

Big Horn Lake Sediment Management Study





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Omaha District

Study Proposal

- Bureau of Reclamation and Omaha District Interagency Agreement
- Omaha provide technical report
- Compares sediment management alternatives and provide future recommendations
- PM/Technical Lead
 - Reclamation – Stephanie Hellekson
 - COE – Dan Pridal





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Scope

- Initial appraisal level of detail
- Focus on screening and alternative comparison
- Highlight constraints/issues/impacts of the sediment management challenge
- Technical focus – number crunching, define what is feasible





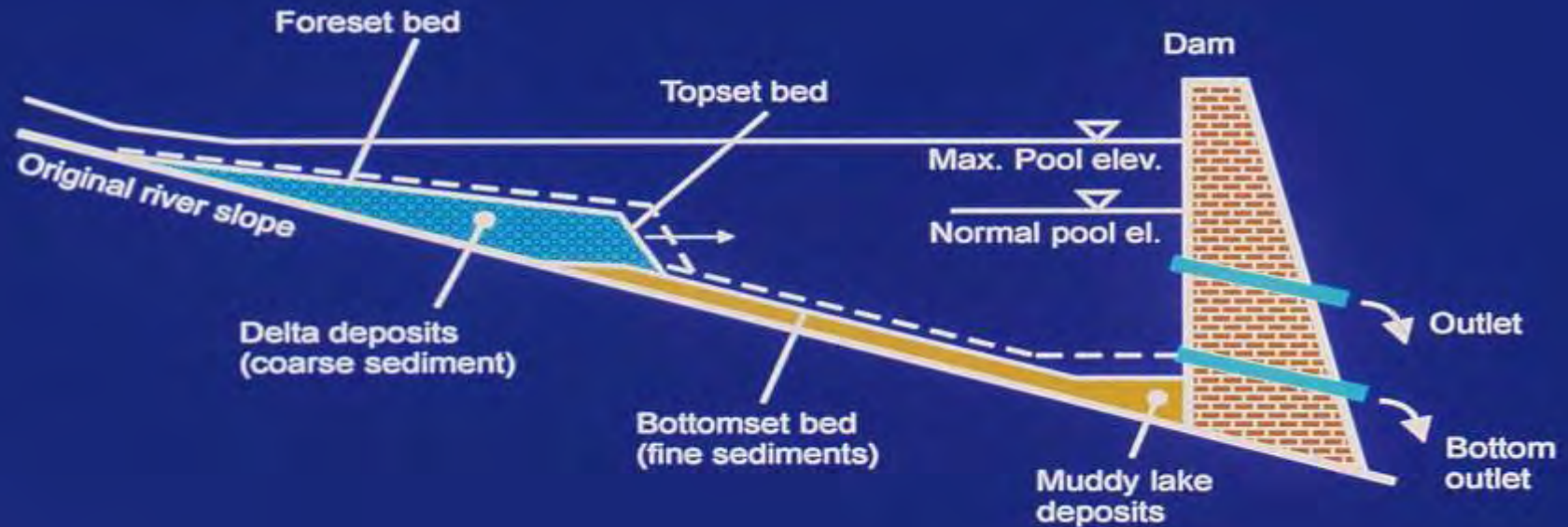
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Alternatives

- A) Higher pool level during recreation season
- B) Trap sediments upstream of Horseshoe Bend
- C) Flush sediment through Horseshoe Bend
- D) Manage sediment within Horseshoe Bend
- E) Manage sediments within the watershed (not part of this study)
- F) Dredging/Removal (evaluate previous)



Delta Formation Overview



Alternative A

A) Higher pool levels during recreation season

Change Yellowtail operation to alter pool level – examine past records with respect to pool level vs. sediment inflow

Modifies deposition location, probably increase in southern end of reservoir, eventually worsen conditions at Horseshoe Bend

Does not solve problem but may buy some time for Horseshoe Bend





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Alternative B

B) Trap sediments upstream of Horseshoe Bend

Alter causeway east of Lovell to serve as impoundment

Area is wide and shallow, more effective for coarse material than fine

Trapped sediment could be removed if funds available

Identify construction issues, policy issues, O&M





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Alternative C

C) Flush sediment through Horseshoe Bend

Maintain lower pool level during high sediment runoff period to flush sediment past Horseshoe Bend

