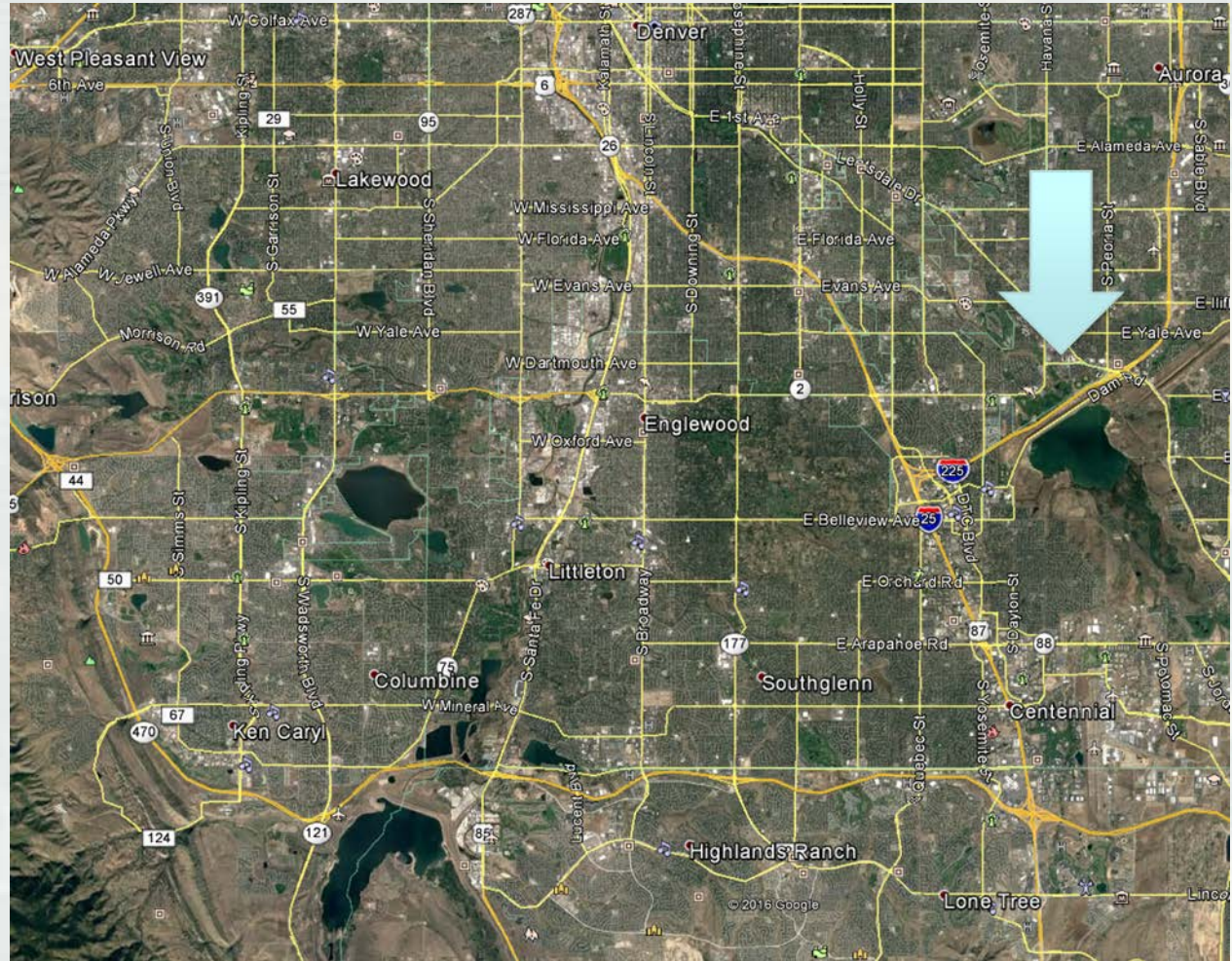


FY17 RSM IPR

Omaha District – NWO

Cherry Creek Dam Pressure Flushing Case Study

BLUF: Cherry Creek Dam, operated by the Omaha District US Army Corps of Engineers (USACE), undertakes a pressure flushing event annually. This flush is done by the Tri-Lakes O&M staff to ensure that deposited sediment does not affect the operability of the discharge gates. This project proposes to take advantage of the 2017 flush, partner with the Bureau of Reclamation (BoR) on a case study, and include the 2018 flush in a comprehensive review of the benefits and impacts of reservoir flushing in the context of Regional Sediment Management.



