Lower Colorado River Multi-Species Conservation Program

Balancing Resource Use and Conservation

Beal Lake Conservation Area

Fiscal Year 2013 Annual Report

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

May 2017

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National Park Service
Bureau of Land Management
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Lower Colorado River Multi-Species Conservation Program

Beal Lake Conservation Area

Fiscal Year 2013 Annual Report

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ACRONYMS AND ABBREVIATIONS

BLCA	Beal Lake Conservation Area
BO	Biological and Conference Opinion
DO	dissolved oxygen
FY	fiscal year
Havasu NWR	Havasu National Wildlife Refuge
LCR MSCP	Lower Colorado River Multi-Species Conservation Program
pH	the acidity or basicity (alkalinity) of an aqueous solution
PIT	passive integrated transponder
Reclamation	Bureau of Reclamation
RPA	Reasonable and Prudent Alternative
USFWS	U.S. Fish and Wildlife Service

Symbols

µS/cm	microsiemens per centimeter
%	percent

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1.0 INTRODUCTION

The purpose of this annual report is to summarize all activities that have occurred at the Beal Lake Conservation Area (BLCA) from October 1, 2012, through September 30, 2013, which is Federal fiscal year (FY) 2013, and projected activities for FY14. Water usage is presented for the calendar year, January 1 through December 31, 2013, consistent with water accounting reporting.

1.1 Background

The Bureau of Reclamation's (Reclamation) Lower Colorado Regional Office, in partnership with the Havasu National Wildlife Refuge (Havasu NWR), initiated the backwater improvement project at Beal Lake and subsequently riparian restoration to meet the conditions of compliance set forth by the 1997 Biological and Conference Opinion (BO) issued by the U.S. Fish and Wildlife Service (USFWS) under the guidance of the Endangered Species Act. The riparian area was initially used to test and demonstrate restoration and management techniques.

In 2001, Beal Lake was dredged to create a refuge for native fishes. The dredge material was distributed over the adjacent area to be planted with native riparian vegetation. The riparian restoration area was constructed in two phases: the first started in 2002 and the second in 2004. Details of the plantings in each field can be found in the 2005 annual report (Reclamation 2005). The project area, which is divided into fields that can be independently irrigated and managed, was designed to provide an area to test various riparian restoration methods and techniques for site preparation, planting, irrigation, monitoring, managing, and maintenance.

As the test fields grew into established stands of native trees, several Lower Colorado River Multi-Species Conservation Program (LCR MSCP) targeted species began to inhabit the site, and in April 2010, the site was approved as the BLCA by the program's Steering Committee. The BLCA contributes approximately 116 acres of Fremont cottonwood-Goodding's willow (*Populus fremontii-Salix gooddingii*) (hereafter cottonwood-willow), marsh, honey mesquite (*Prosopis glandulosa*) and screwbean mesquite (*Prosopis pubescens*) land cover types (figure 1) toward the acreage goals of the LCR MSCP, and it continues to contribute valuable information about restoration techniques and management practices.

