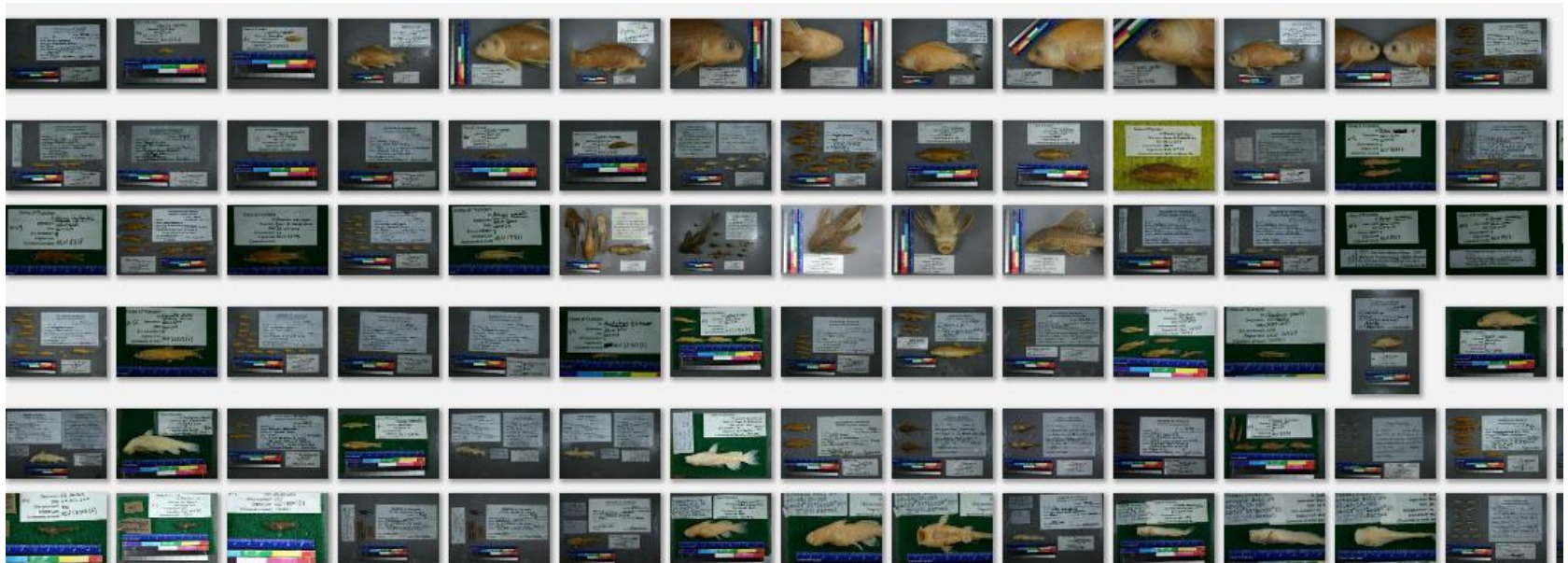


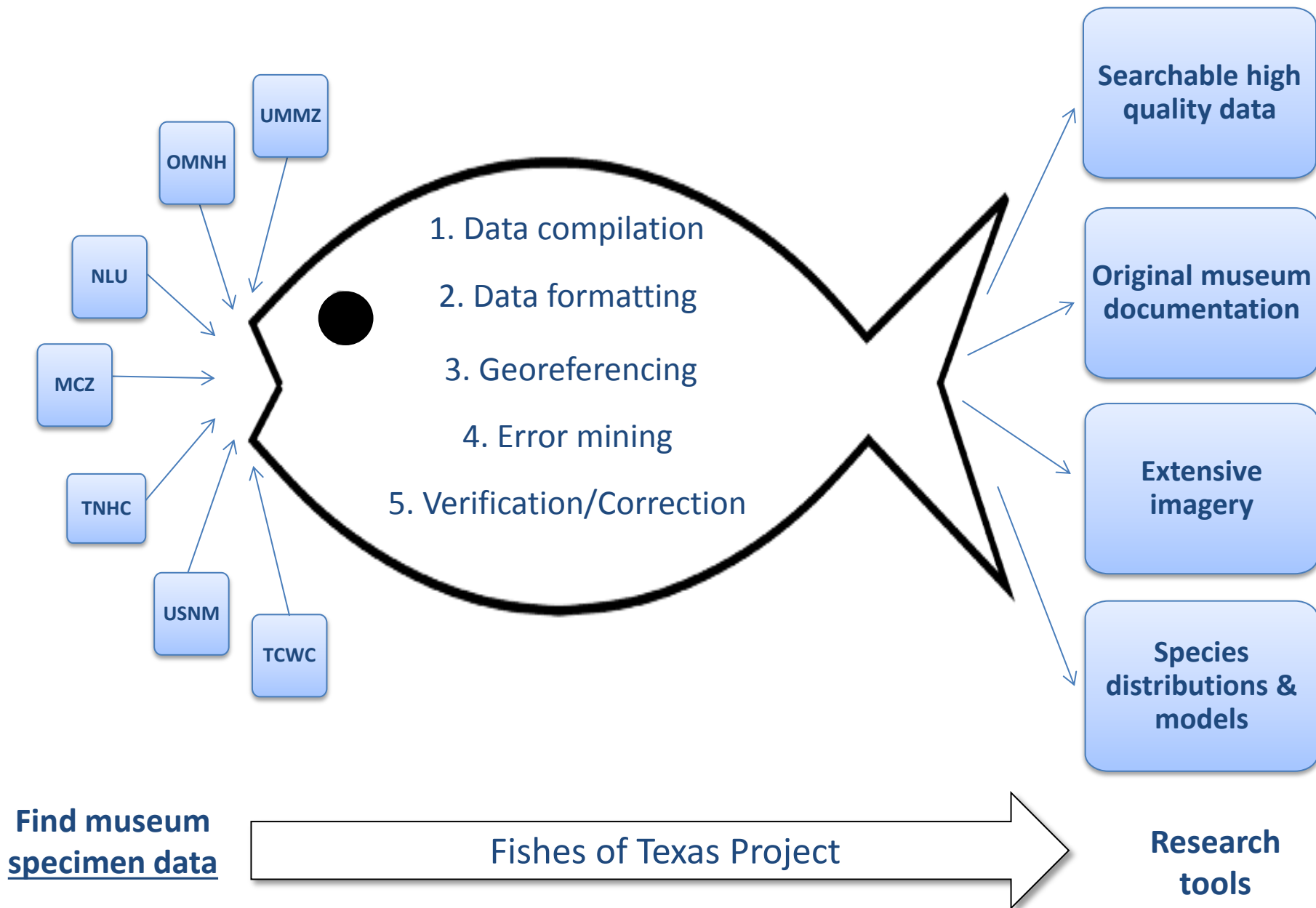
Fishes of Texas Project: Specimen Imaging

