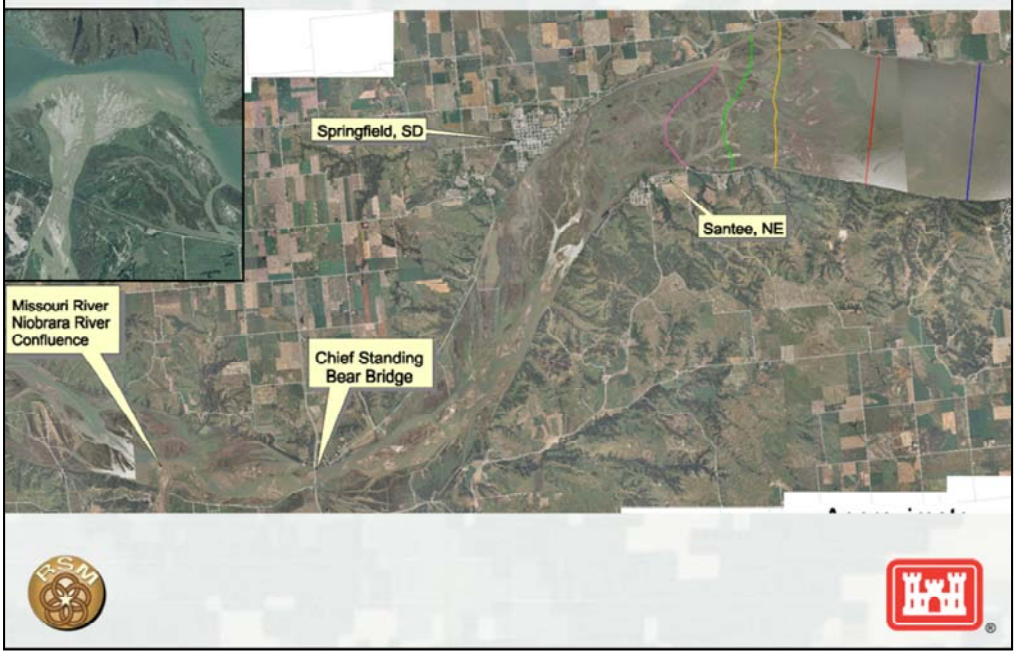
Lewis and Clark Lake Delta Locations



FY13 RSM IPR

Omaha District, Integration of Advanced Sediment Tools in HEC-RAS
Paul Boyd, NWO / Stanford Gibson, HEC

Accomplishments/Benefits/Lessons Learned

New sediment tools in HEC-RAS v. 4.2 (2013) and v. 4.3 (2014-5)

Unsteady sediment modeling improves reservoir modeling flexibility dramatically.

Bank erosion modeling allows for better assessment of sediment inputs

HEC-RAS can now run seamlessly through reservoir and connected river reaches

Opportunities to take action

Use modeling package to increase the size of models, making them 'regional'

