DOE-EM/GJ1640

Moab UMTRA Project
Flood and Drought Mitigation Plan

Revision 15

December 2025

U.S. Department of Energy

Office of Environmental Management

Prepared by the Remedial Action Contractor under contract number 89303322DEM000073
for the U.S. Department of Energy Office of Environmental Management, Grand Junction, Colorado.

Moab UMTRA Project
Flood and Drought Mitigation Plan

Revision 15

Review and Approval

11/17/2025

X James Ritchey

James Ritchey
RAC Environmental Technician
Signed by: JAMES RITCHEY (Affiliate)

11/17/2025

X Heather White

Heather White
RAC Moab Operations/Site Manager
Signed by: HEATHER WHITE (Affiliate)

11/24/2025

X Greg D. Church

Greg D. Church
RAC Program Manager
Signed by: GREGORY CHURCH (Affiliate)

Revision History

Revision	Date	Description
0	May 2008	Initial issue.
1	May 2011	Annual update.
2	May 2013	Annual update.
3	May 2014	Annual update includes incorporation of new groundwater and surface water data.
4	July 2015	Annual update.
5	April 2016	Revision includes clarification of specific actions in Sections 3.1 and 3.2.
6	May 2017	Annual update and revision to include specific actions with the CF5 Klein tank extraction operations.
7	December 2018	Update to include specific actions associated with drought.
8	December 2019	Annual update.
9	January 2021	Annual update.
10	April 2021	Update to include information pertaining to flow events in Moab Wash.
11	January 2022	Annual Update
12	December 2022	Annual Update to include moving scope of work exclusively to the RAC.
13	December 2023	Updated to reference 2023 flood and flood extent figures.
14	December 2024	Updated to include well field ERT trailer.
15	December 2025	Updated to remove extraction system references and include surface remediation impacts

Contents

Figures

Tables

Appendix

Attachment

Acronyms and Abbreviations

CA	Contamination Area
CBRFC	Colorado Basin River Forecast Center
CF	Configuration
cfs	cubic feet per second
DOE	U.S. Department of Energy
ft	feet or foot
IA	interim action
msl	mean sea level
NEPA	National Environmental Policy Act
NIDIS	National Integrated Drought Information System
NOAA	National Oceanic and Atmospheric Administration
NWS	National Weather Service
POD	Plan of the Day
RAC	Remedial Action Contractor
SME	subject matter expert
TLD	thermoluminescent dosimeter
UMTRA	Uranium Mill Tailings Remedial Action
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VFD	variable frequency drive

1.0 Introduction

The U.S. Department of Energy (DOE) Moab Uranium Mill Tailings Remedial Action (UMTRA) Project (the Project) site (Moab site) is a former uranium ore-processing facility. It is located about three miles northwest of the city of Moab in Grand County, Utah, and lies on the western bank of the Colorado River.

Several features of the Moab site are shown in Figure 1. The site is transected by the Moab Wash, which flows during significant storm events. North of the Wash is a freshwater intake structure that supplies a pond used for irrigation, dust control, decontamination, rinsing containers, and injection water as part of groundwater interim action (IA) remediation. Low stage of the Colorado River associated with drought conditions can result in insufficient water flowing into the Project's freshwater intake structure. The IA well field is located between the toe of the tailings pile and the river south of the Moab Wash. The site is susceptible to flooding because approximately 160 acres of the nearly 480 acres of the property are within the 100-year floodplain of either the Colorado River or Moab Wash.

In the winter of 2010/2011, a 20-acre area located north of the Moab Wash and along the Colorado river was remediated in the winter of 2010/2011 by excavating and removing contaminated soil. As part of this remediation, the berm that was previously installed along the riverbank was removed and more than 158,000 cubic yards of contaminated soil were removed from this area during the remediation creating areas of lower elevation. As was anticipated, this northern area is now more susceptible to flooding at lower river stages. Also, in 2025, additional remediation of the Contamination Area (CA) relocated boundary berms and increased the area susceptible to flooding.

Section 2.0 of this Plan provides information about river stage and flood predictions, Section 3.0 presents the trigger points that mandate specific actions, Section 4.0 provides guidance on specific steps in flood preparation, and Section 5.0 provides guidance to steps that should be taken after flood water has receded.

In addition, drought conditions in the Colorado River Basin have the potential to impact site operations. Several crucial Remedial Action Contractor (RAC) functions are dependent on freshwater usage. Section 6.0 describes freshwater usage at the Site and provides information on monitoring for drought; Section 7.0 contains protective actions that should take place on-site to prepare for drought conditions. Section 8.0 describes actions that should be taken once the drought has ended.

1.1 Purpose and Scope

This Plan is applicable to flooding and river drought conditions that may occur at or near the Moab site and outlines the planning and actions to be taken to prepare for these scenarios. It is intended to proactively guard against potential operational risks and maintain compliance during these conditions. In the event of flooding, the *Moab UMTRA Project Emergency/Incident Response Plan* (DOE-EM/GJ1520) will be utilized, which contains a Flood Action Plan checklist that includes actions to be taken (e.g., notifications, evaluations) when the Operations/Site Manager calls a Flood Alert.

1.2 Background

Stream flow data on the Colorado River has been collected by the U. S. Geological Survey (USGS) at gaging station 09180500 near Cisco, Utah, since 1914. This station, located approximately 30 miles upstream of the site, is the closest USGS gaging station to Moab and provides the most complete data set representing river flow passing the site. There are no significant tributaries between the gaging station and the Moab site. In 2009, the Project installed a standard USGS-style river staff gage at the freshwater intake structure, just west of the freshwater pond at the eastern (upstream) end of the site. The elevation of the Colorado River surface may be recorded from this gage to monitor flooding conditions.

On average, the river annually reaches a maximum flow between late May and early June, with an average annual instantaneous peak runoff at the Cisco gage of 27,400 cubic feet (ft) per second (cfs) and a daily mean flow of 23,100 cfs. Above-average runoff is attributed to a combination of above-average snowpack in the Upper Colorado River Basin, late spring precipitation events, and above-average temperatures.

Peak flows within the last 50 years have equaled or exceeded more than 40,000 cfs 12 times, with the two highest peak flows occurring in 1983 and 1984 (61,900 and 70,300 cfs, respectively). During these two flood events, the Moab site was reportedly flooded up to the toe of the tailings pile.

The most recent significant site flooding event occurred in 2023 when the peak daily mean runoff reached 40,900 cfs (which is equivalent to a river surface elevation of 3,967.4 ft mean sea level (msl)) on May 19. The impacts of this flooding event are well documented in the *Moab UMTRA Project 2023 Flood Response Summary* (DOE-EM/GJRAC3110).