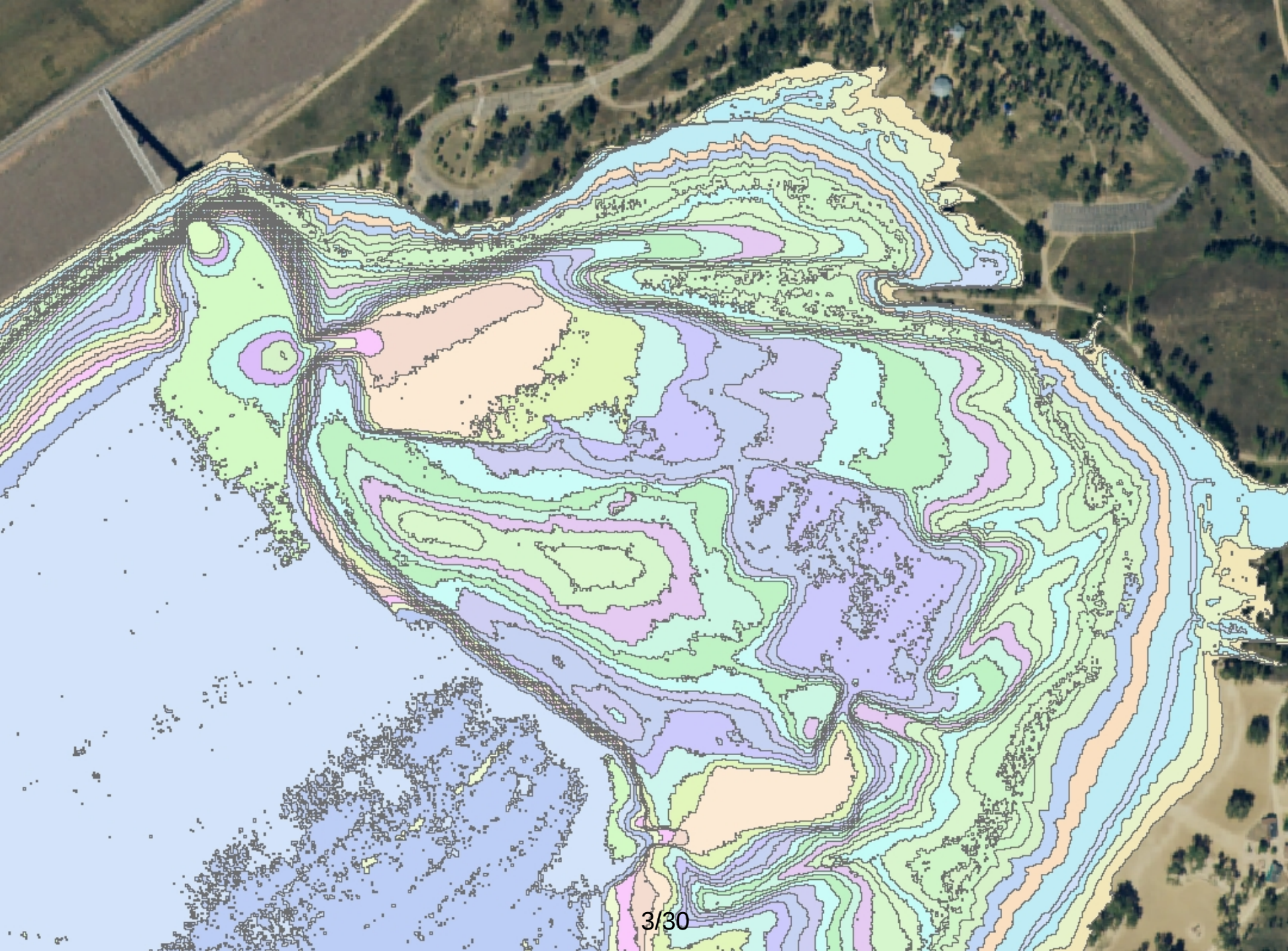
Cherry Creek Dam Pressure Flushing Case Study

