

Studies near the Hite Area

Late winter – Early spring 2023

The perched river, a deteriorating boat ramp,
and a wild sedimented wasteland

Returning Rapids



Project



During the first quarter of 2023, more and more attention was being put towards trying to discern what may happen near the confluence of the Dirty Devil and Colorado Rivers.

In January of the year, it became obvious that the rocks appearing at the north Wash Ramp were accelerating the downcutting and rate of change at the North Wash Boat Ramp. The river has been carving at a rate of approximately 1 foot per month.

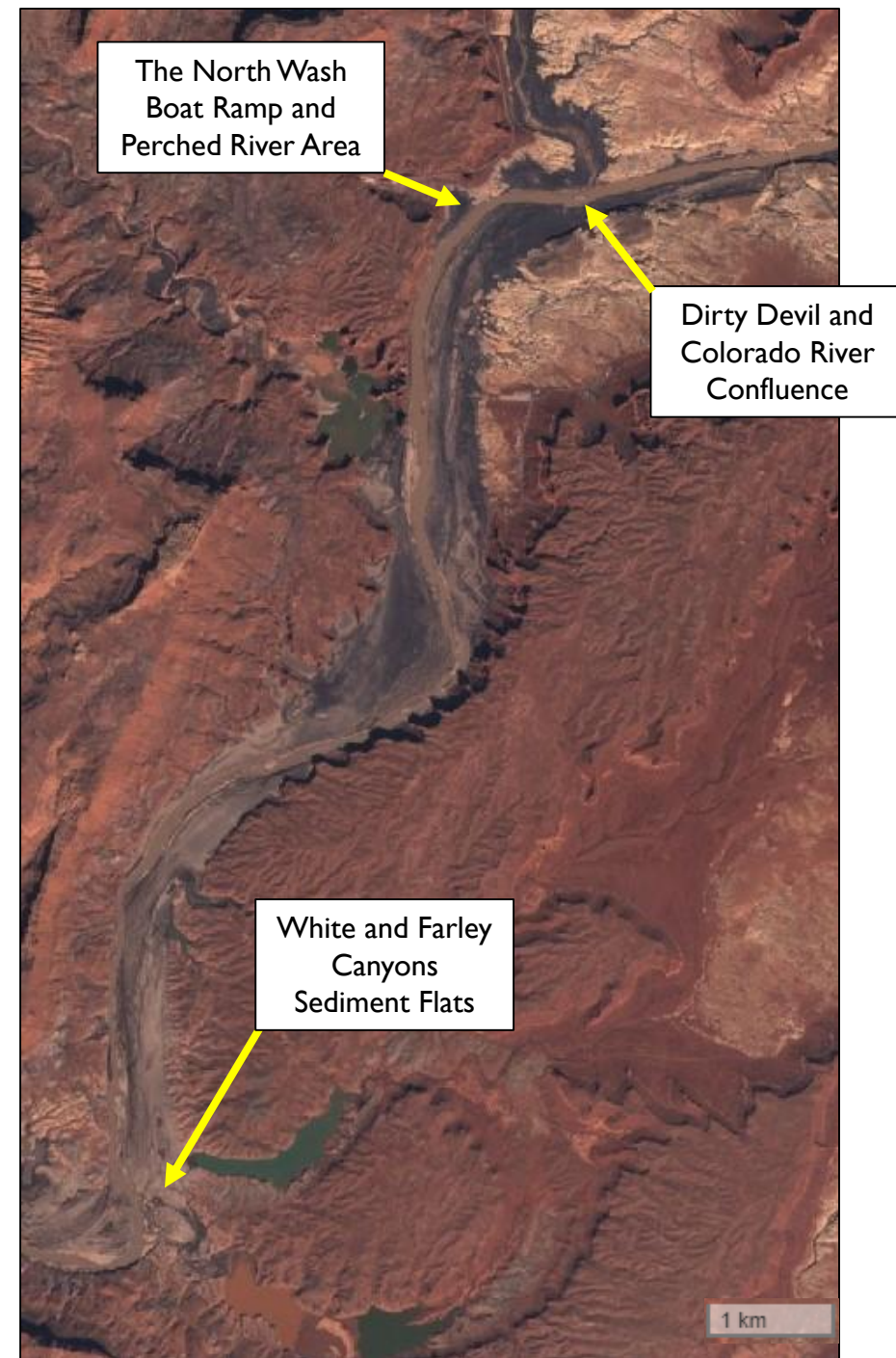
On February 10th, Glen Canyon National Recreation Area announced in a low water update that the North Wash Ramp has been deemed unsustainable and that no maintenance will be conducted at the site. Boaters would have to continue further downcanyon to Bullfrog Marina.

