Seen in Cuatrociénegas during many not so idle nor idyllic summers 90 years after the original "El Gringo"

Observando en Cuatro Ciénegas durante muchos no tan ociosos e idílicos años 90 años después del original “El Gringo”

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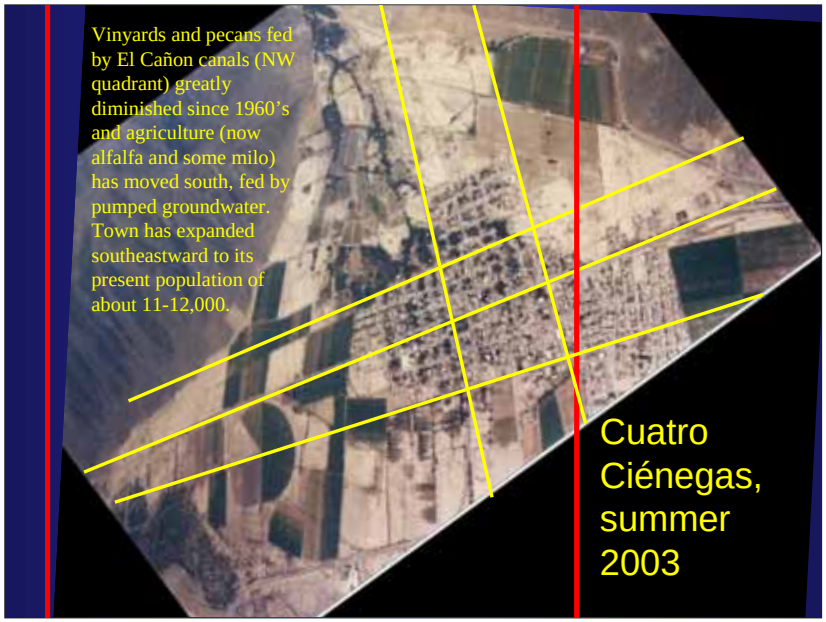
Cuatrociénegas is full of totally unexpected discoveries, distractions and unknowns, and at least this ichthyologist now finds himself wandering into, and getting stuck in, things that are rather distant from fish biology and ecology...

The greatest value of research may not always result from the discoveries that the researchers initially set out to make...

The problems confronting the Reserve are clearly regional, but the observations made by Weeks 90 years ago were almost all from the town. Almost all of my research has been outside of the town, but I'll start there too…

Cuatro Ciénegas, summer 1968

- El Cañon discharge filled a 36"pipe in early 1960's.
- Note dark vinyards & pecans in northwest quadrant, fed by El Cañon canals, and relative lack of fields below that.
- By this time, discharge of El Cañon had already declined some according to locals, and some vinyards along lower canals were abandoned. No pumps in use.
- Town extended to easternmost line.


Vinyards and pecans fed by El Cañon canals (NW quadrant) greatly diminished since 1960's and agriculture (now alfalfa and some milo) has moved south, fed by pumped groundwater. Town has expanded southeastward to its present population of about 11-12,000.
Cuatro Ciénegas, summer 2003

This long-dry wheat mill was powered by Río El Cañon from the 1880's into the 1950's

Feeder canal and its 2nd floor entry to the mill, now at least 10-12 m above the adjacent streambed

Between the mill and the stream is a now-dry swimming pool that locals say has not seen water since the late 1960's – early '70's. The stream is now not much more than 1" deep and 12" wide on riffles in front of the mill.

Alfalfa agriculture in headwaters

At least recently, drying of Río El Cañon correlates with groundwater pumping in the valley at the head of the canyon (Valle de Calaveras), primarily for alfalfa and dairy production.

El Río de Cuatrociénegas?

- Has anyone ever considered the possibility that restoration of flows to the Río El Cañon could give the town a “River Walk” area not unlike San Antonio’s? It certainly would not be easy to achieve, but dreams should always be encouraged, and the hydrological potential may still be there. Is alfalfa that now uses the water upstream worth more than the tourism that could be developed among the pecans along this beautiful river?

