Survey And Status of the Two Federally Listed Oklahoma Fish

Buck Ray & Curtis Tackett
Oklahoma Department of Wildlife Conservation
Oklahoma Clean Lakes and Watershed Association
April 2, 2014

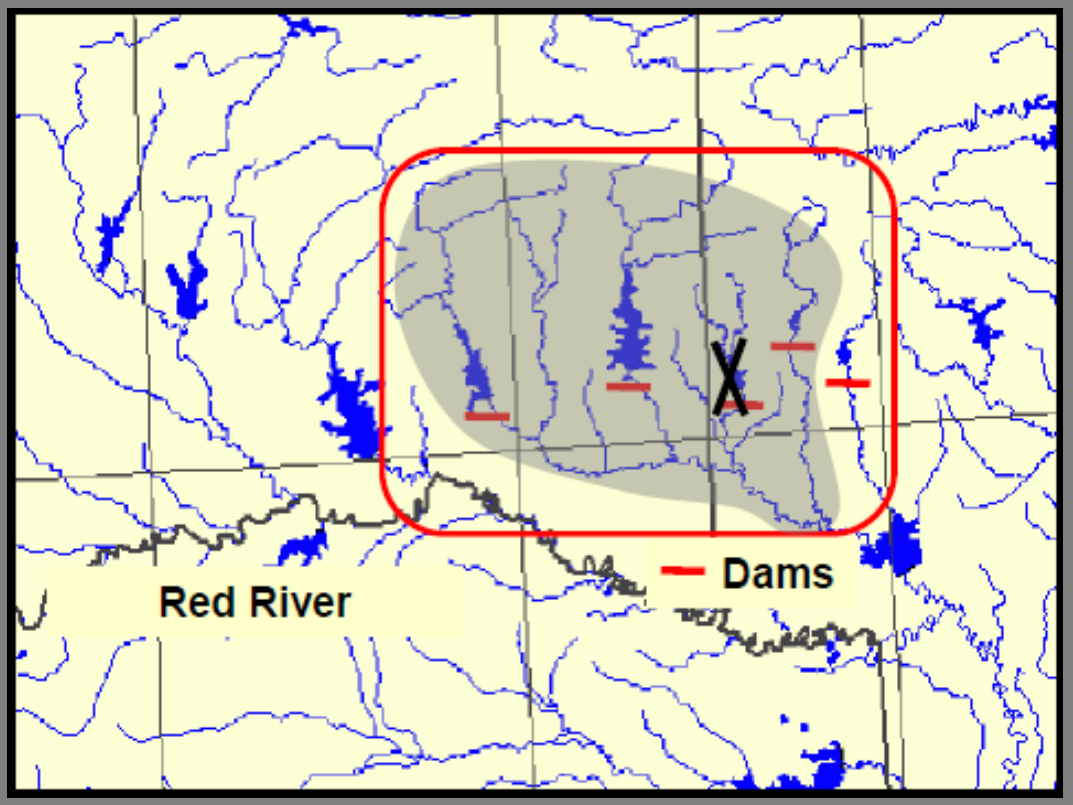
Status of the Leopard Darter (*Percina pantherina*) in Southeast Oklahoma Streams

Conservation Concerns

- Historically Low Abundance and Small Range
- Listed as Threatened in 1978

  - Silviculture – erosion, road-cutting, siltation, 1900-present

  - Fragmentation – reservoir construction boom in the 1960's



Federal Listing

- Listed as Federally Threatened under ESA in 1978
- Critical Habitat designated in Oklahoma:
  - Little River above Pine Creek Reservoir
  - Black Fork Creek, a tributary to the Little River;
  - Glover River above Oklahoma Highway 37 crossing upstream into the main channels of both the East and West Forks of the Glover River;
  - Mountain Fork River

