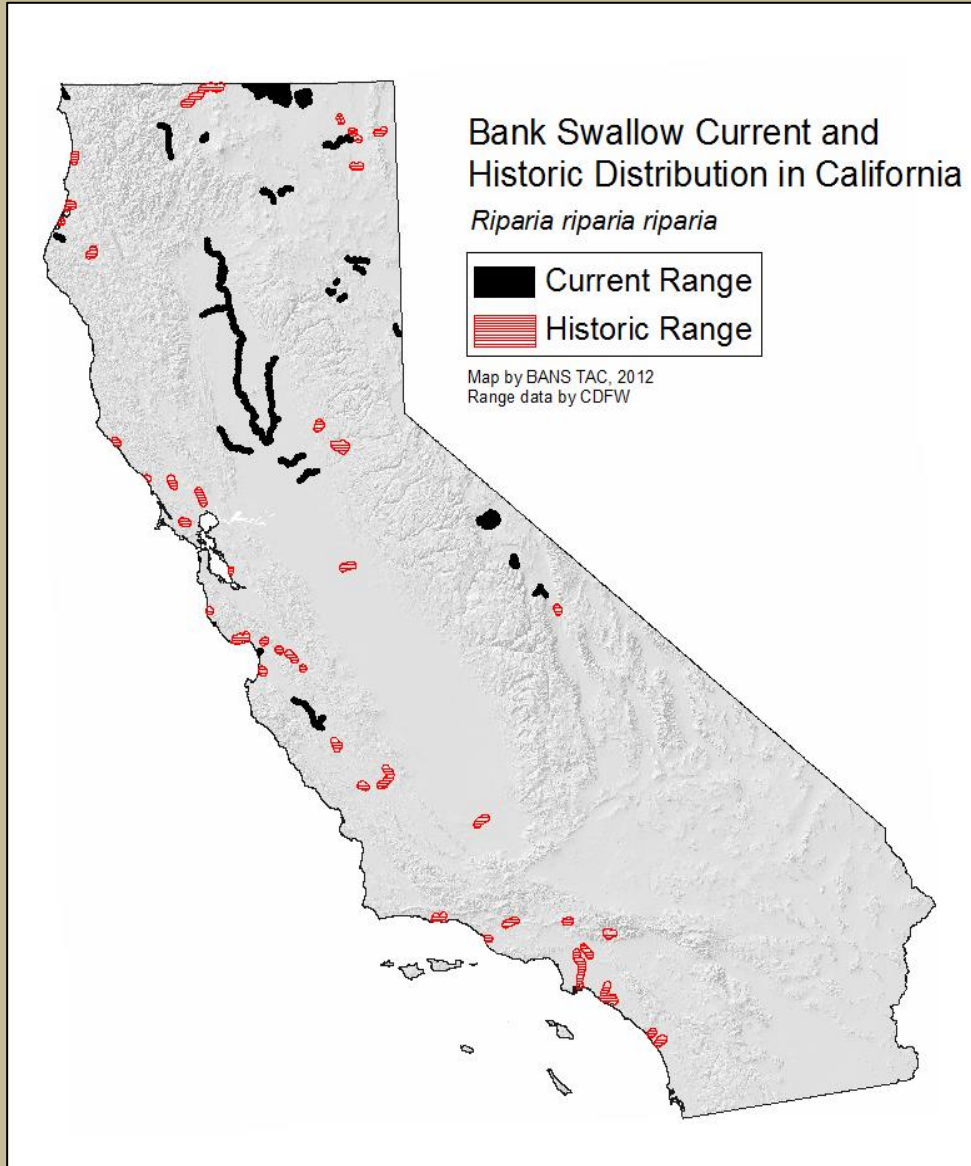


Photo: Steve Hampton

Bank Swallow – Habitat Requirements

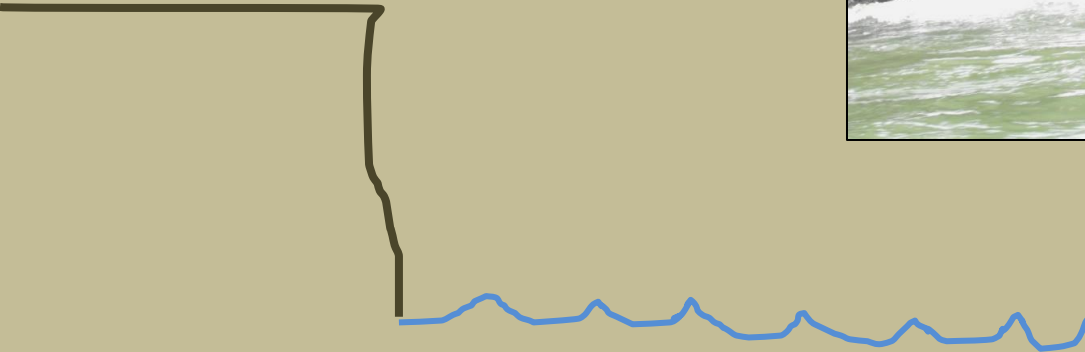
Riparia riparia



- Vertical banks or bluffs
- Friable soils
- Source of renewal

Bank Swallow – Habitat Not Made to Last

Riparia riparia



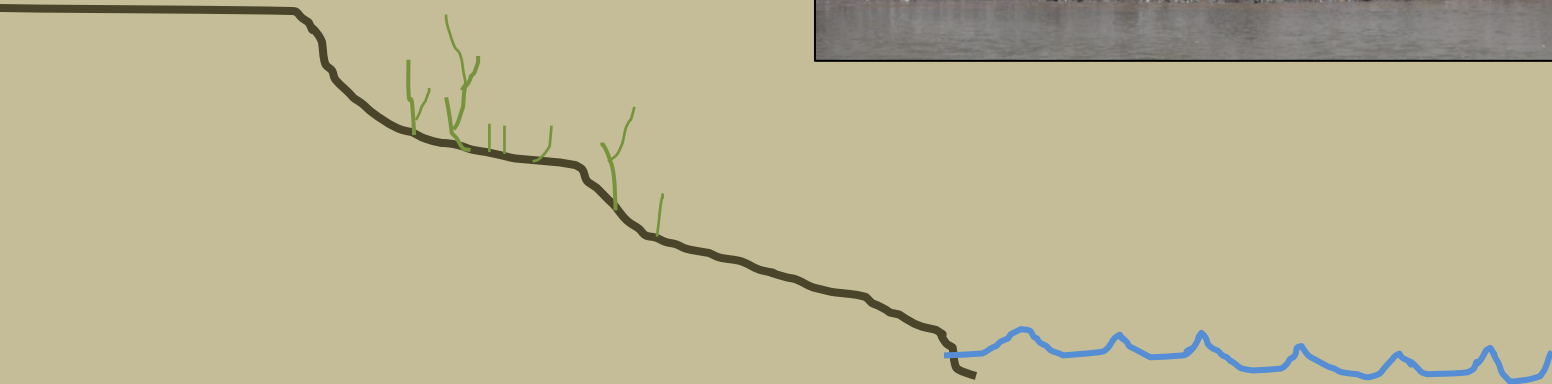
Bank Swallow – Habitat Not Made to Last

Riparia riparia



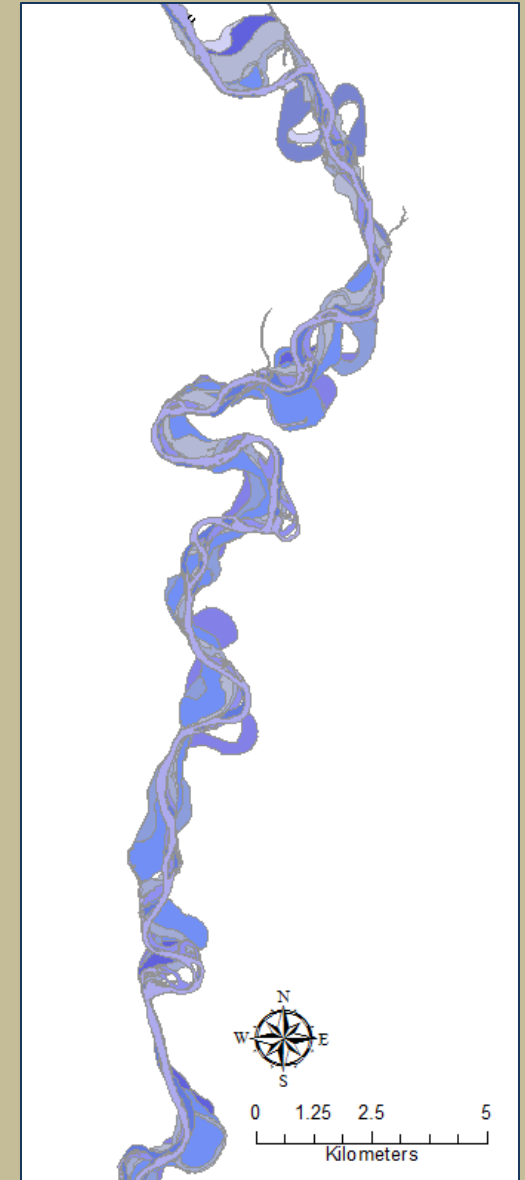
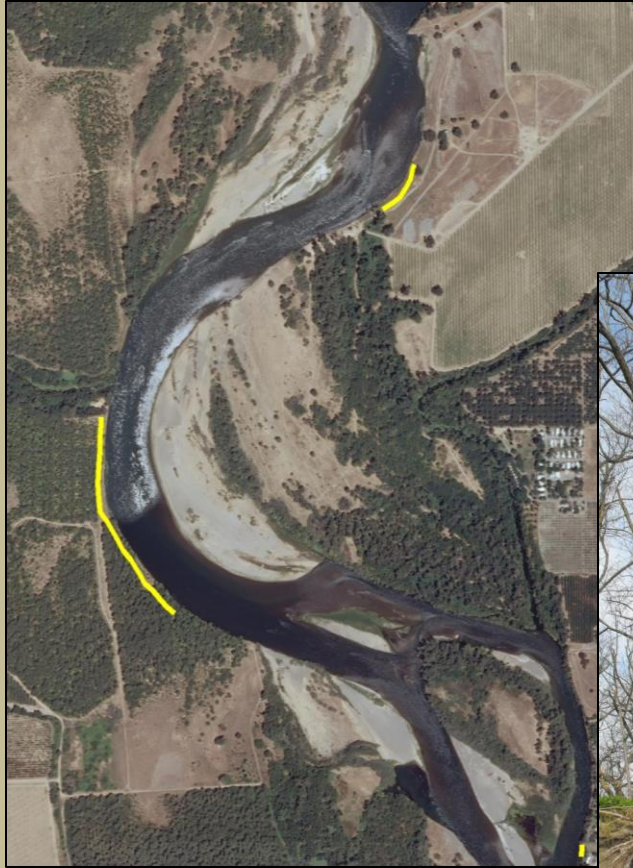
Bank Swallow – Habitat Not Made to Last

