

Draft Report 2 Implementation Matrix

Category	Synopsis	#	Recommendation	Workshop Input	Recommended for Implementation	Compliance-oriented	Fiscally-responsible	Feasible	Implementation Strategy	Comments
<div style="border: 1px solid black; padding: 2px;"> <div style="background-color: #ffffcc; padding: 2px;">APPLIED RESEARCH</div> <div style="background-color: #ffffcc; padding: 2px;">MONITORING</div> <div style="background-color: #e6e6fa; padding: 2px;">M&M MEASURES</div> <div style="background-color: #e6e6ff; padding: 2px;">HYDRO</div> <div style="background-color: #e6ffe6; padding: 2px;">ECO</div> </div> <p>Research Priorities Moving Forward</p> <p>Some specific applied research foci are especially important given the HCP's management objectives.</p>		1	The 2017 project to establish better relationships between the fountain darter and the different species and coverages of SAV (including Ludwigia) in both systems is critically important.	General agreement; Population studies should try to include all species, not just the CSR, for use as a baseline (using an empirical model)	Done, and may be done, through analysis of biomonitoring data or through future Applied Research.	No	Yes, with the caveat that the Applied Research budget only extends until 2019.	Yes		1. Research to be conducted in 2018 and 2019 was established by the 2017 Research Work Group. Generally, this list is more comprehensive than what has been provided by NAS; 2. 2018 and 2019 are the last two years of Applied Research.
		2	Research to better understand the life history of listed species and identifying effective sampling techniques rightfully deserves high priority.		Yes	No	Yes, with the caveat that the Applied Research budget only extends until 2019.	Yes	To be conducted through the Refugia research program.	
<p>Application and Limitations to Application for Existing Applied Research Results</p> <p>Applied research study results can and should be used to inform management efforts; in some cases, caution is warranted in applying these results, however.</p>		3	The CSR temp and oxygen study's use of surrogates is of questionable relevance for the CSR.	General agreement, and the following specific comments: The Spring Communities should: maintain focus on planting and using native plant species in both systems; promote native plant species for restoration but not to the detriment of surrounding species.	N/A	No	Yes, with the caveat that the Applied Research budget only extends until 2019.	Yes	HCP staff agrees with this comment.	
		4	The CSR temp and oxygen study's use of lab environments may not provide a relevant test of CSR behavior in its natural environment.		N/A	No	Yes, with the caveat that the Applied Research budget only extends until 2019.	Yes	HCP staff agrees with this comment.	
		5	Areas where Hygrophila is of concern should be targeted for Ludwigia establishment where restoration efforts are being carried out.		TBD by SAV teams with SC input.	No	Yes, aquatic vegetation restoration is funded for the Comal and San Marcos systems.	Yes	This recommendation will be made available to NB and SM/TXSTATE for consideration as they implement the SAV schedule/regime established through AMP.	
		6	The competitive advantage of Ludwigia against Hygrophila should be communicated to the SAV modeling team and incorporated into their efforts.		Done	No	N/A	Yes	The SAV research was conducted by members of the modeling team.	
		7	Additional consideration of the interactions between Hydrilla and Ludwigia is needed before conclusions are made or further application of this research occurs.		NA	No	Yes, with the caveat that the Applied Research budget only extends until 2019.	Yes	HCP staff agrees with this comment.	
		8	Ludwigia should be seriously considered for use in the San Marcos system.		TBD by SAV teams with SC input.	No	Yes, aquatic vegetation restoration is funded for the San Marcos system.	Yes	This recommendation will be made available to SM/TXSTATE for consideration as they implement the SAV schedule/regime established through AMP	

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		9	miniDOT oxygen sensors in Landa Lake and Upper Spring Run should be continued as part of a routine integrated water quality and biological monitoring program		Yes	No	Yes, DO management is funded for the Comal system.	Yes	EAHCP added a sonde to Landa Lake; CONB plans to add through 2018 Work Plans (not yet approved).	
		10	The Committee recommends that aeration not be used routinely as a mitigation measure.		TBD	No	Yes, DO management is funded for the Comal system.	Yes	NB is currently conducting research to establish a DO Mgmt. Plan for Landa Lake.	
CSRB Population and Sampling Techniques	Several issues remain to be addressed with regards to CSRB population and sampling.	11	There should be a method to provide standardized data that accounts for the amount of time that the cotton lure has been deployed.	General agreement, and the following specific comments: A study looking CSRB population abundance using a model that incorporated the entire system, not just the sample reached identified in the HCP; • Ensure continued use and implementation of a CSRB sampling Standard Operating Procedure; • A large scale population/abundance study on CSRB is needed.	Done	No	Yes, with the caveat that the Applied Research budget only extends until 2019.	Yes	Done through the 2016 CSRB Cotton Lure SOP Work Group.	
		12	The CSRB trophic study should be looked at with a view to possibly identifying an alternative sampling approach for the CSRB that could be a reasonable reflection of population densities.		No; already completed.	No	Yes, with the caveat that the Applied Research budget only extends until 2019.	Yes		
		13	Identifying the type, and estimate the relative amount, of organic matter near or at the cotton lure placement locations should be included as part of the cotton-lure SOP for CSRB.		Done	No	Yes, with the caveat that the Applied Research budget only extends until 2019.	Yes	Done through the 2016 CSRB Cotton Lure SOP Work Group.	
		14	A validation study encompassing repeated sampling from the same and new spring outlets to account for potential life history and flow effects on the population estimates is highly recommended.		Done	No	No	Yes	Data from the new database and other sampling entities would have to be compiled and examined.	
		15	Studies on the importance of Peck's cave amphipod-predation on the CSRB may be warranted.		No	No	Yes, with the caveat that the Applied Research budget only extends until 2019.	Yes		
		16	Key lab experiments involving the CSRB (e.g., connectivity study) should be validated using creative field studies where variables can be manipulated.		No	No	No	?		