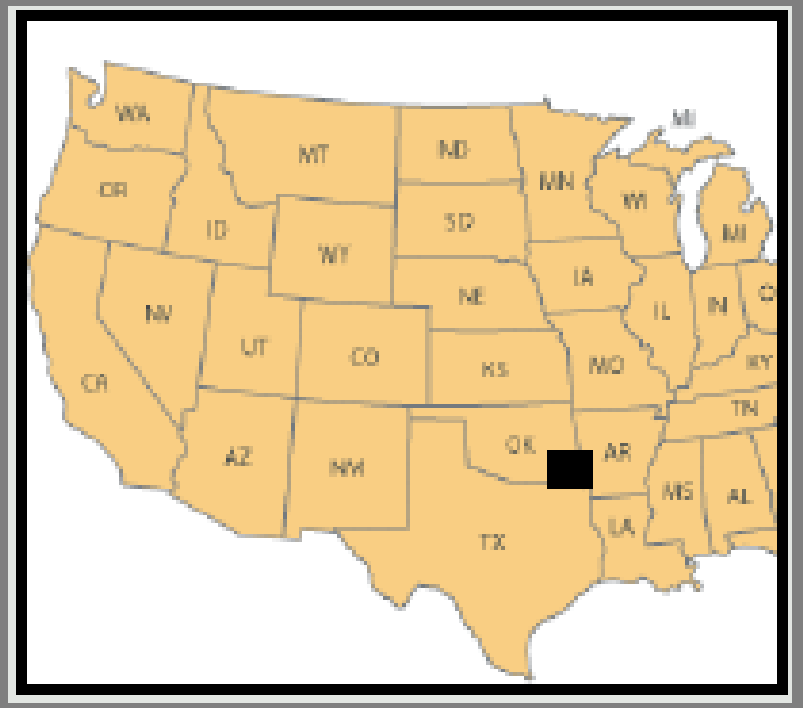
Percina pantherina, Leopard darter.
Miller and Robison (1973)

Habitat Overview

- Found in intermediate to large streams
- They are typically not found in smaller headwater streams
- May to February prefer large pools with rubble to boulder substrate
- Spawning occurs on gravel substrates however the dominant riffle substrate may be gravel, rubble, boulder, and bedrock

Distribution

- Historically occurred in the upland large stream habitat of the Little River drainage in Oklahoma and Arkansas
- Currently populations are found in isolated river stretches throughout its historic range
- In Oklahoma it has been located in the Mountain Fork River, the Glover River, the Little River and their large tributaries.
- In Arkansas it has been found in the Cossatot, Robinson Fork, and Mountain Fork Rivers



Distribution of the Federally-Threatened Leopard Darter *(Percina pantherina)*

Honobia Creek
Big Eagle Creek
Cow Creek
Blackfork Creek
Little River
West Glover
E. Boktoklo Creek
Mountain Fork River
Cossatot River
Buffalo Creek
East Glover
Cloudy Creek
Little River
Glover River
Robinson Fork
Broken Bow Lake
Gillham Lake
Pine Creek Lake
Dierks Lake
De Queen Lake
Mena
Dierks
Broken Bow
Little River

N

0 2.5 5 10 Miles

Designated Critical Habitat
Leopard Darter Occupied Streams

CO KS MO IL
OK TN
NM AR
TX MS LA

Map created by D. Fenner - USFWS - 17Dec2013

Field Surveys

- Permanent Sites – depletion counts, snorkel swim transects to try to count every fish in a particular pool.
- Rotational Sites – timed visual survey, no transects or depletion
- Survey data from 1998 – 2013
- Also count and monitor other darter species (orangethroat, johnny, channel, logperch)


Johnny Darter

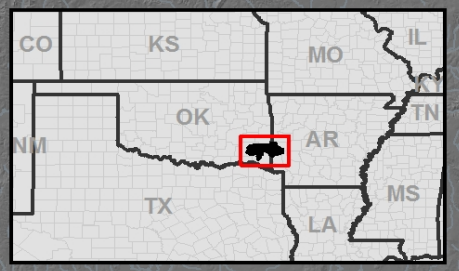
Monitoring Sites for the Federally-Threatened Leopard Darter *(Percina pantherina)*

Honobia Creek
Big Eagle Creek
Cow Creek
Blackfork Creek
Little River
West Glover
E. Boktoshi Creek
Mountain Fork River
Cossatot River
Buffalo Creek
Cloudy Creek
East Glover
Little River
Glover River
Robinson Fork
Text
Gillham Lake
Broken Bow Lake
Pine Creek Lake
Dierks Lake
De Queen Lake
Little River

