

**City of San Marcos/Texas State University
2017 Work Plan**

2017 San Marcos/Texas State University Work Plan Budget

HCP Section	Conservation Measure	7.1	Estimated 2017 Budget	Difference
5.3.1/5.4.1	Texas wild-rice Enhancement	\$125,000	\$100,000	(\$25,000)
5.3.6/5.4.4	Sediment Removal	\$25,000	\$25,000	\$0
5.3.8/5.4.3/ 5.4.12	Control of Non-Native Plant Species	\$75,000	\$170,000	\$95,000
5.3.3/5.4.3	Management of Floating Vegetation Mats and Litter	\$80,000	\$51,298.10	(\$28,701.90)
5.3.5/5.3.9/ 5.4.11/5.4.13	Non-Native Species Control	\$35,000	\$27,959.20	\$7,040.80
5.3.7	Designation of Permanent Access Points/Bank Stabilization	\$20,000	\$0	(\$20,000)
5.7.1	Native Riparian Restoration	\$20,000	\$55,742.70	\$35,742.70
5.3.2/5.4.2	Management of Recreation in Key Areas	\$56,000	\$56,000	\$0
5.7.6	Impervious Cover/Water Quality Protection	\$200,000	\$150,000	(\$50,000)
5.7.5	Management of HHW	\$30,000	\$30,000	\$0
5.3.4	Prohibition of Hazardous Material Transport	\$0	\$0	\$0
5.7.3	Septic System Registration and Permitting Program	\$0	\$0	\$0
5.7.4	Minimizing Impacts of Contaminated Runoff	\$0	\$0	\$0
5.4.5	Diversion of Surface Water	\$0	\$0	\$0
5.4.7	Diving Classes in Spring Lake	\$0	\$0	\$0
5.4.8	Research Programs in Spring Lake	\$0	\$0	\$0
5.4.10	Boating in Spring Lake and Sewell Park	\$0	\$0	\$0
5.4.9	Management of Golf Course and Grounds	\$0	\$0	\$0
	Total	\$666,000	\$666,000	\$0

5.3.1/5.4.1 Texas Wild-Rice Enhancement and Restoration

Texas State University and the City of San Marcos are continuing to partner to enhance and restore Texas wild-rice (TWR) in Spring Lake and the San Marcos River to the San Marcos wastewater treatment plant.

Long-term Objective:

To restore 8000 m² of TWR (in addition to the 2013 baseline of 4000 m²) and protect existing and restored areas of TWR (as required in Table 4-10).

Plant Source: The production of Texas wild-rice occurs at the Freeman Aquatic Building (FAB) at Texas State University and the U.S. Fish and Wildlife Service San Marcos Aquatic Research Center (SMARC). Production of plants at the FAB and SMARC is incorporated into this work plan budget (TWR Enhancement & Removal of non-natives).

Enhancement and restoration of TWR focuses on the removal of non-native vegetation within mixed stands of TWR and removal of non-native vegetation in areas adjacent to existing TWR stands. The work plan also includes selective TWR planting areas where non-native vegetation and sediment is removed as discussed in EAHCP measures 5.3.6/5.4.4 (Sediment removal) and 5.3.8/5.4.3/5.4.12 (Control of non-native plant species). In addition, TWR areal coverage within Spring Lake is targeted for 1500 m².

Target for 2017:

In late 2015, the EAA began an analysis of the submerged aquatic vegetation for the San Marcos springs systems. The goals of this analysis is to establish a timeline, with annual goals, to achieve the vegetation restoration Biological Goals in the EAHCP, and to use lessons learned from field experience in the first years of implementation, to modify methodologies. This analysis is expected to be completed in the summer of 2016. All methodologies and goals pertaining to this conservation measure are pending until decisions are made in regards to the submerged aquatic vegetation analysis.

Monitoring:

All planted areas are filmed via quadcopter which is then mapped and analyzed via GIS.

Budget:

Table 7.1:

\$125,000

Estimated 2017 budget:

\$100,000

*\$25,000 transferred to Non-native Plant Removal for 2017

5.3.6/5.4.4 Sediment Removal

The City of San Marcos and Texas State University are partnering to remove sediment from the river bottom in support of the native SAV planting program from Spring Lake to IH-35.

Long-term Objective:

To remove sediment in areas of planting activity to enhance success of TWR and other native SAV plantings. This long-term objective is in flux in response to the decreased funding in Table 7.1. For 2017, we will focus on sediment removal for only SAV plantings and then re-evaluate for following years. To remove 158 m³, the cost has been \$555,000 (2013 – 2015).

