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Moab Case Study: Risk and Environmental Protection Issues

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2023 Global Summit
on Environmental Remediation
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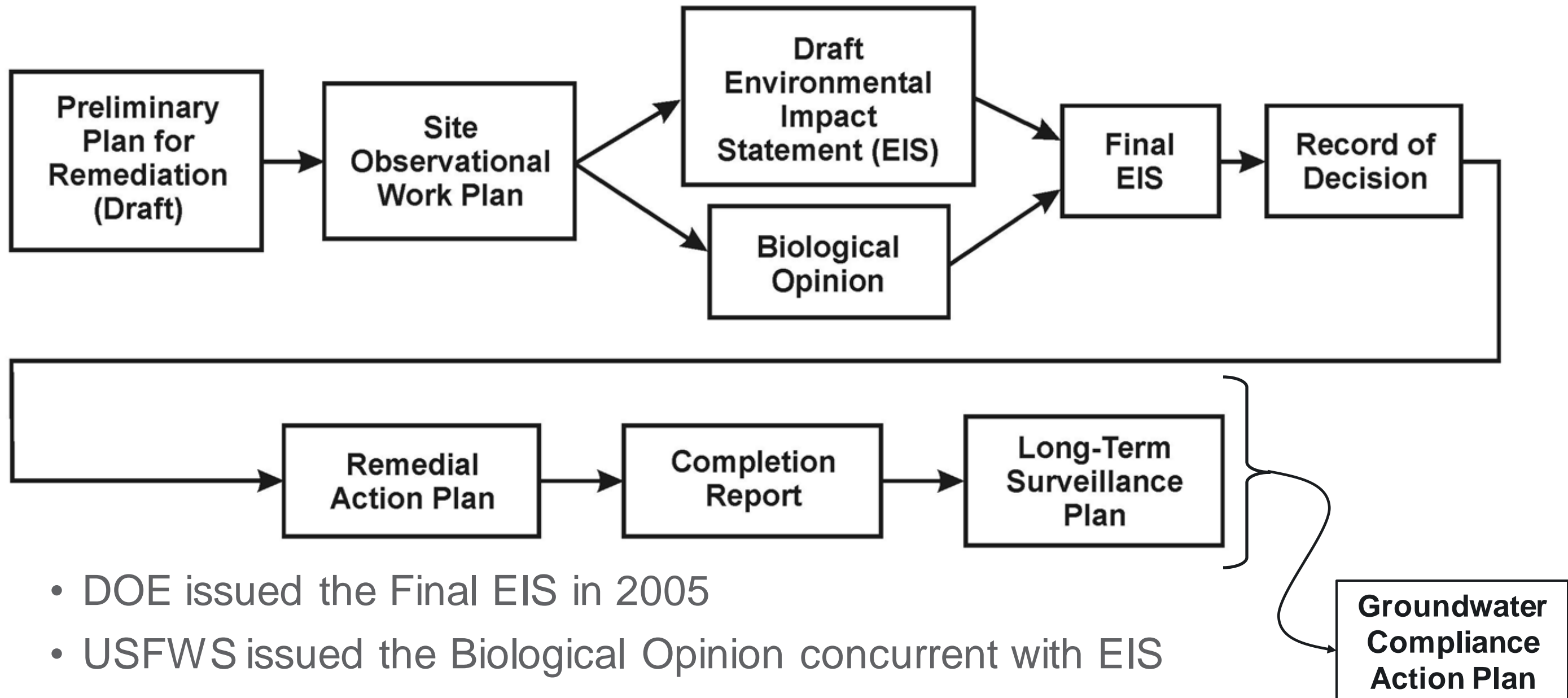
Outline

- What is risk?
- UMTRA Process and Moab Site
 - Role of USFWS Biological Opinion
- Interim Actions
- Next Steps





UMTRA Project Documentation Process



Risk Issues for Consideration - Human Health Risk

- EIS identified potential for public to be exposed to unacceptable levels of radon and other radiological hazard if the mill tailings pile remained at site.
- Relocation of the mill tailings pile to secure site at Crescent Junction addresses long-term public health risk