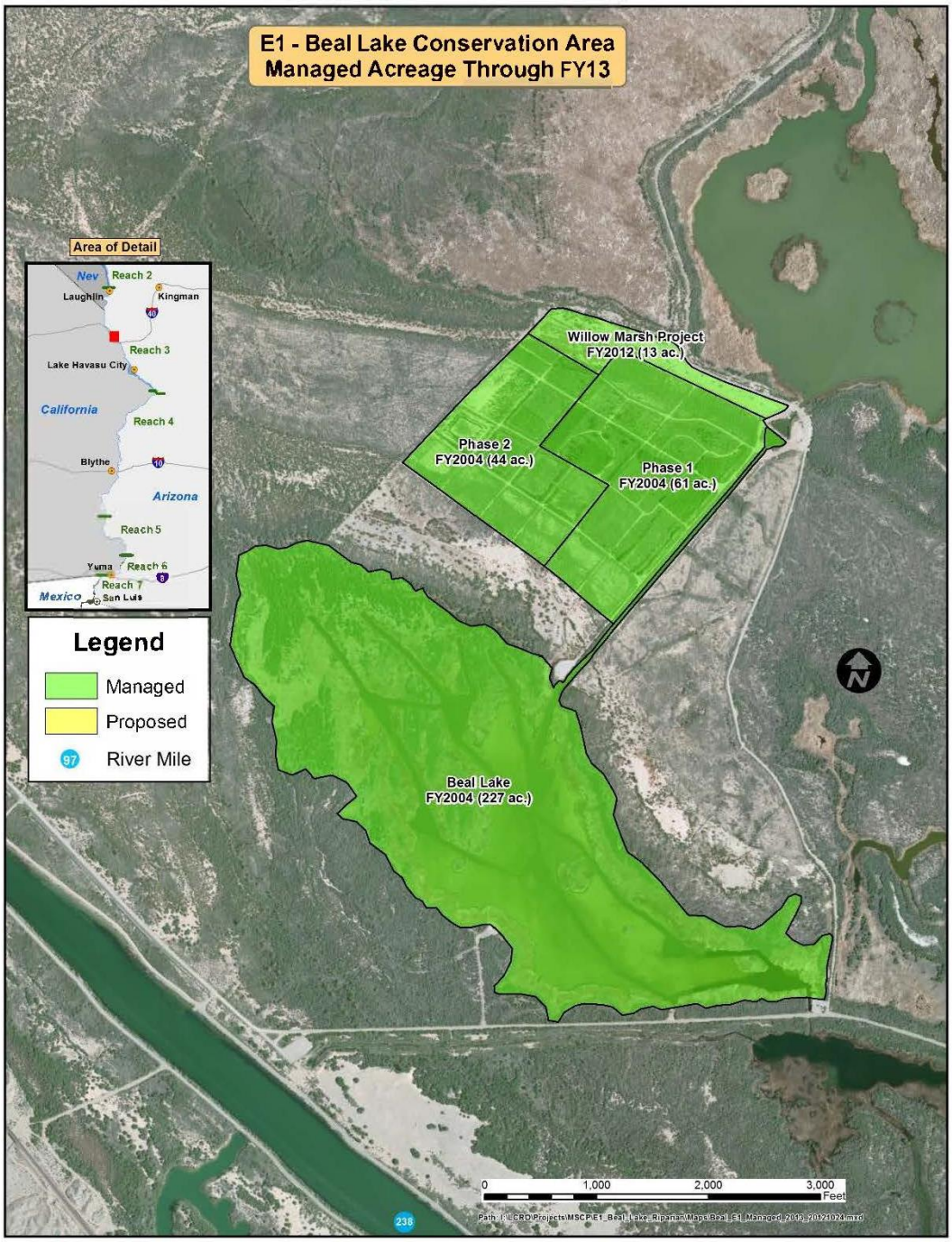

Figure 1.—BLCA managed acreage, FY13.

2.0 CONSERVATION AREA SITE INFORMATION

2.1 Purpose

The BLCA was developed both for native fishes and terrestrial wildlife species. The lake is intended to be managed for the razorback sucker (*Xyrauchen texanus*) and bonytail (*Gila elegans*) and is a continuation of the commitment to construct habitat for native fishes under the 1997 BO and does not provide creditable land cover acreage to the LCR MSCP. The riparian restoration area provides habitat for a variety of avian and small mammal species and provides creditable land cover type acreage to the program. Irrigation cycles for the riparian restoration area are evaluated annually to determine if conditions are appropriate for the species targeted by the LCR MSCP, specifically the southwestern willow flycatcher (*Empidonax trailii extimus*).

2.2 Location

The BLCA is located in Reach 3, between the Colorado River and Topock Marsh, on the Havasu NWR, near Needles, California. It is within the historic flood plain of the lower Colorado River and adjacent to River Mile 237 on the Arizona side (figure 2).

2.3 Land Ownership

The BLCA is located on the Havasu NWR, which is owned and managed by the USFWS.

2.4 Water

The BLCA receives water from the Havasu NWR's 2nd and 3rd priority water entitlement provided by the 1964 Supreme Court Decree in *Arizona* v. *California* and by U.S. Department of the Interior Secretarial reservation. Havasu NWR's entitlement of 37,339 acre-feet per year consumptive use and 41,839 acre-feet diversionary right of Colorado River water is used to fill Topock Marsh through two instrumented inlet canals. The water used for irrigation at the BLCA is supplied from Topock Marsh.

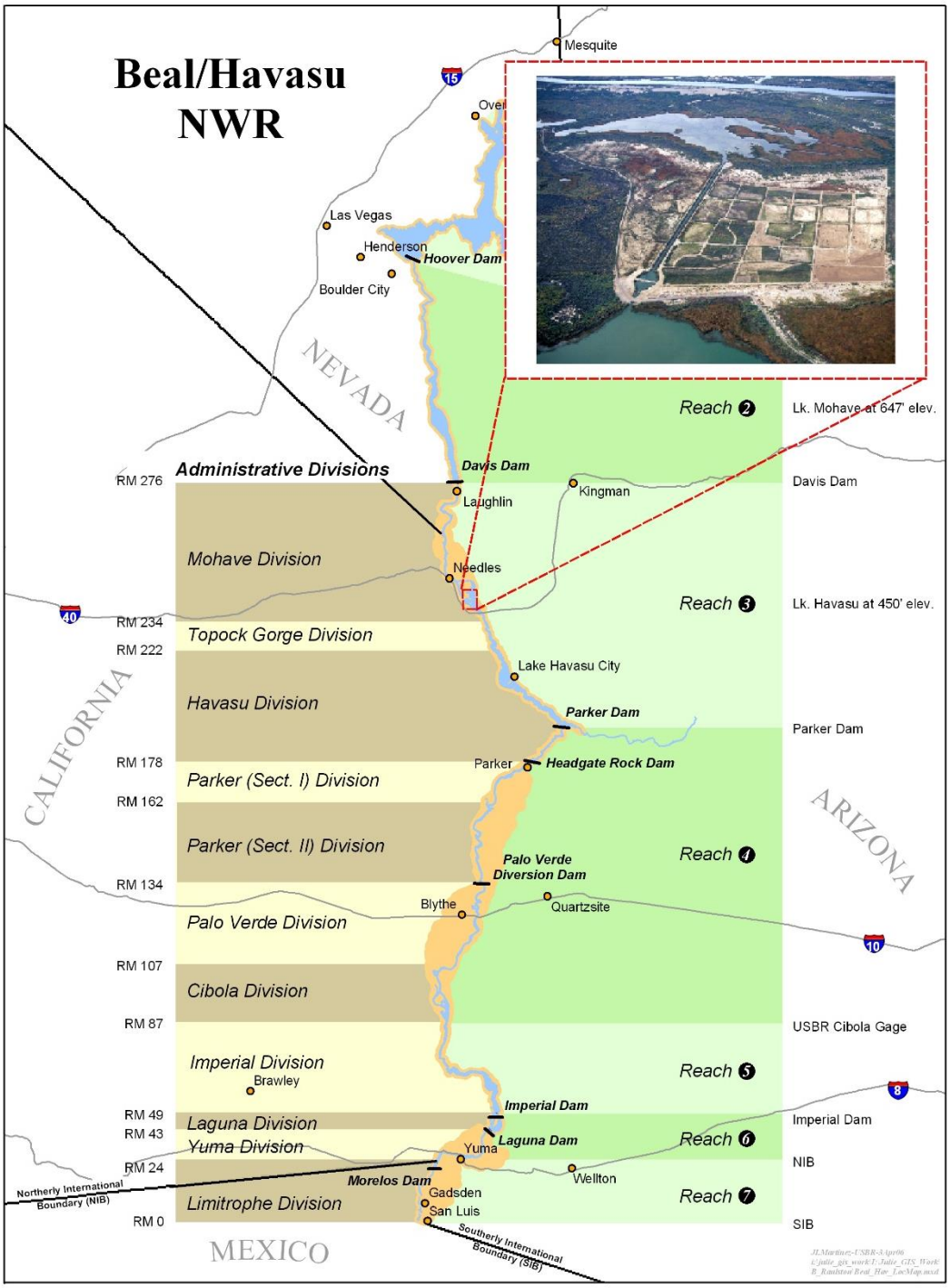

Figure 2.—The location of the BLCA.