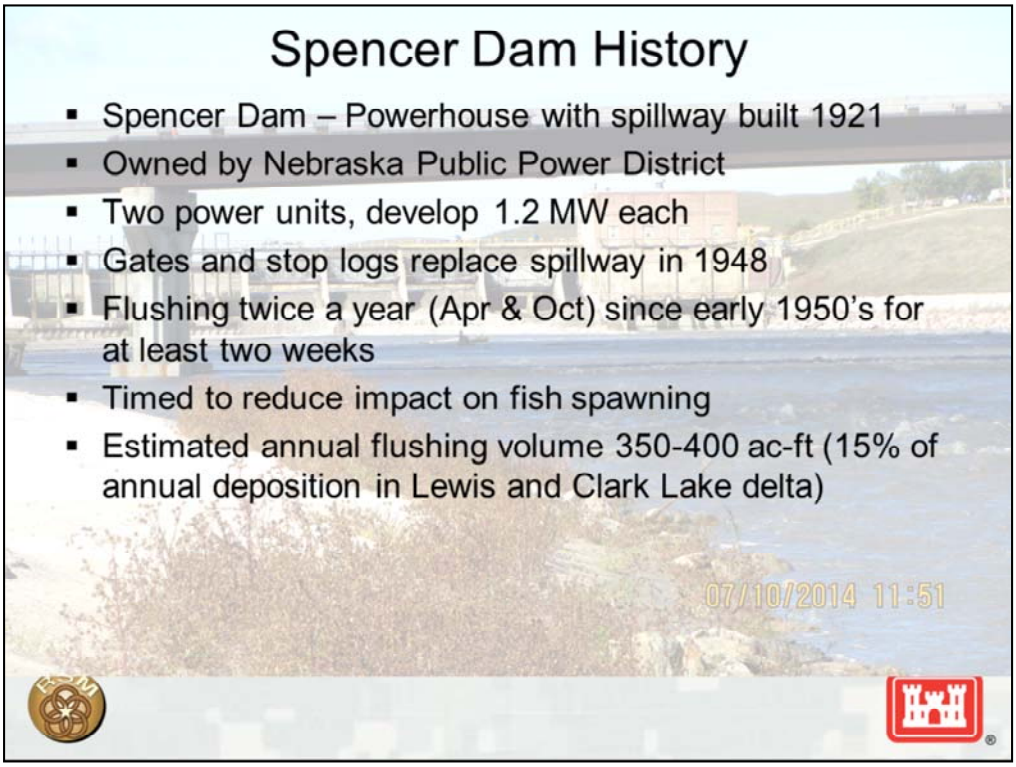
Find datasets in districts to help test new tools

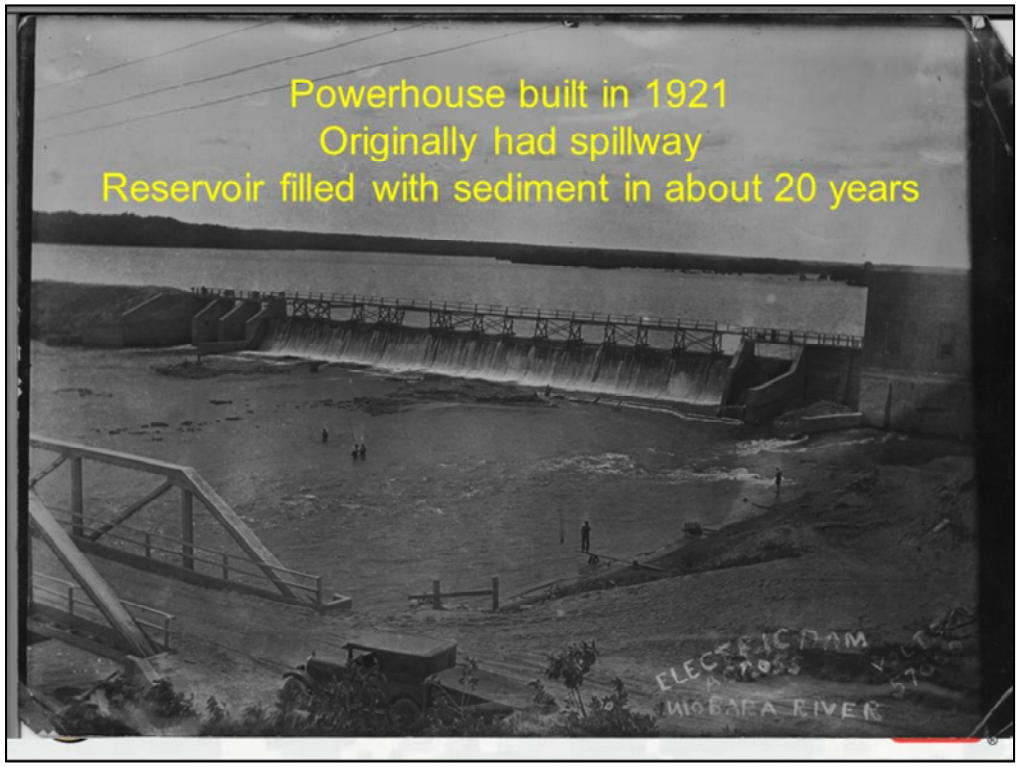
Collaborate between districts to build models