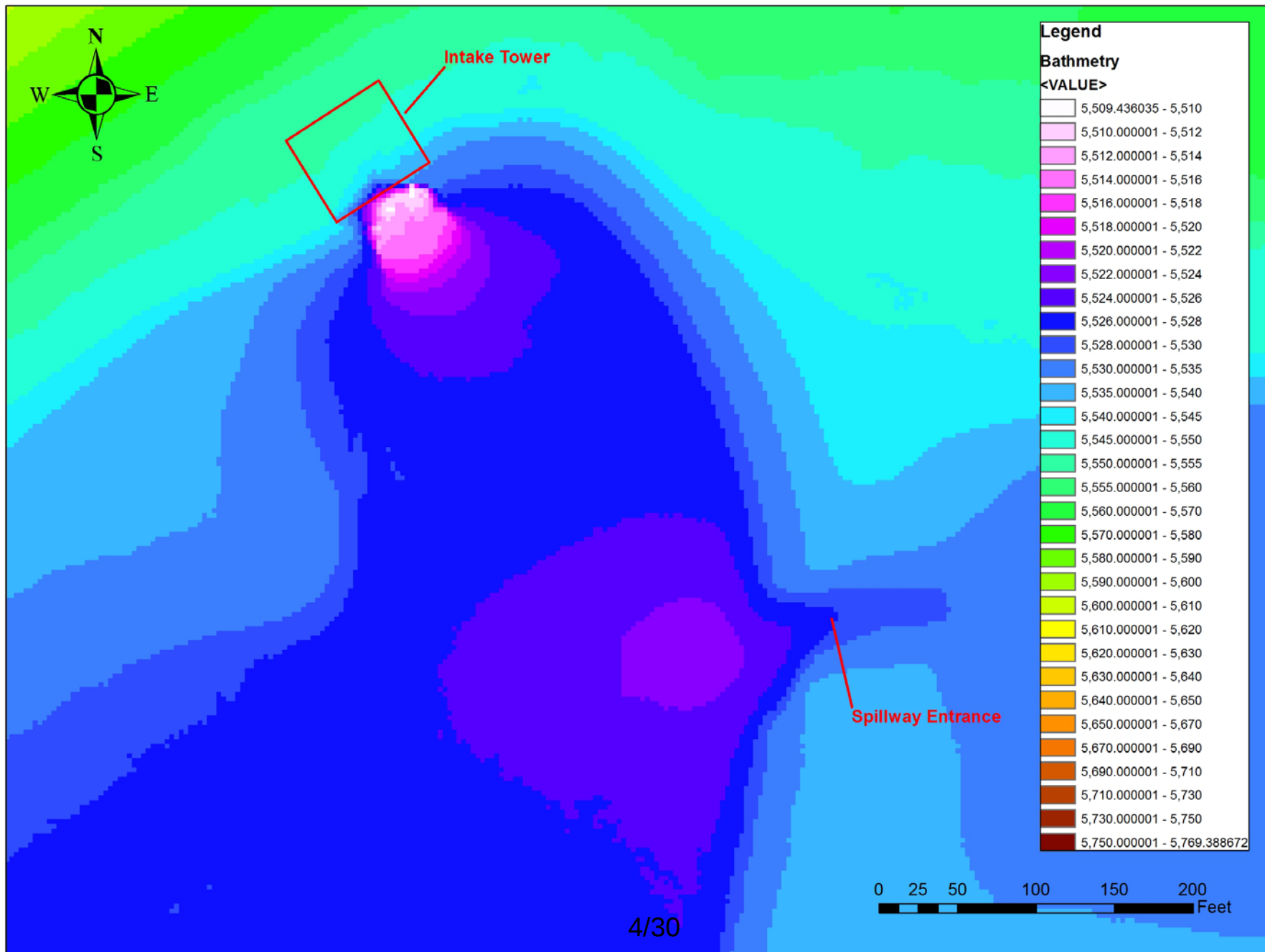
Approach

(including Tools/Models/Data Used)

- Bureau of Reclamation has a 2-yr research unit on pressure flushing
- Team with BoR, USGS, City of Denver, and Denver Water to monitor and measure the pressure flush in May 2017 and May 2018
- Low flow flush (250cfs per gate) in 17
- High flow flush (1350cfs per gate) in 18
- BoR will complete multidimensional models for pressure flushing predication
- BoR providing multibeam surveys and reservoir sed samples
- Will develop a sed budget for flush and examine flush efficiency – with a goal of reducing the water needed for flushing







2017 Cherry Creek Flushing Operation Schedule

Tues May 23, 2017

Scheduled Time (MDT)	Task	Actual Start Time	Actual End Time
2:30pm	Gate 1 release 50 cfs and leave at 50 cfs overnight. Notes:		