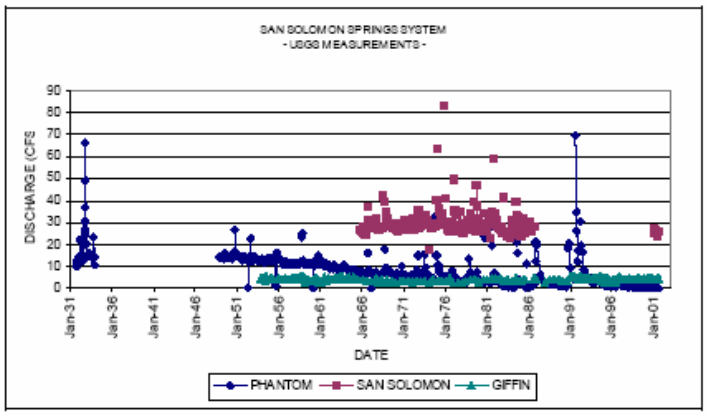


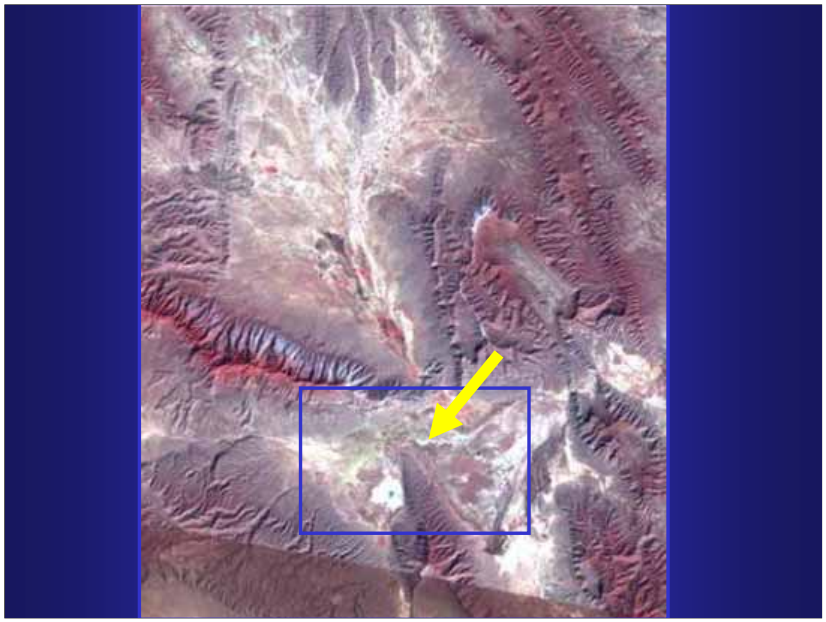
Figure 1: Spring flow in Phantom Lake, San Solomon, and Giffin springs.

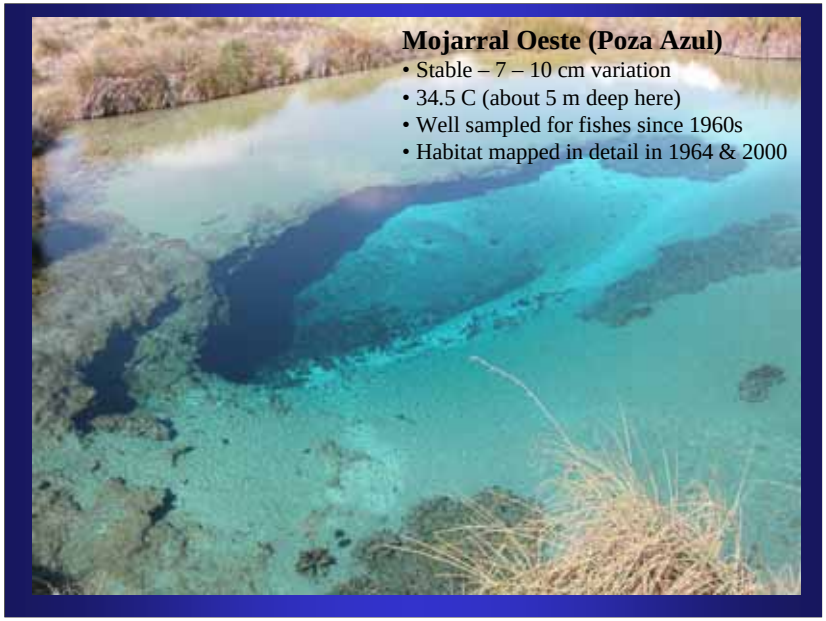
Isotopic analysis suggests that the base flow that feeds the springs is more than 10,000 years old (Ridgeway, Chowdhury, and Mace. 2004. Texas Water Development Board)

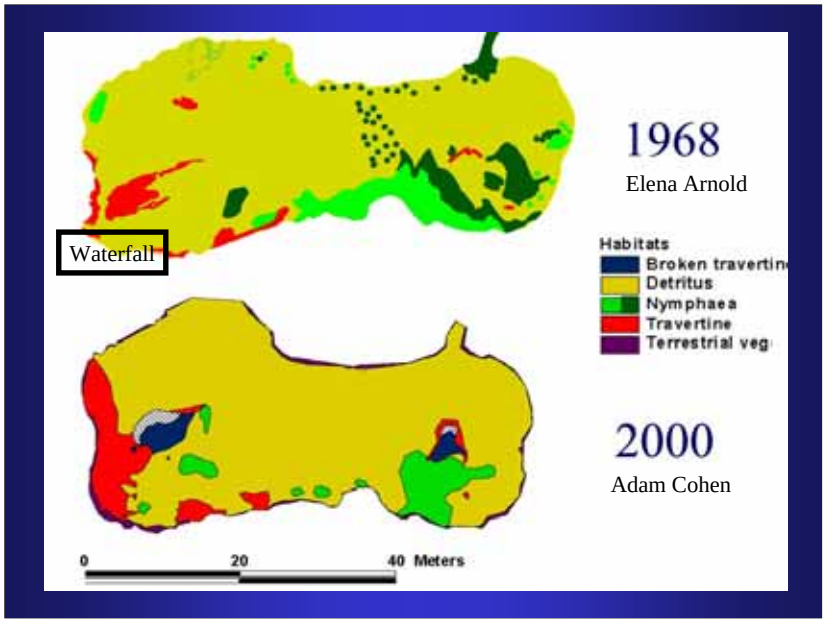
La Mota in Ocampo – 50 km north

J.M. Artigas

- Water park fed by ~ 6 small springs.
- Home of the undescribed Ocampo cichlid




Mojarral Oeste (Poza Azul)
• Stable – 7 – 10 cm variation
• 34.5 C (about 5 m deep here)
• Well sampled for fishes since 1960s
• Habitat mapped in detail in 1964 & 2000


Waterfall
1968
Elena Arnold
Habitats
Broken travertin
Detritus
Nymphaea
Travertine
Terrestrial veg
2000
Adam Cohen
0
20
40 Meters