Near the end of March, it was apparent that there was going to be an above average snowpack. This would greatly amplify the rates of change that was being observed.

A higher run off combined with an all time low reservoir level will make for a massive scour through the giant plug of sediment caused by Glen Canyon Dam and its reservoir in Cataract and Upper Glen Canyon.

What follows in this mini report is continued documentation of the evolution of this area.

Dirty Devil to White Canyon
Sentinel-2 LIC image on 2023-03-18



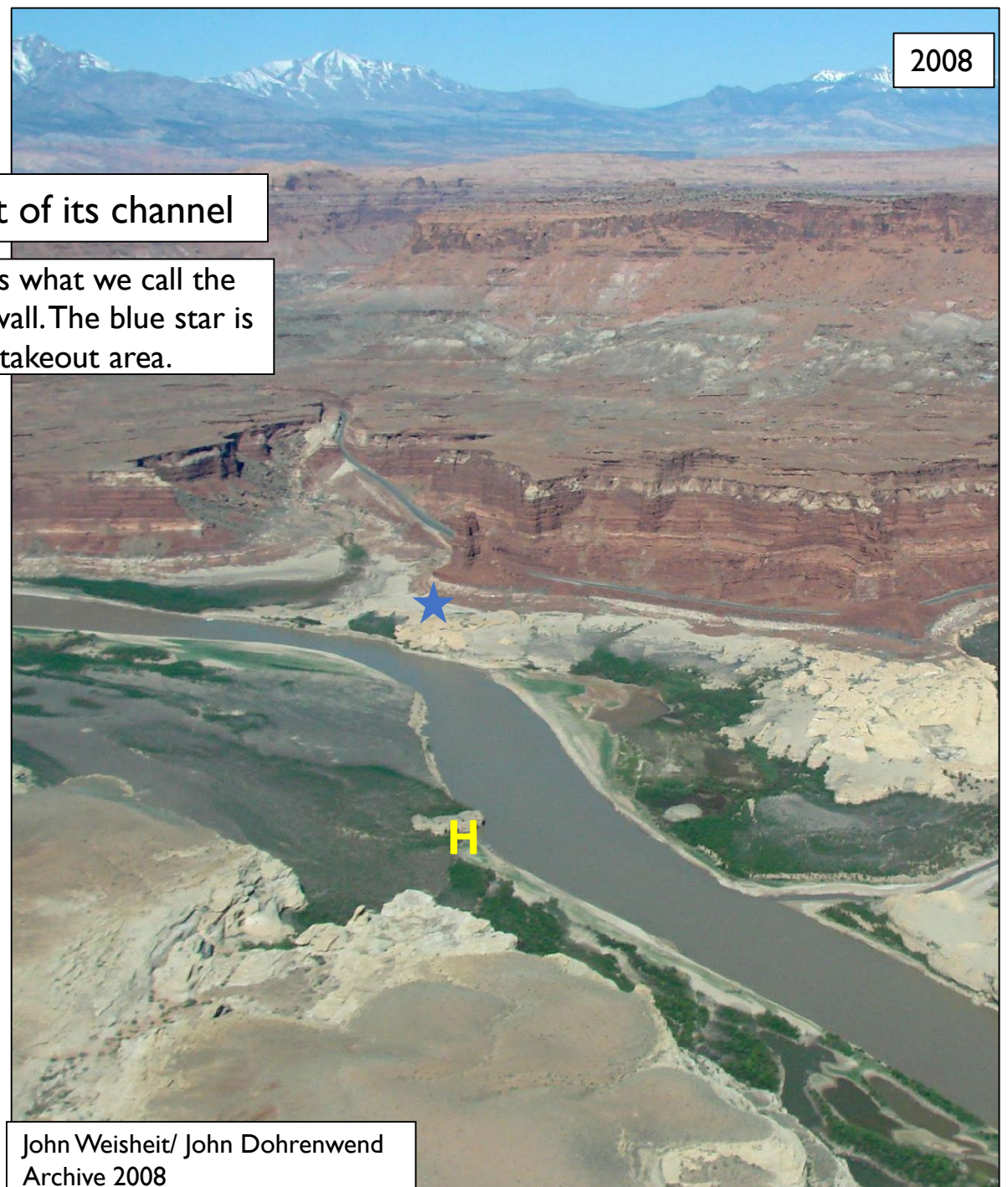
1962



The river out of its channel

The yellow "H" is what we call the Dirty Devil Headwall. The blue star is the current takeout area.

