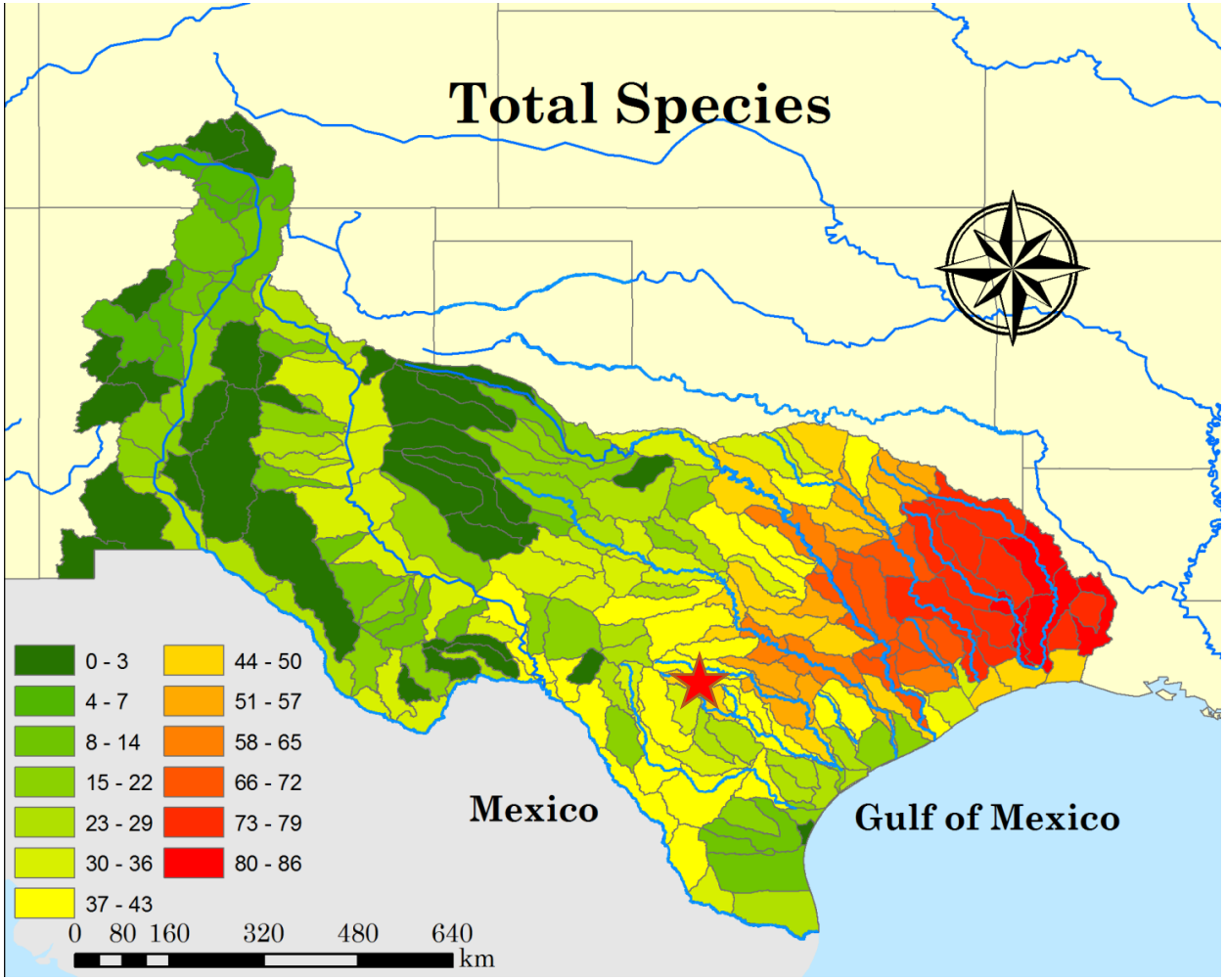
SAN ANTONIO RIVER AUTHORITY

Leaders in Watershed Solutions

# Biological Monitoring Training
# Fish Identification
# May 10, 2016

# Species Richness

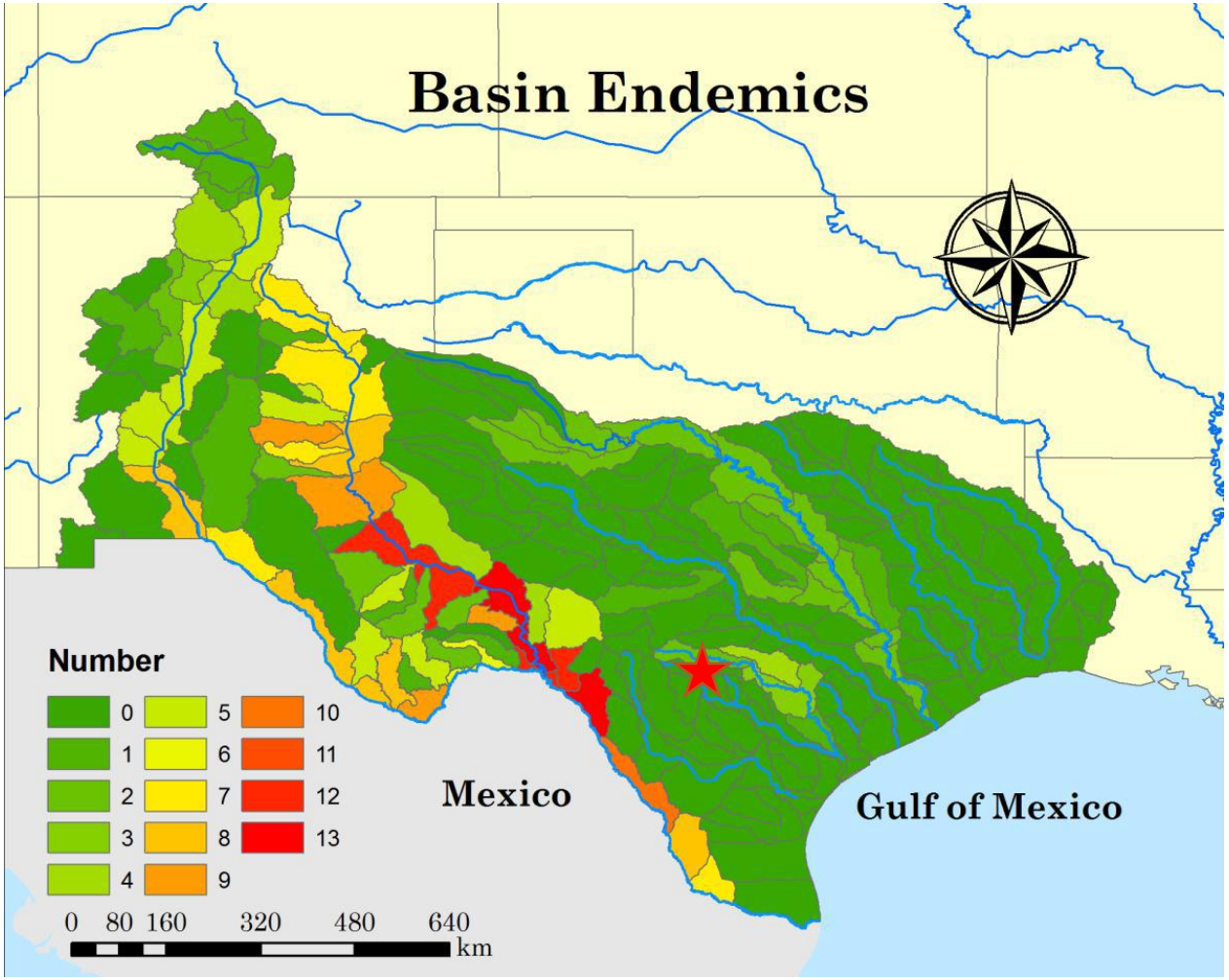
- Significant E→W Gradient
- Greater water availability means:
  - Greater Resource Availability
  - Less Competition
  - Physicochemical Stability




Maxwell (2013)

# Endemic Species

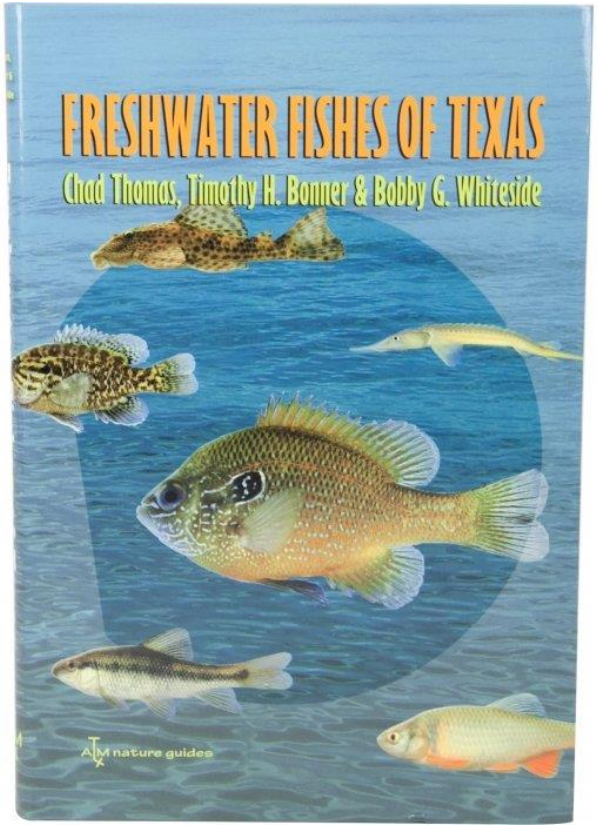
- Endemic Species – restricted to a particular locality or region
- Opposite of species richness map
- Greater water availability means greater connectivity resulting in fewer endemics



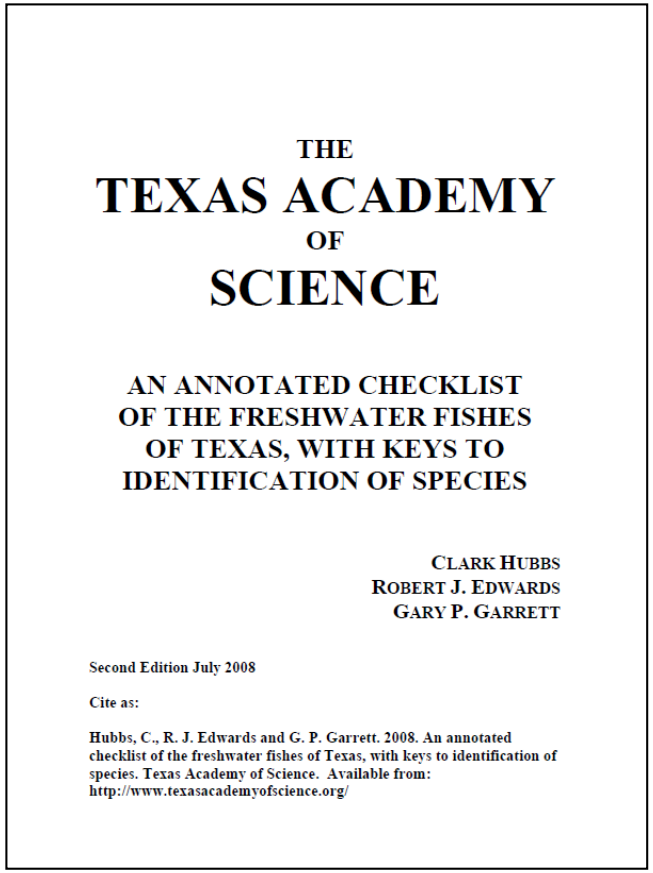

Maxwell (2013)

# Identifying Made Easier

## Know your basin & what to expect




Thomas et al 2007



THE
TEXAS ACADEMY
OF
SCIENCE

AN ANNOTATED CHECKLIST OF THE FRESHWATER FISHES OF TEXAS, WITH KEYS TO IDENTIFICATION OF SPECIES

CLARK HUBBS
ROBERT J. EDWARDS
GARY P. GARRETT

Second Edition July 2008

Cite as:

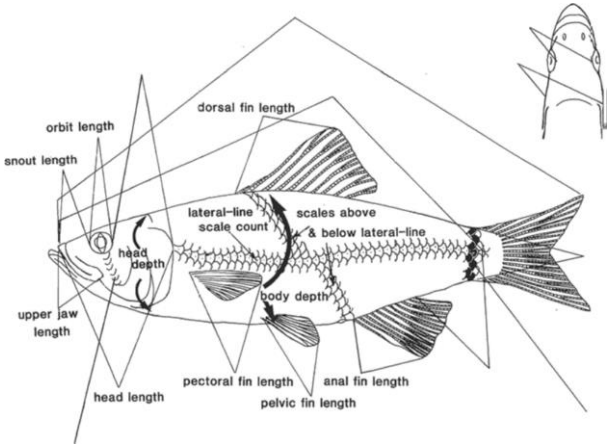
Hubbs, C., R. J. Edwards and G. P. Garrett. 2008. An annotated checklist of the freshwater fishes of Texas, with keys to identification of species. Texas Academy of Science. Available from: http://www.texasacademyofscience.org/

