

Glen Canyon Dam Adaptive Management Work Group
Agenda Item Information
September 9-10, 2008

Agenda Item

2008 High Flow Experiment, Update on Preliminary Observations

Action Requested

√ Information item only; we will answer questions but no action is requested.

Presenters

John Hamill, Chief, and Ted Melis, Deputy Chief, Grand Canyon Monitoring and Research Center

Previous Action Taken

√ The Bureau of Reclamation executed a high flow experiment of approximately 41,500 cfs for 60 hours beginning March 4, 2008.

Relevant Science

√ The following describes the relevant research or monitoring on this subject:
The “Science Plan for Potential 2008 Experimental High Flow at Glen Canyon Dam,” can be found at http://www.gcmrc.gov/research/high_flow/2008/documents.aspx. Look for the last document under “Planning Documents” and click on “Proposed 2008 High-Flow Science Plan.”

Background Information

The Department of the Interior initiated an experiment in early March 2008 to inform managers about the effectiveness of using high flows from Glen Canyon Dam to improve natural, recreational, and cultural resources in Grand Canyon National Park. Flows from the dam began increasing on the evening of March 4, with powerplant bypass flows beginning at approximately 10 am on the morning of March 5. Water was released through Glen Canyon Dam’s powerplant and bypass tubes to a maximum of approximately 41,500 cubic feet per second for about 60 hours.

At the May 2008 AMWG meeting, Grand Canyon Monitoring and Research Center and other agencies reported on preliminary observations from the experiment; including suspended-sand concentrations and transport rates at the river mile 87 USGS gaging station (Grand Canyon near Phantom Ranch), as well as photographs of a variety of sand bar responses that occurred during the HFE. At the September 2008 AMWG meeting, the GCMRC will present additional preliminary data on suspended-sand concentrations and transport rates that were measured during the 2008 HFE at river miles 30 and 226 (above Diamond Creek). A select number of expanded time-lapse videos of backwater study sites will also be shown (also, formation of new sand dunes), as well as updates from the biological projects 2 (terrestrial vegetation), 3 (aquatic productivity) and 4a and 4b (rainbow trout movement and spawning studies, respectively). Preliminary estimates for increased sand transport under July and August dam operations will be reviewed and compared to March through June releases. In addition, an update will be provided on any significant sand inputs that may have occurred from major tributaries by the time of the AMWG meeting.



2008 High Flow Experiment Update

By
John Hamill and Ted Melis

Grand Canyon Monitoring and Research Center

Adaptive Management Work Group

September 09, 2008

Outline for September HFE Update

- **Recall MAY Update** – Color Handout was Mailed in June (as requested in May)
- **Riparian Vegetation Update** (Project 2)
- **News on Sand Inputs & Mainstem Transport** (Project 1.A)
- **Progress on Sediment Modeling** (Project 1.B) CHANNEL MAPS!
- **Sand Storage Changes** (Project 1.C) AEOLIAN REWORKING
- **Backwater Habitats** (Project 1.D) INVENTORY & VIDEOS
- **Review of Reporting Schedule**

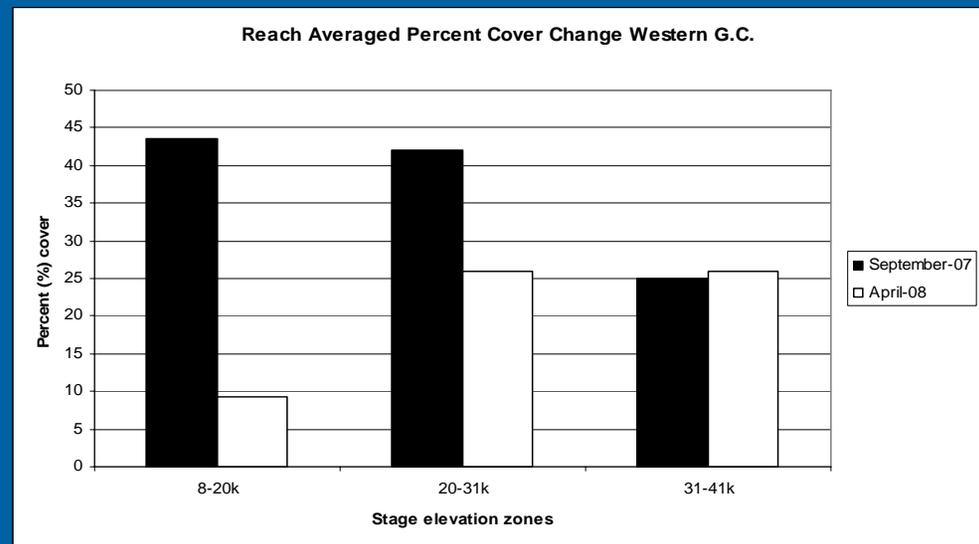
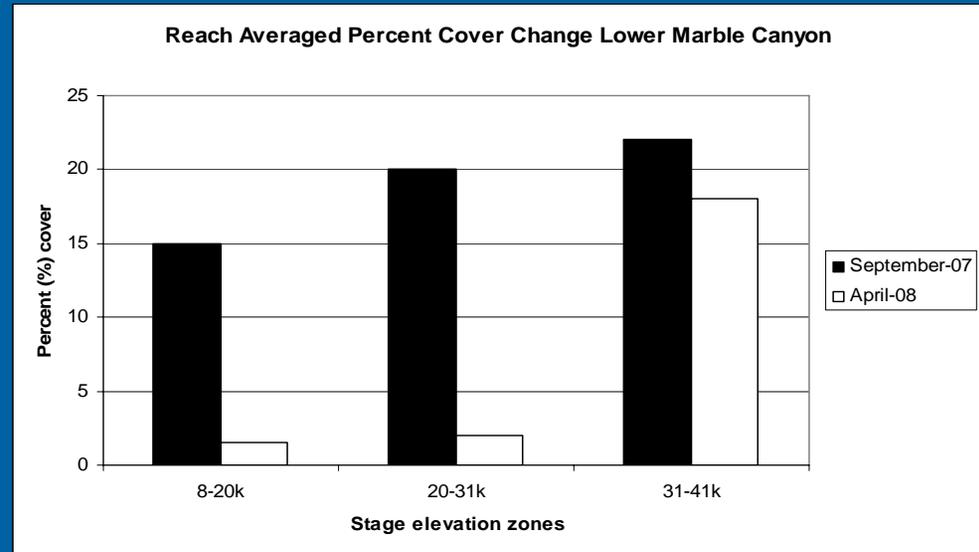
PROJECT 2 UPDATE - Riparian Vegetation & HFE

- **Cover and species presence/absence data collected September 07, April 08, Sept 08**
- **Primary burial of perennial vegetation**
- **Perennial shoots some seedlings – Seepwillow, camelthorn**
- **Exotic annuals occurring at top of HFE stage elevation**
- **Lots of organics in sediment**
- **Too early for Tamarisk seedlings—will see in Fall following Summer flows**



PROJECT 2 UPDATE - Riparian Vegetation & HFE

- % Cover classes and species presence/absence data collected September 07, April 08, Sept 08
- Primary burial of perennial vegetation
- Baccharis and Tamarisk most common dominant shrub encountered in April (20-41k zones)
- Juncus sp. was most common dominant wetland species encountered in April (8-20k zone)
- All reaches lost vegetative cover between 8 – 41k stage elevations
- Greatest cover loss was between 8 – 31k zones but % decrease in cover varied among reaches (38 – 90% decrease)
- Resampling in later September – early October to see longer term response/recovery—previous data suggest return to previous cover values (Kearsley and Ayers, 1999).