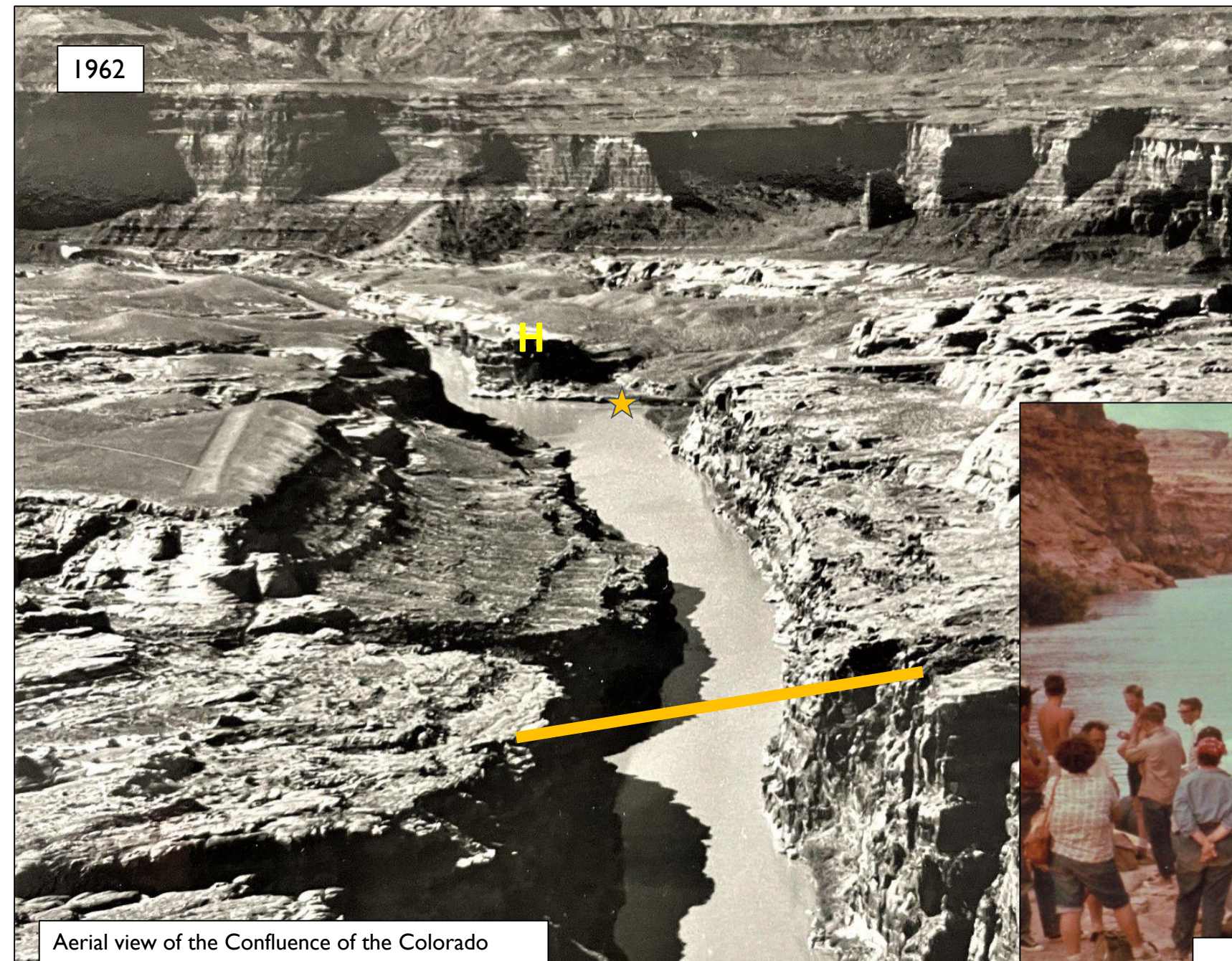
2008



RS9383_P_557_420-6955 Mouth of Dirty Devil
WL Rusho 4_62_ Cropped

John Weisheit/ John Dohrenwend
Archive 2008

1962



Aerial view of the Confluence of the Colorado
Dirty Devil WL Rusho

A perspective of the Dirty Devil Colorado Rivers confluence area before the bridge was constructed. The orange line shows where the bridge sits today. The Dirty Devil flows in from the right of the star.

The picture below shows the view upstream from the camp that was at the confluence. The star is the location of the camp.



The landing at the mouth of the Dirty Devil River
Doc Marston Collection, Huntington Library cropped lightened

A Match from the Bridge

Crampton 1966 P0197n47_03_20
J Willard Marriott Library,
Reservoir level 3540 ft

1966



2023

Peter Lefebvre 3-13-2023, 5600cfs,
Bridge gage 3579 ft

Things of note:

The rock point emerging midway down the channel on the left,
how steep the right cliff is in the Crampton shot,
and the river flowing through the cobble hills right of the headwall.

1966



Another aerial view from 1963

The Headwall is just downstream of the confluence of the two rivers. The ledge landing/ camp can be seen at river level on the downstream side of the confluence also

P-557-420-8061 Glen Canyon Unit, Colorado River Storage Project, Arizona-Utah. The Dirty Devil (Fremont) as seen from its confluence with the Colorado River. Located at Mile 169.6, this stream is generally considered to mark the head of Glen Canyon and the lower end of Narrow Canyon.

3/26/63

Bureau of Reclamation Photo

This shot also shows the gravel terrace that the river is now flowing over at a historic elevation of ~3600-3620ft

Another comparison of a photo from low flying plane near the Dirty Devil from the 1950s that is at or below water/sediment delta level in 2023.



Dirty Devil Confluence 3-2-2023 3579 bridge
5400 cfs

Dirty Devil confluence from plane, enhanced