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Bank Swallow – Linked to River Process

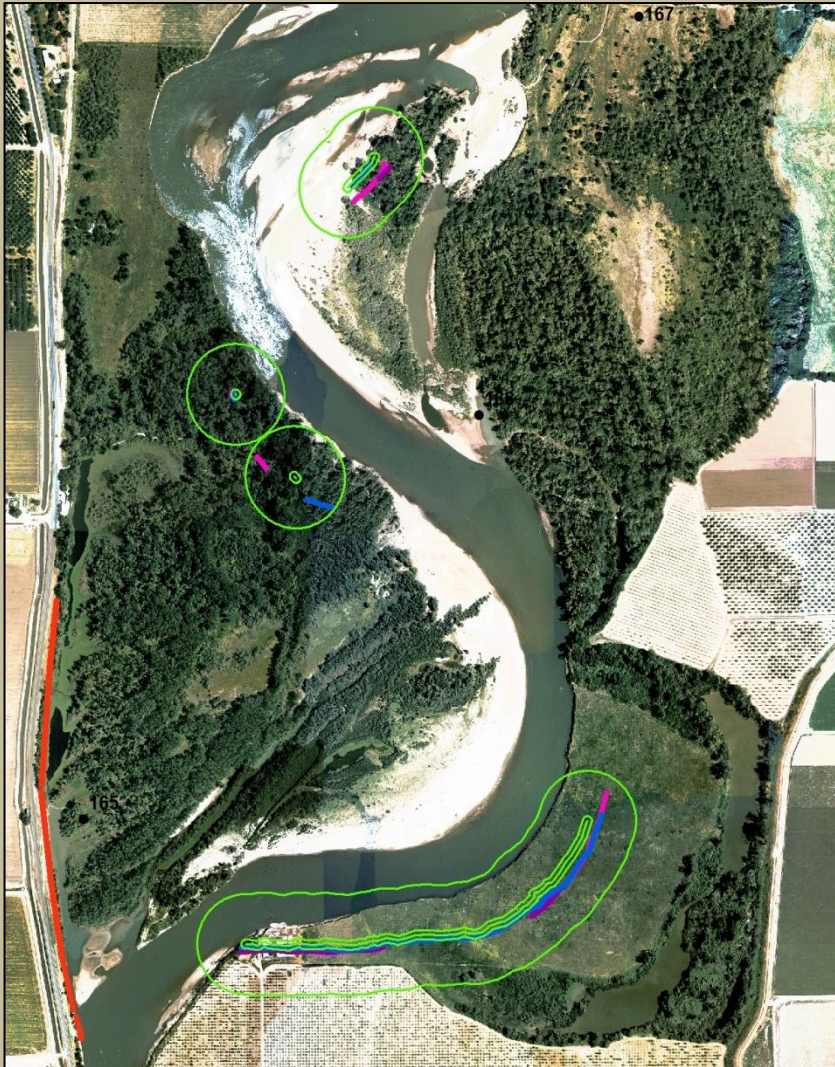
Riparia riparia



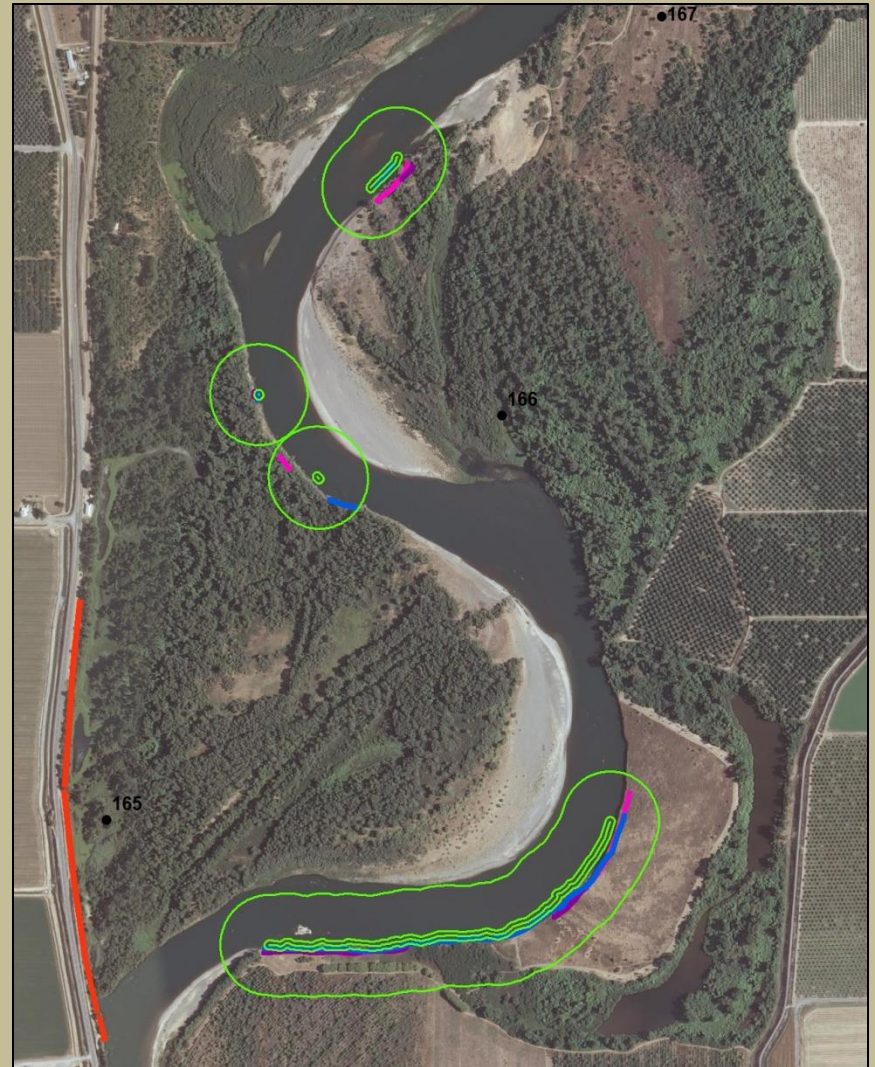
Bank Swallow – Linked to River Process

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RM 166 - 1999



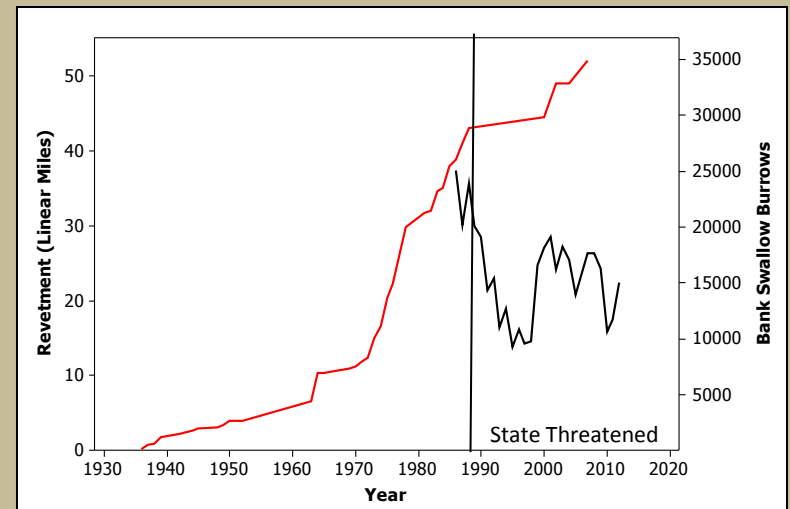
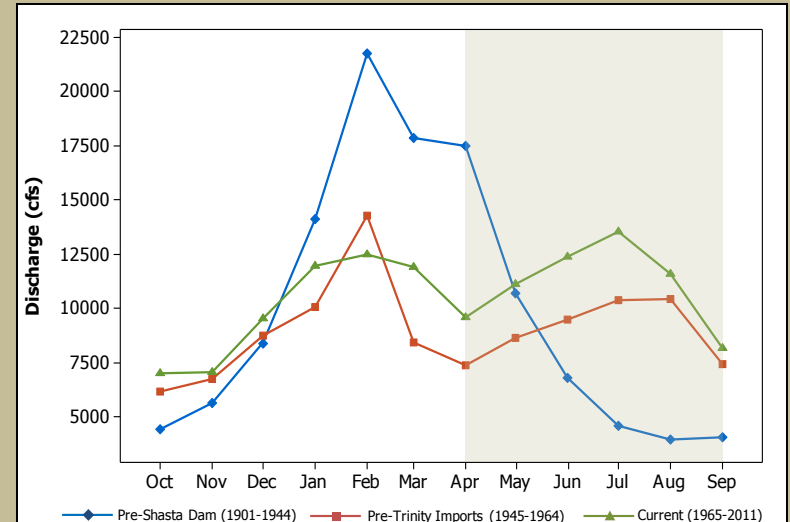
RM 166 - 2009



