Knowledge Assessment II Stakeholder Workshop – Aquatic Resources

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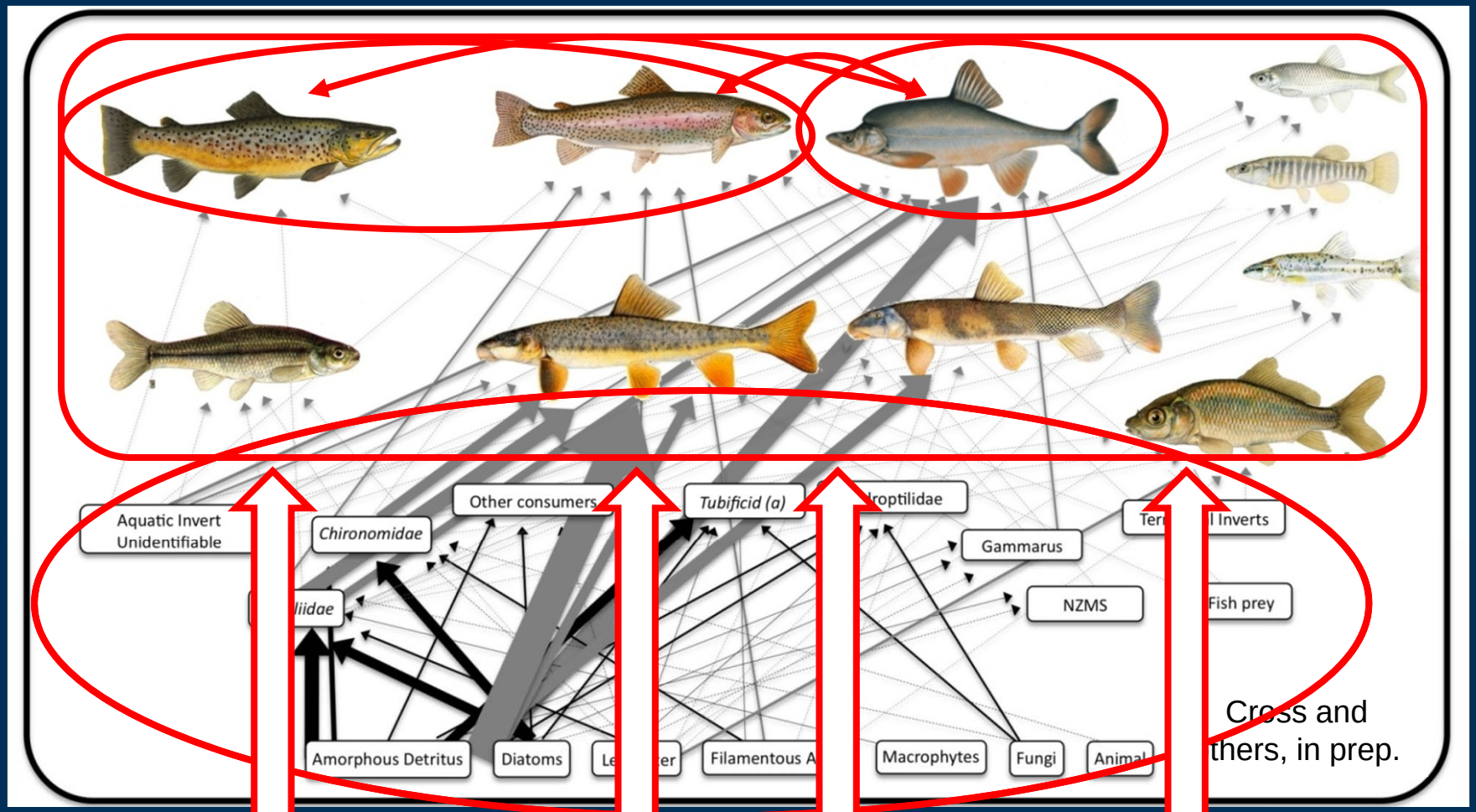
Workshop Agenda



Water Temperature Flow Turbidity Geomorphology

Relevant Strategic Science Questions:

<u>AMWG Priority 1: Why are the humpback chub not thriving, and what can we do about it? How many humpback chub are there and how are they doing?</u>

1. To what extent are adult populations of native fish controlled by production of young fish from tributaries, spawning and incubation in the mainstem, survival of young-of-year (YoY) and juvenile stages in the mainstem, or by changes in growth and maturation in the adult population as influenced by mainstem conditions?

