

The mollusk collection at the Delaware Museum of Natural History

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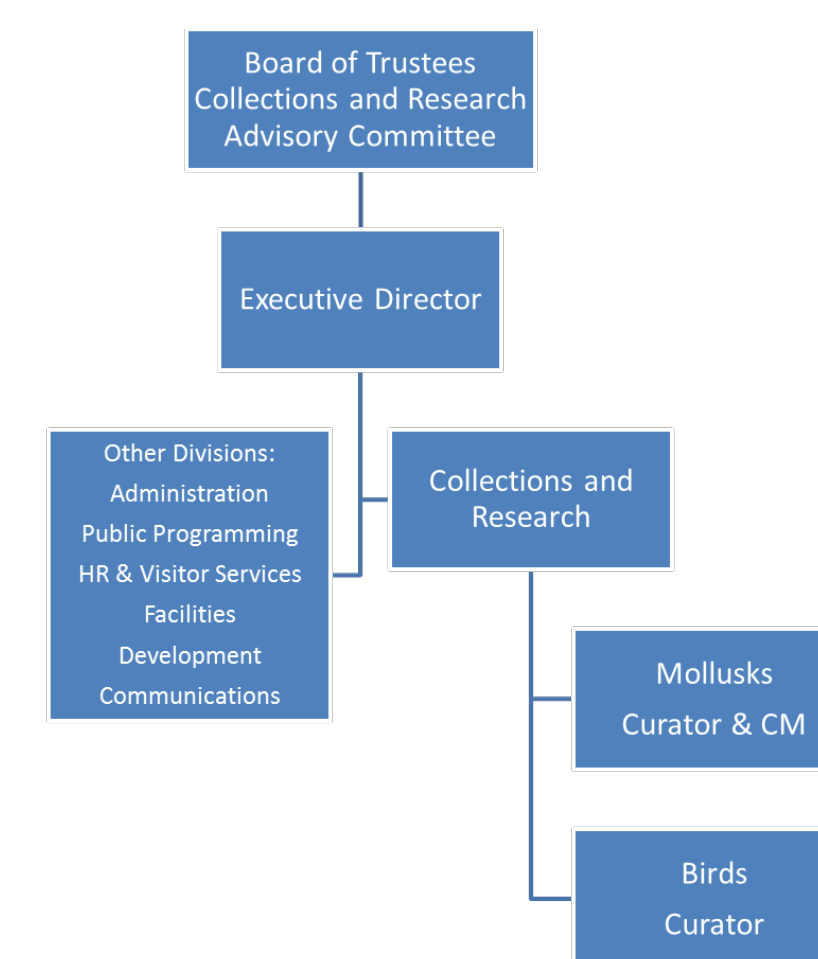
Delaware Museum of Natural History, 4840 Kennett Pike, Wilmington, DE 19807

Introduction

The Delaware Museum of Natural History (DMNH) is a private, non-profit institution that is not affiliated with a college or university. The DMNH mollusk collection was established in 1972 when the Museum was opened, although many of the purchases and collecting expeditions pre-date the physical structure. The 2016 operating budget for the Mollusk Department included \$2700 for collections conservation (e.g., boxes). The collection is actively growing via donations and curator research; recent highlights include terrestrial snails from the Kuril Islands and Delmarva Peninsula and deep-sea cephalopods from the Northwest Atlantic. Computerization of collection records started in the 1980s, and approximately 90% of holdings have a digital record. The InvertEBase digitization grant has improved the quality of the freshwater bivalve and unionid collection records and has provided the resources needed to transition these specimens from a legacy Access database into Specify v.6.5. Over the past year, 8% of collection records have been moved on-line (approx. 17,000 of 220,000 lots), with 50,000 more expected by the end of 2018.

Organization

Fig. 1. DMNH Organization Chart. Collections and Research (C&R) is one of 7 Divisions in the Museum which has 20 full time, 3 part time and 15 casual part time employees. The Board of Trustees advisory committee is comprised of 4 board members, 4 staff members, plus 6 local and national collections experts and scientists.



