



# **Using Mobile Devices for Collections Management**

**Cody W. Thompson, Ph.D.**

**University of Michigan**

**Museum of Zoology and Department  
of Ecology & Evolutionary Biology**

# Outline

- **Current Mobile Technology Use**
- **The Need for Incorporating Mobile Technology in Natural History Collections**
- **Case Study: Inventorying the UMMZ Mammal Collection for Relocation**
- **Other Curatorial Applications**

# Mobile technology is everywhere!



# And everyone is using it...

- According to the Pew Research Center (2014):
  - 90% of American adults own a cell phone
  - 64% of American adults own a smartphone
  - 42% of American adults own a tablet computer
  - 32% of American adults own an e-reader
- And it is not just teenagers
  - Relatively even use across the sexes, race/ethnicity, age, education, income, and community

## Cell owners in 2014

Among adults, the % who have a cell phone

	Have a cell phone
All adults	90%
<b>Sex</b>	
a Men	93 <sup>d</sup>
b Women	88
<b>Race/ethnicity*</b>	
a White	90
b African-American	90
c Hispanic	92
<b>Age group</b>	
a 18-29	98 <sup>cd</sup>
b 30-49	97 <sup>cd</sup>
c 50-64	88 <sup>d</sup>
d 65+	74
<b>Education level</b>	
a High school grad or less	87
b Some college	93 <sup>a</sup>
c College+	93 <sup>a</sup>
<b>Household income</b>	
a Less than \$30,000/yr	84
b \$30,000-\$49,999	90
c \$50,000-\$74,999	99 <sup>ab</sup>
d \$75,000+	98 <sup>ab</sup>
<b>Community type</b>	
a Urban	88
b Suburban	92
c Rural	88

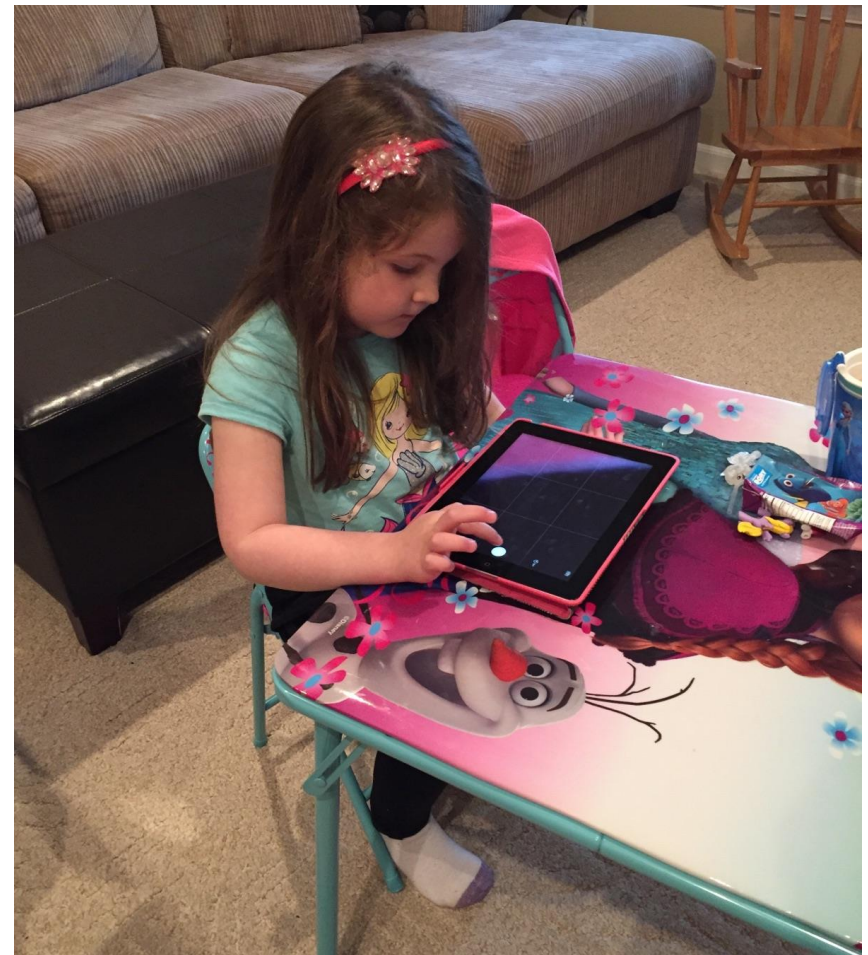
Source, Pew Research Center Internet Project Survey, January 9-12, 2014. N=1,006 adults. Note: Percentages marked with a superscript letter (e.g., <sup>a</sup>) indicate a statistically significant difference between that row and the row designated by that superscript letter, among categories of each demographic characteristic (e.g., age).

