GCDAMP Knowledge Assessment: Status & Trend

Resource Topic:	Recreational experience
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Resource Characteristic	Specific Measure	Status	Trend	Confidence	Rationale: Status/Trend	Rationale: Confidence	Recommendations
Glen Canyon walk-in angling access and safety	Annual average difference from daily mean flow of 10 kcfs, over water year	Moderate Concern	Deteriorating	High	Proposed experiments under the LTEMP EIS preferred alternative increases the likelihood of average daily flows different than 10 kcfs and daily flow ranges greater than 5 kcfs	The LTEMP EIS specifies operational and experimental flows as part of the preferred alternative.	Minimize daily mean flows different than 10 kcfs and flow ranges greater than 5 kcfs during operational and experimental flows while meeting downstream resource objectives. Increase experimental flow education and outreach to anglers.
Glen Canyon walk-in angling trout condition	Five year moving average daily rainbow trout catch > 16 inches, per angler, over water year	Unknown	Unknown	Low	The Arizona Game and Fish Department's annual status of the Lees Ferry rainbow trout fishery does not report size of rainbow trout catch > 16 inches.	N/A	Operate Glen Canyon Dam in such a manner to manage rainbow trout recruitment and promote and foodbase to meet rainbow trout specific condition measure. Implement measures to identify rainbow trout catch greater than 16 inches.
Glen Canyon walk-in angling trout abundance	Five year moving average daily rainbow trout catch > 1/hour, per angler, over water year	Significant Concern	Deteriorating	High	The Arizona Game and Fish Department's annual status of the Lees Ferry rainbow trout fishery indicates a declining trend in average daily rainbow trout catch.	The Arizona Game and Fish Department's annual electrofishing data corroborates with the trend in angling catch per hour.	Operate Glen Canyon Dam in such a manner to manage rainbow trout recruitment and promote foodbase to meet rainbow trout specific abundance measure at sustainable levels while addressing other downstream resources.
Glen Canyon watercraft angling access and safety	Annual average difference from daily mean flow of 10 kcfs, over water year	Moderate Concern	Deteriorating	High	Proposed experiments under the LTEMP EIS preferred alternative increases the likelihood of average daily flows different than 10 kcfs and daily flow ranges greater than 5 kcfs	The LTEMP EIS specifies operational and experimental flows as part of the preferred alternative.	Minimize daily mean flows different than 10 kcfs and flow ranges greater than 5 kcfs during operational and experimental flows while meeting downstream resource objectives. Increase experimental flow education and outreach to anglers.
Glen Canyon watercraft angling trout condition	Five year moving average daily rainbow trout catch > 16 inches, per angler, over water year	Unknown	Unknown	Low	The Arizona Game and Fish Department's annual status of the Lees Ferry rainbow trout fishery does not report size of rainbow trout catch > 16 inches.	N/A	Operate Glen Canyon Dam in such a manner to manage rainbow trout recruitment and promote and foodbase to meet rainbow trout specific condition measure. Implement measures to identify rainbow trout catch greater than 16 inches.
Glen Canyon watercraft angling trout abundance	Five year moving average daily rainbow trout catch > 1/hour, per angler, over water year	Significant Concern	Deteriorating	High	The Arizona Game and Fish Department's annual status of the Lees Ferry rainbow trout fishery indicates a declining trend in average daily rainbow trout catch.	The Arizona Game and Fish Department's annual electrofishing data corroborates with the trend in angling catch per hour.	Operate Glen Canyon Dam in such a manner to manage rainbow trout recruitment and promote foodbase to meet rainbow trout specific abundance measure at sustainable levels while addressing other downstream resources.
Flatwater floating in Glen Canyon NRA	Annual accessibility (i.e., lost visitor days during HFEs), over water year	Moderate Concern	Deteriorating	High	Increase in experiments under the LTEMP EIS preferred alternative increases the likelihood of accessibility issues (i.e., lost visitor days during HFEs), over water year	The LTEMP EIS specifies operational and experimental flows as part of the preferred alternative.	Minimize duration and magnitude of experimental flows that create access issues while still accomplishing downstream resource objectives.