Target for 2017:

Remove sufficient sediment to maximize success of TWR and SAV plantings (see TWR Enhancement & Non-native Removal sections).

Method:

As specified in the HCP, hydrosuction will be used to remove accumulations of sediment. Divers will be trained on equipment operations, diving safety protocols, and recognition of all stages of listed species from larval to adult.

Divers remove all vegetation and then scan the area for the presence of listed species and other biota prior to starting dredging operations. One diver floats on surface to manage the pump and relay information to the dredge operator, one worker will be stationed by the discharge point to monitor operations and answer public questions. Disposal of removed sediment will be at the Texas State University Composting Center or Animal Shelter compost site.

Monitoring:

Turbidity is monitored during and after all removal efforts.

Budget:

Table 7.1:
\$25,000

Estimated 2017 budget:
\$25,000

5.3.8/5.4.3/5.4.12 Control of Non-Native Plant Species

The City of San Marcos and Texas State University are partnering to implement an on-going non-native plant replacement program for the San Marcos River from Spring Lake to Stokes Island. Non-native species of aquatic, littoral, and riparian plants will be replaced with native species to enhance Covered Species habitat.

Long-term Objective:

To keep the density of invasive aquatic, littoral and riparian plants as low as possible through monitored removal in and along the San Marcos River.

Assumptions: Non-native aquatic plants will be removed in association with fine sediment removal and TWR enhancement as described in conservation measures 5.3.6/5.4.4 and 5.3.1/5.4.1. It is also assumed that production of native aquatic plants will continue at the FAB and the SMARC. Funding for the production of plants at the FAB and SMARC is incorporated into this work plan budget. Removal of littoral plants and other small caliper invasives is also included in this budget as a separate project.

Target for 2017:

In late 2015, the EAA began an analysis of the submerged aquatic vegetation for the San Marcos springs systems. The goals of this analysis is to establish a timeline, with annual goals, to achieve the vegetation restoration Biological Goals in the EAHCP, and to use lessons learned from field experience in the first years of implementation, to modify methodologies. This analysis is expected to be completed in the summer of 2016. All methodologies and goals pertaining to this conservation measure are pending until decisions are made in regards to the submerged aquatic vegetation analysis.

Littoral: The area from Spring Lake to just below IH-35 has undergone initial removal of elephant ears, so in 2017 all treated areas will be monitored for regrowth and planted with natives. Most importantly, efforts will be extended to remove hot spots that contribute to regrowth.

Methods:

Littoral: On the banks, elephant ear (*Colocasia esculentes*) is the focus of removal efforts. *C. esculenta* primarily reproduces by producing additional tubers beneath the soil or by sending off long runners called stolons which attempt to root in the soil or in any nearby body of water. The species also produces an inflorescence with a spathe tube that is green but the blade is orange on both sides. Hand removal will be used wherever possible. Chemical removal consists of the use of glyphosate-based aquatic herbicide and surfactant that is drip-sprayed onto the surface of the leaves and stalks to remove more “entrenched” elephant ear plants. Small caliper invasive plants in the littoral zone are also removed.

Monitoring:

Aquatic vegetation: Newly planted areas are monitored monthly to evaluate success rate. The planted areas will be weeded (non-native species removed) and replanted as needed to meet target areal coverage. An annual river inventory will be conducted to identify the presence and

location of new non-native vegetation establishment. Turbidity will be monitored during and after all removal efforts. Success will be measured by the surface area cleared of non-natives and increased coverage by native SAV.

Budget:

Table 7.1:

\$75,000

Estimated 2017 budget:

\$170,000

*\$95,000 transferred from TWR Enhancement (\$25K) and Bank Stabilization (\$20K) and WQ/LID (\$50K) to cover the scope of this measure across three contractors annual budget.

5.3.3/5.4.3 Management of Floating Vegetation Mats and Litter

The City of San Marcos and Texas State University are partnering to implement an ongoing program to manage floating vegetation and litter removal for the enhancement of listed species habitat. Management activities include removal of vegetation mats that form on top of Texas wild-rice plants, particularly during low flows, and removal of litter from the littoral zone, stream bottom and tributaries. Texas State University will manage aquatic vegetation in Spring Lake through use of its harvester boat and hand cutting of vegetation by divers authorized to dive in Spring Lake.

Long-term Objective:

Minimize impacts of floating vegetation and litter on TWR stands and overall aquatic community within the San Marcos River, as well as keep springs clear to enhance San Marcos salamander habitat.

