

GCDAMP FY2017 Knowledge Assessment Summary: Experimental & Management Actions

April 4, 2017




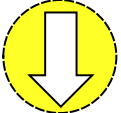
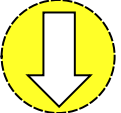
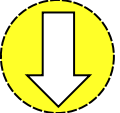









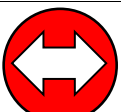
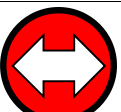
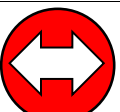
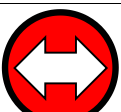
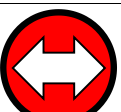
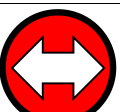
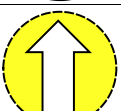

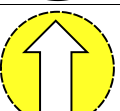
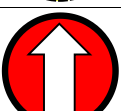
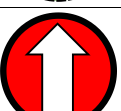
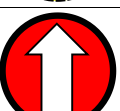
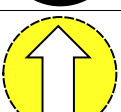

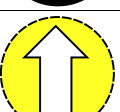
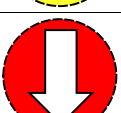
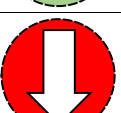
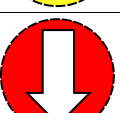
This document tabulates the results of the FY2017 Knowledge Assessment (KA) concerning the expected effects of LTEMP Experimental and Management Actions on the resources on which the KA has focused. In particular, this tabulation addresses each resource topic separately, to show the expected effects of the LTEMP Experimental and Management Actions on each individual characteristics of each resource. The expected effects of the LTEMP Experimental and Management Actions may differ among the several characteristics of a resource (resource characteristics). Averaging these expected effects across all individual characteristics for a single resource (shown in the first table for comparison) may sometimes give a distorted picture of the available knowledge.

Symbol Key										
Strength of Effect				Direction of Effect				Confidence		
Strong	Moderate	Weak	Unknown	Positive	Neither	Negative	Unknown	High	Medium	Low

AVERAGE EXPECTED EFFECT BY RESOURCE TOPIC

Resource Topics → Experimental & Management Actions ↓	Aquatic food base average	Archaeological and cultural resources average	Humpback chub average	Hydropower and energy average	Invasive fish species average	Other native fish species average	Rainbow trout fishery average	Recreational experience average	Riparian vegetation average	Sediment average	Water quality average
Fall HFEs > 96-hr duration											
Fall HFEs ≤ 45, cfs in October or November											
Humpback chub translocation											
Larval humpback chub head-start program											
Macroinvertebrate production flows											
Mechanical removal of invasive fish species											
Mechanical removal of rainbow trout from LCR reach											
Proactive Spring HFEs ≤ 45, cfs in April, May, or June											
Riparian vegetation restoration											
Spring HFEs ≤ 45, cfs in March or April											
Trout management flows											

AQUATIC FOOD BASE

Resource Characteristics → Experimental & Management Actions ↓	Food base diversity	Secondary production	Aquatic food base average
Fall HFEs > 96-hr duration			
Fall HFEs ≤ 45, cfs in October or November			
Humpback chub translocation			
Larval humpback chub head-start program			
Macroinvertebrate production flows			
Mechanical removal of invasive fish species			
Mechanical removal of rainbow trout from LCR reach			
Proactive Spring HFEs ≤ 45, cfs in April, May, or June			
Riparian vegetation restoration			
Spring HFEs ≤ 45, cfs in March or April			
Trout management flows			

ARCHAEOLOGICAL & CULTURAL RESOURCES

Resource Characteristics →	Depositional Integrity (Arch site stability)	Depositional Integrity (Arch site stability) - GLCA	National Register Integrity	National Register Integrity - GLCA	Archaeological and cultural resources average
Experimental & Management Actions ↓					
Fall HFEs > 96-hr duration					
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Spring HFEs ≤ 45, cfs in March or April					
Trout management flows					

HUMBPACK CHUB

Resource Characteristics →	Adult chub population in western Grand Canyon	Adult population that spawns in the LCR	Juvenile chub population in CR near LCR	Juvenile chub population in western Grand Canyon	Humpback chub average
Experimental & Management Actions ↓					
Fall HFEs > 96-hr duration					
Fall HFEs ≤ 45, cfs in October or November					
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Macroinvertebrate production flows					
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Trout management flows					