N

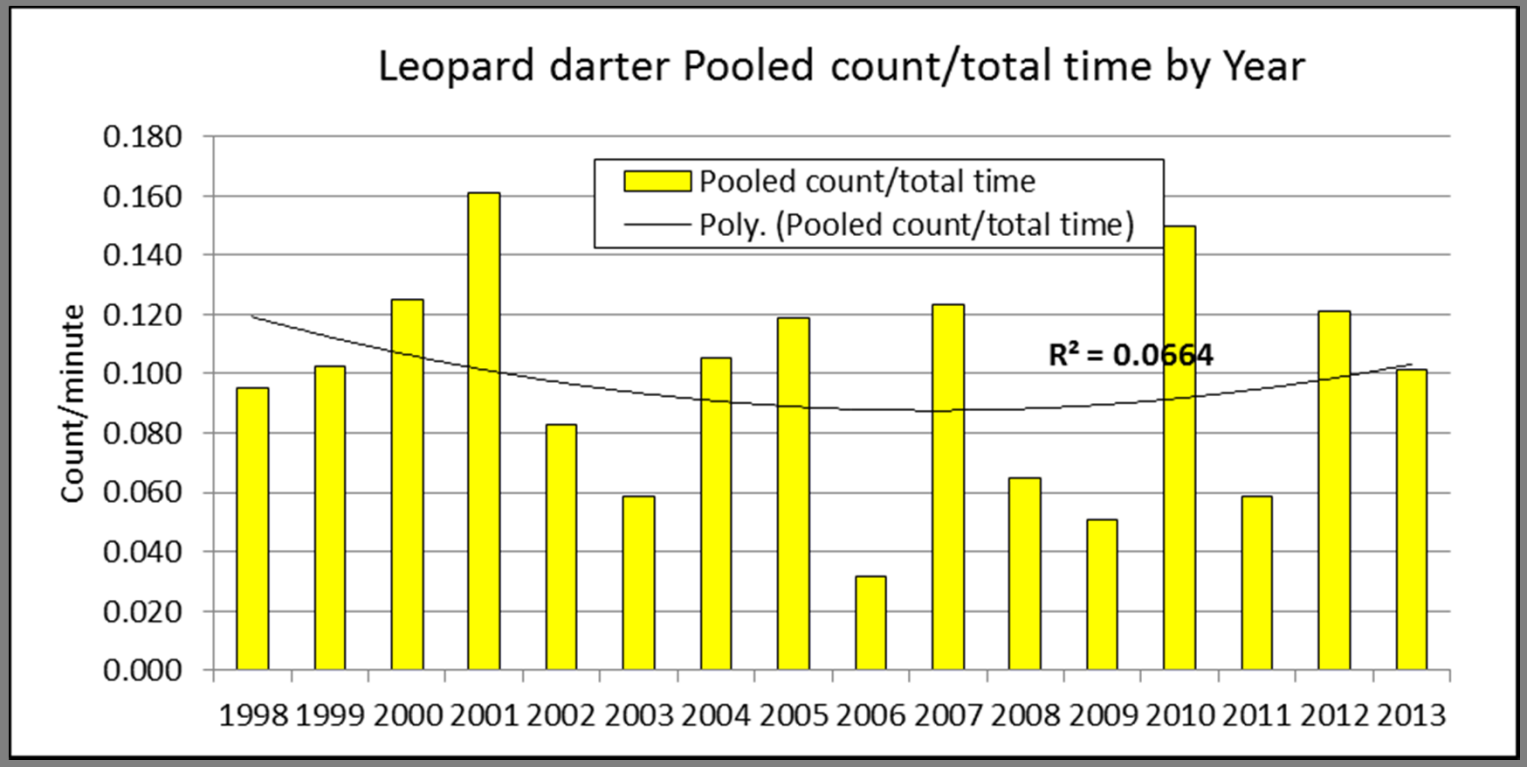
0 2.5 5 10
Miles

Permenant Monitoring Sites
Rotational Monitoring Sites
Leopard Darter Occupied Streams