Hubbs et al 2008

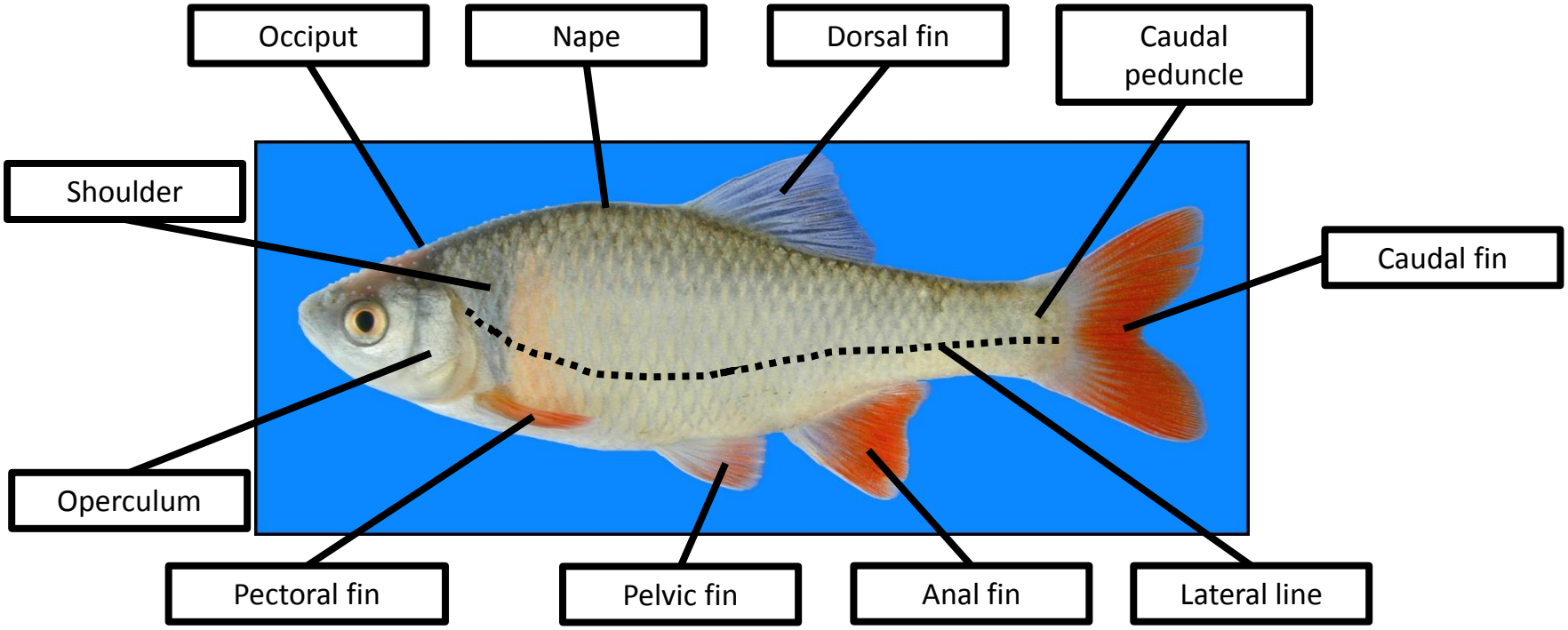
http://txstate.fishesoftexas.org/

# How to identify a fish:

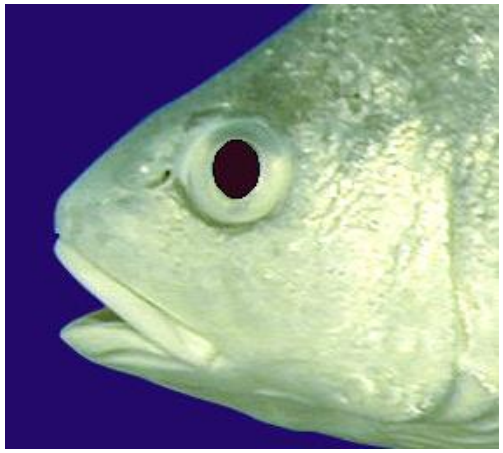
- Chromatophores vs melanophores
- Mouth position
- Fin type, placement, counts
- Scale counts and type
- Measurements
- Concrete morphological characters (tooth patches, barbels, pharyngeal teeth, intestines)




# Fish Basics


Occiput
Nape
Dorsal fin
Caudal peduncle
Shoulder
Caudal fin
Operculum
Pectoral fin
Pelvic fin
Anal fin
Lateral line

# Fish Basics



**Terminal mouth position**

**Subterminal mouth position**

**Inferior mouth position**

# Fish Basics

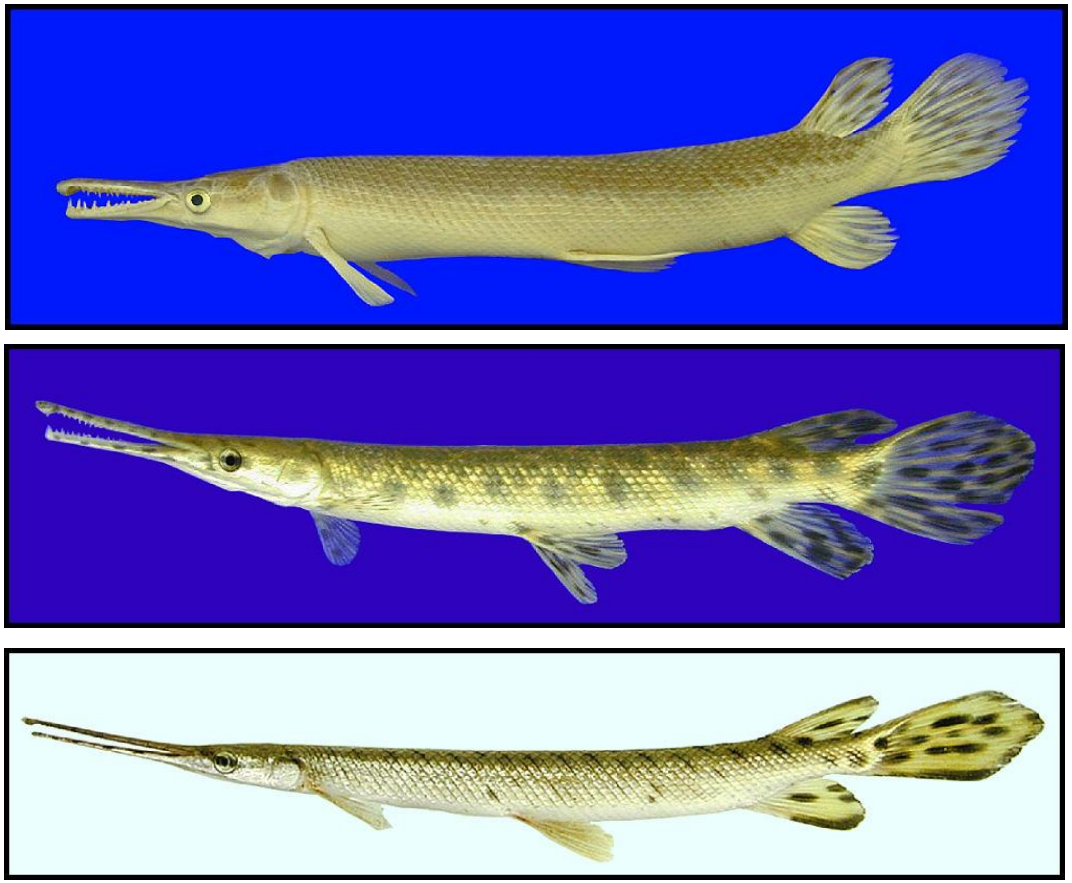
Forked

Emarginated

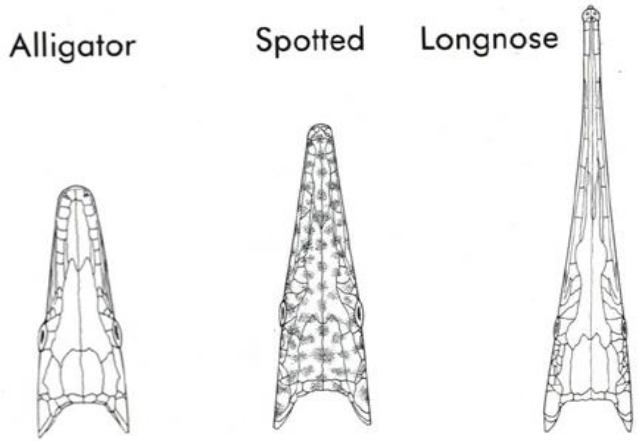
Square

Round

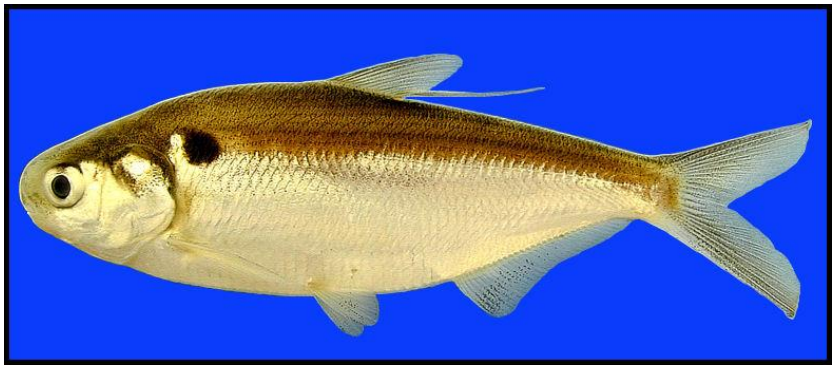
# Lepisosteidae



- Long, cylindrical body
- Ganoid scales
- Dorsal and anal fin opposite and set very far back on body



# Clupeidae



## Gizzard Shad

- Shoulder spot is larger than eye
- Subterminal mouth (fingernail test), below eye level

## Threadfin Shad

- Shoulder spot is smaller than pupil
- Terminal mouth (fingernail test), even with eye level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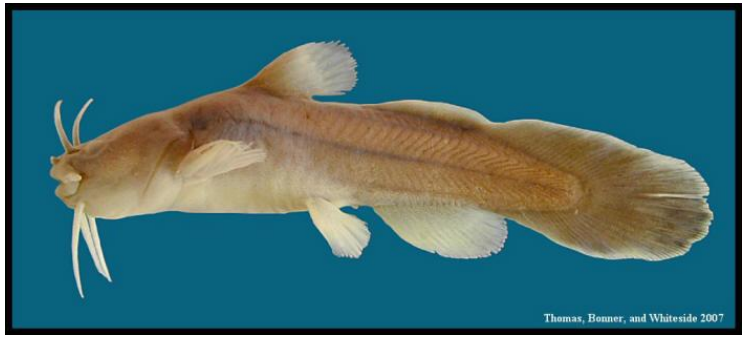
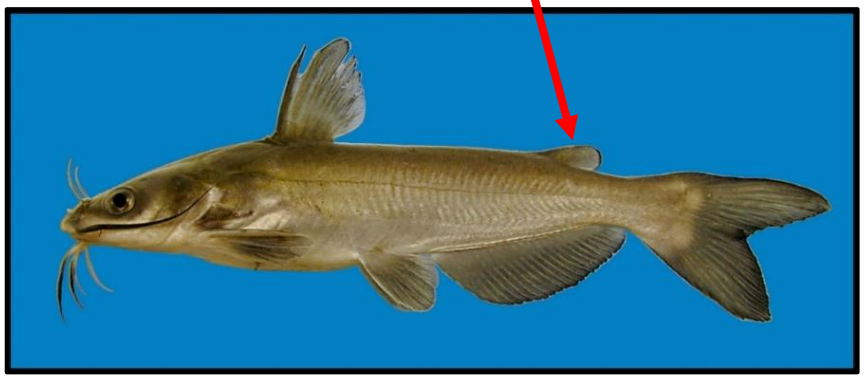
# Ictaluridae