Facilities



Fig. 2. The DMNH dry collection is housed in cabinets on the Museum's 3rd floor, over exhibit space. A) Cabinets are arranged phylogenetically, but the genera and species within are arranged alphabetically for ease of retrieval. B) The DMNH wet collection is housed in flammable cabinets in a room that vents outside.

Staffing



Fig. 3. Staff in the collection. The Mollusk collection has a full-time curator and collections manager, and a part-time, grant funded database specialist; however, most data entry and collections-based activities are done by volunteers and summer interns (A & B). In 2016, 24 Collections and Research volunteers contributed 2233 hours of effort in the collection (=1.15 FTE).

Service



Fig. 4. The Mollusk collection supports the avocational community by providing the du Pont Trophy award at shell shows across the country. In 2012, the Trophy transitioned to a print of a commissioned artwork that highlights collections activities or species of interest to collectors.

The Mollusk Collection

Taxonomic diversity



Fig. 5. The DMNH collection has representatives from 500 families, 3,599 genera and 21,743 species. A) The collection is roughly 75% gastropods, 25% bivalves with small collections of other major taxa. B) The Muricidae and Conidae holdings are particularly strong, as shown in this word cloud of all 220,000+ lots. C) The 20 largest marine families in the DMNH collection.

Geographic diversity

Number of Lots	North America*	South America	Rest of World	World Total
Terrestrial Gastropods	21,046	2,069	15,139	38,254
Freshwater I: Unionida	6,263	142	413	6,818
Freshwater II: Venerida	811	21	284	1,116
Freshwater† Gastropods	5,170	223	1,553	6,946
Marine, all orders	62,740	2,583	101,756	167,079
Total: All MOLCOL	96,030	5,038	119,145	220,213

Number of Specimens‡	North America*	South America	Rest of World	World Total
Terrestrial Gastropods	205,517	8,864	85,587	299,968
Freshwater I: Unionida	36,768	515	1,518	38,801
Freshwater II: Venerida	55,195	126	12,697	68,018
Freshwater† Gastropods	129,458	2,145	15,116	146,719
Marine, all orders	518,009	17,050	479,933	1,014,992
Total: All MOLCOL	944,947	28,700	594,851	1,568,498

Table 1. Lot/Specimen Breakdown by Habitat and World Area. Approximately 44% of the DMNH collection is from North America, 2% from South America and 54% from the rest of the world, especially the Indo-West Pacific. Within North America, 22% are terrestrial gastropods, 7% are freshwater bivalves, 5% are freshwater gastropods, and 65% are marine bivalves and gastropods.

Notes: MOLCOL is the legacy database managed as an Excel file. *Includes Central America and for non-marine, the Caribbean Islands. †Includes Estuarine species and a few Marine species in certain families. ‡A "specimen" may be a shell, an egg, or an alcohol-preserved body.