Below-average river flow conditions also impact the Moab Site by limiting or eliminating the ability to withdraw freshwater. A river intake structure, pump, and associated freshwater pond are in the northern portion of the site (Figure 2). The water is used for various site operational activities. In 2007, 2018, and 2022 the river elevation dropped lower than the intake, and a secondary pump was utilized to continue operations. This pump is also used at various times when the river intake structure becomes silted-in.

1.3 Site Conditions

Figure 3 represents a rating curve generated using the 2011 flows for the site based on the river flows measured at the Cisco gaging station and the corresponding river surface elevation measured at the site river intake structure. Using the rating curve, the associated river surface elevation for flows above 23,000 cfs (average peak flow) will exceed the land surface elevation adjacent to the river allowing water to begin to migrate beyond the site boundary.

At a flow near 35,000 cfs, Colorado River water will crest the high point in the southern drainage channel (noted on Figure 2) and begin entering the wellfield. Once flows exceed approximately.37,000 cfs, the low point on the berm along the Moab Wash will be topped, and river water is expected to flow to the south within the constructed channel that runs through Configuration (CF) 5 from the Moab Wash

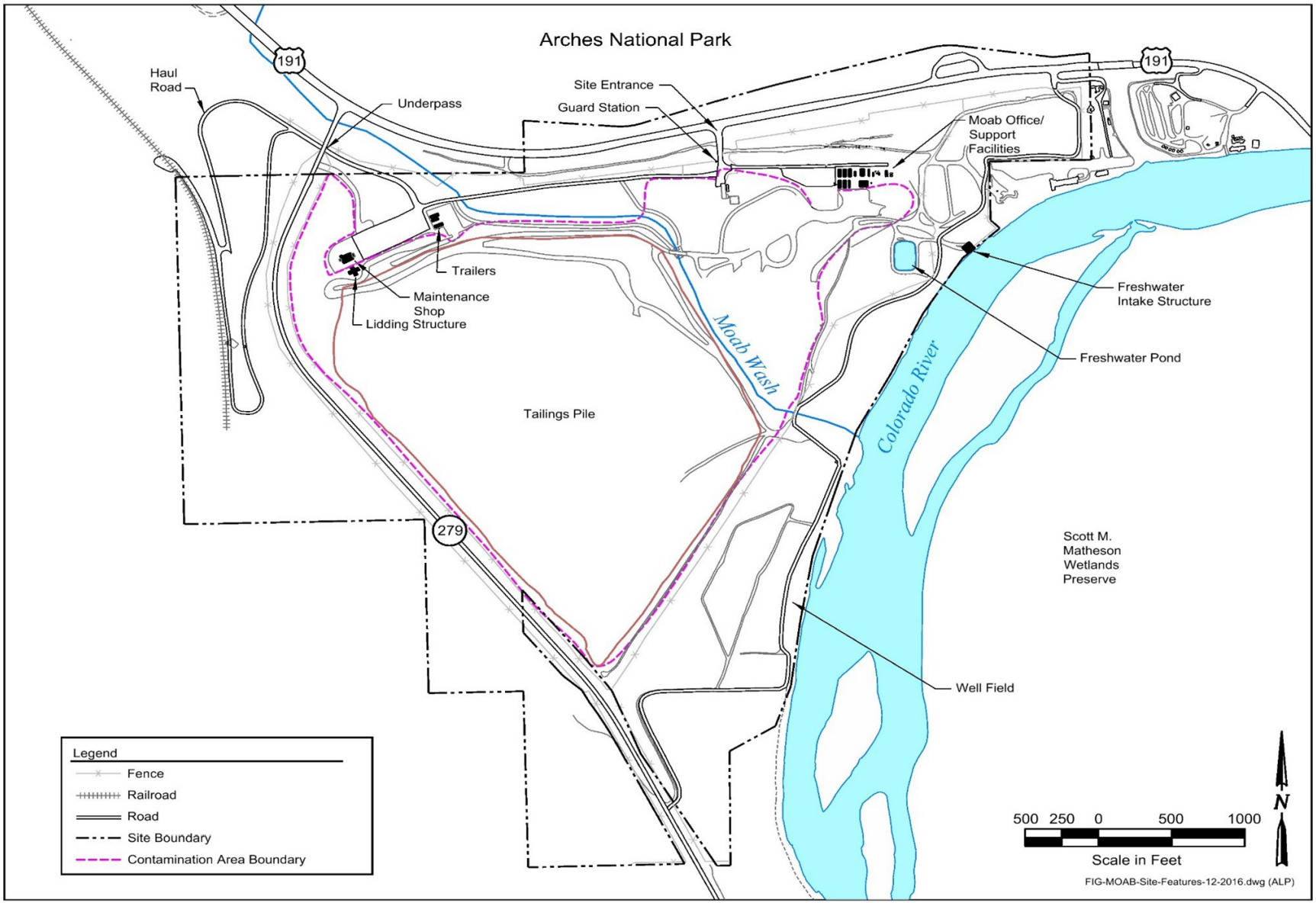

Figure 1. Moab Site Features

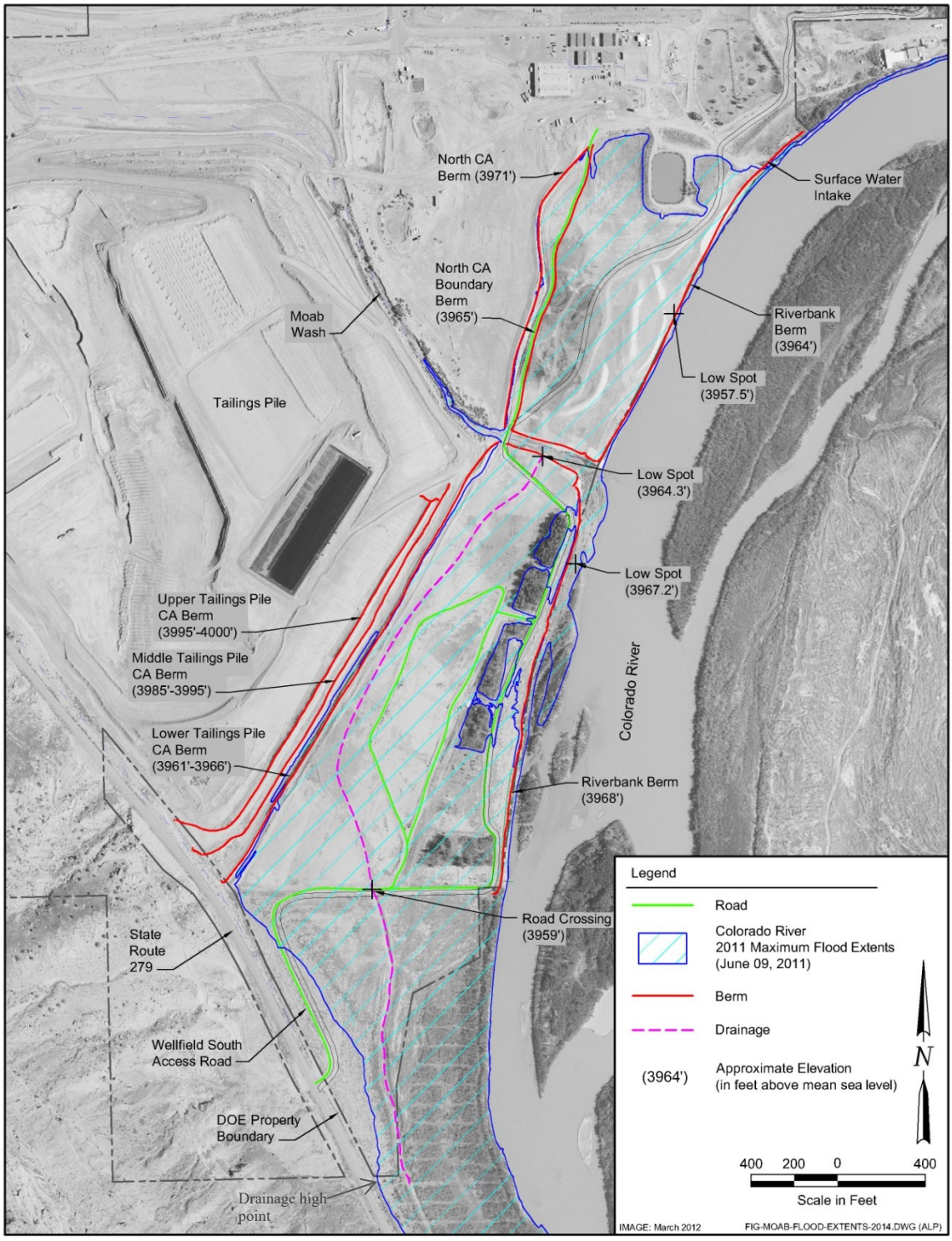

Figure 2. Moab Site Features, Colorado River Elevations, 2011 Flood Extent, and CA Berms and Elevations

