



Goal 10: Nonnative Invasive Species 2024 Metrics Update

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Glen Canyon Dam Adaptive Management Program
Annual Reporting Meeting (virtual)
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Photos: Freshwaters Illustrated

Nonnative Colorado River Fishes



Smallmouth Bass



Brown Trout



Rainbow Trout



Gizzard Shad



Green Sunfish



Channel Catfish



Striped Bass



Walleye



Lake Powell



Bluegill



Black Crappie



Red Shiner



Bullhead spp.



Grass Carp



Common Carp



Threadfin Shad



Background

“Minimize or reduce the presence and expansion of aquatic nonnative invasive species.”

- Measures progress in minimizing the presence and expansion of aquatic nonnative fishes and crayfish species in the Colorado River and its tributaries over the period of the LTEMP.
- Eight metrics defined in Goal 10:
 - 10.1-10.4: Average number of invasive aquatic species present per habitat segment within each risk level (low, medium, high, very-high).
 - 10.5-10.8: Average number of invasive aquatic species present per habitat segment within each risk level that exhibit evidence of reproduction (early life history stages).

Risk Levels

- Species assigned to risk levels in the NPS *Expanded Non-Native Aquatic Species Management Plan (2021)*
- Risk level based on potential for predation, competition, or adverse effects on:
 - Native and/or federally listed species
 - Recreational Rainbow Trout fishery
- Accounts for current population status, likelihood of entrainment or expansion, and environmental factors



Photo: Freshwaters Illustrated



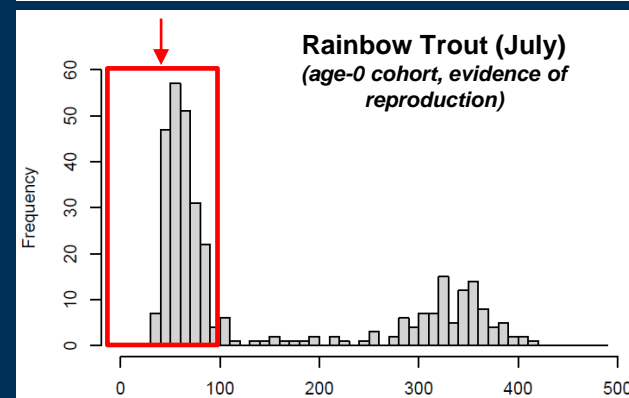
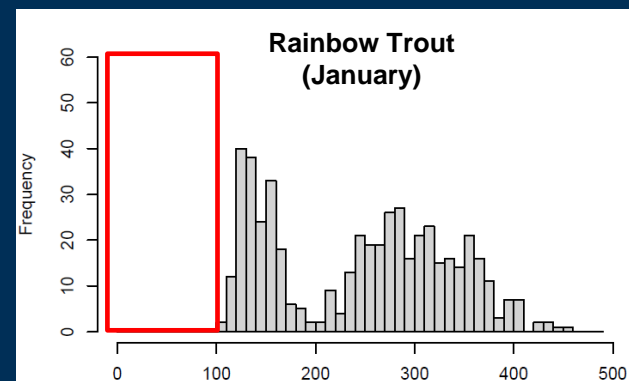
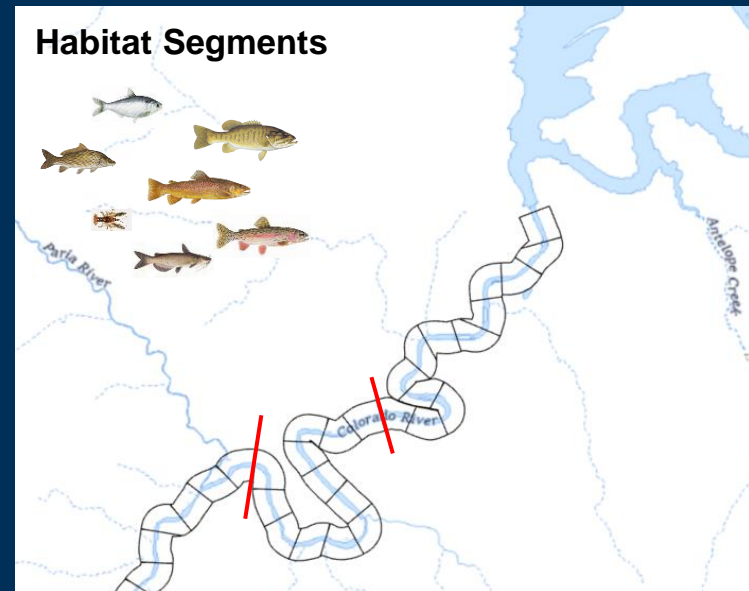
Photo: Freshwaters Illustrated