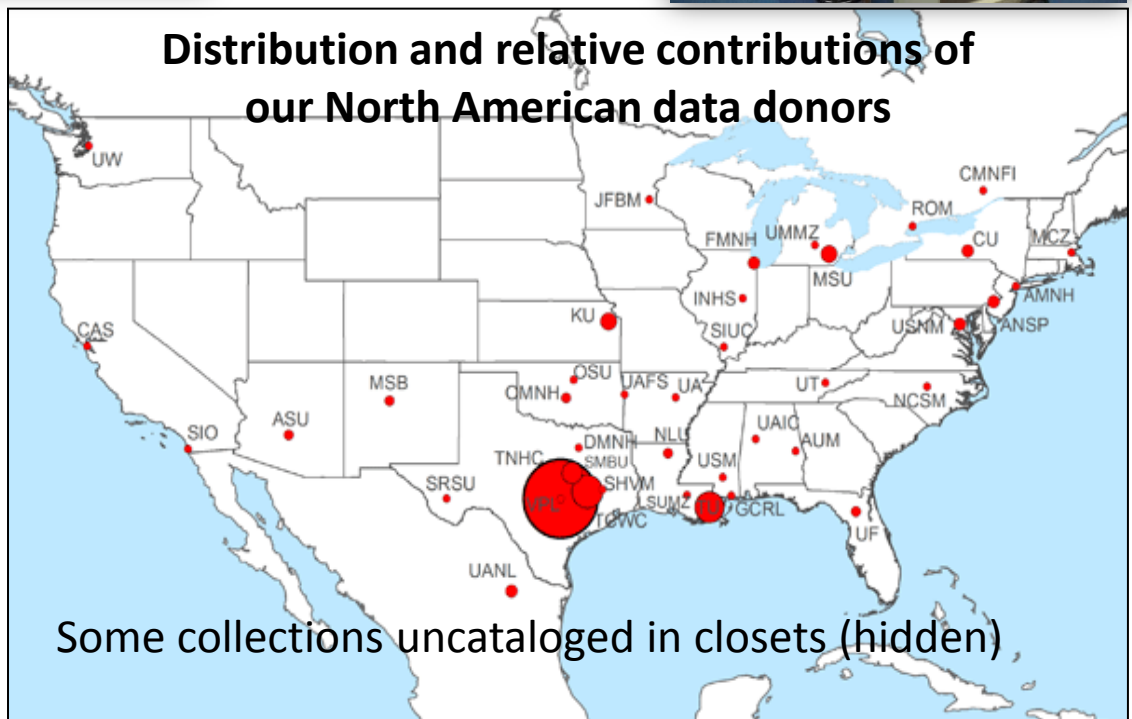
Adam Cohen and Dean Hendrickson

Texas Natural History Collections

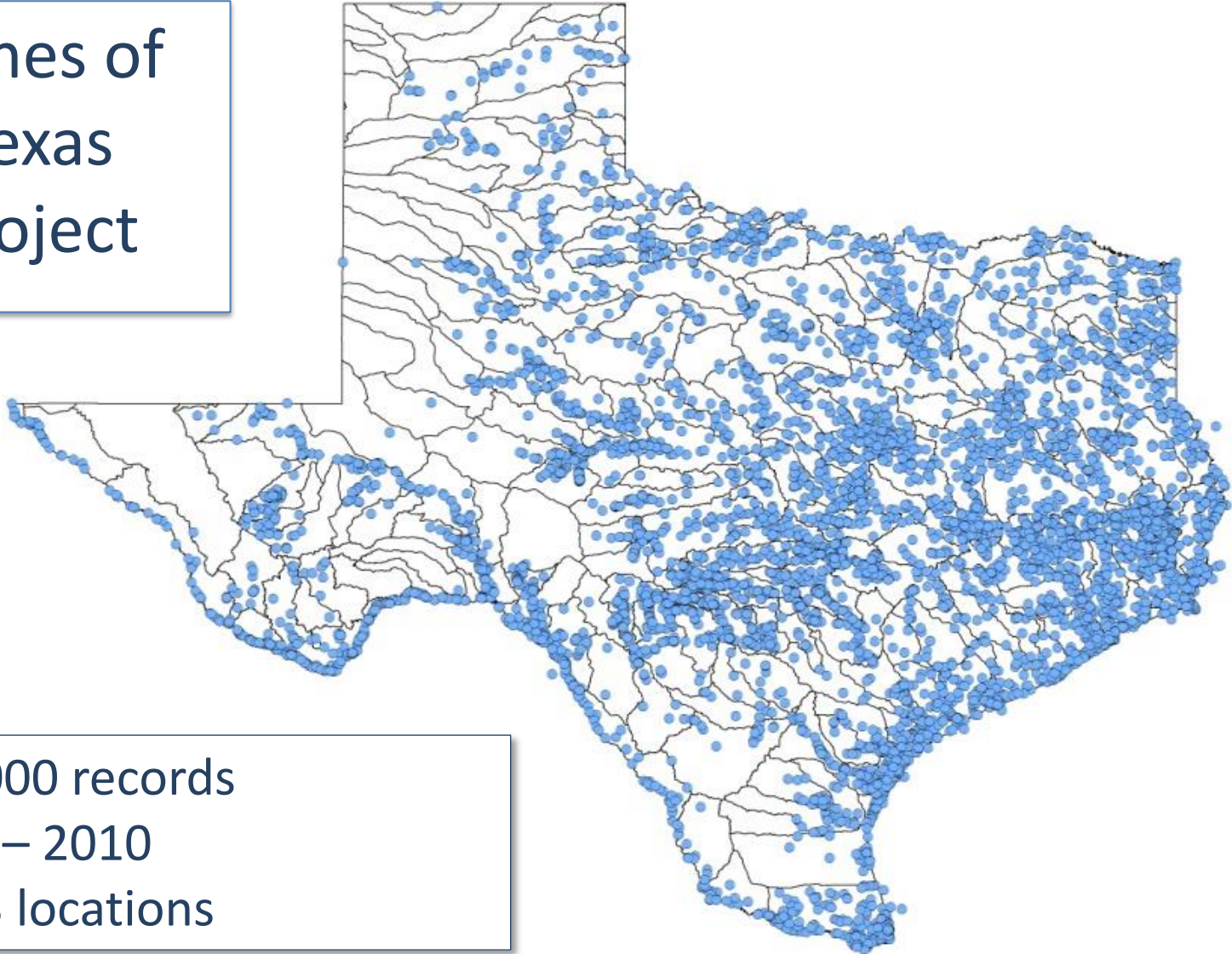
University of Texas







Fishes of Texas Project



- 123,000 records
- 1852 – 2010
- 7,553 locations

Building a digital library (from donors and FoTX)

Field notes(>1,000)



Field photos (>1,000)

Survey Texas Coll. No. 6831-600
 Drainage San Marcos Locality St. Louis Island 1/2 mi. S of San
Marcos Spring
 County Blanco Quadrangle Blanco-Edwards
 Water Clear, white Vegetation Upland
 Vegetation Upland, Pines, Liveoaks
 Bottom Sand, mud, gravel Current —
 Shore open to 1/2 mile Distance from shore 50'
 Temperature: Air 75°F Time 11:00 Wind light
 Depth of Capture 0-3 ft Depth of Water 0-3 ft
 Method of Capture 1/2 mile from shore Date 14 Aug 68
 Collected by 1986/11/10, Bill Doyle
 Orig. preser. 10 20mm x 10mm Time —
 General notes: —

Gambusia affinis 1 imm. - yellow tail
Poecilia latipinna 100 taken - others seen
Tetodon lineatus 8 juv.
Notropis pygmaea 1 juv.
Notropis venustus 6 juv. - ad
Ampelisca arenaria 1 juv.
Cichlasoma cyaneum - new sp. - juv.
Micropterus S. salmoides 1 juv.
Hyphessobrycon 1 juv.
Amphiprion variegatus - new sp. - juv.
Leopoldo variegatus 1 juv. - ad
Leopoldo variegatus 1 juv. - ad
Channa argus 1 juv. - ad

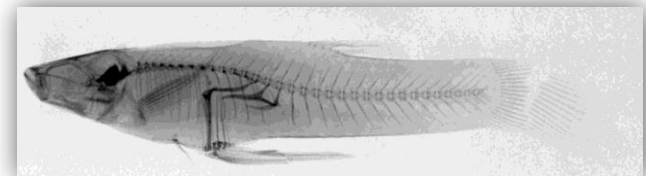
Specimen details (1,080)



in situ (>400)



Illustrations (220)



X-rays (230)

- Museum ledgers
- Imaging of jar contents (>1,400)

Data improvement process

Georeference localities

Synonymize taxonomy & collector names when possible

Reconstruct collection events to correct errors (taking advantage of many records from disparate sources)

Examine collector's life-time collections for records representing temporal outliers. Correct dates if possible.