Whitewater river running experience (i.e., rapids)	Annual average difference from daily mean flow of 22 kcfs, over water year	Moderate Concern	Deteriorating	High	Mean daily flows of 22k rarely seen, even in equalization years.	Based on historical operation of Glen Canyon Dam.	Keep mean daily flows at a minimum of 12kcfs
Whitewater time on river (i.e., less time on river leads to more off-river recreational time)	Annual average daily mean flow less than 22 kcfs, over water year	Moderate Concern	Deteriorating	High	Mean daily flows of 22k rarely seen, even in equalization years.	Based on historical operation of Glen Canyon Dam.	Keep mean daily flows at a minimum of 12kcfs

Whitewater boat mooring (i.e., reduced beaching risk)	Annual average daily flow range greater than 10 kcfs, over water year	Significant Concern	Unchanging	High	Risk of beaching has more to do with daily fluctuating flows, unchanged from Modified Low Fluctuating Flows.	LTEMP EIS operating criteria similar to Modified Low Fluctuating Flows.	Minimize percent of daily fluctuations, especially during months with lower releases.
Whitewater river crowding (i.e., rapids, beaches)	Annual days with minimum flow less than 8 kcfs, over water year	Significant Concern	Deteriorating	Medium	Lower flows possible under LTEMP, increasing risk of crowding.	Low Summer Flow experiments will compound crowding above big rapids, and at popular attraction sites.	Consider minimum flows/ fluctuations at 6,000-9,000cfs.
Whitewater navigational risk	Annual days with minimum flow less than 8 kcfs, over water year	Significant Concern	Deteriorating	High	Significant concern during Low Summer Flow experiments.	Projected LTEMP EIS operating criteria	Consider minimum flows/ fluctuations at 6,000-9,000cfs.
Whitewater navigational risk Diamond down	Percent change in suspended sediment, Diamond down	Significant Concern	Deteriorating	High	Significant concern during Low Summer Flow experiments.	Projected LTEMP EIS operating criteria	Consider minimum flows/ fluctuations at 6,000-9,000cfs.
Backpacking/day-use usable campsite area	Total usable campsite area (meters squared) during summer months	Significant Concern	Deteriorating	High	Increases in sand volume are offset by vegetation encroachment in usable campsite areas. Unsure whether increases by HFE's or decreases by vegetation encroachment will be greater.	Usable campsite area is a more subjective measure than sandbar volume and has greater uncertainty. Beaches are rebuilt through HFEs, but are reduced by fluctuating flows while vegetation encroaches.	Although HFE's build sandbars, they do not scour vegetation, which continues to expand into usable campsites. Consider non-native vegetation removal, within certain stretches.
Backpacking/day-use shore access	Annual average daily mean flow greater than 10 kcfs, over water year	Moderate Concern	Deteriorating	High	Proposed experiments under the LTEMP EIS preferred alternative increases the likelihood of average daily flows greater than 10 kcfs.	The LTEMP EIS specifies operational and experimental flows as part of the preferred alternative.	Minimize daily mean flows different than 10 kcfs during operational and experimental flows while meeting downstream resource objectives.
Backpacking/day-use shore availability	Annual average daily flow range greater than 5 kcfs, over water year	Moderate Concern	Deteriorating	High	Proposed experiments under the LTEMP EIS preferred alternative increases the likelihood of daily flow range greater than 5 kcfs.	The LTEMP EIS specifies operational and experimental flows as part of the preferred alternative.	Minimize daily flow range greater than 5 kcfs during operational and experimental flows while meeting downstream resource objectives.
Wilderness experience	Annual whitewater and aircraft launches for resource management, research, and transportation activity, over water year	Significant Concern	Deteriorating	High	Threats of development, over flights, possible mining contamination, daily fluctuating flows.	Possible and current negative impacts of running a controlled river, one that does not follow a 'natural' hydrograph.	Operate Glen Canyon Dam in such a manner as to protect, mitigate adverse impacts to, and improve the values for which Grand Canyon National Park was formed.
