Why Digitize Vertebrate Collections?

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What is collection digitization?

- In the vertebrate collection community…
  - Digitization efforts often start and end at computerizing paper catalogs
  - May include georeferencing with resources
  - But also includes imaging specimens, imaging paper collections, archiving media specimens, etc.
- So, where are we in the vertebrate collection community?
  - Good question!!!
  - Let's use UMMZ Mammals as an example

Looking at the UMMZ Mammals (1800s & 1900s)

- 1817 – University of Michigan founded
- 1837 – Cabinet of Natural History established by the state of Michigan
- 1913 – UMMZ formed as an independent research museum
- 1977 – With *NSF* support, UMMZ Mammals begins to digitize paper catalog

Looking at the UMMZ Mammals timeline (1980s & 1990s)

- 1981 – Bob and Lorie Thompson give birth to their first son!!!
- 1982 – Full computerization achieved using Taxir on university's mainframe
- 1984 – Additional *NSF* support completes digitization of UMMZ Mammals special collections
- 1994 – UMMZ Mammals began using Filemaker on its own machines
- 1994 – *NSF* supports the first grant to establish the Animal Diversity Web

Looking at the UMMZ Mammals timeline (2000s)

- 2001 – Seventeen mammal collections, including UMMZ Mammals, create the Mammal Networked Information System (MaNIS) formed with *NSF* support
- 2001 – GBIF officially established
- 2002 – UMMZ Mammals participates in Great Lakes flora and fauna project funded by *IMLS*
- 2007 – UMMZ Mammals fully georeferenced via Manis project

Mammal Networked Information System MaNIS

Looking at the UMMZ Mammals timeline (2010s)

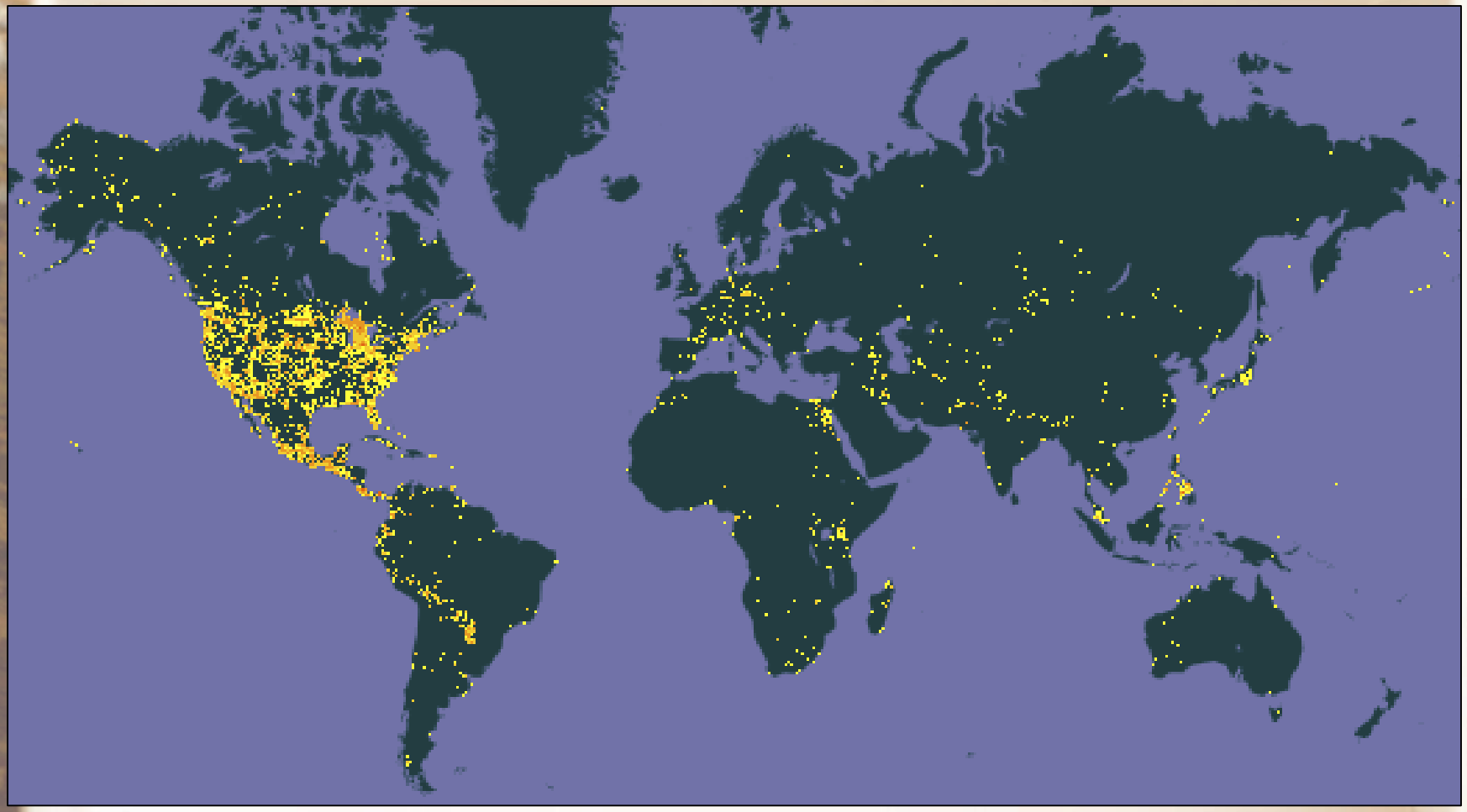
- 2010 – VertNet established with *NSF* funding
- 2011 – iDigBio created with *NSF* support
- 2013 – I start at the UMMZ
- 2013 – MaNIS goes offline
- 2013 – UMMZ Mammals available on VertNet search portal
- 2014 – UMMZ Mammals available on GBIF and iDigBio search portals
- 2014 – Animal Diversity Web release ADW Pocket Guide for iOS
- 2014 – UMMZ Mammals develops Google Scholar profile
- 2015 – University of Michigan natural history collections join Specify project