Plot out species distributions & flag suspect records

Research & correct suspect records, often by examining specimens.

donor	date	location	collectors	species	N
USNM	5-6-2010	Travis County., Btn Cr at Park	Smith, Wills, Cole	<i>C. venusta</i>	21
TNHC	5-6-2010	Travis Co., Barton Ck at Zilker Prk	Smith, Wills, Cole	<i>C. venusta</i>	14
TNHC	5-6-2010	Travis Co., Barton Ck at Zilker Prk	Smith, Cole	<i>I. punctatus</i>	1
MSB	5-6-2010	Travis Co., Barton Ck at Zilker Prk	Smith, Wills, Cole	<i>L. megalotis</i>	1
TNHC	5-6-2010	Travis Co., Barton Ck at Zilker Prk	Smith, Wills, Cole	<i>P. olivaris</i>	1
TNHC	6-5-2010	Travis Co., Barton Ck at Zilker Prk	Smith, Wills, Cole	<i>L. gulosus</i>	4
ASU	5-6-2010	Travis Co., Barton Ck at Zilker Prk	Smith, Wills, Cole	<i>L. gulosus</i>	2

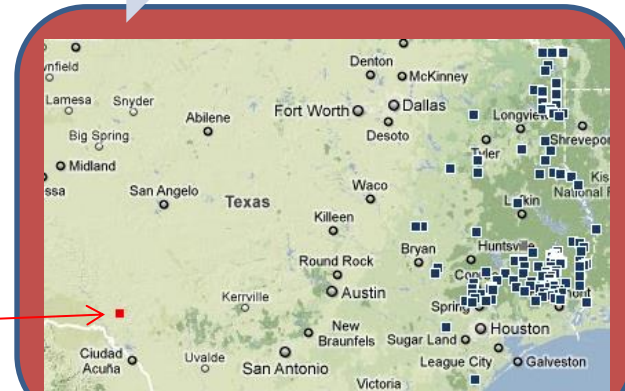
Fictitious example of records from three museums from what is likely a single collection event. Example shows the kinds of errors we can detect.

Should be "Travis Co., Barton Ck at Zilker Prk"

Should be "Smith, Wills, Cole"

Should be "5-6-2010"

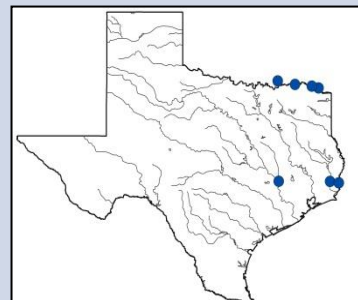
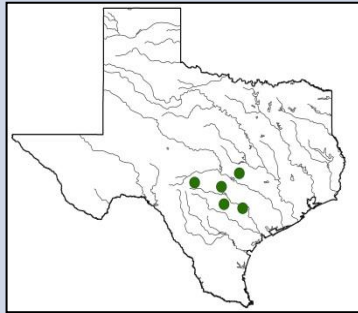
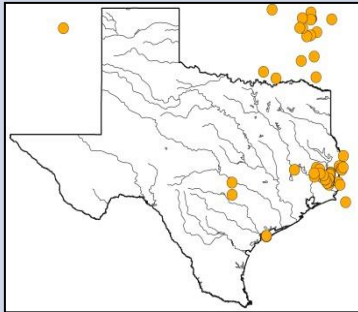
Suspect occurrence record is likely a specimen mis-identification



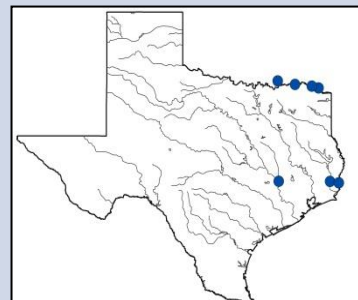
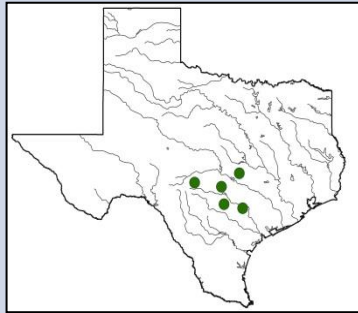
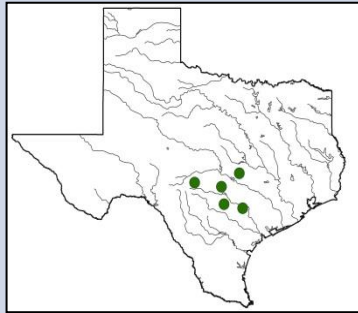
Stepwise creation of occurrence maps for 3 species



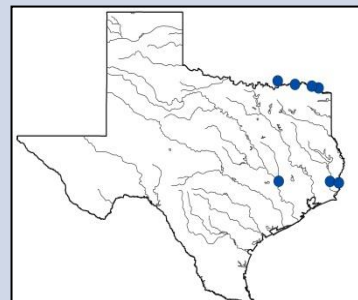
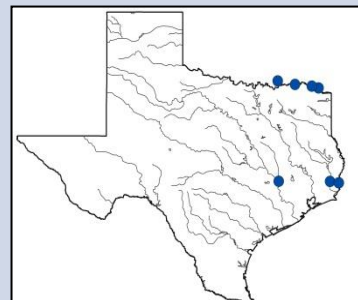
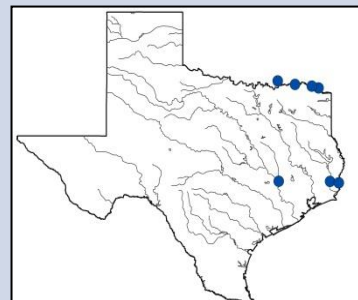
Micropterus punctulatus
Spotted Bass



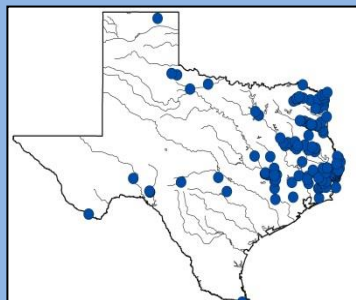
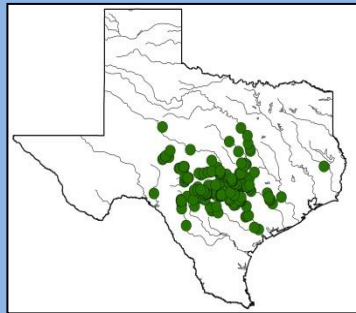
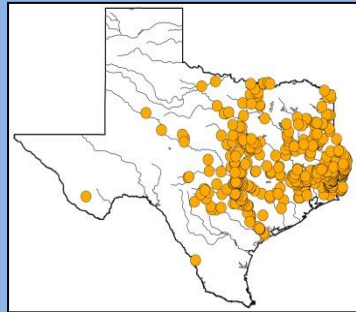
Micropterus treculii
Guadalupe Bass



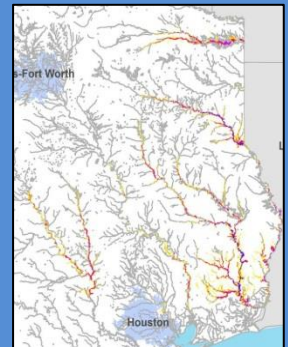
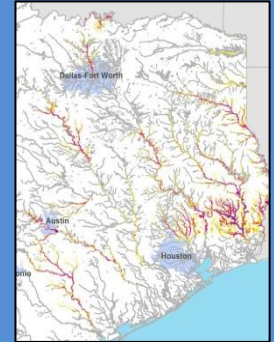
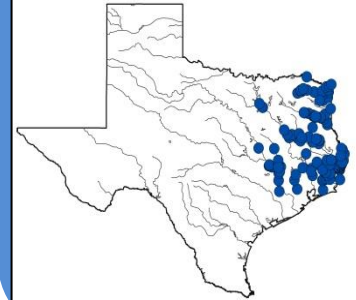
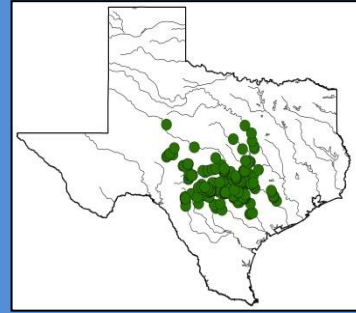
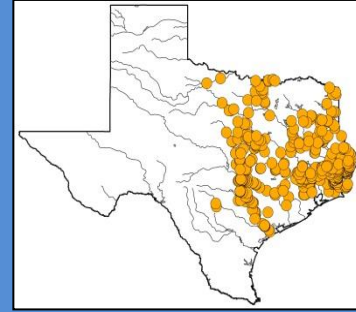
Hybognathus nuchalis
Mississippi Silvery
Minnow