2.5 Agreements

A Land Use Agreement was signed in 2010 by Reclamation and the USFWS to secure land and water for the BLCA for the remainder of the 50-year LCR MSCP. The agreement outlines the rights and responsibilities of each partner in the project's development and maintenance.

2.6 Public Use

The BLCA is in an area that was closed to the public by the USFWS prior to becoming a conservation area, and it remains closed to the public.

2.7 Law Enforcement

Law enforcement activities at the BLCA are performed primarily by the USFWS's law enforcement officer under the LCR MSCP's site-specific Fire Management & Law Enforcement Strategy (Reclamation 2010). Additional local law enforcement assistance is available through the Arizona Game and Fish Department's Kingman Office, the Mohave County Sherrif's Office, and the Bureau of Land Management's Lake Havasu Field Office.

2.8 Wildfire Management

The USFWS will provide an appropriate management response to all wildfires that occur within the BLCA. The full range of suppression strategies is available to managers provided that selected options do not compromise firefighter and public safety, are cost effective, consider the benefits of suppression and the values to be protected, and are consistent with resource objectives (Reclamation 2010).

3.0 HABITAT DEVELOPMENT AND MANAGEMENT

3.1 Planting

Fields J and E were cleared to prepare them for seeding of Goodding's willow for the Lassenite Pozzolan Soil Amendment Study. This study aims to evaluate if the amendment of Lassenite Pozzolan at an application rate of 5% in the top 6 inches of soil will enhance the germination success of Goodding's willow (Geosystems Analysis, Inc. 2013).

3.2 Irrigation

The fields at the BLCA are independently flood irrigated from one alfalfa valve positioned in a corner of each field (figure 3). The fields are irrigated on a schedule that prioritizes establishing newly planted vegetation, creating microclimate conditions for LCR MSCP species, and preventing salts from accumulating in the soil. The fields recently planted or seeded with native vegetation are irrigated on a weekly basis, while fields with established stands of trees are either frequently irrigated to create microclimate conditions for covered species or are put on a reduced irrigation schedule to merely keep salts from accumulating in the soil.

Figure 3.—Overview of the BLCA.

The groundwater at the BLCA fluctuates both seasonally and spatially throughout the site. In summer, groundwater elevations at the BLCA are shallow, generally ranging between 2 and 8 feet below the ground surface due to high riverflows and higher elevations in Topock Marsh. Given the shallow water table, established stands of native trees have access to groundwater and, therefore, require irrigation only to keep soil salinity levels from increasing over time.

During the 2013 irrigation season, a total of 1,075 acre-feet of water was applied to the BLCA riparian fields compared to 1,017 acre-feet of water in 2012. The increase in irrigation water was due to the two demonstration fields being irrigated through the month of October.

A detailed weekly irrigation schedule (by habitat cell) is prepared prior to each growing season. As the growing season progresses, small changes are made to benefit resource conservation. Rain, temperature, humidity level, groundwater elevation, etc., factor into weekly irrigation management.

3.3 Site Management

Irrigation, maintenance, and cleaning of the wedge-wire screens were conducted at the BLCA from mid-March through mid-September. Routine maintenance (oil changes, fuel filters, fueling, etc.) was performed on the irrigation pump throughout the year.

The 0.6-mm wedge-wire screens that supplement the flow of water through the semipermeable rock structure, which filters water to exclude predatory fishes before entering Beal Lake, were manually scrubbed every other week during the irrigation season and every month during the off-season.

Road grading and improvements were conducted in September 2013. As annual rains and vehicle usage degrade the existing roads, equipment and road base must be brought in to maintain good driving surfaces.

4.0 MONITORING

4.1 Backwater Monitoring

A variety of techniques and gear types are used to sample and monitor the fish populations in Beal Lake and may include trammel netting, hoop netting, electrofishing, and remote passive integrated transponder (PIT) tag scanning. Monitoring information collected from Beal Lake is used to estimate native fish abundance, characterize fish species composition in the lake, and measure habitat and water quality parameters. These data are intended to be used to help inform management of the lake for native fishes. There were no native fishes stocked in FY13.

4.1.1 Native Fishes

Beal Lake continues to be managed cooperatively by the USFWS Arizona Fishery Resources Office in Parker, Arizona, and the LCR MSCP. This

management has included the stocking and monitoring of both razorback suckers and bonytail. The lake is also occupied with a variety of non-native fish species. In 2013, activities at Beal Lake included fish surveys and water quality zooplankton, and algae monitoring.

A large fishkill was observed in early March 2013 when 20–30 adult carp (*Cyprinus carpio*) were seen floating on the surface. A followup trip was made 2 weeks later, and no live fishes were observed anywhere in the backwater. Fish monitoring surveys were limited to 1 day of electrofishing in April and 3 days of remote PIT scanning in May. No live fishes were found during the electrofishing survey, and the three PIT scanning units accounted for 7,896 scanning minutes and resulted in zero contacts.

On April 3, water quality specialist Mark Dahlberg (Arizona Game and Fish Department) was called out to help identify the potential cause of the fishkill. Water samples were collected, and a subsequent analysis confirmed the presence of golden algae (*Prymnesium parvum*) – an organism that can produce a toxin that can kill fish and other gill-breathing life forms.

Prior to the fishkill, the last razorback sucker population estimates were conducted in May 2012 using remote PIT scanners. The estimated razorback sucker population for Beal Lake was 34 fish (figure 4). No other fish surveys occurred in 2013; however, personnel routinely looked for signs of fish during the monthly golden algae surveys.