Mid 1950s – Dick Sprang Collection, Cline Library

2021

3-17-2021 Peter Lefebvre
4000cfs, Bridge gage 3600ft

Two Years of Change

2023

The river surface is 21 feet lower,
deposits from the Dirty Devil
push way further into the channel,
and major amounts of sediment
have eroded from the face of the
headwall.

3-13-2023 Peter Lefebvre
5600cfs Bridge gage 3579



One Year of Carving, Looking upstream from the Headwall

2022

2023

3-29-2022 Peter Lefebvre
Bridge Gauge 3588ft 6000cfs

3-29-2023 Peter Lefebvre
Bridge Gauge 3580ft 7200cfs

A view from the headwall gives you a better vantage point to see how much mud was carved away. Exactly one year to the date. The river really carved back some mud here and is being pushed around by the Dirty Devil.
It will be interesting to see what high water does to this area in this years runoff.

Another View from the Headwall Looking Upstream

2022



2023



3-29-2022 Peter Lefebvre
Bridge Gauge 3588ft 6000cfs

3-29-2023 Peter Lefebvre
Bridge Gauge 3580ft 7200cfs

Massive Slumping

The carving that has taken place at the confluence of the Dirty Devil and Colorado River often occurs in large slumping events.
This photo series captured one of these collapses on film.
Note the skiff is 16 feet in length.



Big Slump at Dirty Devil 3-3-2023
bridge 3579 5400 cfs_Travis Custer



Slump and Wave at Dirty Devil 3-3-2023
bridge 3579 5400 cfs_Travis Custer



Skiff for scale near Slump 3-3-2023
bridge 3579 5400 cfs_Travis Custer

2023



1921



Two Views of the Dirty Devil Colorado River Confluence

Upper photo –
GCMRC USGS snout surveying near the flood caused island
at the confluence of the Dirty Devil and Colorado Rivers
3-29-2023 Mike DeHoff
Bridge 3580.6 ft, 8500 cfs

Photo 195

USGS boats and crew at the mouth of the Dirty Devil River
1921

Kolb Collection, NAU.PH.568.5374, Cline Library

Note – In 2023 the sediment delta/river level inhibit getting low
enough in elevation to accurately match this photo.