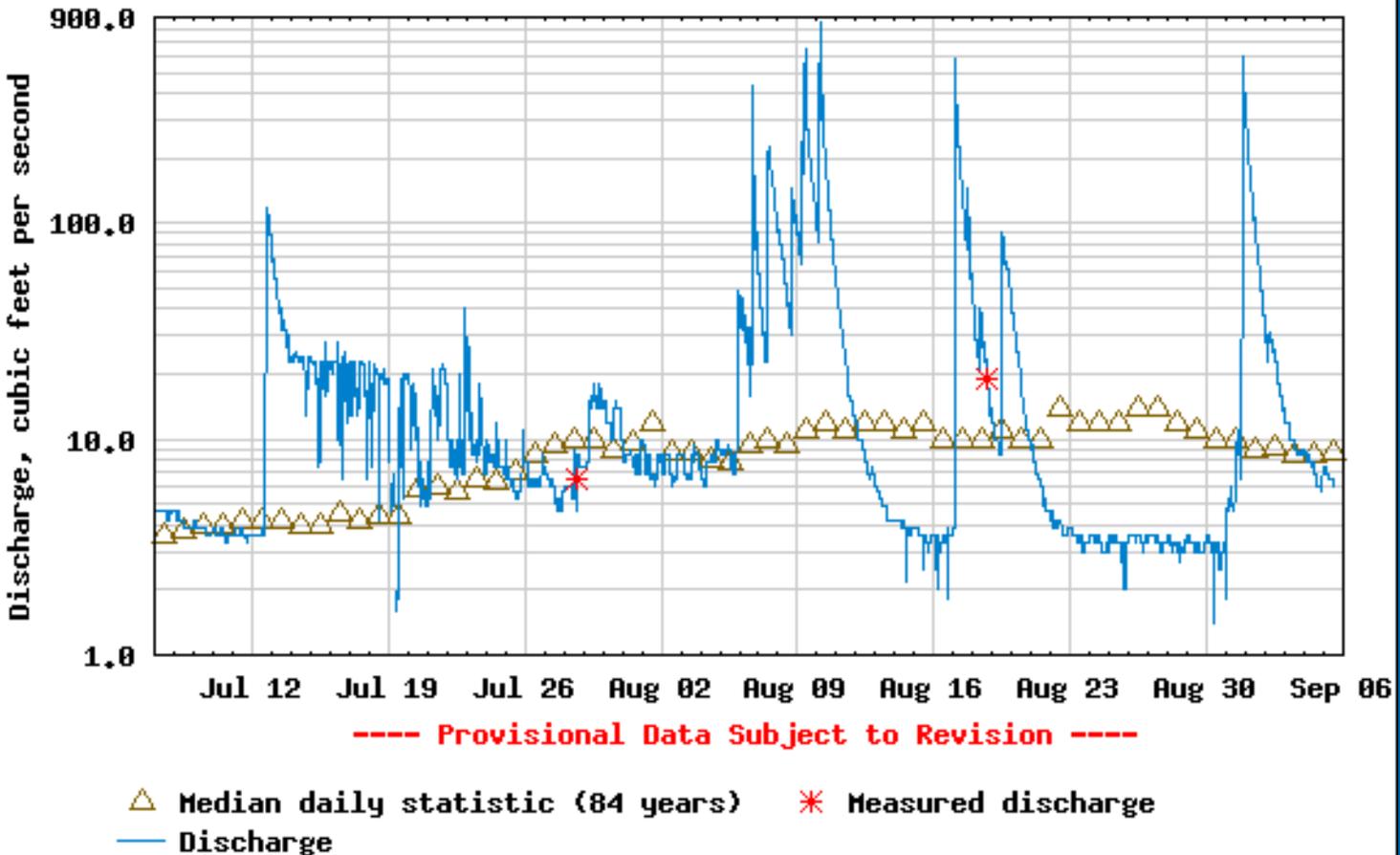
PROJECT 1.A – Sediment Balance

Sand Inputs & Main Channel Transport

Paria River Flows – Summer 2008



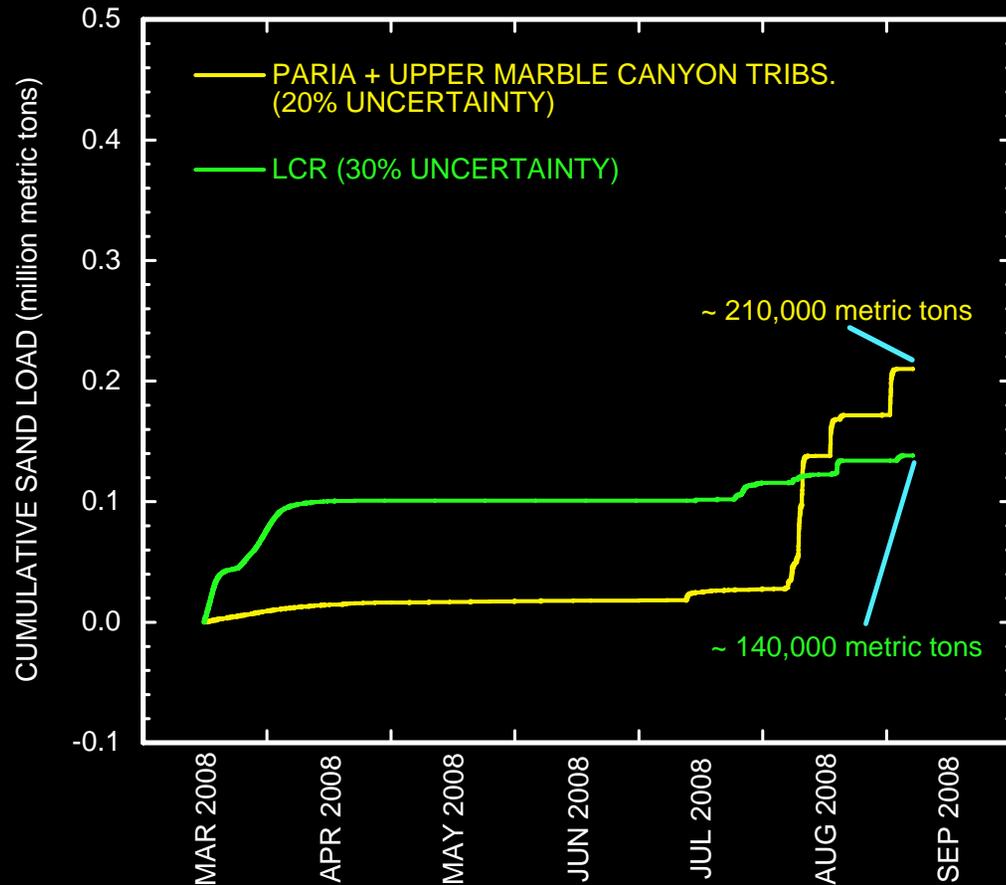
USGS 09382000 PARIA RIVER AT LEES FERRY, AZ



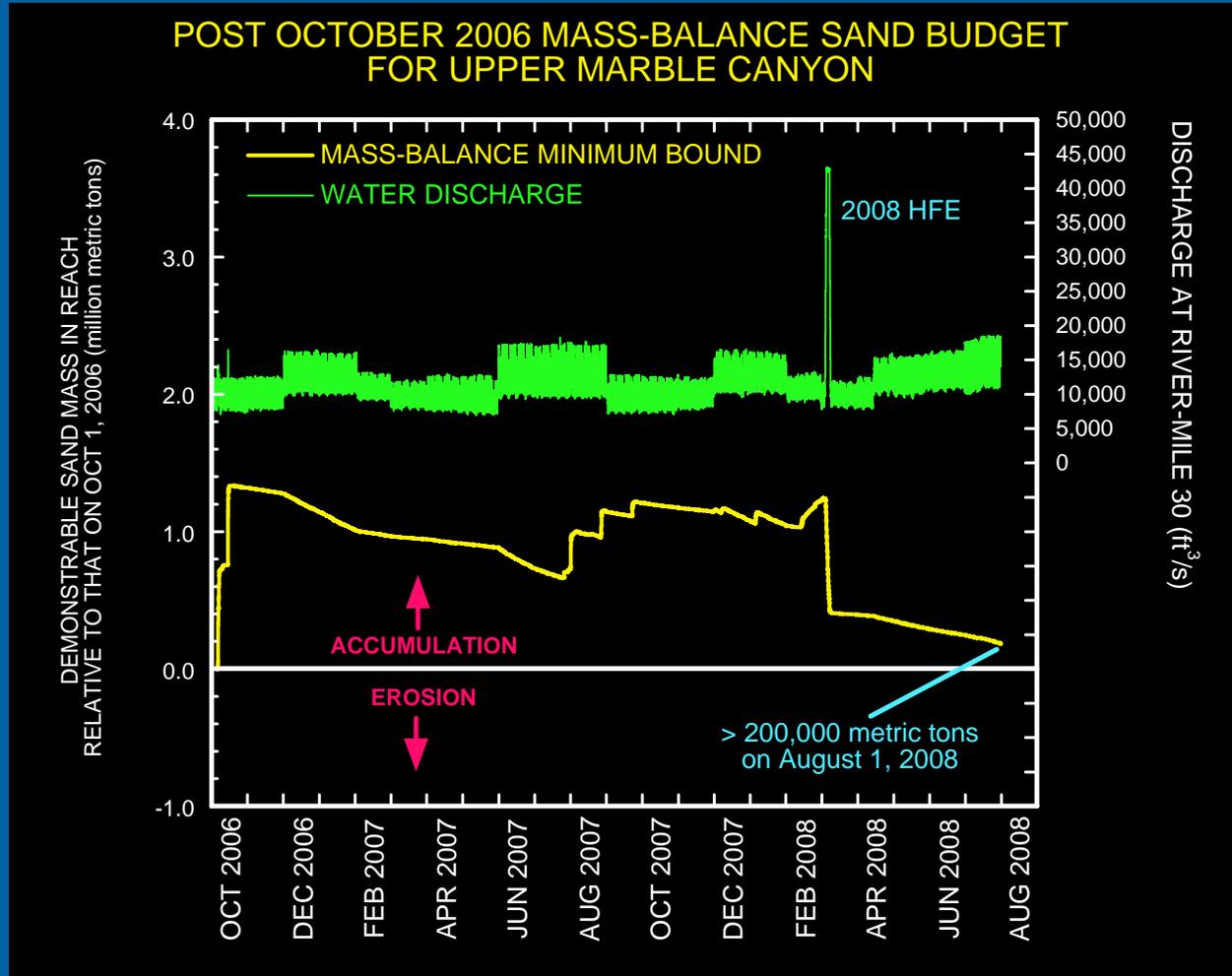
Preliminary results – subject to review and revision