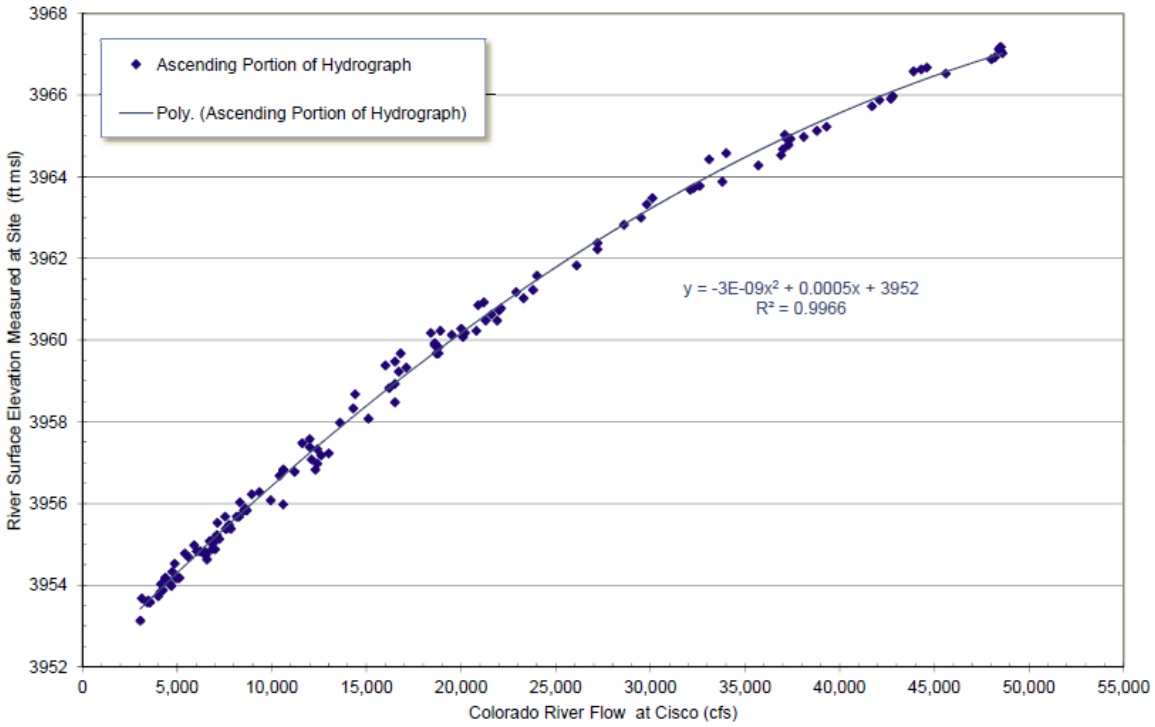

Figure 3. Cisco River Gage vs. Site Elevation Gage

The bank along the river from the Moab Wash to the southern end of CF4 has elevations that generally range from 3,968 to 3,969 ft msl. A previous survey identified a low spot on the berm adjacent to the area between the infiltration trench and the baseline area, where the elevation is 3,967.2 ft msl.

Due to the large width of the river at the Moab Site, there is insufficient energy in the river to adversely impact the tailings pile even if inundated. Thus, protection of the tailings pile from flooding is limited to maintaining the berms during lower river stages. Additional information is available in:

- Federal Emergency Management Agency, "Flood Insurance Study, Grand County, Utah," 2006.
- U.S. Geological Survey Scientific Investigations Report 2005-2025, "Initial Phase Investigation of Multi-Dimensional Streamflow Simulations in the Colorado River, Moab Valley, Grand County, Utah," 2004.

The river intake structure for the freshwater pump contains a concrete inlet from the river to the wet well. The inlet is typically covered in silt from the river at varying depths, and the sediment is removed as needed. It was noted in 2018 that the river elevation starts to approach the bottom of the inlet at a river flow of nearly 2,000 cfs.

2.0 Monitoring Colorado River Stage for Potential Flooding

When the river flow rate at the Cisco gage is expected to exceed 15,000 cfs, groundwater personnel will monitor the current and forecast river stage daily and report the status to site management.

