

GCDAMP Knowledge Assessment: Effects of Experimental & Management Actions

Resource Topic:	Sediment
Preparer(s):	Paul Grams, David Topping, Joel Sankey, Helen Fairley with panel including Lucas Bair, Daniel Buscombe, Joseph Hazel, Erich Mueller, and Jack Schmidt; with minor edits by D. Braun
Version Date:	3/7/17 with revisions by D. Topping 3/14 following email discussion with D. Braun

Resource Characteristic	Specific Measure	Exper or Mgt Action	Strength	Direction	Confidence	Rationale: Strength & Direction	Rationale: Confidence	Recommendations
Sandbar volume	Median sandbar volume	Spring HFEs ≤ 45,000 cfs in March or April	Strong	Positive Effect	High	Previous HFE's have resulted in sandbar deposition.	Short-duration, sediment-enriched HFE's have consistently resulted in deposition.	Continue current sandbar monitoring.
Sandbar volume	Median sandbar volume	Proactive Spring HFEs ≤ 45,000 cfs in April, May, or June	Strong	Positive Effect	Medium	Previous HFE's have resulted in sandbar deposition.	Effect will depend on degree of sediment enrichment, which may vary for proactive HFE's.	Develop study plan for proactive HFE's before implementation.
Sandbar volume	Median sandbar volume	Fall HFEs ≤ 45,000 cfs in October or November	Strong	Positive Effect	High	Previous HFE's have resulted in sandbar deposition.	Short-duration, sediment-enriched HFE's have consistently resulted in deposition.	Continue current sandbar monitoring.
Sandbar volume	Median sandbar volume	Fall HFEs > 96-hr duration	Strong	Positive Effect	Medium	Previous HFE's have resulted in sandbar deposition.	Effect will depend on degree of sediment enrichment--sand supply could be exhausted during extended duration HFE, which may result in less sandbar deposition.	Develop study plan for extended duration HFE's before implementation.
Sandbar volume	Median sandbar volume	Trout management flows	Strong	Negative Effect	Low	If trout management flows include high fluctuations, sandbar erosion is expected. Flow magnitude and fluctuations strongly affect sand transport.	Confidence is low, because the magnitude of fluctuations is not clear and the frequency or duration of trout managements strongly affect sand transport.	Develop study plan for trout management flows before implementation.
Sandbar volume	Median sandbar volume	Macroinvertebrate production flows	Moderate	Positive Effect	Low	Stable low flows minimize sand transport and sandbar erosion.	Confidence is low, because it is not clear how frequently these flows will occur.	Continue current sandbar monitoring.
Sandbar volume	Median sandbar volume	Riparian vegetation restoration	Unknown	Unknown	Medium	Mechanical removal of vegetation could have either a positive or negative affect on sand deposition in future flows.	Confidence is medium, because it is likely that there is an effect.	If vegetation management occurs, monitor sandbar response in future high flows.
Sand storage	Total sand storage volume	Spring HFEs ≤ 45,000 cfs in March or April	Strong	Unknown	High	High flows may result in either increases or decreases in sand storage. The result varies among HFE's and river segments.	Confidence is high because HFE's have a strong impact on sand storage, although the direction and magnitude of that impact can't be generalized, because it depends on factors that change for each event.	Continue monitoring sand storage. If persistent declines in storage occur, considering revising action.
Sand storage	Total sand storage volume	Proactive Spring HFEs ≤ 45,000 cfs in April, May, or June	Strong	Unknown	High	High flows may result in either increases or decreases in sand storage. The result varies among HFE's and river segments.	Confidence is high because HFE's have a strong impact on sand storage, although the direction and magnitude of that impact can't be generalized, because it depends on factors that change for each event.	Continue monitoring sand storage. If persistent declines in storage occur, considering revising action.
Sand storage	Total sand storage volume	Fall HFEs ≤ 45,000 cfs in October or November	Strong	Unknown	High	High flows may result in either increases or decreases in sand storage. The result varies among HFE's and river segments.	Confidence is high because HFE's have a strong impact on sand storage, although the direction and magnitude of that impact can't be generalized, because it depends on factors that change for each event.	Continue monitoring sand storage. If persistent declines in storage occur, considering revising action.
Sand storage	Total sand storage volume	Fall HFEs > 96-hr duration	Strong	Unknown	High	High flows may result in either increases or decreases in sand storage. The result varies among HFE's and river segments.	Confidence is high because HFE's have a strong impact on sand storage, although the direction and magnitude of that impact can't be generalized, because it depends on factors that change for each event.	Continue monitoring sand storage. If persistent declines in storage occur, considering revising action.
Sand storage	Total sand storage volume	Trout management flows	Strong	Unknown	High	High flows may result in either increases or decreases in sand storage. The result varies among HFE's and river segments.	Confidence is high because HFE's have a strong impact on sand storage, although the direction and magnitude of that impact can't be generalized, because it depends on factors that change for each event.	Continue monitoring sand storage. If persistent declines in storage occur, considering revising action.
Sand storage	Total sand storage volume	Macroinvertebrate production flows	Weak	Positive Effect	Medium	Low flows result in lower rates of sand transport and sand retention.	Confidence is low, because it is not clear how frequently these flows will occur.	
Sand storage	Total sand storage volume	Riparian vegetation restoration	Weak	No Effect	High	Vegetation management not expected to affect total sand storage.	The scope of vegetation management is expected to be small relative to the total sand storage for any given river segment.	