VertNet

iDigBio
Integrated Digitized Biocollections

Specify

What does this mean?
-108,352 georeferenced records-



What does this mean?
-Increased Usage Data-

- Traditional Annual Report Data (2014-2015)
  - Total Research Visitors – 61
  - Total Public Visitors – 614
  - Total Visitor Days – 1,132
  - Total Loans – 28
  - Total Specimens/Samples Loaned – 415
  - Total Data Requests – 25
  - Total Publications – 16 (that I know about)

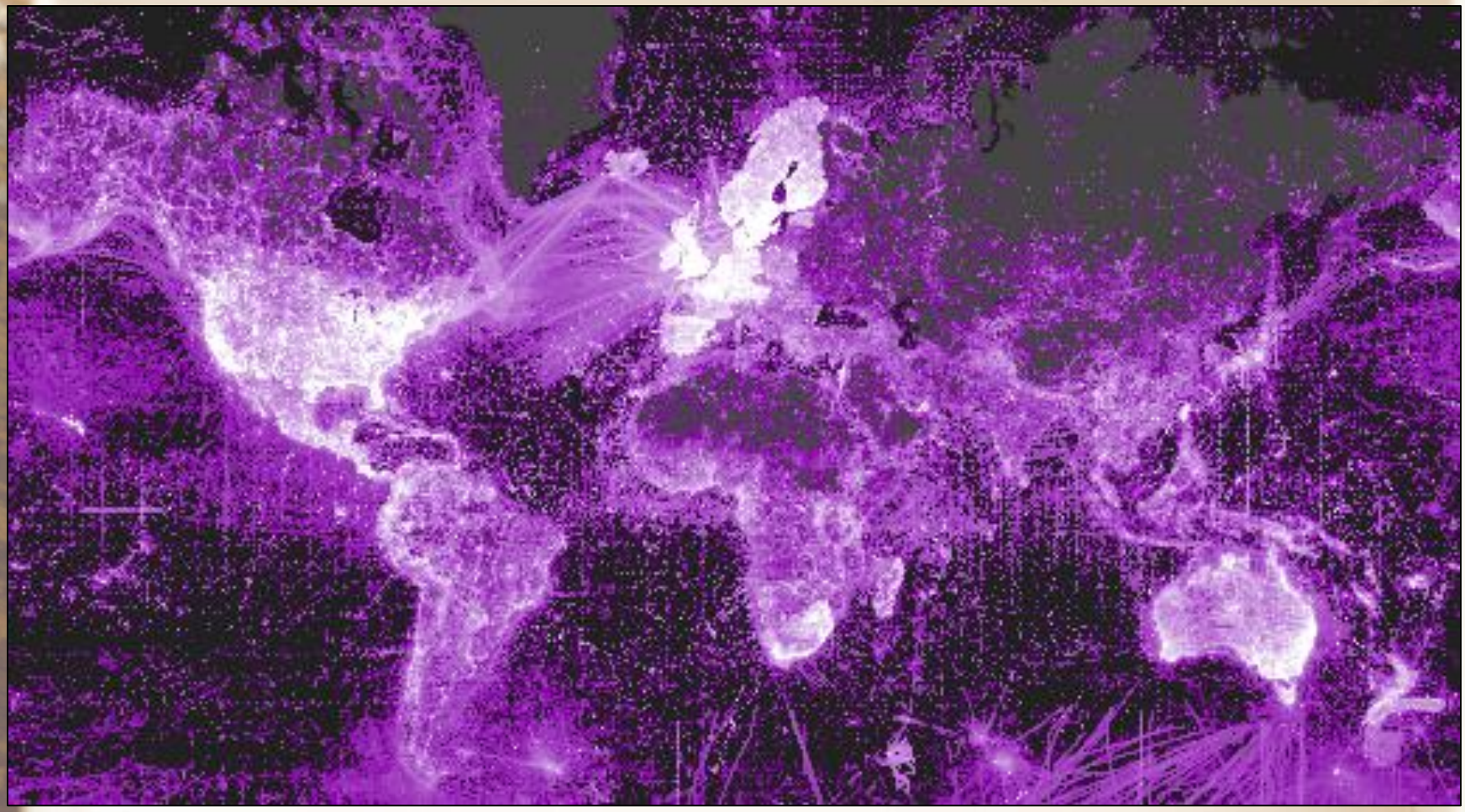
What does this mean?
-Increased Usage Data-