Risk Issues for Consideration - Ecological Risk

- Release of contaminants from mill operations and from the mill tailings pile into groundwater and Colorado River is at levels exceeding risk levels for aquatic organisms
 - Contaminants of concern: Ammonia, Uranium, other metals
 - Chronic and Acute criteria for contaminants and aquatic organisms
 - Endangered Species Act
- Ecological risk is driving the interim actions with the groundwater and surface water



Biological Opinion, USFWS, 2004

- Focus on fish species:

Common Name	Scientific Name	Status
Humpback chub	<i>Gila cypha</i>	Endangered
Bonytail	<i>Gila elegans</i>	Endangered
Colorado pikeminnow	<i>Ptychocheilus lucius</i>	Endangered
Razorback sucker	<i>Xyrauchen texanus</i>	Endangered

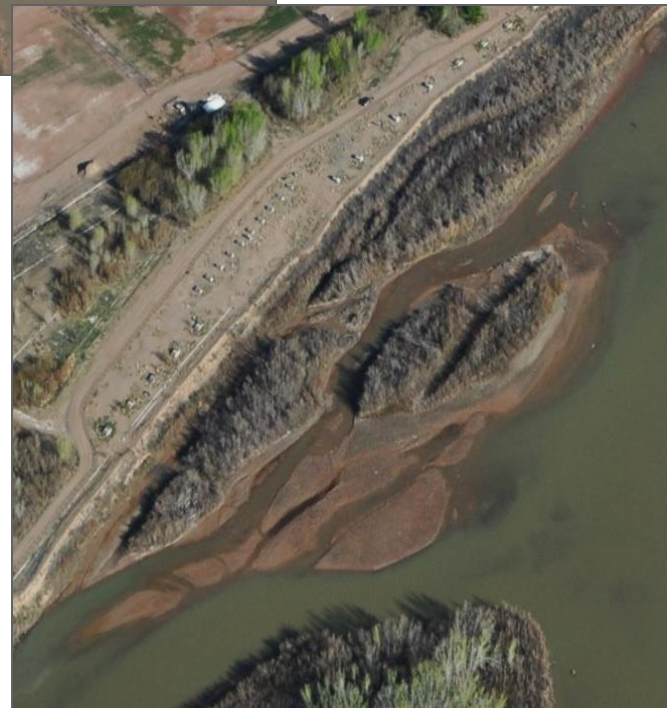
- “DOE assumes that by reducing near-surface groundwater ammonia concentrations to 3 mg/L they will be able to achieve chronic standards (0.6 mg/L ammonia) in all habitats.”
 - Based on ≥ 10 -fold dilution factor from groundwater to surface water
- USFWS issued an Incidental Take Statement based on DOE’s implementation of an active groundwater remediation system



Ecological Risk Drivers



Critical fish habitat along
shoreline of
Colorado River



- Ammonia in groundwater emerging into surface water at levels that exceed acute and chronic criteria.
- Larval fish – Young-of-the-Year – can get into pools along shoreline where groundwater contamination enters the surface water
- Dynamic environment changes critical fish habitat over time
- Interim action minimize ecological risk



Measures Required by 2005 Biological Opinion

- Monitor backwater habitats near the Moab Site for any indication of fish being affected by surface water contamination.
- Evaluate the effectiveness of their initial action (diluting non-protective contaminant concentrations in backwater habitats by pumping clean river water).
- Address uncertainties associated with the groundwater remediation program.
- Reduce effects of surface water contamination in habitats along the south bank of the Colorado River if necessary.
- Reduce the effects of entrainment at all project pumping sites.

