

## Monitoring and Mitigation Measures Recommendations

Topic	Recommendation	Details
<b>Methodological Issues Associated with Water Quality Monitoring</b>	Additional methodological considerations should be taken into account in the WQ monitoring program.	If the EAA is to use Clean Rivers Program WQ data, it should co-located in sampling space and time.
		All nutrient analyses be performed on the same water sample(s).
		Frequency and extent of high concentrations of PAHs should be established by more extensive sampling in areas where elevated levels have been identified.
		If it is not possible to substantially reduce PAH concentrations through sediment removal and source control, evaluation of bioavailability of the PAHs in the sediment should be considered.
<b>Administrative Considerations Associated with the Monitoring Program</b>	The monitoring program would benefit from some administrative considerations taken into account.	The EAA should consider forming a standing working group on monitoring that would meet as needed to provide advice and outside perspective on the EAA's monitoring program.
<b>Integration of Monitoring with Other HCP Programs</b>	Synergies can and should be obtained through integration of monitoring efforts with other aspects of HCP's programming.	The eco modeling team should have been represented in the monitoring work groups.
		The monitoring program should include the long-term data required to test and inform continuous refinements of the ecological model.
		The EAA should consider deploying the miniDOT dissolved oxygen sensors used in the Landa Lake dissolved oxygen study as part of the routine monitoring program.
		<i>All M&amp;M measures that are implemented as part of the HCP should be integrated into one conceptually unified monitoring program.</i>
		<i>The performance monitoring of M&amp;M measures should be integrated into the existing water quality and biological monitoring programs.</i>
		M&M effectiveness monitoring should be done periodically with a comprehensive synthesis of the monitoring data every five years or so.
		We recommend continuing to compute ratios from data such as those reported in BIO-WEST and Watershed Systems Group (2016), further refining the data to be as species specific as possible.
		In light of October 2015 flooding damage, upstream erosion and stormwater runoff control measures may be needed to protect planting and sediment control efforts downstream.
		There is not enough new habitat from native plantings to maintain populations of fountain darter to balance non-native plant removal.

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<p><b>Submerged Aquatic Vegetation &amp; Related Conservation Measures</b></p>	<p>Additional monitoring, effectiveness assessment, and integration should be considered in these Measures.</p>	<p>Habitat availability for the FD should be verified by considering the carrying capacity of the various SAV species (both native and non-native) for fountain darter.</p>
		<p>It is important to track the difference between the area of non-native plants removed and the sustained native coverage (reported as m<sup>2</sup> ).</p>
		<p>It is important to track the number of plants planted, resulting sustained area, coverage of vegetation from baseline maps in 2013, and lessons learned regarding new species or techniques.</p>
		<p>Non-native vegetation should be considered as fountain darter habitat when it comes to maintaining and increasing habitat availability for the fountain darter.</p>
		<p>Bank pins and turbidity loggers could be used to evaluate sediment deposition where background knowledge is not currently available. Water depth and sediment accumulation should be monitored in areas being considered for sediment removal as well as post-removal as well.</p>
		<p>All sediment removal actions should be coupled to monitoring efforts to demonstrate their efficacy.</p>
		<p>Sediment removal activities should be limited to areas where ongoing upland sources or natural stream dynamics will NOT lead to deposition of new sediment within a matter of years.</p>
		<p>The Committee recommends that aeration not be used routinely as a mitigation measure, but be held in reserve to be used only in case of severe low oxygen conditions throughout all of Landa Lake.</p>
		<p>Manual breaking up and removal of the floating mats should be considered as a mitigation measure if floating mats cover more than 25 percent of the surface of Landa Lake and dissolved oxygen concentrations decrease.</p>
<p>Due diligence should be applied to verify the future long-term reliability of the ASR system given the importance of the ASR performance to the success of the HCP.</p>		

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<p><b>Springflow Protection Measures</b></p>	<p>Additional analysis of the performance and capacity of the ASR system should be conducted; also, a more systematic approach to Phase 2 decisions is warranted.</p>	<p>The EAA and SAWS should give consideration to whether geochemical reactions between the Edwards Aquifer injected/recharged water and the aquifer permeable matrix may cause adverse water quality issues in the short or long term (especially as the storage volume increases to encounter aquifer matrix not yet exposed to the Edwards Aquifer groundwater).</p>
		<p>The EAA and SAWS should give consideration to whether there are any geochemical reactions between the injected Edwards Aquifer groundwater and native Carrizo Aquifer groundwater that may cause adverse water quality issues in the short or long term.</p>
		<p>The EAA and SAWS should give consideration to whether there is any evidence of mineral precipitation in the aquifer or on well materials (e.g., models or projections of porosity declines in the ASR storage zone) that may affect long-term system performance.</p>
		<p>The EAA and SAWS should give consideration to what the long-term trends in ASR well performance are.</p>
		<p>The Committee recommends that at a minimum of annually, determine specific injection at each ASR well to assess if there are any long-term changes in ASR well performance.</p>
		<p>The Committee recommends to design and implement water quality monitoring for arsenic and related constituents in monitoring wells during recharge and storage events.</p>
		<p>The Committee recommends to design and implement water quality monitoring in ASR wells during recovery events.</p>
		<p>The Committee recommends that compliance of the parties participating in the spring flow protection measures be audited due to the high expense of the spring flow protection measures and their importance to the HCP's success.</p>