2. After georeferencing and synonymization of taxa names

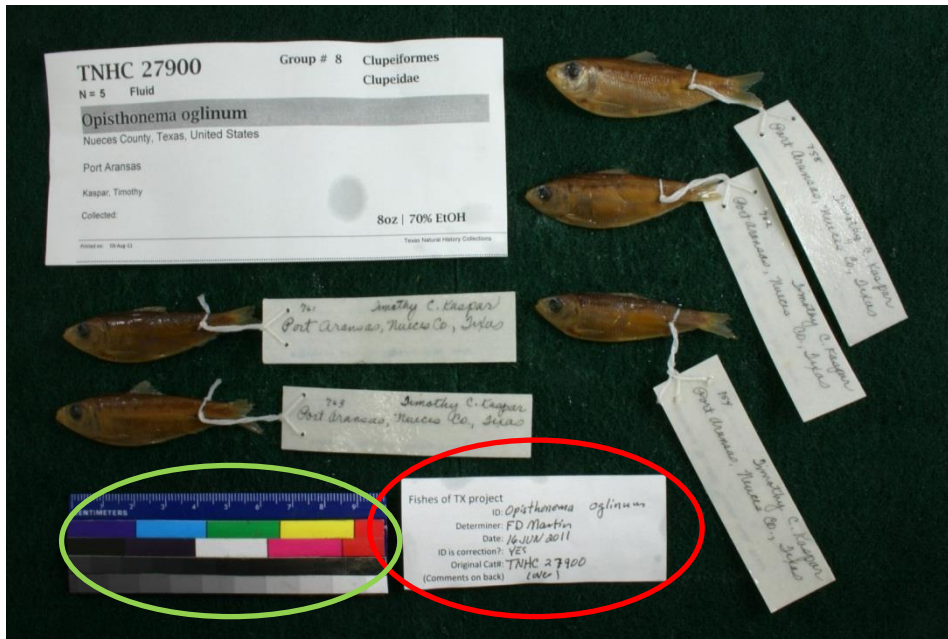


3. After ID verification



Data correction & ID's are a major focus of FoTX!

Jar contents images: field labels, curation labels, determiner notes, specimens

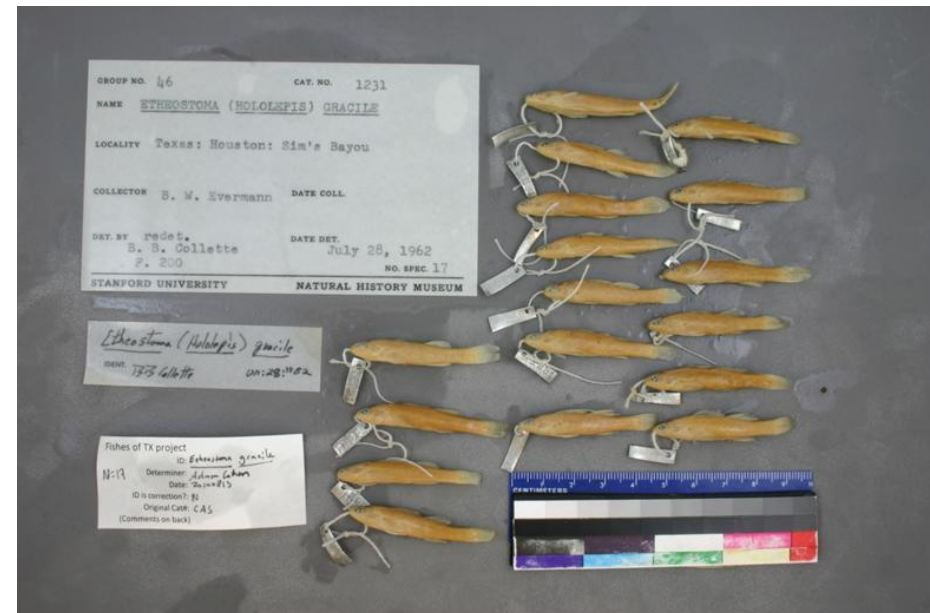
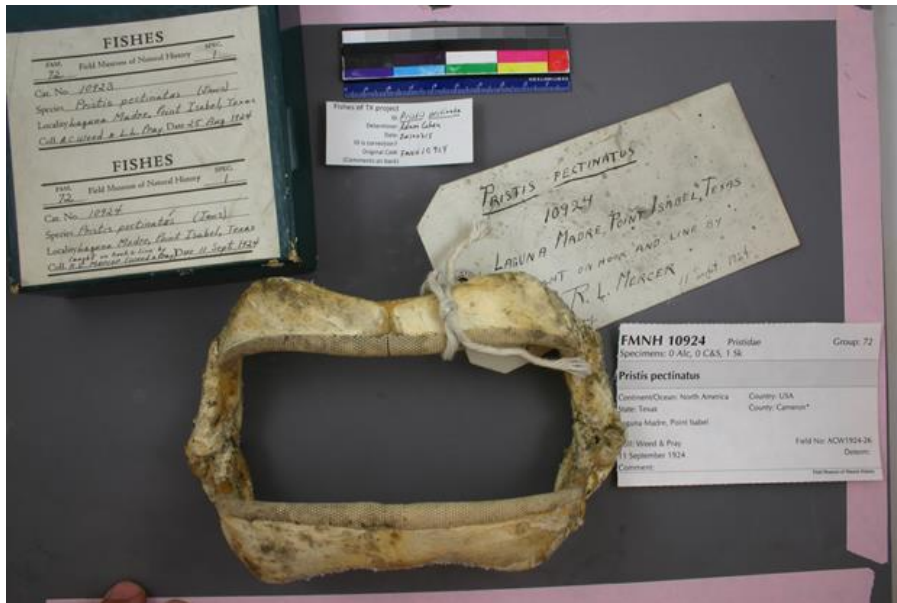


Photography not originally part of FoTX.

No funding. Secondary priority.

But obvious value in capturing an image (**support of ID & occurrence data**).

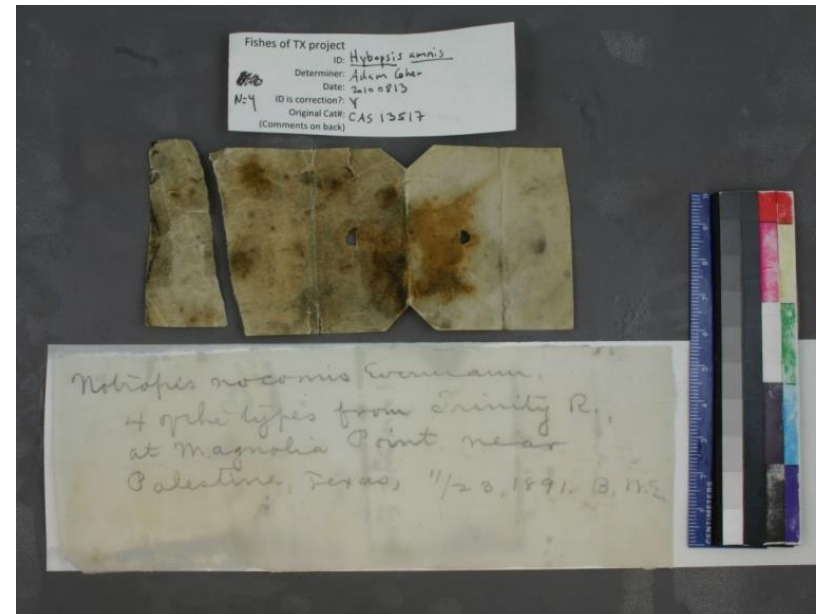
Due to time constraint and a single simple set up there are issues of **glare, depth of field, & composition**.





How to deal with some of these issues?