2.1 Flood Designations

Flooding is defined as the inundation of normally dry areas as a result of increased water levels in an established water course. The flood warning normally specifies crest information. It usually occurs 6 or more hours after the causative event, and it is usually associated with widespread heavy rain and/or snowmelt or ice jams

The National Weather Service (NWS) has a flood warning notification system that includes several flood designations applicable to the Moab Site, including flash flood warning, flood warning, and river flood warning (http://www.nws.noaa.gov/floodsafety/index). The NWS reports forecast the river stage for 2 weeks. NWS flood designations are described as follows:

Flash flood warning – Issued to inform the public, emergency management, and other cooperating agencies that flash flooding is in progress, imminent, or highly likely.

Flood warning – Issued to inform the public of flooding along larger streams that pose a serious threat to life or property. A flood warning will usually contain river stage (level) forecasts.

River flood warning – Issued when the forecast points at specific communities that have formal gaging sites and established flood stages or areas along rivers where flooding has been forecast, is imminent, or is in progress.

The warning will contain the forecast point covered, the current stage (if it is available), and the established flood stage. From the forecast crest, the NWS determines which areas will be affected by the river flooding. This information is included in the warning that is issued as a site/event-specific call-to-action.

Groundwater personnel will monitor the NWS website and report any warnings to the Operations/Site Manager if an immediate threat occurs.

2.2 River Stage Reporting

Estimated Colorado River flow rates for the Cisco gaging station (based on upstream flow rates and weather systems impacting the Colorado River basin) can be monitored on the National Oceanic and Atmospheric Administration (NOAA) website at *http://www.cbrfc.noaa.gov/river/station/flowplot/flowplot.cgi?CLRU1*. Figure 4 shows an example hydrograph from the Cisco gage.

The homepage to the Colorado Basin River Forecast Center (CBRFC) is located at *www.cbrfc.noaa.gov* and the website provides NOAA western water supply forecasts.

3.0 Decision-making for Mitigating Potential Flood Damage

Table 1 provides a summary of the critical flows, the river surface elevation, and the areas of the site that will be impacted by flood waters as discussed in Section 1.3.

To avoid unnecessary efforts and associated costs with flood preparation, specific actions are triggered by observed river flow rates and stage forecasts for the Cisco gage. Taking the historical data into account, this Plan establishes conservative trigger points for action at 15,000 cfs, 25,000 cfs, 30,000, and 35,000 cfs or greater.

These trigger points account for increases in flow rate that may occur over the weekend when site support is limited. Figures A-1 through A-4 in Appendix A show the ground elevations of the Moab Site that will be impacted by the specific river flow. Figures A-3 and A-4 (for flows of 35,000 and 40,000 cfs, respectively) were generated prior to 2025 surface remediation activities that included the removal of some berms that were once located at the base of the tailings pile and north of Moab Wash. As a result, these maps may no longer be representative of the areas actually impacted at these river flows. Surface remediation activities are on-going as the site moves towards closure, and this needs to be taken into consideration during flood preparation.

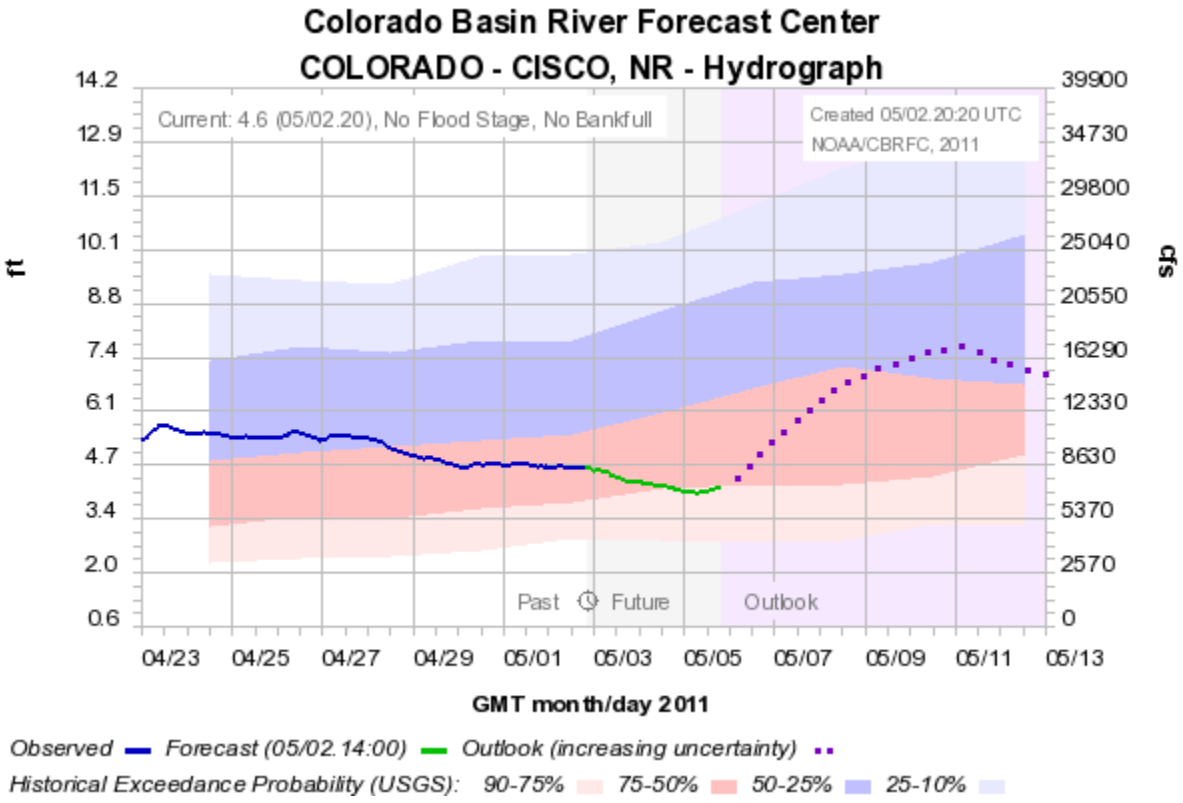

Figure 4. Example Hydrograph from Cisco, Utah, Gaging Station

Table 1. Key River Flows, River Surface Elevations, and Associated Areas Impacted