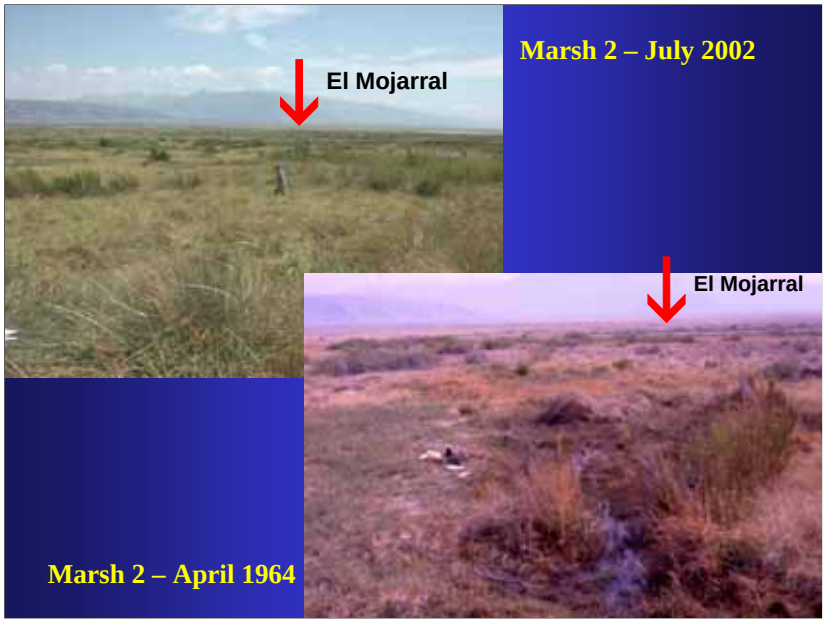
W. S. Brown photo taken December 12, 1965 of stream flowing from his *Terrapene* study sites behind the photographer into Mojarral Oeste. Note apparently higher water level of poza in background as well.

Looking for Bill Brown's marshes 34 years after his last visit.

We were not sure we had found Bill's box turtle marshes, so we searched for and found him, and brought him back to Cuatrociénegas to visit and show us his study sites. His fieldnotes and photos were invaluable.