- VertNet (1 April 2014 to 28 February 2015)
  - 4,076 total searches (371 per month)
  - 61,893 total records searched (5,627 per month)
  - 838 total downloads (70 per month)
  - 68,640 total records downloaded (70,408 per month)
- GBIF (15 March 2014 to 9 March 2015)
  - 6,146 total downloads (~512 per month)
- iDigBio (1 January to 28 February 2015)
  - 130,605,208 total searches (65,302,604 per month)
  - 193,524 total downloads (387,524 per month)
- Google Scholar (through 15 March 2015)
  - 41,920 total citations
  - 14,603 citations since 2010
  - 2,399 citations of papers published in the last 5 years

So, where are we in the vertebrate collection community?

- It is size and resource dependent…
  - Most large collections have digitized their specimen data; however, many small institutions have not!
  - Most large collections have georeferenced their specimen data; however, many small institutions have not!
  - Most large collections have connected to data aggregators; however, many small institutions have not!

But it’s more than dots on a map!!!



Source: GBIF

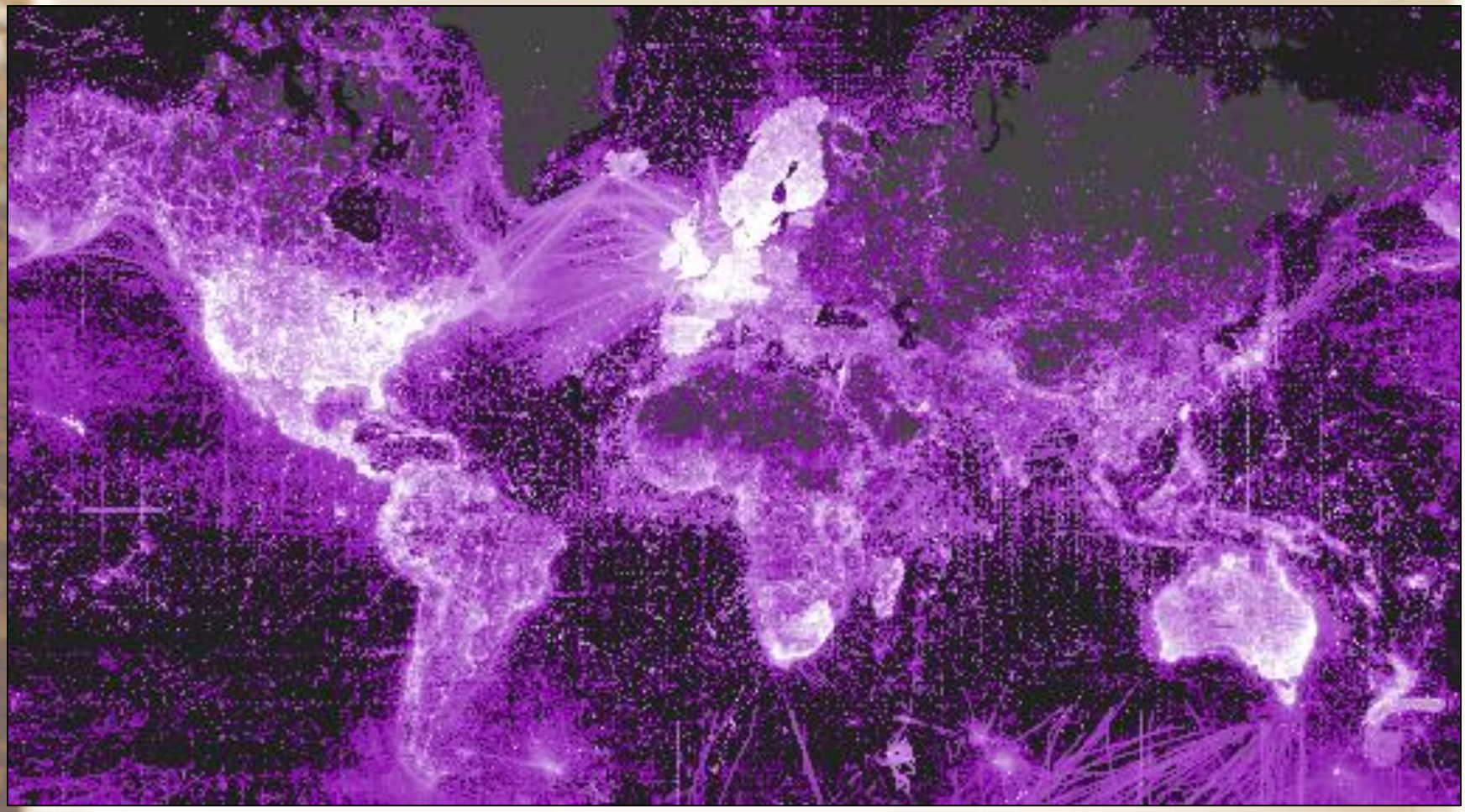
So, where are we in the vertebrate collection community?

- However…
  - Few collections have begun imaging their specimens!
  - Few collections have begun imaging their paper collections!
  - Few collections have begun archiving media specimens!
- Answer: We still have a long ways to go!!!

So, why should we digitize?

- Increasing loss of biodiversity
  - We are now in the Anthropocene!!!
  - Habitat fragmentation
  - Habitat degradation
  - Climate change
  - 86% of taxa remain unknown to science (Mora et al. 2011)
  - Need more collecting (Rocha et al. 2014)

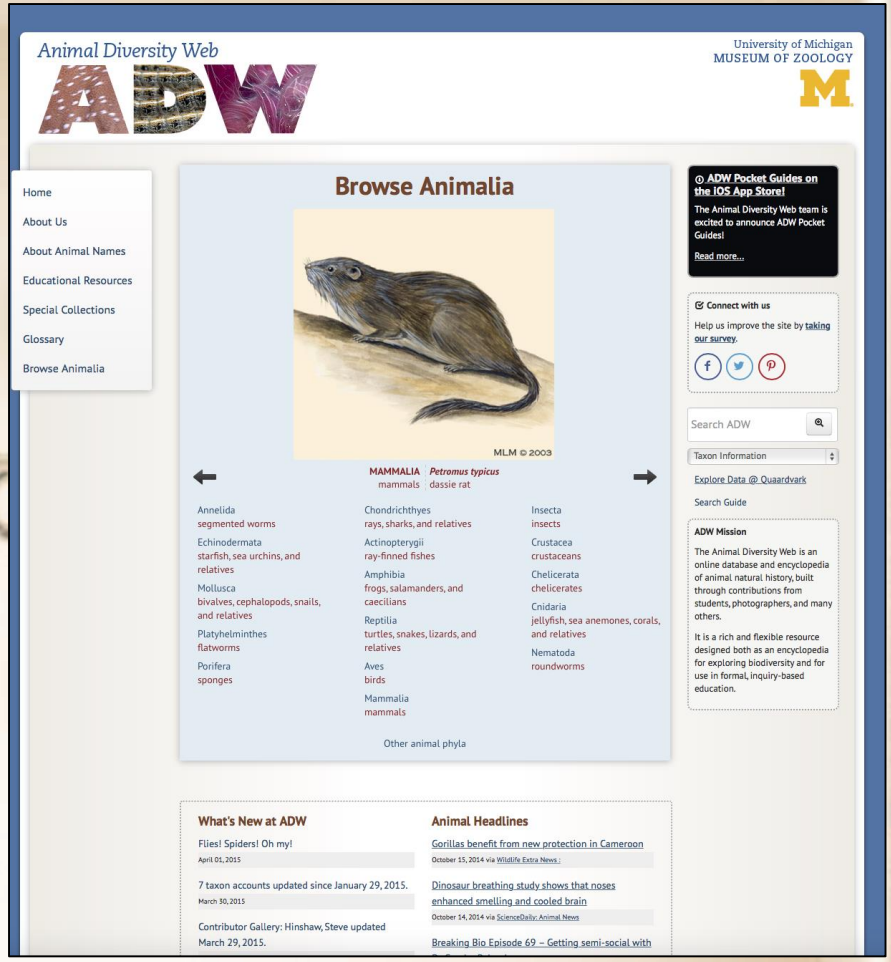
Those dots are important!