Lots of detail images

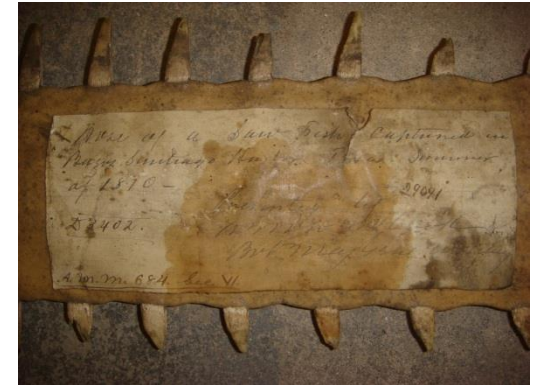
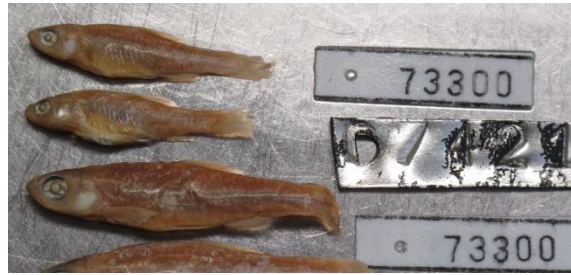


Variability in specimens & labels contributes to difficulty

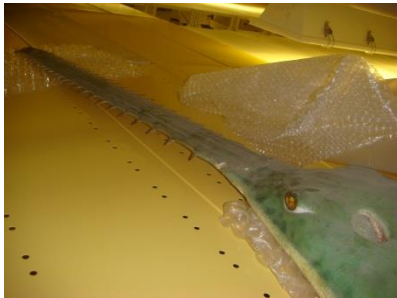
size



labels



curling



Two Digitization Protocols (home vs. away)



	Traveling	TNHC
Personnel	2/3 staff capable of IDs	Depend on volunteers (in flux)
Processing time (jar out of storage)	Quick as possible	Months
Focus	ID's & quick photos	ID's, specimen observations, photos

Internal Working Document (TNHC specimens)

Methods for identification and photography of TNHC specimens FoTX Project

Adam Cohen and Jeremy Harrison

October 2010

Revised January 2011 – Melissa Casarez

Revised Feb 2013 – Adam Cohen

Contents

General info.....	
Work flow.....	
Labels.....	
Specimen Log Data Sheet	
Specimen ID.....	
Data entry in Excel	
Photographs.....	
Camera settings	
Cannon EOS Rebel:.....	
Photo set up	
Example composition	
Post processing.....	

Camera settings

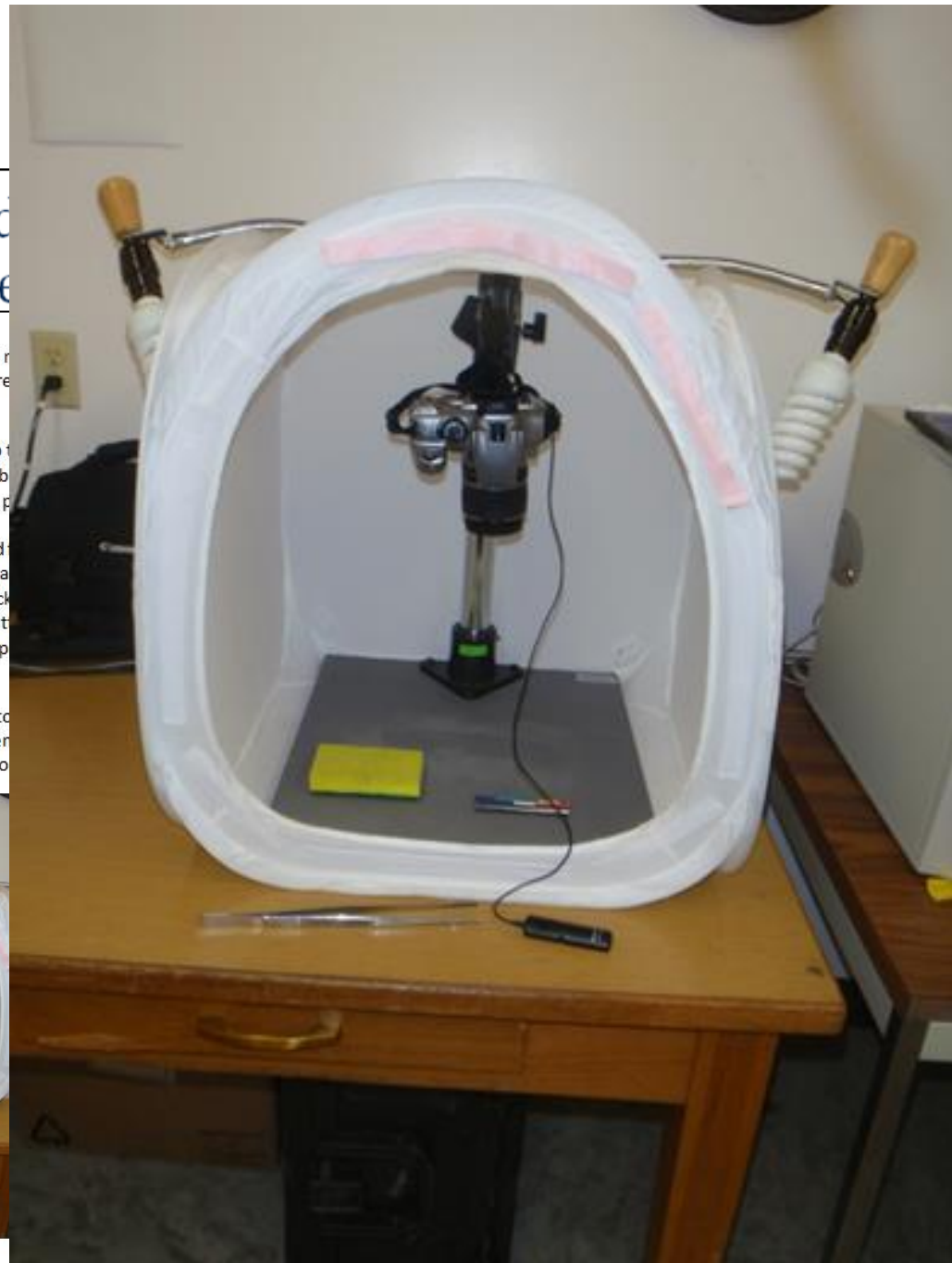
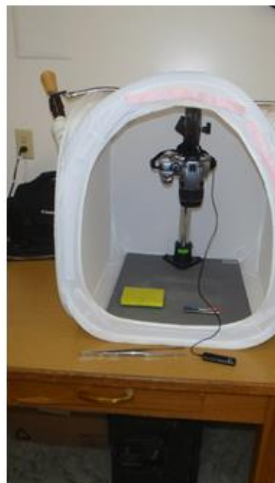
These will typically already be set and r
especially after the camera has been re

Cannon EOS Rebel:

- Aperture priority – dial on top
- Set aperture as small as possib
- White balance as florescent – p
- shutter release button
- Highest quality jpg (“large and
- menu controls, push menu aga
- ISO to 100 – push “ISO” at back
- Autofocus to center – grey but
- the shutter release button to p

Photo set up

The photo below shows how the photo
parallel with the plane of the specimen
occur if you used your hand. Lights sho



Physical Data Entry Form

Affixed with
rubber band

One sheet per jar

Data entry initials/date:

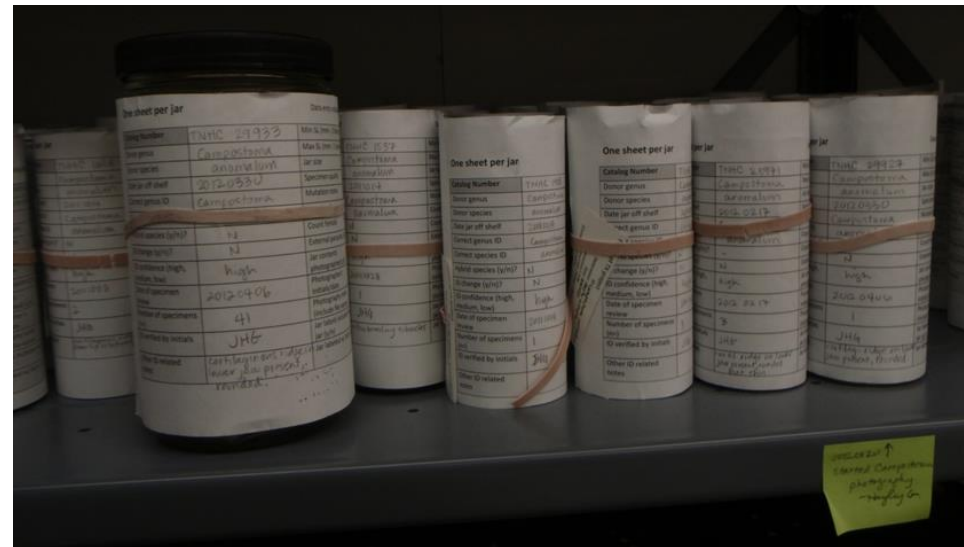
MJC 10/28/2011

Other specimen info
(Easily acquired)

Catalog Number	16809 (1)	Min SL (mm - 2 decimals)	21.71
Donor genus	Dorosoma	Max SL (mm - 2 decimals)	38.09
Donor species	petenense	Jar size	quart
Date jar off shelf	3/29/11	Specimen quality	good
Correct genus ID	Dorosoma	Mutation notes	none
Correct species ID	petenense	Count male	n/a
Hybrid species (y/n)?		Count female	n/a
ID change (y/n)?	N	External paratsites (y/n)	n
ID confidence (high, medium, low)	high	Jar contents photographed (y/n)	Y
Date of specimen review	5/10/11	Photographer's initials/date	MJC 10/28/11
Number of specimens (n=)	347	Photography notes (include file names)	TNHC-16809(1)
ID verified by initials	VB	Jar labels included inside jar (y/n)	Y
Other ID related notes	See ID tag	Jar labeled w/ dots (y/n)	Y

Specimen ID data

QC and tracking



Why use a physical data entry form?