2023 Observations (last flood event)		
River Flow (cfs)	**Elevation (ft msl)**	**Area Impacted**
15,000	3,958.8	Surface water began to back up into Moab Wash.
19,900	3,960.8	River exceeded its banks, and water entered the north off-pile area.
22,600	3,961.8	Northern off-pile access road was inaccessible.
23,000	3,961.9	Surface water entered the northern off-pile area.
29,100	3,964.0	Water backed up to the Moab Wash lower crossing.
30,000	3964.3	Lower crossing was impassable.
39,800	3967.1	Water started flowing from both southern drainage (from the former Palicaro Property) and from the Moab Wash southern spillway
40,700	3967.4	2023 Peak Flow on May 19, flood water reached just below base of pump house

3.1 Specific Actions at 15,000 cfs

The RAC will take the following actions once the Cisco gage flows are predicted to reach approximately 15,000 cfs:

- Conduct a walkdown of areas to identify potentially vulnerable assets and establish corrective actions. Visually inspect berms, determine if site boundary signs in the northern off pile should be removed, and repair or enhance as needed.
- Determine if the head gate located off the State Route 279 well field access road should be closed.
- Shut down all freshwater injection into the well field when the river flow reaches 15,000 cfs.
- Verify observation well caps have been installed.
- Determine if any equipment in the northern off pile needs to be relocated.
- Notify the Moab Operations/Site Manager (or RAC On-call Manager during non-working hours), who will then notify the DOE Site Engineer, the Federal Cleanup Director, and Project Public Affairs.
- Inform site security and site personnel during daily safety briefing of flood-prone areas at the site where operations will be restricted for that day.

3.2 Specific Actions at 25,000 cfs

At flows of just above 25,000 cfs, well field access will be impacted by surface water backing up into the Moab Wash and onto the lower Wash crossing. Once the Colorado River flows are predicted to reach 25,000 cfs at the Cisco gage, RAC personnel will perform the following tasks:

- Complete berm inspections for erosion and signs of breaching (see Attachment 1).
- Secure the contents of the groundwater sand filter shed, the CF5 pump house, and associated items.
- Remove any equipment that can be damaged by rising water and relocate to higher ground.
- Check the power poles near the Moab Wash to determine if additional support is needed.
- Suspend irrigation activities in the well field area (as necessary) and remove irrigation equipment that may be damaged or transported out of the area by flood waters. Shut down the well field access road across the Moab Wash when deemed unsafe (historically occurs at flows greater than 25,000 cfs). The well field southern access road is typically not accessible at flows greater than 30,000 cfs due to flood water coming from downstream of the site.
- Contact site electrician/electrical Subcontractor regarding potential removal of electrical equipment from the well field.
- Contact Subcontractor regarding potential transport of pump house to higher ground (near Hwy 279 gate).

3.3 Specific Actions at 30,000 cfs

If the flow is expected to exceed 30,000 cfs at the Cisco gage, RAC personnel will perform the following tasks. Completion of these action items will be determined at the time of the river forecast observation.

- Shut down all power to the well field and secure power following the *Moab UMTRA Project Lockout/Tagout and Out of Service Procedures* (DOE-EM/GJ1552) to prevent inadvertent energization to the well field.

- Have an electrician remove the CF5 power center from the well field, as well as the CF5 variable frequency drives (VFDs), electrical panels, and electrical disconnects. In addition, an electrician should also remove the heaters in the CF4 well vaults.
- Measure water levels at each monitoring well equipped with a data logger/pressure transducer. Label, download, and remove each data logger/pressure transducer.
- Open the head gate at the State Route 279 well field access road.
- Assess whether any air monitoring sampling equipment will be impacted by flood water, and determine if air particulate sampling equipment, radon cups or thermoluminescent dosimeters (TLDs) need to be removed. In addition, personnel may lose access to the Matheson air monitoring locations.
- Radiological Control personnel will conduct a visual survey of the Moab Wash lower crossing to determine if radiological sampling should be performed in areas where the rising waters can come into contact with residual radioactive material at the CA boundary or within the channel of Moab Wash.

3.4 Specific Actions at 35,000 cfs or Greater

For flows that are predicted to reach 35,000 cfs or greater, the RAC will perform the following tasks:

- Hold weekly (or more frequently as needed) meetings to discuss site actions and predicted river flow forecasts.
- Contact Williams Northwest Pipeline at 435-220-0139 to inform them that the Moab Site is expecting a flow of greater than 35,000 cfs, so they will have time to remove electrical equipment from their equipment location adjacent to the river intake structure.
- Contact Enterprise Gas to inform them that the Moab Site is expecting a flow of greater than 40,000 cfs and that on-site access to their gas line may be impacted.
- If the river reaches an elevation not encountered before, actions will be taken as warranted by the site conditions.
- Close the river intake pump head gate to avoid sediment accumulation inside the structure.
- Determine if signage is necessary to warn boaters about on-site underwater hazards.
- If flows are expected to exceed 40,700 cfs, move the well field pump house and trailer containing the Electrical Resistivity Tomography equipment to a non-flood prone location (e.g., near the southern gate off of Hwy 279).

3.5 Specific Actions for Moab Wash during Heavy Precipitation Events

In the event of heavy rainfall events that produce visible flow in the Moab Wash, the RAC will:

- Take photos of the Wash flow (if the storm event occurs during work hours and can be done safely).
- Close off access to lower crossing until flow stops. Radiological Control personnel, if needed, will perform a gamma survey and sample collection of the sediment in the lower crossing. Once the sediment has been analyzed for Radium-226 concentration, the crossing will be cleaned, with the removed material placed either into the CA or on the clean areas outside of the CA, pending sample results. Scanning will be completed in accordance with the *Moab UMTRA Project Radiological Control Response to Moab Wash Flow Procedure* (DOE-EM/GJRAC2053).
- Monitor the flowrate if it is safe to do so. The Groundwater Program has a portable flowmeter that can be used.

- If it is safe to do so, Groundwater personnel will collect a surface water grab sample for analytes determined by DOE personnel.
- Monitor erosion within the Wash post-storm event. A drone may be useful in capturing images.
- Close the upper Wash crossing while the Wash is flowing; employees in the Support Area/Queue will have to enter and exit the site off State Route 279 until deemed safe by site health and safety personnel. A blue light will be turned on at the Guard Shack to indicate the upper Moab Wash crossing is impassable.

4.0 Specific Actions for Flood Mitigation

RAC Management will evaluate the Colorado River bank, lower portion of the Moab Wash, and berms in the CA to identify low points, erosional features, or loose soils that may be subject to further erosion during flooding. Objects that may be disrupted during flooding will be noted to determine if relocation or protection in place is preferred.

The representatives will pay attention to possible hazardous materials that may require special actions. The walkdown survey may result in corrective actions; any potential impacts/issues will be discussed with Operations/Site Managers, and appropriate actions will be taken.