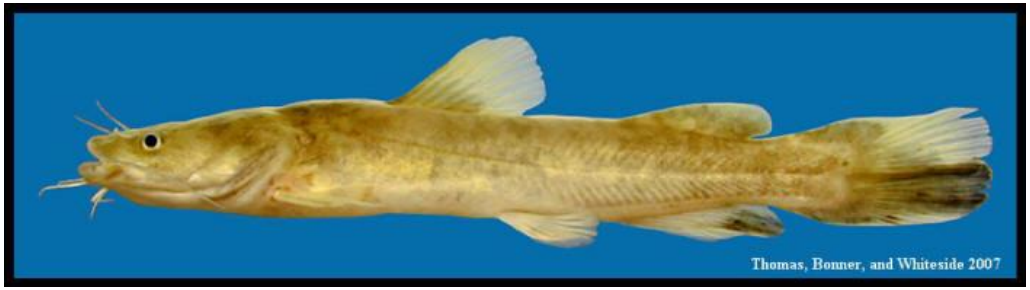

**Madtom Catfish - *Noturus***

Adipose fin



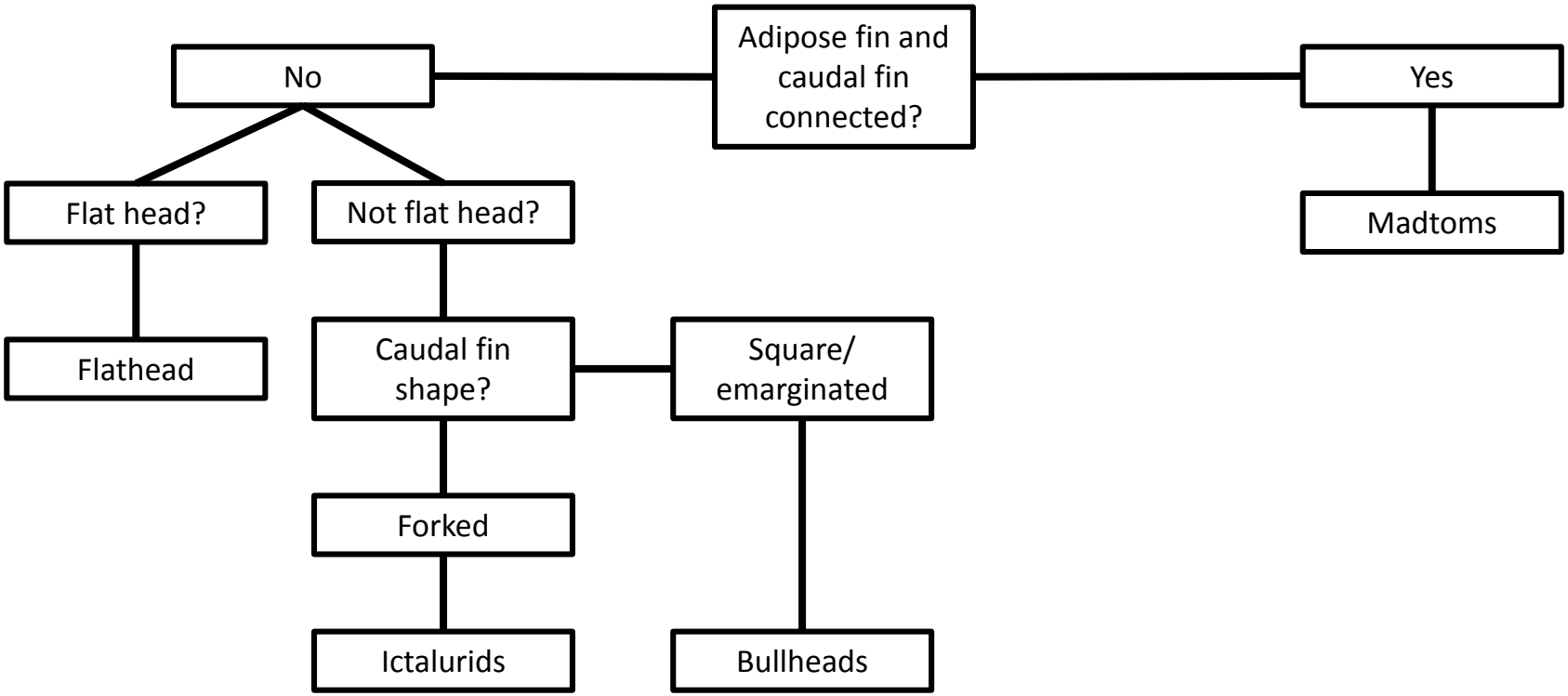
**True Catfish - *Ictalurus***


**Bullhead Catfish - *Ameiurus***

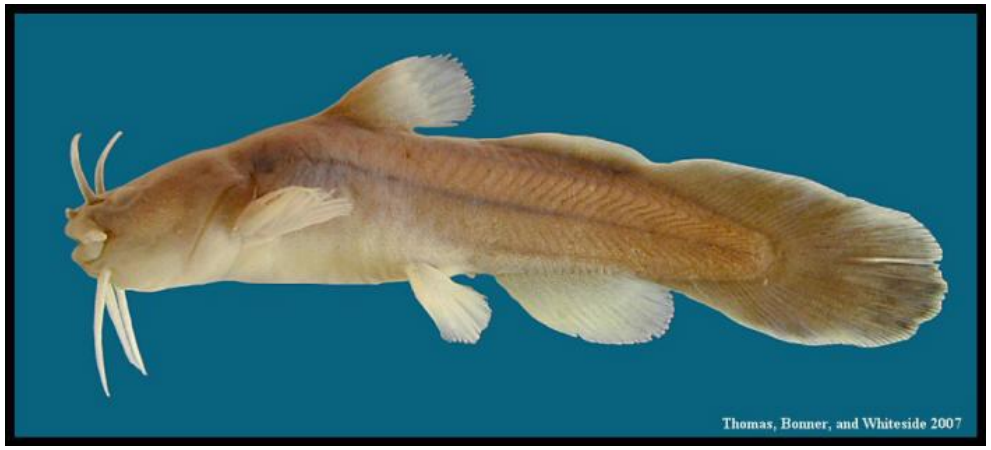



**Flathead Catfish - *Plyodictis***

# Ictaluridae

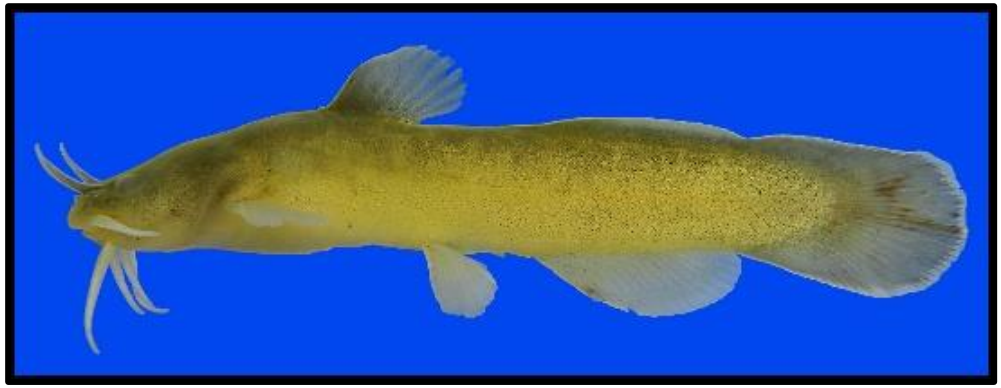


# Madtom Catfish




Tadpole Madtom

- Terminal mouth

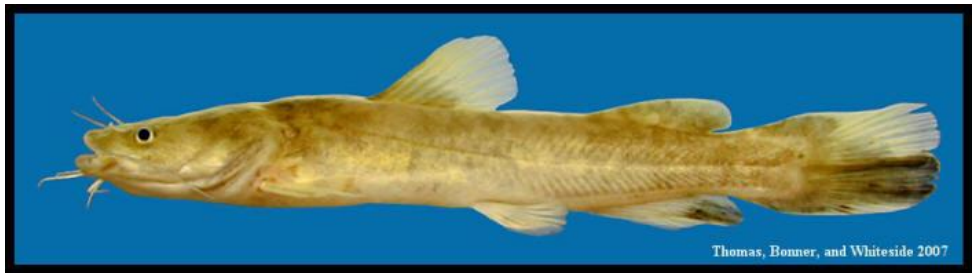


Freckled Madtom

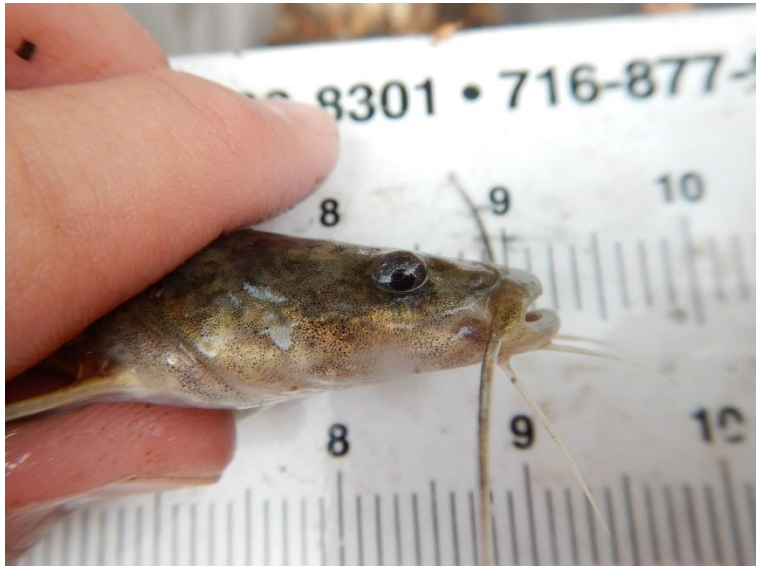
- Subterminal mouth

# Flathead Catfish

- Adipose fin and caudal fin are clearly separated
- Compressed head
- Square caudal fin







# Bullhead Catfish


Black Bullhead

- Brown/black chin barbels


Yellow Bullhead

- White/yellow chin barbels

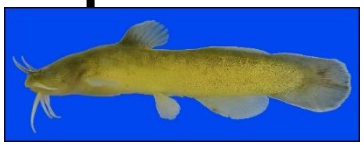

Thomas, Bo

**Are the adipose fin and caudal fin clearly separated?**

NO

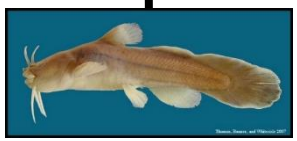
What is the mouth position:

Subterminal



Freckled Madtom
*Noturus nocturnus*

Terminal

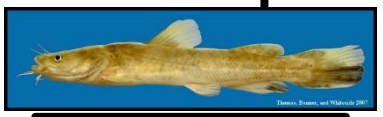


Tadpole Madtom
*Noturus gyrinus*

YES

Is the head compressed?

YES



Flathead Catfish
*Plyodictis olivaris*

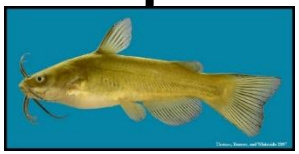
NO

What is the shape of the caudal fin?

Square / Emarginated

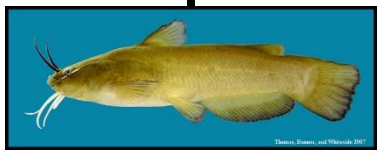
What color are the chin barbels?

Black / brown



Black Bullhead
*Ameiurus melas*

Yellow / white

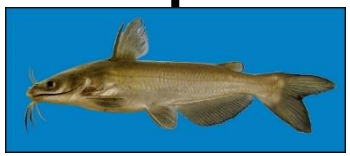


Yellow Bullhead
*Ameiurus natalis*

Forked

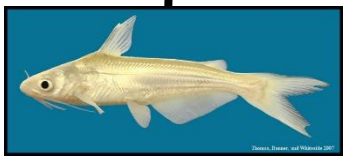
What shape is the anal fin?

Rounded



Channel Catfish
*Ictalurus punctatus*

Straight / Angled



Blue Catfish
*Ictalurus furcatus*

# Loricariidae


**Suckermouth Catfish**
***Hypostomus plecostomus***

- **Typically spotted**
- **Fewer than 9 dorsal fin rays**

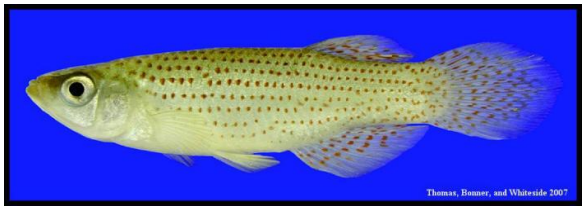
**Sailfin Catfish**
***Pterygoplichthys spp.***