Wed May 24, 2017

Scheduled Time (MDT)	Task	Actual Start Time	Actual End Time
8:55	Gate 1 closed. Notes:		
9am	Gate 3 release 250 cfs for 15 minutes. Notes:		
9:15	Gate 3 closed. Notes:		
9:20	Gate 1 release 250 cfs for 15 minutes. Notes:		
9:35	Gate 1 closed. Notes:		
9:40	Gate 2 release 250 cfs for 15 minutes. Notes:		
9:55	Gate 2 closed. Notes:		
10am	Gate 4 release 250 cfs for 15 minutes. Notes:		
10:15	Gate 4 closed. Notes:		
10:20	Gate 5 release 250 cfs for 45 minutes for USGS flow measurement. Notes:		
11:05	Gate 5 closed. Notes:		
11:10	Reset to required State release. Notes:		

Gate Settings (for one service gate) at lake elevation ~ 5550 ft-msl.

50 cfs release = 0.20 feet

250 cfs release = 1.00 feet



FY17 RSM IPR

Omaha District – NWO

Cherry Creek Dam Pressure Flushing Case Study

Partners

Participant Contacts

US Army Corps of Engineers, Cherry Creek Dam Flush Operations

Joe Maxwell	Operations Project Mgr	720-982-6020
Scott Franklin	Civil Engineer	303-507-1368
Tim Rose	Ranger, Natural Resources	720-276-5303
Carl Voss	Engineer Tech	303-507-7443
Sandor Rebek	Engineer Tech	720-988-0365
Clyde Ullrich	Maintenance	720-816-5301

US Army Corps of Engineers, Omaha Water Control

Katie Seefus	Civil Engineer	402-995-2309
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US Army Corps of Engineers, Omaha Sediment Engineering

Dan Pridal	Hydraulic Engineer, Sediment Section Chief	402-995-2336
Paul Boyd	Hydraulic Engineer	402-253-6752
Bill Williams	Hydraulic Engineer	402-995-2920

Cherry Creek State Park

Jason Trujillo	Park Manager	303-518-1659
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City of Denver, Cherry Creek and Trail downstream of Cherry Creek Dam

Erick Anderson	Parks & Rec, Chief Inspector, Citywide Ops	303-514-3380
Joe Alire	Parks & Rec, Operations Supervisor	303-916-4421
	Park Rangers Hotline	303-331-4050
	Police Dept, Emergency	911
	Police Dept, Non-Emergency	720-913-2000

US Bureau of Reclamation, Sediment and River Hydraulics Group

Kent Collins	Hydraulic Engineer	303-868-0572
Blair Greimann	Hydraulic Engineer	303-517-8130

USGS

Greg Smith	Lakewood Field Office Chief	303-941-0550



Cherry Creek Dam Pressure Flushing Case Study

Value to the Nation

- Pressure flushing used at more reservoirs than first thought
- Most times the flush magnitude and duration is an historic SWAG
- Being able to model pressure flushing will allow better prediction of flush efficiency, possibly reducing water usage.
- May be a viable management action for other reservoirs