Direct data entry

Vs.

data form

- Reduce transcription errors.
(Enter data only once)
- Save time

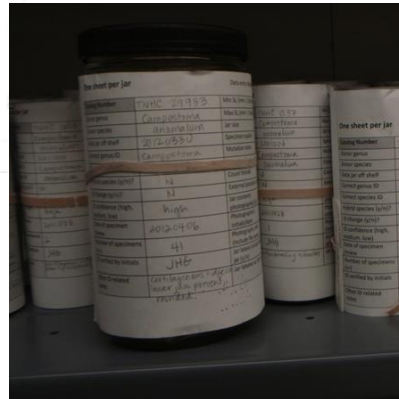
→ But not so. Lots of errors (unreliable volunteers?)

- More reliable data entry when done by hand on paper
- Form can follow the jar from shelf to shelf
- Includes status of the jar (checklist)
- Keep wet and dry work stations apart
- Single trust-worthy data entry/verification person
- Physical paper backup

One sheet per jar

Data entry initials/date: MTC 10/28/2011

Catalog Number	16809 (1)	Min SL (mm - 2 decimals)	21.71
Donor genus	Drosophila	Max SL (mm - 2 decimals)	38.09
Donor species	petenense	Jar size	small
Date jar off shelf	3/29/10	Specimen quality	good
Correct genus ID	Drosophila	Mutation notes	none
Correct species ID	petenense	Count male	16
Hybrid species (y/n)?		Count female	16
ID change (y/n)?	N	External parasites (y/n)	n
ID confidence (high, medium, low)	high	Jar contents photographed (y/n)	Y
Date of specimen review	5/10/11	Photographer's initials/date	MTC 10/26/11
Number of specimens (n=)	347	Photography notes (include file names)	2011-10-26-11
ID verified by initials	VB	Jar labels included inside jar (y/n)	Y
Other ID related notes	see ID tag	Jar labeled w/ dots (y/n)	Y



Processing room with shelves



Workflow

1) Pull jars based on FoTX priorities (ID priority)



Shelf 1

2) Examine specimens & fill out data forms (affix with rubber band)

Correct ID

Re-determined

Shelf 2

Shelf 2.5

To collection manager

2.5) Assign new catalog number & re-label

3) Photograph (multiples), check photos & return contents to jar

Shelf 3



Quality Control (trusted staff only)

- 5) Data entry to Excel (possibly re-examine contents)
- 6) Image selection (keep/delete/re-take)
& file renaming

File name = inst.& catalog#
(from photo)

TNHC_1234	all jar contents
TNHC_1234_2	specimen detail
TNHC_1234_3	specimen detail
TNHC_1234_L	label/s only
TNHC_1234_L_2	label detail

File type = jpg
Res = 3072 X 2048

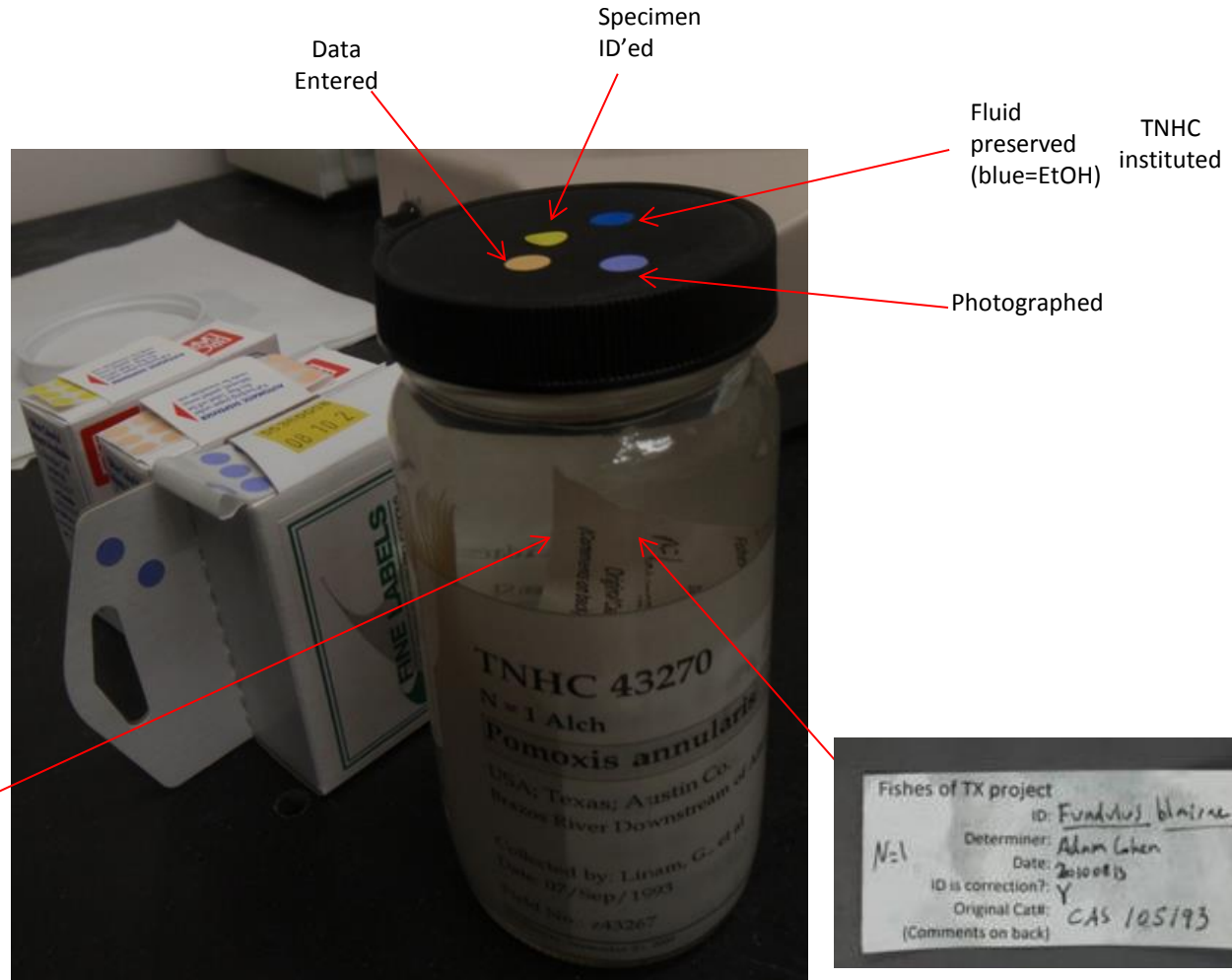
Stored initially on Univ.
TX servers. Then to
Texas Advanced
Computing Center
servers.

- 7) Insert FoTX labels in jar & colored indicator dots on lid. File data sheet.

Cart for
transport

- 8) Return lot to storage.