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Relevant Strategic Science Questions:

AMWG Priority 1: Why are the humpback chub not thriving, and what can we do about it? How many humpback chub are there and how are they doing?

2. Does a decrease in the abundance of rainbow trout (RBT) and other cold- and warm water nonnatives in Marble and eastern Grand Canyons result in an improvement in the recruitment rate of juvenile humpback chub to the adult population?

3. Do RBT immigrate from Glen to Marble and eastern Grand Canyons, and, if so, during what life stages? To what extent do Glen Canyon immigrants support the population in Marble and eastern Grand Canyons?

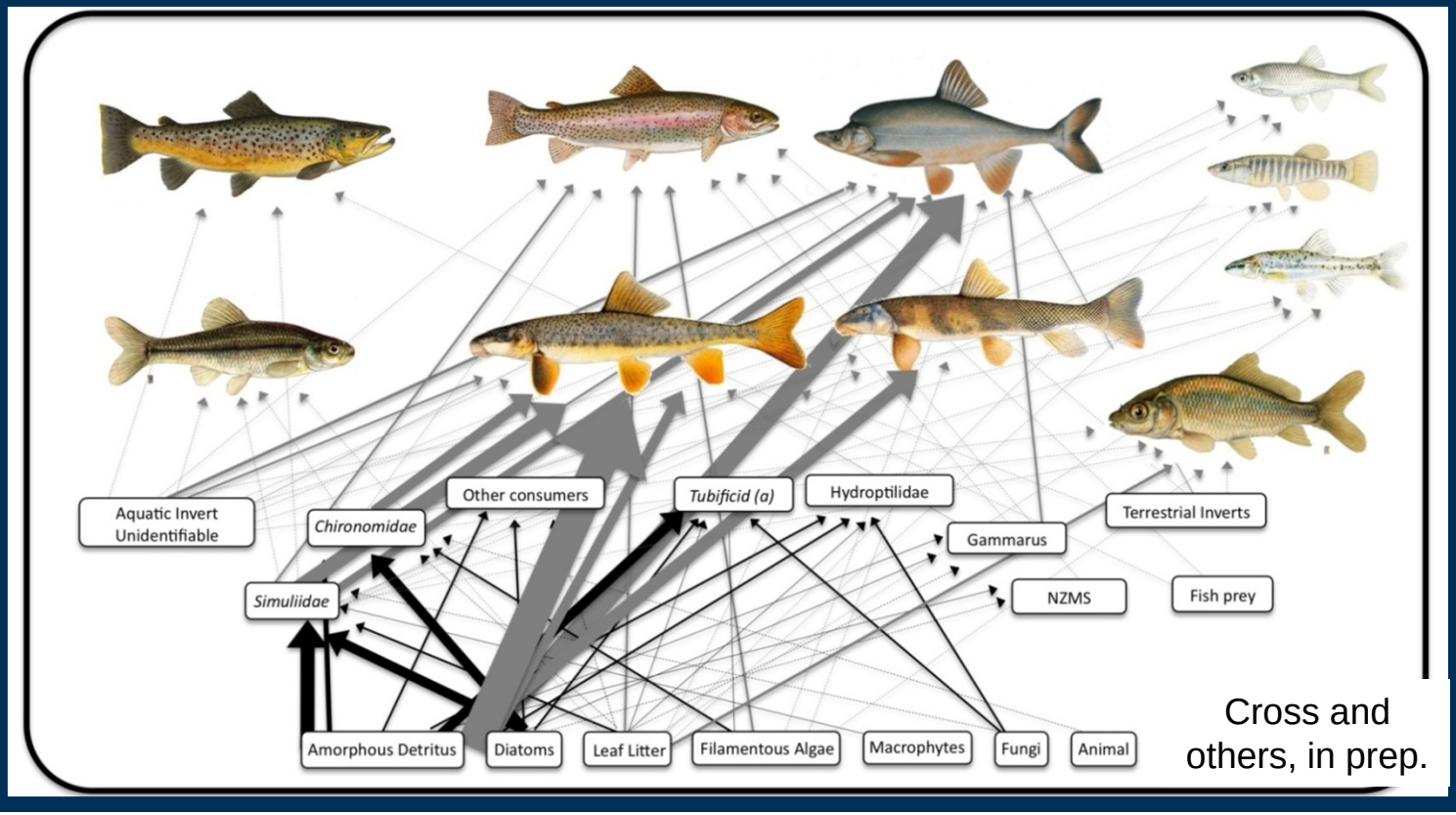
4. Can long-term decreases in abundance of RBT in Marble and eastern Grand Canyons be sustained with a reduced level of effort of mechanical removal or will recolonization from tributaries and from downstream and upstream of the removal reach require that mechanical removal be an ongoing management action? This question also applies to future removal programs targeting other nonnative species.