Map created by D. Fenner - USFWS - 17Dec2013

Survey Results 1998-2013



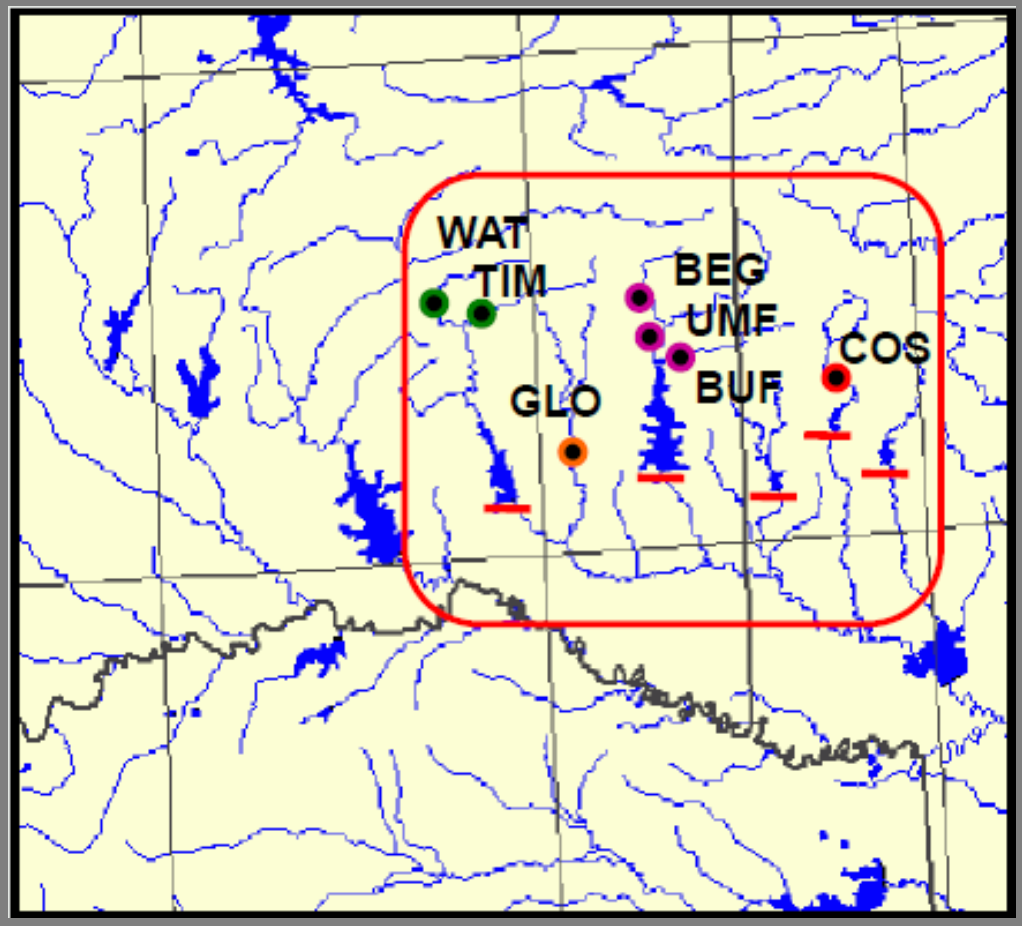
Flashy trend of the population consistent with the flashy nature of these river systems