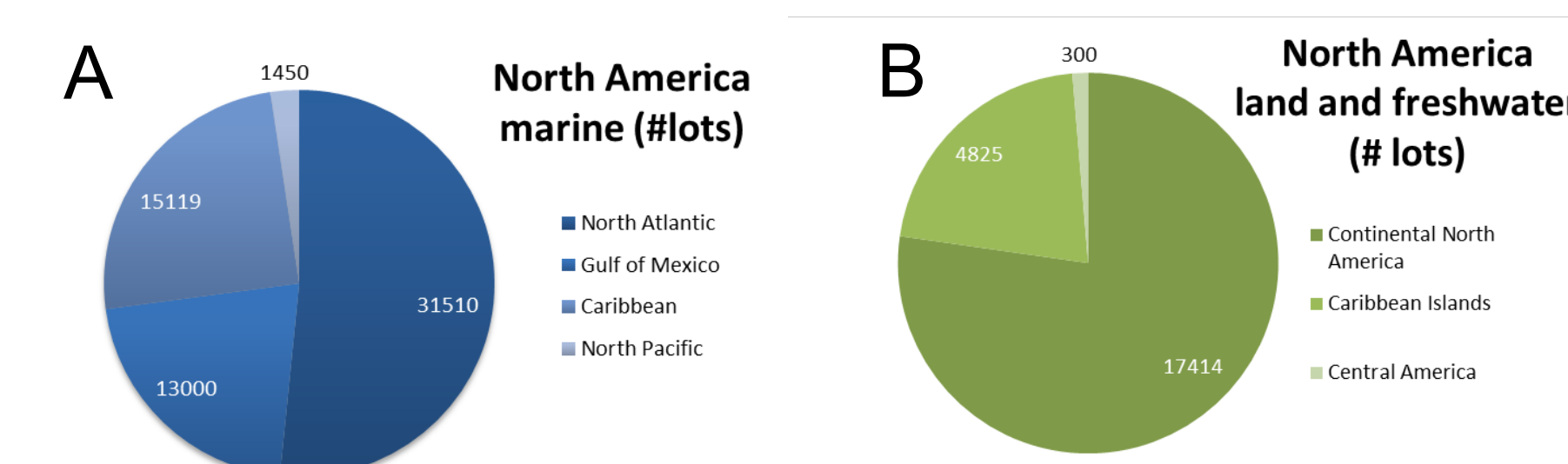


Fig. 7. North America holdings. A) Most of the marine holdings are from the East Coast of the US and Canada. B) Over 75% of the land and freshwater holdings are from North America and the Caribbean.