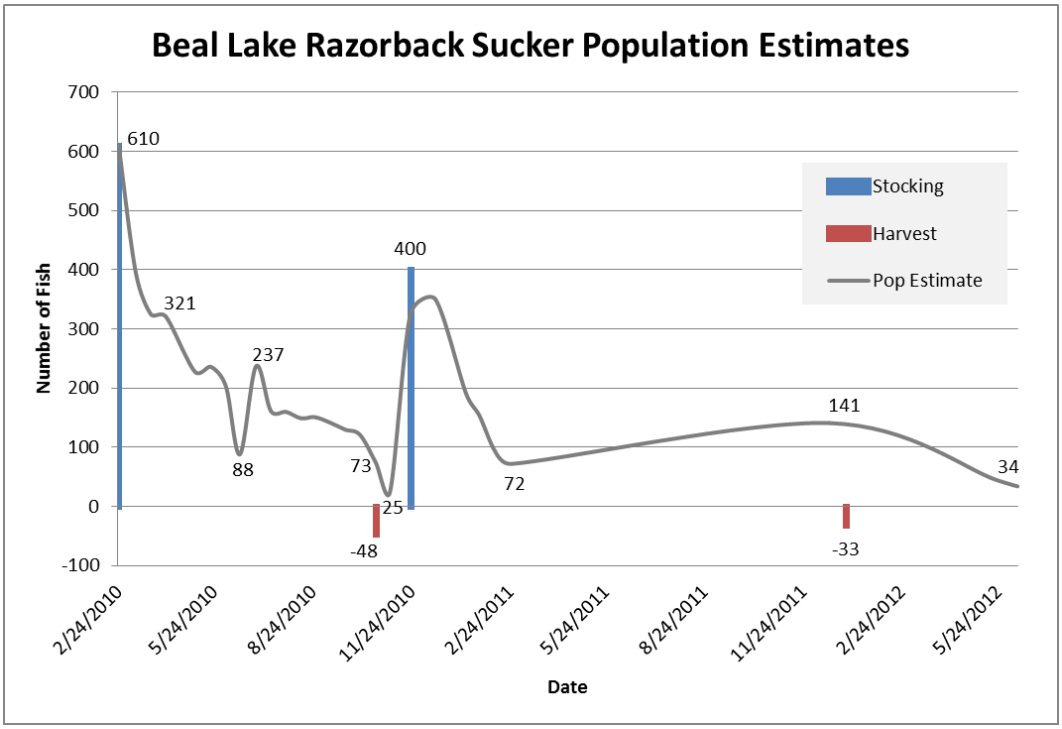

Figure 4.—Beal Lake 2010–12 razorback sucker population estimates.

4.1.2 Water Quality Monitoring

Four permanent water quality stations have been equipped with Troll 9500 multi-parameter probes since May 2010. The probes are deployed throughout the backwater to measure dissolved oxygen (DO), temperature, pH, and specific conductivity. The values for these parameters rarely exceeded the suggested management guidelines for razorback suckers, with the exception of a few instances; when this has occurred, the readings have been geographically limited to one or two of the water quality stations and have not been typically observed lake-wide. Daily and annual cycling of these parameters have been documented and are relatively stable in the backwater (figures 5–8); the only exception is the annual increase in specific conductivity. The specific conductivity values have increased steadily from approximately 3,000 microsiemens per centimeter (µS/cm) following the 2006 pump down/renovation, and they are now in excess of 7,000 µS/cm, which was observed in summer 2013. This steady rise in conductivity is common for terminal lakes in this region, but it can be ameliorated via pumping or other methods of dilution.

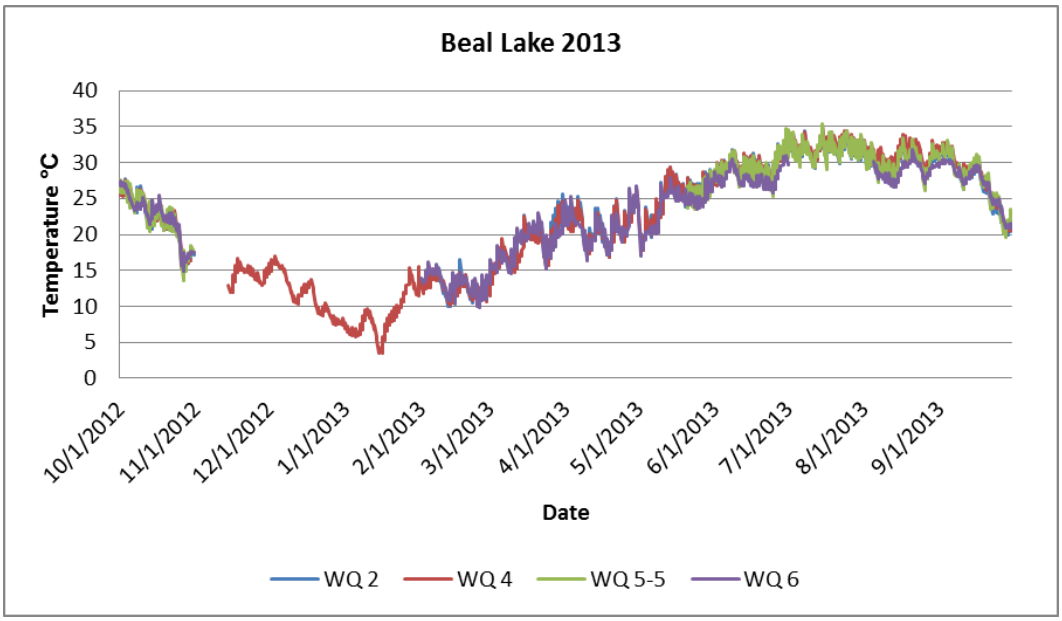

Figure 5.—2013 Beal Lake water temperature.