Brown had meticulously surveyed the location of his marshes, and

copiously documented their physical and botanical details,


El Mojarral
Marsh 2 – July 2002
El Mojarral
Marsh 2 – April 1964

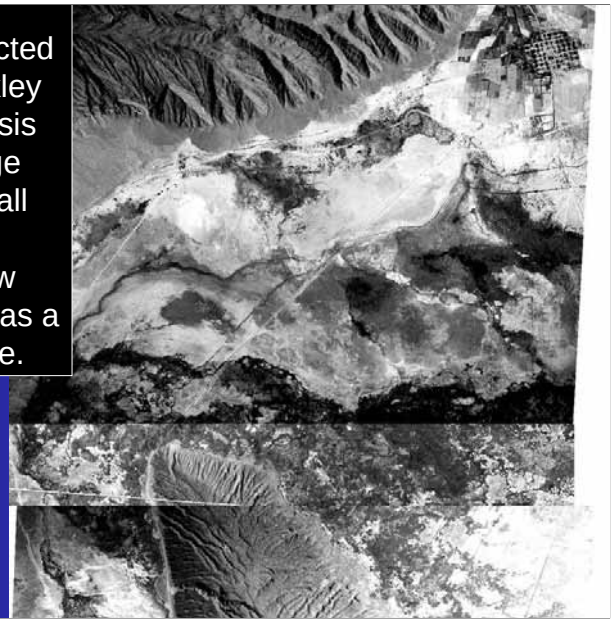

Marsh 11 – July 2002
Marsh 11 – Dec 1965

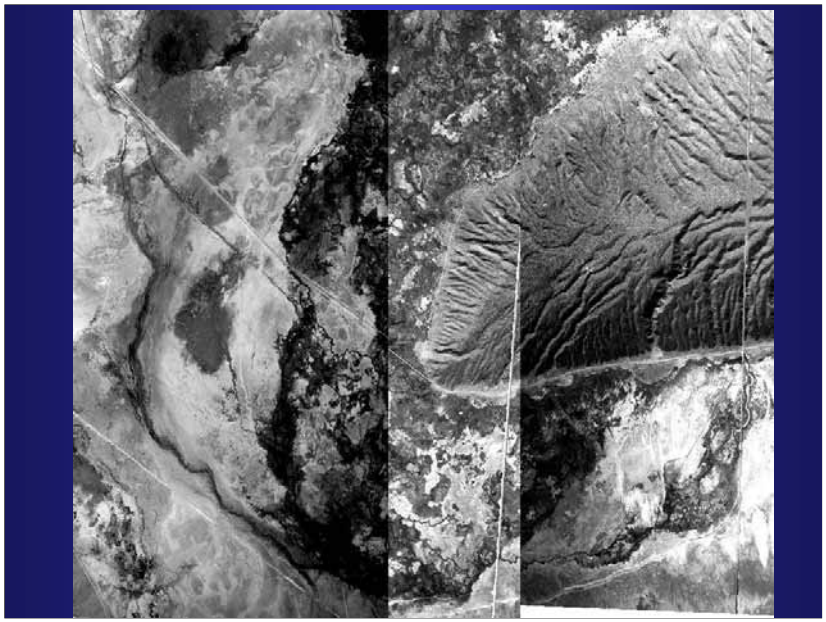
Marsh 10-11 – “fresh burn” – April 1966

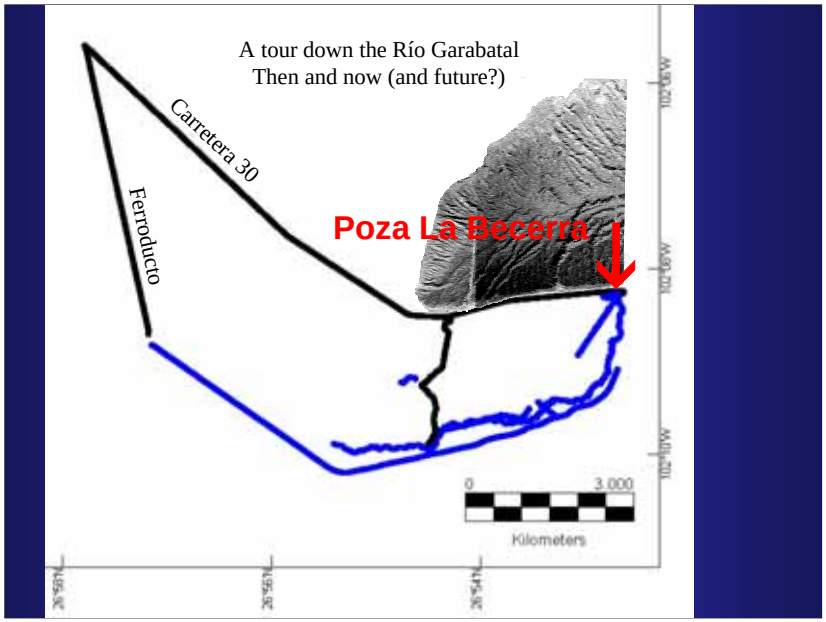
"… based on our observations in 2002 when we revisited and relocated the marshes I had worked in, my strong impression -- and the photographic evidence provides good support for it -- is that the marshes have been lost due to dehydration and have been replaced by thick mats of tall grasses. I felt then that **prescribed burning of the area to remove the dense overgrowth would be appropriate**…. The terrestrial communities have also been radically altered and replaced by these grasses, so that too could be a justification for the treatment…. There used to be a Chihuahuan mixed grassy and shrubby community between the marshes and burning had traditionally been done there to allow more grasses (probably a mix of different species than the species that have replaced them) to crop up for the goats and horses that roamed the area in 1965…"

William Brown, in email July 26, 2004

1968 aerial photos contracted by W.L. Minckley formed the basis for his drainage map and overall studies of the basin, and now can be useful as a baseline image.

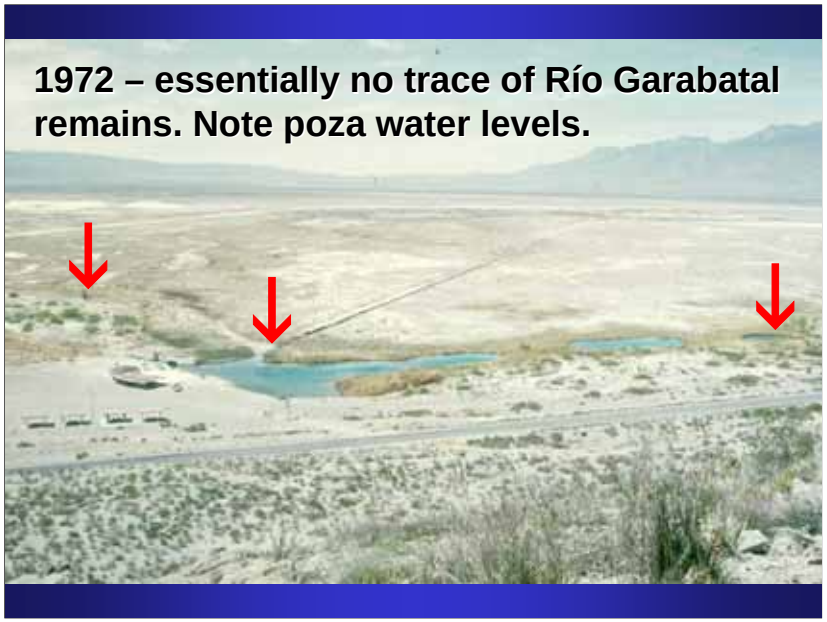




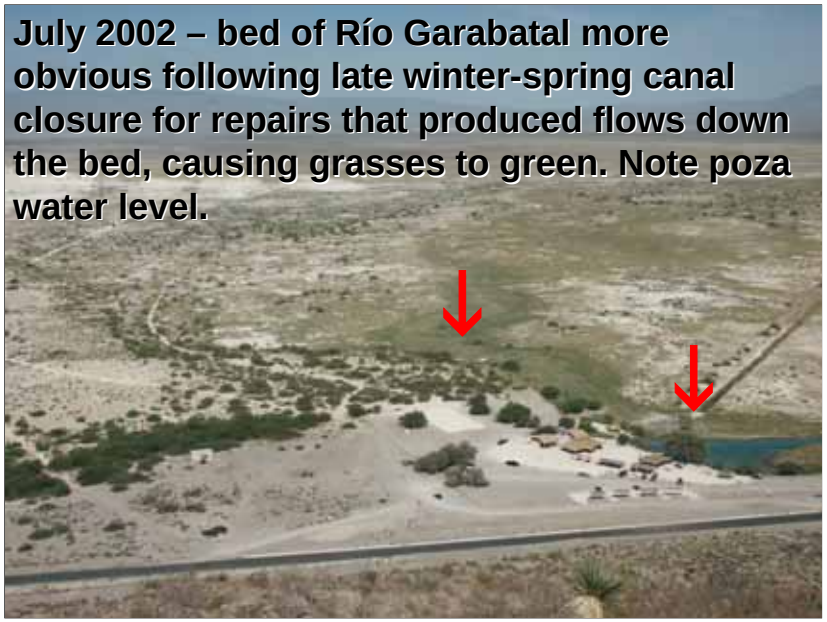

A tour down the Río Garabatal
Then and now (and future?)
Carretera 30
Ferroducto
Poza La Becerra
0
3,000
Kilometers
102°06'W
102°08'W
102°10'W
26°56'N
26°54'N
26°52'N