Relevant Strategic Science Questions:

<u>AMWG Priority 1: Why are the humpback chub not thriving, and what can we do about it? How many humpback chub are there and how are they doing?</u>

5. What are the important pathways, and the rate of flux among them, that link lower trophic levels with fish and how will they link to dam operations?

6. Are trends in the abundance of fish populations, or indicators from fish such as growth, condition, and body composition (for example, lipids), correlated with patterns in invertebrate flux?



Cross and others, in prep.

Relevant Strategic Science Questions:

AMWG Priority 1: Why are the humpback chub not thriving, and what can we do about it? How many humpback chub are there and how are they doing?

7. Which tributary and mainstem habitats are most important to native fishes and how can these habitats best be made useable and maintained?

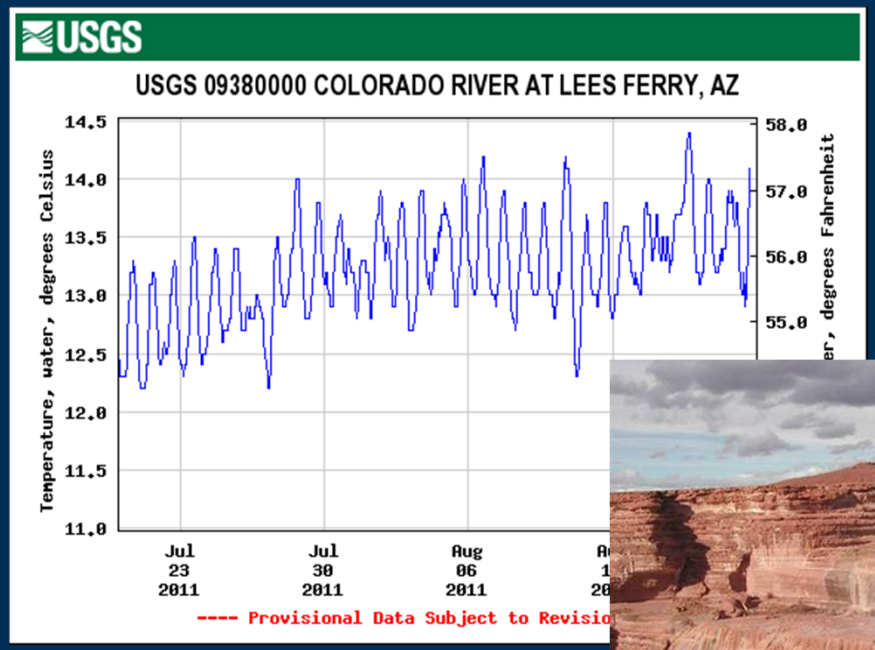
8. How can native and nonnative fish best be monitored while minimizing impacts from capture and handling or sampling?

Relevant Strategic Science Questions:

AMWG Priority 3: What is the best flow regime?

2. To what extent could predation impacts by nonnative fish be mitigated by higher turbidities or dam-controlled high-flow releases?

5. How is invertebrate flux affected by water quality (for example, temperature, nutrient concentrations, turbidity) and dam operations?