4.1.3 Phytoplankton and Zooplankton

Phytoplankton and zooplankton monitoring was conducted quarterly at Beal Lake throughout the year and all samples were taken from the four water quality stations Troll 9500 probes were deployed. Samples were collected from the entire water column using standardized vertical sampling methods and were analyzed

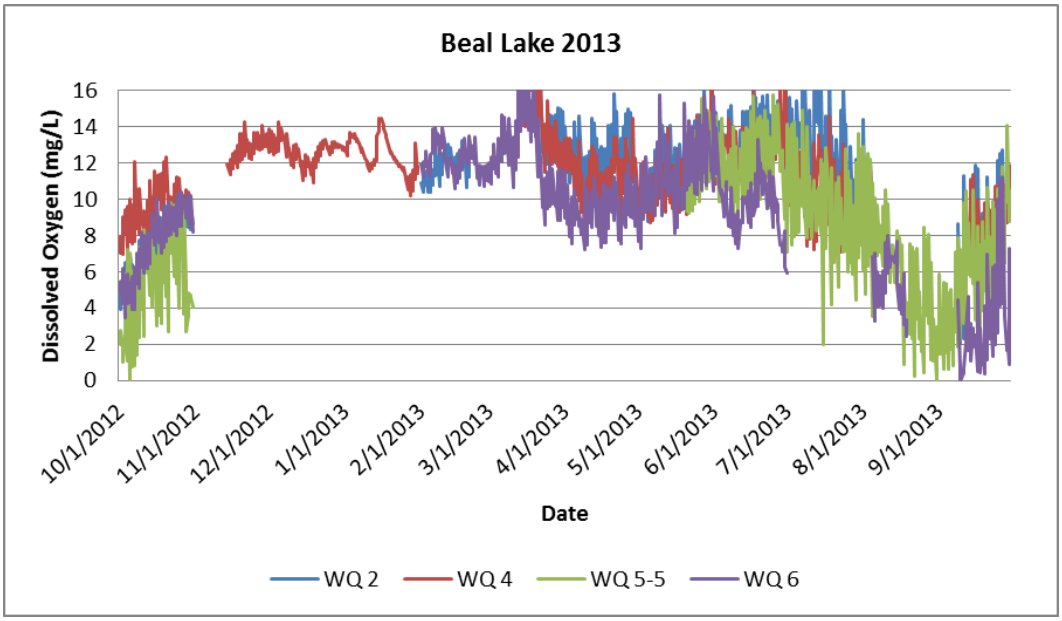

Figure 6.—2013 Beal Lake DO.

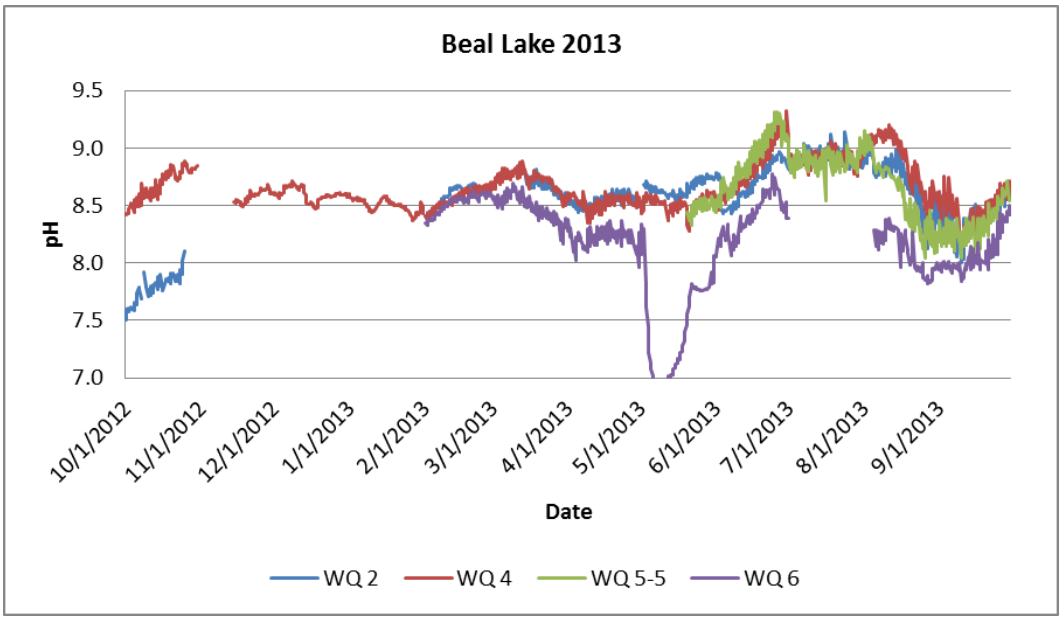

Figure 7.—2013 Beal Lake pH.