- **Vermiculations**
- **More than 10 dorsal fin rays**

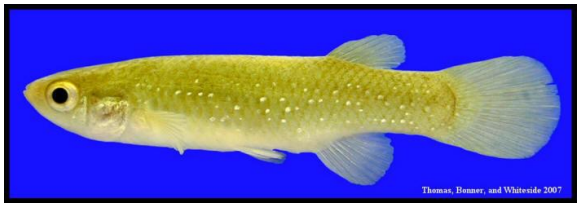
# Fundulidae

- **Dorsally flattened**
- **Caudal fin rounded**


**Rainwater Killifish**
**Coastal & Rio Grande**




**Western Starhead Topminnow**
**Brazos north to Red**




**Golden Topminnow**
**Lavaca northeast to Sabine**

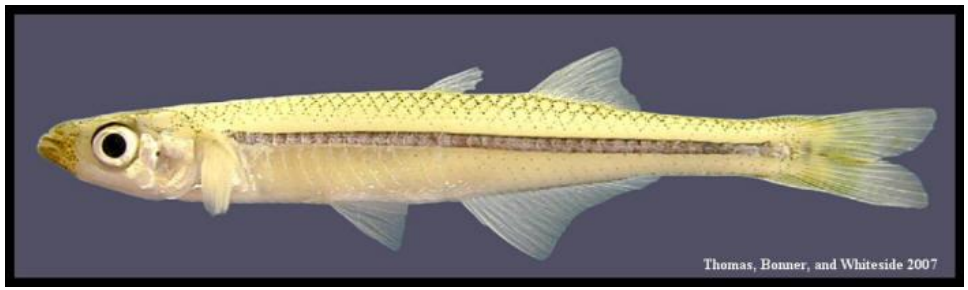

**Blackstripe Topminnow**
**San Antonio northeast to Red**


**Blackspotted Topminnow**
**San Jacinto northeast to Red**

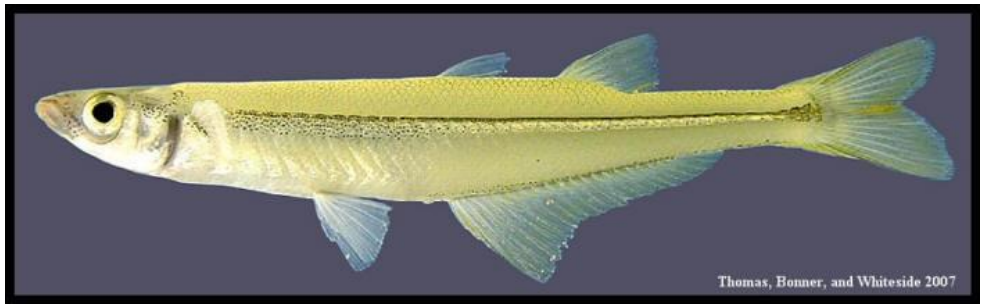

**Plains Killifish**
**Pecos to the Red**


**Gulf Killifish**
**Brazos, Rio Grande, Pecos**

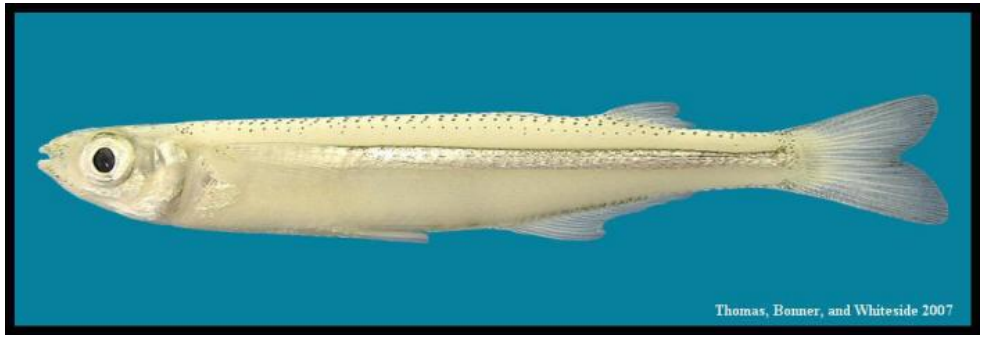
# Atherinopsidae




**Inland Silverside**
Statewide distribution
Prominent crosshatching dorsally




**Brook Silverside**
East TX distribution
Much smaller scales
Longer snout




**Rough Silverside**
Coastal distribution
4 rows of spots dorsally
Ctenoid scales

# Poeciliidae




**Gambusia**

- Dorsal fin set behind anal fin
- Distinct gonopodium on males

**Mollies**

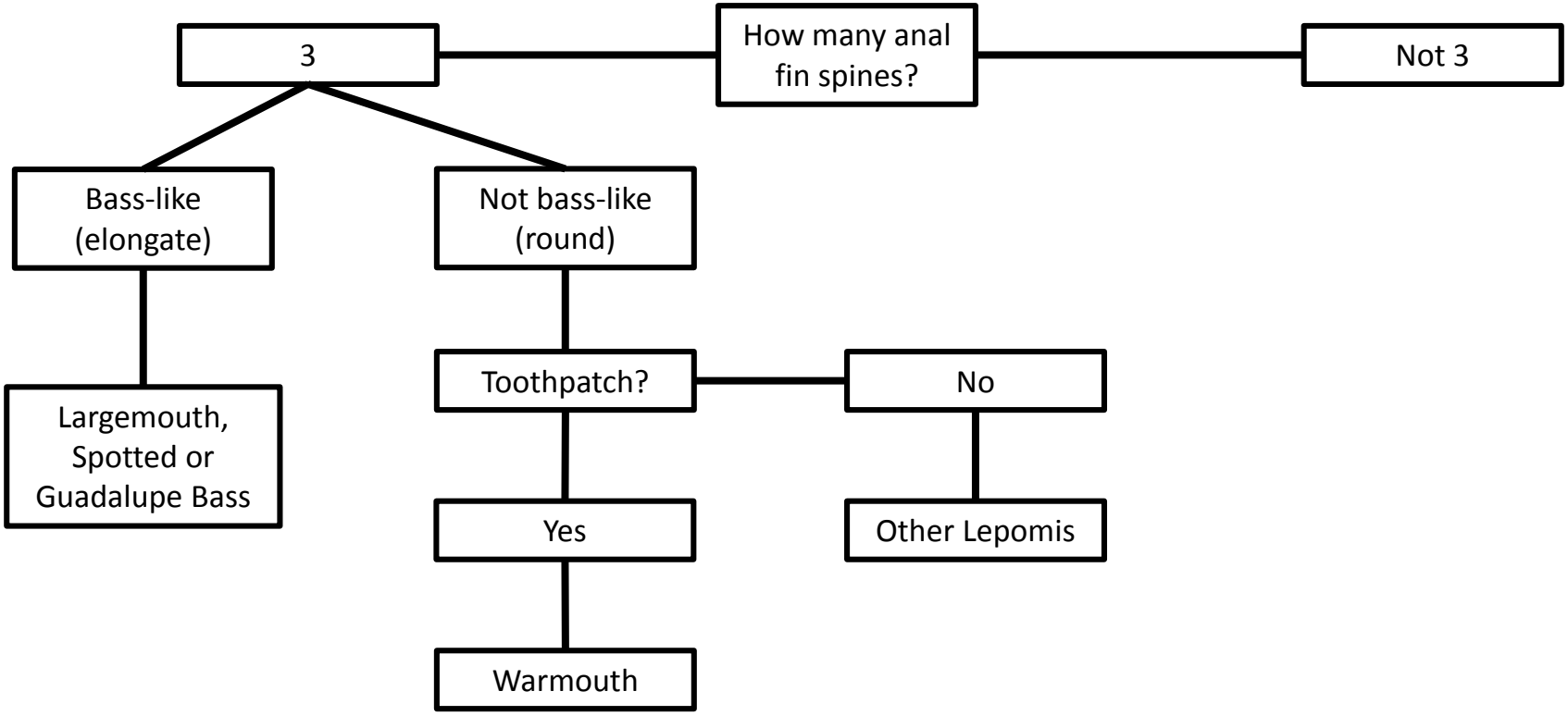
- Dorsal fin origin anterior to anal fin
- Amazon Molly
  - Crosshatching more distinct
  - Dorsal fin behind pelvic fins
- Sailfin Molly
  - Lines of spots more distinct
  - Dorsal fin even or in front of pelvic fins

# Centrarchidae





# Centrarchidae



# >3 anal fin rays


White Crappie
- "Balding"
- Pigment forms vertical bars
- 6 dorsal fin spines
- 6 anal fin spines
- Nearly Statewide

Black Crappie
- Dorsal origin further forward
- Pigment forms blotching
- 7-8 dorsal fin spines
- 6 anal fin spines
- Central TX and eastward

Flier
- Symmetrical appearance
- 11-13 dorsal fin spines
- 7-8 anal fin spines
- East Texas

Rock Bass
- 11-13 dorsal fin spines
- 6 anal fin spines
- San Marcos and Comal Rivers

Largemouth Bass

- 1st & 2nd dorsal fin narrowly joined
- “Deep V”
- No toothpatch.

Spotted Bass

- 1st & 2nd dorsal fin more broadly joined.
- “Shallow V”
- Toothpatch
- Rows of spots underneath main lateral band.

## Spotted Bass:

Dark band running down side is generally shallower with less gaps.

## Guadalupe Bass:

Dark band running down side is generally taller with larger gaps.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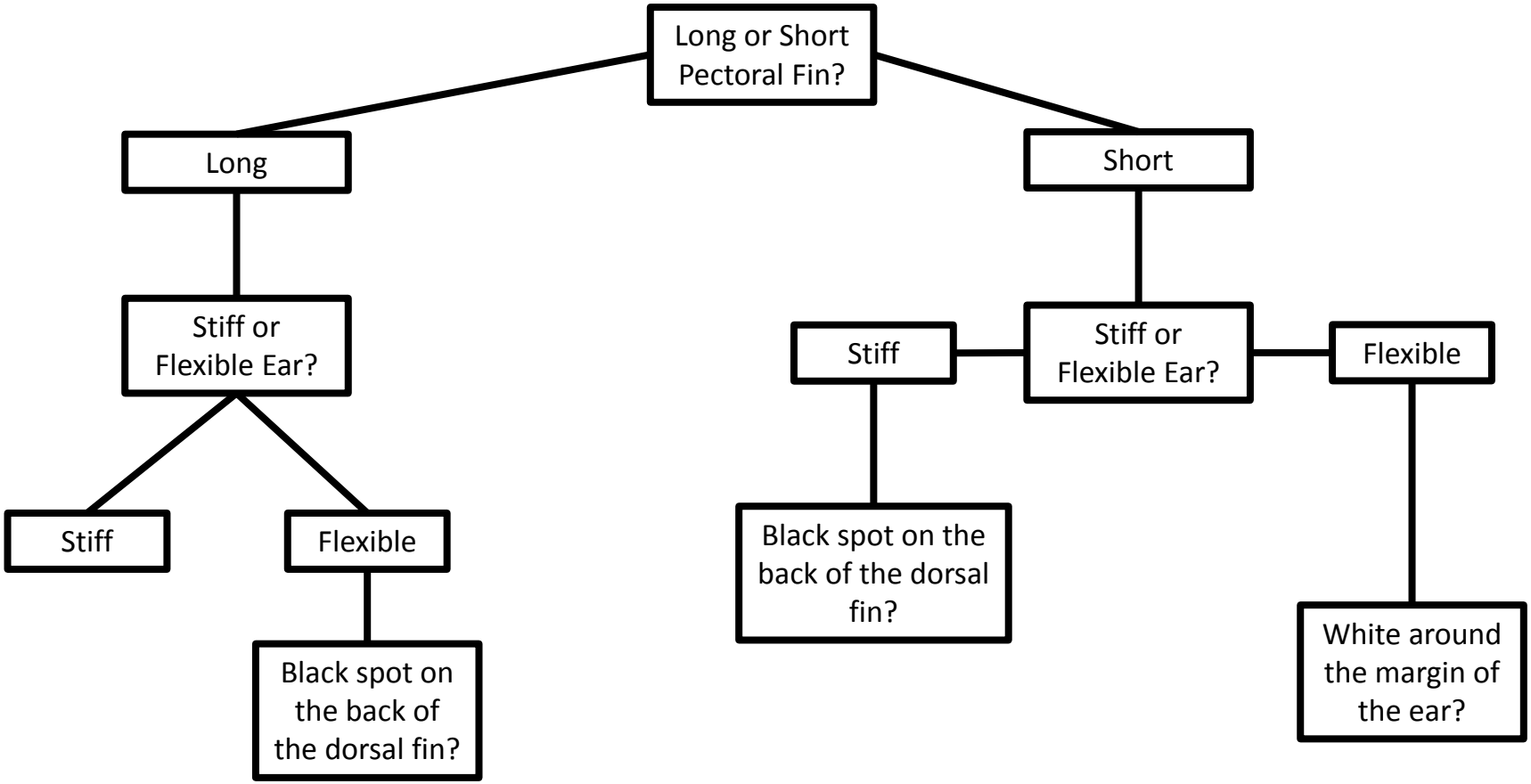
5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21


Long or Short Pectoral Fin?
Long
Short
Stiff or Flexible Ear?
Stiff
Flexible
Black spot on the back of the dorsal fin?
Stiff
Stiff or Flexible Ear?
Flexible
Black spot on the back of the dorsal fin?
White around the margin of the ear?