Assumptions: Existing vegetation management activities in Spring Lake will continue to follow the Spring Lake Management Plan (approved by the President's Cabinet) and the EAHCP, as described under Methods. Litter and floating vegetation mat removal will follow the existing protocol and schedules currently employed by the City of San Marcos and the EAHCP, as described below under Methods.

Target for 2017:

Continued implementation of the established protocols.

Methods:

Spring Lake: Each week about five springs are cut, with divers returning to cut the same springs every two to three weeks. During summer algal blooms, the springs will be managed more frequently (up to four springs per day), but mostly to remove algae. Texas State employees and supervised volunteers will fin the area around the springs to remove accumulated sediment, and then clear a 1.5 meter radius around each spring opening in Spring Lake with a scythe. Over the next 1.5 meter radius around the spring opening, they will shear vegetation to a height of 30 cm, and then to one meter over the following three meter radius. Plant material will not be collected, but carried away by the current. Cumulatively, about six meters of vegetation around each spring opening will be modified. Mosses will not be cut. The volume of plant material to be removed will vary by the amount of time between cuttings, and season. The harvester boat will remove a range of 15 to 20 boatloads of plant material a month from Spring Lake. The harvester will clear the top meter of the water column, cutting vegetation from sections one, two, and three once a week (See HCP Figure 5.2). The harvested vegetation will be visually checked by driver for fauna caught in the vegetation. If the driver observes fauna, he/she will stop work and put the animal(s) back into Spring Lake if appropriate. Texas State employees and supervised volunteers are trained to recognize the Covered Species through the Diving for Science program (Section 5.4.7.1), and avoid contact with them. Vegetation mats will be removed from zones four and five on an as-needed basis (See HCP Figure 5-2). The total area cut will equal about nine surface acres. The Spring Lake Area Supervisor also schedules cleanup of nuisance floating species such as water hyacinth and water lettuce from Spring Lake. The floating plants will be collected by hand and shaken prior to removal from the river to dislodge any aquatic species caught in the

plant. The plants will be deposited into dump trucks and taken to the Meadows Center compost area. The activities described in this section are not funded by the EAHCP. They are fully supported by Texas State University.

San Marcos River: Floating vegetation in Texas wild-rice stands will be pushed and/or lifted off the stands and removed. Inorganic litter will be picked up weekly from the substrate, surface and littoral zones of the San Marcos River from upper Sewell Park to City Park and from IH-35 to Stokes Island during the recreational season (May 1st to September 30th) and monthly during offseason. Litter will also be picked up from public lands within the four tributaries. Monitoring of downstream Texas wild-rice stands to keep the stands clear of drifting vegetation will also be undertaken.

Monitoring:

Floating vegetation and litter are targeted weekly during the recreation season and then monthly during the remainder of the year. In the event of low flows, this activity will be monitored for potential impacts on listed species and will be suspended if impacts are observed. Volume of litter will be tracked.

Budget:

Table 7.1:

\$80,000

Estimated 2017 budget:

\$51,298.10

*Total includes contract amount (\$48,798.10) and public outreach funds (\$2,500). \$28,701.90 will be transferred to Native Riparian Habitat Restoration

5.3.5/5.3.9/5.4.11/5.4.13 Non-Native Species Control

The City of San Marcos, in partnership with Texas State University, will implement a program of invasive faunal control in the San Marcos River on a periodic basis with expanded efforts of control, if needed, at low flows. The species include suckermouth catfish, tilapia, nutria and *Melanoides* and *Marisa cornuarietis*. Educational materials will be provided to local pet shops, commercial outlets who sell aquarium species, University buildings and dorms and various public facilities. Alternatives, such as a local pet shop and discovery center release pond, will be offered to fish and snail owners.

Long-term Objective:

Reduction of non-native, invasive species in the San Marcos River to levels that minimize their possible impacts on Covered Species and the aquatic ecosystem.

Target for 2017:

Contractor will use methods that have proven to be successful in efficient capture of invasive species from Spring Lake to IH-35. Contractor will count and trend captured individuals for all targeted species.

Methods:

Methods will be undertaken in a manner that avoids impacts to resident turtles and other native species. Fyke nets, live trap cages, spear and bow fishing continue to be effective methods. Contractor uses and will continue to use volunteer spearfishing tournaments to increase total removal, while saving costs and providing an educational awareness component to the community.

Effective removal of *Melanoides* and *Marisa cornuarietis* will continue to be accomplished by determining the locations of highest snail density and using dip nets to remove the snails weekly. The species will be controlled by diving several hours after sunset to hand-pick the snails from the submergent vegetation.

Monitoring:

It is assumed that the integrated biological monitoring program will assess the status of non-native animal species to accompany trend data collected by contractor.