Bank Swallow – Impacts to Habitats and River Processes

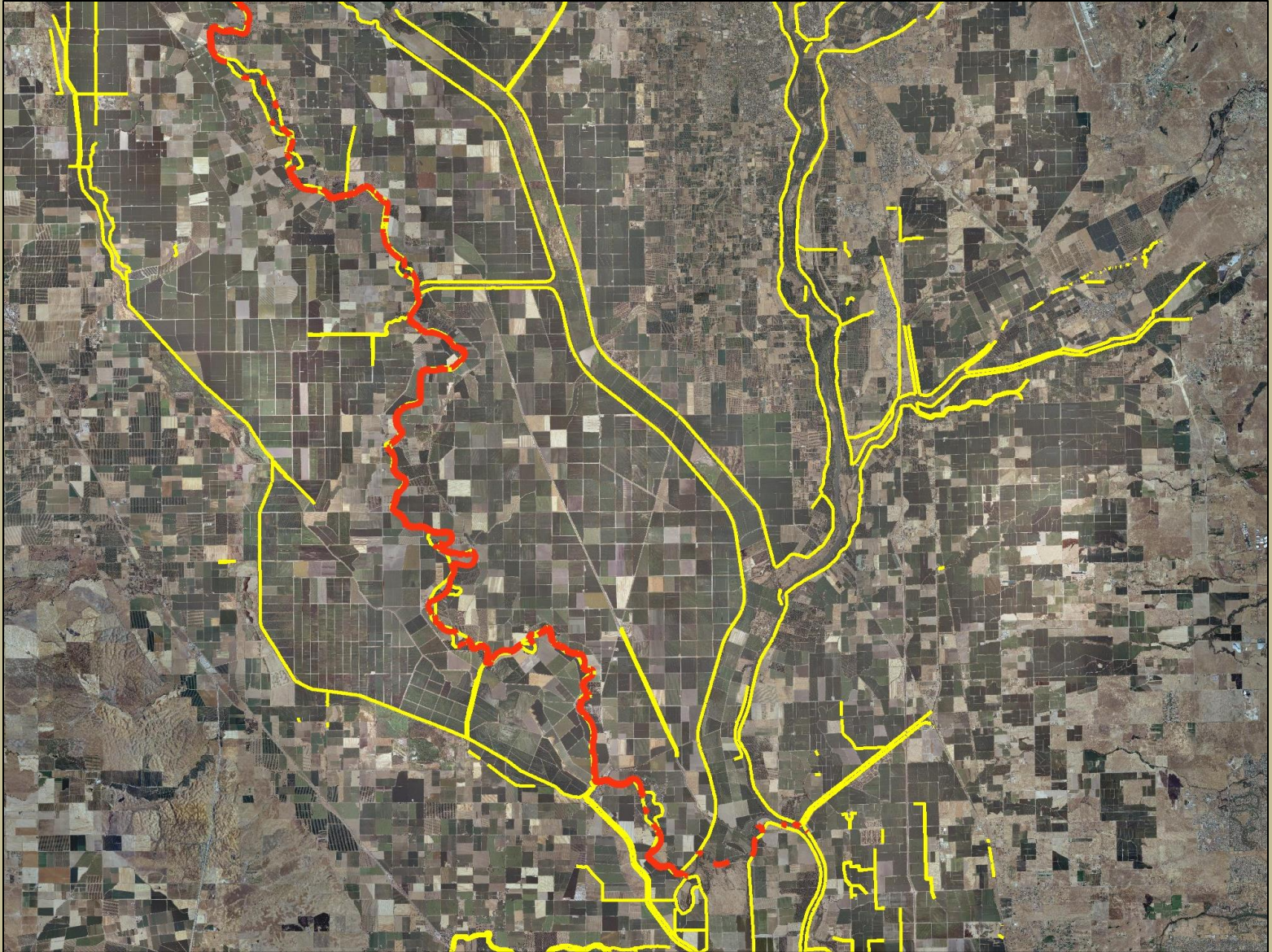
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- Changes in flow regimes
- River bank stabilization
- Loss of foraging habitat



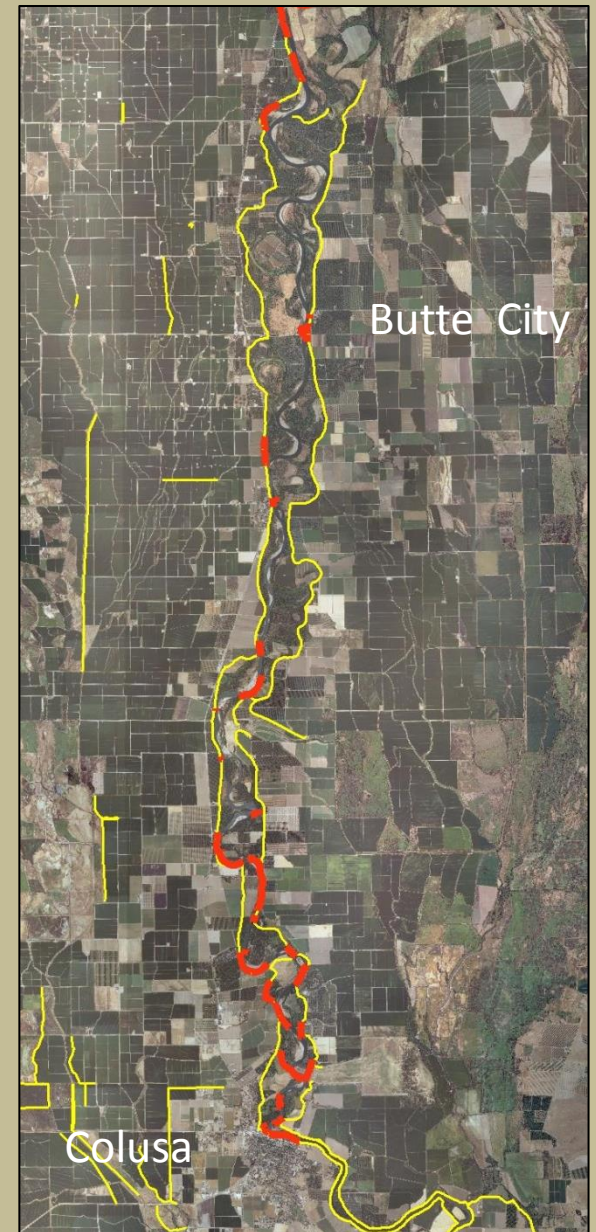
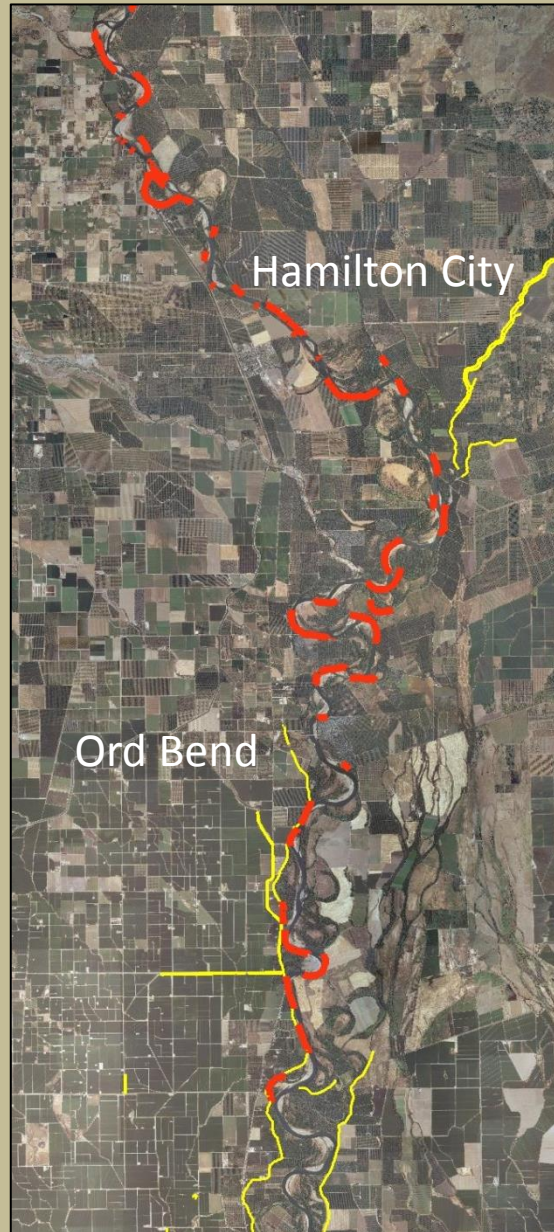
Bank Swallow – Sacramento River Reach 4

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Bank Swallow – Sacramento River Reach 2 - 3

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Bank Swallow — Response to Revetment Removal

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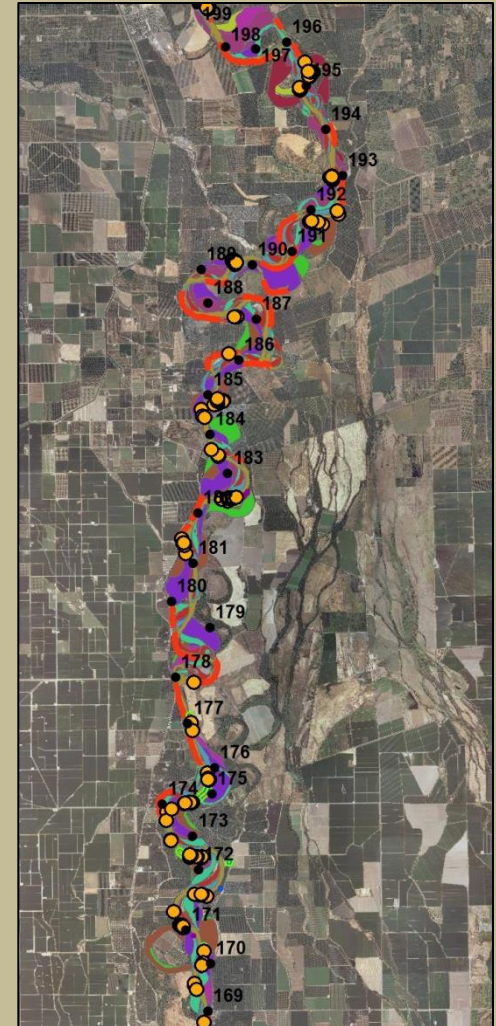
Would Bank Swallows respond to the removal of bank protection along the Sacramento River?