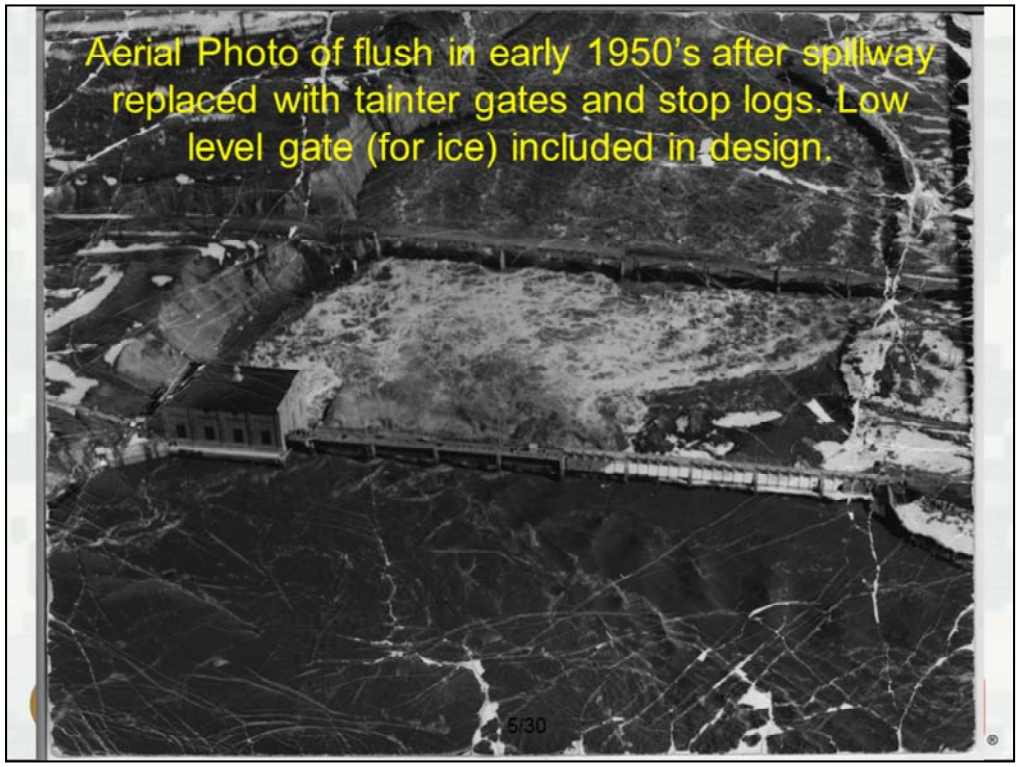
2

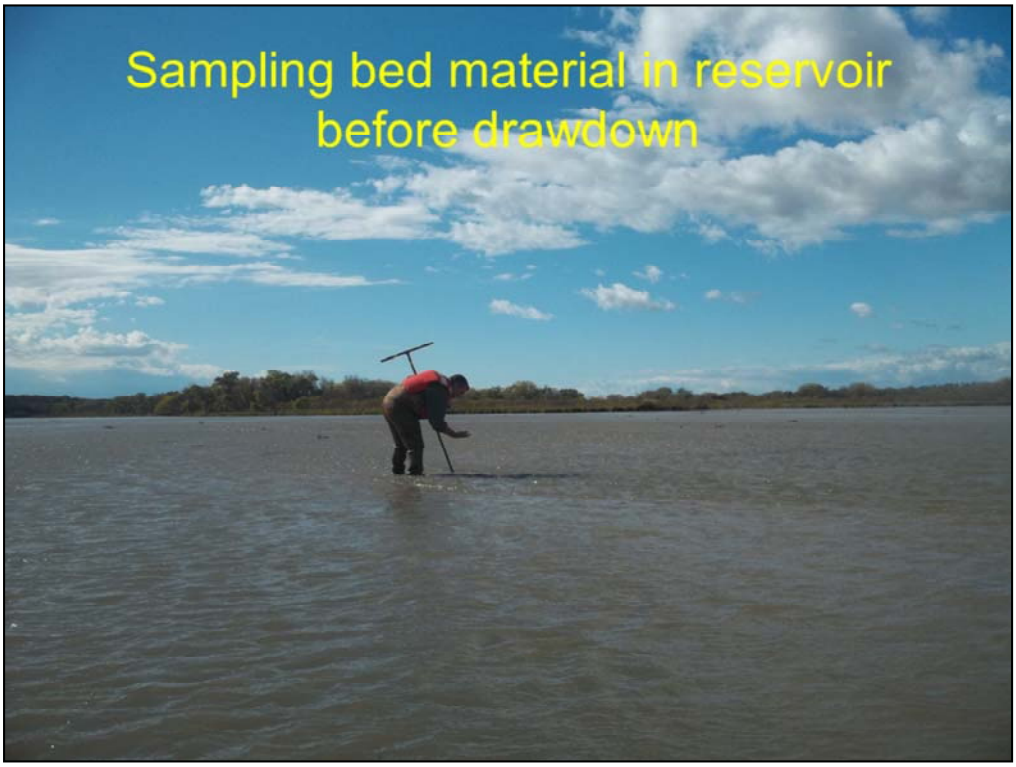
Spencer Dam History

- Spencer Dam – Powerhouse with spillway built 1921
- Owned by Nebraska Public Power District
- Two power units, develop 1.2 MW each
- Gates and stop logs replace spillway in 1948
- Flushing twice a year (Apr & Oct) since early 1950's for at least two weeks
- Timed to reduce impact on fish spawning