Paria and Little Colorado Rivers Sand Supplies - Summer 2008

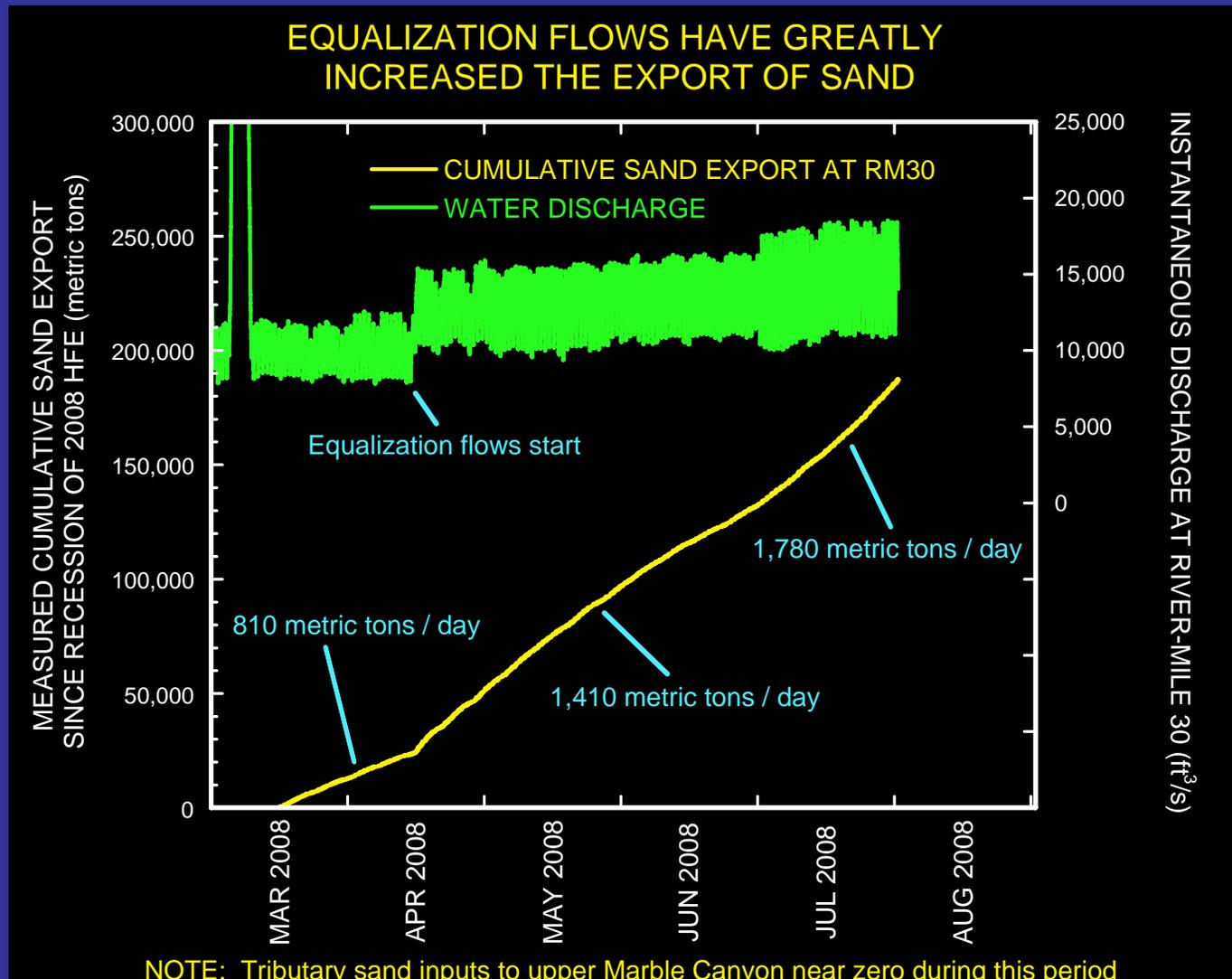
POST 2008 HFE SAND INPUT TO THE REACH BETWEEN THE LEES FERRY AND GRAND CANYON GAGES



Sand Accounting for Colorado River River Miles 1-30 (WY2006 – 2008)

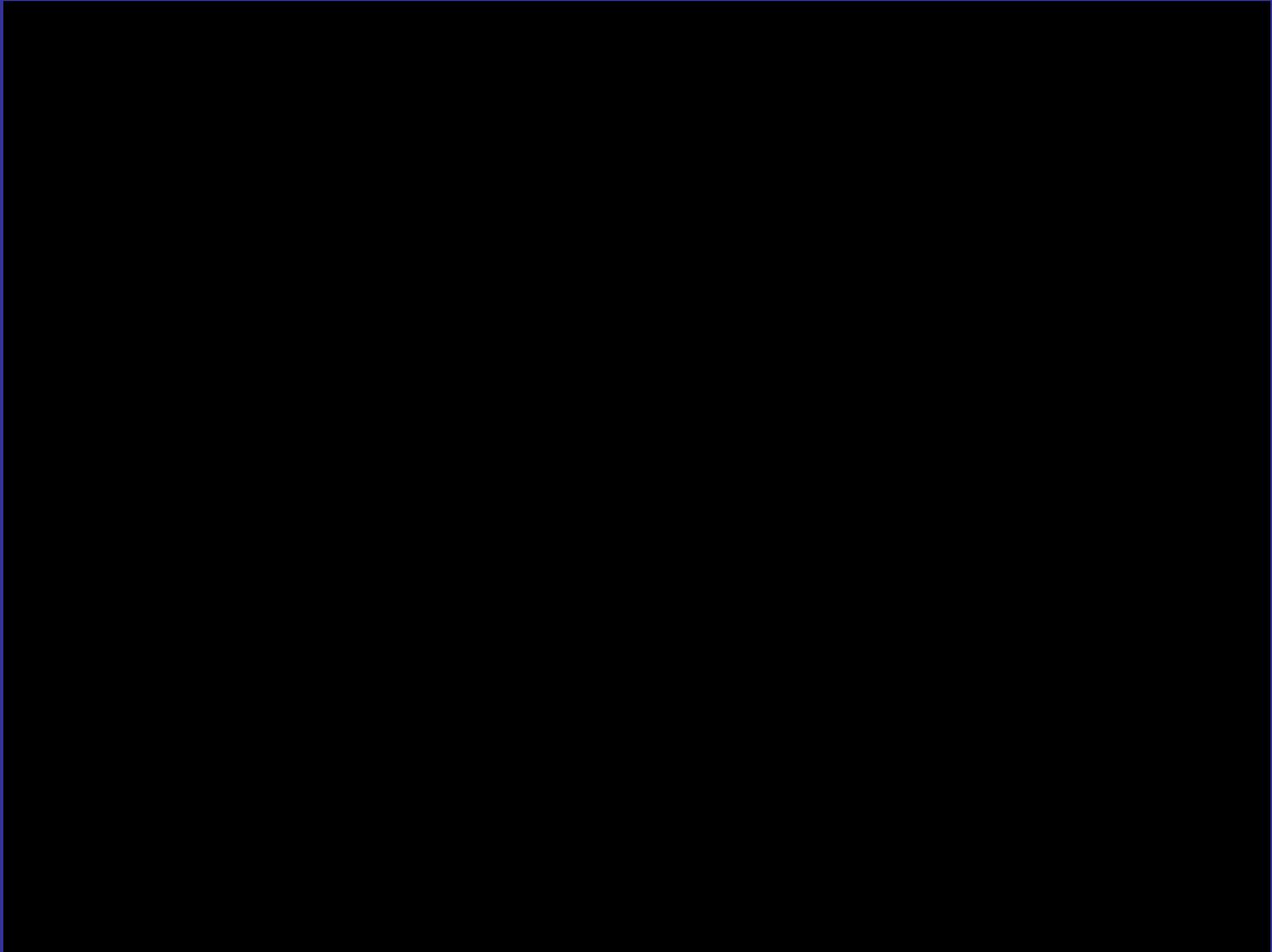


Sand Transport Rates and Changes in Glen Canyon Dam Operations Influence of the Summer 2008 Operations under MLFF Releases