Mac
3
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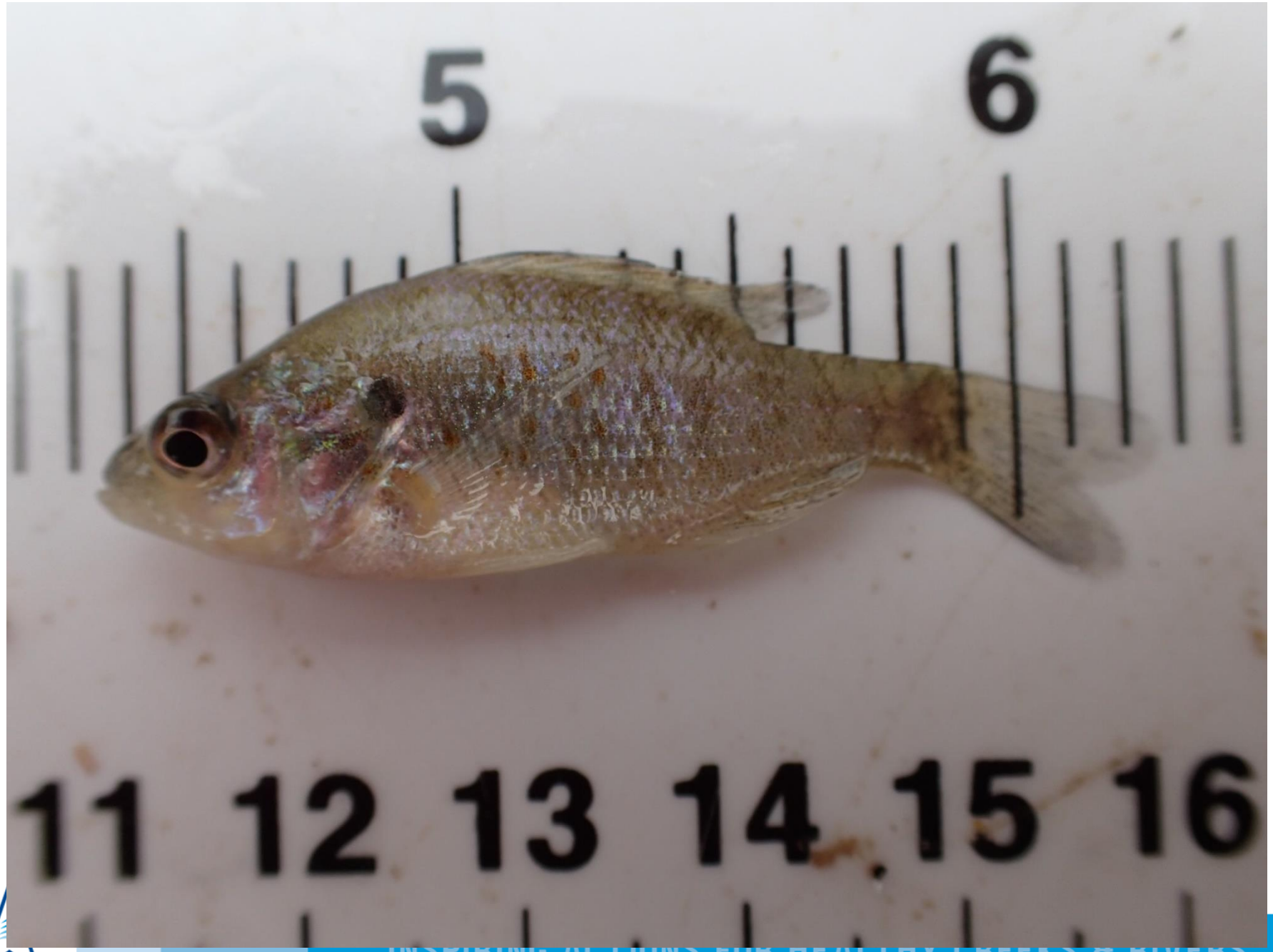
6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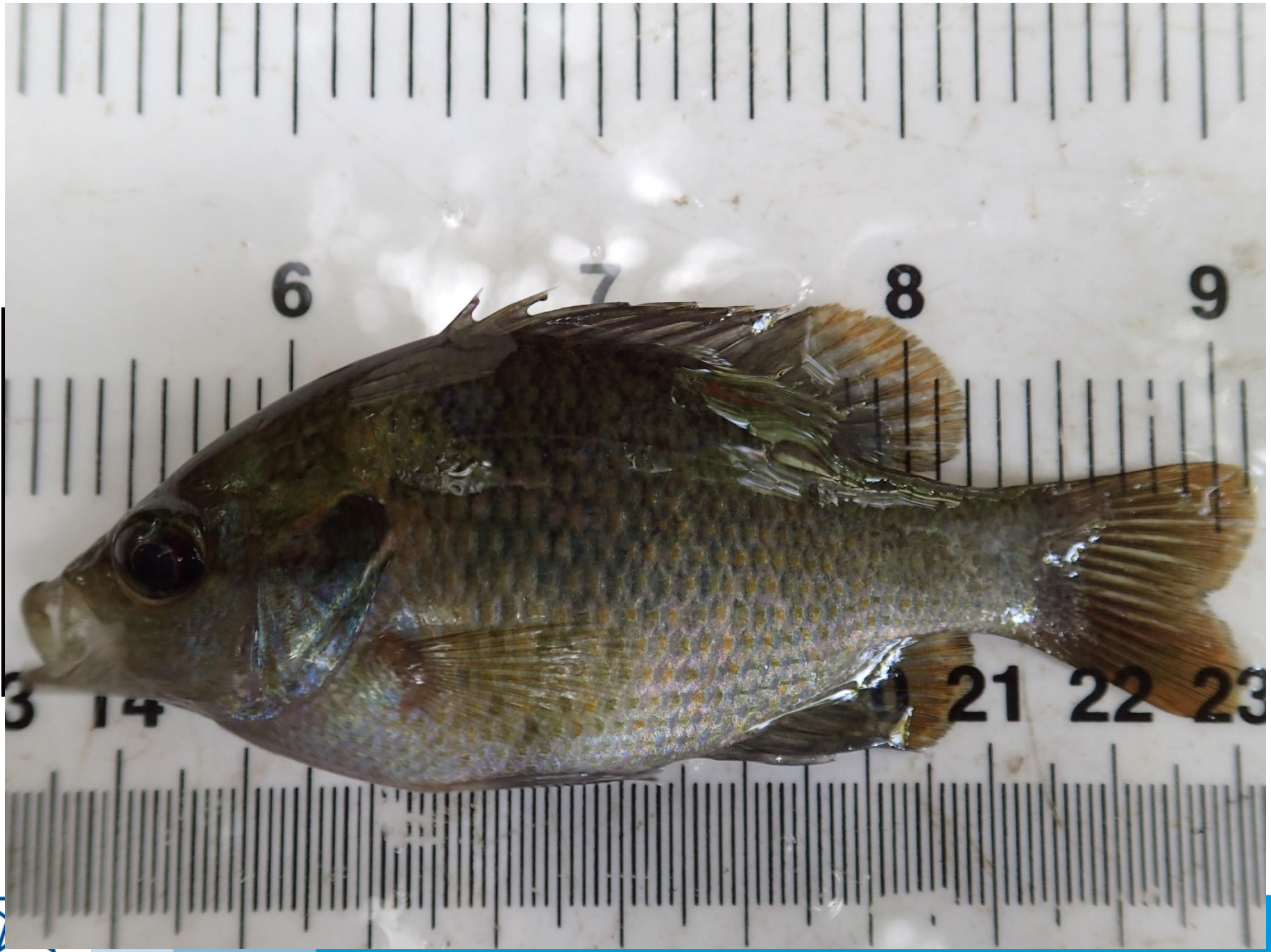
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Long or Short Pectoral Fin?

Long

Stiff

Stiff or Flexible Ear?

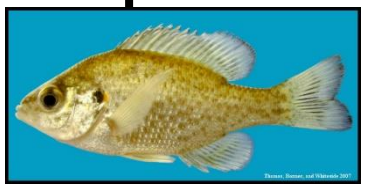
Flexible

Black spot on the back of the dorsal fin?

No

Orangespotted Sunfish
*Lepomis humilis*

Yes



Redear Sunfish
*Lepomis microlophus*

Bluegill Sunfish
*Lepomis macrochirus*

Short

Stiff

Stiff or Flexible Ear?

Flexible

Black spot on the back of the dorsal fin?

No

Redspotted Sunfish
*Lepomis miniatus*

Yes

Green Sunfish
*Lepomis cyanellus*

White all the way around the margin of the ear?

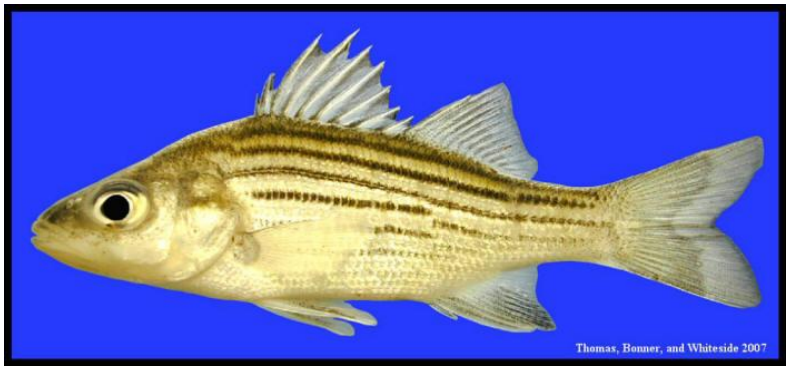
Yes

Longear Sunfish
*Lepomis megalotis*

Redbreast Sunfish
*Lepomis auritus*

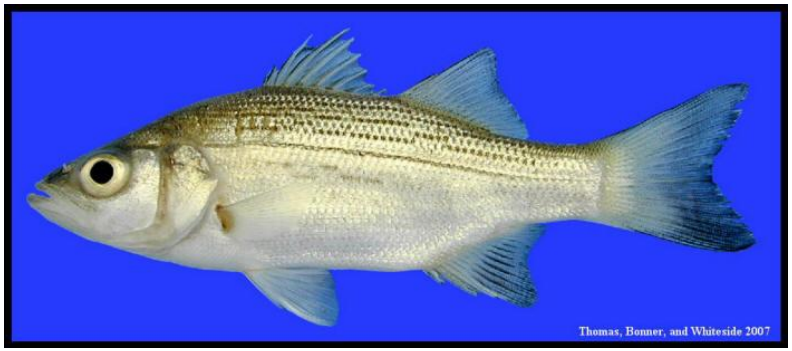
No

# Moronidae



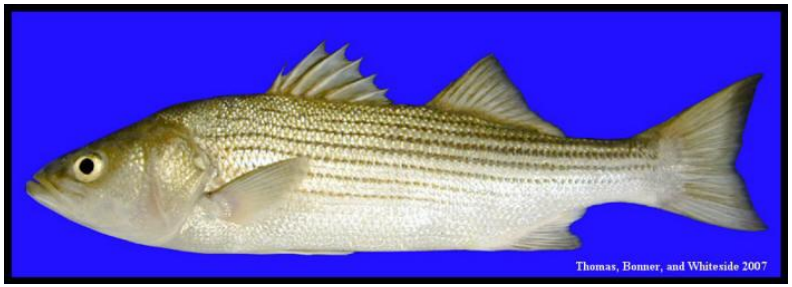

## Yellow Bass:

Dorsal fins joined
2nd and 3rd anal spine about equal
9-10 soft anal rays




## White Bass:

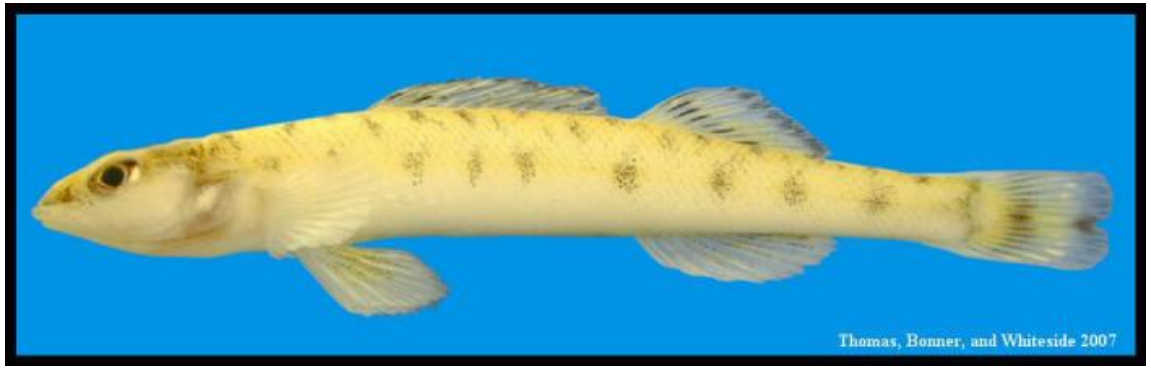
Dorsal fins separated
2nd and 3rd anal spine different length
11-13 soft anal rays
Single tooth patch




## Striped Bass:

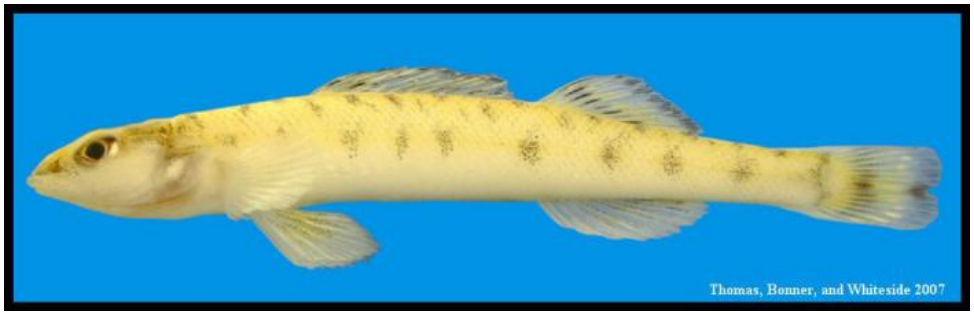
Dorsal fins broadly separated
Elongated body (BD >3x SL)
Two tooth patches