Ready to reshelve



USNM127282 

Atlantic Stingray

Dasyatis sabina

Screen captures from specimen page


Specimen Details

Collector(s)

I. Ginsburg


Collecting Event

Collected: Jan. 1, 1926 - Dec. 31, 1932 

Collecting Event ID: Z-USNM127282 

Determination

Taxon: *Dasyatis sabina* 

Determiner: Martin, Floyd Douglas 

Staff Notes:


ID Status: Specimen examined and ID'ed for FoTX project | ID Comments: Disc rounded; snout longer and more angular than for *Dasyatis say* | ID Confidence: high | Georef Remark: Point placed at the pass connecting the Gulf of Mexico with the bays and extent runs to the town of Aransas Pass. | Georef Annotation: | Not Georeferenced Because:

Suspect Notes: None 

Number of Specimens: Unknown 

Verbatim Donor Data

Donor Genus: *Dasyatis*
Donor Species:
Donor Hybrid Species:
Donor Subspecies:
Donor Num Specimens:
Donor Specimen Type: Unknown
Donor Collector: I. Ginsburg
Donor Determiner:
Donor Specimen Notes: ,Invent ledger for further data.
Donor Collected Date: none
Donor Field Number:
Donor Drainage:
Donor Country: United States
Donor State: Texas
Donor County:
Donor Locality: Texas, Aransas
Donor Collecting Event Remark:
Donor Latitude:
Donor Longitude:
Donor Latitude DMS:
Donor Longitude DMS:


Natural Region: gulf coast prairies & marshes 

Basin: Nueces-Rio Grande 

HUC Name: South Corpus Christi Bay 

HUC Code: 12110202

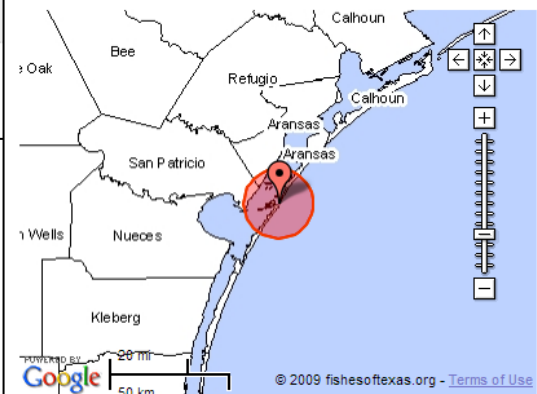
Geography: Nueces County, Texas 

Description: Aransas Pass 

Latitude/Longitude: 27.84032281 N, -97.05096717 W 

Error: 13370m 

Map



Photos of this Specimen

[upload photo with metadata](#) OR [bulk upload photos only](#)



Field Notes

(**DISABLED**) [upload field notes](#)

There are no field notes available yet.

Comments On USNM127282 

No comments have been posted yet.

ADD YOUR COMMENT



WEBSITE

www.fishesoftexas.org

But much improved version here:
test.fishesoftexas.org (username=testguest; password = treculii)

Please participate.
We'll take images from anyone.





Dean Hendrickson



Adam Cohen



Doug Martin



Ben Labay



Melissa Casarez



Val Bugh



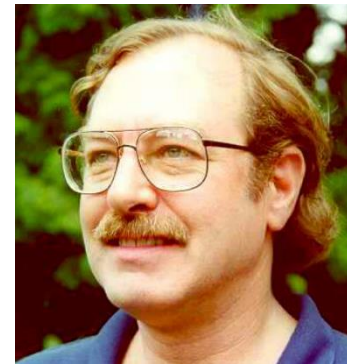
Jessica R. Rains



Sahotra Sarkar



Mackenzie Anderson



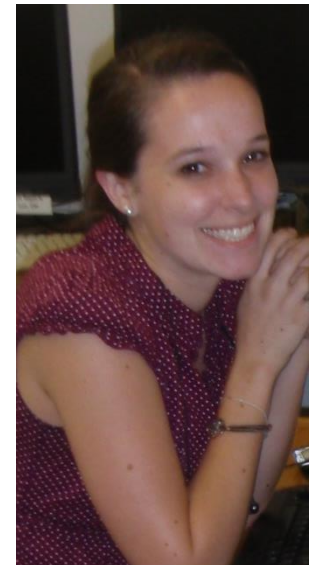
Bob Edwards



Jeremy Harrison



Gary Garrett (& wife Linda)



Gina Higby

Katharine Criswell (no photo yet)

Allison Anderson (TNHC) - Database
 Jonathan Armbruster (AUM) - data donation
 Bob Ayers (SR) - Land access
 Henry Bart (TU) - data donation
 Mark Brinkman (SIB) - Collector
 Henry Brooks (None) - Land access
 Bill Bunch (SOS) - Advisor
 Sara Cartwright (OMNH) - data donation
 Melissa Casarez (TNHC) – cataloging, georeferenciing
 Ethan Cohen (TNHC) - Database advise
 Brandon Crawford (TNC) - Land access
 Drew Davis (TNHC) - General assistance
 Laura Dugan (TNHC) - GIS
 Anthony Echelle (OSU) - data donation
 Robert Edwards (UTPANAM) - Key - various critical tasks
 Hersh Eric (CRWR) - GIS data donation
 Gena Esposito (TNHC) - General assistance
 Lloyd Findley (CIAD) - Common names
 Margaret Fischer (TNHC) - Administrative
 Montemayor Gaby (CIAD) - Common names
 John Gallner (UTDIIA) - Database advise
 Gary Garrett (TPWD) – Funding - Key - various critical tasks
 Wendy Gordon (TCEQ) - Institutional liaison
 Keene Haywood (UTDIIA) - Website advise

Clark Hubbs (UT-IB) – started it all

Ben Labay (TNHC) – Georeferencing, GIS
 Manuel Lemus (None) - Photographer
 Joann Lovelace (TNHC) - Georeferencing

John Lundberg (ANSP) - data donation
 John Maisano (TNHC) - Museum exhibits
 Edie Marsh-Matthews (OMNH) - data donation
 Floyd (Doug) Martin (TNHC) – Collector, determiner, etc.
 William Matthews (OMNH) - data donation
 Robby Maxwell (TNHC) - Collector
 Cydney Meyer (TNHC) - Collector
 George Murphy (TNHC) - Georeferencing
 Claire Patenia (TNHC) - Collector
 Susannah Reilly (TNHC) - Collector
 Nelson Rios (TU) - data donation

Jessica R. Rains (TNHC) - Cataloging- various critical tasks

Stephen Ross (GCRL) - data donation
 Beck Runte (TNHC) - General assistance
 Sahotra Sarkar (UT – IB) – species occurrence modelling
 Terri Siegenthaler (SR) - Land access
 Blake Sissel (UT – IB)– modeling
 Garold Sneegas (None) - Photographer
 Wayne Starnes (NCSM) - data donation
 Ann Syptak (TNHC) - General assistance
 Edward Theriot (TNHC) - Administrative
 Joe Tomelleri (None) - Illustrator
 Dora Wakou (TNHC) - Collector
 Jameson Wall (TNHC) - Collector
 Mark Westneat (FMNH) - data donation

TEXAS ADVANCED COMPUTING CENTER

Apologies to many (dozens of) volunteers and about 20 data providers not yet listed, and profound thanks to the 3,045 collectors who, over the past 160 years, deposited vouchers in Natural History Collections, thus assuring permanency and verifiability of these invaluable data. And, thanks to the institutions who assured the long-term maintenance of those collections.