Budget:

Table 7.1:

\$35,000

Estimated 2017 budget:

\$27,959.20

*Total includes contract amount (\$25,459.20) and public outreach funds (\$2,500). \$7,040.80 will be transferred to Native Riparian Habitat Restoration.

5.3.7 Designation of Permanent Access Points/Bank Stabilization

The City of San Marcos has completed the construction of bank stabilization/access points at seven locations along the San Marcos River. In 2016, repairs were made to most access points as needed (anchor rocks).

Long-term Objective:

Maintain integrity of structures and control erosion in the recreation traffic areas at each structure.

Target for 2017:

Quarterly monitoring to ensure ongoing structural stability.

Budget:

Table 7.1:

\$20,000

Estimated 2017 budget:

\$0

*\$20,000 will be transferred to Non-native Plant Removal

5.7.1 Native Riparian Habitat Restoration

The City of San Marcos and Texas State University have undertaken a program to increase the area and density of the riparian and water quality buffer zone on public and private lands from the Spring Lake Dam to Stokes Park using native vegetation. Upon completion of the riparian and water quality buffer zone on public land, private landowners will be asked to voluntarily participate in the plan.

Long-term Objective:

Establish a robust native riparian and water quality buffer community that benefits Covered Species and the habitat quality adjacent to and within the San Marcos River down to IH-35 as well as prevent public access in undesirable locations which will decrease bank erosion. A zone of prohibitive vegetation along the uppermost edge of the riparian and water quality buffer community will be established to encourage river users to access the river via hardened access points. Encourage private riverside landowner participation in this program and provide the labor and plants as practical. Contractor(s) will perform invasive removal and maintenance. Native plantings and maintenance will be done by volunteers during regular planting events.

Target for 2017:

Use contractor to remove invasives from the last portion of Ramon Lucio Park (Wildlife Annex). Volunteers will replant with natives, and contractor/volunteers will maintain all treated areas from Spring Lake to IH35. *Arundo donax* removal will be researched for possible extraction. Once sediment has been removed from the channel behind Snake Island, the private landowners will be contacted to participate in this program.

Monitoring:

Monitoring will occur monthly to check for re-growth and treat as needed. HTC provided a cost proposal for water quality buffer maintenance from headwaters to IH-35 @ \$30,000 per year. So maintenance will continue to be a mix of contract work and volunteerism.

The City has provided and will continue to provide all fences to protect the sites as well as game cameras and other security measures as needed to prevent theft, vandalism and unauthorized access

Budget:

Table 7.1:

\$20,000

Estimated 2017 budget:

\$55,742.70

*\$35,742.70 will be transferred from Litter Removal and Non-native species control to fund this measure. Budget plan includes funding the project over four years (2015 -2018) to cover expenses through the transfer of funds from other measures and the yearly allocation. This budget plan was approved during the 2015 Work Plan session.

5.3.2/5.4.2 Management of Recreation in Key Areas

Public recreational use of the San Marcos Springs and River ecosystems include, but are not limited to swimming, wading, tubing, boating, canoeing, kayaking, golfing, scuba diving, snorkeling and fishing. To minimize the impacts of incidental take resulting from recreation, the City of San Marcos will implement the Recreation Mitigation Measures adopted by the San Marcos City Council on February 1, 2011 (Resolution 2011-21). The City of San Marcos and Texas State University will enforce these measures (as covered in HCP Section 5.3.2.1) to ensure their success. Section 5.3.2.1 includes multiple educational and public outreach suggestions for implementation:

- a. Signage. Post signage at the City Park tube rental facility, Rio Vista Falls and at proposed hard access points along the river. Signs will have the same template and coloration so they are recognized up and down the river. Signs will cover the rules of the river and educate the public on the importance of the resource. All signs will be bilingual. Kiosk signs have been produced, but kiosks need to be built for posting at each access point. Awaiting final construction of the access points in 2016. Interpretive map has been designed and will be produced and posted in 2017.
- b. Video Loop at City Park and Rio Vista Falls offering information about the river and safety rules while people are waiting for shuttle or tubes. Video will be finished in 2016 for Lion's Club and will be updated and distributed electronically for increased exposure.
- c. Posted maps showing trail, access points, fishing access and other amenities. Include a map at Stokes Park to help inform about the San Marcos River/Blanco confluence. This map is under design by interns.
- d. Work with the Tourist Information Bureau to include information on the endangered species and ongoing HCP projects at hotels/restaurants, bed and breakfast facilities, Chamber of Commerce, Visitor's Center, City of San Marcos internet site, etc. along with the recreational information.
- e. Park Rangers. Include a section on river biology in the training of the park rangers so they can help disseminate the information.
- f. School Outreach. Implement an outreach program for San Marcos Consolidated Independent School District (SMCISD) so this information can be relayed to youth in San Marcos and indirectly to the parents. This is underway through the embedding of our interactive river habitat card game into curriculum for SMCISD elementary schools.
- g. Overall Interpretation Plan. This would pull all the informational ideas together for conformity, continuity, and implementation. This is also under development.
- h. *Additional outreach:* The San Marcos Discovery Center provides a facility dedicated to inclusion of HCP education and public outreach for the aquifer region.