\* The results for race/ethnicity are based off a combined sample from two weekly omnibus surveys, January 9-12 and January 23-26, 2014. The combined total n for these surveys was 2,008; n=1,421 for whites, n=197 for African-Americans, and n=236 for Hispanics.

PEW RESEARCH CENTER

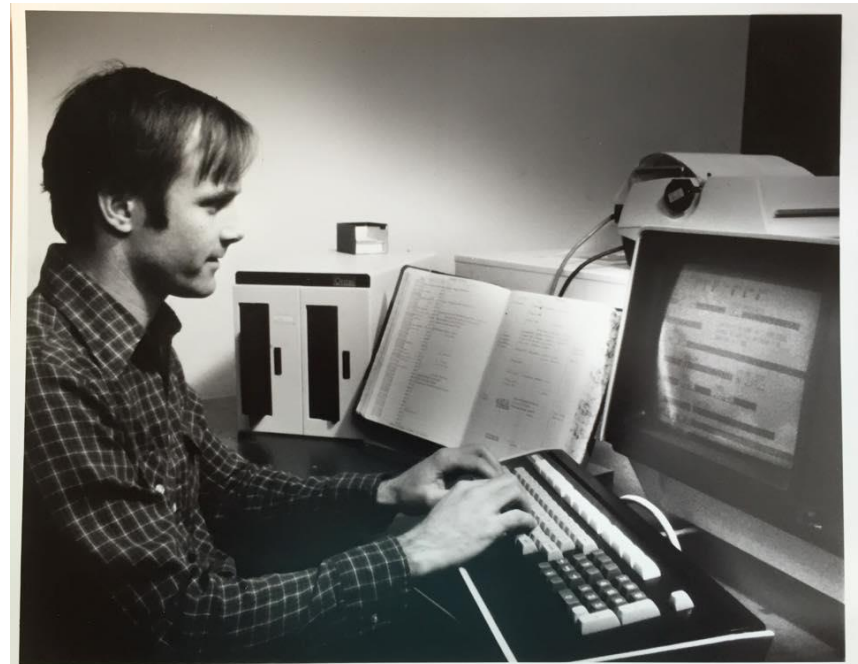
# And children are growing up mobile...

- According to Child Guide Magazine, for children 11-16 years old:
  - 96% have a cell phone.
  - 75% have a tablet.
  - 65% have an e-book reader.
- Mobile technology is becoming an important part of K-12 education (Speak Up 2014 National Research Project)
  - 58% of schools use tablets in the classroom



# Why should natural history collections incorporate mobile technology?

- **Little to no training required**
  - See above!
- **Readily available in various formats**
  - Cell phones, tablets, etc.
- **Applications and cloud storage streamline data processing**
  - Easily integrated into existing applications
  - Box, Dropbox, Flickr, Google Drive, Google Photos, etc.
- **Highly controllable**



# Case Study: Inventorying the UMMZ Mammal Collection for Relocation



# Case Study: Inventorying the UMMZ Mammal Collection for Relocation



In 2011, UM moved the UMMZ's enormous ethanol-preserved collection to the newly renovated facility.