Glen Canyon walk-in angling access and safety	Annual average daily flow range greater than 5 kcfs, over water year	Moderate Concern	Deteriorating	High	Proposed experiments under the LTEMP EIS preferred alternative increases the likelihood of average daily flows different than 10 kcfs and daily flow ranges greater than 5 kcfs	The LTEMP EIS specifies operational and experimental flows as part of the preferred alternative.	Minimize daily mean flows different than 10 kcfs and flow ranges greater than 5 kcfs during operational and experimental flows while meeting downstream resource objectives. Increase experimental flow education and outreach to anglers.
Glen Canyon watercraft angling access and safety	Annual average daily flow range greater than 5 kcfs, over water year	Moderate Concern	Deteriorating	High	Proposed experiments under the LTEMP EIS preferred alternative increases the likelihood of average daily flows different than 10 kcfs and daily flow ranges greater than 5 kcfs	The LTEMP EIS specifies operational and experimental flows as part of the preferred alternative.	Minimize daily mean flows different than 10 kcfs and flow ranges greater than 5 kcfs during operational and experimental flows while meeting downstream resource objectives. Increase experimental flow education and outreach to anglers.
Whitewater river crowding (i.e., rapids, beaches)	Annual recreational whitewater visitor launches, over water year	Significant Concern	Deteriorating	Medium	Lower flows possible under LTEMP, increasing risk of crowding.	Low Summer Flow experiments will compound crowding above big rapids, and at popular attraction sites.	Consider minimum flows/ fluctuations at 6,000-9,000cfs.
Wilderness experience	Annual recreational whitewater visitor launches, over water year	Significant Concern	Deteriorating	High	Threats of development, over flights, possible mining contamination, daily fluctuating flows.	Possible and current negative impacts of running a controlled river, one that does not follow a 'natural' hydrograph.	Operate Glen Canyon Dam in such a manner as to protect, mitigate adverse impacts to, and improve the values for which Grand Canyon National Park was formed.

Whitewater usable campsite area since 2002, critical reaches	Total whitewater usable campsite area	Significant Concern	Deteriorating	Medium	This entry row was moved from the original Sediment spreadsheet to here because it addresses the topic specifically from the perspective of recreation. Present area is below 2002 reference and decreasing. Increases in sand volume are offset by vegetation encroachment in campsite areas. Decreases in campsite area more common than increase in reference period.	Campsite area is a more subjective measure than sandbar volume and has greater uncertainty.	Although HFE's build sandbars, they do not scour vegetation, which continues to expand into campsites.
Whitewater usable campsite since 2002, non-critical reaches	Total whitewater usable campsite area	Significant Concern	Deteriorating	Medium	This entry row was moved from the original Sediment spreadsheet to here because it addresses the topic specifically from the perspective of recreation. Present area is below 2002 reference and decreasing. Increases in sand volume are offset by vegetation encroachment in campsite areas. Decreases in campsite area more common than increase in reference period.	Campsite area is a more subjective measure than sandbar volume and has greater uncertainty.	Although HFE's build sandbars, they do not scour vegetation, which continues to expand into campsites.
Whitewater usable campsite during HFE protocol, critical reaches	Total whitewater usable campsite area	Unknown	Unknown	Low	This entry row was moved from the original Sediment spreadsheet to here because it addresses the topic specifically from the perspective of recreation. Increases in sand volume are offset by vegetation encroachment in campsite areas. However, present area and trend relative to 2012 reference are unknown because this metric has very high uncertainty because of high variability in data and because "campsite area" is a more subjective measure than sandbar volume.	Present area and trend relative to 2012 reference have very high uncertainty because of high variability in data and because "campsite area" is a more subjective measure than sandbar volume.	Although HFE's build sandbars, they do not scour vegetation, which continues to expand into campsites.
Whitewater usable campsite during HFE protocol non-critical reaches	Total whitewater usable campsite area	Unknown	Unknown	Low	This entry row was moved from the original Sediment spreadsheet to here because it addresses the topic specifically from the perspective of recreation. Increases in sand volume are offset by vegetation encroachment in campsite areas. However, present area and trend relative to 2012 reference are unknown because this metric has very high uncertainty because of high variability in data and because "campsite area" is a more subjective measure than sandbar volume.	Present area and trend relative to 2012 reference have very high uncertainty because of high variability in data and because "campsite area" is a more subjective measure than sandbar volume.	Although HFE's build sandbars, they do not scour vegetation, which continues to expand into campsites.