NOTE: Tributary sand inputs to upper Marble Canyon near zero during this period

VIDEO OF THE 30-MILE SANDBAR & BACKWATER SITE



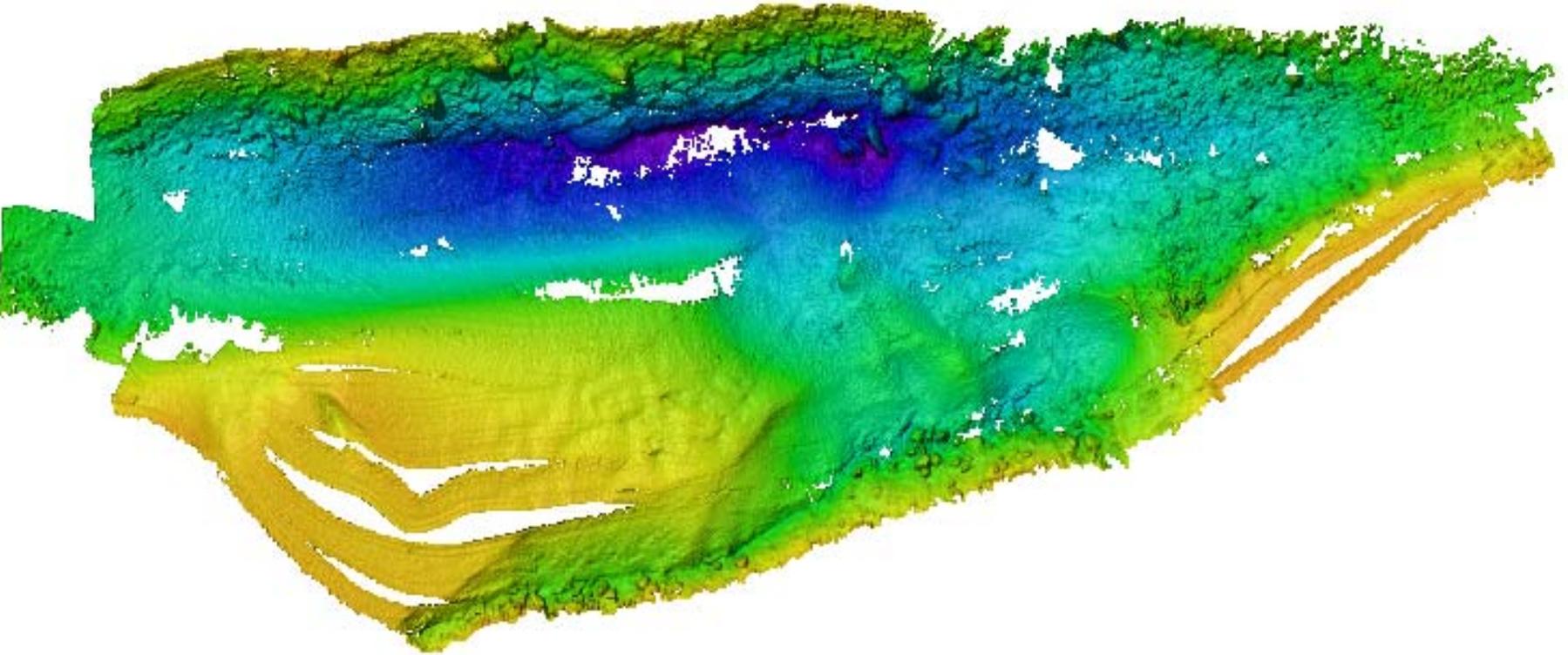
Action Figures Sold Separately

PROJECT 1.B - Modeling Site (RM 45) Channel Surveys are All Processed

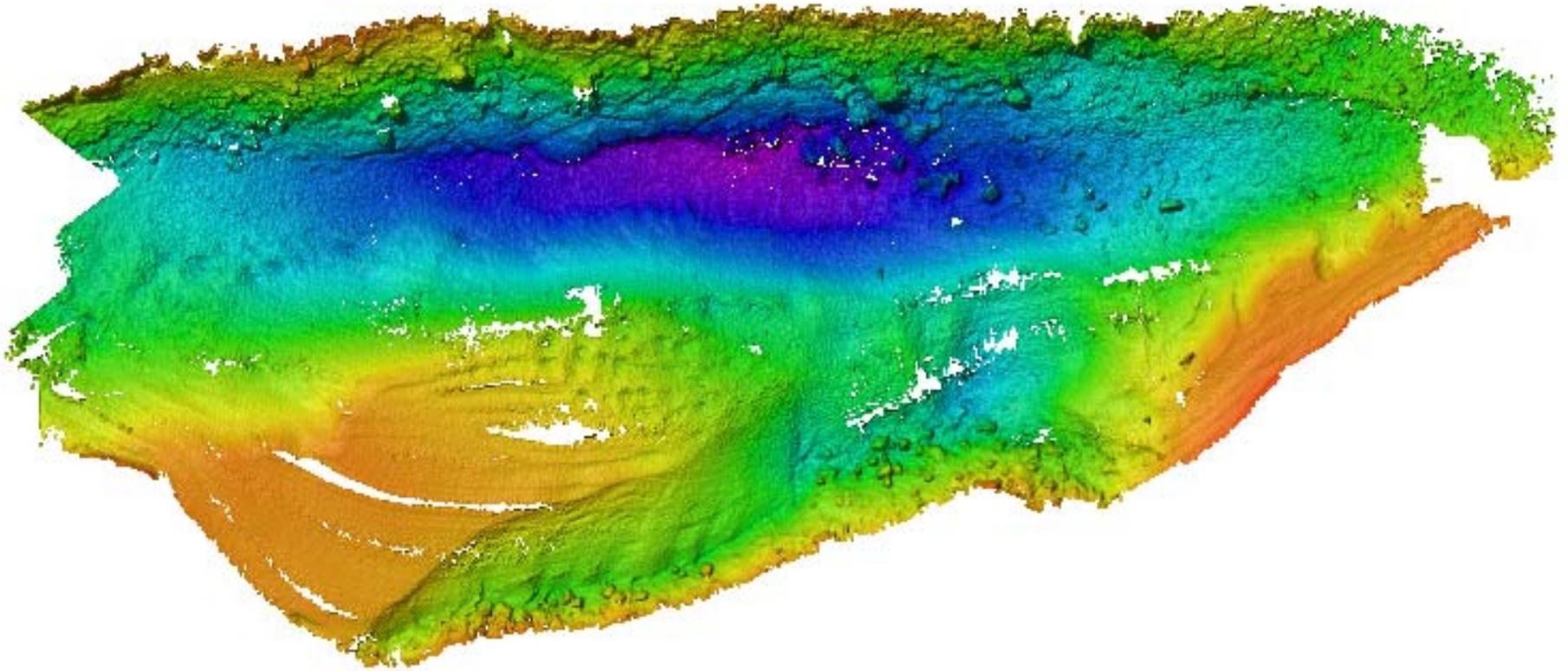
BLUE is Deeper & **ORANGE** is Shallower

*Following Slides Show Preliminary Data (Northern Arizona University – Geology Dept.)
– subject to review and revision*