Schedule

This week – surveys and sed
samples in reservoir

23May – downstream channel
surveys

24May – flush and post surveys



RSM-U Workshop on Reservoir Management

August 15-17, 2017
RMC, Lakewood, CO

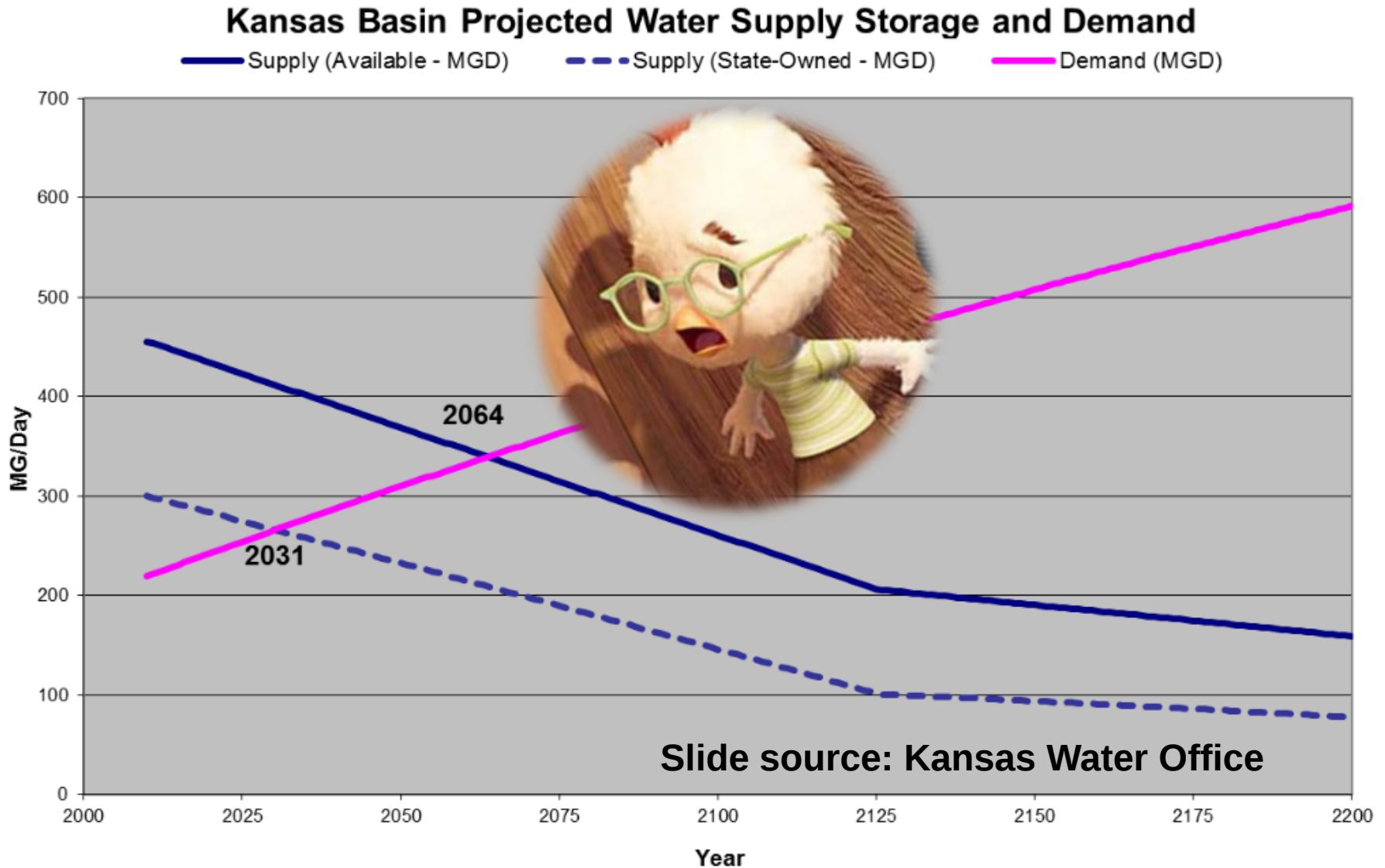


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US Army Corps of Engineers
BUILDING STRONG®

Supply – Demand Graphs

● 2% drought condition





Paonia Reservoir, 1961



Paonia Reservoir, October 2014



Reservoir is 25% full of sediment

Source: Collins and Kimbrel, 2015
<http://acwi.gov/sos/pubs/3rdJFIC/Contents/9C-Collins.pdf>

Why does it matter to RSM?

- Many of our inland river systems are sediment starved
- That sediment is being collected in reservoirs
- The reservoir and river system are interconnected – any management action for reservoirs has a direct regional effect on downstream river channels, including navigation channels and ports, marinas, etc.



Why Do a Workshop on Reservoir Management?

- Significant growth globally in active management of sediment in reservoirs – likely the result of reduced benefits due to age.
- Management agencies (USACE, Reclamation, NRCS, States) are increasingly looking to regain reservoir storage capacity to slow the loss of benefit
- Education of decision makers on the benefits/impact of the sediment management methods can lead to more flexible implementation.



Who it is for?

- The content will be focused on the methods most commonly used for reservoir management.
- Regulatory, Planning, Ops Managers are the focus audience (non-Fed partners at Fed invite)
- An engineering workshop on assessment and numerical modeling of reservoir management methods is expected in 2018.



Management Options w/Case Studies

Reactionary Pass sediment downstream

- Sediment yield reduction
- Sediment bypass
- Sediment pass-through (routing, sluicing)
- Drawdown flushing
- Pressure flushing
- Hydrosuction
- Inlet extension
- Density current venting
- Hydraulically assisted density current venting
- Sediment focusing
- Dredging
- Reallocation
- New reservoirs/dam raises