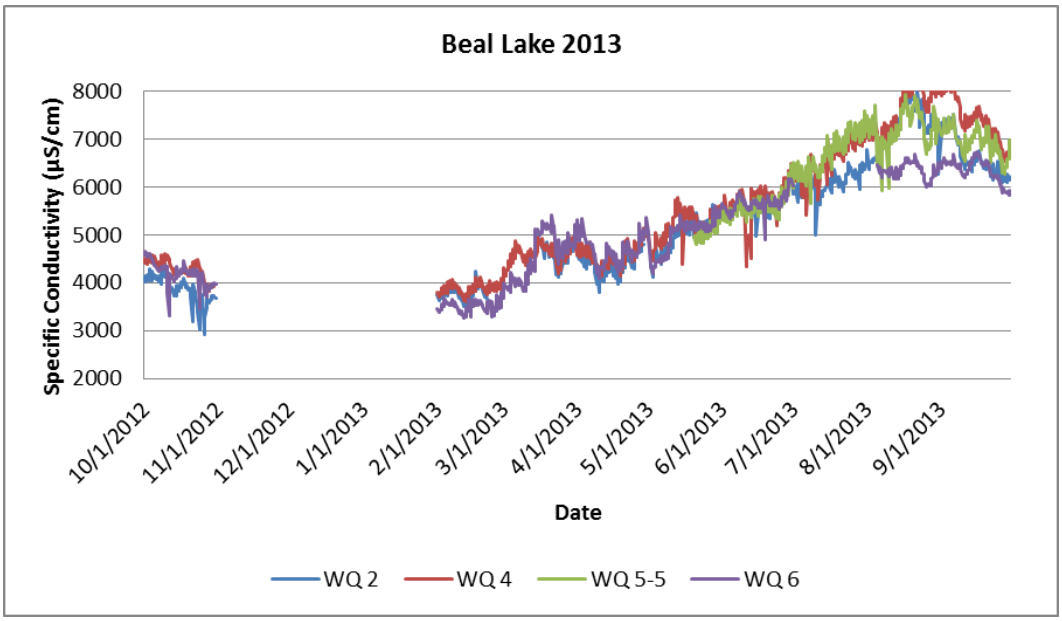

Figure 8.—2013 Beal Lake specific conductivity.

for relative abundance and total biomass (figure 9). Both the phytoplankton and zooplankton results were considered relatively low for backwater-type environments, but they are regionally comparable to other backwater habitats. The results for total phytoplankton biomass show it as seasonally variable, and there have been spring spikes in each of the past 2 years.

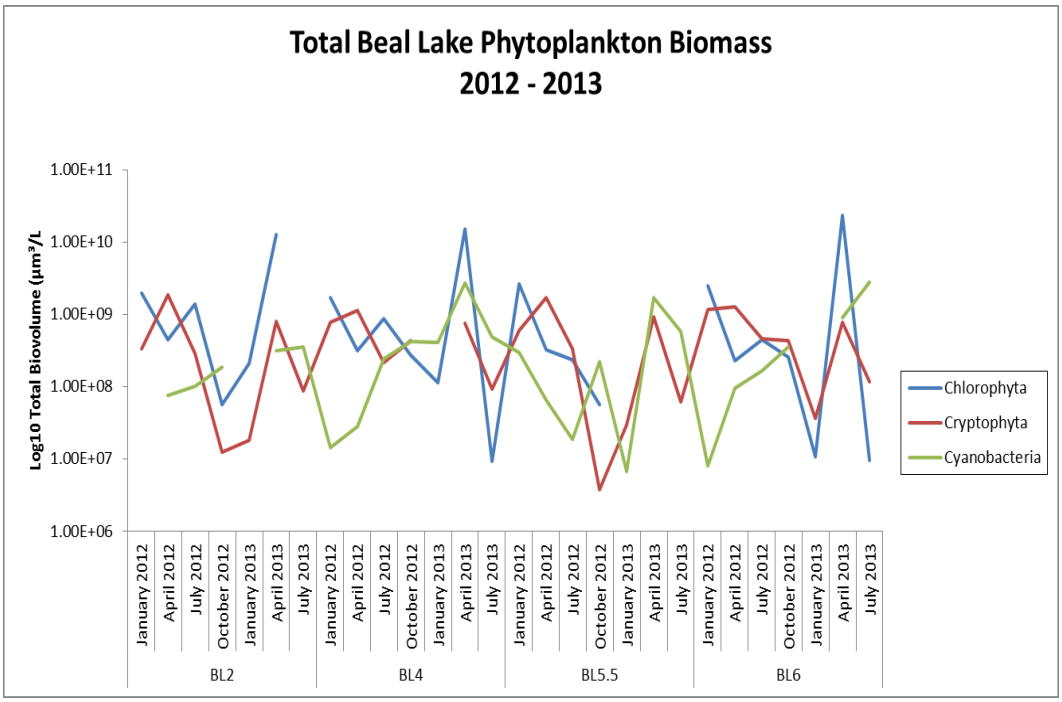

Figure 9.—Beal Lake total phytoplankton biomass.

4.1.4 Golden Algae Monitoring

Monthly golden algae monitoring was initiated immediately following the fishkill that occurred in April 2013. The algae were present in the April and May samples, but then they were not detected for the remainder of the year (figure 10). Golden algae are considered to be a cool water alga, and these results were not surprising considering the mean water temperatures were in excess of 25 degrees Celsius by June 1, 2013, and remained at or above this level through mid-September.

