HABITAT CONSERVATION PLAN EDWARDS AQUIFER
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A *Path* to Protecting Endangered Species

The City of New Braunfels completes riparian restoration project at the Comal Springs

Mark Enders (right) and Phillip Quast inspect newly restored riparian area along Spring Run 3.

Walking along Spring Run 3 in Landa Park, you can't help but notice the beauty of what looks like a flowing stream running toward Landa Lake. With the high Edwards Aquifer levels due to the recent heavy rains and resulting recharge of billions of gallons of water into the aquifer, the Comal Springs are emptying fresh water into the creek at a high rate creating that familiar natural sound as it flows over the rocks and river bed. But, if you were able to look a little deeper into that calm scene, you would find out that this specific location is an important habitat to three endangered species. Protecting that habitat is what the recent riparian restoration along Spring Run 3 was intended to do.

"In the orifices of Spring Run 3, you will find the Comal Springs Riffle Beetle, the Comal Springs Dryopid Beetle and the Peck's Cave Amphipod, which are all endangered species which the Edwards Aquifer Habitat Conservation Plan is designed to protect," said Mark Enders, watershed program manager for the City of New Braunfels. "Over time, as visitors would walk along the bank of the stream, the grass was worn away and a very wide foot path was established. Unfortunately, that led to rainfall washing sediment into the stream which created an adverse environment for the species. So, our solution was to develop that path into a riparian area with native grasses and plants which will help prevent erosion over time."

The project consisted of creating a 430-foot long and five- to 10-foot wide buffer along the banks of Spring Run 3. Overall, 572 plants consisting of 11 varieties were installed on the visitor side of the stream. The selected plants were drought and deer tolerant as well as the types that would be found in a riparian environment. A temporary irrigation system was installed to ensure that the young plants will be able to establish a solid root system. Once that occurs, the native plants will be able to survive without any other water than what nature provides. The opposite side of the stream already contains native trees and shrubs which help shade and protect the springs.

“In working with the City of New Braunfels Parks and Recreation Department, we were asked make the project look more like a landscape design rather than a wild natural riparian area in order to accommodate park visitors,” said New Braunfels Watershed Coordinator Phillip Quast. “We though that was a good idea and so we created the curved path layout rimmed with chopped limestone blocks. It took a little more than two weeks to install and it looks a bit sparse now since we’ve just completed the planting. But, in about two years when the area has completely grown in, it will be a really nice looking, densely vegetated addition to the stream bank. And because we know visitors like to look at the flowing water from the springs, we added some larger rocks along the bank where people could get next to the water without trampling the native plants.”

Enders noted that this project is a part of the City of New Braunfels habitat conservation plan. The City took the lead on the program but all of the plans were presented to the Science and Implementing Committees of the Edwards Aquifer Habitat Conservation Plan (EAHCP). With those committee approvals, the City hired the contractors and served as project manager for the installation.

“The deep root structures from the series of native plants we’ve used will help keep the soil together so it can reduce sedimentation in the river and serve to shade the river some,” Enders explained. “As compared to many other projects we’ve taken on as part of the EAHCP, this one is relatively small. It cost about $35,000 and we were able to complete the installation in less than three weeks. But, from a environmental protection point of view, because this is prime habitat for endangered species living here, this project will provide significant protections for those species. And that’s why we were pleased to get this one done and ready to move on to others we have planned in the Comal Springs ecosystem.”

That’s a Wrap

National Academy of Sciences Wraps its EAHCP Evaluation

The EAHCP and NAS teams prepare for a field trip along the Comal River.

After nearly five years of work, the National Academy of Sciences (NAS) delivered its third and final report regarding its review of the Edwards Aquifer Habitat Conservation Plan (EAHCP). Leading up to this evaluation, NAS had written two other reports based on specific requests from the EAHCP leadership. Overall, the EAHCP received predominantly favorable comments in the 160-page final report and various suggestions on improving data collection, continuing existing pollution prevention measures and expanding species protection programs.

“This was certainly a unique process for an NAS review primarily because of the multi-year commitment,” said Danny Reible who chaired the committee of scientists. “Very rarely does a NAS committee have such extensive exposure to a project like we did with this one. We had a great team of experts for the EAHCP

project and were fortunate to have most of them through the entire process. All of those factors contributed to a substantive report and one that I hope is extremely helpful to the EAHCP as it nears some decision points for the next phase of the program."

After the first two NAS reports, the EAHCP team sponsored day-long work sessions with its stakeholders and committee members to solicit feedback on the NAS comments and suggestions. Special workgroups containing members with scientific expertise related to the topics in the reports were also convened to take a deeper look at the NAS recommendations and the stakeholder feedback as well.

"The National Academy of Sciences is really the gold standard for scientific review in the United States," said EAHCP Chief Science Officer Dr. Chad Furl. "So, we invested lots of time in evaluating their reports, sharing them with regional scientific experts and soliciting feedback from all stakeholders. We wanted to be absolutely certain that when we received that third and final report, we had done everything we could to take advantage of the NAS committee's expertise and to get our own experts' appraisal of NAS suggestions. We believed that would give us the greatest certainty in moving our programs forward."

This first NAS report from the three-phase study focused on improving modeling efforts for the Edwards Aquifer, specifically reviewing four scientific initiatives within the HCP: ecological modeling, hydrologic modeling, biological and water quality monitoring and applied research. The second report centered on the 38 "Minimization and Mitigation Measures" designed to protect the listed species from the impacts of both human-caused and natural disturbances to the Edwards Aquifer spring systems. The third report gets to the ultimate questions of whether the conservation measures in the EAHCP are adequate to meet its biological objectives, and whether the biological objectives will meet the biological goals.