Likely some deposition still occurs within Horseshoe Bend

Does not solve sediment problem but spreads to entire project to buy time, long term impact may be detrimental and worse than without change

Risk that pool may be impacted during lower runoff years, other similar impacts





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Alternative D

D) Manage sediment within Horseshoe Bend

Implement local features to control and alter sediment deposition and transport through Horseshoe Bend

May require berm construction to separate flowing river from recreation area

Sediments move past Horseshoe Bend with minimal impact to recreation area

Alternative is most independent of other actives, least impacted by hydrology

Other alternatives may also require some implementation of local sediment management activities



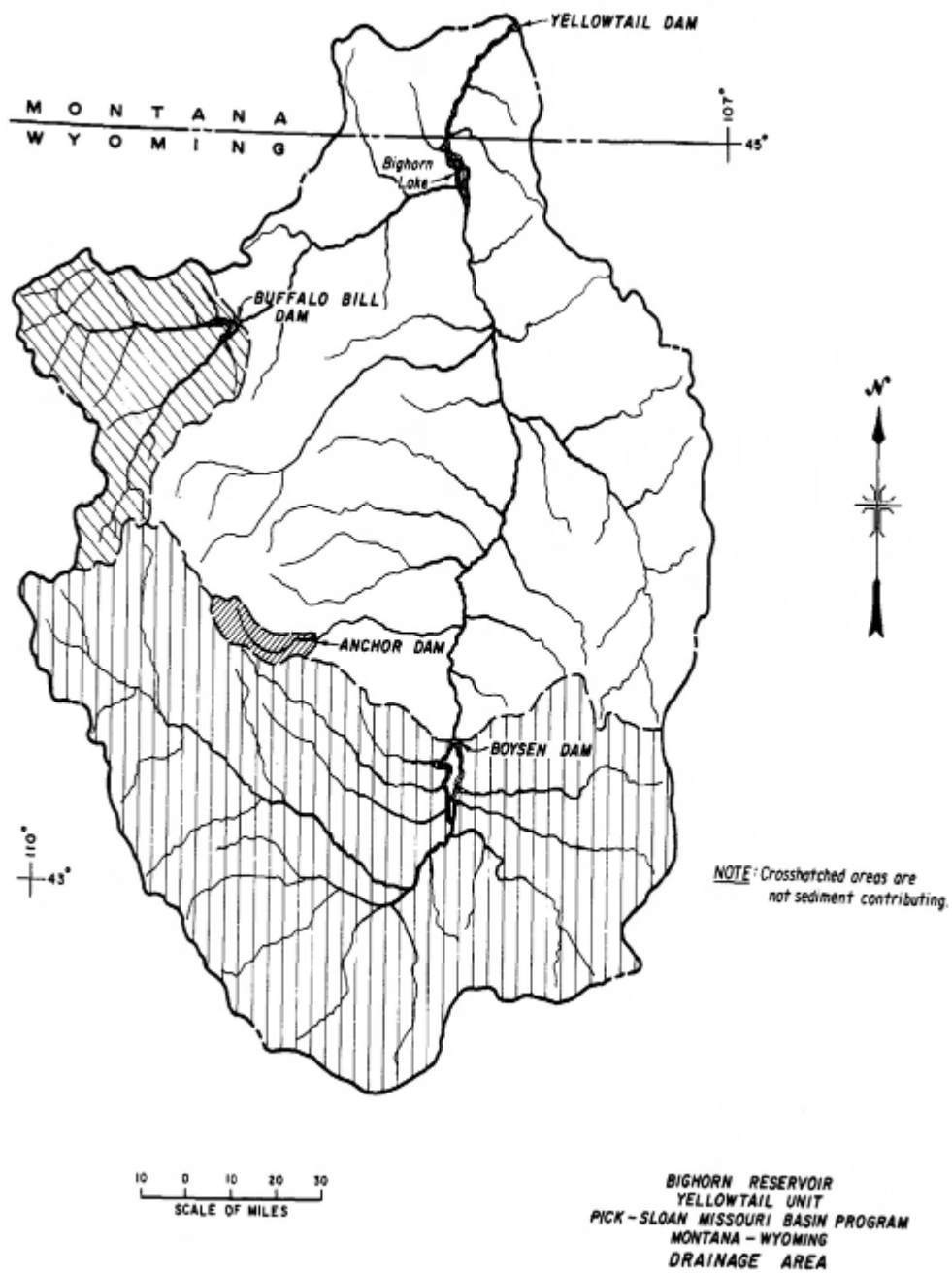


Figure 3. - Drainage area for Bighorn River above Yellowtail Dam.

