

**GCDAMP Knowledge Assessment: Drivers & Constraints**

Resource Topic:	Sediment
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Resource Characteristic	Driver or Constraint	Strength	Direction	Confidence	Rationale: Strength & Direction	Rationale: Confidence	Recommendations
Sandbar volume	Short duration high flows	strong	Positive Effect	High	High flows result in deposition on sandbars.	Consistent results from repeated high-flow experiments.	Short-duration high flows are effective for building sandbars.
Sandbar volume	Sustained high flows	strong	Negative Effect	Medium	Long-duration high flows (several weeks or more) inundates bars and causes sandbar erosion.	Consistent with theory. Observed during 2011 sustained high flows.	Long-duration high flows should be expected to cause sandbar erosion.
Sandbar volume	Sustained low flows	strong	Positive Effect	High	Long-duration low flows result in lower rates of bar erosion.	Consistent with theory. Observed during periods of low flows (e.g. fall steady flows).	Sustained low flows decrease rates of erosion.
Campsite area	Short duration high flows	strong	Positive Effect	High	Deposition during high flows increases campsite size.	Consistent results from repeated high-flow experiments.	Short-duration high flows are effective for increasing campsite area.
Campsite area	Sustained high flows	strong	Negative Effect	Medium	Erosion during sustained high flows erodes sandbars and results in less exposed sand for campsites.	Consistent with theory. Observed during 2011 sustained high flows.	
Campsite area	Sustained low flows	strong	Positive Effect	High	Long-duration low flows result in lower rates of bar erosion and more exposed sand for campsites.	Consistent with theory. Observed during periods of low flows (e.g. fall steady flows).	
Sand storage	Annual release volume	strong	Negative Effect	High	Annual release volume is a strong control on sand transport and sand storage in all river segments.	Consistent with theory. Observed years of high release volumes have been observed to export more sand than years of low release volumes.	Greater sand export should be expected in years of high annual release volumes.
Sand storage	Short duration high 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.	Short-duration high flows should be expected to move sand downstream causing depletion in some segments and accumulation in other segments. This effect is expected to be secondary to the effect of annual release volumes.
Sand storage	Sustained high flows	strong	Negative Effect	High	Sustained high flows export large volumes of sand.	Consistent with theory. Observed during 2011 sustained high flows.	Greater sand export should be expected during sustained high flows.
Sand storage	Sustained low flows	strong	Positive Effect	High	Sustained low flows export less sand.	Consistent with theory. Observed during periods of low flows (e.g. fall steady flows).	Less sand export should be expected during sustained low flows.
Campsite area	Vegetation expansion	Strong	Negative Effect	High	Vegetation encroaches on campsite area.	Vegetation encroachment has been observed in many campsite studies.	Vegetation management may be required to change campsite area.
Campsite area	Vegetation loss	Strong	Positive Effect	High	Loss of vegetation increases campsite area.		
Availability of sand for aeolian transport in support of archeological site preservation	Short duration high flows	Moderate	Positive Effect	Medium	Short duration high flows result in deposition on sandbars which are sources of aeolian sand for dunefields and archaeological sites	Consistent with research and theory, but monitoring is based on a small sample size with results that range from net sediment surplus to net sediment deficit during the current HFE protocol.	Continue monitoring and expand sample sizes to increased confidence in strength and direction determinations
Availability of sand for aeolian transport in support of archeological site preservation	Sustained high flows	Moderate	Unknown	Medium	Long-duration high flows (several weeks or more) inundate bars and causes erosion of sandbars which are sources of aeolian sand for dunefields and archaeological sites	Theoretically, supply of fluviially-sourced aeolian sand should decrease as a function of sandbar erosion, but this has not been demonstrated experimentally	Continue monitoring and expand sample sizes to increased confidence in strength and direction determinations

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Availability of sand for aeolian transport in support of archeological site preservation	Vegetation expansion	Moderate	Negative Effect	Medium	Vegetation can impede aeolian transport of sand from sandbars to dunefields and archaeological sites	Consistent with research and theory, but monitoring is based on a small sample size with results that range from net sediment surplus to net sediment deficit during the current HFE protocol.	Continue monitoring and expand sample sizes to increased confidence in strength and direction determinations. Conduct experimental manipulations of vegetation.
Availability of sand for aeolian transport in support of archeological site preservation	Vegetation loss	Moderate	Positive Effect	Medium	Vegetation can impede aeolian transport of sand from sandbars to dunefields and archaeological sites	Consistent with research and theory, but monitoring is based on a small sample size with results that range from net sediment surplus to net sediment deficit during the current HFE protocol.	Continue monitoring and expand sample sizes to increased confidence in strength and direction determinations. Conduct experimental manipulations of vegetation.