

## NAS Report 1 Abbreviated Implementation Plan: Biological and Water Quality Monitoring

	Recommended for Implementation	Program Component	Recommendation	Description	Fiscally Feasible	Implementation Strategy	Additional Comments
25	Done - in progress	Biological Monitoring	Measure the distribution of the CSRFB (108:32)	Measuring CSRFB distribution should be a high priority, using a randomized or stratified randomized approach throughout Landa Lake, Spring Island and other areas of potential habitat.	Yes	If this study is conducted to build on the work done by ZARA in 2014, it should be prioritized by the Science Committee as part of the regular Applied Research program.	This study was conducted in 2014 by ZARA environmental as part of the Applied Research program. The study established a distribution during a low flow year, but did not establish a population estimate with confidence. This study could be expanded by conducting again during a normal flow year or attempting to establish a population estimate. It could be done through the 2016 Applied Research program.
26	Done - in progress, part of current program	Biological Monitoring	Continue monitoring index reaches (114:33)	Monitoring of index reaches needs to continue in order to assess trends and build on existing databases.	Yes - currently covered in existing budget.	N/A	This is already part of the Bio Monitoring work plan and program. Recommend to establish a Biological Monitoring Work Group to do a holistic review of the biological monitoring program and its integration with the water quality monitoring program.

## NAS Report 1 Abbreviated Implementation Plan: Biological and Water Quality Monitoring

	Recommended for Implementation	Program Component	Recommendation	Description	Fiscally Feasible	Implementation Strategy	Additional Comments
27	Yes	Biological Monitoring	Develop quantitative sampling methods for the CSRБ (116:1)	New quantitative sampling methods are needed for the CSRБ to complement and improve upon the cotton lure approach. The comprehensive survey of CSRБ distribution proposed as part of the Applied Research Program should be given high priority.	Yes - conduct research as part of the 2016 or 2017 Applied Research program	Add this research to the 2016 and/or 2017 Applied Research work plan; this project should be prioritized by the Science Committee as part of the regular Applied Research program <b>(Immediate Implementation).</b>	*The Science Committee has been discussing this topic at recent meetings. This recommendation should complement their discussions. *Workshop participants generally supported establishment of new methods. *This research would specifically look at methods other than use of the "cotton lure"; but also could be designed to include an "Optimization Study" for the cotton lure. *This research could also be used to determine the composition of the biofilm; or if already established by other researchers, could determine the utilization of the biofilm by the CSRБ.
28	Yes	Biological and Water Quality Monitoring	Increase coordination and integration of the biological monitoring and water quality monitoring programs (115:9)	The bio monitoring and water quality monitoring programs are only loosely integrated. Increased coordination and integration of the bio monitoring and water quality monitoring activities is needed.	Yes - the cost to fund the staff position is available in the Refugia budget.	Create a Water Quality monitoring work group and a Biological monitoring work group to develop a strategy to implement this recommendation <b>(Immediate Implementation).</b>	It is recommended that a Director of Refugia and Covered Species Programs be added to the HCP staff to assist with this workgroup facilitation, analysis and resulting implementation.

## NAS Report 1 Abbreviated Implementation Plan: Biological and Water Quality Monitoring

	Recommended for Implementation	Program Component	Recommendation	Description	Fiscally Feasible	Implementation Strategy	Additional Comments
29	Yes per the NAS RRWG- who also recommended a final determination from a Water Quality monitoring Work Group	Water Quality Monitoring	Enhance nutrient sampling (115:24).	Enhance sampling for nutrients is recommended. It is expected that nutrients and other urban background contaminants may be more important than many of the specific toxins that are currently included in the sampling program. The planned elimination of many of these parameters after one or two initial rounds of sampling if significant detections are not observed is supported by the NAS.	Potentially - for this component to be added to the water quality program, another of equal fiscal impact would need to be removed.	Create a Water Quality monitoring work group to develop a strategy to implement this recommendation.	<p>*As several years of data have been collected under the HCP Water Quality program and much has been learned, it is time to take a step back and revisit the Water Quality monitoring program from a holistic approach. It is recommended that a work group be formed to consider all NAS Water Quality monitoring recommendations and look for needed modifications based on data collected.</p> <p>*Additionally it is recommended that a Director of Refugia and Covered Species Programs be added to the HCP staff to assist with this workgroup facilitation, analysis and resulting implementation.</p>

