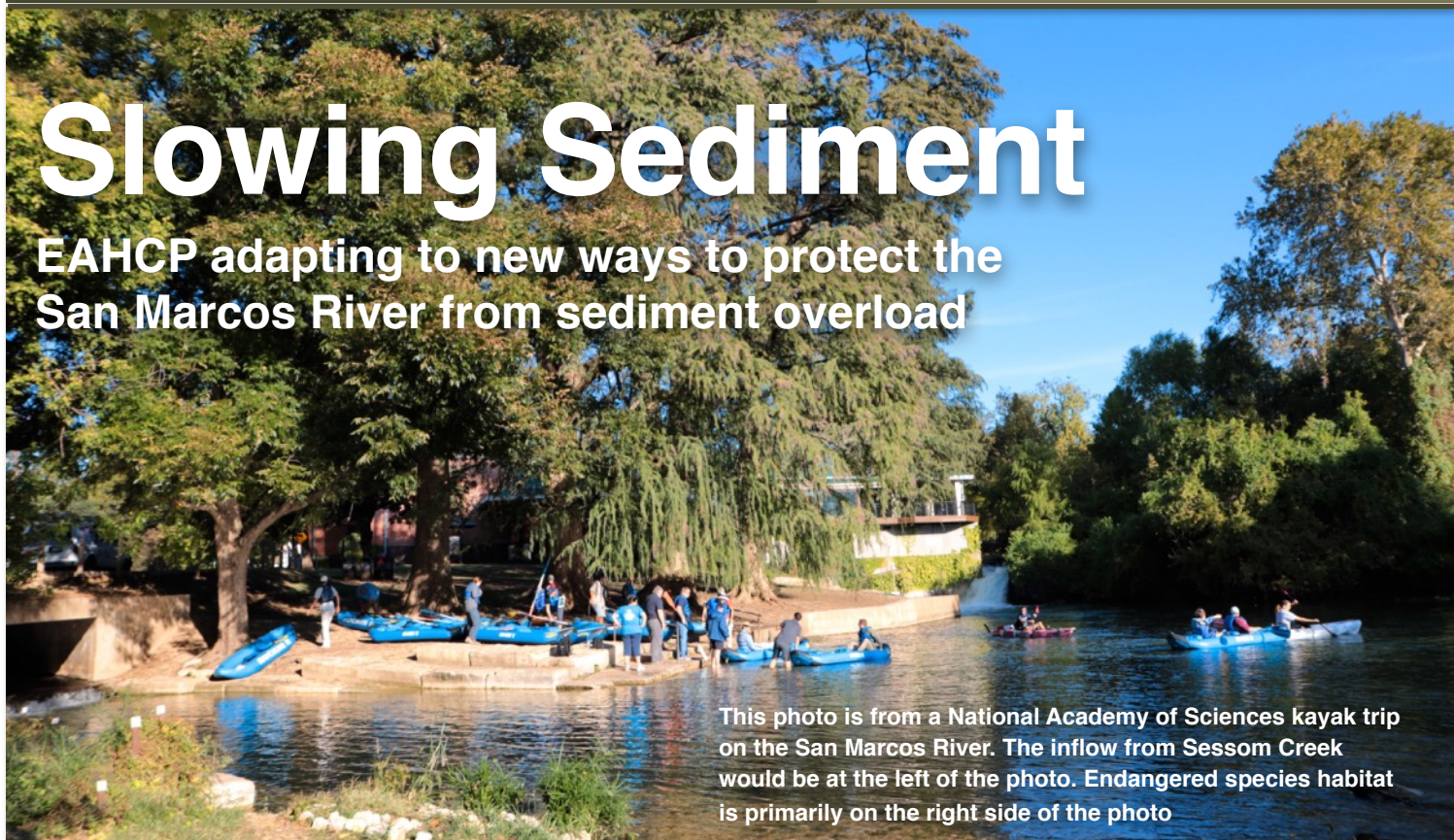




Slowing Sediment

EAHCP adapting to new ways to protect the San Marcos River from sediment overload



This photo is from a National Academy of Sciences kayak trip on the San Marcos River. The inflow from Sessom Creek would be at the left of the photo. Endangered species habitat is primarily on the right side of the photo

The Grand Canyon is one of nature's most famous displays of soil erosion, with the Colorado River carving out that colorful 5,000- foot deep panorama over the course of five million years.