Evaluation Method

- Collect available data
- Construct hydraulic model
- Verify model with existing conditions
- Modify model for alternative
- Evaluate and compare
- Basis for recommendations





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Modeling Options

- Simple sediment transport for a cross section
- HEC-RAS / HEC-6 / GSTARS Hydraulic Models
- More complex models (2d and 3d)
- Model complexity and analysis limited
- Will select model consistent with alternatives and available data





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Model Input

- Hydraulic Model Data Requirements
 - River/Reservoir Geometry Data
 - Roughness and Loss Coefficients
 - Bed Gradation Data for River and Reservoir Reaches
 - Upstream Inflow
 - Sediment Inflow and Gradation
 - Pool Level



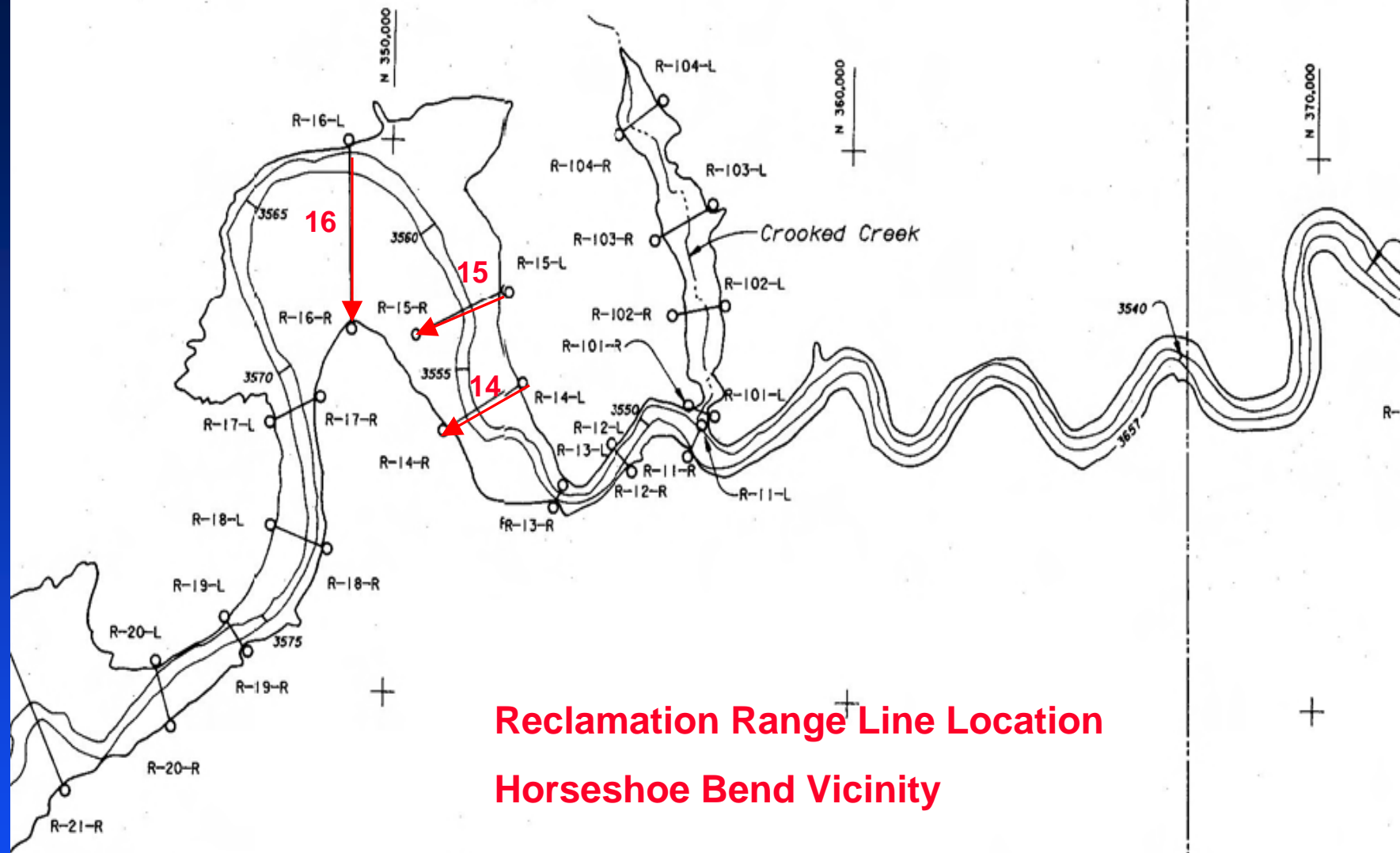


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Data Sources

- Reservoir rangeline surveys (numerous years)
- Sediment sampling
- USGS gage stations
- Other Agencies
 - Sediment data?
 - Historical topo data?
 - Aerial photos?
 - Previous Studies





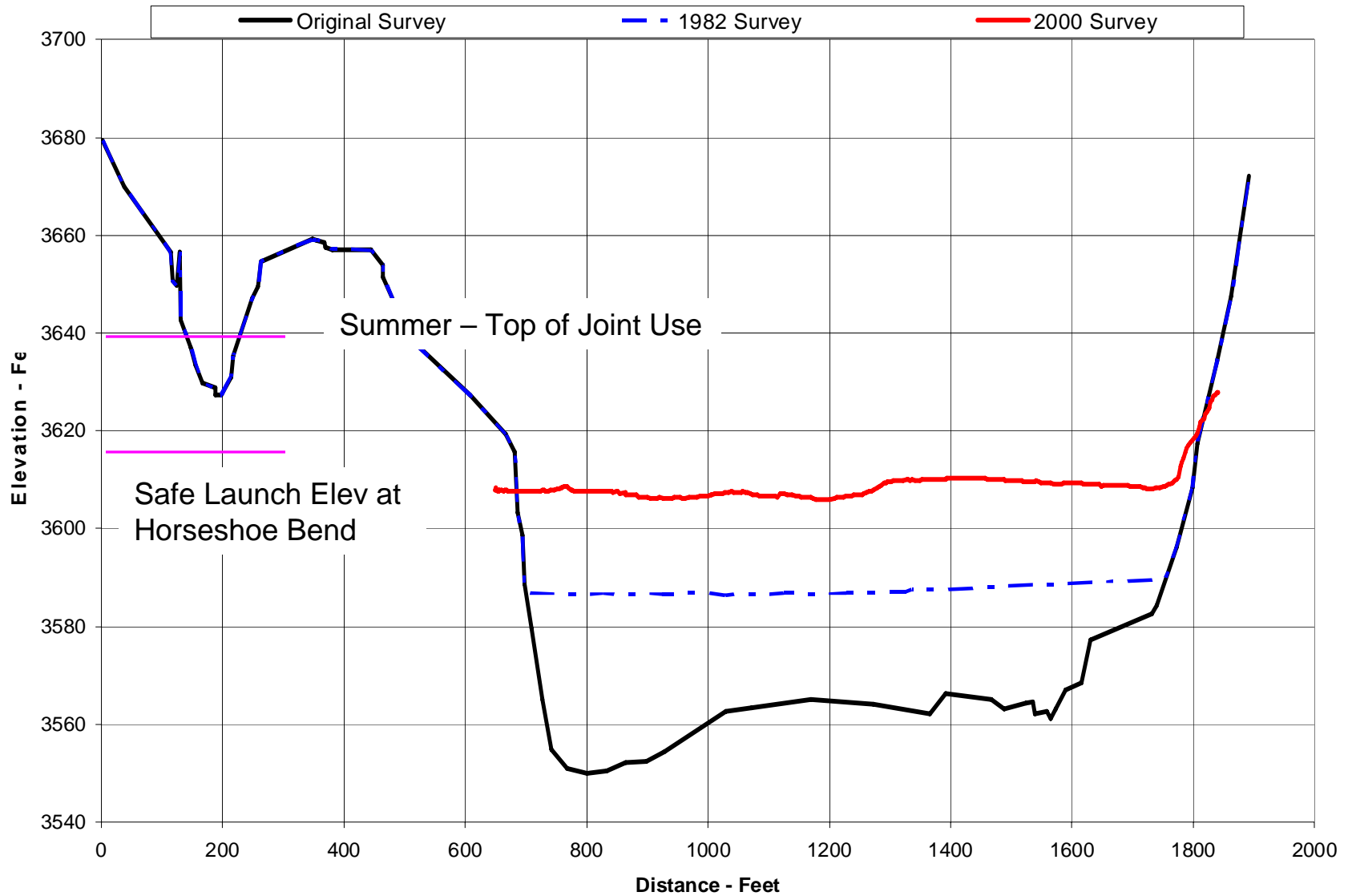
**Reclamation Range Line Location
Horseshoe Bend Vicinity**