Methods:

Aerial photographs (NAIP and other imagery)
USACE 1991 Atlas
DWR 1978 Atlas
Channels 1896-1999 (DWR)

Rip-rap Dataset (DWR)

Bank Swallow Survey Dataset (1999-2012)



Bank Swallow — Response to Revetment Removal

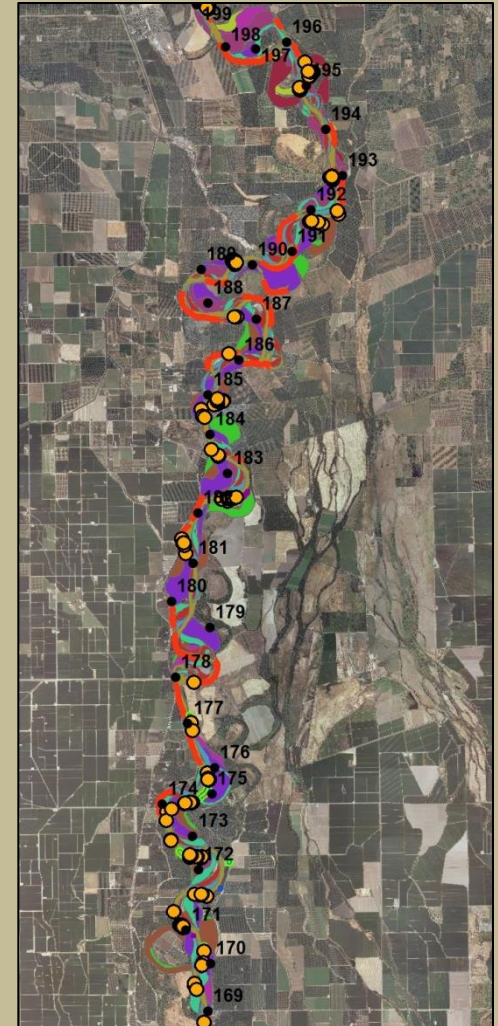
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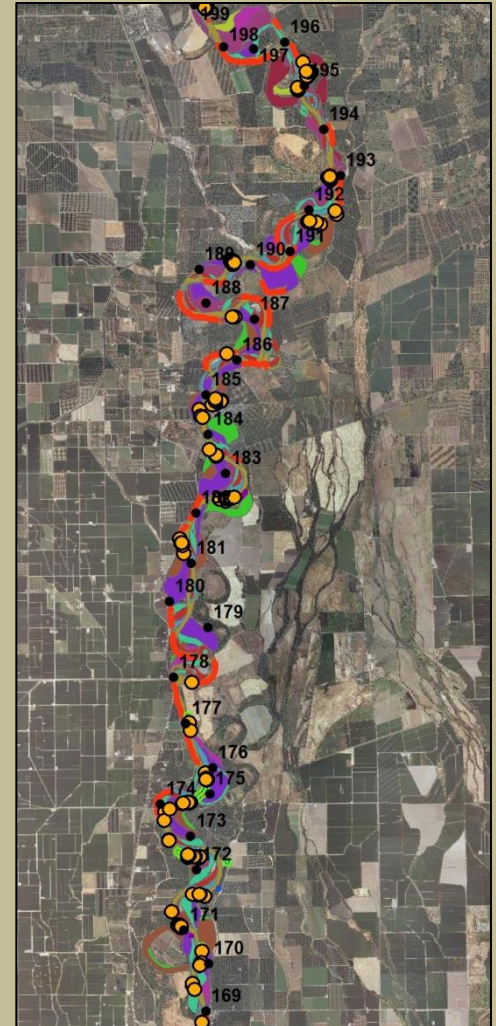
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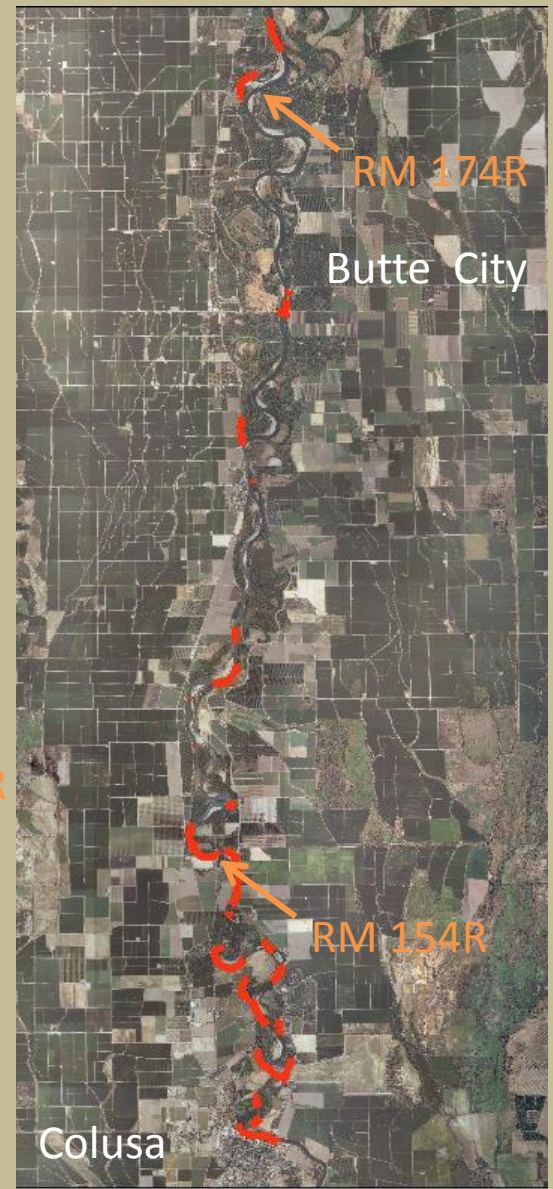
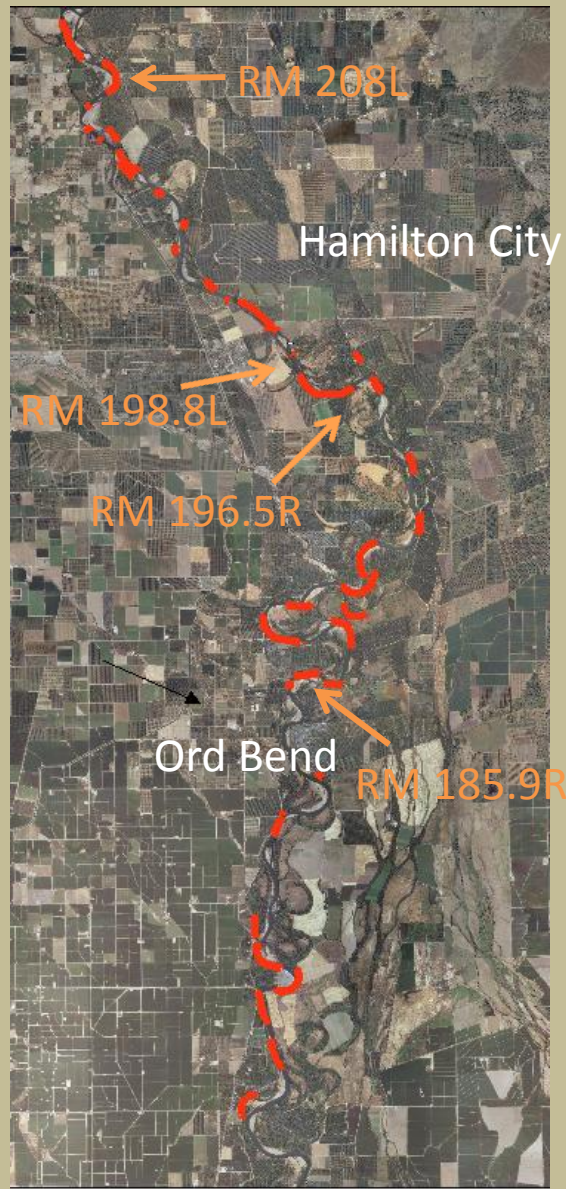
Bank Swallow — Response to Revetment Removal