5.0 Specific Actions after Flood Water Recedes

Once the well field is accessible, and there is no longer a threat of flooding or danger, the RAC will perform the following tasks:

- Assess any flood damage on the river berm and in the well field. Complete any necessary corrective actions.
- Assess the need to transfer ponded water away from the well field.
- Contact the site electrician/electrical Subcontractor to re-install any removed electrical infrastructure associated with the ERT and Injection Systems.
- Return data loggers/pressure transducers to wells.
- Identify areas of standing water and determine whether mosquito abatement is necessary.
- Return radon cups/TLDs to the well field, if necessary.
- Resume well field injection after the river flow drops to less than 15,000 cfs.
- Conduct a post-flood meeting to discuss sediment removal from the Moab Wash lower crossing or other areas of the site and the repair of roads and berms.
- Reinstall signs that were removed along the site boundary/river.
- Monitor irrigation needs and replace irrigation equipment when needed.
- Perform radiological surveys in areas that have been deemed to have the potential for cross contamination due to flooding.
- Return air monitoring equipment to the well field.
- If radiological soil samples were collected before the flooding, recollect samples in those same areas as soon as it is feasible. Compare the pre-flood radiological data against the post-flood collected data to report any loss of contamination and to what extent.

6.0 Monitoring Colorado River Drought Conditions

Several factors are used to determine drought conditions in the Colorado River Basin including reservoir water storage capacity, soil moisture leading into the winter season, and precipitation/climate. The CBRFC (*www.cbrfc.noaa.gov*) presents this data on their website and conducts an Early Outlook Webinar in December for the up-coming winter/spring season. Water supply webinars take place monthly from January through April.

The CBRFC also updates an Upper Colorado Situational Awareness webpage with information concerning soil moisture, snow conditions, water year precipitation, and month to date precipitation. An example of the available information is presented in Figure 5, which displays the water supply forecast for June 2018 (during drought conditions). During 2018 the peak river flow was only 8,470 cfs, and flows decreased below 2,000 cfs by late September. In addition, NOAA has a separate program called the National Integrated Drought Information System (NIDIS) (drought.gov), which includes a national drought early warning system.

Regional drought conditions can impact daily operations at the Moab Site at any point during the year; however, the drought outlook for the year is significantly dependent on winter conditions in the Colorado River Basin.

6.1 Freshwater Intake Structure

The freshwater intake structure is located on the bank of the Colorado River and supplies the site freshwater pond with water used for various site functions. The intake structure consists of a flat bottom concrete intake channel fitted with a raised portion separating the channel from the wet well. The intake channel feeds a wet well in which vertical turbine pumps direct water to the freshwater pond.

When the river flow is below the elevation of the intake channel, it is not possible to use the system to fill the pond. The elevation of the intake channel is 3,952.21 ft above mean sea level although river sediment deposition may increase the intake elevation, preventing water flowing to the intake structure.

Several factors are used to determine drought conditions in the Colorado River Basin including reservoir water storage capacity, soil moisture leading into the winter season, and precipitation/climate. The CBRFC (*www.cbrfc.noaa.gov*) presents this data on their website and conducts an Early Outlook Webinar in December for the up-coming winter/spring season. Water supply webinars take place monthly from January through April.

The CBRFC also updates an Upper Colorado Situational Awareness webpage with information concerning soil moisture, snow conditions, water year precipitation, and month to date precipitation. An example of the available information is presented in Figure 5, which displays the water supply forecast for June 2018 (during drought conditions). During 2018 the peak river flow was only 8,470 cfs, and flows decreased below 2,000 cfs by late September. In addition, NOAA has a separate program called the National Integrated Drought Information System (NIDIS) (drought.gov), which includes a national drought early warning system.

6.2 Drought Reporting

The RAC will monitor the CBRFC and the NIDIS websites and report drought conditions to site management as necessary.

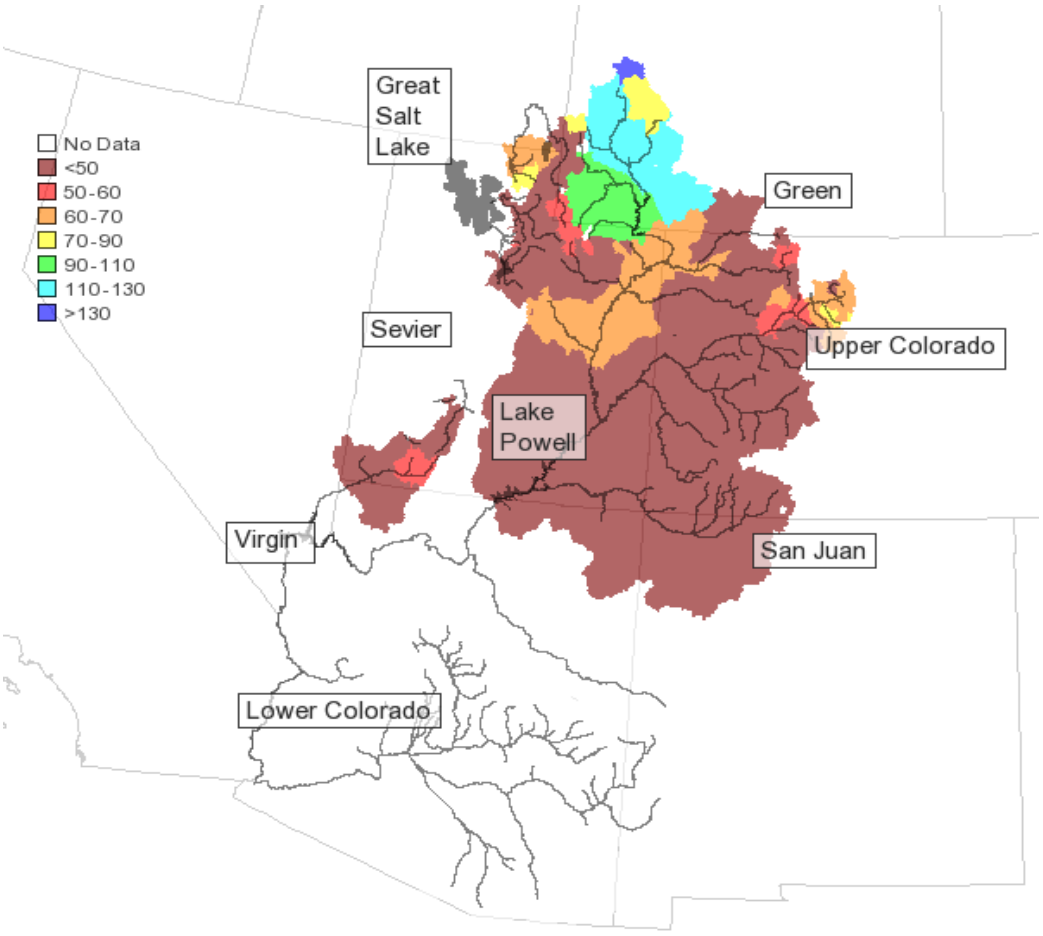

Figure 5. CBRFC Percent Average Water Supply Conditions for June 2018

7.0 Drought Action Items

Drought planning action items have been determined to mitigate risk to project operations. When the CBRFC/NIDIS predicts below average river flow and drought conditions, the RAC will prepare for the listed actions.