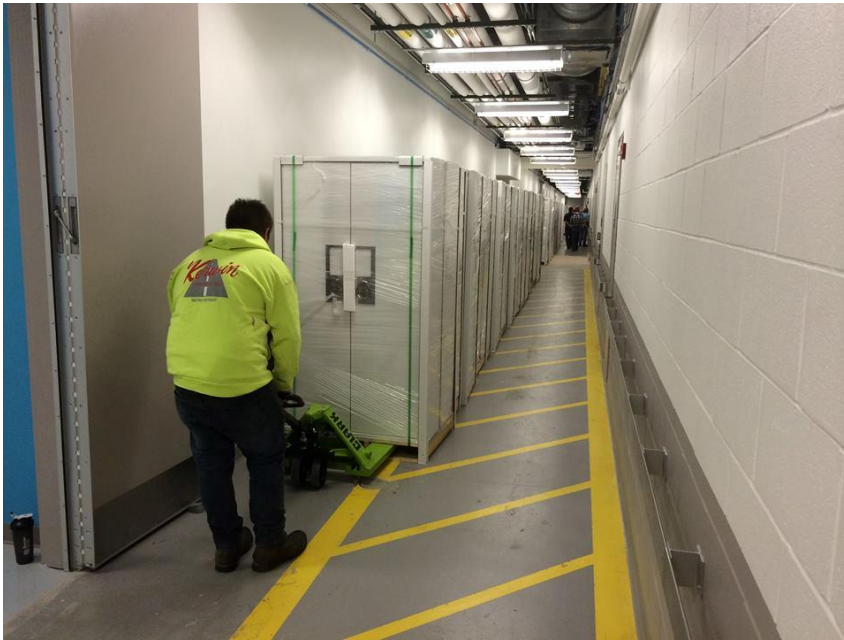


# Case Study: Inventorying the UMMZ Mammal Collection for Relocation



**In 2015, a recent renovation for dry collections increased total renovated space to ~97,000 gross square feet.**

# Case Study: Inventorying the UMMZ Mammal Collection for Relocation



***Total UM investment is ~\$44,450,000.***

# Case Study: Inventorying the UMMZ Mammal Collection for Relocation

- So, how do we navigate the movement of:
  - 3 million anthropological specimens
  - 2.2 million paleontological specimens
  - 10 million zoological specimens
- And more importantly, how do I navigate the movement of 150,000 specimens...



# Case Study: Inventorying the UMMZ Mammal Collection for Relocation

- **Timeline**

- **425 weeks (based on 2-person team)**
- **In reality, it will take five 2-person teams ~20 months to move our collections.**
- **However, all inventories and specialty packing are the responsibility of the collections.**

Collection	Duration in Weeks
Anthropology	80
Invertebrates	34
Paleobotany	45
Vertebrates	84
Bird	55
Fish	5.5
Herps	1.75
Insect	10
Mammals	48
Mollusks	61
Total	425

# Case Study: Inventorying the UMMZ Mammal Collection for Relocation

- **Question**
  - How do I inventory and pack 150,000 mammal specimens in about 6 months?
- **Requirements for Mapping**
  - Label 292 cabinets and 3433 drawers
  - Capture content and number of specimens on each tray
- **Answer**
  - 2 former students with freshly-minted bachelor's degrees, a laptop, 2 iPod Touches, and 50 rolls of archival tissue



# Case Study: Inventorying the UMMZ Mammal Collection for Relocation



# Case Study: Inventorying the UMMZ Mammal Collection for Relocation



- **The Process**

- Label each cabinet and tray with a unique identifier (e.g., Ruthven\_3035\_150P)
- Count the number of each prep type on each tray
- Photograph each tray with cabinet/tray number using iPod and Google Photos
- Enter all data in Google Drive

# Case Study: Inventorying the UMMZ Mammal Collection for Relocation

Inventory: Packing - Google | UM Dry Collection Mammals

https://docs.google.com/spreadsheets/d/1vKek\_GQuhotCMFDAikDp2dIfFeMhS6ZXXSUlcbxmy/edit#gid=5983579