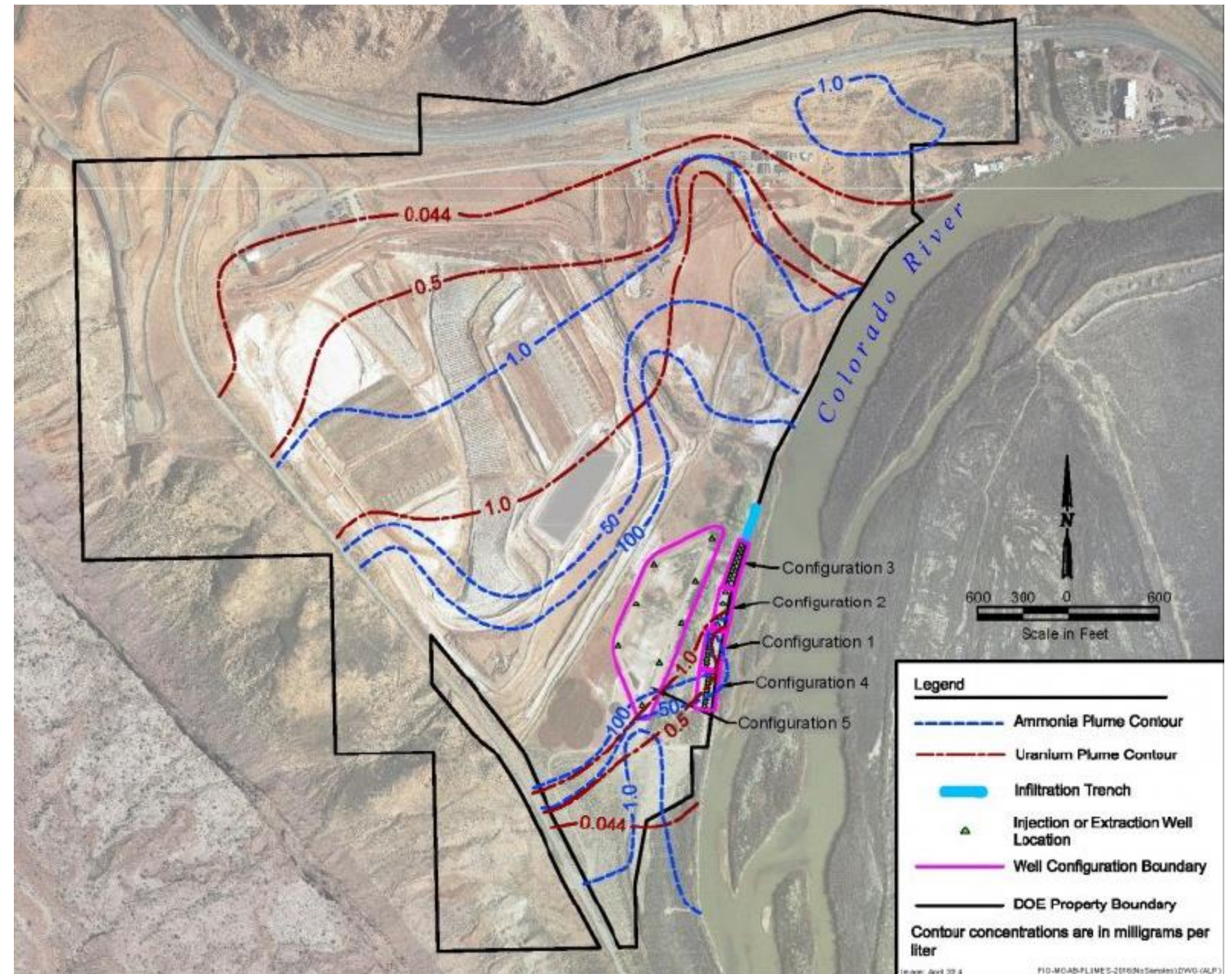


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Environmental Protections Offered Through Interim Actions

Groundwater remediation system:

- Extraction of contaminant mass (ammonia and uranium) near the uranium mill tailings pile
- Injection of fresh water closer to the river to protect critical habitat areas for endangered fish species