- i. Provide HCP presentations to TxState Outdoor Recreation class and Wildlife Society club and partner with TxState Geography Intern Program to increase volunteer participation.
- j. Provide outreach at booths including 72 degree festival, Concert Series (Earth & Water), Passport SMTX, Business Expo, Don't Mess with Texas Litter Cleanup.
- k. Present Water Quality and Riparian Restoration outreach during volunteer planting days; most recently to the entire Texas State football team.

Long-term Objective:

To establish and maintain a trained seasonal conservation resource that will monitor recreational activities and monitor/maintain ongoing HCP measures in and along the San Marcos River while educating the public about the Covered Species and importance of their protection as part of our enforcement obligations under the SSA and HCP measures and establish an ongoing stream of information to increase public awareness and support. Also, to establish a program that provides incidental take coverage to third parties through the acquisition of a Certificate of Inclusion (COI).

Target for 2017:

Continue the implementation of recreational management goals as outlined above. Educate the public engaged in water-based recreation on sustainable river use that protects listed species and their habitats. The seasonal workers will also conduct miscellaneous cleanup and HCP project maintenance while walking/kayaking. Introduce the COI program to qualified third parties conducting recreational activities in and along the San Marcos River.

Methods:

The contracted conservation resource will monitor river user activities from Memorial Day weekend to Labor Day weekend on a Wednesday through Sunday schedule. They will also actively engage in public education and outreach about target species and their habitats. Finally, they will aid in the implementation of recreational management goals.

Monitoring:

Every few years, the public will be surveyed during the recreation season to assess the level of understanding of Covered Species, ongoing HCP Measures, effectiveness of the public outreach and education program, and the impacts of recreational activities on species and habitat. Last survey occurred in 2015.

Budget:

Table 7.1:

\$ 56,000

Estimated 2017 budget:

\$56,000

5.7.6 Impervious Cover/Water Quality Protection

The City of San Marcos and Texas State University will implement a program to protect water quality and reduce the impacts of urbanization based upon the LID/BMP practices. Urban land development tends to increase the intensity of storm water flows and the amount of nonpoint source (NPS) pollution reaching local water resources. Buildings, roads, and other impervious surfaces shed rain more rapidly than areas covered by vegetation, and most typical urban land uses require rapid drainage of storm water. The very rapid, direct connection of developed land across paved surfaces and through drainage conveyances to waterways tends to carry more pollutants more quickly from the land surface to water resources. A number of water quality problems and impairments in Texas are attributed in full or in part to such urban storm water runoff carried through storm sewers and channelized streams. The science committee stated this measure was one of great importance to the success of the EAHCP for listed species protection (May 9, 2013). Addressing water quality is critical to protection of the listed species in a rapidly developing environment.

Long-term Objective:

Implement a program that minimizes the impacts associated with urbanization and changes in land use/cover in the Upper San Marcos watershed, manages stormwater as close to its source as possible, treats stormwater as a resource rather than a waste product, emphasizes conservation and the use of on-site features to protect water quality, and increases infiltration to groundwater and aquifer recharge for the protection of riverine integrity.

Target for 2017:

Implement the Water Quality Protection Plan (WQPP) as adopted by Texas State University and City of San Marcos incorporating all jurisdictional watershed areas that directly or indirectly impact Covered Species' critical habitat for the purpose of meeting the goals stated in the long-term objective. Includes public education, staff integration, potential changes to the City's Land Development Code and Stormwater Technical Criteria Manual, potential changes to the University's Master Plan and Construction Standards, designs for retrofit water quality projects, grant proposals, land conservation program and coordination with ongoing stormwater management plans for city and university.

Methods:

City of San Marcos and Texas State University have a contract for the implementation of the developed plan.

Budget:

Table 7.1:
\$200,000

Estimated 2017 budget:
\$150,000

*\$50,000 will be transferred to Non-native Plant Removal

5.7.5 Management of Household Hazardous Waste

The City of San Marcos will maintain a Household Hazardous Waste (HHW) program that involves the periodic collection of Household Hazardous Waste Collection (HHWC) and its disposal.