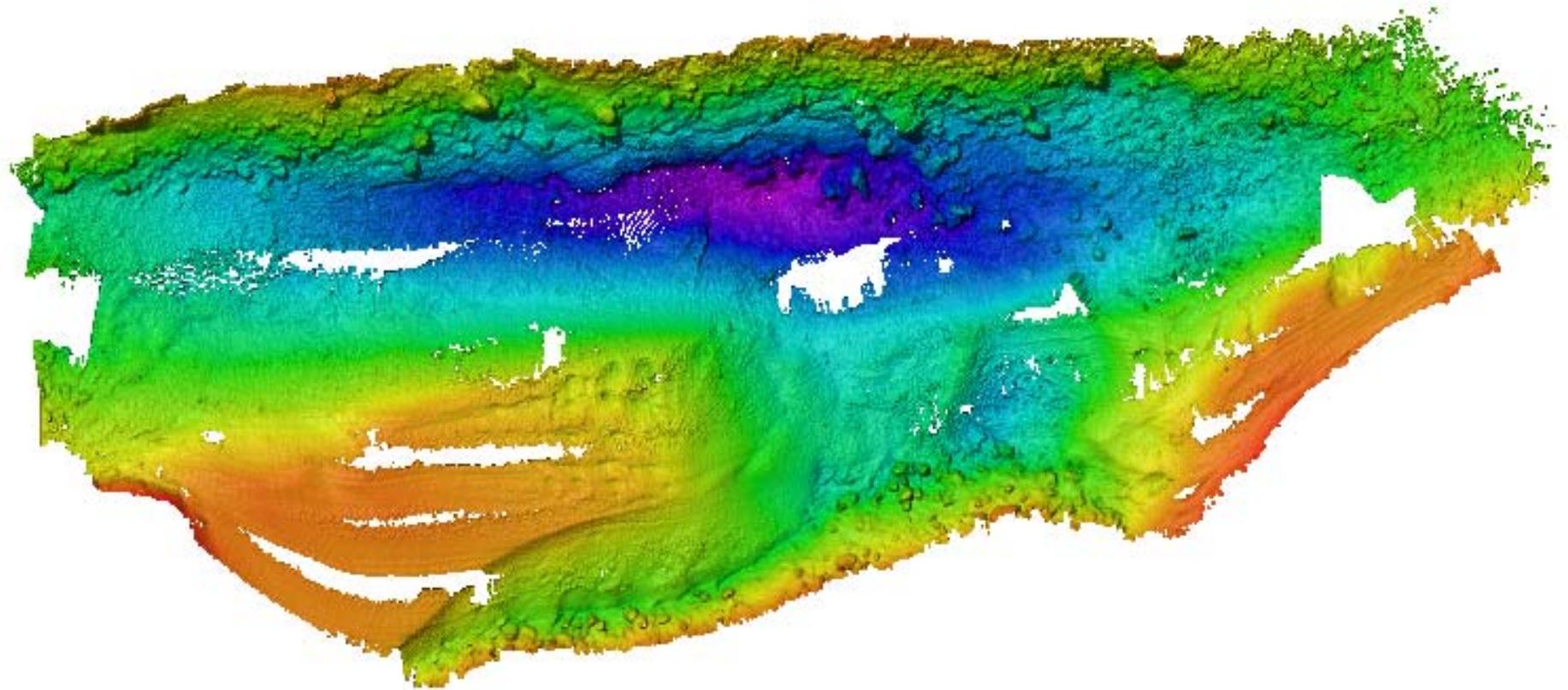
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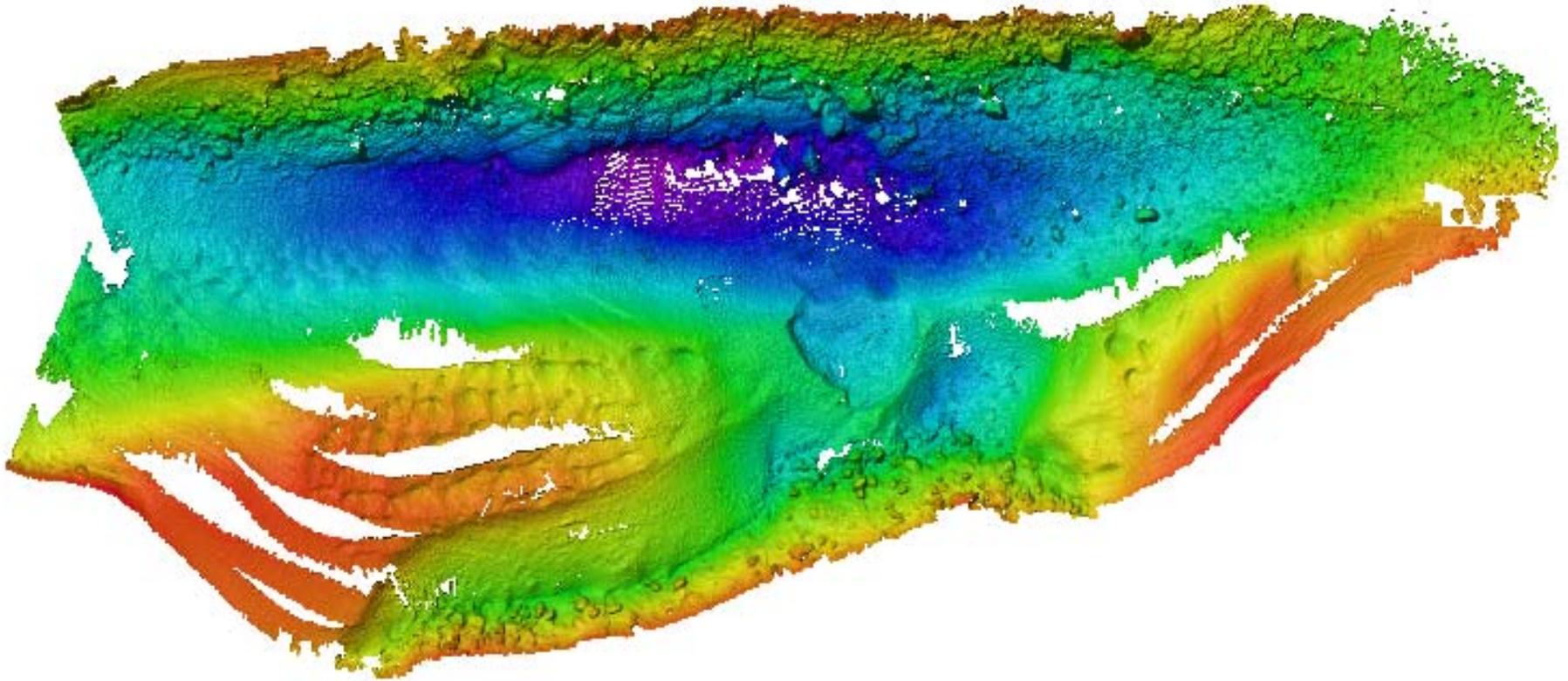
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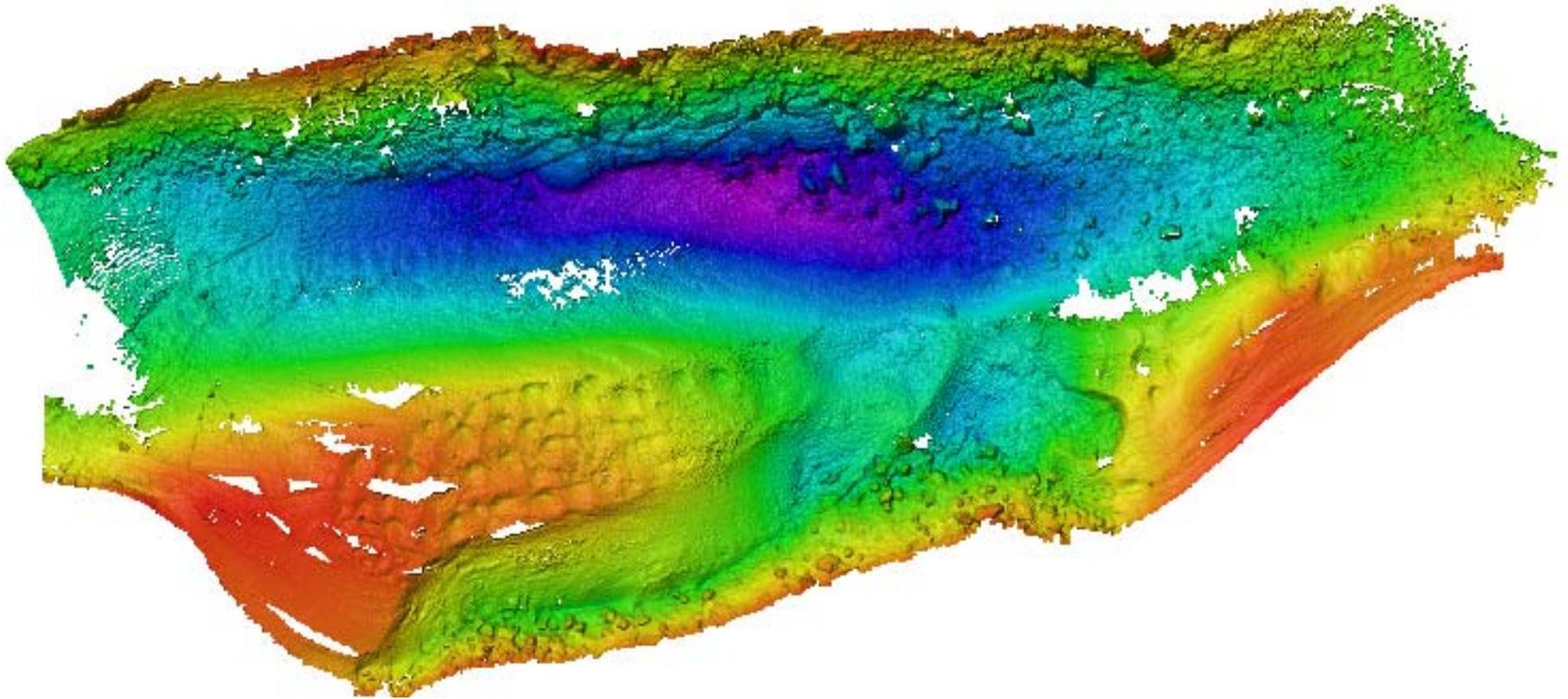
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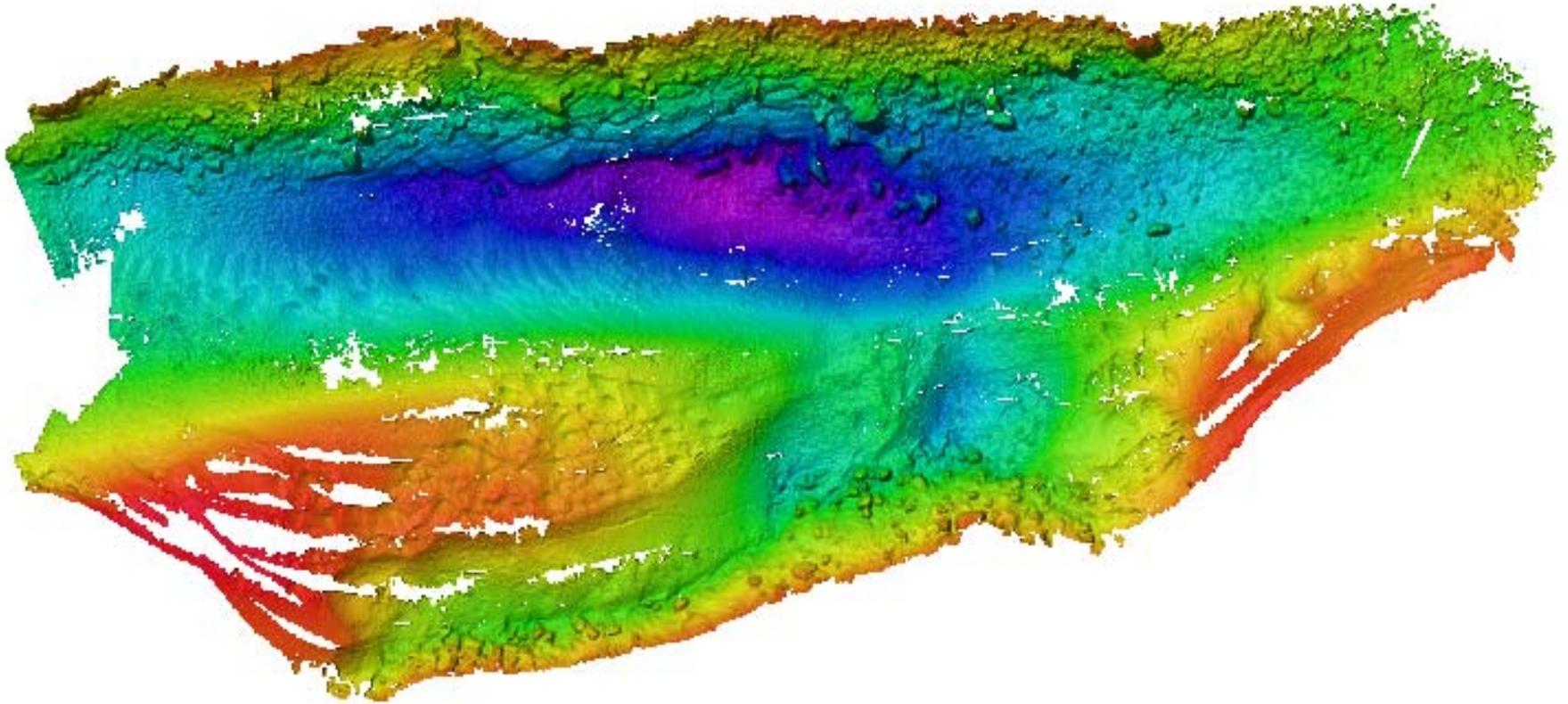
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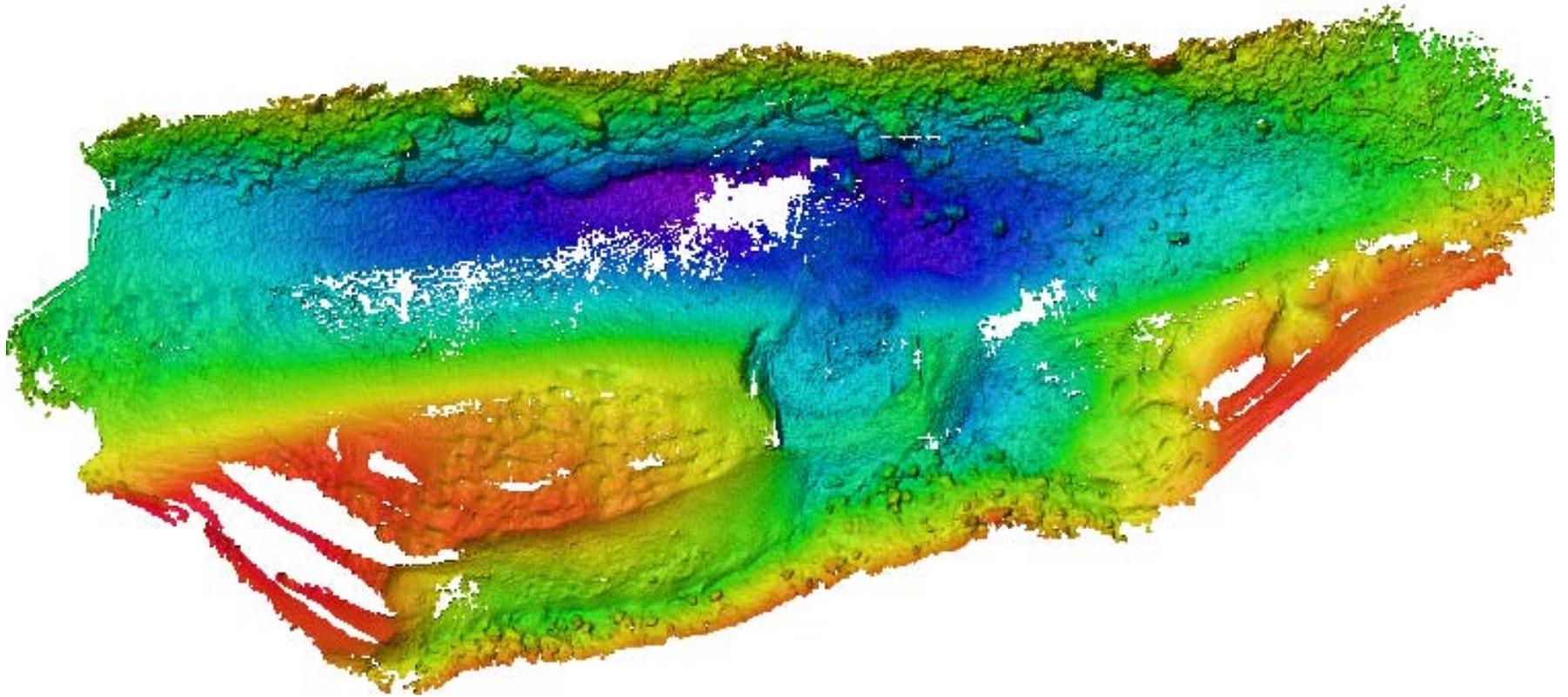