7.5 feet of difference in Water Surface Elevation at the Headwall

2022

H

2023

H

Lower Dirty Devil Headwall area 4-30-2022
Bridge 3588 ft, approx. 9300 cfs
Mike DeHoff

Lower Dirty Devil Headwall area 3-29-2023
Bridge 3580.6 ft, 8500 cfs
Mike DeHoff

2021



3-17-2021 Peter Lefebvre
4000cfs Bridge gage 3600

Two Years of Change just upstream of the Boat Ramp

3-13-2023 Peter Lefebvre
5600cfs Bridge gage 3579

2023



Looking upstream towards the bridge from the takeout area.
The river is out of its original channel here and flowing over cobbles
and bedrock. These cobbles and bedrock are beginning to show on
both sides of the river in the picture to the right.

We worry this could become a riffle or a rapid in the next few
years.

An overview of the North Wash Ramp Area from Hite Overlook



The reservoir filling near the Dirty Devil
Photo source not known



Peter Lefebvre

This shows what is going on beneath the surface of the current river and some of the features that it flows over. The blue stars are above the current takeout area. The fingers of land below the star, and the land bridge/saddle right of the star, are capable of creating rapids in the future as the river carves down. Directly upstream and downstream of where we take boats out.

Lake Powell as it filled in 1973 and the current river in 2022

1973



Dirty Devil Confluence area 1973

2022

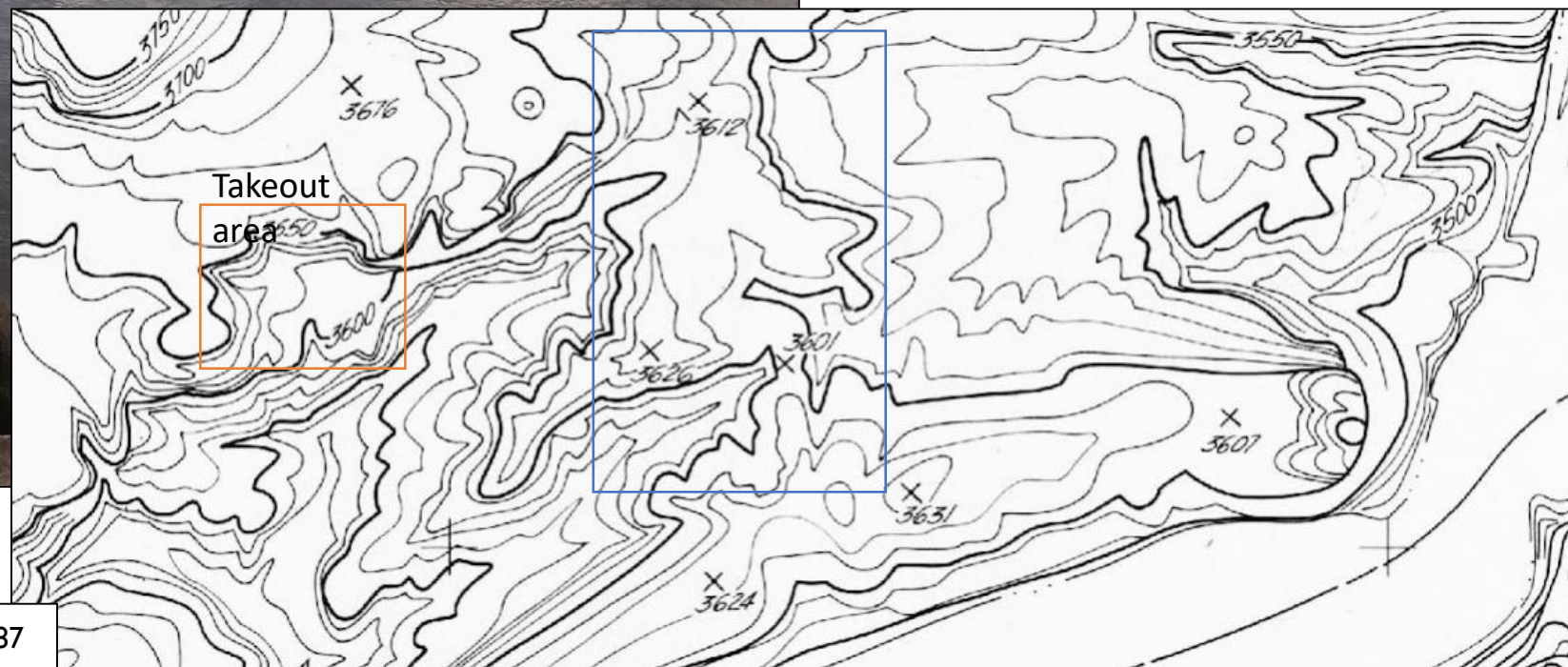


Peter Lefebvre

An insightful match. It gives you an idea of where the saddle is upstream of the ramp. Currently there is rock showing on both sides of the river in the exact spot where the saddle is. This match shows how much sediment has been deposited on the landscape and how steep the cliffs are where the current ramp is. Not promising for a smooth transition from ramp to river as the river cuts down.



In the blue box you can see rocks sticking out of the mud banks and below the water's surface. This is pinching the river and probably the early signs of a riffle/rapid that may form here. This is the exact location of the saddle shown in the previous slide. In this topo map of the area (pre dam) you can see the elevations of the saddle. With a high point of 3626 and the bridge gauge currently at 3582.6 the river has already carved through 20-40ft of pre dam strata. The saddle was comprised of cobble on top, but at some point, bedrock must be hit.



7-6-2022 Peter Lefebvre
8500cfs, bridge gauge 3584 ft