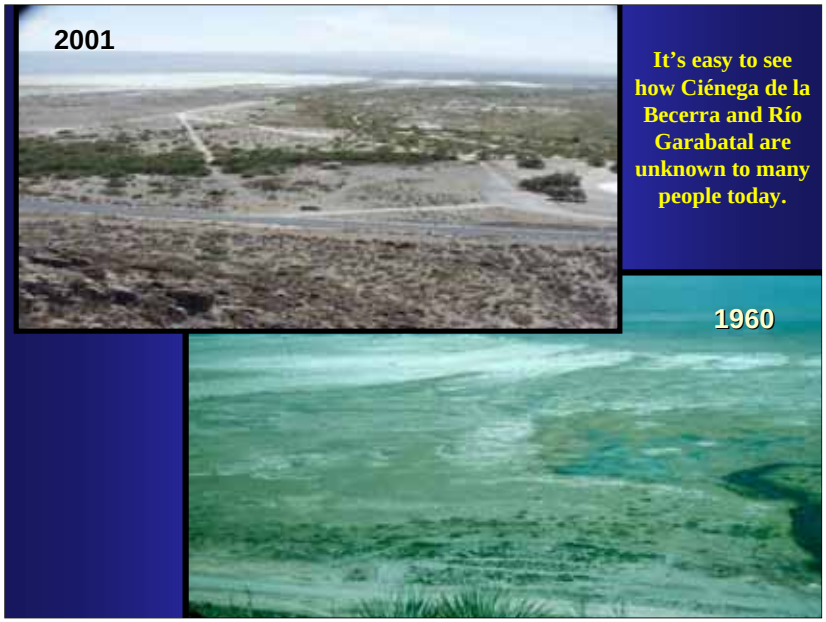

1960
R. R. Miller photographer

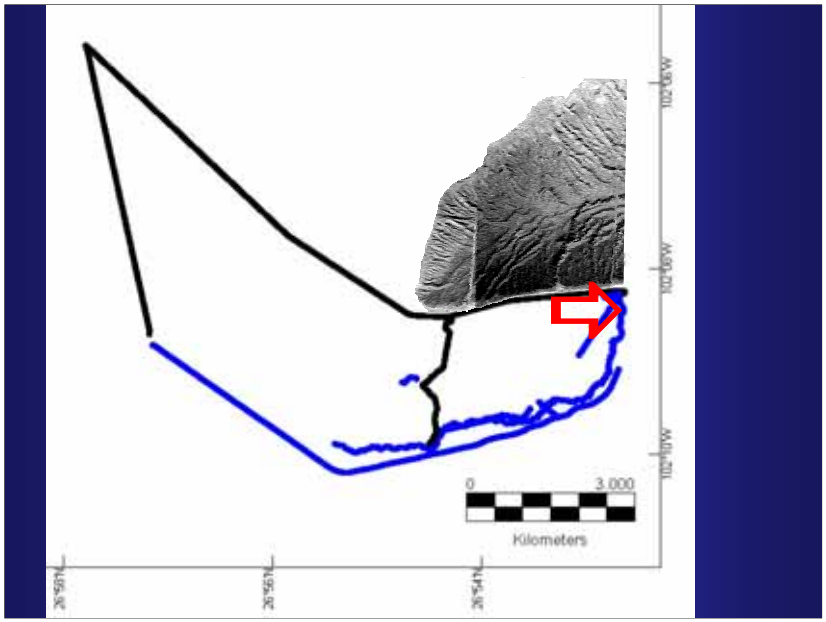

Dec. 28, 1964, shortly after canal lowered level of Poza de la Becerra
'When first arrived 12/27/64, late evening, Becerra had been drained to a low level by a canal constructed running WNW from main pools of Becerra out approx. 1 mile to another marsh.' - William S. Brown (photographer) .


1972 – essentially no trace of Río Garabatal remains. Note poza water levels.


July 2002


July 2002 – bed of Río Garabatal more obvious following late winter-spring canal closure for repairs that produced flows down the bed, causing grasses to green. Note poza water level.


2001
It's easy to see how Ciénega de la Becerra and Río Garabatal are unknown to many people today.
1960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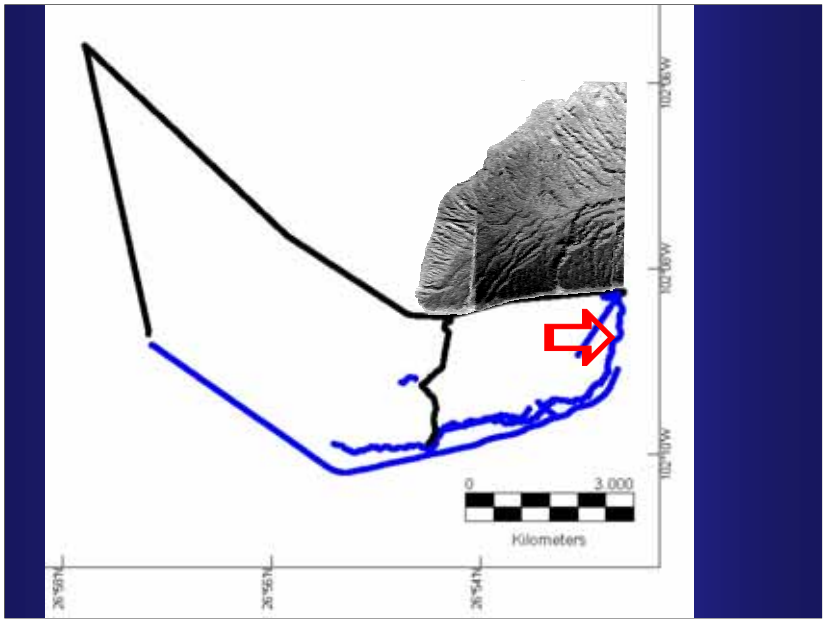
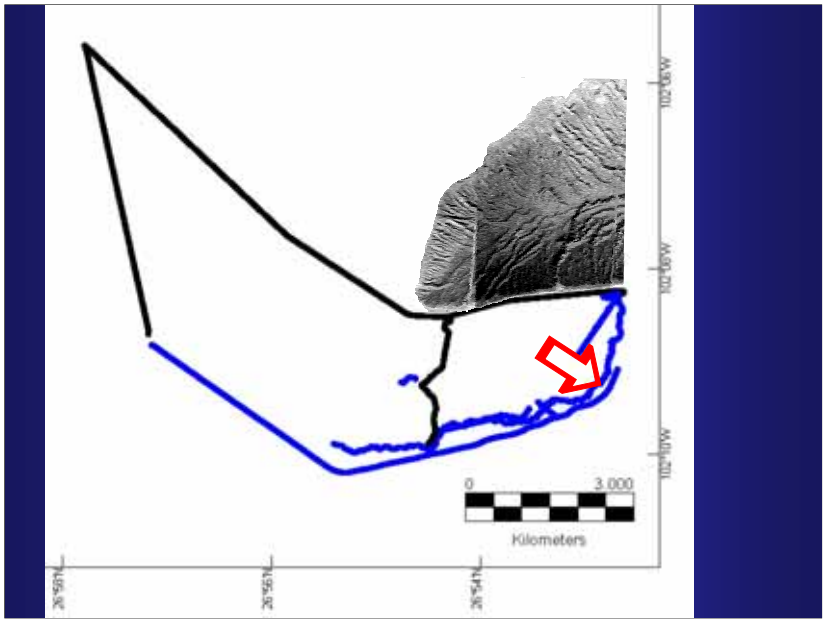