W Y O M I N G M O N T A N A

D/S Horseshoe Bend

2000 Bighorn Lake Sed. Survey –
Reclamation Sed. Group

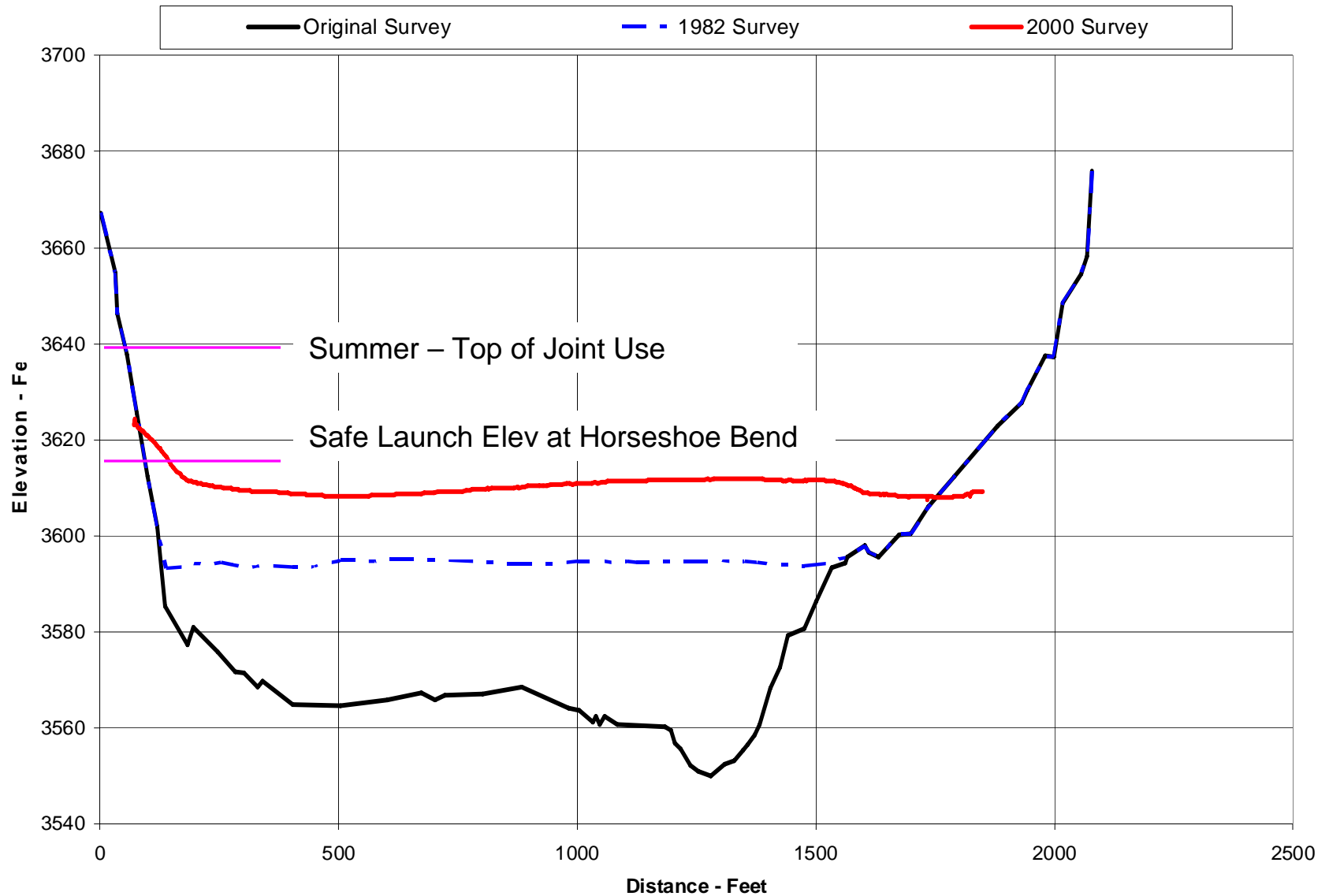
Range Line 14



Lower Horseshoe Bend