Here in South Texas, the Edwards Aquifer Habitat Conservation Plan (EAHCP) is dealing with its own issues of soil erosion and resulting sedimentation in the San Marcos River, which is the unique habitat for several endangered species.

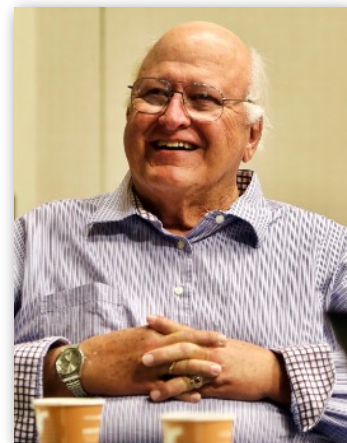
"The original agreement we have with the U.S. Fish and Wildlife Service, which approved our habitat conservation plan, calls for ongoing amount of sediment removal from

the San Marcos River each year," said Melani Howard, who implements the EAHCP for the City of San Marcos. "What we've found, however, is that sediment removal in the San Marcos River was extremely time and labor intensive. To limit the take of endangered species during removal operations, we kept the effort minimal. After three years, it was clear that we were not making much headway for the dollars expended. So we needed to find a different solution."

In looking at the situation, the EAHCP team developed a mitigation strategy to replace the sediment removal program.

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Dr. Glenn Longley (below) is an expert on the San Marcos River watershed and on water quality protection strategies. The EAHCP Steward Podcast at www.EAHCP.org features interviews with Dr. Longley and Dan Robertson.



“What we’ve found is that sediment mitigation can have fewer impacts on the stream and endangered species habitat, can be more sustainable over time, address the source of sedimentation, and actually cost less than sediment removal,” Howard explained. “We analyzed the watershed and have found that the area along Sessom Creek tributary to the San Marcos River is a place we can focus our mitigation efforts.”

Sessom Creek rose to the top of the mitigation list due to its proximity to the headwaters of the San Marcos River, its impact on endangered species where it connects with the San Marcos River, high impervious cover in neighborhoods the creek flows through, high erosion of the creek’s stream banks, and its high channel slope conditions.

Following the identification of the problems, a plan consisting of more than 20 various projects were identified as potential sediment mitigation solutions.

“We’re now looking at stream restoration efforts to shore up the creek’s banks, to include soil stabilizing riparian restoration, specific stream bank repairs and the addition of some stormwater best management practices designed to reduce the flows into the San Marcos and capture sediment before it gets to the river.”

Before any of these measures can be implemented, various options are being reviewed by the EAHCP Water Quality Work Group made up of water quality experts from around the Edwards Region. The EAHCP’s Science Committee will also dig into the proposed mitigation solutions before a final recommendation is made to the EAHCP Implementing

Committee. Once the Implementing Committee gives its approval on the scope of the plan, engineering and construction will follow.

“Overall, our projections are showing that by using these mitigation measures, we can reduce the sediment loads to the San Marcos River by nearly 240,000 pounds per year,” Howard said. “And this new direction will come in within the EAHCP budget established for addressing sedimentation in the river. While the City of San Marcos will be partnering with the EAHCP in funding the projects, the City of San Marcos will be responsible for maintaining the new infrastructure over time.”

If all goes as planned, engineering design of the projects could start in October of this year with construction expected to start in 2019.

The Water Quality Work Group listens to options for preventing sedimentation in the San Marcos River.





FORECASTING THE FUTURE

While there is a large amount of research being conducted as part of the Edwards Aquifer Habitat Conservation Plan (EAHCP), one of the single most important questions needing an answer is, “What happens to the endangered fountain darter during times of extended drought and severe heat?” The logical follow-up question is, “How can you know that beyond observations made on what has happened in the past?”

The answer: there’s an app for that.

Well, arriving at an answer to the question is not quite as simple as clicking some buttons on your phone. This app, based on applied research, involves dynamic computer calculations via the EAHCP’s updated ecological model.