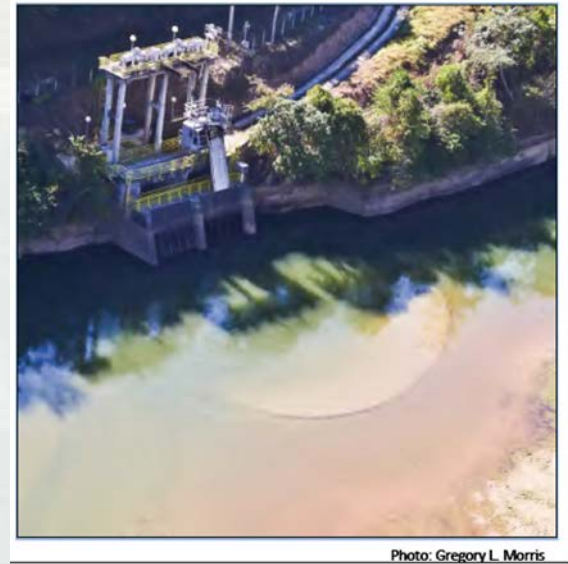
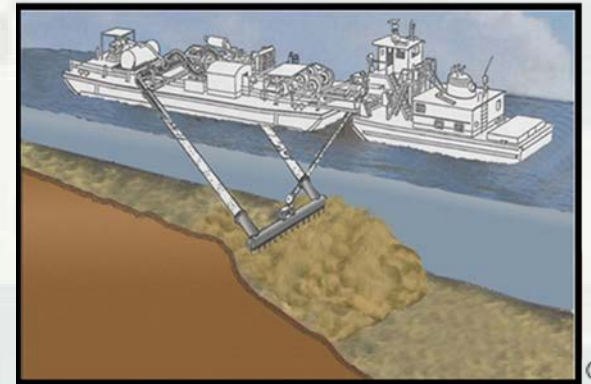


Photo: Gregory L. Morris



Workshop Details:

- August 15-17, 2017
- 4th Fl. Large Conf. Room @ Risk Management Center – Lakewood, CO
- No tuition!
- Instructors:
 - ▶ Dr. John Shelley, NWK
 - ▶ Dr. Paul Boyd, NWO
 - ▶ Dr. Ian Floyd, ERDC-CHL
 - ▶ Mr. Travis Dahl, ERDC-CHL



- Two days of classroom instruction
- Working demos
- Tour of the Reclamation Physical Modeling Lab at Denver Fed Center
- Site Visit and Case Study review of Pressure Flushing at Cherry Creek Dam



Getting the word out!

- Promotional materials
- Distribution through RSM list
- Regulatory and Planning Chiefs in NWO will push to district counterparts
- Set up a registration site w/RSM



Reservoir Sediment Management Workshop for Planners, Regulators, and Managers

Aug 15th-17th, 2017

USACE Risk Management Center, Lakewood, CO



US Army Corps
of Engineers



Why attend?

Over half of the large dams in the United States are more than 50 years old. Impacts from sediment accumulation are having significant impacts on the benefits we all take for granted from reservoirs. The current strategy to "trap and store" sediment while starving downstream channels is not sustainable and will lead to both a dramatic increase in operations and maintenance costs and an eventual complete loss of reservoir benefits. Reservoir sediment management is becoming a necessity with a goal of eventual reservoir sustainability. Regulators, planners, and managers need to be prepared to make informed decisions about reservoir sediment management activities.

Workshop Topics:

The workshop will focus on the "big picture" of the impacts of reservoir sediment accumulation, the array of potential solutions, screening methods for sediment management options, and the reservoir management, environmental, and operational implications of both problems and solutions. The workshop will include large group lectures, breakout groups, case studies, hands-on demonstrations, and a site visit.

Who should attend:

Regulators, managers, planners, operators, and others who want to better understand the problems and solutions for reservoir sediment management are encouraged to attend.

Can non-Corps people attend?

State and Local agency personnel are welcomed with a USACE host.

Tuition: No tuition cost to participants.

Workshop Location:

Peck Conference Room—4th Floor
USACE Risk Management Center
12596 West Bayaud, Suite 400
Lakewood, CO 80228

For Additional Information, Contact:

Paul Boyd, NWO, 402-995-2350
paul.m.boyd@usace.army.mil
John Shelley, NWK, 816-389-2310
john.shelley@usace.army.mil

Cherry Creek Dam and Reservoir



Sponsor: This workshop is being supported by the USACE Regional Sediment Management (RSM) program, which aims to develop a systems approach to deliberately manage sediments in a manner that maximizes natural and economic efficiencies to contribute to sustainable water resource projects, environments, and communities.

Find out more at: <http://rsm.usace.army.mil/>

Sign up at:

<https://operations.erdc.dren.mil/nav/rsm.cfm?Step=1>
by 31 July 2017