LOTS OF IDENTIFICATION ERRORS

Geographic outliers: 3,789

70% (2,427) proved to be mis-identified

Select species (not outliers): 908

12% (113) proved to be mis-identified

Colorado River cyprinids: 1,345

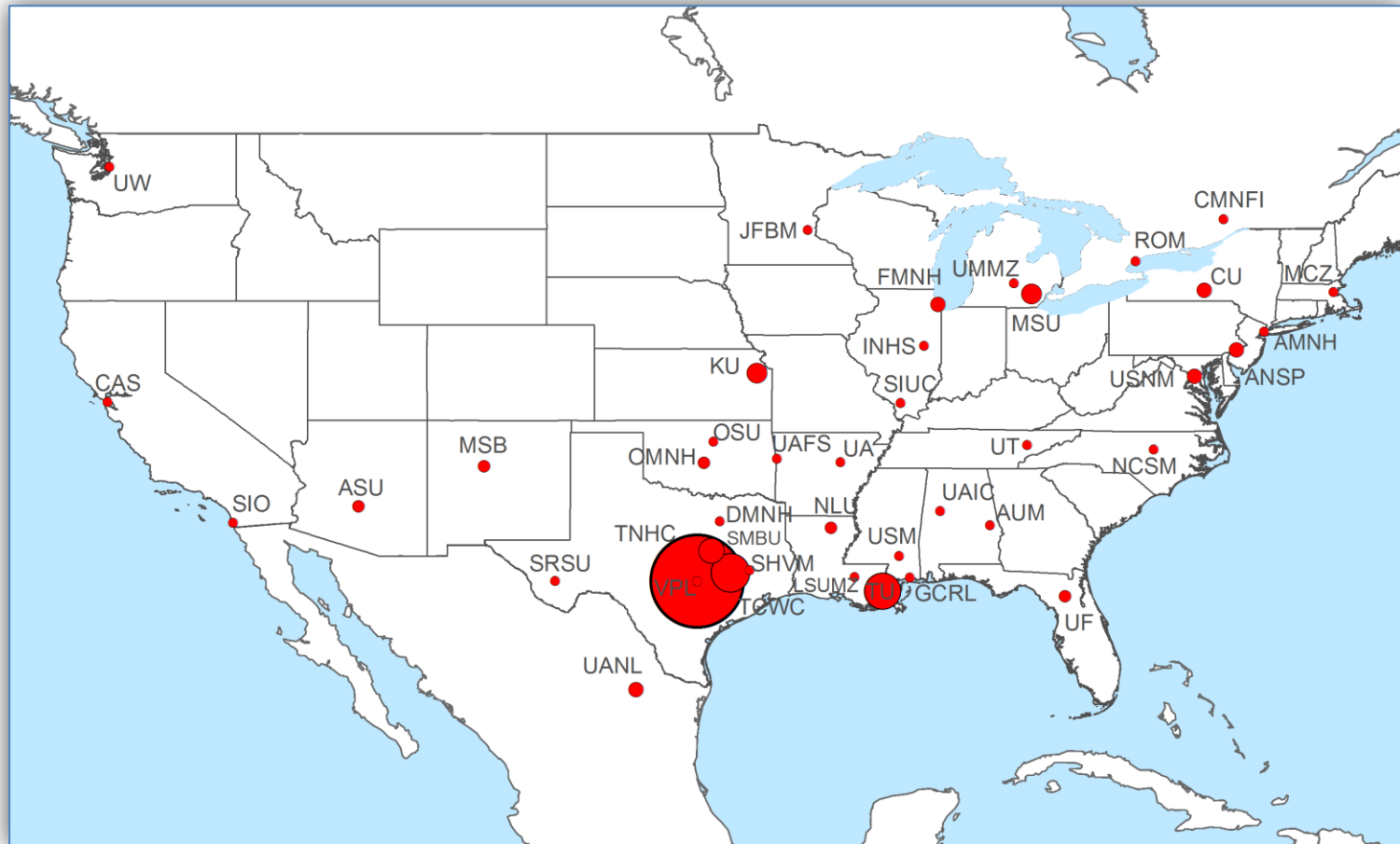
3% (175) proved to be mis-identified

New major river basin occurrence records (Track 1 only)

	Canadian	Red	Sulphur	Cypress	Sabine	Neches	Trinity	San Jacinto	Brazos	Colorado	Colorado-Lavaca	Lavaca-Guadalupe	Guadalupe	San Antonio	Guadalupe-Lavaca	San Antonio-Nueces	Nueces	Rio Grande
N NEW (33 total; 2.36/basin)	1		3			5	3	3	2	4	1	1	2	2	1	2		3
<i>Atractosteus spatula</i>	upstream reaches of Brazos and Trinity																	
<i>Campostoma anomalum</i>																		
<i>Dorosoma petenense</i>	generally further west across state																	
<i>Erimyzon sucetta</i>										X								
<i>Erimyzon oblongus</i>										X								
<i>Etheostoma radiosum</i>			X															
<i>Etheostoma proliare</i>										X								
<i>Etheostoma fusiforme</i>						X												
<i>Fundulus grandis</i>							X											
<i>Fundulus chrysotus</i>																X		
<i>Fundulus jenkinsi</i>											X							
<i>Heterandria formosa</i>						X												
<i>Hybognathus placitus</i>			X										X	X				X
<i>Ichthyomyzon gagei</i>						X		X										
<i>Ictiobus cyprinellus</i>						X												
<i>Lepisosteus oculatus</i>																		X
<i>Lepisosteus platostomus</i>			X															
<i>Lepomis symmetricus</i>															X	X		
<i>Lucania parva</i>														X				
<i>Lythrurus fumeus</i>													X					
<i>Moxostoma congestum</i>							X											
<i>Notropis amabilis</i>								X	X									
<i>Notropis atherinoides</i>	X							X		X								
<i>Notropis chalybeatus</i>						X												
<i>Notropis straminius</i>							X											
<i>Phenacobius mirabilis</i>									X									
<i>Poecilia formosa</i>												X						

Carpoides sp. (cyprinus)?
Campostoma spadiceum
Pimephales notatus
Moxostoma albidum

Our data come only from museum specimens (for now)



42 museums represented

Fishes of Texas Project - overview

Texas Natural History Collection

	Track 1	Track 2
Dates of acquisition	11/1997 to 05/2006	04/2009 to 10/2010
Number of records	81,218	43,223 new (not including updates of Track 1 records)
Records georeferenced	67,190	~40,000
Distinct georeferenced localities	5,729	+ ~2,000 not in Track 1
Collecting events	10,954	?
Taxa synonymized with accepted names	Yes	mostly done
Geographic outliers flagged	3,789 (5%)	none
Geographic outliers verified	completed	none
Collection dates edited	3,114	none
Collector names edited	Yes	none
fields available on website	all	verbatim data only, no GIS-based categorical fields
Date range	1851-2006	1853 - 2010
Number of contributors	34	8 new + 28 previous donor updates

Fishes of Texas Project - overview

Texas Natural History Collection

	Track 1	Track 2
Dates of acquisition	11/1997 to 05/2006	04/2009 to 10/2010
Number of records	81,218	43,223 new (not including updates of Track 1 records)
Records georeferenced	67,190	~40,000
Distinct georeferenced localities	5,729	+ ~2,000 not in Track 1
Collecting events	10,954	?
Taxa synonymized with accepted names	Yes	mostly done
Geographic outliers flagged	3,789 (5%)	none
Geographic outliers verified	completed	none
Collection dates edited	3,114	none
Collector names edited	Yes	none
fields available on website	all	verbatim data only, no GIS-based categorical fields
Date range	1851-2006	1853 - 2010
Number of contributors	34	8 new + 28 previous donor updates

FISHES OF TEXAS

[HOME](#) [DATA](#) [MAPS](#) [TAXONOMY](#) [CHECKLISTS](#) [MODELS](#) [KEY](#) [DOCUMENTATION](#) [DONATE](#) [LOGIN](#) [REGISTER](#)

COLLECTION

Searches query the entire database, however, choosing values for any geography variables in the right column will retrieve only georeferenced records, which include Texas records from inland, bays and barrier islands. However, some records from that same geographic scope (and elsewhere) were not georeferenced and so can be retrieved on the basis of geography only by querying the verbatim data. See the documentation (Using the Online Database / Georeferencing and Geographic Units) for more information.

Data downloading, image contributing and commenting are possible only after registering (see Registration tab).

Record details can be seen by clicking on links to the specimen pages from the Catalog Number provided in the query results. Records suspected to contain errors in the verbatim data are identified on the specimen pages, in the CSV download files and in the mapping tab.

Complete your query below and click [Submit](#) [\(clear query\)](#)

Taxonomy ⓘ

-- Select a Family -- -- Select a Genus -- -- Select a Species --

Catalog Number ⓘ

-- Select an Institution

Collected By ⓘ

Collected Between Years ⓘ

 and

Verbatim Event Contains ⓘ Verbatim Object Contains ⓘ

Show Me ⓘ

records per page ☐ records with photos ☐ records with field notes

Geography

County ⓘ -- Any County --

Natural Region: ⓘ -- Any Natural Region --

Basin: ⓘ -- Any Basin --

HUC Name: ⓘ -- Any HUC Name --

Locality contains: ⓘ

Georeference error < ⓘ meters

80404 Record(s)

1 - 25 of 80404 Record(s) [next page »](#)

Common Name

Scientific Name

Geography

Catalog Number