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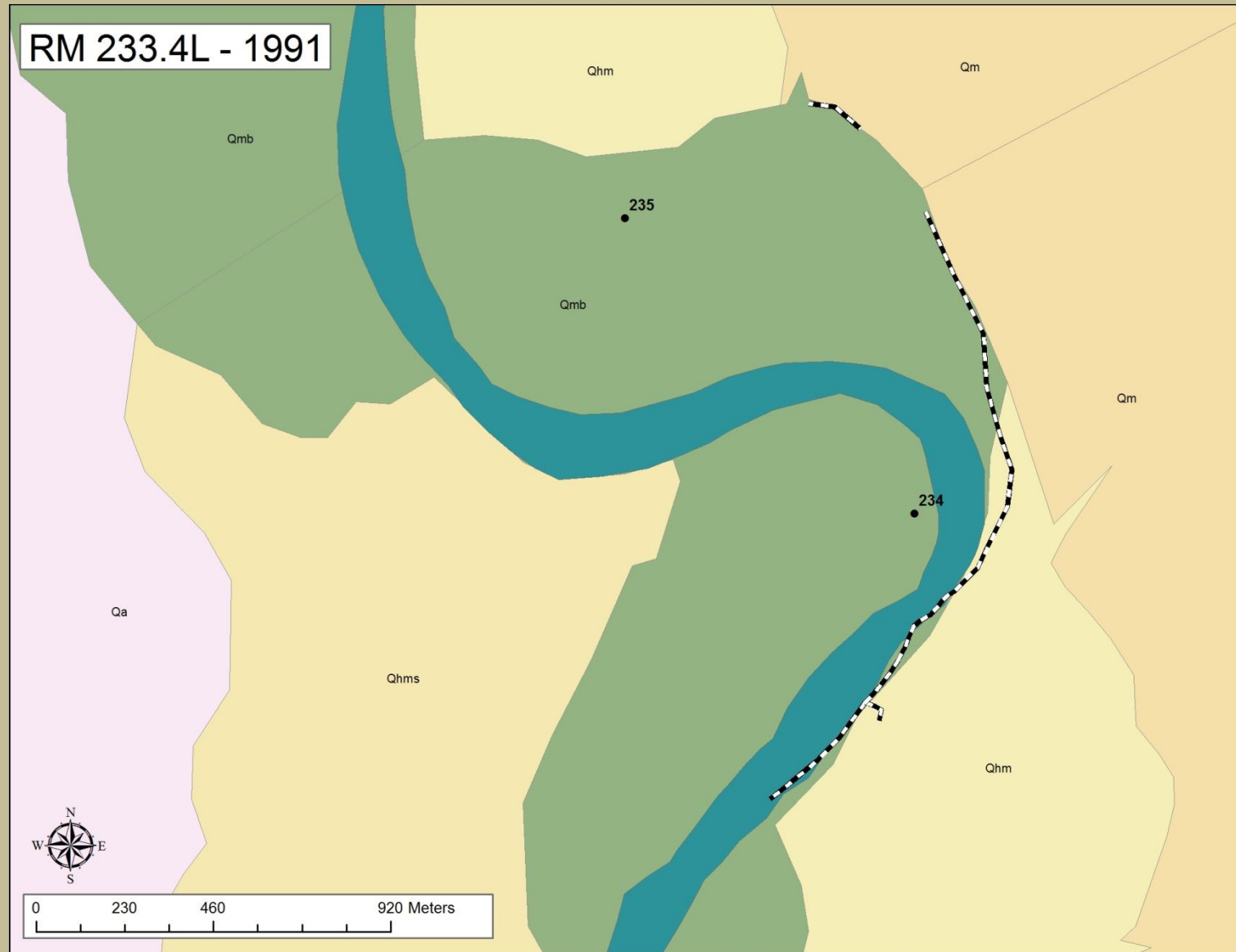
Bank Swallow – Results

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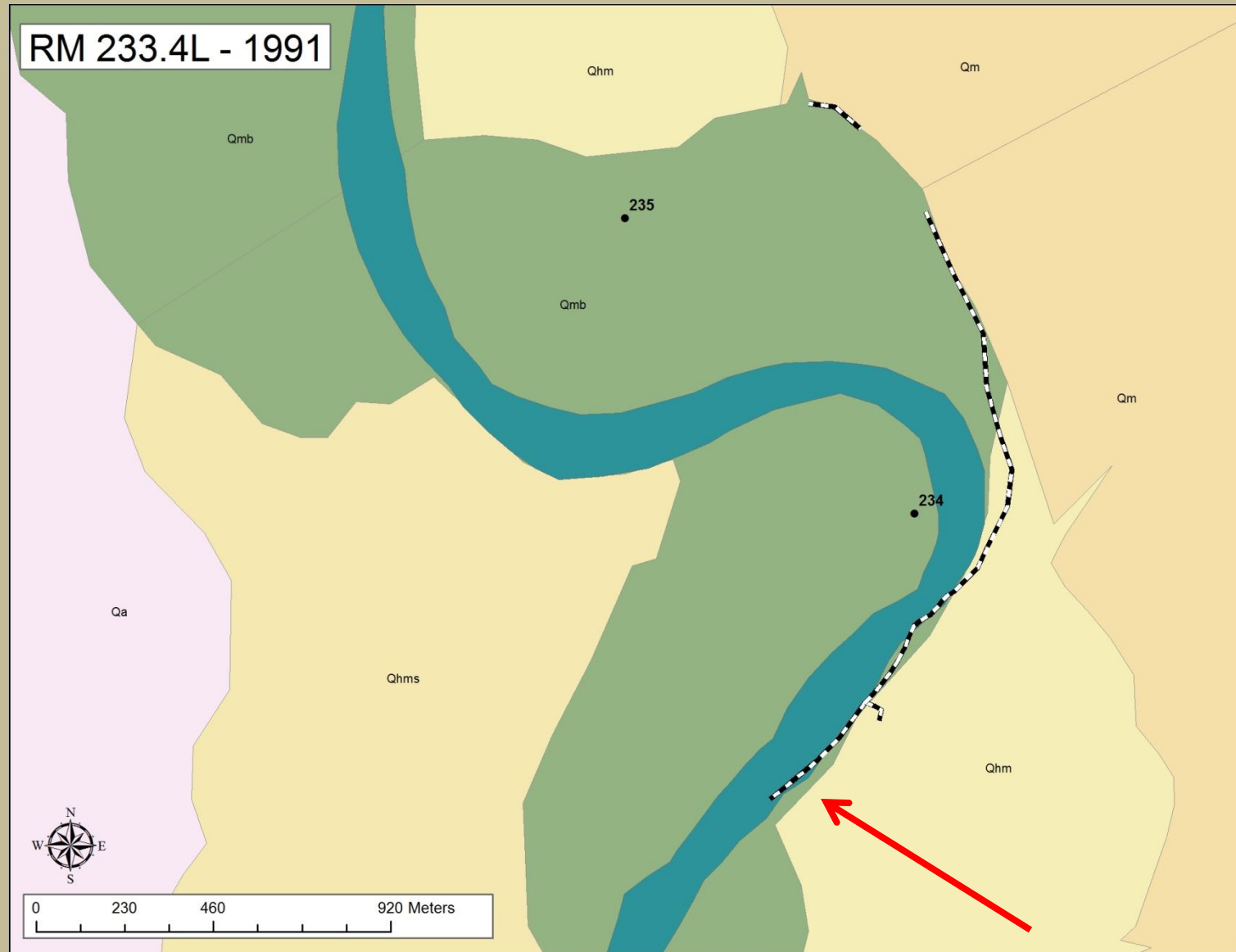
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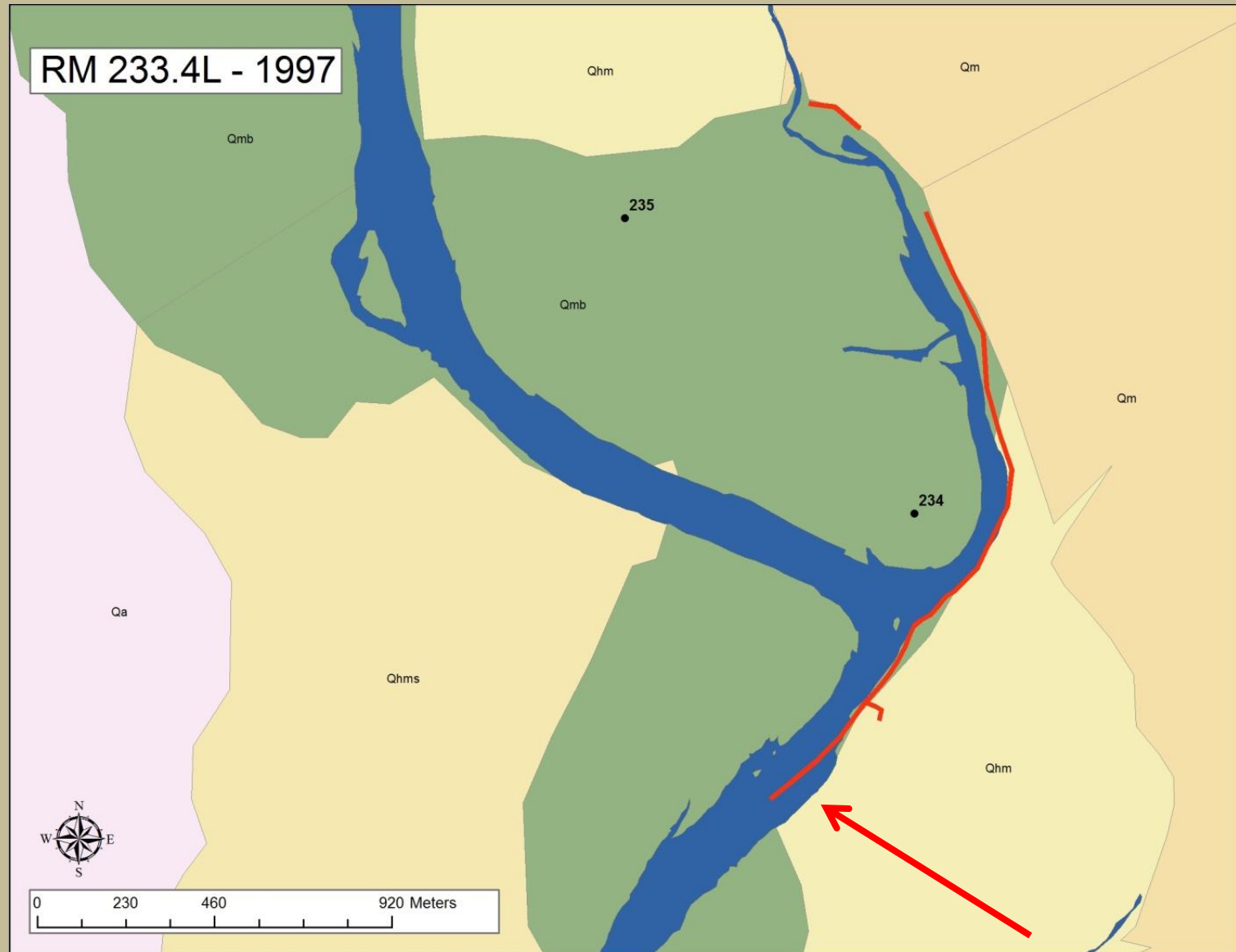
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Riparia riparia