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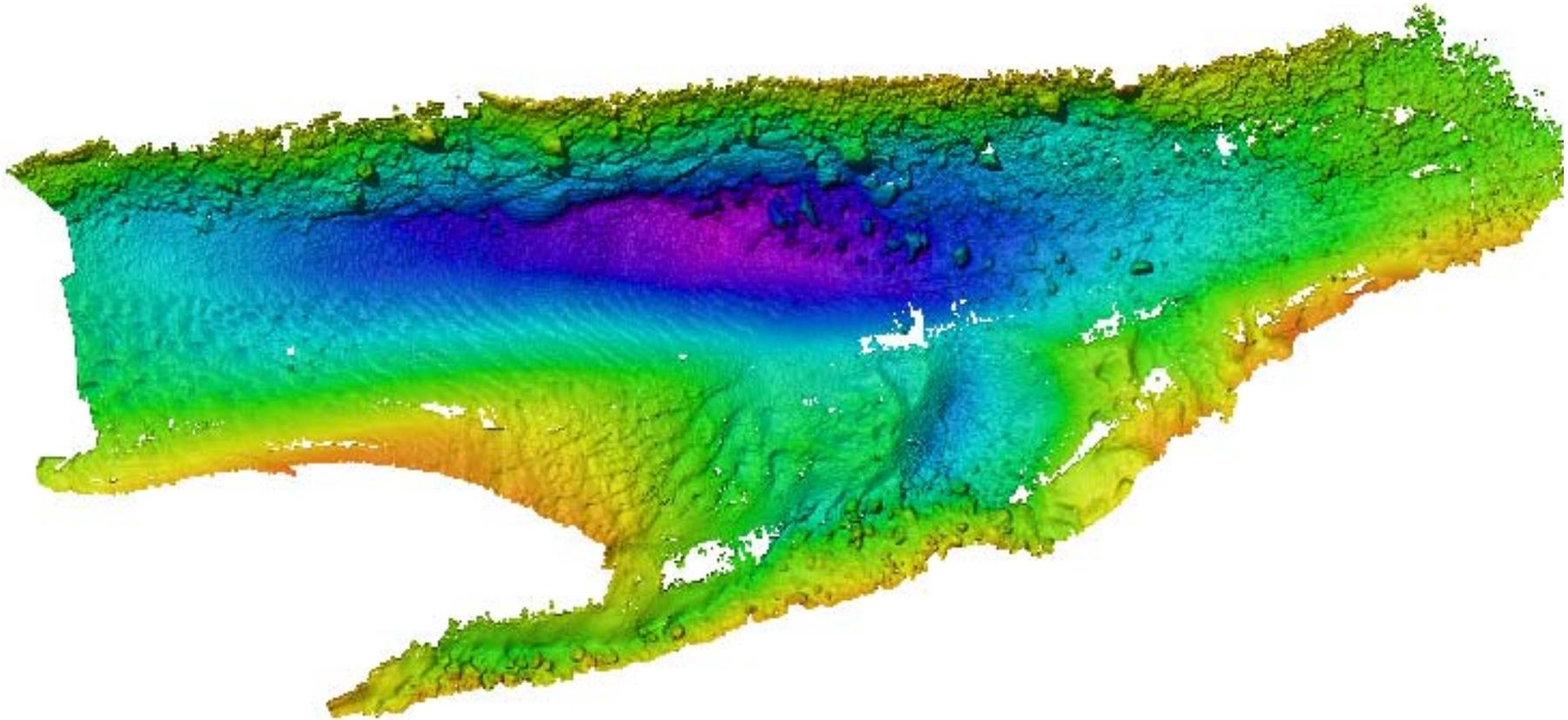
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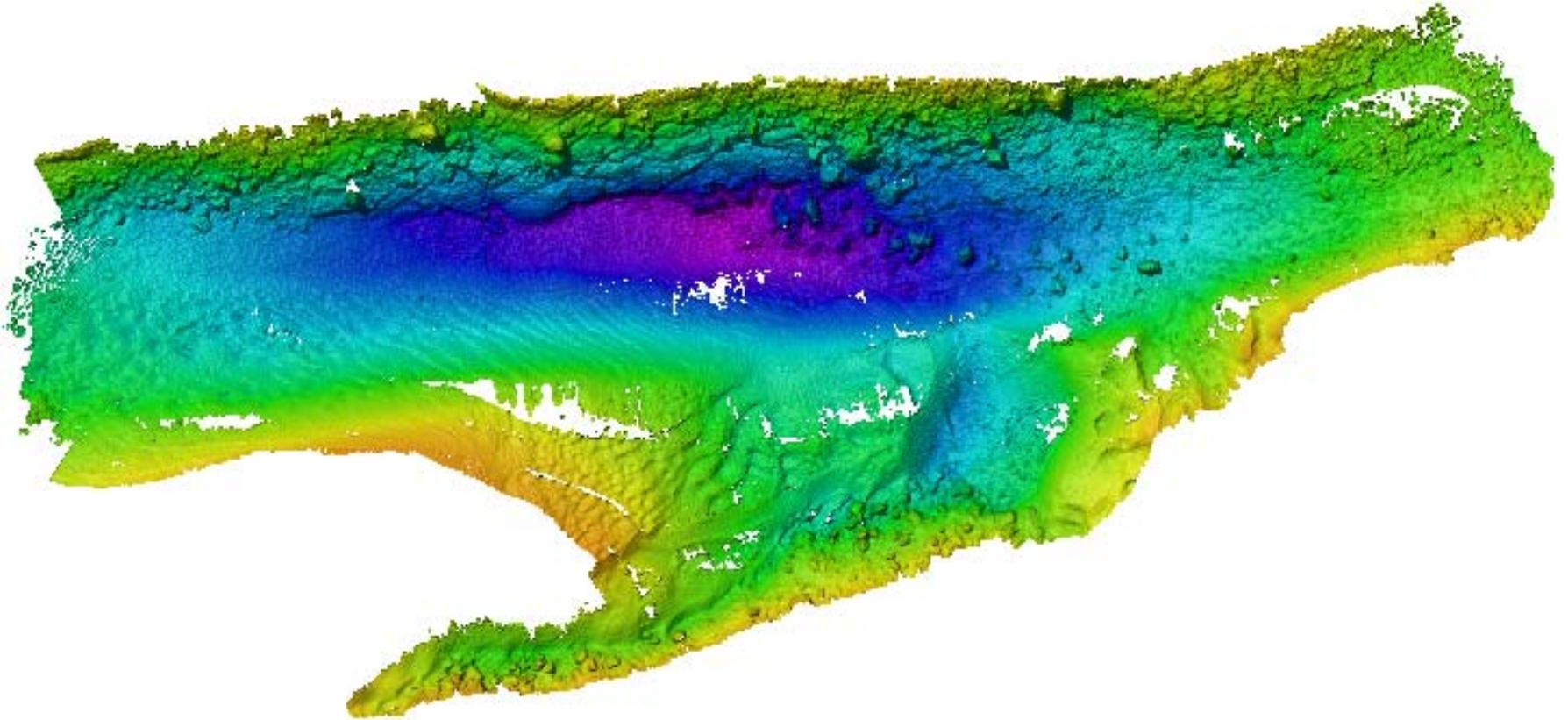
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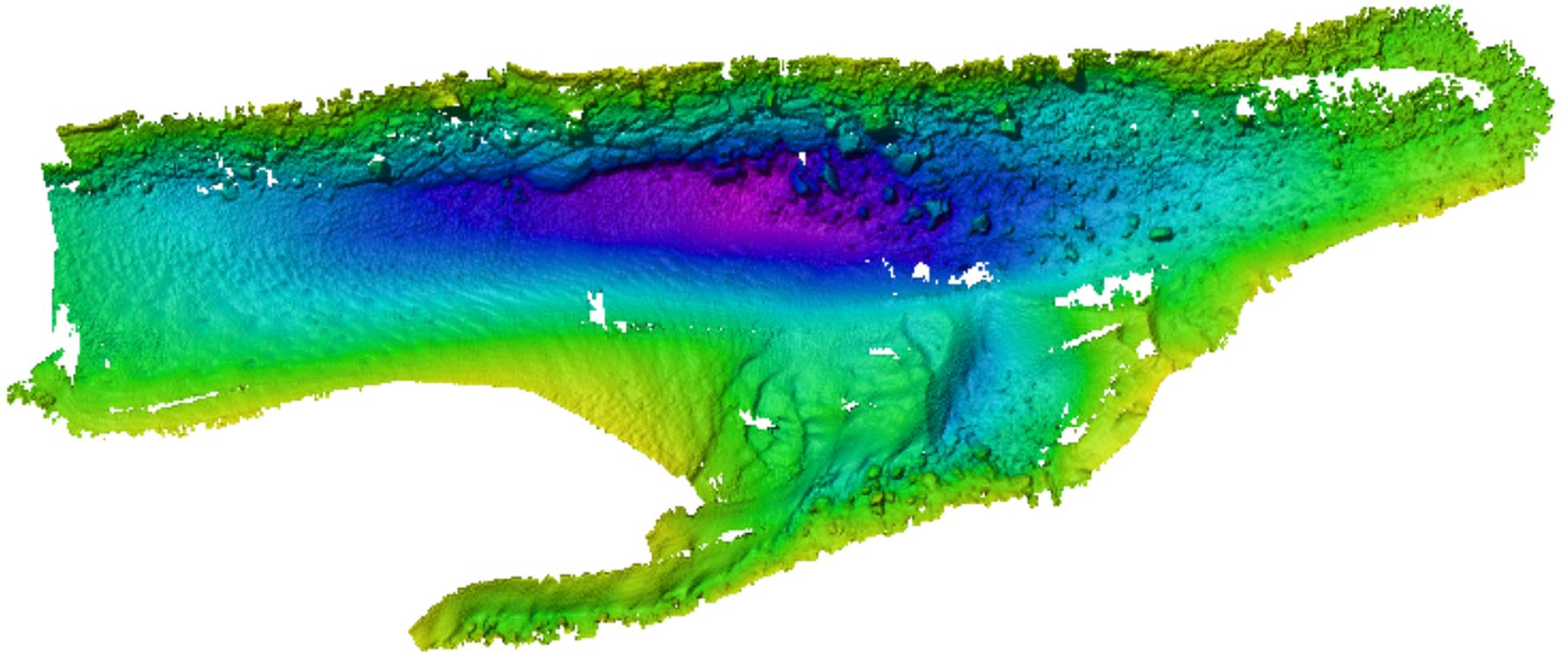
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3-10-08, @12:00