Photo: Colorado River Conservancy

Methods

- Compiled 2024 data from partners and collaborators
- Defined habitat segments at meaningful scale (12-13 km)
- Calculated average # species present in any life stage
- Created length-frequency plots and identified age-0 fish cohorts
- Calculated average # species with evidence of reproduction



Low-Risk Species

Detected (2024)		Not Detected
	Fathead Minnow	Brook Trout/ Other Salmonids
	Gizzard Shad	Golden Shiner
	Mosquitofish	Threadfin Shad
	Plains Killifish	
	Rainbow Trout (GLCA)	

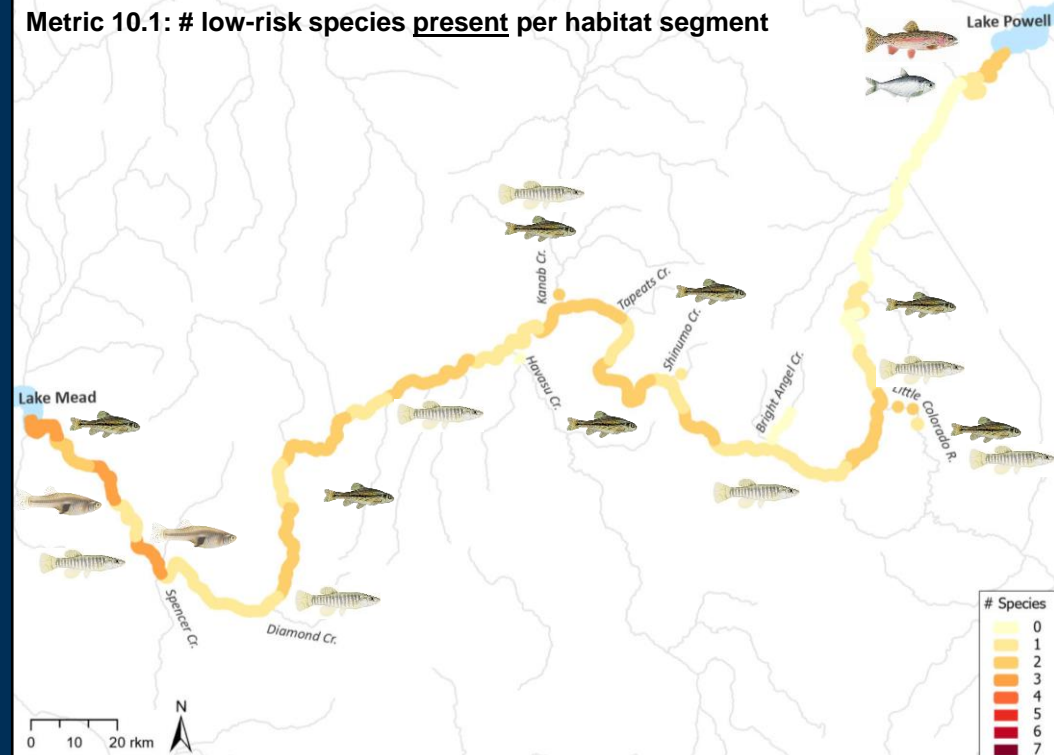
10.1: Mean # nonnative species

- Tributaries
 - Little Colorado River = 1.7
 - Kanab Creek = 2.0
 - Shinumo Creek = 1.0
 - Havasu Creek = 0
 - Bright Angel Creek = 0
- Mainstem = 1.4