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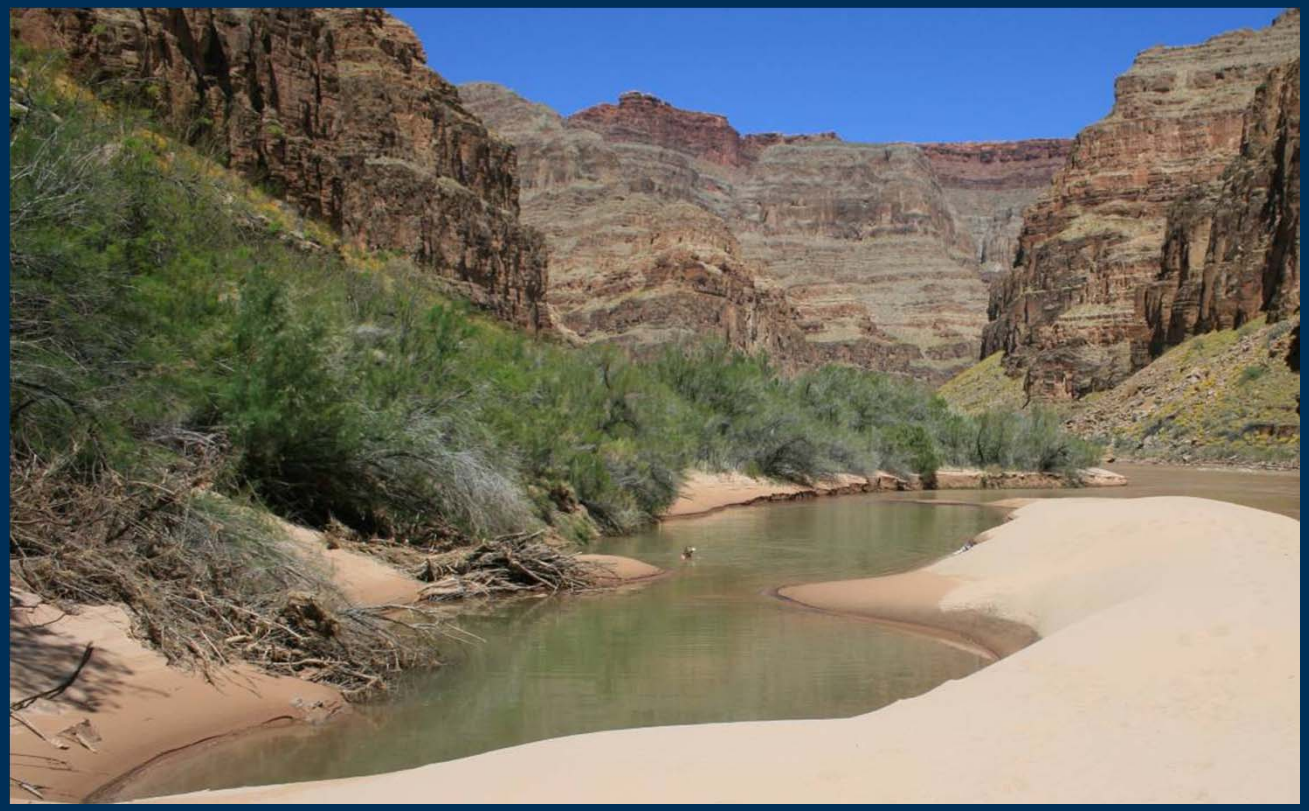
Relevant Strategic Science Questions:

AMWG Priority 4: What is the impact of sediment loss and what should we do about it?

2. How important are backwaters and vegetated shoreline habitats to the overall growth and survival of YoY and juvenile native fish? Does the long-term benefit of increasing these habitats outweigh short-term potential costs (displacement and possibly mortality of young humpback chub) associated with high flows?



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Relevant Strategic Science Questions:

AMWG Priority 5: What will happen when we test or implement the temperature control device (TCD)? How should it be operated? Are safeguards needed for management?

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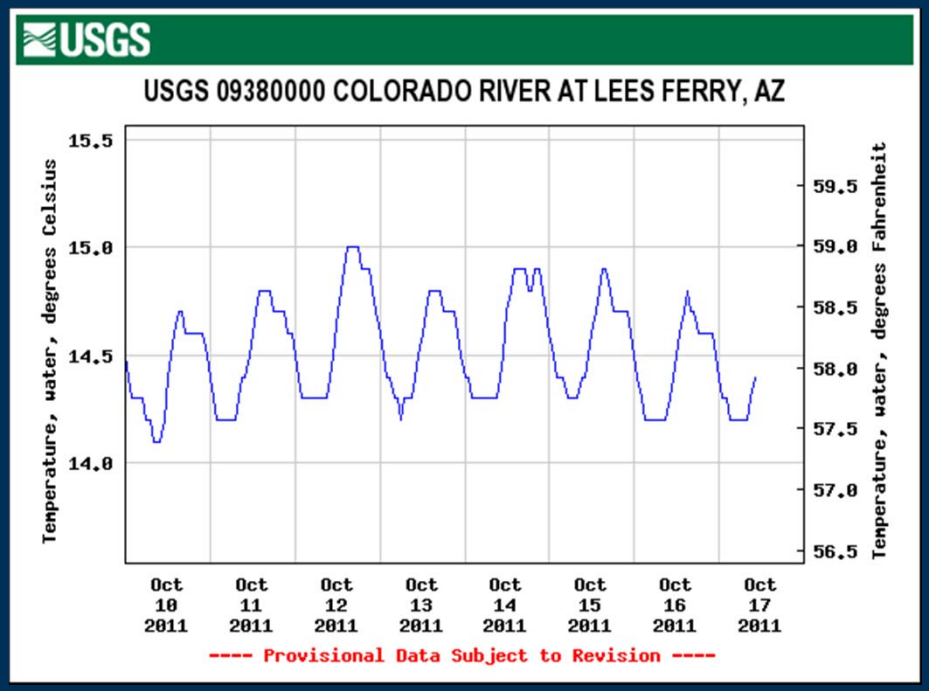
Relevant Strategic Science Questions:

AMWG Priority 5: What will happen when we test or implement the temperature control device (TCD)? How should it be operated? Are safeguards needed for management?

3. To what extent do temperature and fluctuations in flow limit spawning and incubation success for native fish?

4. What is the relative importance of increased water temperature, shoreline stability, and food availability on the survival and growth of YoY and juvenile native fish?



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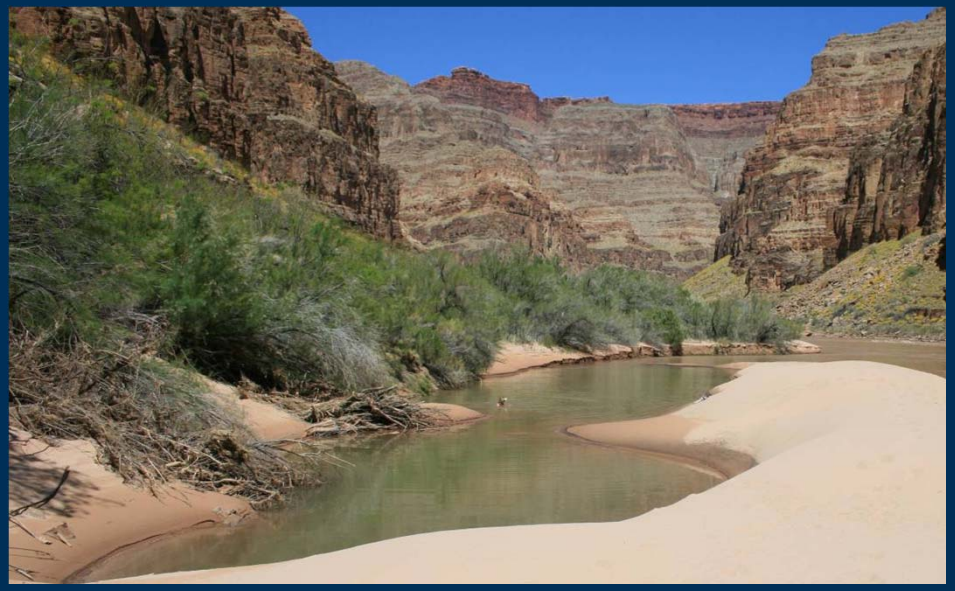
Relevant Strategic Science Questions:

AMWG Priority 5: What will happen when we test or implement the temperature control device (TCD)? How should it be operated? Are safeguards needed for management?

5. Will increased water temperatures increase the incidence of Asian tapeworm in humpback chub or the magnitude of infestation, and if so, what is the impact on survival and growth rates?

6. Do the potential benefits of improved rearing habitat (warmer, more stable, more backwater and vegetated shorelines, more food) outweigh negative impacts due to increases in nonnative fish abundance?



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Science Questions from the Tribes

Humpback chub:

How do high flows affect humpback chub habitat? Specifically, do high flows fill in spaces between boulders along rocky shorelines downstream of the LCR that are hypothesized to be used as habitat by YOY humpback chub to hide from predators?

Trout:

How do high flows affect the population, density, and movement of rainbow trout, and contribute to the "problem" that the trout removal EA is trying to address?

Humpback chub-trout interactions:

How do we know that trout removal is a significant factor limiting recruitment of Humpback Chub? How can this be true when humpback chub numbers seem to be increasing at the same time as rainbow trout numbers are increasing?

Other species:

What is the collateral damage to other fish and aquatic species from repeated electroshocking of trout? How does putting electricity in the water potentially impact other species besides fish, such as amphibians and water insects?

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