# Percidae

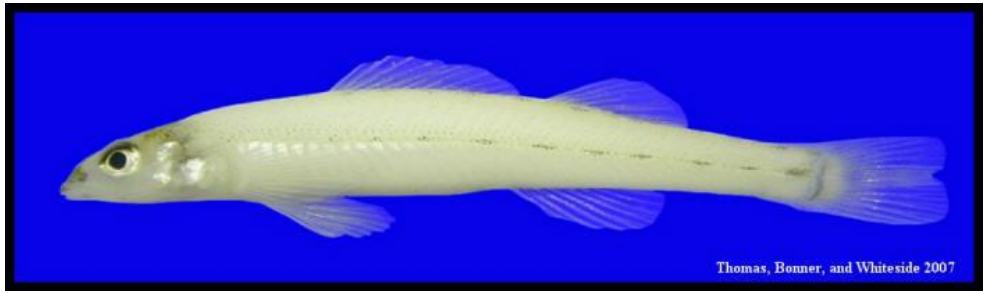

Thomas, Bonner, and Whiteside 2007


Thomas, Bonner, and Whiteside 2007

# Ammocrypta




*Scaly Sand Darter*

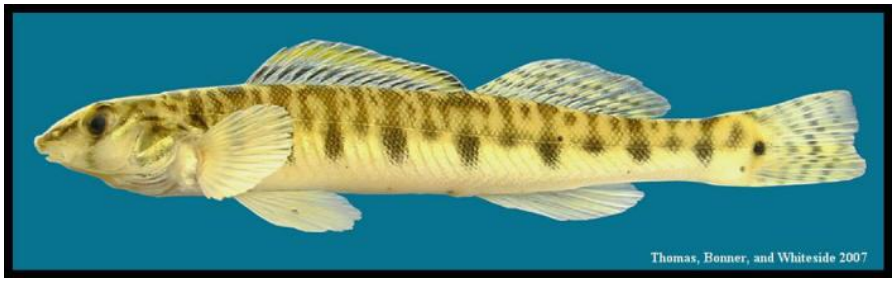



*Western Sand Darter*

- Body depth >7x in body length
- East Texas

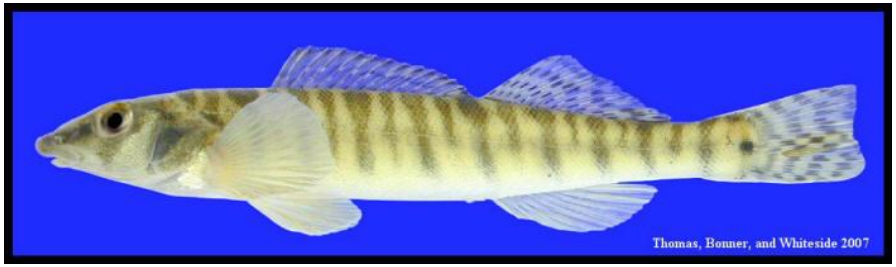
# Percina

## The Logperch




Texas Logperch

- Medially constricted, vertical bars of alternating length
- 9-10 full length bars
- Primarily Edwards Plateau



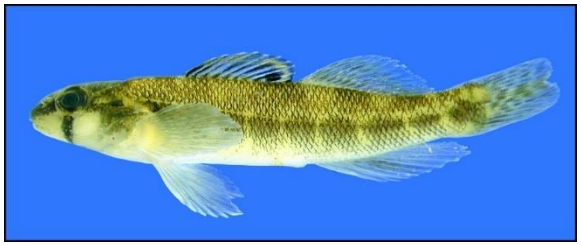

Logperch

- Extremely long snout
- Northeast portions of the Red River only


Bigscale Logperch

- Vertical bars are more narrow and around the same length
- 15-20 full length bars

# The Darters

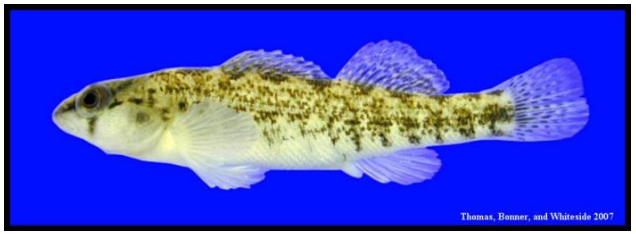


**River Darter**

- **Bigger body (*Percina*)**
- **Faint dusky blotches**
- **Two dark spots on the first dorsal fin (posterior spot much more prominent)**

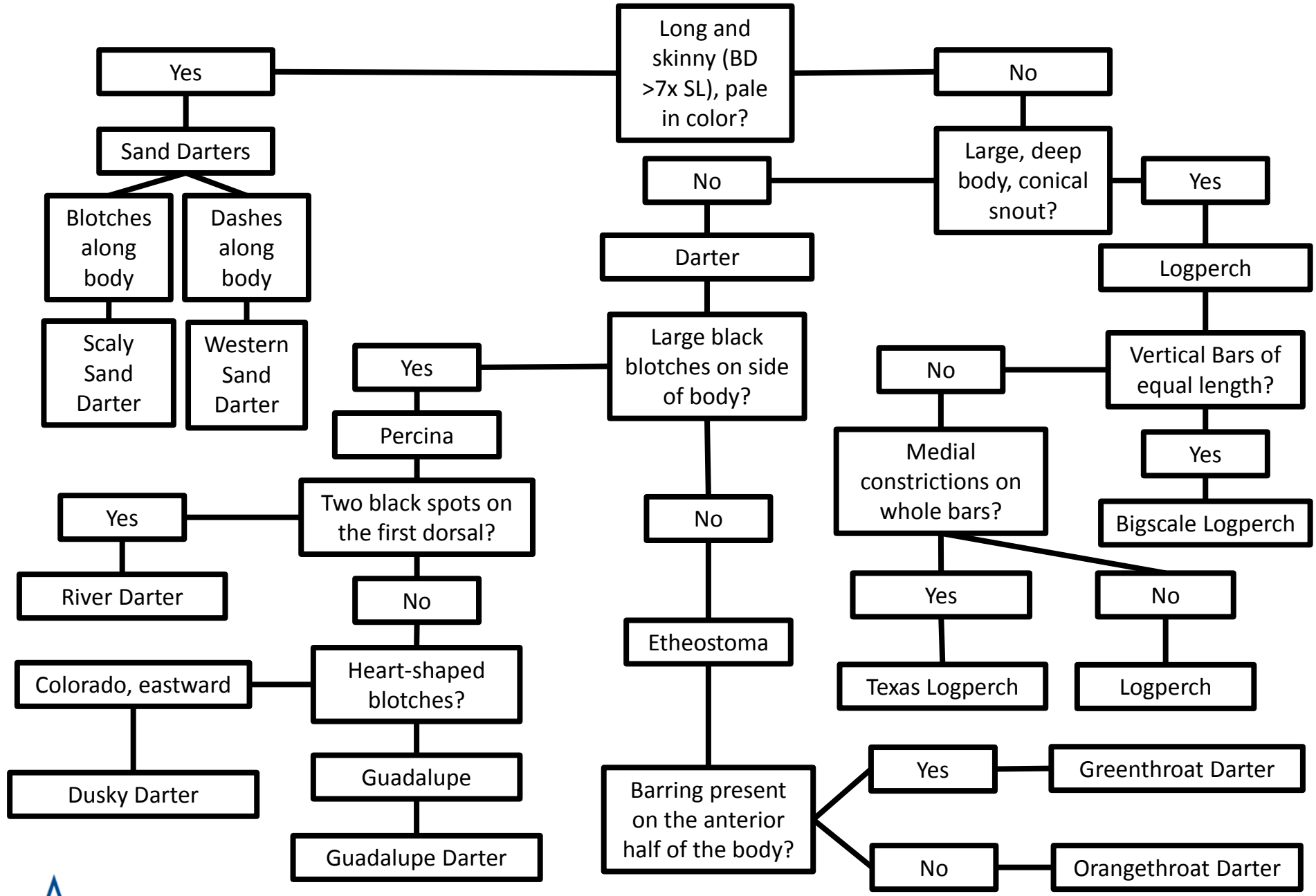
**Greenthroat Darter**

- **Smaller body (*Etheostoma*)**
- **Barring more prominent on anterior half of body than Orangethroat**
- **Green/blue throat in breeding males**
- **More spring associated**




**Orangethroat Darter**

- **Smaller body (*Etheostoma*)**
- **Only dashes prominent on anterior half of body**
- **Orange/red throat in breeding males**


Long and skinny (BD >7x SL), pale in color?
Yes
No
Sand Darters
Blotches along body
Dashes along body
Scaly Sand Darter
Western Sand Darter
No
Large, deep body, conical snout?
Yes
Darter
Logperch
Large black blotches on side of body?
Vertical Bars of equal length?
Yes
Percina
No
Medial constrictions on whole bars?
Yes
Bigscale Logperch
Yes
Two black spots on the first dorsal?
No
Yes
No
River Darter
No
Etheostoma
Texas Logperch
Logperch
Colorado, eastward
Heart-shaped blotches?
Dusky Darter
Guadalupe
Barring present on the anterior half of the body?
Yes
Greenthroat Darter
Guadalupe Darter
No
Orangethroat Darter


**Rio Grande Cichlid**

- **5-6 anal spines**
- **Typically more brightly colored with iridescent spotting**
- **Large dark spot on side of body**
- **Vertical barring more prominent on posterior half of body**

# Catostomidae

## Long Dorsal Fins


### River Carpsucker

- Blunter nose
- Triangular subopercle
- Statewide


### Smallmouth Buffalo

- Deeper body
- Rounded subopercle
- Statewide except panhandle

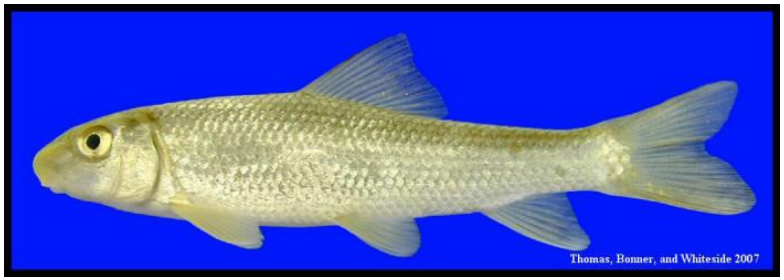
Not mentioned: Blue Sucker, Bigmouth Buffalo, Black Buffalo

# Catostomidae

## Short Dorsal Fins


### Spotted Sucker

- Long slender body
- Rows of spots down side of body
- Brazos, northeastward and Llano River

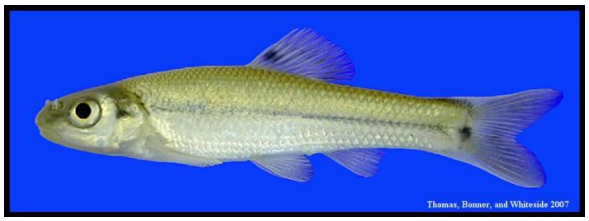


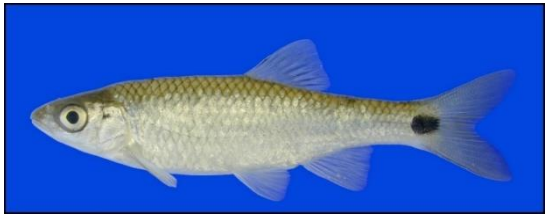

### Gray Redhorse

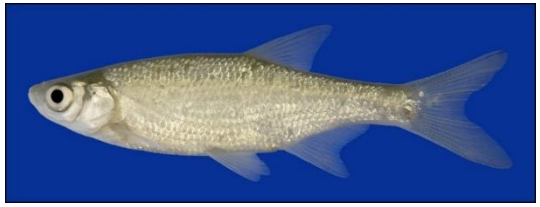
- Long slender body
- Rounded subopercle
- Rio Grande, Nueces, Pecos / Brazos, Colorado, Guadalupe, San Antonio

Not mentioned: Creek Chubsucker Lake Chubsucker, Golden Redhorse, Blacktail Redhorse

