

**GCDAMP Knowledge Assessment: Effects of Experimental & Management Actions**

Resource Topic: Archaeological and cultural resources

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Version Date: 1/12/2017

Resource Characteristic	Specific Measure	Exper or Mgt Action	Strength	Direction	Confidence	Rationale: Strength & Direction	Rationale: Confidence	Recommendations
Depositional Integrity (Arch site stability)	NPS ASMIS monitoring	Spring HFEs ≤ 45,000 cfs in March or April	Strong	Positive Effect	High	Availability of sand for redistribution is linked to stability of terrace deposits which hold archaeological resources; as sand supply is reduced, the ability of terraces and sand bars to rebuild is diminished. For HFE's conducted in the early spring, the likelihood of sand deposition and redistribution is higher than the fall given that the windy season is late spring into early summer. See all the same reports as listed above	Availability of sand for redistribution is linked to stability of terrace deposits which hold archaeological resources; as sand supply is reduced, the ability of terraces and sand bars to rebuild is diminished. For HFE's conducted in the early spring, the likelihood of sand deposition and redistribution is higher than the fall given that the windy season is late spring into early summer. See all the same reports as listed above	Establish and implement targeted monitoring pre and post HFE's
National Register Integrity	NPS ASMIS monitoring	Proactive Spring HFEs ≤ 45,000 cfs in April, May, or June	Moderate	Positive Effect	High	availability of sand for redistribution is linked to stability of terrace deposits which hold archaeological resources; as sand supply is reduced, the ability of terraces and sand bars to rebuild is diminished. See all the same reports as listed above	availability of sand for redistribution is linked to stability of terrace deposits which hold archaeological resources; as sand supply is reduced, the ability of terraces and sand bars to rebuild is diminished. See all the same reports as listed above	Establish and implement targeted monitoring pre and post HFE's
National Register Integrity	NPS ASMIS monitoring	Fall HFEs ≤ 45,000 cfs in October or November	Moderate	Positive Effect	High	availability of sand for redistribution is linked to stability of terrace deposits which hold archaeological resources; as sand supply is reduced, the ability of terraces and sand bars to rebuild is diminished. See all the same reports as listed above	availability of sand for redistribution is linked to stability of terrace deposits which hold archaeological resources; as sand supply is reduced, the ability of terraces and sand bars to rebuild is diminished. See all the same reports as listed above	Establish and implement targeted monitoring pre and post HFE's
National Register Integrity	NPS ASMIS monitoring	Fall HFEs > 96-hr duration	Moderate	Positive Effect	High	availability of sand for redistribution is linked to stability of terrace deposits which hold archaeological resources; as sand supply is reduced, the ability of terraces and sand bars to rebuild is diminished. See all the same reports as listed above	availability of sand for redistribution is linked to stability of terrace deposits which hold archaeological resources; as sand supply is reduced, the ability of terraces and sand bars to rebuild is diminished. See all the same reports as listed above	Establish and implement targeted monitoring pre and post HFE's
Depositional Integrity (Arch site stability) - GLCA	NPS ASMIS monitoring	Spring HFEs ≤ 45,000 cfs in March or April	Moderate	Negative Effect	High	Archeological resources in Glen Canyon are not associated with significant wind deposition of sediment (Anderson 2006); and aeolian sand transport may not have been particularly important to landscape evolution and cultural site preservation, even in the past (East et al. in press). Highs flows meant to distribute sediment for aeolian transport have been shown to degrade terraces in Glen Canyon (Grams et al. 2007) and the archeological resources they contain (Collins et al. 2014).	Our current understanding of strength and direction of effects on the physical stability of archeological resources is subject to little or no disagreement amongst archaeologists and geomorphologists working in the field. The results are supported by numerous peer-reviewed studies and is supported by substantial, high-quality, documented expert knowledge.	Establish and implement targeted monitoring pre and post HFE's; expand stage elevation model for HFEs to include GLCA Reach
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Depositional Integrity (Arch site stability) - GLCA	NPS ASMIS monitoring	Fall HFEs $\leq$ 45,000 cfs in October or November	Moderate	Negative Effect	High	Archeological resources in Glen Canyon are not associated with significant wind deposition of sediment (Anderson 2006); and aeolian sand transport may not have been particularly important to landscape evolution and cultural site preservation, even in the past (East et al. in press). Highs flows meant to distribute sediment for aeolian transport have been shown to degrade terraces in Glen Canyon (Grams et al. 2007) and the archeological resources they contain (Collins et al. 2014).	Our current understanding of strength and direction of effects on the archeological resources is subject to little or no disagreement amongst archaeologists and geomorphologists working in the field. The results are supported by numerous peer-reviewed studies and is supported by substantial, high-quality, documented expert knowledge.	Establish and implement targeted monitoring pre and post HFE's; expand stage elevation model for HFEs to include GLCA Reach
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Depositional Integrity (Arch site stability) - GLCA	NPS ASMIS monitoring	Trout management flows	Strong	Negative Effect	High	Ongoing monitoring has demonstrated that the wet-dry cycling resulting from fluctuations at low flow levels has caused the most persistent impacts to the submerged Spencer Steamboat remains.	Our current understanding of strength and direction of effects on the archeological resources is subject to little or no disagreement amongst archaeologists and geomorphologists working in the field. The results are supported by numerous peer-reviewed studies and is supported by substantial, high-quality, documented expert knowledge.	Continue submerged monitoring of Spencer Steamboat.
Depositional Integrity (Arch site stability) - GLCA	NPS ASMIS monitoring	Macroinvertebrate production flows	Strong	Negative Effect	High	Ongoing monitoring has demonstrated that the wet-dry cycling resulting from fluctuations at low flow levels has caused the most persistent impacts to the submerged Spencer Steamboat remains.	Our current understanding of strength and direction of effects on the archeological resources is subject to little or no disagreement amongst archaeologists and geomorphologists working in the field. The results are supported by numerous peer-reviewed studies and is supported by substantial, high-quality, documented expert knowledge.	Continue submerged monitoring of Spencer Steamboat.
Depositional Integrity (Arch site stability) - GLCA	NPS ASMIS monitoring	Humpback chub translocation	Strong	No Effect	High			
Depositional Integrity (Arch site stability) - GLCA	NPS ASMIS monitoring	Mechanical removal of rainbow trout from LCR reach	Strong	No Effect	High			
Depositional Integrity (Arch site stability) - GLCA	NPS ASMIS monitoring	Mechanical removal of invasive fish species	Strong	No Effect	High			
Depositional Integrity (Arch site stability) - GLCA	NPS ASMIS monitoring	Larval humpback chub head-start program	Strong	No Effect	High			
Depositional Integrity (Arch site stability) - GLCA	NPS ASMIS monitoring	Riparian vegetation restoration	Strong	Unknown	Medium	Potential exists for direct effects where management actions intersect with archeological resources. Potential for increase in aeolian sand delivery in Glen Canyon is uncertain and likely that overland-flow erosion would continue to be the dominant landscape process (East et al. in press).	Our current understanding of strength and direction of effects on the archeological resources is subject to moderate uncertainty. The results are supported by some documented evidence and analyses that are consistent with well-accepted principles in the relevant fields of knowledge.	

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