Long-term Objective:

Continue to provide a place for citizens of San Marcos and Hays County to safely dispose of HHW.

Assumptions: City of San Marcos will continue its existing program.

Target 2017:

Continue outreach and target 2750 participants for public outreach events. Staff will conduct these events and convert or dispose of the HHW between events. Fund outreach to surrounding communities within the San Marcos River watershed that cannot afford to partner in a HHWC program.

Methods:

Open drop-off opportunities two days a week (Tuesday and Friday) from 12:00 noon to 3:30 p.m. to the public. Conduct HHWC events 1 to 2 times per year on a Saturday in north central Hays County. Cover disposal costs for these events.

Monitoring:

Track the amount of HHW received and number of participants from San Marcos, Hays County, and surrounding communities. All necessary documentation will be turned in to TCEQ. Identify the HHW that comes from communities with the San Marcos River watershed and the cost of collecting, processing and disposing of HHW from these communities.

Budget:

Table 7.1:

\$30,000

Estimated 2017 budget:

\$30,000

5.3.4 Prohibition of Hazardous Materials Transport Across the San Marcos River and Its Tributaries

The City of San Marcos will coordinate with the Texas Department of Transportation to designate hazardous materials routes which minimize the potential for spills into the San Marcos River. This effort will include legislation, if necessary, and additional signage.

Long-term Objective:

Reduce the potential of spill of hazardous materials in the San Marcos River and its tributaries.

Assumptions: The primary effort will involve stakeholder engagement, public meetings, and coordination with TXDOT.

Target for 2017:

Coordination with TxDOT for the implementation of hazardous materials restrictions and establishment of signage. Contact New Braunfels office for more rapid implementation.

Methods:

Complete checklist provided by TxDOT to establish a hazmat route that all transport routes that cross the San Marcos River and its primary tributaries.

Monitoring:

Bi-annual monitoring of hazmat traps on designated roadways to determine functionality and annual monitoring of all installed signage will be accomplished. Substandard conditions will be repaired or replaced as necessary.

Budget:

Table 7.1:

\$0

Estimated 2017 budget:

\$0

5.7.3 Septic System Registration and Permitting Program

The City of San Marcos will undertake an aerobic and anaerobic septic system registration, evaluation, and permitting program to prevent subsurface pollutant loadings from potentially being introduced to the San Marcos Springs ecosystem within city limits.

Long Term Objective:

To continue the registration, permitting and inspection of all new or existing septic systems installed or modified in the City of San Marcos jurisdiction. This has and will continue to be done to ensure compliance of all Texas Commission on Environmental Quality (TCEQ) regulations governing septic systems.

Assumptions: The existing program is adequate to meet the intent of this Measure.

Target for 2017:

To have an accurate record of new and existing septic systems installed and modified in city jurisdiction. Also, by ordinance, to have all owners of septic systems connect to municipal sewer lines as they become available.

Methods:

It is required by law that all septic systems are permitted by the local Designated Representative (DR), which is the City of San Marcos Environmental Health Department. Plans are submitted with the application and reviewed by the DR for TCEQ compliance. Once these are met, the permit to construct is issued. The design, site evaluation, installation and inspections can only be performed by individual that are licensed by TCEQ. Before the installation or modification is approved, inspections are made by the DR to ensure that the system installed corresponds with the design. Once completed, a license to operate is issued to the property owner by the DR. All DRs are subject to TCEQ Compliance Reviews.

Monitoring:

The City of San Marcos Environmental Health Department reviews all applications and inspects the installations of all new and modified septic systems within the City's jurisdiction. The Department also monitors maintenance and responds to all complaints reported or observed.

Budget:

Table 7.1:

\$0

Estimated Budget:

\$0

5.7.4 Minimizing Impacts of Contaminated Runoff

The City of San Marcos will construct two sedimentation ponds along the river to help reduce the amount of contaminated material that enters the river as a result of rain events. The first pond will be located in Veramendi Park beside Hopkins Street Bridge. The second pond will be created by widening the drainage ditches that run alongside Hopkins Street and cut directly to the San Marcos River.

Long-term Objective:

Reduce the input of sediment and roadway pollutants into the San Marcos River.

Assumptions: Construction of the proposed sediment retention ponds are funded under Measure 5.7.6.

Target for 2017:

Continue to research funding sources for the design and construction of the Best Management Practices (BMPs) to be constructed at Veramendi Park and along Hopkins Street that will reduce total suspended solids (TSS) by 85%. Baseline water quality measurements should be taken prior to BMP installation. Storm water discharge should be re-sampled after BMP installation to measure success.