UM Dry Collection Mammals Inventory

File Edit View Insert Format Data Tools Add-ons Help All changes saved in Drive

60

	A	B	C	D	E	G	H	I	J	K	L	M	N		
1						Collection Information									
2						Specimen # (Only include for specimens not in cabinets)									
	Building	Room	Cabinet	Tray	Photo ID	Order	Family	Genus	Species	Prep Type(s)	Qty	HV Item	Change Log		
2629	Ruthven	3035	150	B	Ruthven_3035_150B	RODENTIA	CRICETIDAE	NEOTOMODON	ALSTONI	18 skins, 18 skull vials	36				
2630	Ruthven	3035	150	C	Ruthven_3035_150C	RODENTIA	CRICETIDAE	OCHROTOMYS	NUTTALLI	50 skins, 44 skull vials	94				
2631	Ruthven	3035	150	D	Ruthven_3035_150D	RODENTIA	CRICETIDAE	OCHROTOMYS	NUTTALLI	47 skins, 41 skull vials	88				
2632	Ruthven	3035	150	E	Ruthven_3035_150E	RODENTIA	CRICETIDAE	ONYCHOMYS	LEUCOGASTER	18 skins, 20 skull vials	38				
2633	Ruthven	3035	150	F	Ruthven_3035_150F	RODENTIA	CRICETIDAE	ONYCHOMYS	LEUCOGASTER	47 skins, 56 skull vials, w/ 1 loan slip	103				
2634	Ruthven	3035	150	G	Ruthven_3035_150G	RODENTIA	CRICETIDAE	ONYCHOMYS	LEUCOGASTER	23 skins, 70 skull vials	93				
2635	Ruthven	3035	150	H	Ruthven_3035_150H	RODENTIA	CRICETIDAE	ONYCHOMYS	LEUCOGASTER	43 skins, 47 skull vials	90				
2636	Ruthven	3035	150	I	Ruthven_3035_150I	RODENTIA	CRICETIDAE	ONYCHOMYS	LEUCOGASTER	23 skins, 27 skull vials	50				
2637	Ruthven	3035	150	J	Ruthven_3035_150J	RODENTIA	CRICETIDAE	ONYCHOMYS	LEUCOGASTER	38 skins, 45 skull vials	83				
2638	Ruthven	3035	150	K	Ruthven_3035_150K	RODENTIA	CRICETIDAE	ONYCHOMYS	TORRIDUS	34 skins, 33 skull vials	67				
2639	Ruthven	3035	150	L	Ruthven_3035_150L	RODENTIA	CRICETIDAE	ONYCHOMYS	TORRIDUS	53 skins, 52 skull vials	105				
2640	Ruthven	3035	150	M	Ruthven_3035_150M	RODENTIA	CRICETIDAE	OSGOODOMYS	BANDERANUS	21 skins, 25 skull vials	46				
2641	Ruthven	3035	150	N	Ruthven_3035_150N	RODENTIA	CRICETIDAE	OSGOODOMYS	BANDERANUS	26 skins, 26 skull vials	52				
2642	Ruthven	3035	150	O	Ruthven_3035_150O	RODENTIA	CRICETIDAE	OSGOODOMYS	BANDERANUS	27 skins, 27 skull vials	54				
2643	Ruthven	3035	150	P	Ruthven_3035_150P	RODENTIA	CRICETIDAE	OSGOODOMYS	BANDERANUS	17 skins, 20 skull vials	37				
2644	Ruthven	3035	184	A		RODENTIA	CRICETIDAE	TRANSANDINOMYS	TALAMANCAE	29 skins, 31 skulls	60				
2645															
2646															
2647															
2648															
2649															
2650															
2651															
2652															
2653															
2654															
2655															