HYDROPOWER & ENERGY

Resource Characteristics →	Electric generation (capacity)	Electric generation (energy production)	Electric generation (energy value)	Emissions	Hydro-mechanical equipment	Load following capability	Net firming purchases	Hydropower and energy average
Experimental & Management Actions ↓								
Fall HFEs > 96-hr duration								
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Riparian vegetation restoration								
Spring HFEs ≤ 45, cfs in March or April								
Trout management flows								

INVASIVE FISH SPECIES

Resource Characteristics →	All non-native coldwater fish	All non-native coolwater fish	All non-native warmwater fish	Brown Trout	Green Sunfish	Invasive fish species average
Experimental & Management Actions ↓						
Fall HFEs > 96-hr duration						
Fall HFEs ≤ 45, cfs in October or November						
Humpback chub translocation						
Larval humpback chub head-start program						
Macroinvertebrate production flows						
Mechanical removal of invasive fish species						
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Riparian vegetation restoration						
Spring HFEs ≤ 45, cfs in March or April						
Trout management flows						

RAINBOW TROUT

Resource Characteristics →	LCR Inflow Area & Marble Canyon Rainbow Trout Fishery - Abundance	Lees Ferry Rainbow Trout Sport Fishery - Abundance	Lees Ferry Rainbow Trout Sport Fishery - Age0 abundance	Lees Ferry Rainbow Trout Sport Fishery - Age0 survival	Lees Ferry Rainbow Trout Sport Fishery - Recruitment	Lees Ferry Rainbow Trout Sport Fishery - RTELSS Age0 recruitment	Lees Ferry Rainbow Trout Sport Fishery - Spawning magnitude/hatch success	Lees Ferry Rainbow Trout Sport Fishery - Survival	Rainbow Trout Maximum Size	Rainbow trout fishery average
Experimental & Management Actions ↓										
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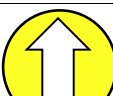
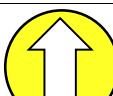
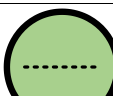

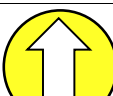





RECREATIONAL EXPERIENCE

Resource Characteristics →	Backpacking/day-use shore availability	Backpacking/day-use usable campsite area	Flatwater floating in Glen Canyon NRA	Glen Canyon walk-in angling access and safety	Glen Canyon walk-in angling trout abundance	Glen Canyon walk-in angling trout condition	Glen Canyon watercraft angling access and safety	Glen Canyon watercraft angling trout abundance	Glen Canyon watercraft angling trout condition	Whitewater boat mooring (i.e., reduced beaching risk)	Whitewater navigational risk	Whitewater navigational risk Diamond down	Whitewater river crowding (i.e., rapids, beaches)	Whitewater river running experience (i.e., rapids)	Whitewater time on river (vs. off-river recreational time)	Whitewater usable campsite area	Wilderness experience	Backpacking/day-use shore availability	Recreational experience average
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Trout management flows																			

RIPARIAN VEGETATION

Resource Characteristics →	Area of herbaceous marsh habitats	Area of woody vegetation	Community heterogeneity	Functional group cover	Native to non-native ratio	Species richness	Total vegetation cover	Vegetation structure (vertical layering)	Riparian vegetation average
Experimental & Management Actions ↓									
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Trout management flows									

SEDIMENT

<p>Resource Characteristics →</p> <p>Experimental & Management Actions ↓</p>	<p>Amount of topographic change indicative of archaeological site stability and preservation potential</p>	<p>Availability of sand for aeolian transport in support of archeological site preservation</p>	<p>Sand storage</p>	<p>Sandbar volume</p>	<p>Sediment average</p>
<p>Fall HFEs > 96-hr duration</p>					
<p>Fall HFEs ≤ 45, cfs in October or November</p>					
<p>Humpback chub translocation</p>					
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<p>Trout management flows</p>					

WATER QUALITY

<p style="text-align: center;">Resource Characteristics →</p> <p>Experimental & Management Actions ↓</p>	GCD outflow concentrations of dissolved oxygen	GCD outflow concentrations of metals (e.g., selenium, mercury, uranium, etc.)	GCD outflow concentrations of nutrients (e.g., phosphorous, nitrogen)	GCD outflow concentrations of phytoplankton, zooplankton, chlorophyll a	GCD outflow salinity, TDS, specific conductance	GCD outflow temperature	GCD outflow turbidity/sediment load	Water quality average
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