This particular ecological model being used by the EAHCP is a computer-based simulation of the fountain-darter populations. Because of the extent and complexity of the river networks, the entire fountain darter population could not be modeled. Instead, this model was created for five study reaches: in the San Marcos-City Park and IH35; in the Comal, Upper Spring Run, Landa Lake, and the Old Channel. The central modeling concept is that fountain darter numbers are governed mainly by habitat quality, which includes the amount of submerged aquatic vegetation in the river system, and by water temperature and by dissolved oxygen.

The ecological model is comprised of four major sub-models, which address river hydraulics, water quality, submerged aquatic vegetation and the fountain darter population. Model inputs include data on river flows including the springflow components, weather, solar radiation, physical makeup and depth of the river channel, amount of aquatic vegetation that provides a living space for darters, and estimated fountain darters in the system.

“The ecological model has tremendous capabilities to answer questions about the fountain darter in situations we previously have not been able to observe,” said Dr. Chad Furl, Chief Science Officer for the EAHCP. “Each model run can take up to a day to complete – it’s pretty

computationally intensive. The model has to account for river hydraulics, water quality, macrophyte communities, and a host of fountain darter life history facets in order to estimate population changes to the fountain darter.

“It is important for people to know that the purpose of the ecological model is for use in helping the EAHCP team make the best recommendations to decision-makers regarding how we implement our springflow protection measures which help preserve the fountain darter during a drought of record,” Furl noted. “Additionally, the model allows us to ask those ‘what if’ questions regarding program changes. We can examine a host of scenarios in order to see if the outcomes are better or worse for the fountain darter and its habitat.”

At a recent public meeting to show some early results from the first ecological model runs, EAHCP team members reported that the current springflow protection measures now in place will protect the fountain darters in a drought of record scenario.

“This was really good news for the Edwards Region,” said Nathan Pence, EAHCP Program Manager. “While it took five years of work on the ecological model to answer the original question, we’re seeing that our springflow protection programs and efforts to restore darter habitats is getting us where we need to be. The model shows that even through worst case drought scenarios, fountain darters will survive and repopulate.”

72 Degrees Video-Cool Approach to Awareness

"I was headed toward another video shoot near the San Marcos River recently, and even though I was lugging a lot of gear, I stopped to pick up some trash that I found near the river," said Dan Robertson, City of San Marcos video technician. "While that might sound a little crazy to some, I not only learned a great deal from the recent video we produced about protecting the San Marcos River, but it positively changed my outlook on the overall environment."

The video Robertson alluded to is called "San Marcos River. Life at 72 Degrees" and was produced by the City of San Marcos to generate awareness among the thousands of tubers who float the crisp-feeling, crystal-clear waters of the San Marcos River during those South Texas scorching hot summers. There are plenty of rules for recreation on the river, but there also is important information about endangered species and the Edwards Aquifer Habitat Conservation Plan's (EAHCP) programs to protect the species and their habitats.

"Producing the video was really the brainchild of Melani Howard and Amy Kirwin who work with the City of San Marcos," Robertson explained. "Melani manages San Marcos' implementation of the



Dan Robertson and tubers enjoy the San Marcos River.

EAHCP and Amy runs the City's recycling and trash disposal operations, so it made sense that the two of them would combine their missions and want to get out the message of keeping the river clean through a video. After we discussed the key messages for the video, they turned me loose to develop the script and then to get the video shot and edited for publication."

Local talent Kory Kelly served as the host for the eight-minute film and an original music track was written and performed by the home-grown bluegrass band Crystal Creek Boys.

"The San Marcos River is so unique and this film gives us a great opportunity to share some critical environmental information with river users," said Howard. "Even the smallest piece of litter can find its

way into the river and be hazardous to the fish, birds and endangered species that live there. We need people enjoying the river to clearly understand that their actions affect the aquatic life in the river. We know visitors to the river enjoy the river, we just need to make sure that the wildlife continue to thrive as well."

Robertson moved to San Marcos from Louisiana and notes the difference in the environmental surroundings.

"My previous experience with large bodies of water was the muddy waters of the Louisiana bayous," Robertson noted. "The San Marcos River is amazingly clear. Producing this video really helped me gain a new perspective in why we all need to help keep the river clean."

You can watch the video at: <https://youtu.be/I34gM0XNrBI>.

The Edwards Aquifer Habitat Conservation Plan e-newsletter, "Steward," is published to highlight the efforts underway to protect the Comal and San Marcos Springs and ensure a healthy habitat for the threatened and endangered species.