- Estimated annual flushing volume 350-400 ac-ft (15% of annual deposition in Lewis and Clark Lake delta)




Powerhouse built in 1921
Originally had spillway
Reservoir filled with sediment in about 20 years
ELECTRIC DAM
NIOBRARA RIVER

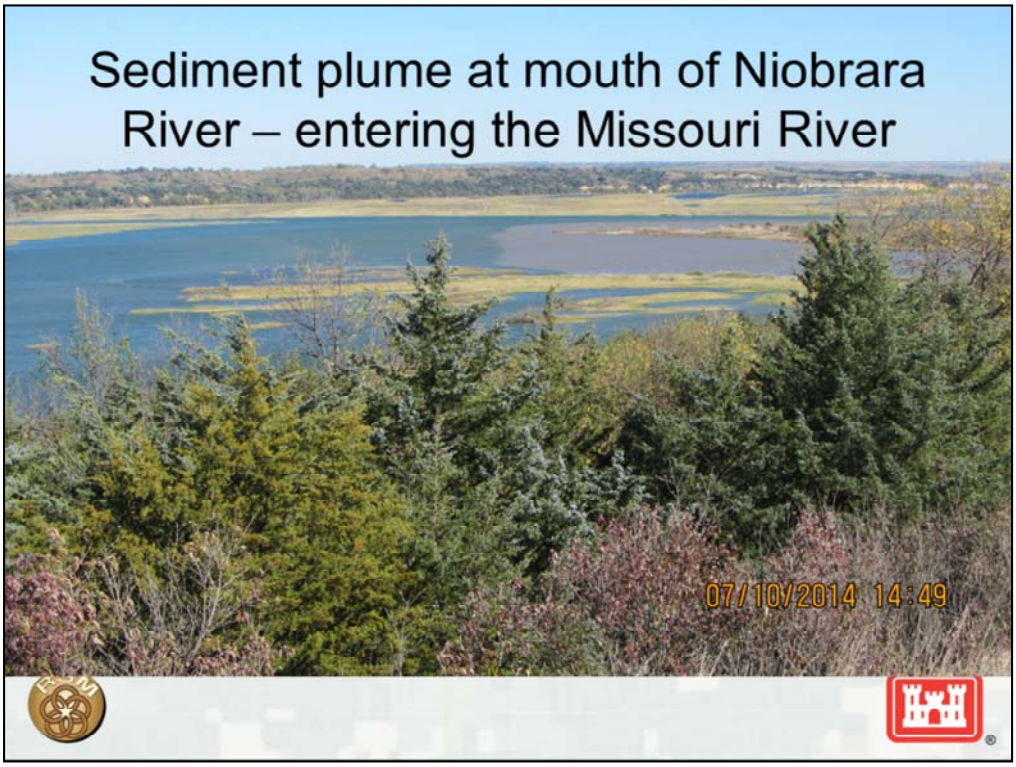

Aerial Photo of flush in early 1950's after spillway replaced with tainter gates and stop logs. Low level gate (for ice) included in design.
5/30