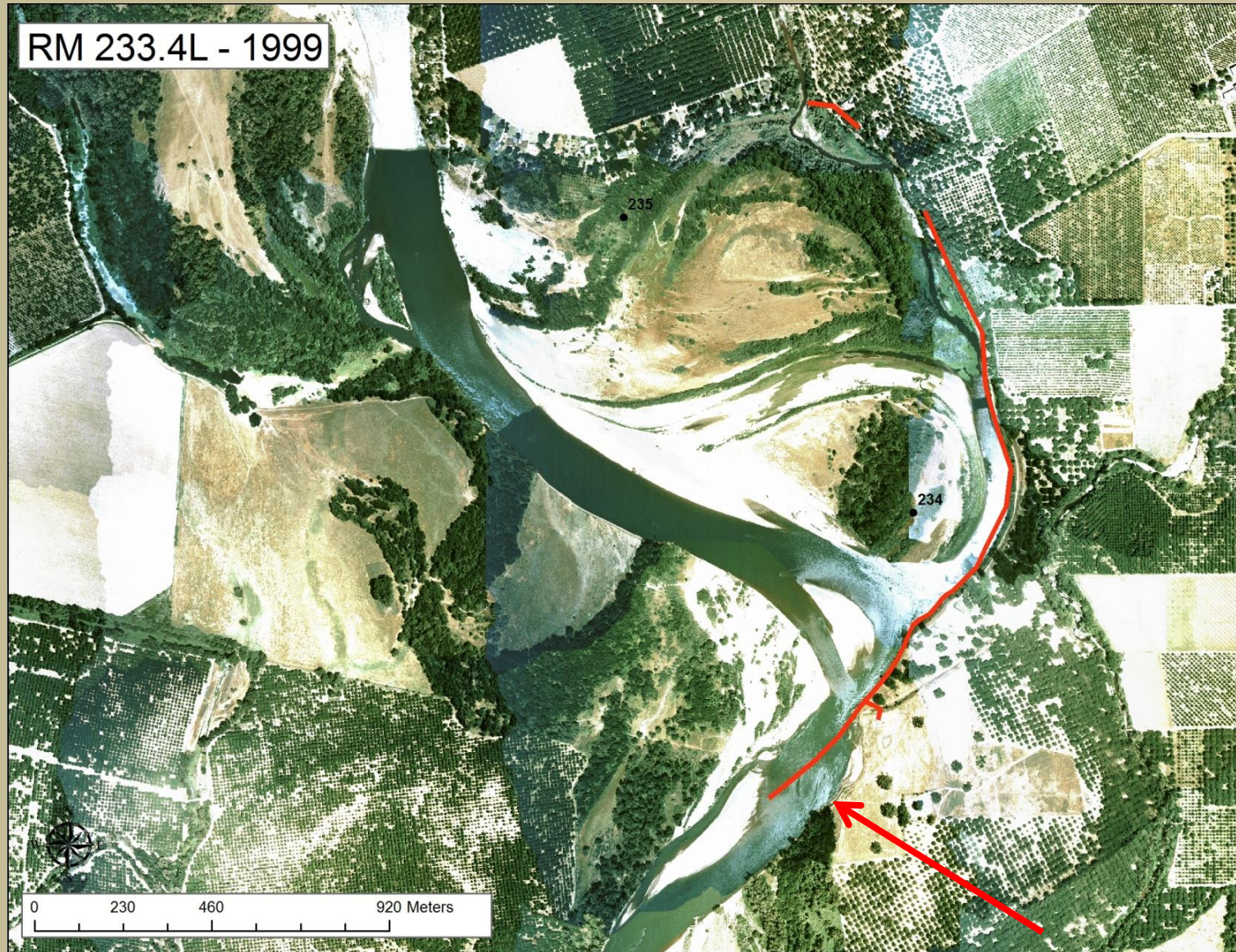
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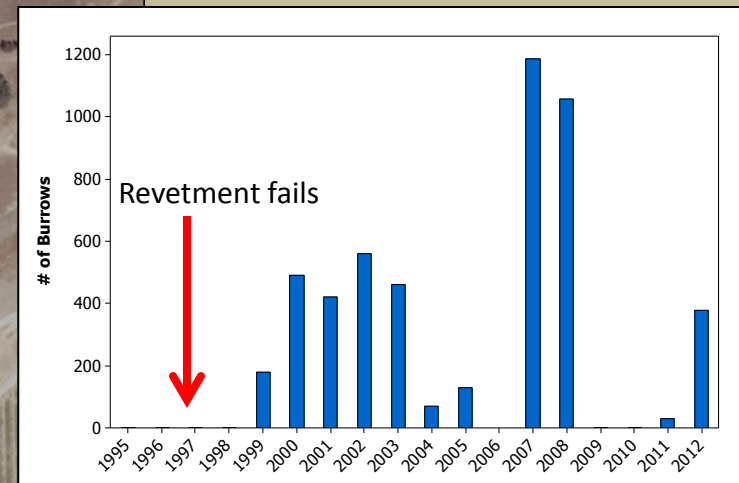
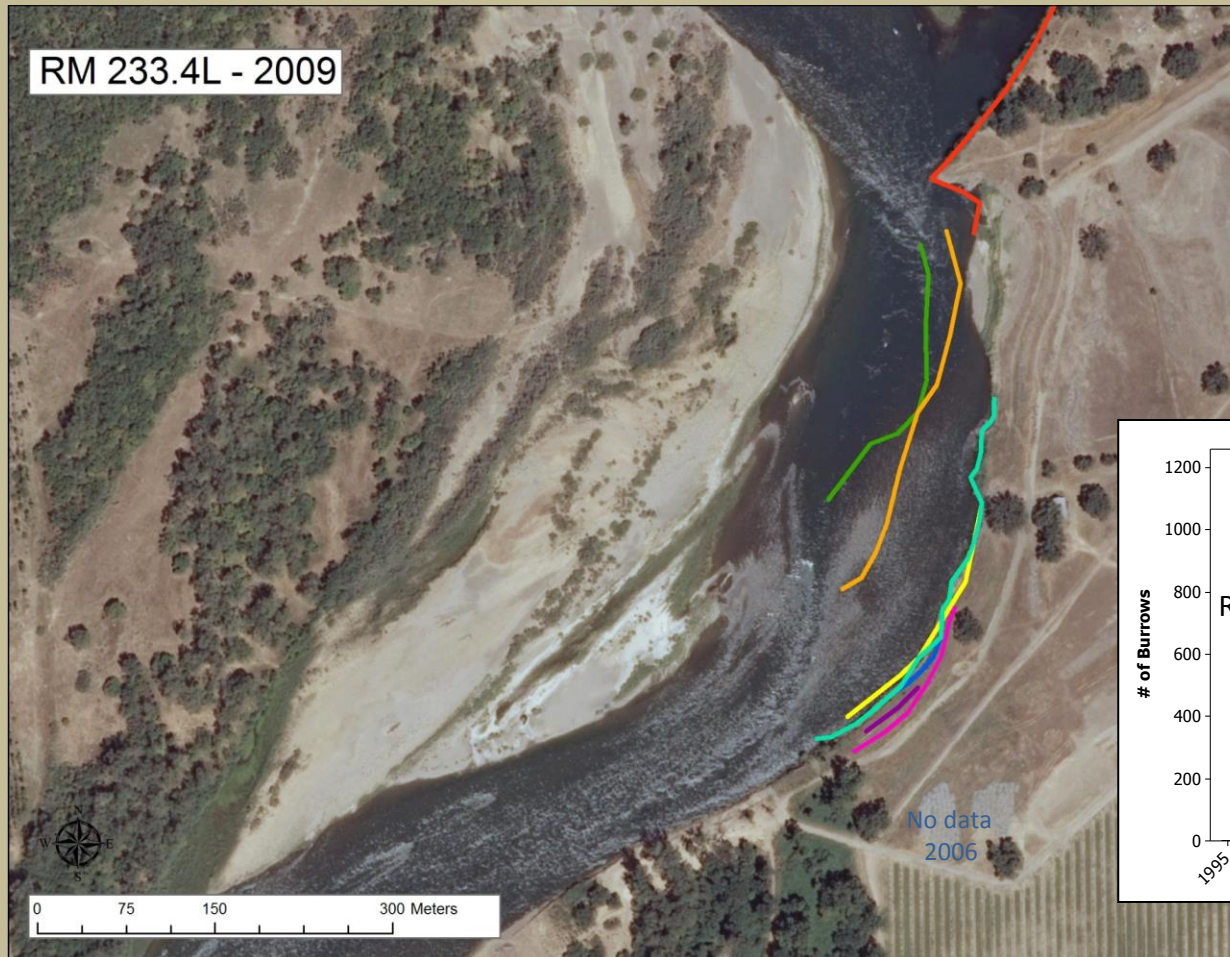
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Bank Swallow — Response to Revetment Removal