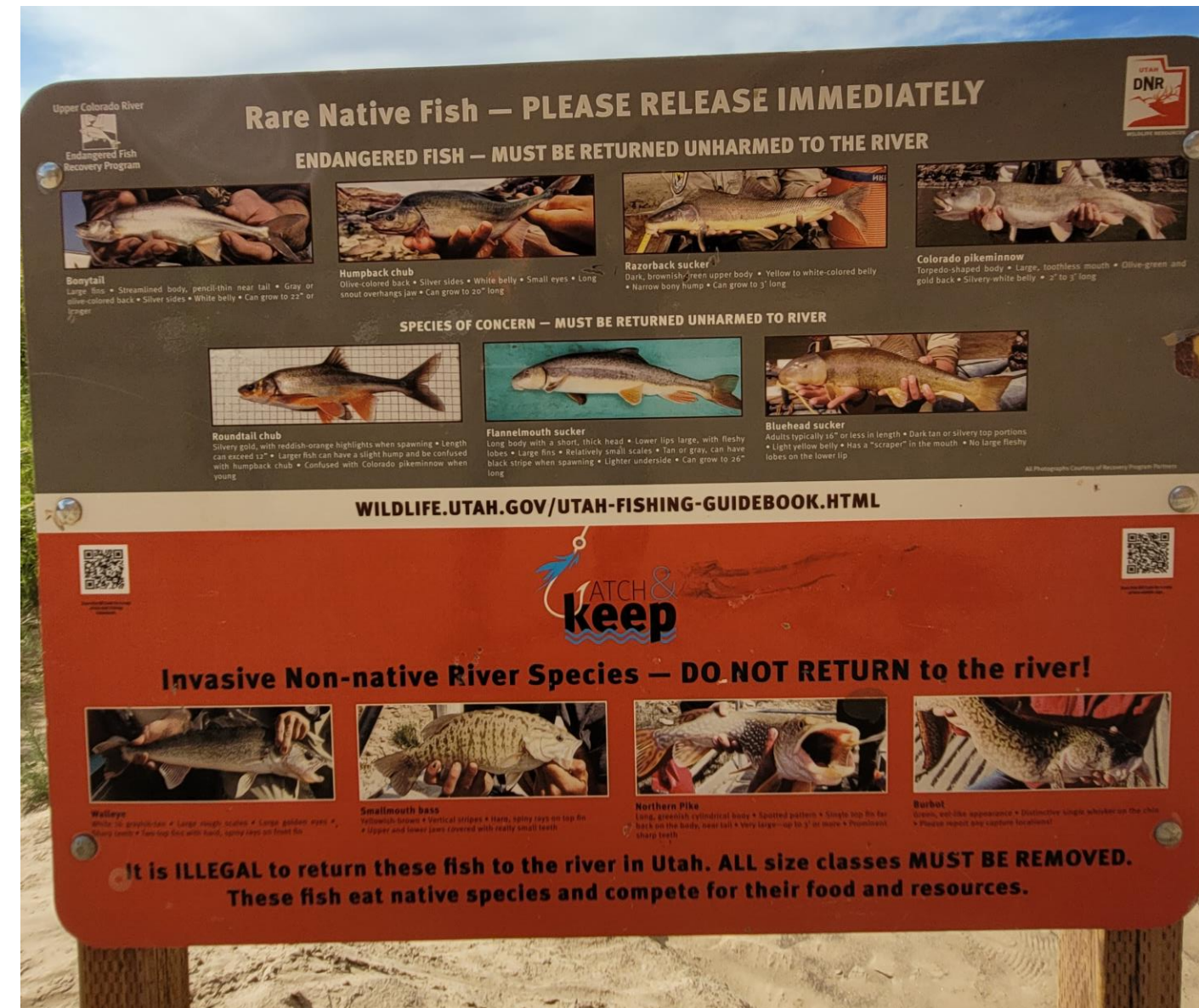
Ammonia and Uranium Concentration Contours and Interim Action Configurations



Next Steps...

Groundwater Compliance Action Plan (GCAP) addresses ecological risk to aquatic organisms and mitigation measures within Biological Opinion

- Dynamics of Colorado River and interactions with site groundwater will change critical habitat
- Uncertainties in site conditions as remedial actions are ongoing adds challenges to modeling future conditions
- Adaptive site management approach can be protective and address final actions





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Thank You! Questions



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