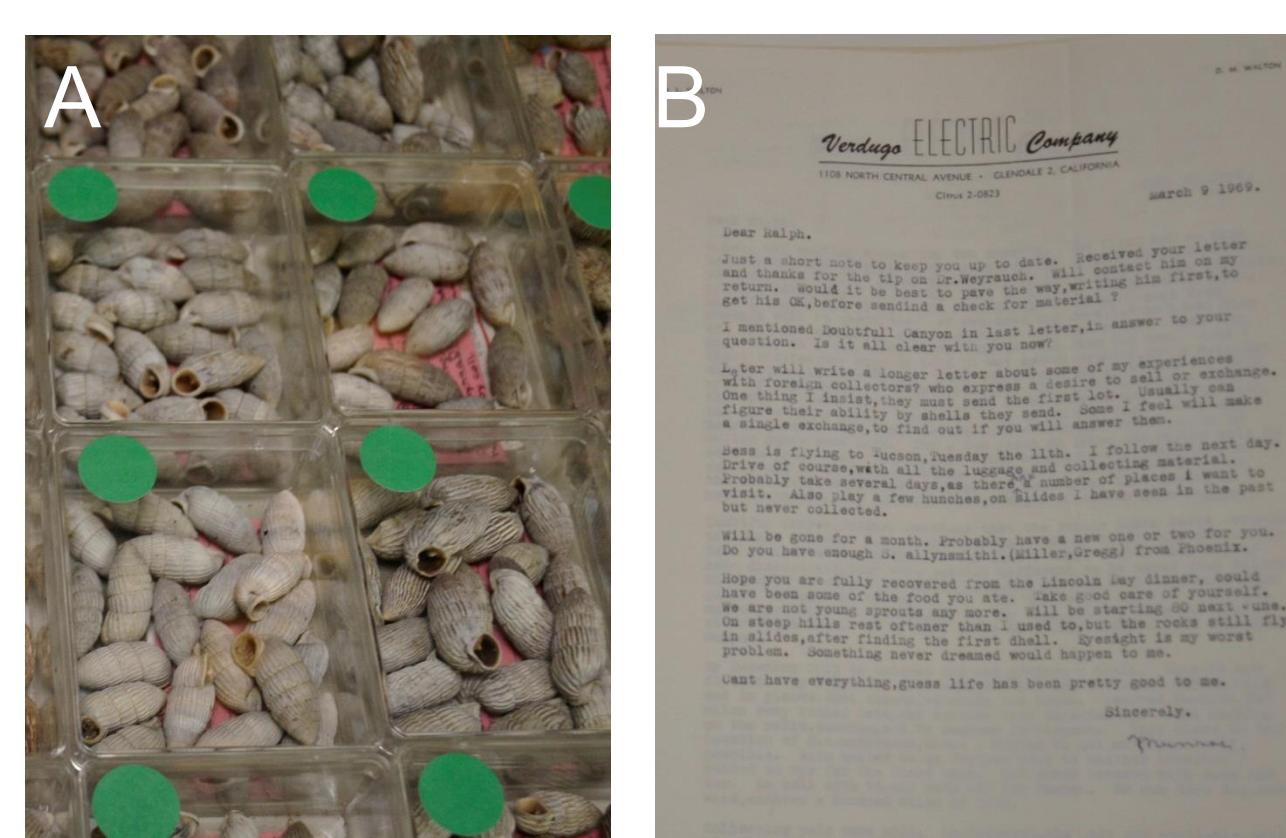


Fig. 6. Other resources in the Mollusk Collection. A) The type collection has over 1200 types. B) The DMNH library and archives are extensive with over 10,000 volumes and a significant rare book collection. The archives are managed in PastPerfect but the library is not cataloged.