Source: GBIF

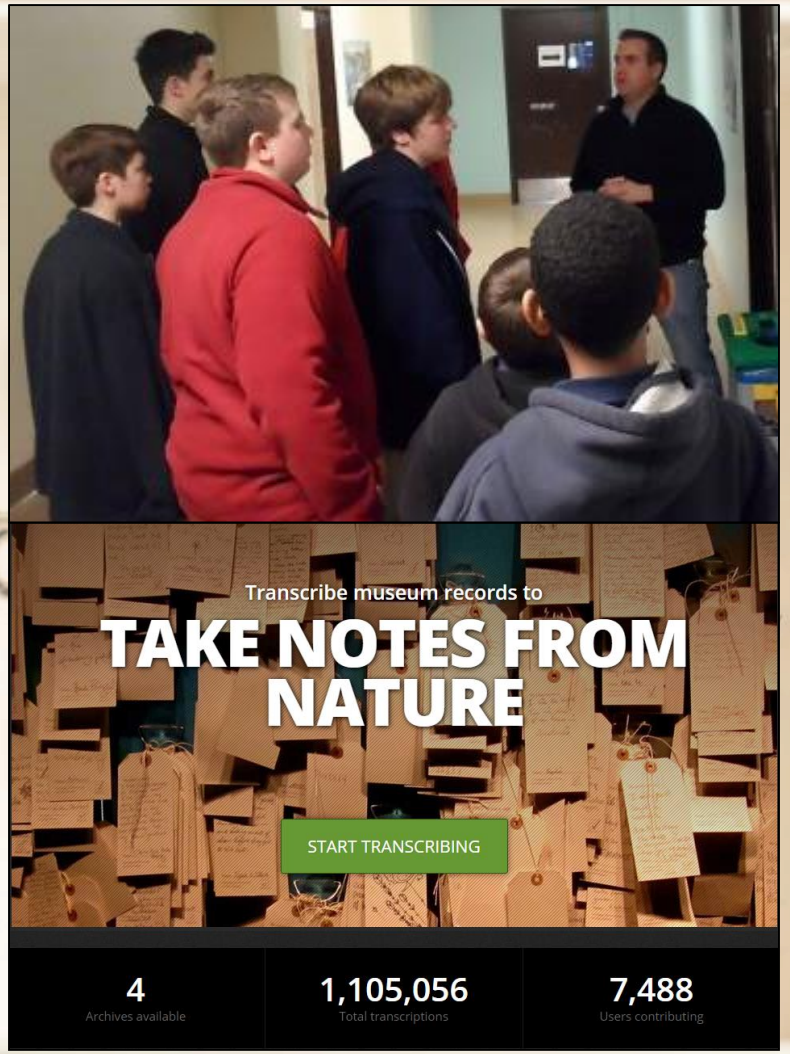
So, why should we digitize?