0
3,000
Kilometers
102°05'W
102°00'W
101°55'W
26°56'N
26°52'N
26°47'N

Long-dry stromatolitic formations in Río Garabatal, 0.5 – 2 km below Poza la Becerra, July 2002. No hint of recent water in this reach.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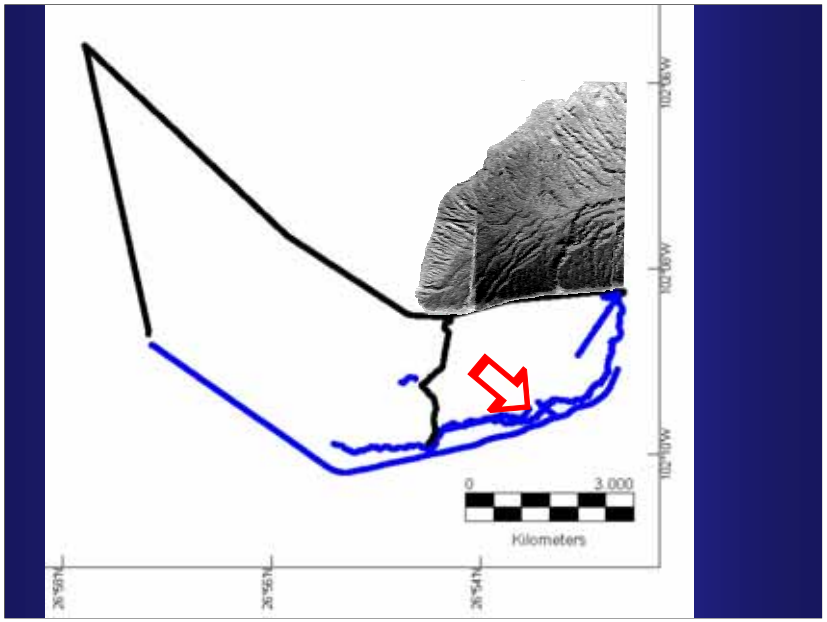
102°05'W
102°00'W
101°55'W
26°59'N
26°56'N
26°54'N

Canal de la Becerra

When we first discovered the jewel cichlid in the basin, we were very concerned about its potential impacts on the native fauna, but took comfort in the fact that, of all spring systems in the basin, Churince is one of few from which it couldn't easily escape to other springs. Poza Churince is at the base of the mountain (on the right side of the screen), along the highway. Water issuing from the springs there flows through the small Rio Churince to an intermediate pool enroute to the large Laguna Churince (also called Laguna Grande), which has no outlet. Water simply evaporates from Laguna Churince, causing it to become highly saline. Fish can not swim from anywhere in the Churince system to any other spring systems in the basin.


