DIGITIZATION AND CURATION IN UF FLUID COLLECTIONS

(AKA: The Second Best Use for Ethanol)

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F I S H E S

Herps (Amphibians, reptiles, etc.)





AMPHIBIAN

Inverts (largely marine)





Digitization

- What types of digitization do these collections conduct?
- Databasing (Microsoft Access: specimen and locality information)
- Georeferencing/map-making (Geolocate, Google Earth, Arc Gis)
- Specimen Imaging (Various SLR cameras, containers, backdrops)

Digitization

- When does digitization happen?
- Fishes mostly after curation.

• Herps – a fair bit before and after curation.

- Inverts mostly before and during curation.
- What improvements can be made to these processes?

Fishes – curation process

- 1) Collect specimens and locality information
- 2) DNA sub-sample
- 3) Anesthetize/Fix in formalin/preserve
- 4) Locality information entered in database
- 5) Sort and identify collections
- 6) Catalog lots
- 7) Label Lots
- 8) Shelve lots

Field: Collect specimens and locality information



Field: DNA sub-sample

Tissue record keeping



Tissue vials

Field: Anesthetize/fix in formalin



Lab: Locality information



Lab: Sort and Identify



Lab: Catalog, label, shelve

Labor intensive

- Data entry/data proofing
- Label proofing/label printing
- Match labels to specimens, insert labels in containers
- Shelve according to phylogenetic system

 Synchronize tissue vials and voucher specimens, send those vials and associated data to centralized deep freeze.

How Fishes arrive at UF

- 55% of new accessions collected by division staff arrive in formalin.
- 35% of new accessions from outside sources/agency partners typically arrive formalin fixed and in alcohol.
- 10% of new accessions pulled from backlog. formalin fixed and in alcohol.

Herps – curation process

Important specimens prioritized.

All others, tagged with catalog number, placed in freezer.



Herp – curation process cont.

Using either previously frozen or recently brought in specimen

- 1) measure SVL & TL
- 2) <u>weigh to nearest g using O-Haus</u> <u>digital scale</u>
- 3) <u>sex</u>
- 4) take tissue sample
- 5) tag (with *catalog* number)



Herp – curation process cont.

- 6) sometimes take digital photos
- 7) Treat with 10% formalin and place in fixing container (tadpole curation ends here)
- 8) enter data into database
- 9) remove and rinse with water after a week or so depending on specimen size



10) place into 70% ethanol and shelve

How Herps arrive at UF

- "94% of new accessions are brought in frozen or recently dead."
- 3% arrive in alcohol with no exposure to formalin
- □ 2% fixed in formalin, preserved in alcohol
- 1% in formalin (tadpoles)
- Most work is done in lab.

.000001% arrive taxidermied, lurk on shelves.



Fish and Herp Digitization Methods



White shark photography, 1998.

> Photography at sea, ca. 1980.



Fish Digital Photography



FIELD. UF 180279 Seriola zonata. 5-March-2011, within hours after fixing in 10% formalin.

LAB. UF 180279 Seriola zonata. 27-February-2013, after nearly 2 years in 70% ethanol.



Plate and lower photo by Zachary Randall.

Fish Digital Photography



Typical preserved fish appearance. UF 182220 Lepophidium gilmorei (holotype). Collected in 1989, photographed in 2012. Photo Credit: Zachary Randall.

Herp Digital Photography



Herp Digital Photography



UF Uncat: *Phelsuma grandis* and UF 169452: Scaphiophus holbrookii (photographic voucher only). Photos by Kenneth Krysko.

FIELD. UF

155478. Micrurus fulvius fulvius. 9-June- 2009, live.



Plate and lower photo by Zachary Randall.

LAB. UF 155478. Micrurus fulvius fulvius. 27-February-2013, after nearly 4 years in 70% ethanol.

Fish Georeference



done post-curation.

Herp Georeference

134,000 specimens – much done post-curation.



Inverts – curation and digitization process



Inverts – Digitization and Curation

- Process differs substantially from Fish & Herp procedures
- Digitization done in the field:
- Photography (including rank system, important morphological characters only seen in live or relaxed specimens)
- Assign specimen/lot numbers (field numbers)

- 1) Collection Locality given a Station Number
- 2) Specimen sorting (!) to morphospecies
- 3) Field number assigned/recorded on master spreadsheet (2 copies of label produced)
- -- whether specimen is to be photographed, subsampled, vouchered and how it is to be fixed – this is all determined and recorded during step 3.

4) Photography (with field number in image)



UF 2341 Terebellidae

5) Anesthesia/Relaxation
6) Subsample (if applicable)/create tissue tubes – insert one copy of field number
7) Animal to Fixative w/ one copy of field number



Processing specimens: Relaxing anesthetic baths, tissue sampling, and fixing



Sorting; bulk sampling

8) Handwritten field sheets imaged (photo or copy)



UF 7809 Sclernephthya sp.



UF 29441 Pylopaguropsis cf. pustulosa

9) Field sheet data to spreadsheet (in field or lab)

Inverts in the lab

- 10) Spreadsheet to Database, catalog numbers assigned and cross-referenced to field numbers.
- 11) DNA tubes matched to catalog numbers created in step ten. Write out paper tags with said catalog number, add to each DNA tube.
- 12) Number/name all photos using a convention based on locality
- 13) Work up bulk specimens not treated in the field (no field numbers, no photos, no DNA)

Inverts in the lab



Mass sampling (bulk specimens)/"rubble bashing"

Invert Digital Photography

FIELD. UF 368637 Phyllidia elegans. Ca. 8-January-2005. Relaxed.

LAB. UF 368637 Phyllidia elegans. Ca. February-2010, after 5 + years in 70% ethanol.



Plate by Zachary Randall.

How Inverts arrive at UF

- 90% or more are collected by division staff and arrive in formalin or alcohol.
- Orphaned collections in queue georeferencing those specimens.

Conclusions

- Fluid collections of fish, herps, and inverts digitize specimen information using similar methods but markedly different processes.
- Specimens are in best condition for photography prior to preservation.
- Conditions for photography are not always ideal prior to preservation.
- Conducting digitization in the field/prior to or concurrent with curation comes with tradeoffs.

Acknowledgements

- Mandy Bemis, UF Invertebrate Zoology
- Kenneth Krysko, UF Herpetology
- Zachary Randall, UF Ichthyology
- Randy Singer, UF Ichthyology