# Cyprinidae

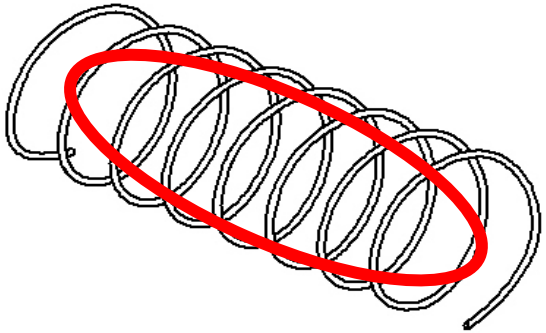


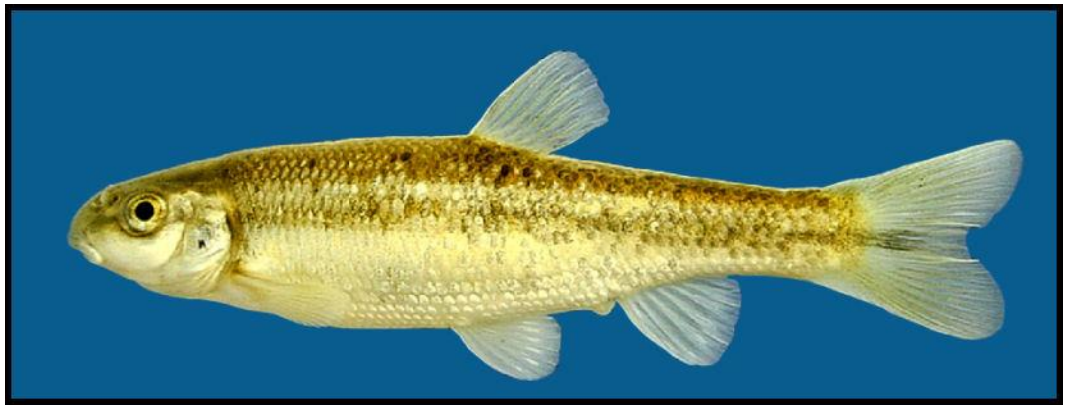





# Campostoma

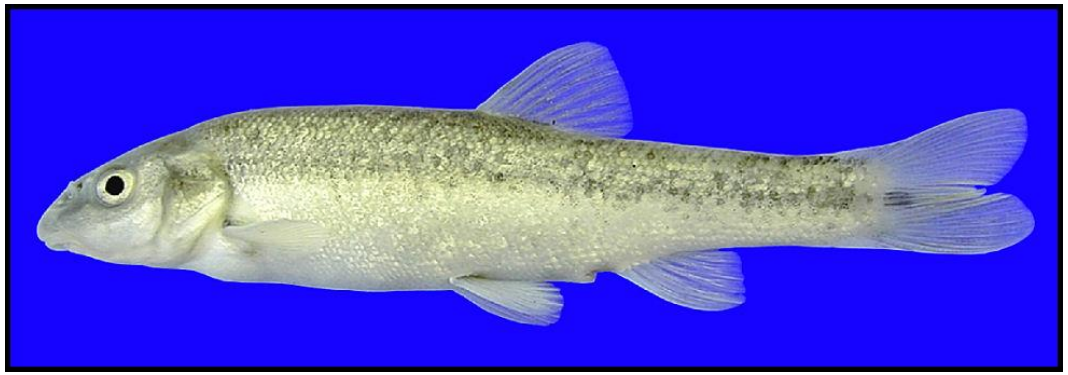
- Intestine wound around the swim bladder
- Chisel-like bottom jaw
- Deciduous scale replacement causes speckling





Central Stoneroller

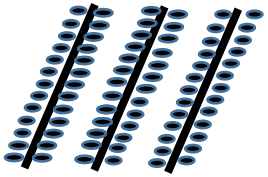
- Larger scales
- Swim bladder fully wrapped
- Central Texas, Devils, Pecos



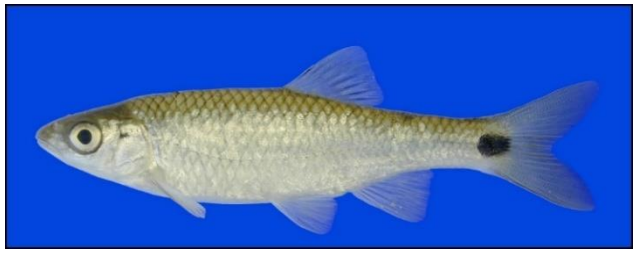
Mexican Stoneroller

- Smaller scales
- Swim bladder partially wrapped
- Rio Grande

# Cyprinella



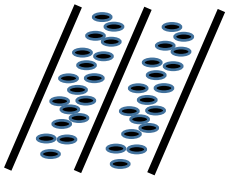
Terminal mouth:

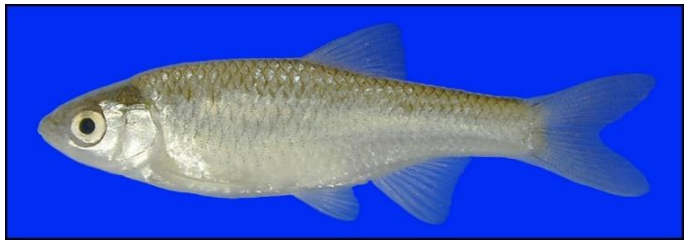


Blacktail Shiner
Rio Grande northeast to Red

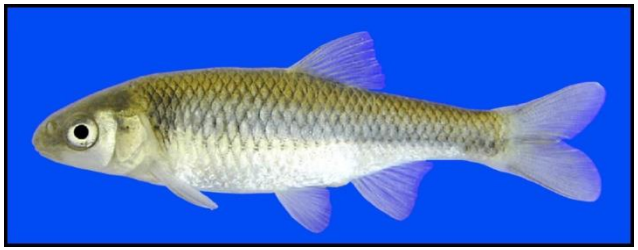
Subterminal mouth:

Proserpine Shiner
Rio Grande, Pecos, Devils

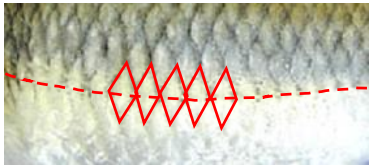




Red Shiner
Statewide except Nueces



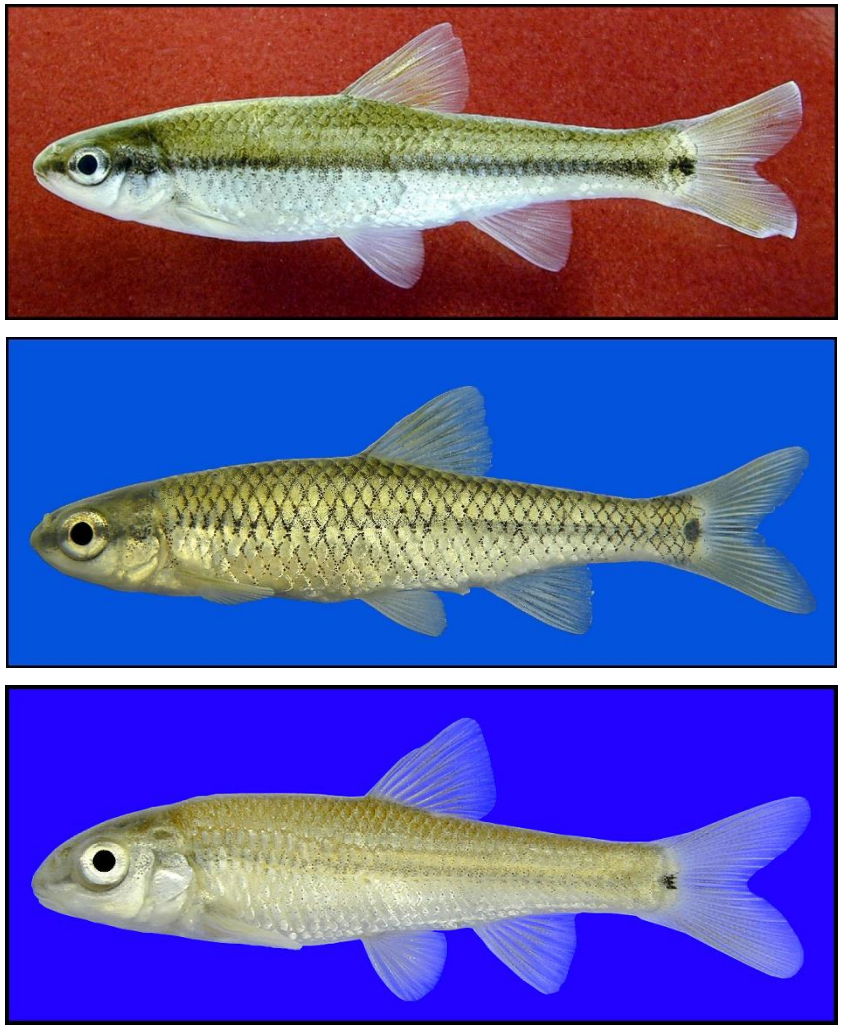
Plateau Shiner
Nueces



- Shoulder patch
- Decurved lateral line
- Diamond shaped mid-lateral scales

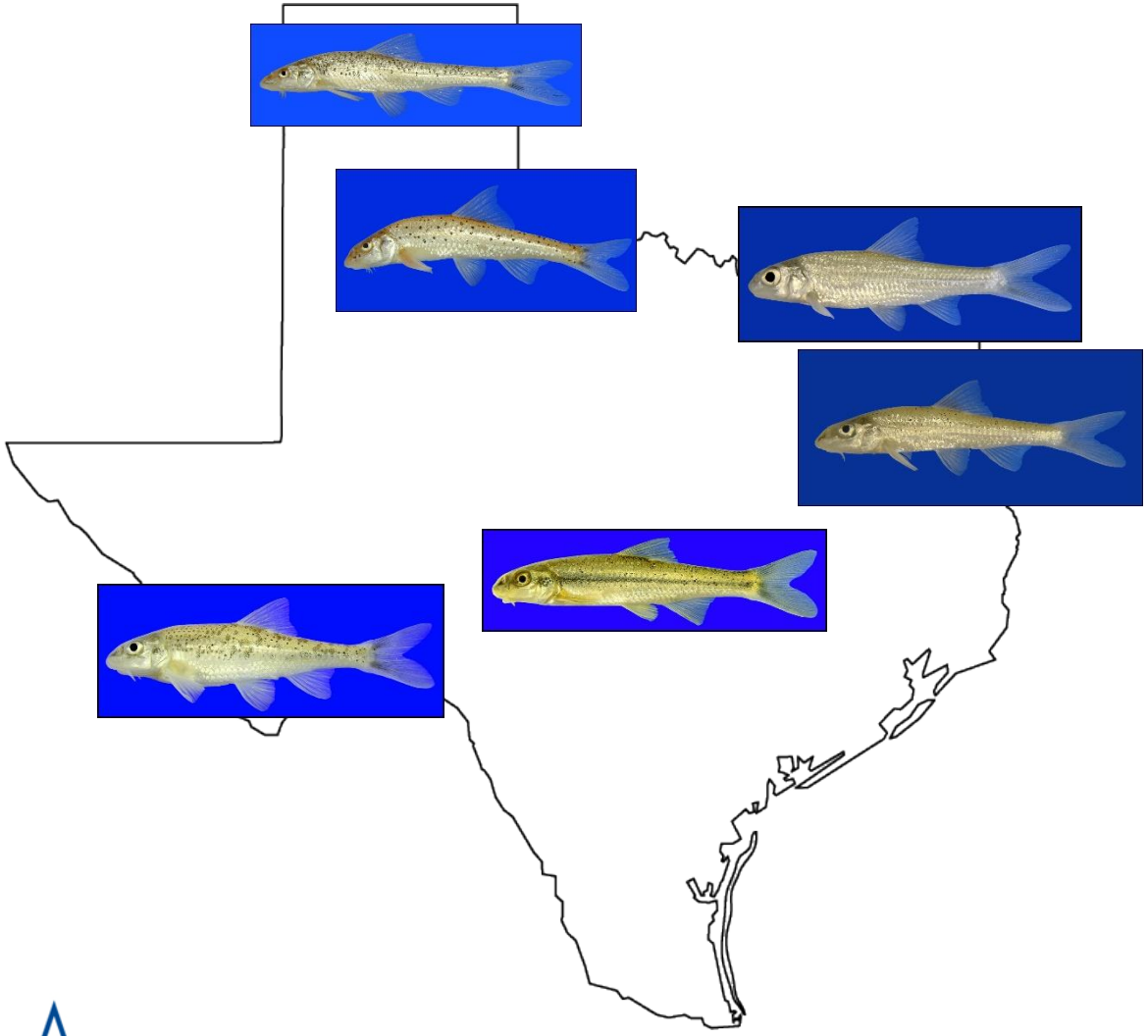
- Deeper bodied, thick
- Pigmentation in-between fin rays

# Dionda



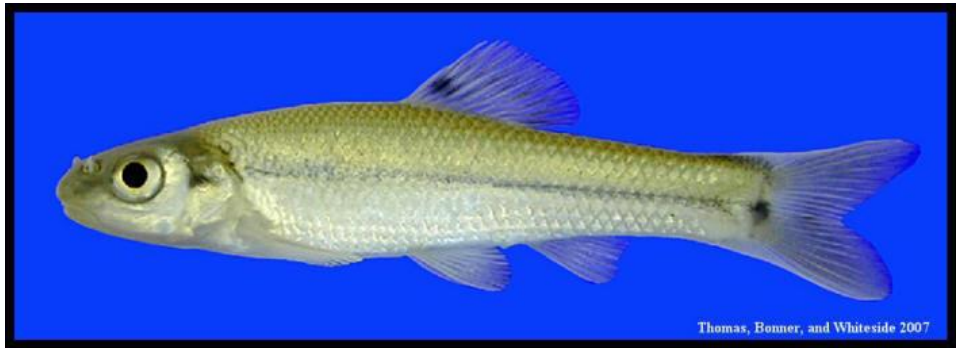
- Flat coiled intestine
- Midlateral stripe extends through eye and around nose
- Very localized:
  - Manatial Roundnose– Devils, Pecos
  - Devils River - Devils
  - Roundnose – Pecos
  - Guad Roundnose– Colorado, Guad
  - Nueces RN – Nueces
- Can have dark peritoneum

# Macrhybopsis



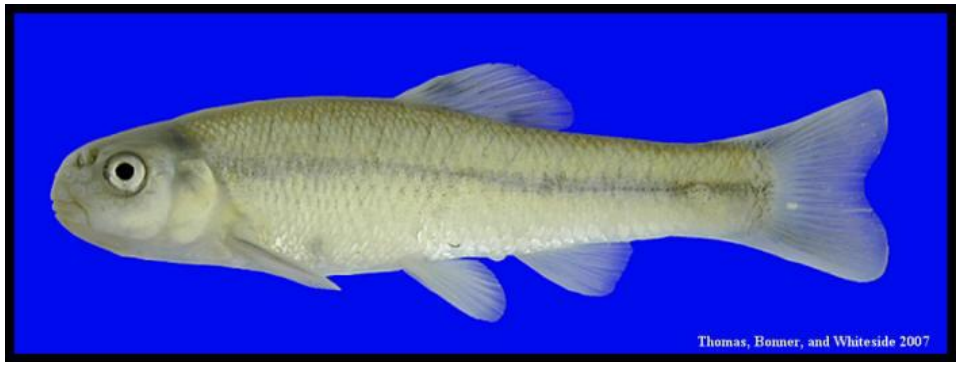
- Ventrally flatted body
- Maxillary barbels
- Very localized, only overlap between Silver & Shoal; Shoal is speckled.