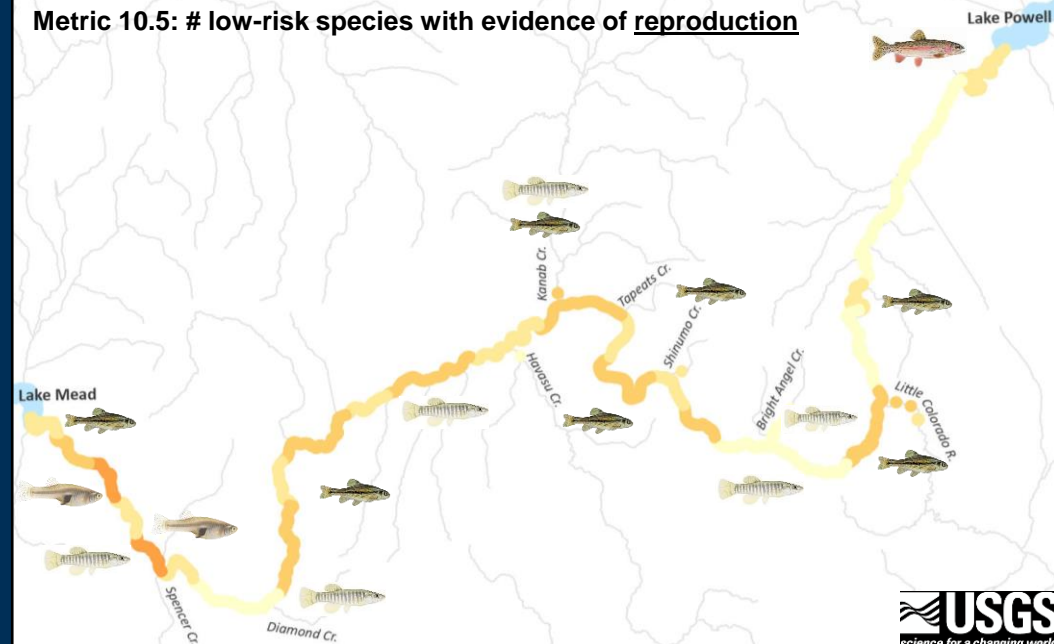
10.5: Mean # reproducing species

- Tributaries
 - Little Colorado River = 1.7
 - Kanab Creek = 2.0
 - Shinumo Creek = 1.0
 - Havasu Creek = 0
 - Bright Angel Creek = 0
- Mainstem = 1.1


Metric 10.1: # low-risk species present per habitat segment



Metric 10.5: # low-risk species with evidence of reproduction



Medium-Risk Species

	Detected (2024)	Not Detected
	Black Bullhead	Blue Tilapia/ Cichlids
	Bluegill	Grass Carp
	Black Crappie	Asian Carps
	Channel Catfish	(Silver/Bighead)
	Crayfish spp.	Redear Sunfish
	Common Carp	
	Red Shiner	
	Yellow Bullhead	

10.2: Mean # nonnative species

■ Tributaries

- Little Colorado River = 4.0
- Kanab Creek = 3.0
- Shinumo Creek = 0
- Havasu Creek = 0
- Bright Angel Creek = 0