Cabinet Inventory | Antler Catalog Numbers | Totals | Drop Downs

Explore

12:18 PM



# Case Study: Inventorying the UMMZ Mammal Collection for Relocation



# Case Study: Inventorying the UMMZ Mammal Collection for Relocation

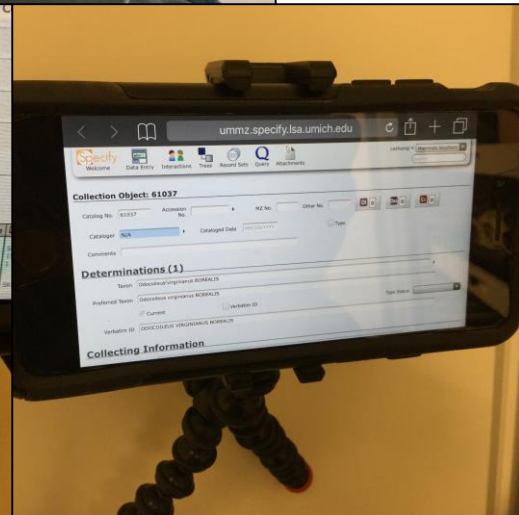
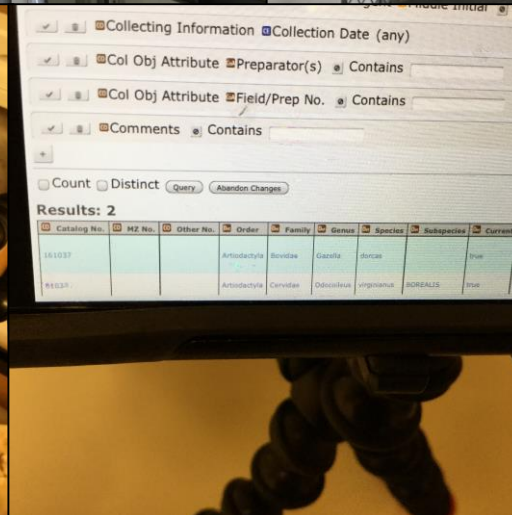
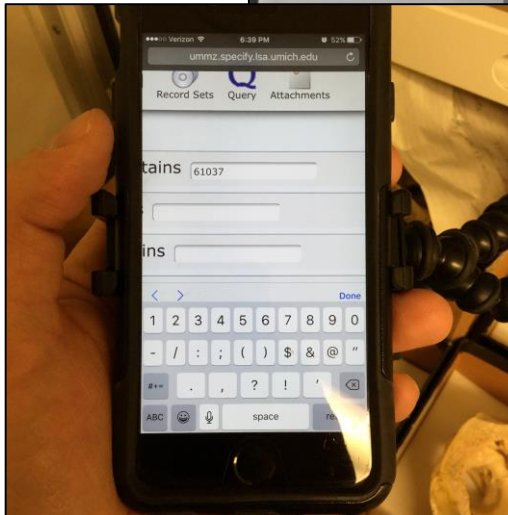
A collage of taxidermied mammal skins and skulls. The top left shows several leopard skins with their heads, one labeled '280K'. The top right shows a tiger skin and other smaller mammals. The center features a tiger skin in a white tray. The bottom left shows a large dark brown bear skin labeled '182'. The bottom right shows several deer or goat skins, one labeled '280J'.