Availability of sand for aeolian transport in support of archeological site preservation	Classifications of the potential for aeolian transport of sand from sandbars to upland settings containing archaeological sites	Spring HFEs \leq 45,000 cfs in March or April	Moderate	Positive Effect	Medium	Previous HFE's have resulted in deposition on sandbars which are the source of aeolian sand for dunefields and archaeological sites	Confidence is medium because the site classifications have an approximate decadal temporal resolution and HFEs can occur at annual or higher frequency	
Availability of sand for aeolian transport in support of archeological site preservation	Classifications of the potential for aeolian transport of sand from sandbars to upland settings containing archaeological sites	Proactive Spring HFEs \leq 45,000 cfs in April, May, or June	Moderate	Positive Effect	Medium	Previous HFE's have resulted in deposition on sandbars which are the source of aeolian sand for dunefields and archaeological sites	Confidence is medium because the site classifications have an approximate decadal temporal resolution and HFEs can occur at annual or higher frequency	
Availability of sand for aeolian transport in support of archeological site preservation	Classifications of the potential for aeolian transport of sand from sandbars to upland settings containing archaeological sites	Fall HFEs \leq 45,000 cfs in October or November	Moderate	Positive Effect	Medium	Previous HFE's have resulted in deposition on sandbars which are the source of aeolian sand for dunefields and archaeological sites	Confidence is medium because the site classifications have an approximate decadal temporal resolution and HFEs can occur at annual or higher frequency	
Availability of sand for aeolian transport in support of archeological site preservation	Classifications of the potential for aeolian transport of sand from sandbars to upland settings containing archaeological sites	Fall HFEs > 96-hr duration	Moderate	Positive Effect	Low	Previous HFE's have resulted in deposition on sandbars which are the source of aeolian sand for dunefields and archaeological sites	Confidence is medium because the site classifications have an approximate decadal temporal resolution and HFEs can occur at annual or higher frequency	
Availability of sand for aeolian transport in support of archeological site preservation	Classifications of the potential for aeolian transport of sand from sandbars to upland settings containing archaeological sites	Trout management flows	Unknown	Negative Effect	Low	If trout management flows include high fluctuations, then there could be erosion of sandbars which are the source of aeolian sand for dunefields and archaeological sites	Confidence is low because no one has considered the implications of trout management flows for dunefields and archaeological sites prior to this knowledge assessment	
Availability of sand for aeolian transport in support of archeological site preservation	Classifications of the potential for aeolian transport of sand from sandbars to upland settings containing archaeological sites	Macroinvertebrate production flows	Moderate	Positive Effect	Low	The increase in exposed sand during lower flow intervals could increase the amount of sand that is available for aeolian transport to dunefields and archaeological sites	Confidence is low because it is not known whether the duration of lower flows will be long enough to result in substantially more aeolian transport and it is not known if this would be discernible in the site classifications	
Availability of sand for aeolian transport in support of archeological site preservation	Classifications of the potential for aeolian transport of sand from sandbars to upland settings containing archaeological sites	Riparian vegetation restoration	Moderate	Positive Effect	High	Mechanical removal of vegetation could have either a positive or negative affect on fluvial sand deposition in future flows, but targeted vegetation removal could greatly increase the potential for aeolian transport of sand to individual/specific dunefields and archaeological sites	Confidence is high because targeted vegetation removal would change the classification of sites	