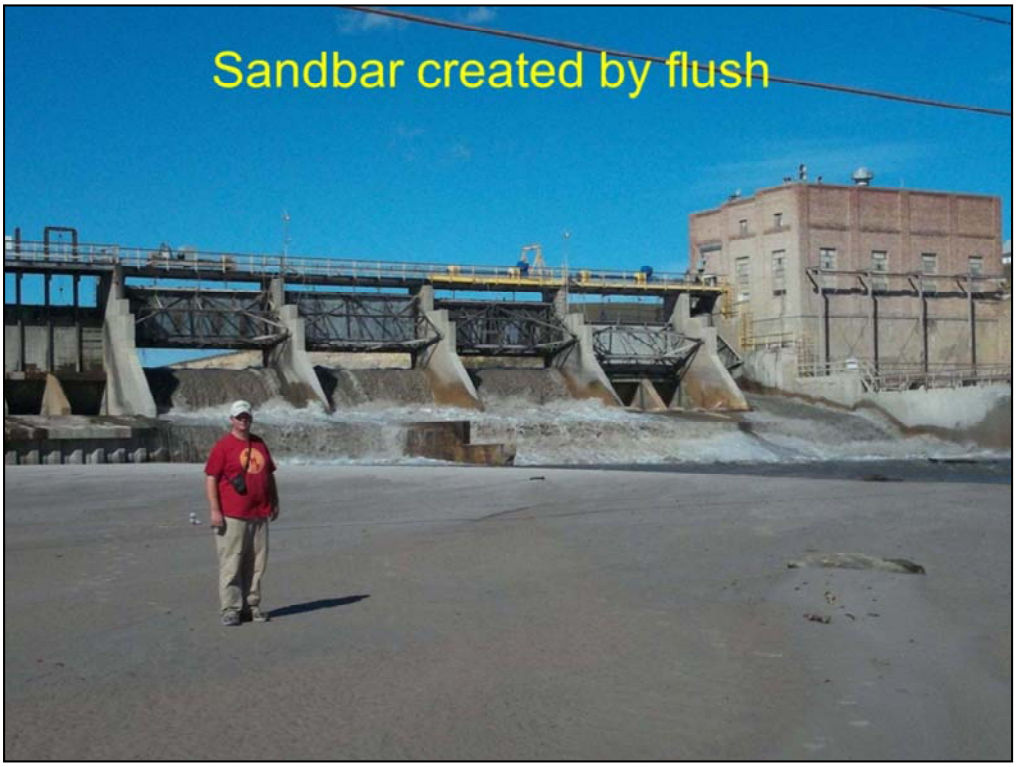

Sampling bed material in reservoir
before drawdown

06/10/2014 11:20

06/10/2014 11:08

Sampling during drawdown


Sediment plume at mouth of Niobrara River – entering the Missouri River
07/10/2014 14:49


Sandbar created by flush

Permitting

- Owner (Nebraska Public Power District) has worked with Neb. Dept of Env. Quality since fish kills in the 1980's.
- Timing of spring and fall flushes adjusted to minimize fish kill
- Slow drawdown night before flush as a cue, DO monitored by NDEQ during flush
- Some fish killed due to stranding
- Public news releases reminding public of schedule

Permitting

- State regulatory office has planned to get a permit since release of RGL 05-04
- Permit has requirements on dates, peak discharge, monitoring with NDEQ, and public communications – all actions that were already in place.
- No public comment
- NPPD selling dam to NRD's, for water right, will have to revisit permit if they choose to operate differently – planning to open gates permanently and decommission hydropower.