- Assess the need for future irrigation water and revegetation activities that may require dust suppression and plan activities accordingly before the pump intake is impacted.
- Assess the need for injection/surface water diversion operations in the well field.
- Meet with DOE personnel to discuss if any program metrics may be impacted (e.g., injection/irrigation).
- Consult with environmental subject matter experts (SMEs) to evaluate any impacts to the Project from requirements in the Title 42 United States Code Section 4321, the National Environmental Protection Act (NEPA), or other regulatory compliance obligations.

- Assess the need for surfactants or stabilizers to add to the water used for dust suppression in both the contaminated and non-contaminated areas.

When the CRBFC forecasts a river flow of less than 1,800 cfs (approximate elevation of 3,952.9 ft msl) at the Cisco River Gage, the RAC will prepare for the listed items.

NOTE: If the river flow is expected to drop below 1,800 cfs for a short period or if the operational demand for freshwater is limited (such as in the winter months), the completion of these action items may not be required.

- Prioritize activities that require freshwater usage. Discuss the need for freshwater for site activities with the Operations/Site Manager and determine if the use of a secondary pump will impact the activities.
- Continue to monitor the river flow and drought conditions on the CBRFC/NIDIS websites.
- Assess whether potable water should be used for operations (e.g., decontamination, container rinse system).
- Monitor the level of the freshwater pond during operations.

8.0 Specific Actions Once the Drought Risk has Diminished

Once there is no longer a threat of drought and low river flow, the RAC will perform the following tasks:

- Resume operations that require freshwater usage.
- Continually monitor the climate conditions and the Colorado River water supply.
- Conduct a post-drought meeting to discuss the need for possible process or physical Site improvements.

9.0 References

42 USC 4321 (United States Code), National Environmental Protection Act.

DOE (U.S. Department of Energy), *Moab UMTRA Project Emergency/Incident Response Plan* (DOE-EM/GJ1520).

DOE (U.S. Department of Energy), *Moab UMTRA Project Lockout/Tagout and Out of Service Procedures* (DOE-EM/GJ1552).

DOE (U.S. Department of Energy), *Moab UMTRA Project Radiological Control Response to Moab Wash Flow Procedure* (DOE-EM/GJRAC2053).

DOE (U.S. Department of Energy), *Moab UMTRA Project 2023 Flood Response Summary* (DOE-EM/GJRAC3110).

Federal Emergency Management Agency, "Flood Insurance Study, Grand County, Utah."

National Oceanic and Atmospheric Administration at *http://www.cbrfc.noaa.gov/river/station/flowplot/flowplot.cgi?CLRU1*

National Oceanic and Atmospheric Administration Western Water Supply Forecast at Western Water Supply Forecasts (*noaa.gov*)

National Integrated Drought Information Systems (NIDIS) www.drought.gov

NWS (National Weather Service) *http://www.nws.noaa.gov/floodsafety/index*

USFWS (U.S. Fish and Wildlife Service), "Final Biological Opinion for Proposed Reclamation of the Atlas Mill Tailings Site in Moab, Utah."

USGS (U.S. Geological Survey) Scientific Investigations Report 2005-5022, "Initial Phase Investigation of Multi-Dimensional Streamflow Simulations in the Colorado River, Moab Valley, Grand County, Utah."

Appendix A.
Surface Water Elevation vs. Site Elevation

Appendix A. Surface Water Elevation vs. Site Elevation

Figure A-1. Potential Flooded Areas at 15,000 cfs (Shown in Highlighted Blue Area)