0
3,000
Kilometers
102°06'W
102°08'W
102°10'W
26°56'N
26°54'N
26°52'N

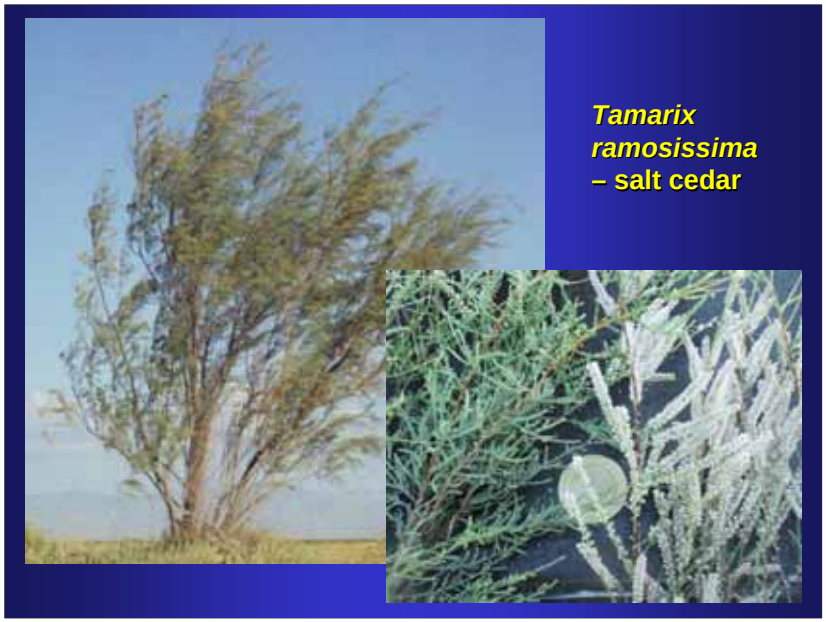
Pozas Chiqueros early 1980's and 2000

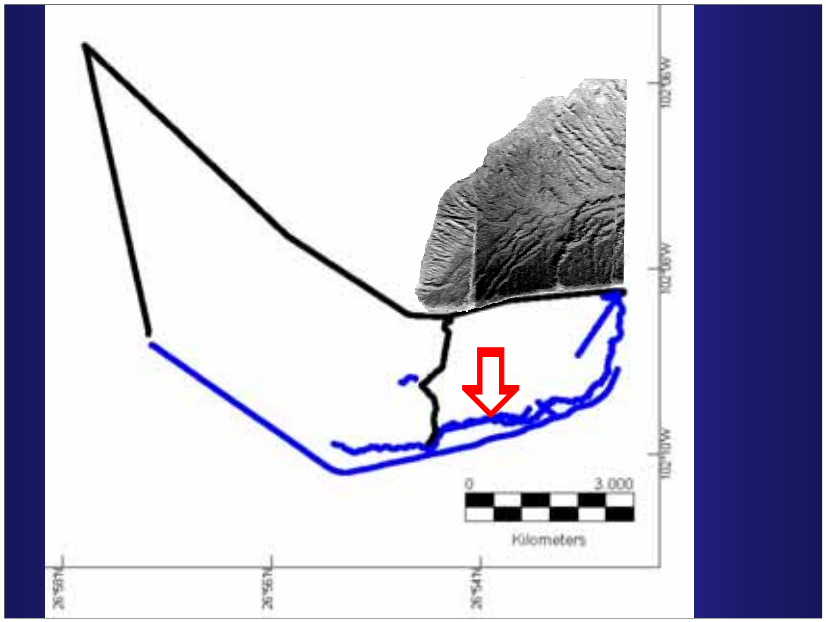
We found Garabatal to be dry and to have clearly been that way for many years. With Dr. Winsborough's help, we returned in October 1998 to duplicate some of her photographs. Those on the left were the way the habitats looked in the early 1980's, and those on the right depict the October 1999 condition. Terrestrial vegetation is now well established where aquatic ecosystems formerly occurred.

The stromatolites at top are now high and dry, and eroding quickly. Arid, Chihuahuan Desert vegetation now grows almost on top of them. The huge pool along the far shore of which the stromatolites pictured once grew, has clearly not held water for many years.

It is not at all clear why Garabatal dried. Water has not been diverted from here. It seems likely that this may be the first casualty attributable to a general, basin-wide drop in water levels.

Many old-time fishermen have talked about how great the fishing used to be in the pools Winsborough studied (Los Chiqueros). I ran across this in summer 2002, perhaps lending credence to their fish tales…


Tamarix ramosissima
– salt cedar


0
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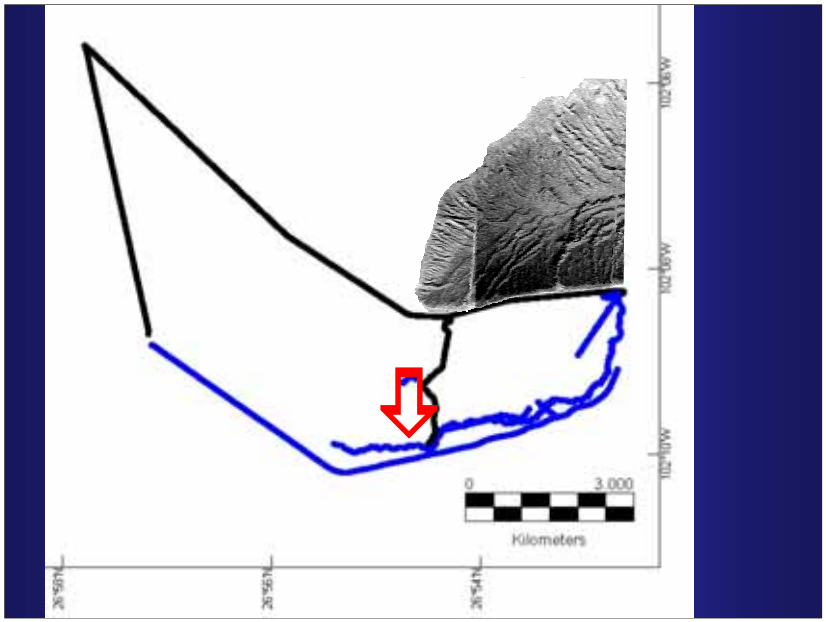
102°10'W
26°56'N
26°54'N
26°52'N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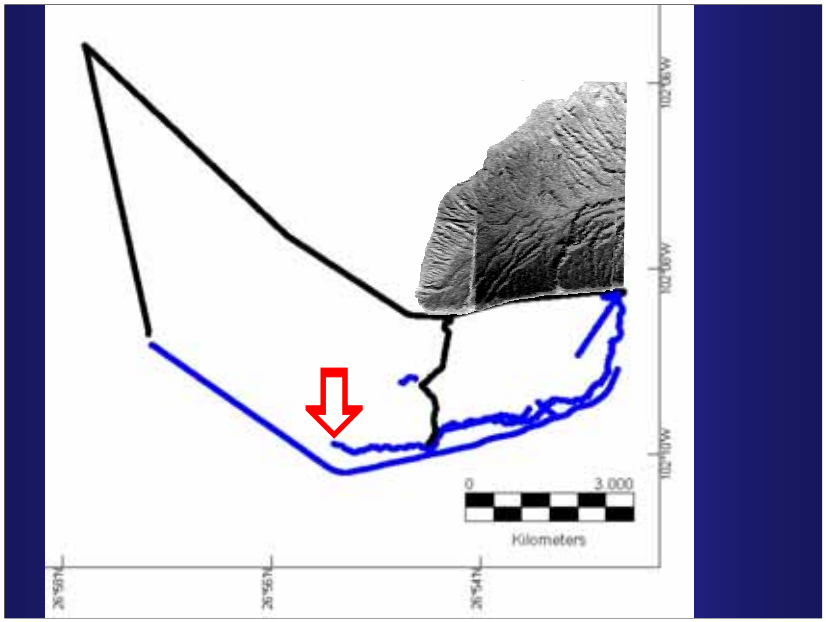
102°08'W
102°10'W
26°56'N
26°54'N
26°52'N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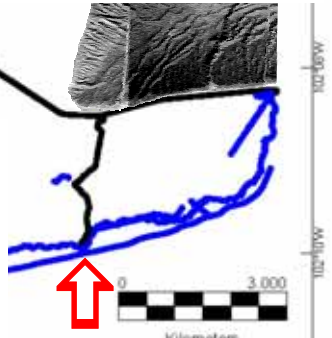
Kilometers