# Pimephales




Bullhead Minnow

- Caudal spot

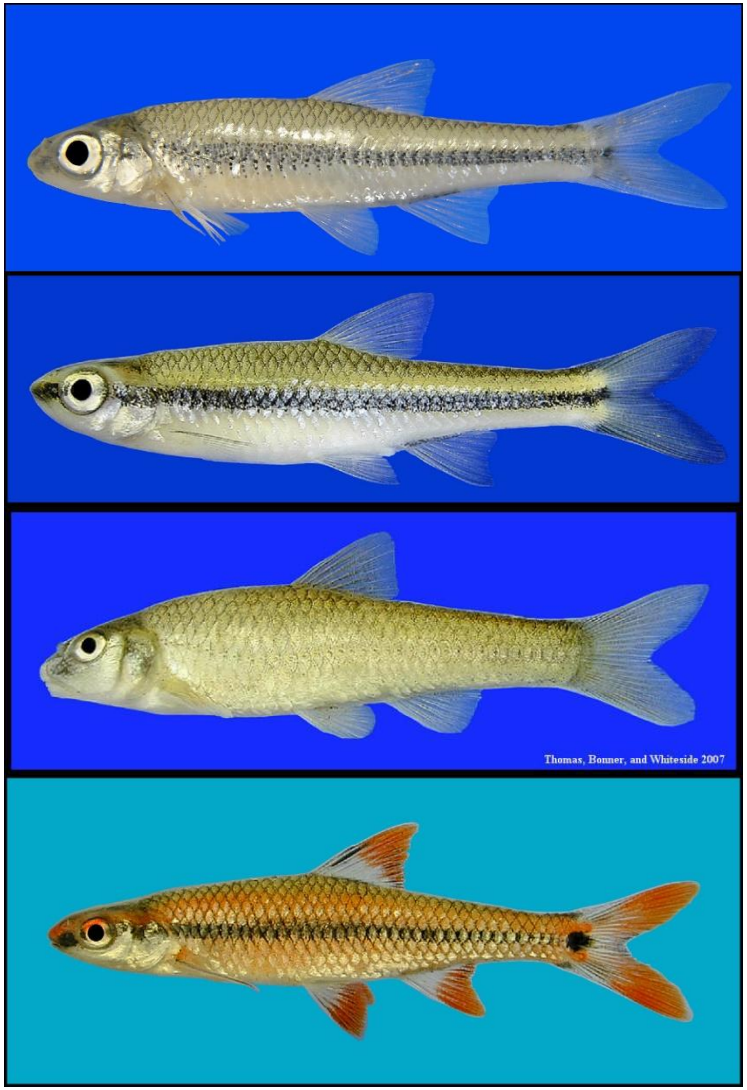



Fathead Minnow

- No caudal spot

- Crowded pre-dorsal scales
- Pigment on anterior of dorsal fin

# Notropis




- Catchall group for the rest of the minnows in Texas
- If your minnow does not apply to any of the other rules it likely falls into the Notropis group

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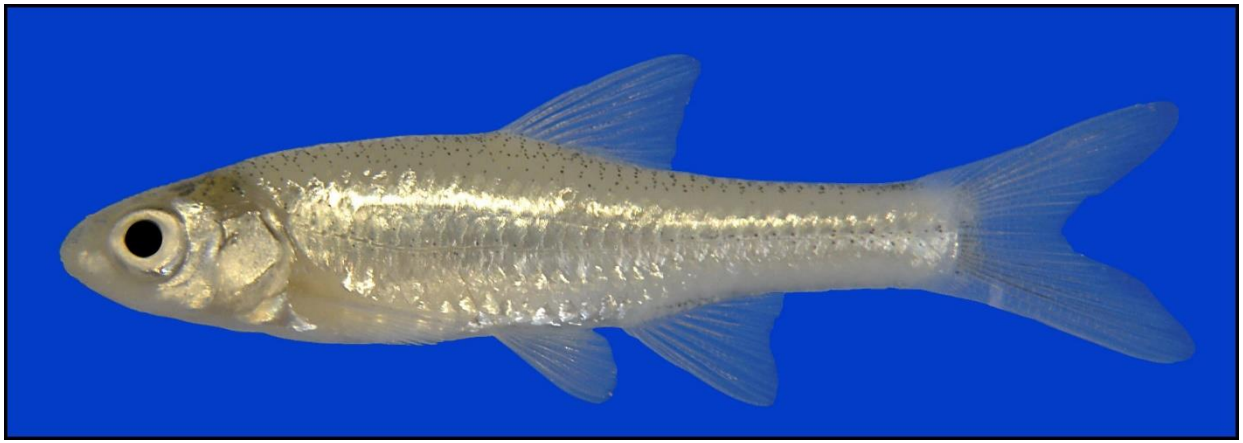
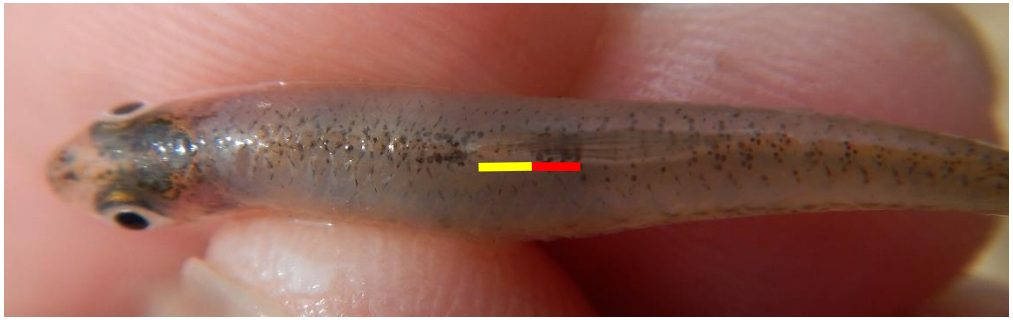
# Ghost Shiner

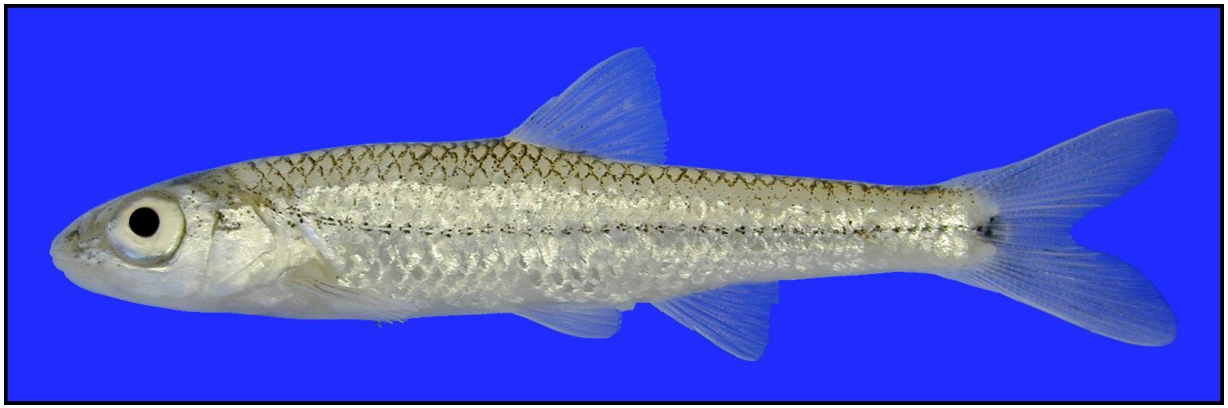


A P

- Subterminal mouth
- Elevated lateral line scales (2x depth along lateral line versus rest of body)
- Pigment very scarce
- Has 2 dorsal bars. Posterior dorsal bar is much longer than the gap between the two bars.
- Pelvic fins just reach anal fin.

# Sand Shiner

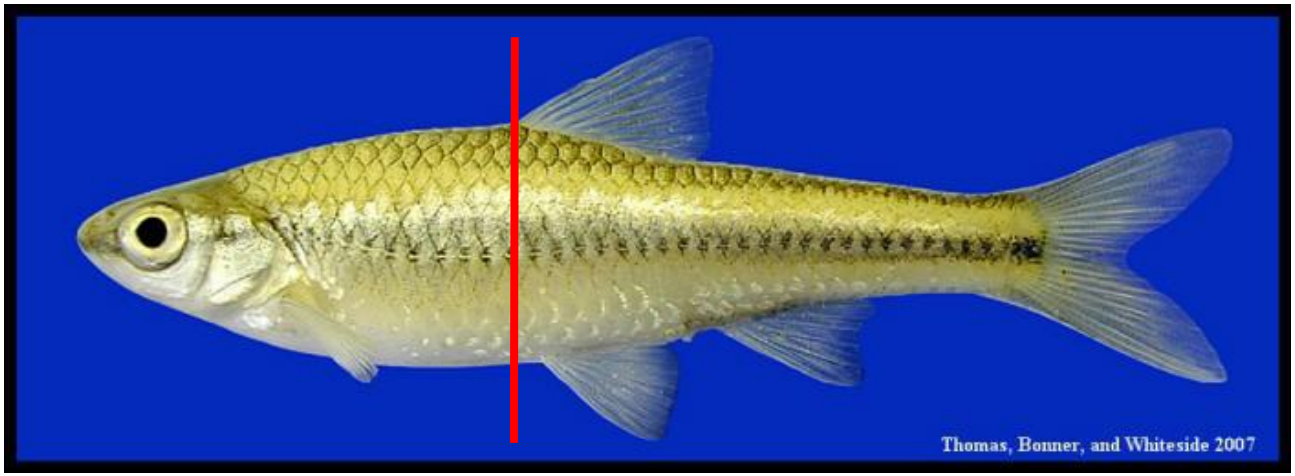




A P

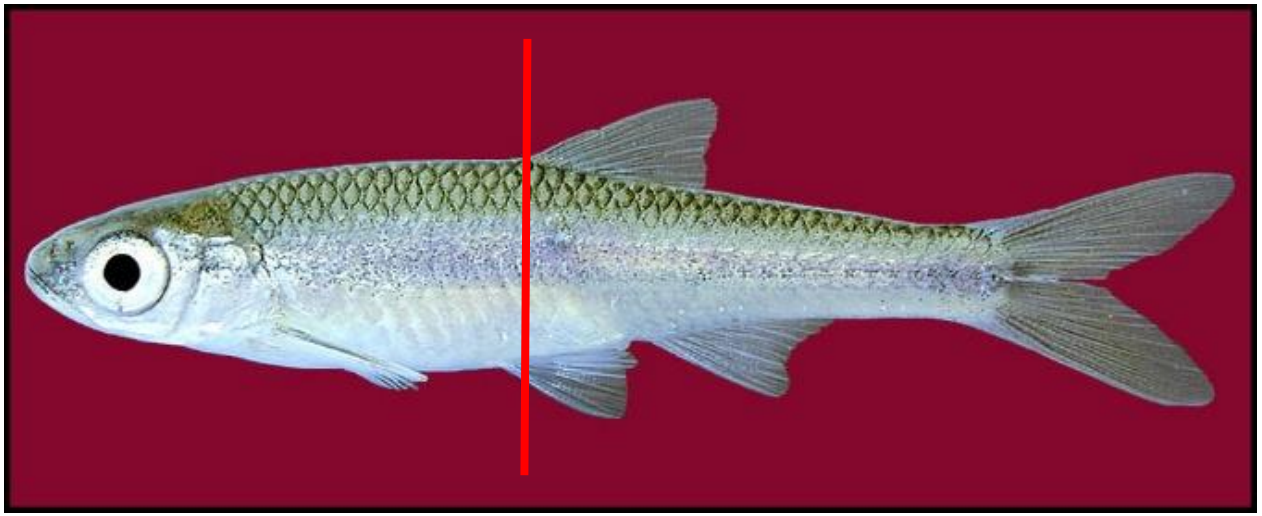
- Subterminal mouth
- Non-elevated lateral line scales (all scales equal depth & width)
- Much more pigment surrounding scales
- Double dashes along lateral line
- Has 2 dorsal bars. Posterior dorsal bar is about the same length as gap between the two

# Weed Shiner




- Terminal mouth
- A lot of pigment, pronounced mid-lateral stripe
- Pigment on lower lip
- Eye smaller than *N. amabilis* (contained ≈4x in body depth)
- Origin of dorsal fin in front of origin of pelvic fin

# Texas Shiner



- Terminal mouth
- Eye extremely large (contained 2.5 – 3x in body depth)
- Origin of dorsal fin behind origin of pelvic fin