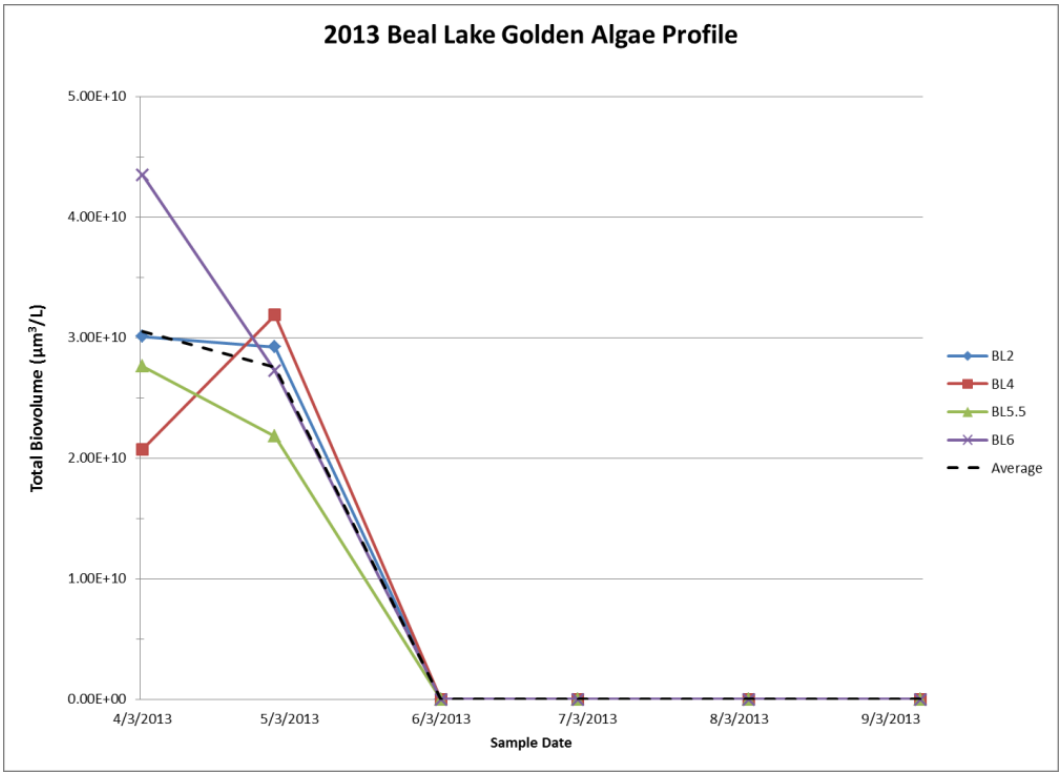

Figure10.—2013 Beal Lake golden algae biovolume.

4.2 Avian Monitoring

Avian monitoring in 2013 included surveys for southwestern willow flycatchers, yellow-billed cuckoos (*Coccyzus americanus occidentalis*), marsh birds, and riparian breeding birds as well as bird migration monitoring at a Monitoring Avian Productivity and Survivorship Station.

4.2.1 Southwestern Willow Flycatcher Surveys

The riparian portion of the BLCA was surveyed five times for southwestern willow flycatchers from May 1 through August 31, 2013. All of the birds

detected after June 15 were considered to be southwestern willow flycatchers. Birds detected before June 15 were considered migrant willow flycatchers (*E. trailli*).

One unpaired southwestern willow flycatcher was detected from June 10 to June 20, 2013. This individual was detected in the same area for more than 7 days and is, therefore, considered a resident; it is also considered to be a southwestern willow flycatcher (McLeod and Pellegrini 2014).

4.2.2 Yellow-billed Cuckoo Surveys

Five surveys for yellow-billed cuckoos were conducted within the riparian portion of the BLCA. The cuckoos were detected on four of the five surveys conducted between June 21 and August 12, 2013. Five individuals were detected on June 21, two individuals were detected on July 5, two individuals were detected on July 18, and one individual was detected on July 31. There was one confirmed pair and one possible pair breeding at the BLCA in 2013 (McNeil and Tracy 2013).

4.2.3 Marsh Bird Surveys

Presence/absence surveys for marsh bird species were conducted at the BLCA in March and April. Nine points were surveyed in the existing lake portion of the BLCA, and three points were surveyed in the created willow marsh (survey points established in 2013). Call-playback surveys for the California black rail (*Laterallus jamaicensis coturniculus*), western least bittern (*Ixobrychus exilis hesperis*), Virginia rail (*Rallus limicola*), and Yuma clapper rail (*Rallus longirostris yumanensis* [also known as Yuma Ridgway's rail = *R. obsoletus yumanensis*]) were performed using a standardized protocol from the National Marsh Bird Monitoring Program (Conway 2008; U.S. Fish and Wildlife Service 2003, 2006). All 12 stations were surveyed once in March and once in April 2013. Four western least bitterns were detected within the existing lake, and there were no covered species detected within the created willow marsh. The western least bittern showed probable breeding evidence (Kahl 2015).

4.2.4 General Bird Surveys

Bird surveys were conducted using a double sampling area search method to determine use by breeding LCR MSCP riparian bird species. Surveys were only conducted on portions of the conservation areas with more than 2 years' growth A total of 20 species (146 pairs) of birds were detected breeding within the habitat at the BLCA. The Arizona Bell's vireo (*Vireo bellii arizonae*), Sonoran yellow warbler (*Dendroica petechia sonorana = Setophaga petechia sonorana*), and summer tanager (*Pirangra rubra*) were confirmed breeding. One Gila woodpecker (*Melanerpes uropygialis*), nine yellow warblers (*D. petechia*), and

two migrant willow flycatchers (*E. trailli*) were observed but not confirmed breeding. Table 1 shows the number of covered bird species detected breeding at the BLCA in FY13 (Great Basin Bird Observatory 2014).

Table 1.—LCR MSCP covered bird species detected breeding at Beal Lake, FY13

LCR MSCP covered species detected	Number of confirmed breeding pairs
Arizona Bell's vireo	13
Sonoran yellow warbler	20
Summer tanager	2
Western yellow-billed cuckoo	1

A bird banding station was operated 10 times from May 1 through July 30, 2013. Three Arizona Bell's vireos, seven yellow warblers, and two summer tanagers were captured and fitted with color bands. One summer tanager was recaptured from 2011 and one from 2012. One yellow warbler was recaptured, and one was resighted; both were from 2011. One Arizona Bell's vireo from 2011 was resighted (Dodge and Kahl 2015).

4.3 Small Mammal Monitoring

4.3.1 Bat Monitoring

Acoustic and capture survey methods were used to monitor bats to document the presence of species using the BLCA and to determine the age, sex, and reproductive status of bats that were captured.

4.3.1.1 Acoustic Surveys

One long-term monitoring station was operated in Field K to continuously monitor bat activity at the site. Table 2 summarizes the total number of bat minutes by month for the four LCR MSCP species in FY13. A bat minute is the number of minutes that at least one bat call is recorded for a species regardless of how many calls are recorded within any 1-minute interval. The method of using bat minutes reduces the bias of a single bat being recorded multiple times within a single minute. All four LCR MSCP covered and evaluation species were detected (Broderick 2016).