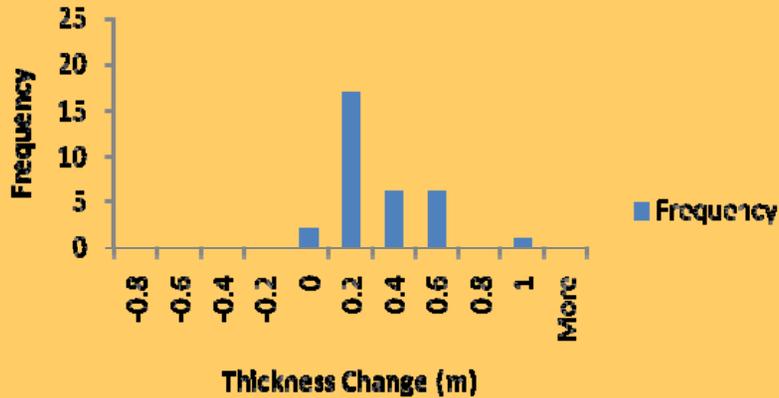


PROJECT 1.C – Sand Storage

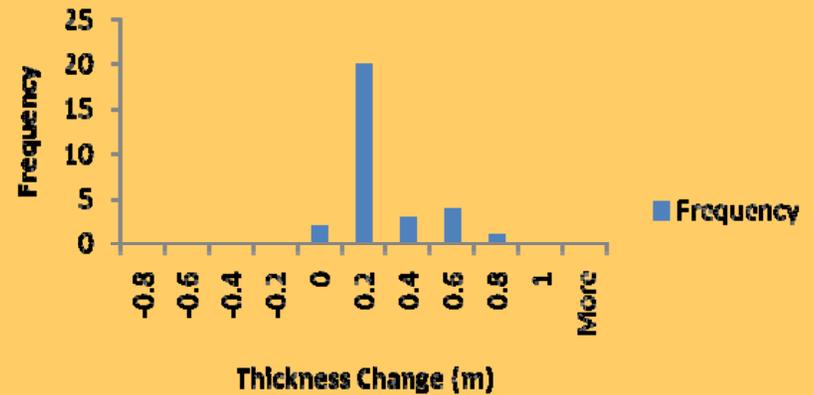
Sandbar Changes
Comparing 1996 vs. 2008

Sandbar Surveys are All Processed for the Above-8,000 cfs Surveys While the Off Shore Channel Surveys are Half Processed