2019



2020



2-24-2019 Peter Lefebvre
Bridge Gauge 3600 ft

2022



12-9-2020 Peter Lefebvre
Bridge Gauge 3596

7-6-2022 Peter Lefebvre
Bridge gauge 3584

The current evolution of
the "Boat Ramp".
All are varying degrees of barely useable.
The river has carved down over 17' since
2019.
The ramp only gets steeper.
Now there is bedrock showing at river level.

2022



North Wash Ramp Overlook 4-30-2022
Bridge 3588 ft, approx. 9300 cfs
Mike DeHoff

2023



North Wash Ramp Overlook 3-29-2023
Bridge 3580.6 ft, 8500 cfs
Mike DeHoff

The sediment at the takeout continues to slump away and rock points are showing themselves all over.

As observed in other locations, when bedrock starts to show it supercharges erosion of the mud.

North Wash Ramp View from across the river
Chris Benson 4-5-2022
Bridge Gauge 3589.1ft, approx. 7000 cfs

Currently we are observing a rate of change in this area at approximate one foot of downcutting/ carving per month. This rate is astonishing but monthly visits during the spring of 2023 have continued to reinforce this rate.

North Wash Ramp View from across the river
Chris Benson 3-28-2023
Bridge Gauge 3580.6 ft, approx. 8500 cfs

2022



2023



What it looks like to get a boat out of the River at the North Wash Boat Ramp



Prepping roller tubes to take the GCMRC Snout rig out at North Wash-
Peter Lefebvre 3-29-2023
Bridge Gauge 3580.6 ft, approx. 8500 cfs



GCMRC snout on tubes coming up the North Wash Ramp
3-29-2023 Peter Lefebvre
Bridge Gauge 3580.6 ft, approx. 8500 cfs

Note the boat got to an angle of 56 degrees at one point coming up the ramp.

2021

Delta Panorama repeat at the mouth of Farley and White Canyon

In 2021 the reservoir was against
the far Windgate cliff.

In 2023 the reservoir has been
displaced 4 miles around the
corner

2023

Sediment Flats or Mud Glacier?



Warping sediment flats near the mouth of White Canyon
3-13-2023



Brenda Bowen and Meg Flynn on distorted mud flat
3-5-2023 Mike DeHoff



Peter, Meg, and Cody in the fun house mirror part of the sediment flats
3-13-2023



The team on a weird sand pressure ridge that led towards the Methane Volcano
3-13-2023

Visiting the Methane Volcano

Meg, Peter,
Benson, and
Cody at the
Methane Volcano
3-13-2023



In the fall of 2022, the expedition group came across odd sediment cone w a gas and water vent. During the spring of 2023 we wanted to visit it and monitor the changes.