Methods:

A contractor will research applicable BMP designs and recommend the most economic and efficient methods to control contaminants.

Budget:

Table 7.1:

\$0

Estimated 2017 budget:

*See Measure 5.7.6

5.4.5 Diversion of Surface Water

Texas State University will curtail its permitted surface water diversions as a function of total San Marcos spring flow to protect the aquatic resources as specified under the HCP flow management strategy. Under TCEQ Certificates 18-3865 and 18-3866, Texas State University's total diversion rate from the headwaters of the San Marcos River for consumptive use is limited to 8.1 cfs (See HCP Section 2.5.5). The total diversion rate from Spring Lake is limited to 4.88 cfs; the total diversion rate from the San Marcos River at Sewell Park is limited to 3.22 cfs (See HCP Section 2.5.5.1 and 2.5.5.2 respectively).

Long-term Objective:

Meet diversion restrictions specified under the HCP.

Target for 2017:

Restriction of surface pumping as specified under the HCP.

Methods:

To minimize the impacts of these diversions, when flow at the USGS gauge at the University Bridge reaches 80 cfs, Texas State University will reduce the total rate of surface water diversion by 2 cfs, *i.e.*, to a total of approximately 6.1 cfs. This reduction in pumping will occur at the pump just below Spring Lake Dam in order to maximize the benefits to salamanders, Texas wild-rice, and other aquatic resources in the San Marcos River below Spring Lake Dam. The University will reduce the total rate of surface water diversion by an additional 2 cfs when the USGS gauge reaches 60 cfs. The additional 2 cfs reduction will be made from the pumps located in the slough arm of Spring Lake, and, therefore, maximize the benefits to the aquatic resources within the main stem San Marcos River below Spring Lake Dam. When the USGS gauge reaches 49 cfs, Texas State University will reduce the total diversion rate to 1 cfs. This further reduction will be made by restricting the pumps located in the Sewell Park reach. The diversion of water will be suspended when the springflow reaches 45 cfs.

Monitoring:

Pumping rates will be reported on a daily basis when any of the pumping restrictions are in force.

Budget:

Table 7.1:

\$0

Estimated 2017 budget:

\$0

5.4.7 Diving Classes in Spring Lake

Access to Spring Lake is strictly controlled and regulated in accordance to federal, state and local laws. City ordinance and state law designate the public waters of Spring Lake as restricted to activities authorized by the University. All diving activities in Spring Lake are governed by the Spring Lake Management Plan.

Long-term Objective:

Maintain the integrity of the ecology and cultural resources within Spring Lake.

Assumptions: All diving activities in Spring Lake are governed by the Spring Lake Management Plan.

Target for 2017:

Implement the diving protocols as outlined in the Spring Lake Management Plan and the Edwards Aquifer HCP Incidental Take Plan.

Methods:

The Diving Safety Officer will monitor all diving activities in Spring Lake, assuring all guidelines contained in the Diving Safety Manual for Spring Lake and the EAHCP ITP are observed.

Monitoring:

The Lake Manager, with assistance from the Diving Safety Officer, will compile an annual summary of diving activities conducted in Spring Lake and provide to the Diving Control Board for its review.

Budget:

Table 7.1:

\$0

Estimated 2017 budget:

\$0

5.4.8 Research Programs in Spring Lake

Access to Spring Lake is strictly controlled and regulated in accordance to federal, state and local laws. City ordinance and state law designate the public waters of Spring Lake as restricted to activities authorized by the University. Proposals for research projects in Spring Lake must be submitted to the Environmental Review Committee, through the Lake Manager, for review and approval.

Long-term Objective:

Maintain the integrity of the ecology and cultural resources within Spring Lake. All research activities in Spring Lake are governed by the Spring Lake Management Plan.

Target for 2017:

Implement the protocols for research as specified in the Spring Lake Management Plan and the EAHCP ITP.

Methods:

Proposals for research projects in Spring Lake must be submitted to the Environmental Review Committee, through the Lake Manager, for review and approval.

Proposals for research projects must be submitted in writing and include:

1. Name and contact information of the responsible party conducting the research,
2. Purpose and expected outcomes of the activities, including a description of how the project contributes to science,
3. Description of activities, including, if appropriate, measures to be taken to minimize any impact on endangered species or their habitat, or any cultural resources found in the lake,
4. Methodology, including literature review,
5. Type of equipment used, how much; where it will be placed, and for how long it will remain in lake (see Equipment in Lake Section E of the Spring Lake Management Plan)
6. Expected impact, and
7. Timeline of Project

Monitoring:

The Lake Manager will compile an annual summary of the research conducted in the lake, including statements on the impact of these activities on the health of the lake.