*2,644 trays inventoried in 23 days  
~115 trays/day*

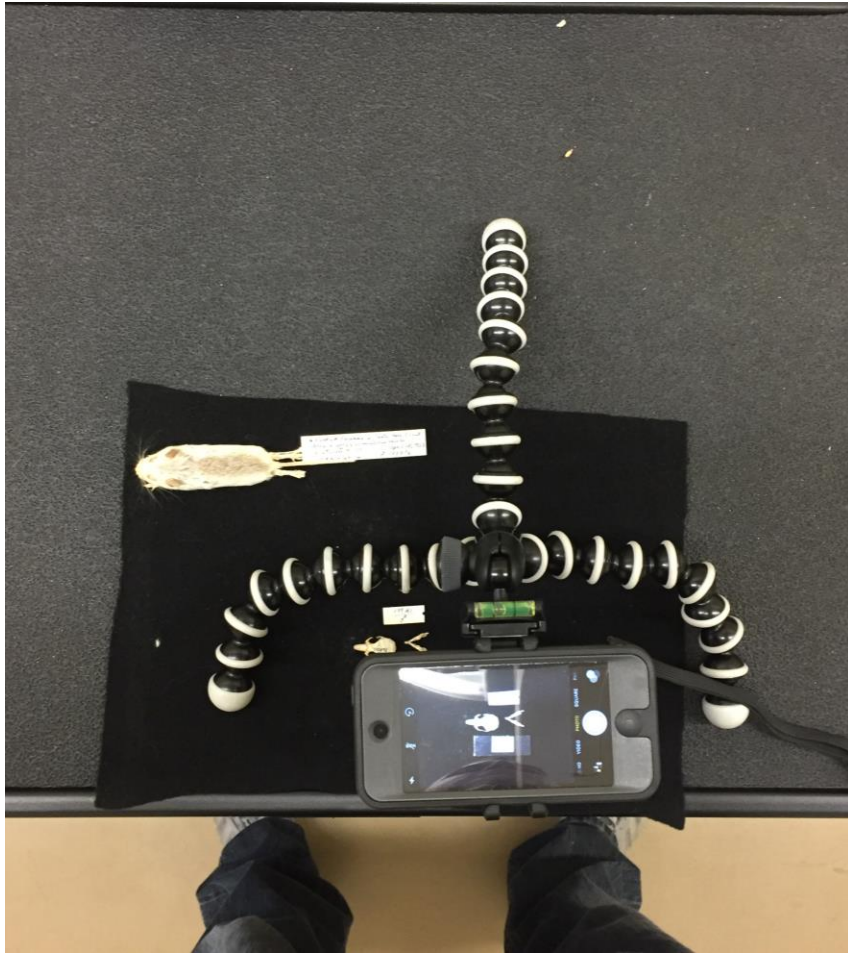
# Other Curatorial Applications



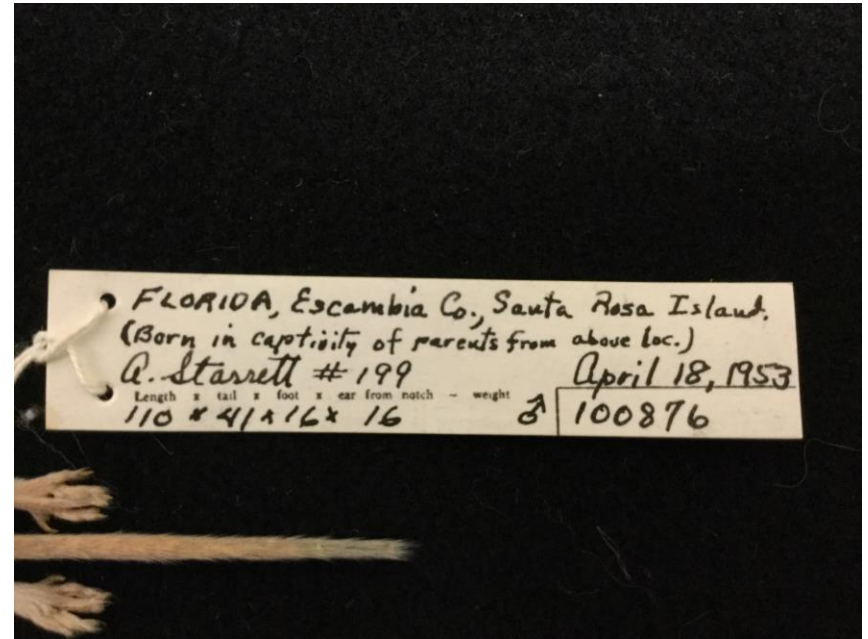
# Curation-on-the-Fly



# Specimen Imaging & Data Entry



# Specimen Imaging & Data Entry



# Conservation Activities



# Imaging Documents

Received from: Department of Conservation, Michigan  
 Field Catalog: Michigan Ontario  
 General locality: Michigan Ontario