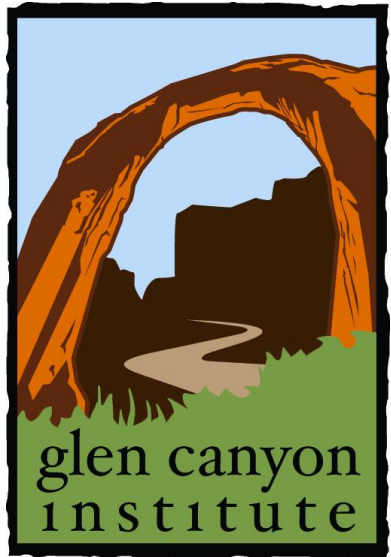


Meg Flynn and Brenda Bowen at the Methane Volcano near the mouth of Farley Canyon
3-5-2023

Returning Rapids



Project



The Returning Rapids Project
is a program of
Glen Canyon Institute

This report was compiled by:
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Editing and consultation by Meg Flynn
Any errors or oversights – please contact Mike

The Returning Rapids Project is comprised of Peter Lefebvre, Chris Benson,
Meg Flynn, and Mike DeHoff

As always, very special thanks goes out to the Glen Canyon Institute

A big THANK YOU to the people involved and to :



We are seeking funding.

The information gathered during our trips and accompanying research has become a valuable resource in the ongoing conversation regarding water in the southwest. During 2023 and 2024 we plan to engage with research efforts that will further inform agencies, tribes, and the public about this dynamic landscape.

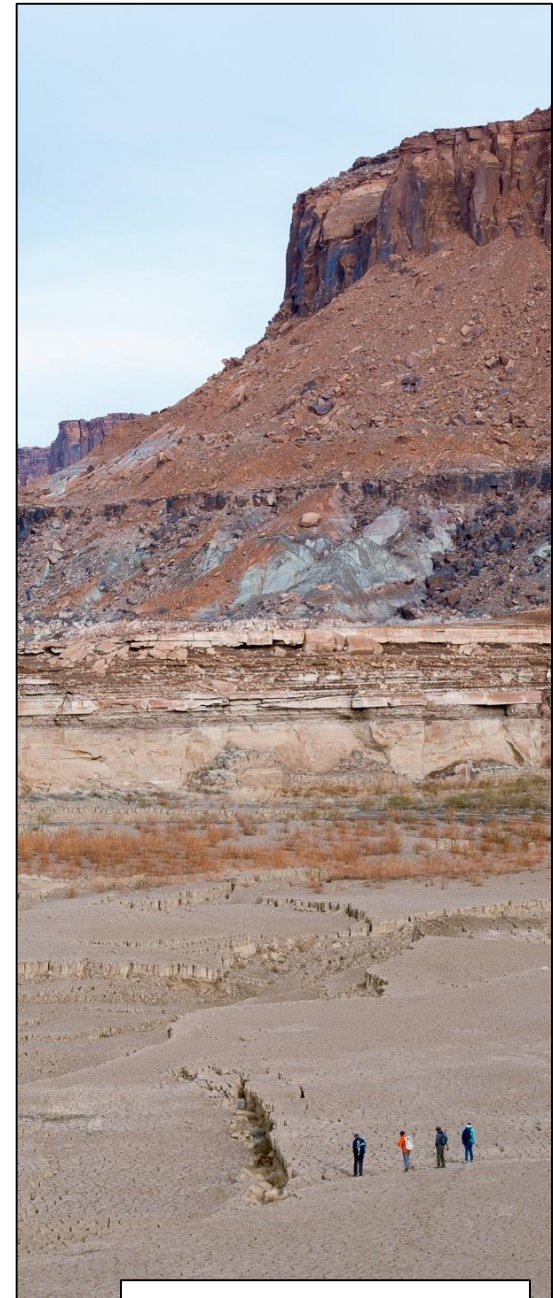
Our project intends to inform decision makers on opportunities to better care for our rivers and canyons.

Please contact us at contact@returningrapids.com

Thank you for taking the time to read this. More to come.
Contact the Returning Rapids Project research team at:
contact@returningrapids.com

For more information, project updates, or to make a donation please visit our website: returningrapids.com

April 2023



The Returning Rapids Team
Cody Cobb 3-13-2023