1996 Controlled Flood Above Baseflow (8,000 ft³/s)



2008 HFE Above Baseflow (8,000 ft³/s)



Nam "Eldo"



*Preliminary Data (Northern Arizona University – Geology Dept.)
– subject to review and revision*

Example of Pre- versus Post-HFE Aeolian Deposition (Project 1.C)



Upper Left: Oblique view of Basalt prior to HFE (Feb 15, 2008)

Below: Basalt with new sand bar after the HFE (April 5, 2008)

Photos at left taken from near the ★



Arrow indicates same tree in all photos

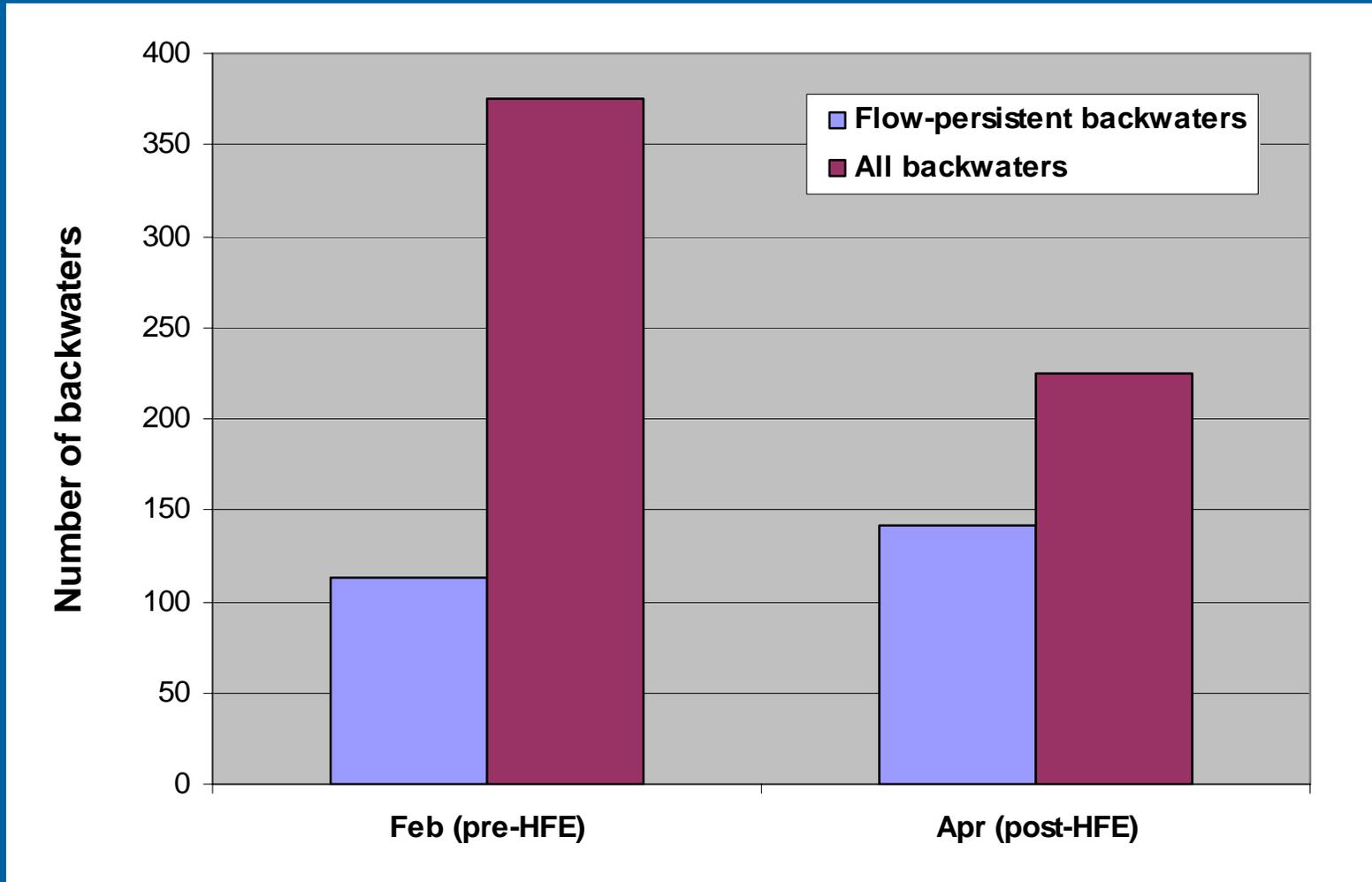


Lower Left: Oblique view of Basalt in July 2008 showing new Aeolian dune derived from HFE sand bar

PROJECT 1.D – Backwaters

Pre- vs. Post-HFE Inventory

Pre- versus Post-HFE Inventory of Backwaters (Project 1.D)



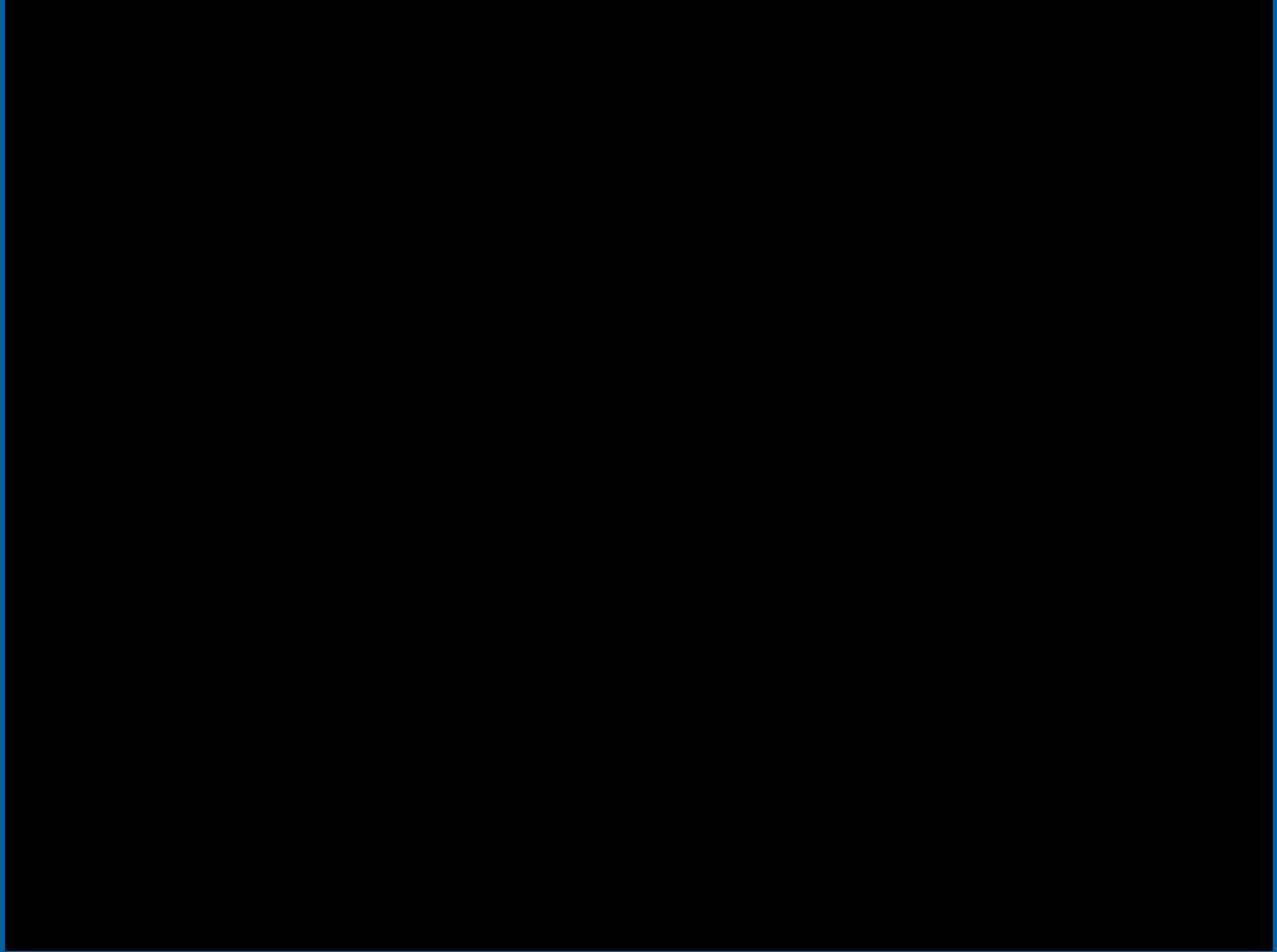
BW 54.6 R; FEBRUARY 6, 2008; LOW-ELEVATION BAR WITH BACKWATER



BW 54.6 R; APRIL 1, 2008; LARGER BAR, NO BACKWATER



VIDEO OF THE 45-MILE SANDBAR & BACKWATER SITE



Reporting Schedule:

-November 2008 Symposium Talks

-Preliminary Draft Reports
Winter 2008-09

-Final Reports (peer reviewed)
December 2009

Thank You for Your Attention!