■ Mainstem = 1.7

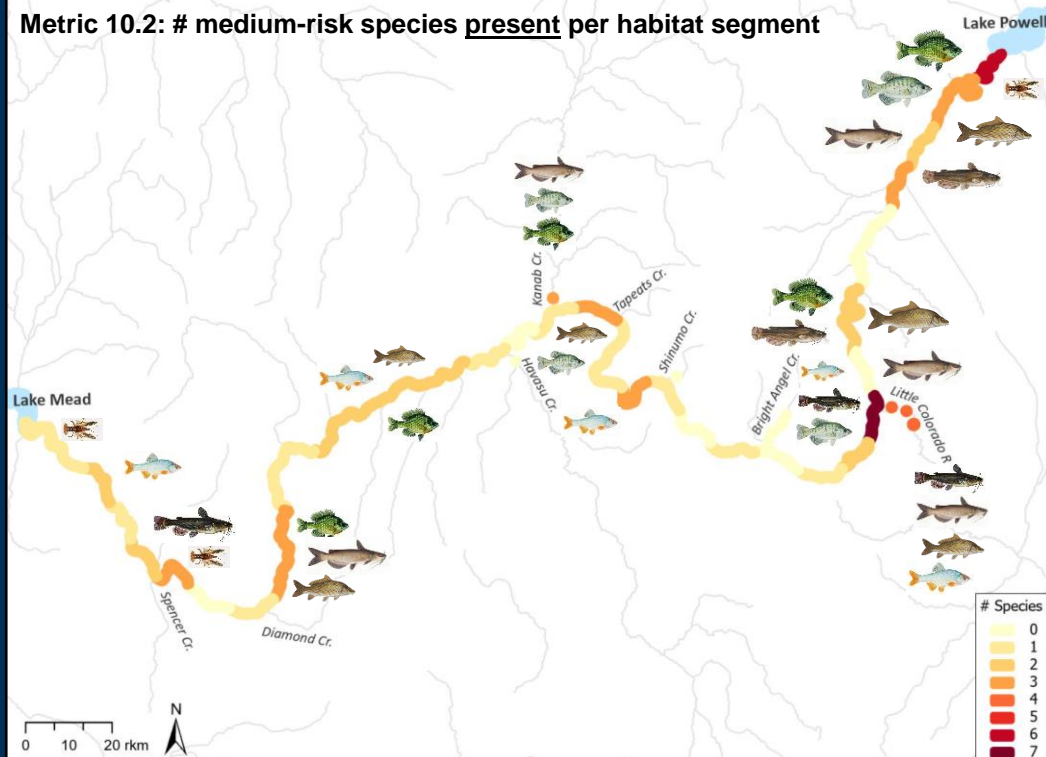
10.6: Mean # reproducing species

■ Tributaries

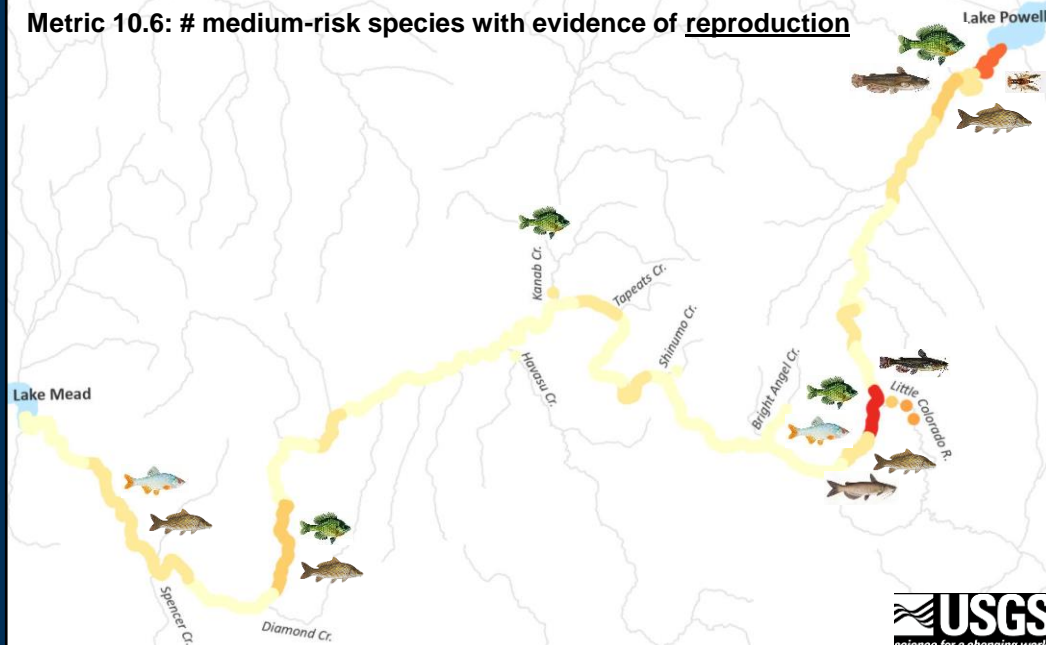
- Little Colorado River = 2.7
- Kanab Creek = 1.0
- Shinumo Creek = 0
- Havasu Creek = 0
- Bright Angel Creek = 0

■ Mainstem = 0.6

Metric 10.2: # medium-risk species present per habitat segment



Metric 10.6: # medium-risk species with evidence of reproduction



High-Risk Species

Detected (2024)		Not Detected
	Green Sunfish	Northern Pike
	Largemouth Bass	White Sucker
	Rainbow Trout (GRCA)	Burbot
	Striped Bass	

