

Work Task C59: Selenium Monitoring in Created Backwater and Marsh Habitats

FY16 Estimate	FY16 Actual Obligations	Cumulative Expenditures Through FY16	FY17 Approved Estimate	FY18 Proposed Estimate	FY19 Proposed Estimate	FY20 Proposed Estimate
\$200,000	\$167,129.76	\$141,782.16	\$160,000	\$160,000	\$160,000	\$160,000

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Start Date: FY13

Expected Duration: FY25

Long-Term Goal: To develop a long-term selenium monitoring plan for the LCR MSCP

Conservation Measures: MRM2 and MRM5 (BLRA, BONY, CLRA, and RASU)

Location: Big Bend Conservation Area (BBCA), Hart Mine Marsh, and the Imperial Ponds Conservation Area

Purpose: To evaluate the selenium levels within created backwater and marsh habitats and establish a selenium monitoring plan as required by the Habitat Conservation Plan

Connections with Other Work Tasks (Past and Future): Monitoring for selenium will be conducted for habitat created through Conservation Area Development and Management (Section E) work tasks (E1, E9, E14, E15 [closed], E16, E25, E27, and E28) and will be incorporated into Post-Development Monitoring (Section F) work tasks (F1, F3, F5, and F7).

Project Description: As described in the Habitat Conservation Plan conservation measures, 512 acres of marsh and 360 acres of backwaters are being developed under the LCR MSCP as part of its habitat creation goals. These created habitats will be monitored over the 50-year term of the program to ensure that they maintain their function for all associated covered species. Sampling efforts will be implemented or continued at designated project sites for the purpose of determining the baseline or changes in selenium concentrations. The initial sampling phase is expected to provide a representative baseline sample and assessment of variability across each site. Once this information is known, a long-term selenium monitoring plan can be recommended for each specific conservation area to be carried out under the appropriate Post-Development

Monitoring (Section F) work task. This baseline sampling phase may be established through a 1- or 2-year approach. If initial levels of detected selenium are well below thresholds of concern, a long-term selenium monitoring plan may be developed that requires less sampling over time. If there is some concern regarding the initial levels of selenium, second-year followup sampling may be conducted to ascertain the relative rate of accumulation of selenium so that a more appropriate long-term monitoring plan can be established. A multi-year sampling protocol will be developed to provide a larger dataset on which management decisions can be based through the adaptive management process. Subsequent years' sampling may be reduced as appropriate, and the frequency and levels of sampling intensity are expected to vary from site to site. Accordingly, annual expenditures are also expected to vary based on these levels of effort. As new conservation areas are developed, this exploratory sampling phase will continue to be accomplished under this work task.

Previous Activities: Sampling sites were identified in FY14 and included the BBCA, Hart Mine Marsh, and the Imperial National Wildlife Refuge (Imperial NWR). Selenium monitoring was initiated in FY15 with the collection of water and substrate samples from the BBCA, Hart Mine Marsh, and the Imperial NWR. It was determined from the results of the analyses of water samples from the Imperial NWR that the levels of dissolved selenium were below threshold water quality standards for fishes and wildlife. Selenium concentrations were elevated in individual samples from the BBCA and Hart Mine Marsh, but the remaining samples contained concentrations below detection limits. It was determined from the results of the analyses of sediment samples from all three sites that the reported total selenium concentrations below detectable levels.

In addition to the three sites identified above, a fourth site was also sampled to collect baseline data for the reopening of Work Task E13. Water, substrate, plankton, and whole body fish samples were collected from McAllister Lake during FY15. Analyses of water and periphyton samples determined selenium concentrations to be well below threshold standards for fishes and wildlife. Selenium concentrations were highest in sediment, plankton, and particularly in fish tissue samples, indicating a potential concern for accumulation. The selenium levels in McAllister Lake will need to be monitored into the future.

FY16 Accomplishments: Selenium monitoring continued in FY16 with the collection of water samples from the BBCA, Hart Mine Marsh, Imperial NWR, and McAllister Lake. Analyses of water samples focused on determining concentrations of dissolved selenium, selenite, and selenate found within the water column at each site. Analyses from the Imperial NWR determined that current levels of all three analytes are well below threshold water quality standards for fishes and wildlife. Similar results were observed at Hart Mine Marsh and McAllister Lake, with dissolved selenium concentrations below 0.4 micrograms per liter ($\mu\text{g/L}$) and selenite and selenate concentrations below 0.1 $\mu\text{g/L}$. The BBCA had the highest reported concentration of dissolved

selenium (1.2 µg/L), and selenite and selenite concentrations similar to those found at Hart Mine Marsh (0.1 µg/L); however, both of these concentrations are still below threshold water quality standards for fishes and wildlife.

In addition to field work conducted in FY16, an Interagency Agreement with the U.S. Fish and Wildlife Service Arizona Ecological Services Field Office was also completed, which will allow for continued selenium monitoring of created backwater and marsh habitat through FY21. Under this agreement, quarterly sampling events will occur during each project year. It is anticipated that multiple sample types will be collected during each event, which may include water, sediment, plankton, macroinvertebrates, and/or fish tissue samples. Collection of this more inclusive suite of sample types will likely provide a better understanding of potential impacts to covered species present at LCR MSCP project areas.

FY17 Activities: Selenium monitoring will continue with quarterly sampling events at up to five LCR MSCP conservation areas. Laboratory analyses of the full sample suite will be compared to selenium thresholds suggested by the U.S. Fish and Wildlife Service for aquatic species, and quarterly activity reports will summarize data as they become available. An annual report will be prepared following receipt of all laboratory analyses.

Proposed FY18 Activities: Selenium monitoring will continue at identified LCR MSCP conservation areas. Specific work proposed will be similar to the previous year and will include collecting samples from each site, analyzing collected samples, comparing extant selenium levels to known thresholds, and summarizing data. Additional sites may also be included for pre- and/or post-development sampling as they are identified. Individual site evaluations will be conducted for each new site in order to determine sampling locations, number of samples, and expected level of effort.

Pertinent Reports: An annual report will be prepared following the FY17 study year.