2000 Bighorn Lake Sed. Survey –
Reclamation Sed. Group

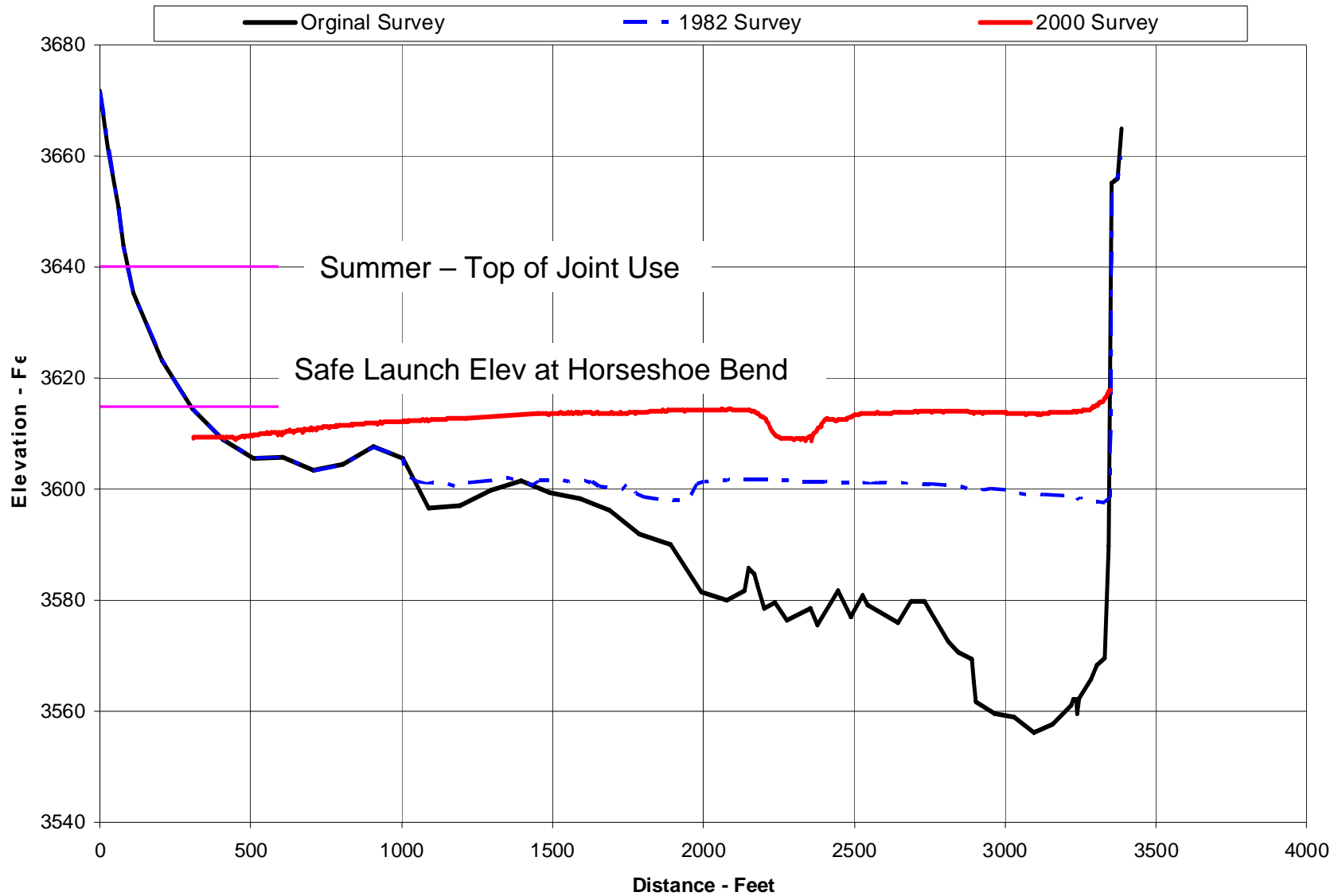
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Upper Horseshoe Bend