10.3: Mean # nonnative species

■ Tributaries

- Little Colorado River = 0.7
- Kanab Creek = 0
- Shinumo Creek = 0
- Havasu Creek = 0
- Bright Angel Creek = 1.2

■ Mainstem = 1.3

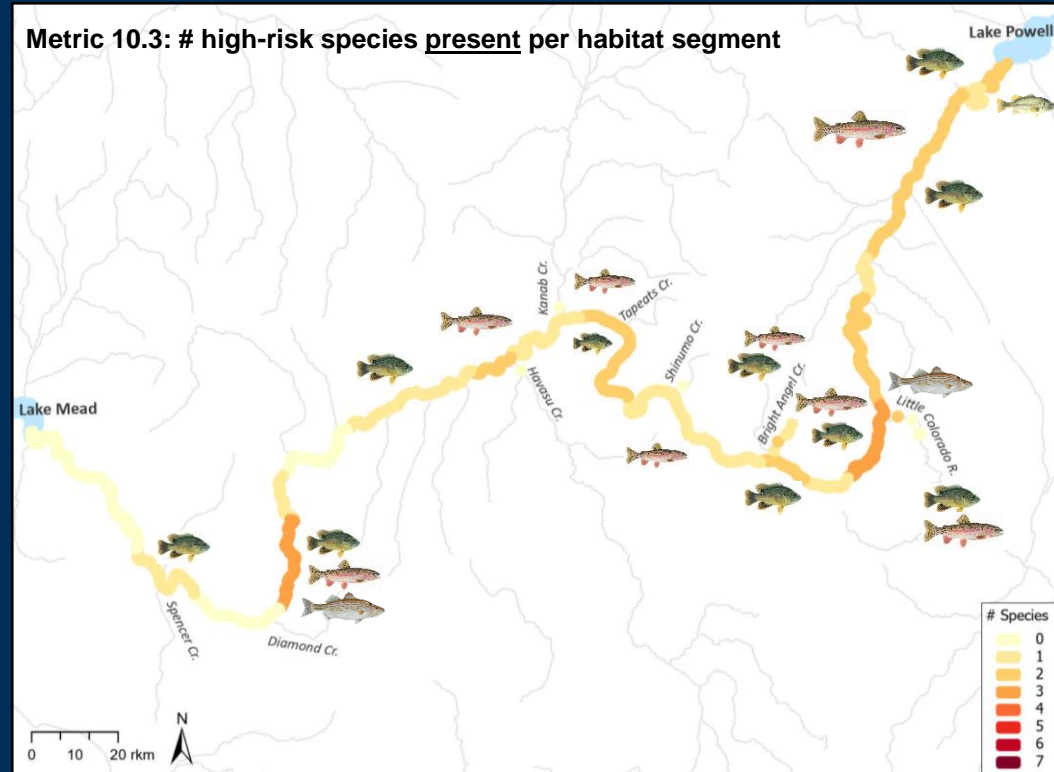
10.7: Mean # reproducing species

■ Tributaries

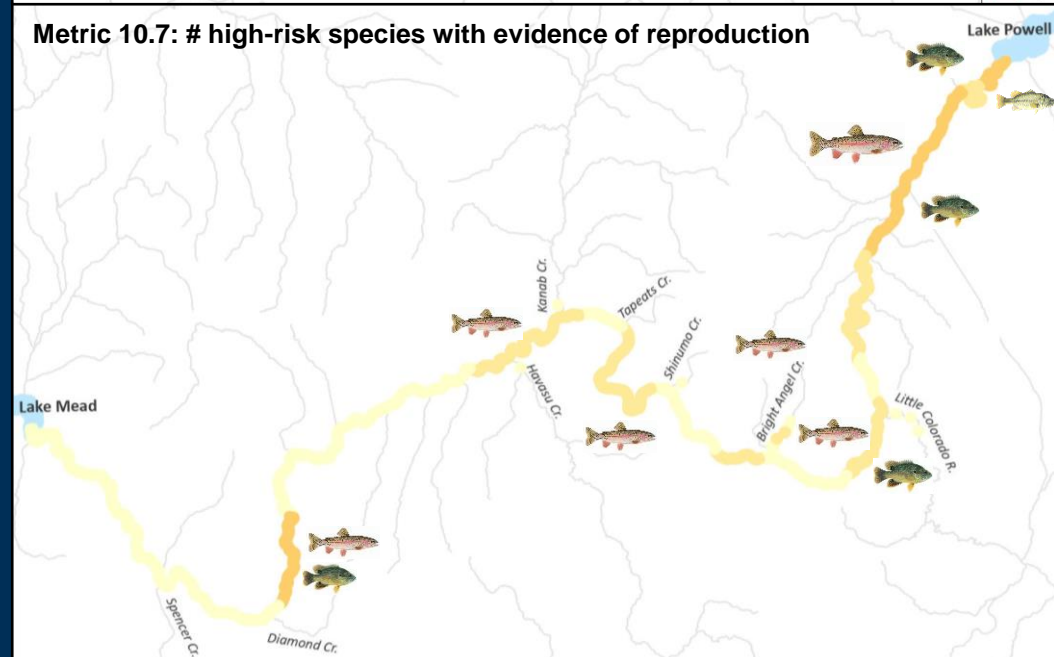
- Little Colorado River = 0
- Kanab Creek = 0
- Shinumo Creek = 0
- Havasu Creek = 0
- Bright Angel Creek = 0.4

■ Mainstem = 0.6

Metric 10.3: # high-risk species present per habitat segment



Metric 10.7: # high-risk species with evidence of reproduction



Very High-Risk Species

Detected (2024)	Not Detected
 Brown Trout	Flathead Catfish
 Smallmouth Bass	
 Walleye	

10.4: Mean # nonnative species

■ Tributaries

- Little Colorado River = 0.3
- Kanab Creek = 0
- Shinumo Creek = 0
- Havasu Creek = 0
- Bright Angel Creek = 1.0