- **Increasing interest in STEM education**
  - **Students learn better when they are able to interact with real data (Parr et al. 2005)**
  - **Integrating natural history collections into online resources provide richer experience (e.g., ADW; Yahnke et al. 2013)**



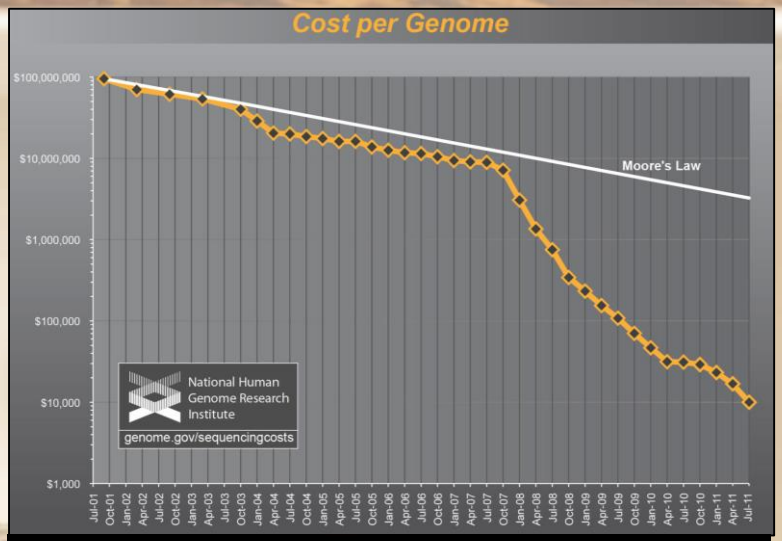
So, why should we digitize?

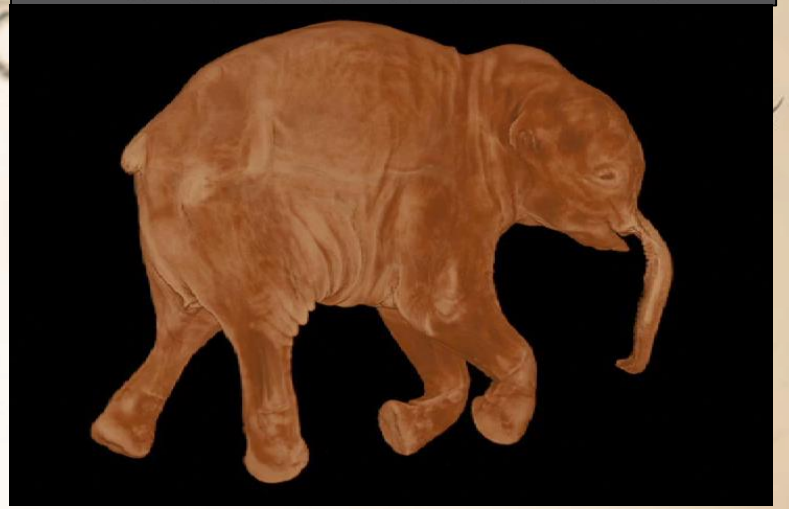
- Increasing the general public's science literacy
  - Children growing up in digital world, providing opportunities to interact with them at the digital level is important!
  - Citizen science efforts at an all-time high!
    - Lab of Ornithology
    - Notes from Nature



So, why should we digitize?

- The technology is there
  - We are now in an era of big data (Hampton et al. 2013)
  - Costs are decreasing, and data is increasing!
  - Museums now more than ever can connect with constituents and affect change (Given & McTavish 2010)





Source: UM Museum of Paleontology

So, why should we digitize?

- The better question is why not!
  - Continue efforts to get collections online, especially small collections
  - Continue to standardize methodology
  - Continue to leverage imaging technology for sharing specimens (e.g., T&E species, valuable items)
  - Continue to advocate for our collections with our administrators, legislators, and general public

Pink-Fairy Armadillo (*Chlamyphorus truncatus*)

THE PICHOCIEGO
(Chlamydophorus truncatus)

The Pichey, as it is commonly called, is a very rare and remarkable member of the Armadillo family. It is a real dwarf when compared with even the smallest of the known Armadillos, while it forceably reminds one of a mole in its shape and habits.

The eyes are small and hidden under the hair which falls over them. The ear is without an external conch. The incisor and canine teeth are absent. The animal lives in sandy plains, and like the mole digs tunnels underground. Very little is known of its habits, as it is seldom seen even by the natives.

It is only known from the western part of Argentine Republic. This particular specimen was taken in the Chilian Andes, and was presented to the Museum by His Excellency, D. F. Sarmiento, formerly President of Argentine Republic.