## NAS Report 1 Abbreviated Implementation Plan: Biological and Water Quality Monitoring

	Recommended for Implementation	Program Component	Recommendation	Description	Fiscally Feasible	Implementation Strategy	Additional Comments
30	Yes, per the NAS RRWG - who also recommended a final determination from a Water Quality monitoring Work Group.	Water Quality Monitoring	Conduct additional residential herbicide, residential chemicals, and personal care product testing (113:9)	Household chemicals, personal care products and residential herbicides should be evaluated for their potential to be introduced into the springs and river systems.	Potentially - for this component to be added to the Water Quality monitoring program, another of equal fiscal impact would need to be removed.	Create a Water Quality monitoring work group to develop a strategy to implement this recommendation.	<p>*As several years of data have been collected under the HCP water quality monitoring program and much has been learned, it is time to take a step back and revisit the water quality monitoring program from a holistic approach. It is recommended that a work group be formed to consider all NAS water quality monitoring recommendations and look for needed modifications based on data collected.</p> <p>*Additionally it is recommended that a Director of Refugia and Covered Species Programs be added to the HCP staff to assist with this workgroup facilitation, analysis and resulting implementation.</p>
31	TBD- per the NAS RRWG - who also recommended a final determination from a Biological monitoring Work Group	Biological Monitoring	Provide a clear mechanism to scale results to the entire spring and reach system (115:1)	The sampling programs do not provide a clear mechanism to scale results to the entire spring and reach system. It may be necessary to provide system-wide estimates of population densities.	No - the Bio Monitoring Budget is already maxed out. For this sampling to be added, another component would need to be dropped. This addition would more than likely be a big ticket item with annual cost over the term of the ITP.	Create a Biological monitoring work group to develop a strategy to implement this recommendation.	<p>*The NAS RRWG discussed that the purpose of expanding the index reaches (system wide representation) has not been determined. If this is considered, a rationale as to why a system wide representation is needed for ITP compliance should be developed.</p> <p>*The Biological Goals and Objectives are tied to the previously identified reaches, not the entire river system.</p> <p>* NAS themselves comments that this is necessary only if desired.</p>

# NAS Report 1 Abbreviated Implementation Plan: Biological and Water Quality Monitoring

	Recommended for Implementation	Program Component	Recommendation	Description	Fiscally Feasible	Implementation Strategy	Additional Comments
32	No- per the NAS RRWG - who also recommended a final determination from a Biological monitoring Work Group	Biological Monitoring	Increase the frequency of sampling in Comal Springs system (106:7)	Because of the apparent sensitivity and variable response of SAV to flow conditions, particularly in the Comal River, it would be best to either sample the total river more frequently than every five years or increase and/or randomize the sampling locations if a more accurate representation of SAV throughout the river is desired. The above sampling methods do not include data needed for the SAV modeling efforts, i.e., plant biomass. For dominant species and species specifically used in the modeling process, biomass data should be collected annually (and may need to be collected multiple times during the growing season to estimate specific growth rates) to validate the percent cover data and to provide accurate data for the SAV model.	No - the Bio Monitoring Budget is already maxed out. For this sampling to be added, another component would need to be dropped. This addition would more than likely be a big ticket item with annual cost over the term of the ITP.	N/A	*Originally, the Variable Flow sampling was conducted 4 times a year. It has since been reduced to twice a year as it was determined there was no additional advantage to sampling a higher frequency. *The NAS RRWG discussed the consistency in data sets and lack of variability in most parameters, leading to the questioning of why implementation of this recommendation would be needed.

## NAS Report 1 Abbreviated Implementation Plan: Biological and Water Quality Monitoring

	Recommended for Implementation	Program Component	Recommendation	Description	Fiscally Feasible	Implementation Strategy	Additional Comments
33	No	Biological Monitoring	Conduct special studies on the fountain darter (106:47)	These special studies could be performed for a limited time to confirm or even improve the interpretation of the standard year-to-year monitoring. One set of studies could be designed to address the representativeness of the index reaches, and to benchmark the degree of uncertainty when index information is extrapolated to the regional or system level.	No - the Bio Monitoring Budget is already maxed out. For this sampling to be added, another component would need to be dropped.	If this recommendation was implemented, it should be prioritized by the Science Committee as part of the regular Applied Research program.	<p>*The purpose of expanding the index reaches to representative reaches (system wide representation) has not been determined. If this is considered, a rationale as to why a system wide representation is needed for ITP compliance should be developed.</p> <p>*The Biological Goals and Objectives are tied to the previously identified reaches, not the entire river system.</p> <p>* NAS themselves comments that this is necessary only if desired.</p>
34	No	Biological Monitoring	Expand macro invertebrate surveys (110:5)	Macro invertebrate surveys should be expanded to habitats that are not currently being evaluated to provide information on the overall health of the aquatic ecosystem, similar to what is done for surface waters throughout the United States as part of national bio assessment programs	No - the Bio Monitoring Budget is already maxed out. For this sampling to be added, another component would need to be dropped.	Create a Biological monitoring work group to develop a strategy to implement this recommendation.	<p>*The participants in the NAS Report #1 workshop supported this recommendation, but did not identify how it contributed to compliance or the Biological Goals.</p> <p>*Macroinvertebrate sampling is typically performed to monitor the health of an aquatic system; the health of the Comal and San Marcos system is being monitored by other components of the monitoring programs.</p> <p>*Macroinvertebrate sampling in the HCP was to originally performed to populate the Ecological model. That effort is now close to complete, and new data would not be generated in time to be used by the modeling team.</p>

## NAS Report 1 Abbreviated Implementation Plan: Biological and Water Quality Monitoring

	Recommended for Implementation	Program Component	Recommendation	Description	Fiscally Feasible	Implementation Strategy	Additional Comments
--	--------------------------------	-------------------	----------------	-------------	-------------------	-------------------------	---------------------

**Clarifying Statements**

All aspects of this table are Science components

None of the recommendations are required for compliance except for #26

All recommendations are operationally and/or politically feasible

None of the recommendations are fatal flaws of the program or support achieving biological goals/objectives

DRAFT