



Comal Springs Riffle Beetle Research Ramps Up

Texas State, Fish & Wildlife, EAHCP advance learning about endangered beetle



Dr. Weston Nowlin is leading a Texas State University riffle beetle research team.

Slowly but surely, scientists from Texas State University and the Fish and Wildlife Service working on the Edwards Aquifer Habitat Conservation Plan (EAHCP) are learning more about the endangered Comal Springs riffle beetle, which lives in spring openings. Just a handful of years ago, researchers noted they were essentially starting from scratch when it came to developing a body of knowledge about the tiny creature. And even

though scientists are learning more each day, the ultimate prize of being able to breed Comal Springs riffle beetles in a lab is still a mystery.

“Eventually, we need to find the right process for maintaining a self-sustaining population of riffle beetles at the EAHCP refugia site,” said Dr. Weston Nowlin, who leads a team of biologists at Texas State University studying the Comal Springs riffle beetle. “Right now we’ve hit a bit of a bottleneck. While we have successfully been able to get the males and females together to produce eggs, the beetles which emerge from metamorphosis do not survive very long. That’s obviously a hurdle we must figure out how to get over if we are going to be able to have some sort of standing stock of riffle beetles in the refugia. That way, if an extended drought or some other disaster were ever to sharply harm the species in the wild, we would be able to reintroduce them into their natural habitat from captivity.”

National HCP Coalition - Continued

Over the past few years researchers have learned about the beetles' life history, how long their reproduction cycle is, what elements are needed for them to reproduce, how they tolerate certain environmental conditions and what kind of a diet they best survive on. From the life history perspective, Weston's team had to start by figuring out how to tell the males and females apart. An analysis of body characteristics found that the females have a longer sternum than their male counterparts. Next, they were able to mate beetles so the females could lay eggs. They also determined what type of substrate the females preferred in laying eggs, how many eggs could be produced at a time and then how long the eggs took to hatch into larvae. The larvae grow through a series of instars, which means various stages of development, before it becomes an adult.



Graduate assistant Kirby Wright checks riffle beetle larvae.

much because the water temperature there rarely changes. All of these findings will definitely help us in the next two studies we are working.”

Currently, Nowlin's team is wrapping up a study centered around the diet for a riffle beetle. From previous research, they know that the riffle beetle's primarily feed off of the biofilm that grows on leaves in the water and other types of organic matter. Getting the diet right will be critical to being successful in being able to produce adult riffle beetles in a lab environment. The next study will focus on creating conditions that will get the pupa to mature into adults.

“We should be wrapping up the diet research sometime over this summer and we're about to begin another two studies,” Nowlin noted. “Some previous research done collaboratively between Texas State and the Fish and Wildlife Service found that in one stage of development, the riffle beetle pupa forms a light, yellowish looking case and then go inactive for a period of time. They noticed that it seemed the Comal Springs riffle beetle pupal cases subsisted best when they were submerged in water. Most of the other types of riffle beetles we know about do not do this. Those pupal cases are typically found on stream banks near the water. So, we're developing two types of devices for Comal Springs riffle beetle pupa to grow in. In one, the pupa will be completely submerged in water. The other will have some sort of air-water interface. Then we'll see which process best allows pupa to develop into adults.

“In addition to that research, we'll also be modifying the frequency with which we handle the riffle beetles and the pupa. We check on and handle them every week, which is standard protocol right now. So, we'll have another group of beetles that we don't handle for several weeks at a time. The riffle beetle pupa have tiny hairs on their outer cases and we think they can be very sensitive. That means that too frequent handling could be changing the way they pupate. All of the things we're learning will hopefully enable the Fish and Wildlife Service to learn the best methods for creating a standing stock in the refugia like they are doing with the endangered fountain darters, Texas wild rice and salamanders.”

“During our research, we've found out how many instars each riffle beetle goes through, what the survivorship is in captivity and then how long they are in the larval stage before they become adults,” Nowlin explained. “However, that last stage of pupation just before they emerge as adults has been where things have broken down. On the upside, we've found out the type of food they like best and that they can be sensitive to changes in water temperature and dissolved oxygen. In fact, just the change of a few degrees in temperature can dramatically impact a riffle beetle's health. That's probably why they like the Comal Spring openings so

EAHCP STEWARD SHORT TAKES

EAHCP's Women in STEM

In February, the United Nations celebrates women and girls in STEM (science, technology, engineering, math), which is why the *EAHCP Steward* would like to say “thank you” to the many talented women on the EAHCP team whom have chosen science as their life’s work. The U.S. will observe STEM Day on November 8 as a way to encourage today’s youth to consider careers in any of the STEM fields.

Next month we will feature the Women in STEM who are on the various EAHCP committees.



Jamie Childers



Kelsey Anderson (left), Taylor McCrary



Kristina Tolman



Melani Howard

Stem Women at the EAHCP - Continued



Kristy Kollaus



Amelia Hunter



Lindsay Campbell



Olivia Ybarra



Linda Moon

Great Texas River Clean Up in San Marcos Scheduled for March 7

The 2020 Great Texas River Clean Up will be happening Saturday, March 7. Registration will begin at 8:30 a.m. and the clean up will begin at 9 a.m. Lunch and a free T-shirt will be provided on a first come, first serve basis. [You can sign up at this link.](#)

Save the Date!

It's official. The National HCP Coalition will be meeting October 26-30 in Austin. So make sure you block out those dates on your calendar and make plans to take advantage of this unique meeting opportunity. You can read more about the National HCP Coalition at www.nhcpcoalition.org.

EAHCP Committees Meeting Schedule for 2020



2020 EAHCP COMMITTEE DATES

IMPLEMENTING COMMITTEE DATES

DATE	COMMITTEE	LOCATON	TIME
January 30, 2020	Implementing	EAA	10:00 AM
August 20, 2020	Implementing	EAA	10:00 AM

JOINT IMPLEMENTING AND STAKEHOLDER COMMITTEE DATES

DATE	COMMITTEE	LOCATON	TIME
March 19, 2020	Joint SH-IC	EAA	10:00 AM
May 21, 2020	Joint SH-IC	EAA	10:00 AM
October 8, 2020	Joint SH-IC	EAA	10:00 AM
December 17, 2020	Joint SH-IC-SC	EAA	10:00 AM

SCIENCE COMMITTEE DATES

DATE	COMMITTEE	LOCATON	TIME
February 26, 2020	Science	COSM	9:00 AM
April 29, 2020	Science	COSM	9:00 AM
September 10, 2020	Science	COSM	9:00 AM
December 17, 2020	Joint SH-IC-SC	EAA	10:00 AM