Table 2.—Total bat minutes by month at the BLCA, FY13

Month	Common name			
	Western red bat[1]	Western yellow bat[2]	California leaf-nosed bat[3]	Pale Townsend's big-eared bat[4]
October	41	9	9	1
November	82	3	0	1
December	15	15	0	0
January	3	2	0	0
February	4	1	0	0
March	35	7	0	0
April	38	9	1	1
May	39	9	1	0
June	43	8	1	2
July	59	15	1	2
August	79	19	7	0
September	32	3	1	0

[1] *Lasiurus blossevillii*.
[2] *Lasiurus xanthinus*.
[3] *Macrotus californicus*.
[4] *Corynorhinus townsendii pallescens = Plecotus townsendii pallescens = C. townsendii*.

4.3.1.2 Capture Surveys

Bats were captured with mist nets at the BLCA 1 night per month from May to September 2013. Two pale Townsend's big-eared bats (*Corynorhinus townsendii pallescens = Plecotus townsendii pallescens = C. townsendii townsendii*) were the only LCR MSCP covered or evaluation species captured. The two were captured in August (Calvert 2016).

4.3.2 Rodent Monitoring

Live trapping was conducted on April 19 and November 5, 2013, to determine the presence of the Colorado River cotton rat (*Sigmodon arizonae plenus*). Sixty traps were set on transects in Field F each night. No Colorado River cotton rats were captured (Hill and Calvert 2016).

5.0 HABITAT CREATION AND CONSERVATION MEASURE ACCOMPLISHMENT

5.1 Vegetation Monitoring

Vegetation measurements were collected to evaluate the vegetation structure from the ground to the upper canopy. Parameters included tree and shrub density, tree heights, and canopy closure.

The tree density in cottonwood-willow plots (Fremont cottonwood, Goodding's willow, and coyote willow [stem density]) ranged from 130–530 trees/stems per acre. The shrub density (willow baccharis [*Baccharis salicifolia*]) and saltcedar [*Tamarix* spp.]) in plots ranged from 245–401 shrubs per acre. Fremont cottonwood, Goodding's willow, and honey mesquite tree heights ranged in plots from 1.8–31.9 meters. The average canopy closure measured at each plot ranged from 38–100%.

5.2 Evaluation of the Beal Lake Conservation Area

The process for habitat creation conservation measure accomplishment was finalized in October 2011 (Reclamation 2011). All restored areas within the BLCA were designed to benefit covered species at the landscape level.

5.2.1 Beal Lake

Beal Lake was credited for 225 acres under the 1997 BO as part of the 300 acres of backwaters required to satisfy Reasonable and Prudent Alternative (RPA) 3. Therefore, no backwater credit is possible toward the 360 acres of credit required by the LCR MSCP. As indicated in the LCR MSCP Habitat Conservation Plan, however, "completion and ongoing maintenance of fish impoundments …that were a condition of the 1997 BO RPA 3, as amended by the 2002 BO, will be included under the LCR MSCP."

5.2.2 Riparian Fields

To meet species habitat creation requirements, the Habitat Conservation Plan provides goals for habitat creation based on land cover types. These land cover types are described using the Anderson and Ohmart vegetation classification system (Anderson and Ohmart 1976, 1984a, 1984b). In 2013, the BLCA supported 116 acres of cottonwood-willow structure type I. Table 3 shows how much habitat is creditable for each of the targeted covered species at the BLCA in 2013. A total of nine species with habitat creation goals have creditable acres.

Table 3.—Species-specific habitat creation conservation measure creditable total acres, 2013

Species-specific habitat creation conservation measure	WIFL1	WRBA2	WYBA3	CRCR2	YBCU1	ELOW1	GIFL1	GIWO1	VEFL1	BEVI1	YWAR1	SUTA1
Creditable acres in 2013	0[1]	9	0[2]	0[3]	9	9	9	9	9	0	9	9
Total (including previous years)	**0**	**116**	**0**	**0**	**116**	**116**	**116**	**116**	**116**	**0**	**116**	**116**

[1] -Although the BLCA provides the appropriate structure type (cottonwood-willow I–IV) as defined in WIFL1 of the Habitat Conservation Plan, Reclamation is in the process of gathering the appropriate hydrologic data to determine saturated soils, moist soils, or slow-moving water. Once these data have been obtained, the BLCA will be evaluated.

[2] Reclamation is in the process of determining the foraging and roosting habitat for the western yellow bat. Once this habitat has been determined, the BLCA will be evaluated.

[3] The preliminary data suggest the Colorado River cotton rat uses both cottonwood-willow and fringe marsh habitats. Reclamation is in the process of evaluating data collected to determine the marsh and cottonwood-willow habitat uses by this species.

These species (including their corresponding conservation measure acronym) are western red bat (WRBA2), yellow-billed cuckoo (YBCU1), elf owl (*Micrathene whitneyi*) (ELOW1), gilded flicker (*Colaptes chrysoides*) (GIFL1), Gila woodpecker (GIWO1), vermilion flycatcher (*Pyrocephalus rubinus*) (VEFL1), Arizona Bell's vireo (BEVI1), Sonoran yellow warbler (YWAR1), and the summer tanager (SUTA1).

6.0 ADAPTIVE MANAGEMENT RECOMMENDATIONS

Adaptive management relies on the initial receipt of new information, the analysis of that information, and the incorporation of the new information into the design and/or direction of future project work (Reclamation 2007). Under the Adaptive Management Program, habitat creation sites will be assessed for biological effectiveness and whether they fulfill the conservation measures outlined in the Habitat Conservation Plan for 26 covered species and if they potentially benefit 5 evaluation species. Post-development monitoring and species research results will be used to adaptively manage habitat creation sites after initial implementation.

The confirmation of the toxic golden algae event in 2013 raises concern for this backwater with respect to its function as long-term native fish habitat. At this time, adaptive management recommendations include discontinuing any native fish stocking in Beal Lake and conducting long-term monitoring for the presence of golden algae to assess the likelihood of another toxic event occurring. Developing strategies to enhance the water quality in Beal Lake may also be appropriate if these actions or improvements could be effective in reducing the probability of another toxic algal event.

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