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		17	Attempts to understand the population abundances of the CSRБ should be undertaken.		No	No	Yes, with the caveat that the Applied Research budget only extends until 2019.	No	TBD at May 10, 2017 Science Committee meeting & subsequently in the EAA Work Plans.	The HCP is not required to produce population estimates of the CSRБ. Rather the HCP is required to produce "take" estimates. 7 CSRБ studies have been conducted to date, including (1) Determination of limitations on Comal Springs riffle beetle plastron use during low-flow; (2) Comal Springs riffle beetle occupancy modeling and population estimate within the Comal Springs system; (3) Evaluation of the long-term elevated temperature and low dissolved oxygen tolerances of larvae and adult Comal Springs riffle beetle; (4) Evaluation of the trophic level status and functional feeding group categorization of larvae and adult Comal Springs riffle beetle; and (5) Evaluation of the life history of the Comal Springs riffle beetle from egg to adult (IN PROGRESS); (6) 2016 Salvage Refugia Report; (7) 2015 Husbandry Study
		18	Attempts to better quantify the CSRБ population densities should be undertaken.		No	No	Yes, with the caveat that the Applied Research budget only extends until 2019.	No		
		19	Attempts to better calibrate the cotton-lure method of sampling to be efficient and reliable for estimating populations should be made.		No	No	Yes, with the caveat that the Applied Research budget only extends until 2019.	No		
Administrative/Logistical Considerations Associated with the Applied Research Program	There are several administrative and/or logistical considerations that should be considered for the improvement of the Applied Research program.	20	The window of time for an RFP to be open to final deadline should be extended.	General agreement and the following specific comments: • The EAA should make changes to the procurement process to attract academic institutions by allowing longer response times to RFPs, creating multi-year contracts, reducing specifications regarding invoicing, payments, reporting, and deliverables; • EAA should develop a method to access and fund MS and PhD students to conduct research in the springs, thereby training new scientists familiar with the springs and creating more data from their research; • Request a reduction of overhead/indirect costs to make it more affordable to work with universities; • There should be a way to try to integrate new data with existing data.	Done	No	Yes	Yes	The time period will be extended from 3 weeks to 8-10 weeks for 2018/2019 RFPs.	
		21	The EAA should continue to look for ways to remove conditions that restrict the pool of potential Applied Research applicants.		Done - continual	No	Yes	Yes		
		22	The EAA should use the data management system being implemented to allow greater data discovery and access by the outside scientific community and the public.		Yes	No	No	Yes	Currently there are no plans or resources to make the database accessible on line. However, EAA is committed to providing all data when requested.	
		23	The cause for the large mortalities of CSRБ at the FAB still need to be definitively identified and resolved through additional study.		No	No	No	No		There have been no recent issues after additional precautions and upgrades were implemented by TXSTATE.
		24	The EAA should be prepared to invest in additional research projects in life history of listed species and sampling techniques that span multiple years, if necessary.		No	No	Yes	Yes	This research is already funded through the refugia program.	

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		25	Monitoring effectiveness of M&M measures should not be part of the Applied Research Program.		TBD?	No	Yes	Yes		While this may be true for long term monitoring, the Applied Research program may be useful for snapshot monitoring questions and issues.
		26	Resources for ongoing data management activities will need to be allocated throughout the lifetime of the HCP.		Yes	No	No	No	Currently there are no resources for ongoing database upgrades.	The original database itself was an unfunded initiative agreed to by EAA
		27	Modeling efforts should become more integral to consideration of future Applied Research projects.		No - was not selected by Research Work Group.	No	Yes, with the caveat that the Applied Research budget only extends until 2019.	Yes		