■ Mainstem = 0.7

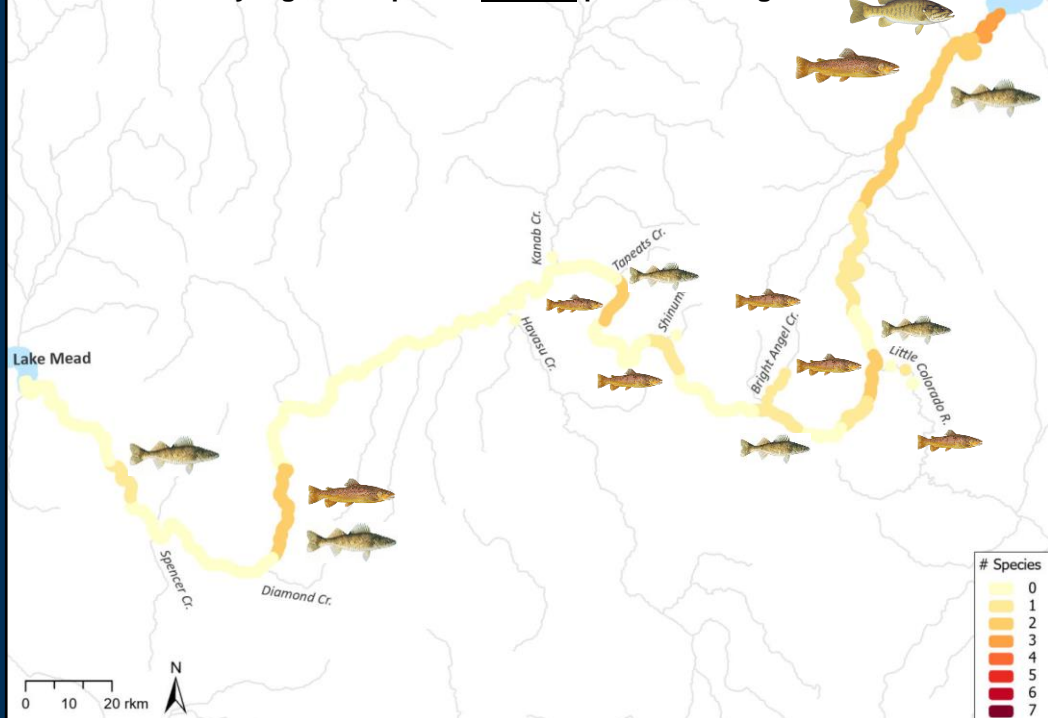
10.8: Mean # reproducing species

■ Tributaries

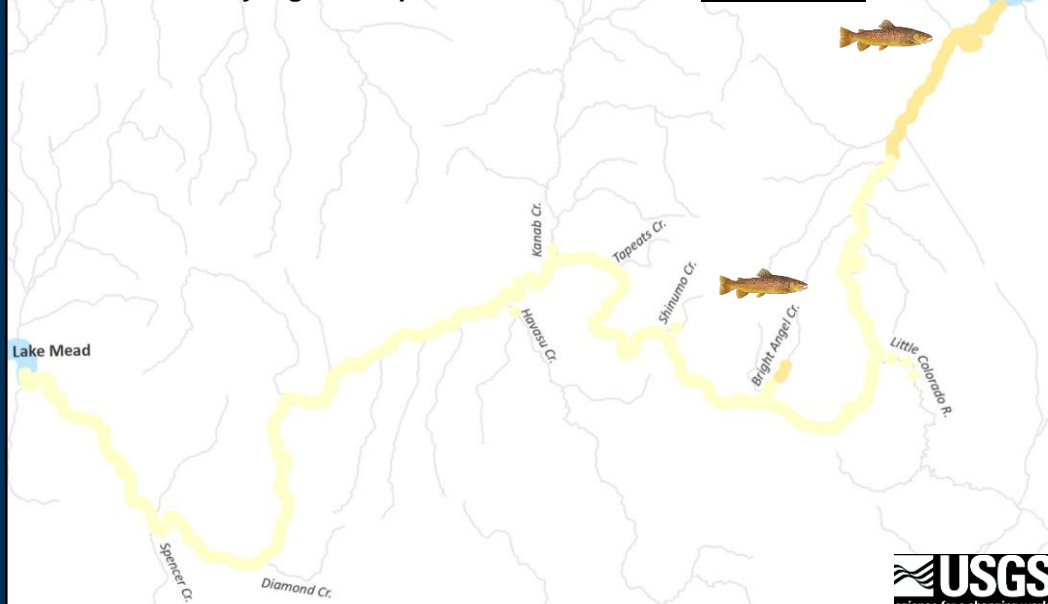
- Little Colorado River = 0
- Kanab Creek = 0
- Shinumo Creek = 0
- Havasu Creek = 0
- Bright Angel Creek = 0.6

■ Mainstem = 0.1

Metric 10.4: # very high-risk species present per habitat segment



Metric 10.8: # very high-risk species with evidence of reproduction



Summary

- Low-Risk: Averaged <2 species per segment, max=3
 - Fathead Minnow, Plains Killifish dominant
 - Gizzard Shad and Rainbow Trout near dam, Mosquitofish in Western Grand Canyon
 - Early life stages of Fathead Minnow and Plains Killifish found throughout river and in Little Colorado River and Kanab Creek
- Medium-Risk: Averaged <4 species per segment, max=7
 - Channel Catfish, Common Carp, Bluegill, Red Shiner, Bullhead frequently captured
 - Hot spots are downstream from Lake Powell, in Little Colorado River and Kanab Creek, and near Fall Canyon
 - Crayfish spp. more common near reservoirs
 - Early life stages more frequent near Glen Canyon Dam and at the LCR

Summary, cont.

- High-Risk: Averaged <1.3 species per segment, max=3
 - Largemouth Bass only captured downstream from Lake Powell
 - Rainbow Trout and Green Sunfish captured throughout Colorado River
 - Striped Bass captured near LCR and in Fall Canyon
 - Early life stages of Green Sunfish distributed in Glen/Marble canyons, near Little Colorado River, Fall Canyon
- Very High-Risk: Averaged <0.7 species per segment, max=3
 - Brown Trout, Walleye captured throughout river, but primarily near lake
 - Furthest physical capture of Smallmouth Bass at RM 15.27
 - Early life stages of Brown Trout captured in Glen/Marble Canyons and in Bright Angel Creek