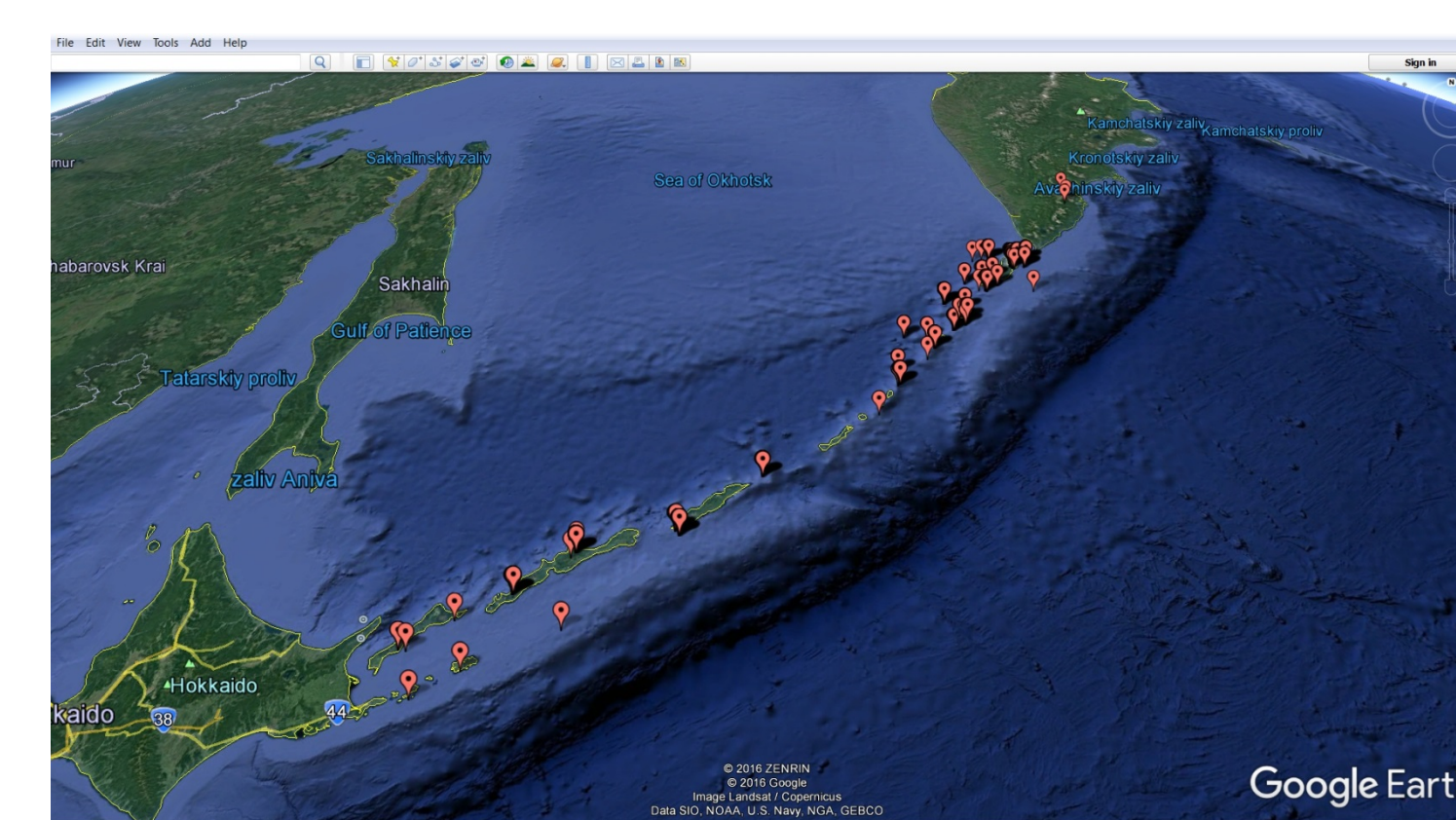


Fig. 8. Georeferencing. Landsnails from the Kuril Islands are one of the few parts of the collection that have been georeferenced.

InvertEBase: Making DMNH Mollusk Data Available Online

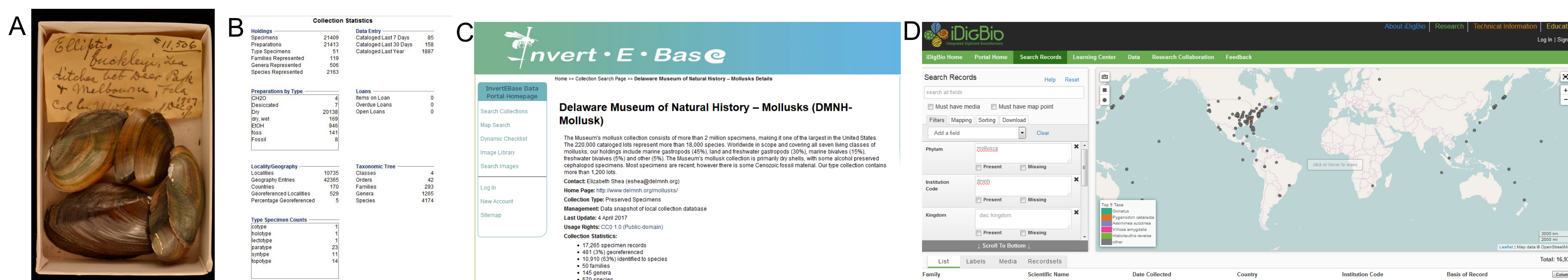


Fig. 9. DMNH is part of the multi-institution NSF grant InvertEBase (ADBC, EF-1402697). The focus at DMNH is on data quality enhancement and data dissemination of the DMNH freshwater and land mollusks holdings. A) The workflow starts with a family-by-family inventory of the physical collection. At the completion of the inventory, found lots are entered into the MOLCOL Excel worksheet, legacy records are updated for taxonomy, and any missing geography data is completed. B) Records are uploaded into Specify v.6 via Workbench, 2000 records at a time. C) A snapshot of the Specify data is pushed to InvertEBase/Symbiota. D) After an initial setup, the Symbiota data is captured by iDigBio for inclusion in their public database.

Future directions

DMNH will continue to use and refine the workflows developed during the InvertEBase grant to bring legacy data into the Specify database. Priority activities include georeferencing the freshwater and land mollusks and considering how to integrate georeferenced deep-sea cephalopod observations (no specimen) into the collection. A 2015 preventative conservation assessment of the landsnails estimated that 0.5% of specimens have indicators of early Byne's efflorescence. Future conservation efforts include replacing the 40+ year old cabinets with archival cabinets.



Acknowledgements

We greatly appreciate the hard work, dedication, and collaboration of:

- All our wonderful volunteers and advisors, especially Drs. Rosemary Ginzberg, Judy Stadler, and Linda Grusenmeyer. The collection is much better off because of your hard work!
- Philadelphia artist Dr. Lauren Sweeney who donates the commissioned artwork for the du Pont Trophy.
- NSF grant InvertEBase (EF-1402697)

Thank you!