GCDAMP Knowledge Assessment: Drivers & Constraints

Resource Topic:	Invasive fish species
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Resource Characteristic	Driver or Constraint	Strength	Direction	Confidence	Rationale: Strength & Direction	Rationale: Confidence	Recommendations
All non-native coldwater fish	Increasing temperature 1-3 degrees	Strong	Positive Effect	Medium	As water warms, temperatures will limit growth (via higher energy demand but limited food base), reproduction, and reducing survival. Note: driver or constraint rated based on whether it increased or decreased the threat posed for RBT, HBC, and other native fishes. If a driver caused the threat to decrease, rated this as a positive effect, meaning a positive effect on RBT, HBC, and other native fishes.	bioenergetics and foodbase studies indicates that warming water will increase bioenergetic demand that the foodbase may not support	
All non-native coolwater fish	Increasing temperature 3-5 degrees	Strong	Negative Effect	High	Many coolwater fish prefer warmer water than is present at Lees Ferry. Note: driver or constraint rated based on whether it increased or decreased the threat posed for RBT, HBC, and other native fishes. If a driver caused the threat to increase, rated this as a negative effect, meaning a negative effect on RBT, HBC, and other native fishes.	coolwater fish are doing well in upper basin	
All non-native warmwater fish	Increasing temperature 5-10 degrees	Strong	Negative Effect	High	If the water increases enough, many warmwater fish present in Lake Powell will be able to complete their life cycle within Lees Ferry and further downstream. Note: driver or constraint rated based on whether it increased or decreased the threat posed for RBT, HBC, and other native fishes. If a driver caused the threat to increase, rated this as a negative effect, meaning a negative effect on RBT, HBC, and other native fishes.	warmwater fish are doing well in upper basin	
All non-native warmwater fish	High flow event(s)	Strong	Positive Effect	Medium	It appears that many species of warmwater fishes decline during and after years of HFE. Note: driver or constraint rated based on whether it increased or decreased the threat posed for RBT, HBC, and other native fishes. If a driver caused the threat to decrease, rated this as a positive effect, meaning a positive effect on RBT, HBC, and other native fishes.		HFE typically reduce non-native abundance
Brown Trout at Lees Ferry Reach	Brown trout recruitment in Lees Ferry Reach	Strong	Negative Effect	High	Increasing YOY since 2013. Note: driver or constraint rated based on whether it increased or decreased the threat posed for RBT, HBC, and other native fishes. If a driver caused the threat to increase, rated this as a negative effect, meaning a negative effect on RBT, HBC, and other native fishes.	electrofishing is effective at monitoring Brown Trout	reduce conditions that promote increased recruitment and numbers of Brown Trout

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Brown Trout below Lees Ferry Reach	Brown trout spawning habitat and recruitment below Lees Ferry Reach	Strong	Negative Effect	High	More access to tributaries such as Bright Angel Creek leads to increased reproduction, and recruitment. Note: driver or constraint rated based on whether it increased or decreased the threat posed for RBT, HBC, and other native fishes. If a driver caused the threat to increase, rated this as a negative effect, meaning a negative effect on RBT, HBC, and other native fishes.	It is well known that Brown Trout spawn in Bright Angel Creek	continue fish weir at Bright Angel Creek, and possibly other tributaries if spawning/recruitment is occurring there
Green Sunfish	Increasing temperature	Strong	Negative Effect	High	If water temp. increases enough, they will be able to complete their lifecycle within Lees Ferry in areas outside the slough and further downstream. Note: driver or constraint rated based on whether it increased or decreased the threat posed for RBT, HBC, and other native fishes. If a driver caused the threat to increase, rated this as a negative effect, meaning a negative effect on RBT, HBC, and other native fishes.	they are a warmwater fish - eg like warmer water than is curently present	continue monitoring for rare-nonnatives
Smallmouth Bass	Smallmouth bass numbers in Lake Powell	Strong	Negative Effect	Medium	More smallmout bass in Lake Powell = greater propagule pressure downstream. Note: driver or constraint rated based on whether it increased or decreased the threat posed for RBT, HBC, and other native fishes. If a driver caused the threat to increase, rated this as a negative effect, meaning a negative effect on RBT, HBC, and other native fishes.	smallmouth are doing well in upper basin as well as Lake Powell, and are highly piscivorous and detrimental to native fish	continue monitoring for rare-nonnatives
Walleye	Increasing temperature	Moderate	Negative Effect	Medium	Slightly warmer temperatures are more ideal for walleye, may improve survival of walleye that make it through the dam. Note: driver or constraint rated based on whether it increased or decreased the threat posed for RBT, HBC, and other native fishes. If a driver caused the threat to increase, rated this as a negative effect, meaning a negative effect on RBT, HBC, and other native fishes.	walleye are doing well in upper basin as well as Northern Lake Powell	continue monitoring for rare-nonnatives
Walleye	Walleye numbers in Lake Powell	Strong	Negative Effect	Medium	More walleye in Lake Powell = greater propagule pressure downstream. Note: driver or constraint rated based on whether it increased or decreased the threat posed for RBT, HBC, and other native fishes. If a driver caused the threat to increase, rated this as a negative effect, meaning a negative effect on RBT, HBC, and other native fishes.	walleye are doing well in upper basin as well as Northern Lake Powell, and are highly piscivorous and detrimental to native fish	continue monitoring for rare-nonnatives

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