Genetics Findings

- Schwemm, Echelle, & Van Den Bussche OSU 2012

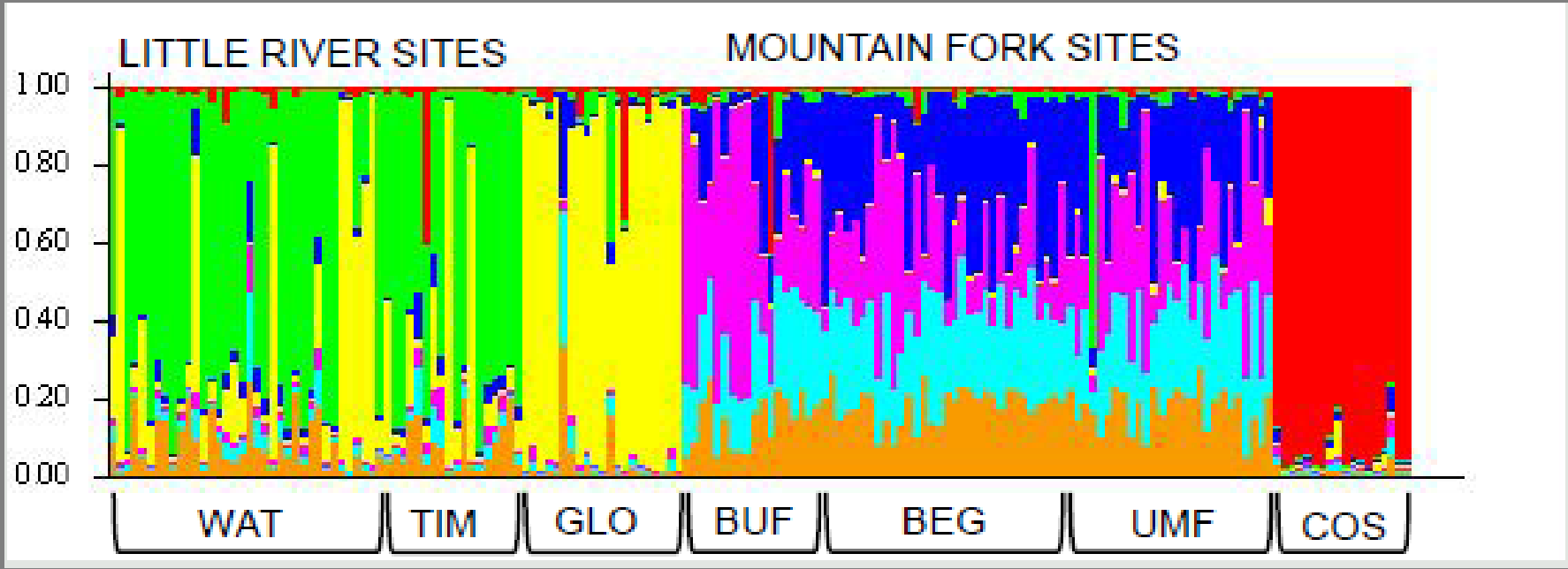
<u>Populations</u>

- Little River (2)
  WAT, TIM
- Glover River (1)
  GLO
- Mountain Fork (3)
  BEG,UMF,BUF
- Cossatot (1)
  COS



Genetics Findings

- Illustrates genetic isolation between river systems due primarily to reservoir construction
- Genetic makeup of individual fish varies greatly between populations



Echelle, & Van Den Bussche OSU 2012

Conclusion

- The decline phase was consistent with reservoir construction over 40 years ago as a causative factor

Future Conservation Goals

- Increase genetic diversity by transplanting fish from isolated populations to other tributaries to encourage genetic mixing
- Consider reintroduction into the Robinson Fork River in Arkansas

Status of the Arkansas River Shiner, *Notropis girardi*, in Oklahoma

Arkansas River Shiner, *Notropis girardi*

- small, streamlined minnow dorsally flattened head, rounded snout, and subterminal mouth.
- Dorsal, anal, perlvic fins all have 8 rays
- maximum length of about 51 mm (2 inches)
- Habitat Generalist –
  - Shallow, sandy bottom rivers and large streams
- Generalized forager –
  - grass seeds, detritus (decaying organic material), sand, sediment, and aquatic and terrestrial invertebrates
- Annual Species - <10% surviving to spawn by year 2

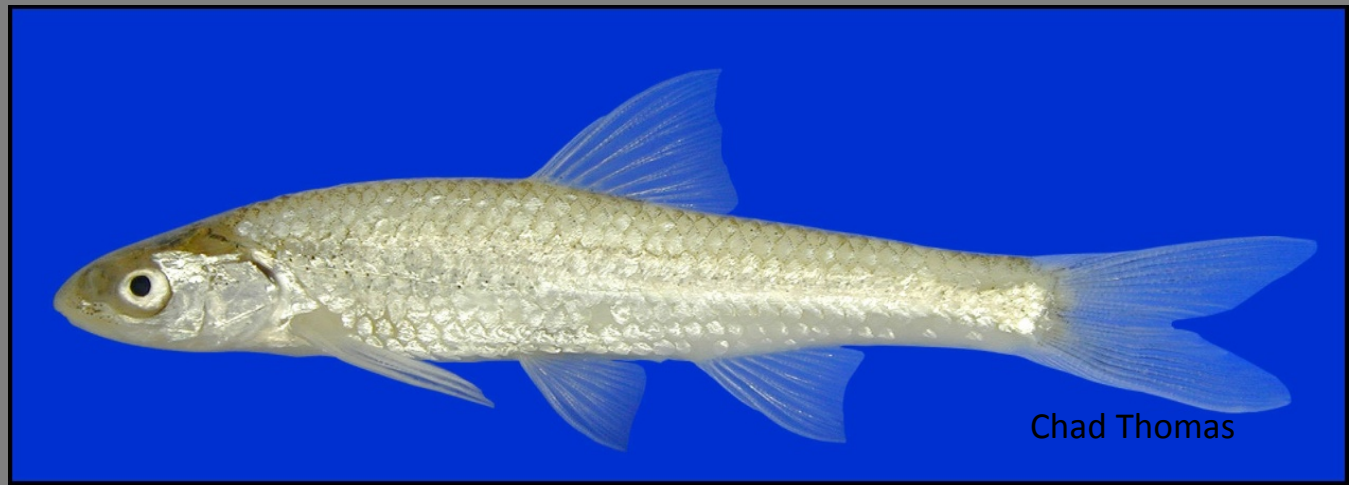
Habitat

- Inhabits the shallow braided channels of wide sandy prairie rivers in the Arkansas River system.
- Uncommon in quiet pools or backwaters