Budget:

Table 7.1

\$0

Estimated 2017 budget:

\$0

5.4.10 Boating in Spring Lake and Sewell Park

Access to Spring Lake is strictly controlled and regulated in accordance to federal, state and local laws. City ordinance and state law designate the public waters of Spring Lake as restricted to activities authorized by the University. All activities involving access to the lake, including glass bottom boat operations, will abide by the rules and intentions of the Edwards Aquifer Recovery Implementation Program Habitat Conservation Plan.

Long-term Objective:

Maintain the integrity of the ecology and cultural resources within Spring Lake and San Marcos River. All boating activities in Spring Lake are governed by the Spring Lake Management Plan and the EAHCP ITP.

Target for 2017:

Implement the protocols for boating as specified in the Spring Lake Management Plan in support of the EAHCP ITP.

Methods:

Boats (canoe, kayak) used for educational activities, excluding glass bottom boats:

1. All boats must be properly washed/disinfected before being placed in lake and once they are removed (see Equipment in Lake in the Spring Lake Management Plan).
2. Participants must receive an orientation prior to boating including: instruction on safety, basic boat handling, and on-site rules and regulations. The orientation will cover information specific to Spring Lake's sensitivity and endangered species.
3. All boating events must be designed to keep participants away from glass bottom boat operations.

To minimize the impacts of boating on the Covered Species' habitat in Sewell Park, canoeing/kayaking classes in Sewell Park will be confined to the region between Sewell Park and Rio Vista dam. Students will enter/exit canoes/kayaks at specified access points to avoid impacting the flora and fauna along the bank. Classes will be no longer than two hours and up to three classes will be held per day. Classes will have a maximum of 20 students in 10 canoes. All classes will be supervised.

Monitoring:

The Lake Manager will compile an annual summary of boating activities conducted on the lake, including statements on the impact of these activities on the health of the lake.

Budget:

Table 7.1:

\$0

Estimated 2017 budget:

\$0

5.4.9 Management of Golf Course and Grounds

Texas State University will complete a golf course management plan that will document current practices and include an Integrated Pest Management Plan (IPMP). The golf course management plan and IPMP will incorporate environmentally sensitive techniques to minimize chemical application, improve water quality, and reduce negative effects to the ecosystem. Expanded water quality sampling targeted at Golf Course operations will be conducted as described in Section of 5.7.2. of the HCP.

Long-term Objective:

Management of the golf course and grounds to minimize and reduce negative effects to aquatic ecosystem in Spring Lake and the San Marcos River.

Target for 2017:

Continued implementation of the Golf Course Management Plan and Integrated Pest Management Plan.

Methods:

The golf course and grounds will be maintained in an aesthetically pleasing, yet environmentally sensitive manner. It is the responsibility of the Golf Course Manager to maintain the course and grounds in accordance with the Integrative Pest Management Plan (IPM). This plan will describe the activities and materials to be used to control pests (i.e. insects, weeds, and other living organisms requiring control) on the golf course in a way that minimally impacts the environment. The IPM will be developed and updated by the Golf Course Manager, in consultation with the Lake Manager and the Environmental Review Committee. The Golf Course Manager will consult with the Lake Manager on any unique situation that may arise outside of routine maintenance that could impact Spring Lake.

Monitoring:

Each year the Golf Course Manager will report to the Lake Manager detailed information on maintenance activities and materials used during the year. The water quality monitoring program performed by the Edwards Aquifer Authority will sample for runoff from the golf course.

Budget:

Table 7.1:

\$0

Estimated 2017 budget:

\$0

Protocol for Implementation of HCP Measures Requiring Diving and/or Boating

All activities in Spring Lake must be submitted to the Spring Lake Environmental Review Committee and/or the Spring Lake Diving Control Board for approval as outlined in the Spring Lake Management Plan. This includes required training and orientation for any diving based activities in Spring Lake by the RSI Diving Safety Officer, using guidelines set out in the RSI Diving Safety Manual for Spring Lake and the San Marcos River. This includes an orientation that covers: instruction on safety, basic boat handling, and on-site rules and regulations. The orientation will cover information specific to Spring Lake's sensitivity, endangered species as well as cultural resources.

All personnel implementing any portion of the HCP for the City of San Marcos and Texas State University will undergo an orientation at the SMARC to ensure awareness of the listed species and safe procedures while working in and along the San Marcos River.