Figure A-2. Potential Impact of 25,000 cfs

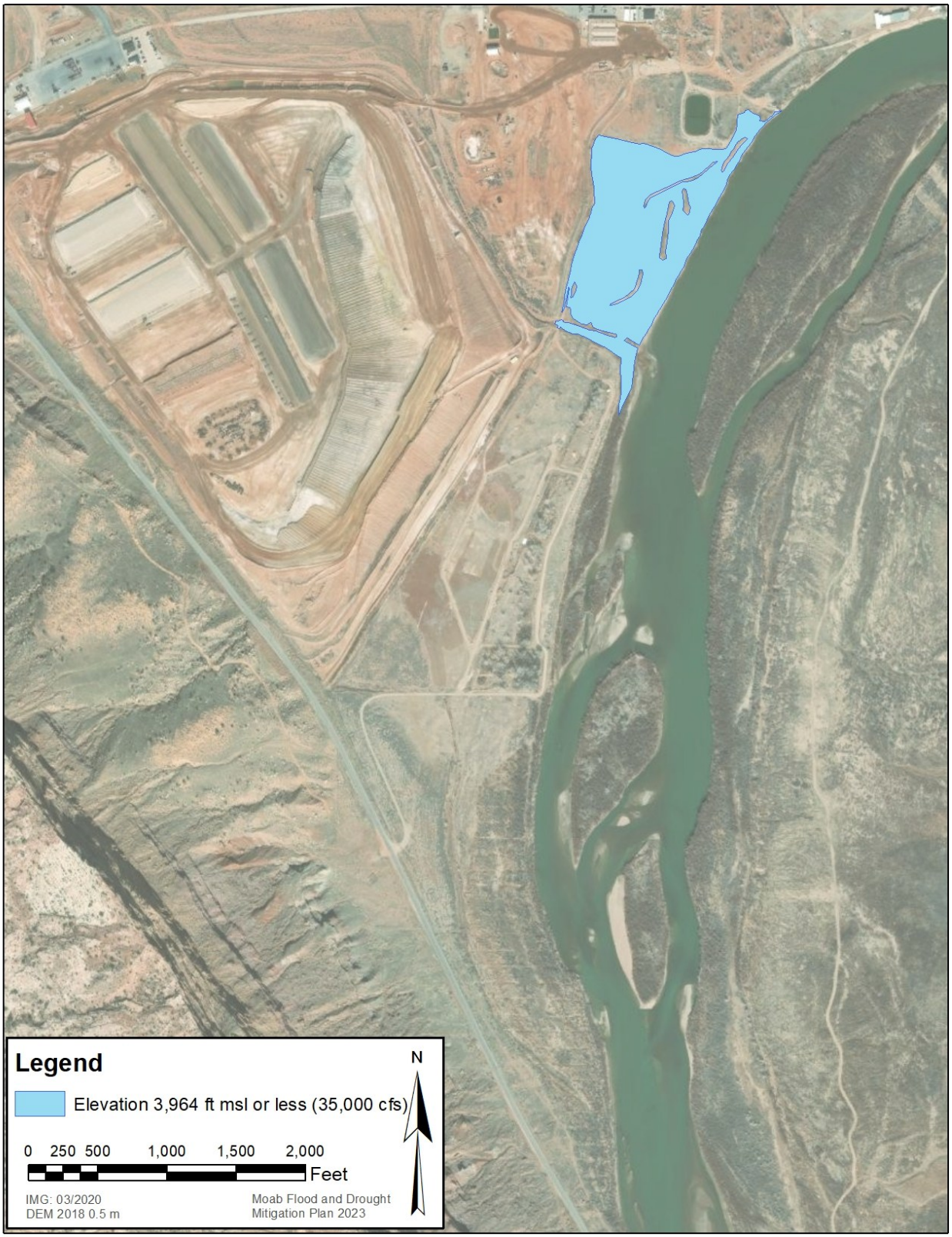

Figure A-3. Potential Impact of 35,000 cfs

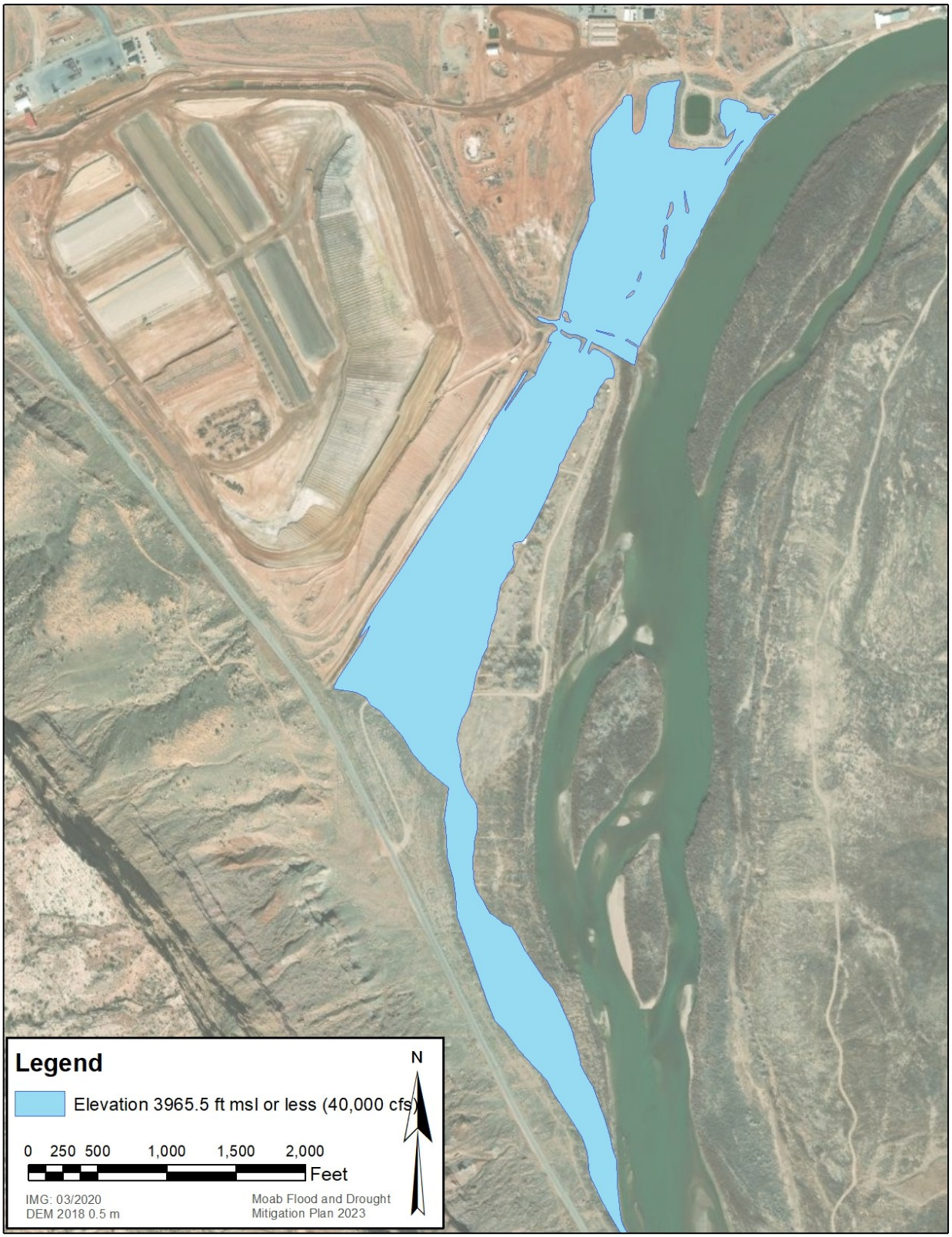

Figure A-4. Potential Impact of 40,000 cfs

Attachment 1.
Berm Inspection Form and Checklist

Attachment 1. Berm Inspection Form and Checklist

Berm Inspection Form and Checklist

INFORMATION:

Inspection Date: _____
Inspection Time: _____
Name of Inspector: _____
Weather Condition: _____
River Flow (cfs): _____

OBSERVATIONS:

☐ **Bank Caving** (*most failure occurs on river-ward slope*)

_____
_____

☐ **Cracking Parallel to Riverbank**

_____
_____

☐ **Slope Slumping/Bulging**

_____
_____

☐ **Soil Erosion**

_____
_____

☐ **Surface Water Seepage** (*wet areas on the berm*)

_____
_____

☐ **Animal Burrows**

_____
_____

WERE PHOTOS TAKEN?

☐ **Yes** ☐ **No**

DEFICIENCIES REPORTED TO:

_____
_____
_____

ADDITIONAL NOTES:

_____
_____
_____

MOAB UMTRA PROJECT CRESCENT JUNCTION

Berm Inspection Form and Checklist (*continued*)