- Reproduction
  - Pelagic-broadcast spawner producing nonadhesive, semibuoyant eggs
  - May – September (peak during mod/high flows)
  - spawn after heavy summer rains
  - eggs drift with current and develop in transit
    - May need up to 135 mile of free flowing river

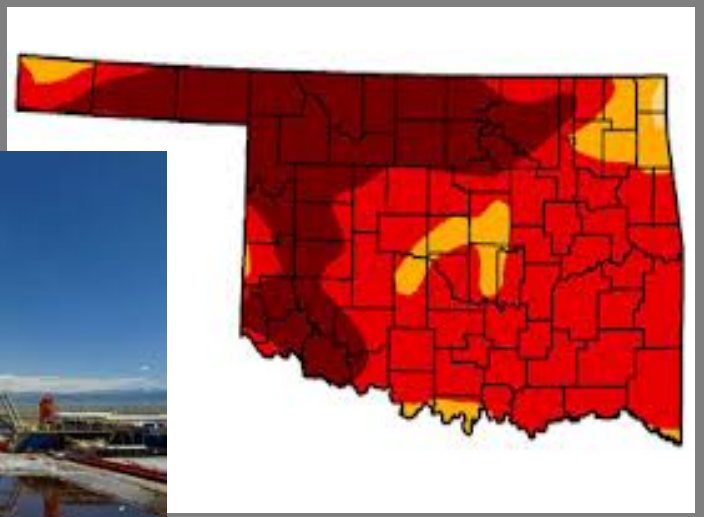
Listing History

- Federally Listed November 23, 1998
- Critical habitat was designated in October 2005
  - Canadian River from Hwy 33 to Indian Nations Turnpike (246 mi)
  - Cimarron River from Hwy 54 in Kansas to Hwy 77 bridge in Oklahoma (286)
- An introduced non-native population of ARS occurs in the Pecos River in New Mexico, which is not protected under the Endangered Species Act.



Distribution of the Federally-Threatened Arkansas River Shiner

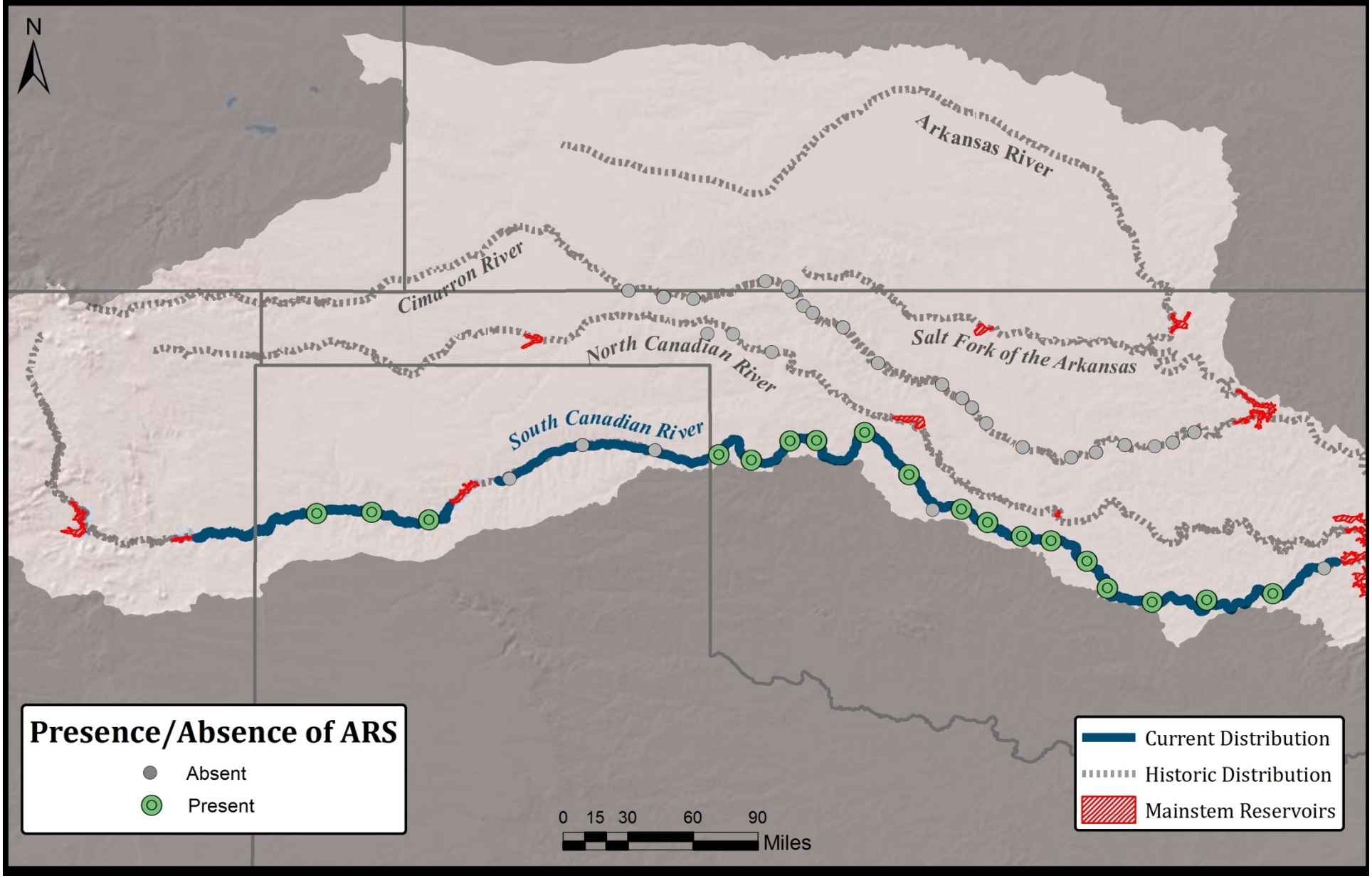
- Reasons for Decline:
  - alteration of river flow patterns as a result of:
    - removal of water from the watershed for irrigation, oil & gas, and household use
    - drought
  - Competition with the accidentally introduced Red River Shiner (Notropis bairdi)
  - Incidental capture in pursuit of commercial bait fish species