March 2004 – The Río Garabatal was briefly re-born when the canal was again closed for repairs.


March 2004


March 2004

Is it feasible to maintain Poza La Becerra at a high level and allow the Río Garabatal once again to flow continually, thus recovering a huge area of natural habitat that could also perhaps provide ecotourism opportunities? I suspect it may not take much energy to pump from the river into the present canal so agriculturists could continue to use the water. Precise surveys, detailed hydrology studies, and an economic analysis would obviously be required.

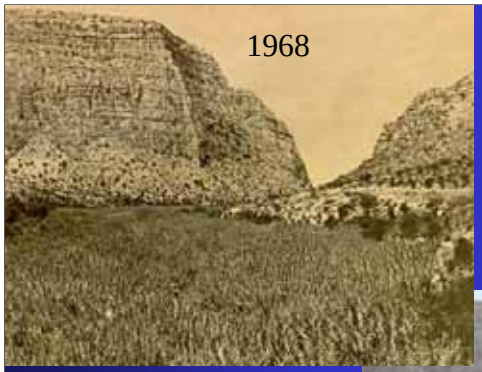


The arrow marks a point where the canal and river channel almost intersect, and the difference in elevation between the two is relatively small. **What would the pump cost? What is the value of Ciénega de la Becerra and 5 km of the Río Garabatal? The value of a much bigger Poza La Becerra? Where are the economists?**

Arundo donax - Giant Reed / Carrizo Grande, unfortunately, in the middle of the Río Mesquites. March 2004

Rio Salado below Cuatro Ciénegas

Mesquite and open grass 1961, dense *Arundo* 2001



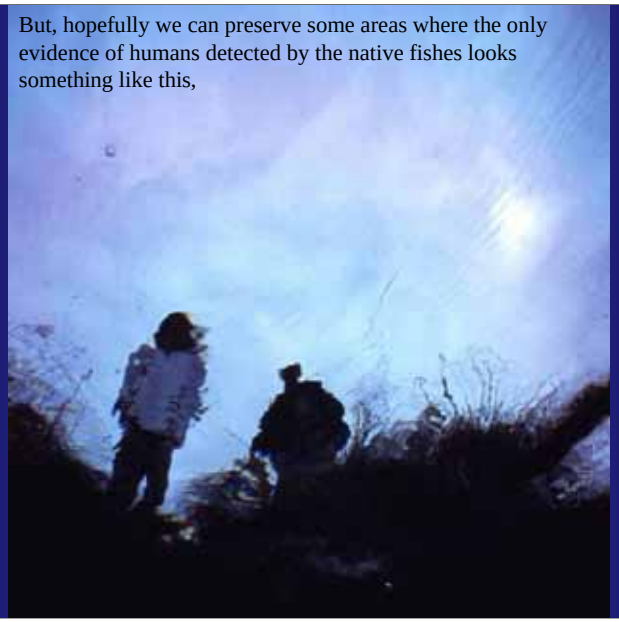
Rio Salado below Cuatro Ciénegas

Pinkava identified reeds as native *Phragmites* in 1968. Now pure, dense, exotic *Arundo donax*


The stream feeding this small reservoir is what I fear the Río Mesquites and much more of Cuatro Ciénegas will look like in the not so distant future...

Of course humans will always be a significant part of the Cuatrociénegas ecosystem,

But, hopefully we can preserve some areas where the only evidence of humans detected by the native fishes looks something like this,



and humans can continue to see some special views like this (without getting wet).

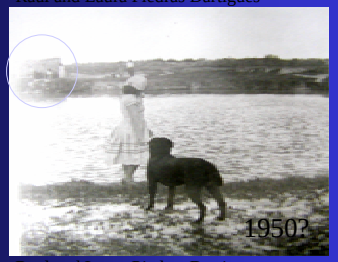
Doing so, however, will require huge investments in controlling human-induced impacts,

but controlling these impacts will also likely have significant and direct, favorable economic impacts for humans, for example the huge amount of water lost to *Arundo* will not only impact fishes and other aquatic organisms, but also those who would have used that water for agriculture.

We may also have to restore some long-lost habitats to help assure that a healthy biota persists for future generations, but that too could have long-term beneficial economic impacts for humans.

Se buscan fotos viejos

Raul and Laura Piedras Dartigues



Raul and Laura Piedras Dartigues

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