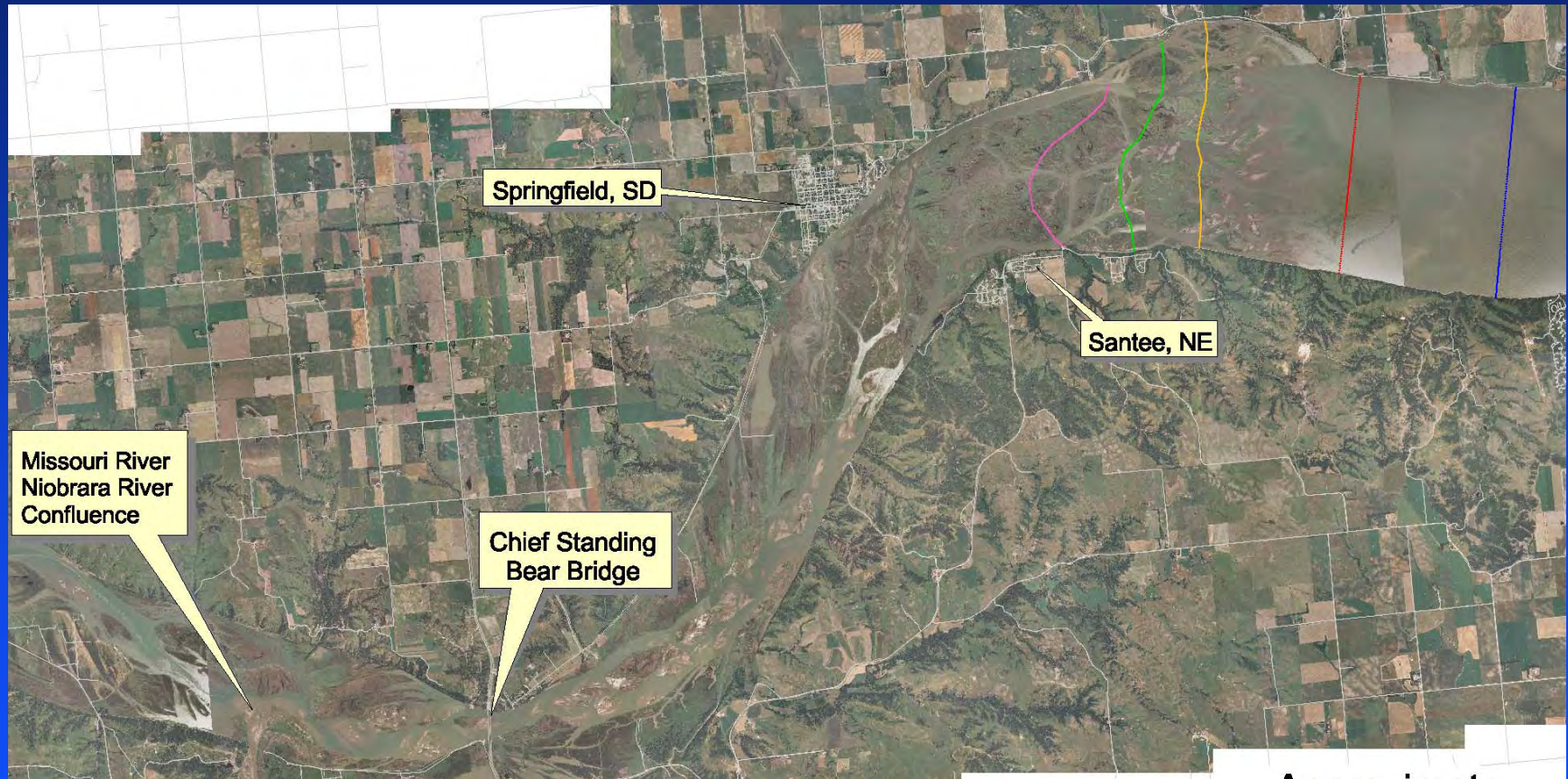
2000 Bighorn Lake Sed. Survey –
Reclamation Sed. Group

Range Line 16



Example

Delta Progression at Gavins Point Dam





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Schedule

- Kickoff Meeting – Jan 2008
- Site Visit and Data Collection – Spring 2008
- Initial model assembly – June 2008
- 60% Alternatives Analysis – August 2008
- 90% Draft Report – October 2008
- Study Complete – November 2008





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Summary

- Compare Sediment Management Alternatives
- Initial assessment level of detail to screen and compare alternatives
- Provide technical report and recommendations



Questions ?