Status Surveys:

- 12 10-meter seine hauls
  - Cimarron River (2000 – 2010)
    - Cimarron county (E. of Hwy 23) to Perkins, Ok
  - S. Canadian River (2000 – ongoing)
    - Bridge crossings from Lake Meredith, TX to I-75 Bridge (OK)
- Basic water quality (temp, cond., salinity, d.o)
- Enumerated by University of Oklahoma, OSU

Presence/Absence of the Federally-Threatened Arkansas River Shiner



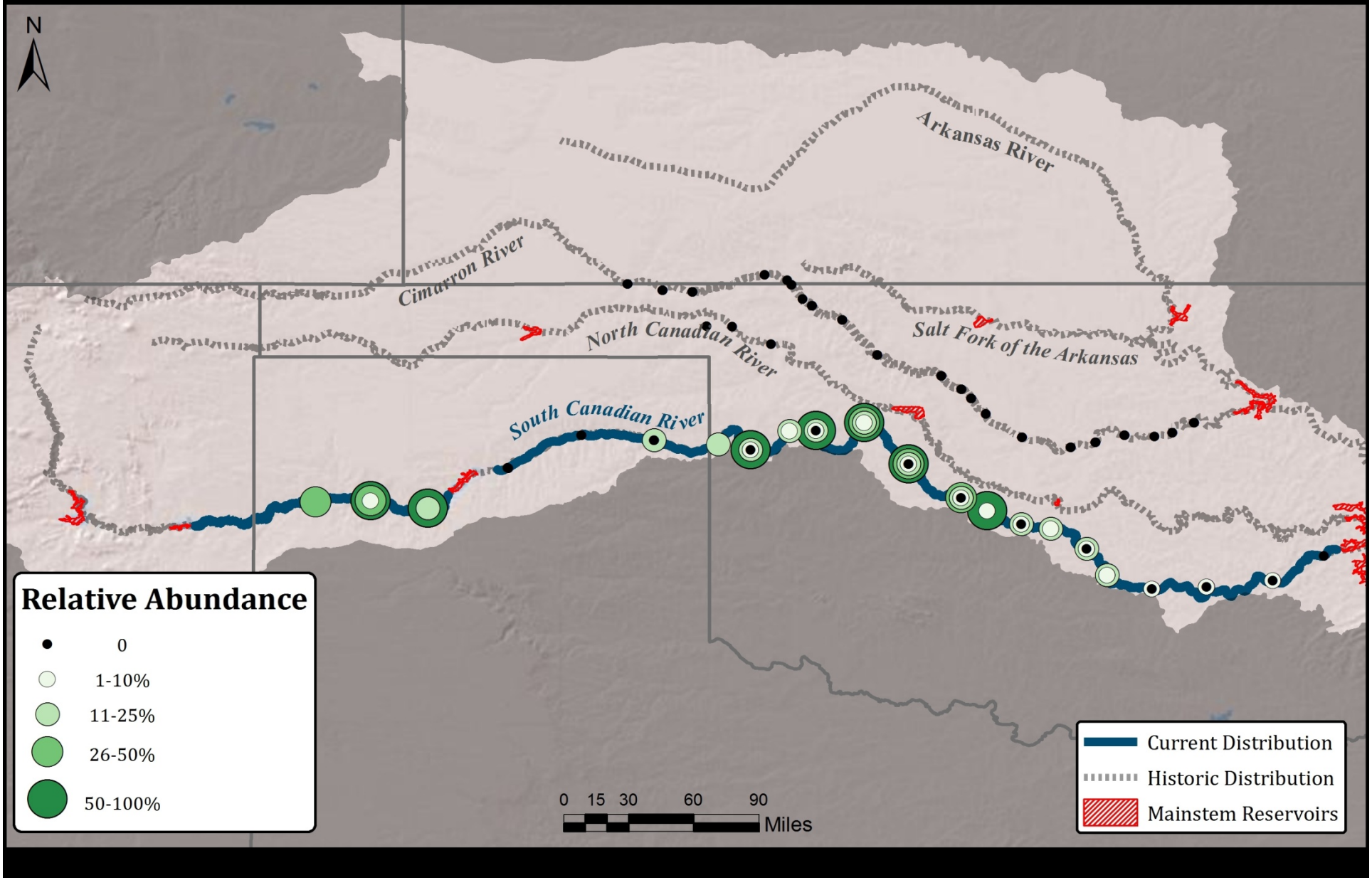
Results:

Number of collections made in each river drainage in each year.

Year of Collection	Canadian River Drainage	Cimarron River Drainage
2007	19	15
2008	14	13
2009	14	15
2010 – 2013	183	62
Total	**230**	**105**

- ARS were collected in 198 collections, all in Canadian River (excluding N. Canadian)
- Widespread and moderately abundant in Canadian
- Absent from Cimarron River

Relative Abundance of the Federally-Threatened Arkansas River Shiner



Impacts of Drought:

- Ranking of mean CFS for 2011 compared to period of record at six USGS gauge stations along the South Canadian River

  ("1st" is equal to the lowest mean discharge on record)

	Canadian Rr - Texas			Canadian Rr - Oklahoma		
	Revuelto	Amarillo	Canadian	Bridgeport	Purcell	Calvin
Number of Record (Years)	52	73	73	62	30	71
Calendar Year to Date	1st	1st	3rd	2nd	2nd	5th
May-Aug (last 120 Days)	1st	1st	3rd	2nd	1st	4th
January	7th	8th	37th	28th	3rd	17th
February	3rd	17th	27th	26th	5th	24th
March	12th	17th	24th	15th	2nd	12th
April	1st	6th	29th	13th	2nd	17th
May	4th	6th	15th	15th	8th	18th
June	4th	1st	6th	2nd	1st	3rd
July	4th	1st	9th	1st	1st	1st
August	2nd	1st	9th	7th	3rd	5th


All Wells
Leoti
Scott City
Ness City
Great Bend
McPherson
Hutchinson
Syracuse
Garden City
Stafford
Dodge City
Pratt
Cheney
Wichita
Winfield
Anthony
Alva
Guymon
Ponca City
Osage Indian Reservation
Enid
Perryton
Gruver
Tulsa
Arnett
Taloga
Dumas
Black Kettle National Grassland
Pampa
Wheeler
Weatherford
Elk City
Oklahoma City
Amarillo
Moore
Shawnee
Norman
Anadarko
Wellington
Pauls Valley
Ada
Altus
Lawton
Childress
Duncan
Plainview
Vernon
Ardmore
Durant
Wichita Falls
0 25 50 100 150 200
Kilometers

Conclusions

- ARS extirpated from Cimarron River
- Disappeared from 80 percent of its historical range
- Restricted to about 500 mi. of the Canadian River

Acknowledgments

- Danniel Fenner - USFWS
- Chris Tanner – USFWS
- Brent Bristow - USFWS
- Curtis Tackett - ODWC
- Clayton Porter – ODWC
- Dr. Shannon Brewer - OSU
- Dr. Eddie Marsh-Matthews – OU
- Dr. Gene Wilde
- Randy Parham - ODEQ
- Robert Bastarache, USFS
- Richard Standage, USFS
- Buck Ray, ODWC
- Don Groom, ODWC
- Kyle James, ODWC
- Jon West, ODWC
- Jay Barfield, ODWC
- Dr. Anthony Echelle OSU

Questions?