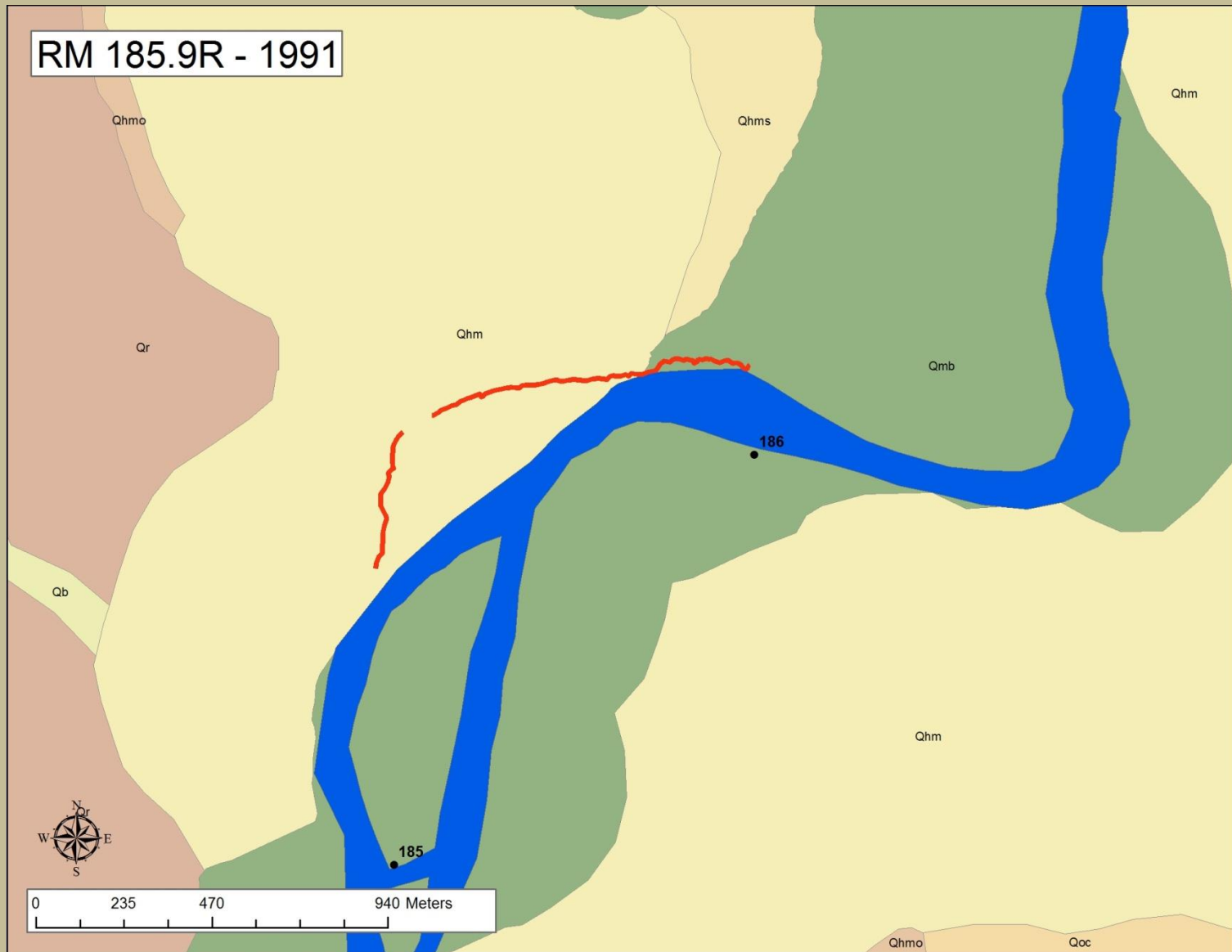
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BANS return within 2 years to the site; in 2007-2008, > 1000 burrows at site