In the third report, NAS evaluated each EAHCP program designed for every endangered species that must be protected as part of the Federal Incidental Take Permit, which is issued and monitored by the U.S. Fish and Wildlife Service. For each species, NAS rated the conservation measures as highly effective, effective, somewhat effective, ineffective, or cannot be determined. Then, each of the biological objectives as designed and implemented were rated as highly likely, likely, somewhat likely or unlikely to meet the biological goals.

"Overall, NAS rated us highly on our work to protect the fountain darter and Texas wild rice species," Furl noted. "They thought our conservation measures to protect the San Marcos salamander would be effective but rated our biological objectives in the 'somewhat likely' to attain the biological goals primarily due to the fact there is less historical data on the San Marcos salamander than what we have for the fountain darter and Texas wild rice. Our riffle beetle research is only a few years old, so NAS could not determine how our early efforts might protect the riffle beetle in the long run. However, they did provide several recommendations on how we could get there in the future."

"Although Committee members represented many diverse perspectives and expertise that varied from river-aquifer hydrology to biology, they reached consensus on all recommendations included in the report," Reible explained. "We hope that all of the EAHCP partners and stakeholders will find these recommendations useful as they guide the scientific initiatives designed to provide effective management of the river-aquifer system and protection of the endangered species."

The National Academy of Sciences was established in 1863 by an Act of Congress and signed by President Abraham Lincoln as a private, nongovernmental institution to advise the nation on issues related to science and technology. Members are elected by their peers for outstanding contributions to research. Additionally, there is a National Academy of Engineering and a National Academy Medicine. The three academies provide independent, objective analysis and advice to the nation and conduct other activities to solve complex problems and help public policy leaders make decisions. Following is a listing of the NAS team assembled from across the country to work on the Edwards Aquifer Habitat Conservation Plan evaluation.

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Measuring Up

EAA Data Collection Team Ensures Information Accuracy through Ongoing Maintenance

EAA's Ron Gloy retrofits a weather station in San Marcos with a new data collector.

There's a favorite South Texas story that says this part of the state gets about 26 inches of rain per year, and you don't want to be around the weekend we get it. With downpour after downpour over the past few months in the Edwards Aquifer Region, that tall Texas tale really wasn't that far from the truth. Just ask the people responsible for measuring all of that flowing water.

"Our department at the Edwards Aquifer Authority (EAA) has the responsibility of recording the rainfall that occurs, recharge water that flows into sinkholes below recharge dams and the water quality in the streams and rivers that are in the Edwards Aquifer Region," said Matt Schwarz, EAA data collection coordinator. "We also work hand-in-hand with the U.S. Geological Survey (USGS) in their calculations of the amount of recharge water the Edwards Aquifer is said to officially take in each year. These are all very critical measures, especially for the Habitat Conservation Plan staff, because many of their programs designed to protect endangered species and habitats are based on those recharge and water quality data points. And the success of those HCP programs is what drives compliance with this region's federal permit under the Endangered Species Act."

Schwarz explained that there are 74 rain gauges located throughout the counties that make up the Edwards Region. Additionally, his group manages nine water quality and four recharge dam monitoring stations. The remote water quality measuring began in 2013 as part of the HCP program. But, the rain gauge and recharge dam monitoring have been in place for nearly 25 years. With the evolution of cellular technology, the EAA is planning to completely overhaul its rain gauge system to take advantage of those advancements."

“The existing weather stations that house the rain gauges use radio waves to transmit data from locations in the field to six relay stations before the data finally arrives at a central receiving location at the San Antonio airport,” said Dr. Newfel Mazari, EAA data collection supervisor. “This type of radio wave technology is older and expensive to operate and maintain. We even have to pay the Federal Communications Commission $10,000 each year to use the radio frequencies we transmit on. Now that cell phone telemetry has progressed to where all of our stations can reliably transmit data over these systems, we have decided to retrofit every station to cellular technology. This system will cost less to operate and maintain and we expect fewer interruptions in service.”

Mazari says they have spent the last several years evaluating and testing systems. He anticipates that they will switch out about 30 weather stations by the end of 2018 and complete the other 44 stations in 2019. The older radio tower system was subject to failure during major storms which would interrupt data transmissions for days and sometimes weeks. Mazari’s group is also working with the contractor that receives the data into a central database to automate reporting in order to make it more readily available to the public and other government agencies.

“Maintenance of this entire network of rain gauges and monitoring stations is extremely important,” Schwarz noted. “The water quality stations require more attention because each of the water quality parameters we measure for has a specific sensor. And, some parts of the station have solutions inside a sensor and those need to be changed out frequently to ensure we are getting good data. Sediment, high winds, birds and all of the other things you can think of out in the environment can throw a monitoring device off and so we have to be vigilant in maintaining those instruments.”

Like the torrents of rain the area experiences, Schwarz says that the data from the monitoring stations can also flow in large volumes. He explained that the stations are capturing specific measurements every 6-15 minute intervals. They typically will then transmit that information on an hourly basis. So, over the course of a month, there will be thousands of data points to collect, analyze and distribute to EAA and external partners alike.

“We understand just how critical this data is to not only the EAA operations but to the EAHCP and outside agencies as well,” Schwarz commented. “We even get regular requests for information from scientists and college students doing research on the Edwards Aquifer. That means our collection methods have to be precise and our devices must be maintained regularly to operate effectively. And, our staff needs to be well-trained on all of these aspects of of our data collection efforts. There is a lot riding on us getting the numbers right.”