Amount of topographic change indicative of archaeological site stability and preservation potential	Volume of sediment gained and/or eroded at a sample of archaeological sites during the current HFE protocol	Spring HFEs \leq 45,000 cfs in March or April	Moderate	Positive Effect	Medium	Previous HFE's have resulted in deposition on sandbars which are the source of aeolian sand for dunefields and archaeological sites	Confidence is medium because of the current small sample size with results that range from net sediment surplus to net sediment deficit during the current HFE protocol.	
Amount of topographic change indicative of archaeological site stability and preservation potential	Volume of sediment gained and/or eroded at a sample of archaeological sites during the current HFE protocol	Proactive Spring HFEs \leq 45,000 cfs in April, May, or June	Moderate	Positive Effect	Medium	Previous HFE's have resulted in deposition on sandbars which are the source of aeolian sand for dunefields and archaeological sites	Confidence is medium because of the current small sample size with results that range from net sediment surplus to net sediment deficit during the current HFE protocol.	
Amount of topographic change indicative of archaeological site stability and preservation potential	Volume of sediment gained and/or eroded at a sample of archaeological sites during the current HFE protocol	Fall HFEs \leq 45,000 cfs in October or November	Moderate	Positive Effect	Medium	Previous HFE's have resulted in deposition on sandbars which are the source of aeolian sand for dunefields and archaeological sites	Confidence is medium because of the current small sample size with results that range from net sediment surplus to net sediment deficit during the current HFE protocol.	
Amount of topographic change indicative of archaeological site stability and preservation potential	Volume of sediment gained and/or eroded at a sample of archaeological sites during the current HFE protocol	Fall HFEs > 96-hr duration	Moderate	Positive Effect	Medium	Previous HFE's have resulted in deposition on sandbars which are the source of aeolian sand for dunefields and archaeological sites	Confidence is medium because of the current small sample size with results that range from net sediment surplus to net sediment deficit during the current HFE protocol.	
Amount of topographic change indicative of archaeological site stability and preservation potential	Volume of sediment gained and/or eroded at a sample of archaeological sites during the current HFE protocol	Trout management flows	Unknown	Negative Effect	Low	If trout management flows include high fluctuations, then there could be erosion of sandbars which are the source of aeolian sand for dunefields and archaeological sites	Confidence is low because no one has considered the implications of trout management flows for dunefields and archaeological sites prior to this knowledge assessment	

Amount of topographic change indicative of archaeological site stability and preservation potential	Volume of sediment gained and/or eroded at a sample of archaeological sites during the current HFE protocol	Macroinvertebrate production flows	Moderate	Positive Effect	Low	The increase in exposed sand during lower flow intervals could increase the amount of sand that is available for aeolian transport to dunefields and archaeological sites	Confidence is low because it is not known whether the duration of lower flows will be long enough to result in substantially more aeolian transport and it is not known if this would be discernible in the surveys of site volume changes	
Amount of topographic change indicative of archaeological site stability and preservation potential	Volume of sediment gained and/or eroded at a sample of archaeological sites during the current HFE protocol	Riparian vegetation restoration	Moderate	Positive Effect	Medium	Mechanical removal of vegetation could have either a positive or negative affect on fluvial sand deposition in future flows, but targeted vegetation removal could greatly increase the potential for aeolian transport of sand to individual/specific dunefields and archaeological sites	Confidence is medium because experimental vegetation removal with monitoring would be necessary to gauge the strength of the effect at individual sites	