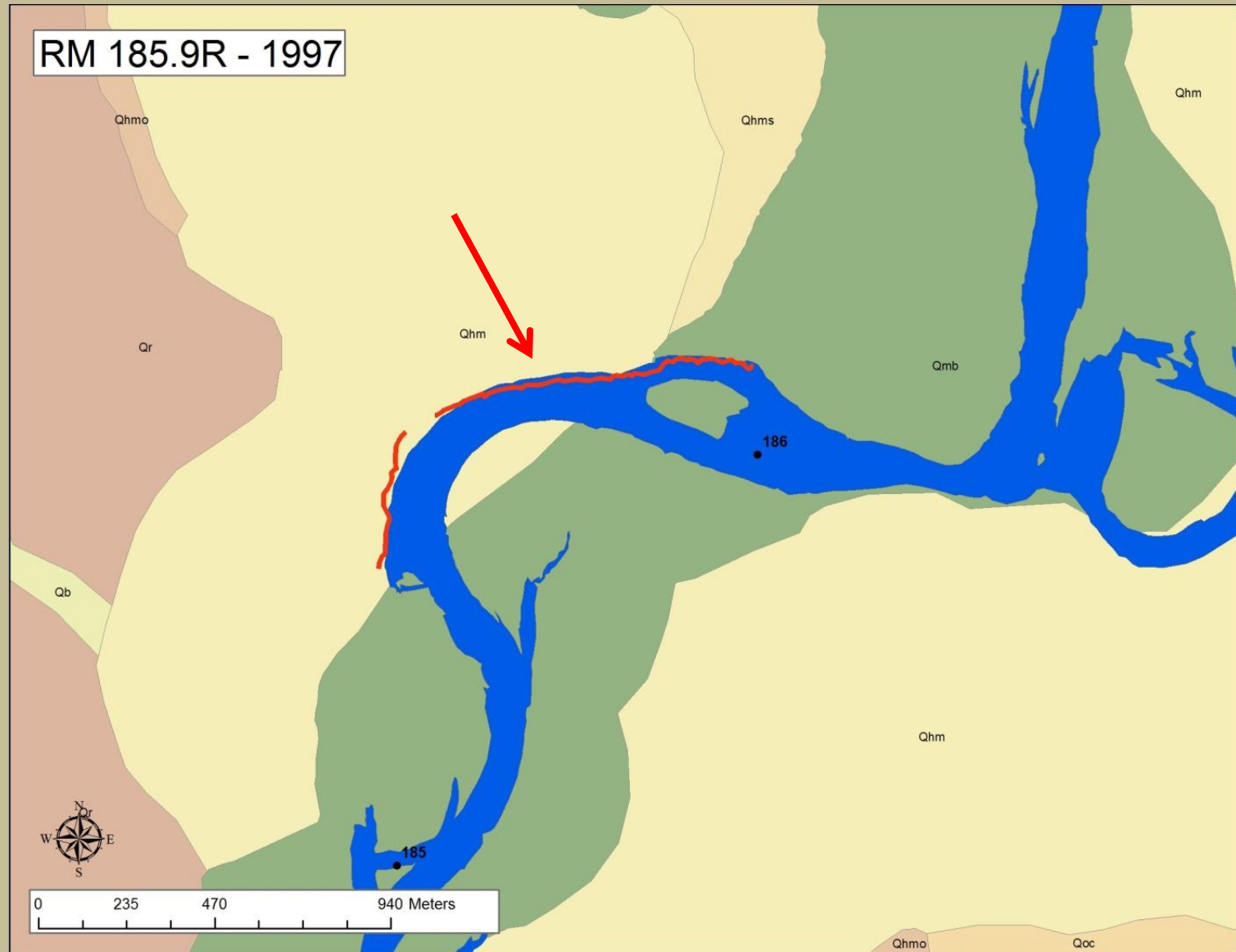
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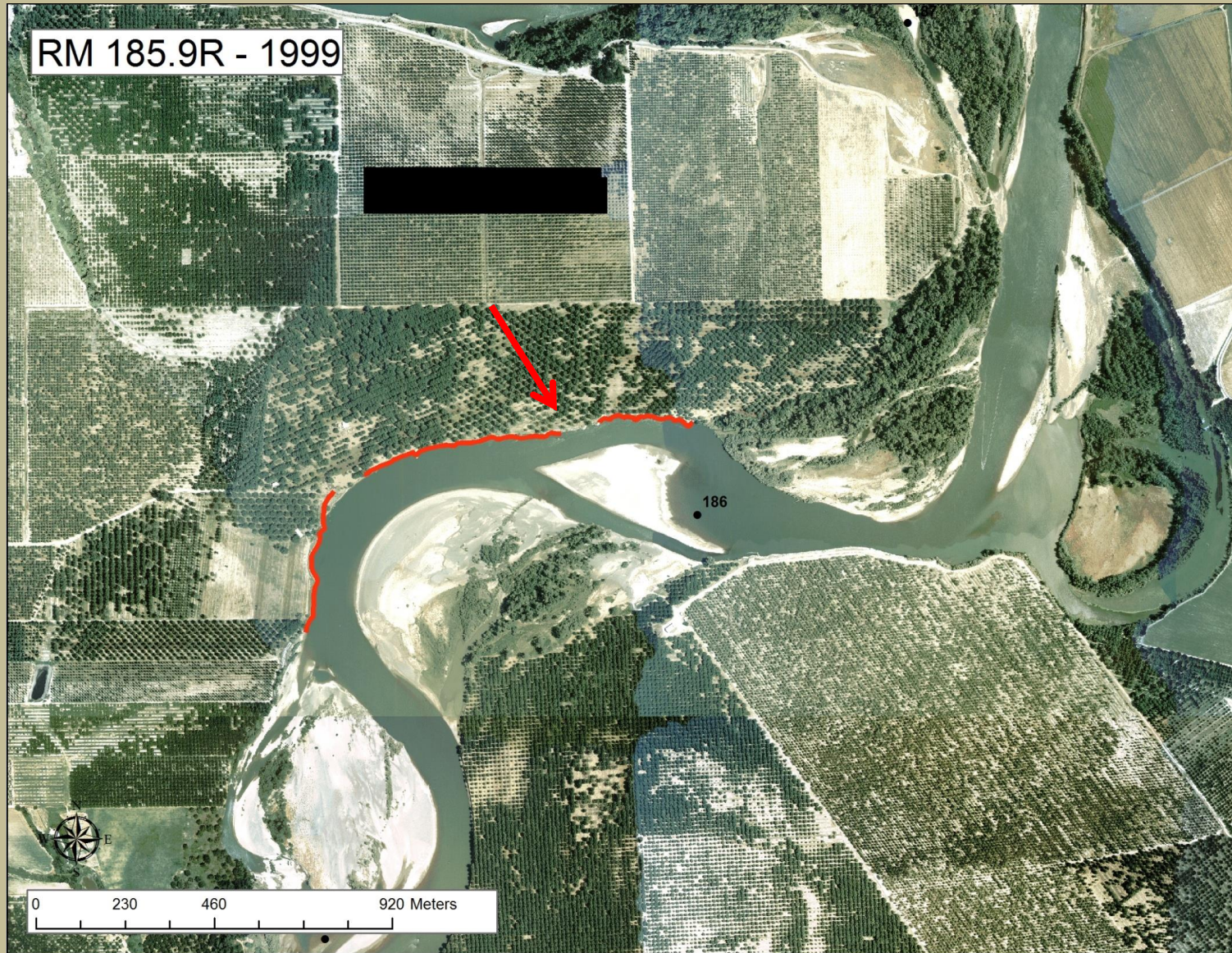
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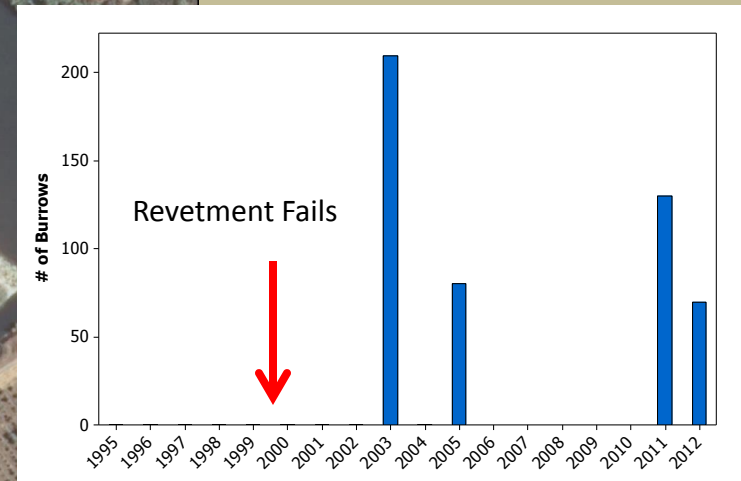
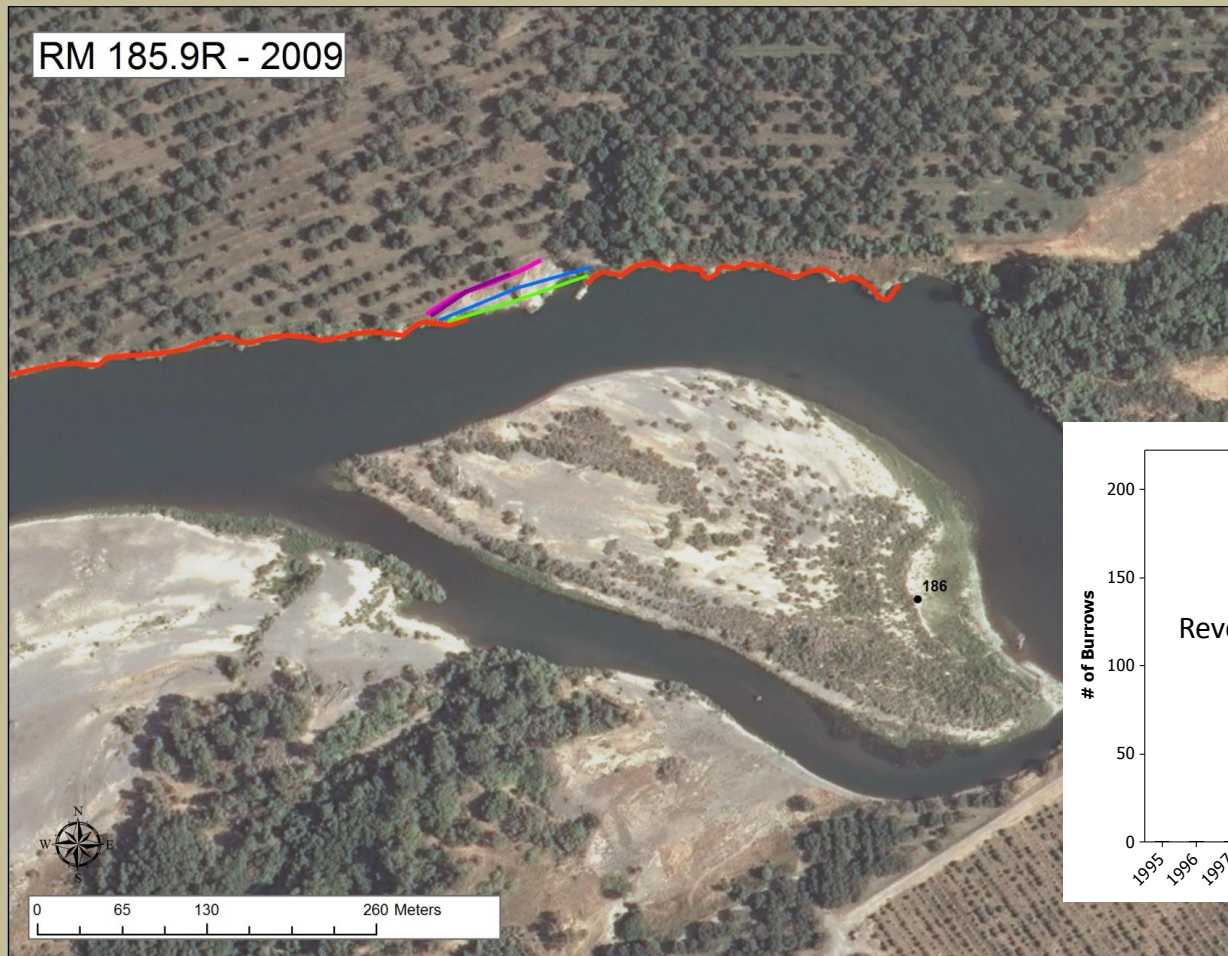
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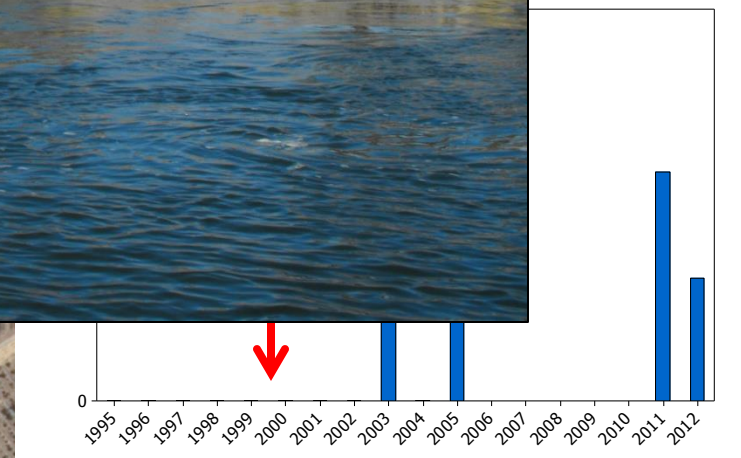
BANS return within 3 years to the site; in 2003, > 200 burrows at site



Bank Swallow — Response to Revetment Removal

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BANS return



Bank Swallow — Response to Revetment Removal

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BANS return



Bank Swallow – Summary of Results

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Revetment:

- 11 sites located where revetment removed, failed, or no longer serving design purpose.
- Approximately 3339 meters (11,018 ft) in total.
- Average length 371 meters (240 m median length), or 800-1200 feet.
- Most sites were probably the result of 1997 high water event
- All but 1 site on alluvium; historic meander deposits.



Bank Swallow – Summary of Results

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Bank Swallows:

- 10 of 11 sites were re-colonized by BANS
- On average, sites were re-colonized in 2.5 years; (min = same year; max = 6 years)
- Soil types at sites were mapped as Columbia, Gianella, moonbend, silty or sandy loam
- Site that was not colonized did not form cut bank



Photo: Jaime Chavez

Bank Swallow – Conclusions

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- We have empirically shown that BANS will re-colonize locations where bank protection is removed.
- Sites are not large- there is habitat potential with modest modifications to the flood system.
- BANS are likely habitat limited on the Sacramento River given their nearly universal response to novel habitats along the waterway.
- Deliberate removal of revetment will likely provide more habitat to the species – affording benefits to other ecosystems and taxa.
- We need to study where revetment removal makes the most sense based on flood management needs, and based on suitability for Bank Swallows (soil type, meander potential, etc).
- Revetment removal in conjunction with conservation easements should be considered in providing breeding and foraging habitat.

Acknowledgements

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And others...



Questions?