Accession number: 1629/0 M33  
 Entered by: T. D. Siskin  
 Date entered: Apr. 19, 2016

AMNH Number	Original Number	Sex	Age	Preparation	Date	Sheet # 5	Collector	Locality
61039	105	♂	ad	skull only	Nov 22, 1929		V. H. Cablane	Michigan
61035	109	..	..	..	..	..	..	Alger Co.: Kentucky
61036	110	..	..	..	20	..	..	Ontonagon Co.: Trout Creek
61037	111	..	..	..	16	..	..	Houghton Co.: Mosley Bay
61038	112	..	..	..	25	..	..	Alcona Co.: Turtle Lake Club
61039	113	..	..	..	Fall 1929	..	..	Chippewa Co.: Wolverine
61040	114	..	..	..	Nov 24, 1929	..	..	Luce Co.: N. N. Newberry
61041	115	..	..	..	..	..	..	Branchford Co.: Roscommon
61042	116	..	..	..	..	..	..	Ontonagon Co.: Rubicon
61043	117	..	..	..	19	..	..	Ogemaw Co.: Union West Branch
61044	118	..	..	..	..	..	..	Dickinson Co.: Union of Ralph
61045	119	..	..	..	24	..	..	Alcona Co.: Beaver Lake
61046	120	..	..	..	15	..	..	Baraga Co.: Skanes
61047	121	..	..	..	24	..	..	Delta Co.: Cornell
61048	122	..	..	..	20	..	..	Chippewa Co.: Quin Drummond
61049	123	..	..	..	..	..	..	Alger Co.: Twp. 48-15
61050	124	..	..	..	..	..	..	..
61051	125	..	..	..	22	..	..	Marquette Co.: Big Bay
61052	126	..	..	..	16	..	..	Dickinson Co.: Northland
61053	127	..	..	..	15	..	..	Delta Co.: Nakua
61054	128	..	..	..	18	..	..	Chippewa Co.: Fiber
61055	129	..	..	..	9	..	..	Ontario: Sturgeon Falls
61056	130	..	..	..	16	..	..	Luce Co.: Sea Jet
61057	131	..	..	..	17	..	..	Ogemaw Co.: West Branch
61058	132	..	..	..	..	..	..	..
61059	133	..	..	..	15	..	..	Dickinson Co.: Ralph
61060	134	..	..	..	17	..	..	Ogemaw Co.: West Branch
61061	135	..	..	..	15	..	..	Chippewa Co.: Fiber
61062	136	..	..	..	27	..	..	Alcona Co.: Hillman
61063	137	..	..	..	16	..	..	Dickinson Co.: Ralph
61064	138	..	..	..	20	..	..	Alger Co.: Au Train
61065	139	..	..	..	..	..	..	Alcona Co.: Birmingham Bun Club
61066	140	..	..	..	..	..	..	Alger Co.: 12 mi. from Nunsing
61067	141	..	..	..	..	..	..	Brand Marais
61068	142	..	..	..	19	..	..	Chippewa Co.: Hulbert

MUSEUM OF ZOOLOGY, UNIVERSITY OF MICHIGAN

UNIVERSITY OF MICHIGAN MUSEUM OF ZOOLOGY - MAMMAL DIVISION  
 1109 Geddes Avenue, Ann Arbor, Michigan 48106-1079  
 Phone (734) 615-2810 Fax: (734) 763-4880

INVOICE OF SPECIMENS

Date: 21 March 2016 INVOICE NUMBER: 2016-018

TO: Neil Duncan  
 American Museum of Natural History  
 Department of Mammalogy  
 Central Park West at 79th Street  
 New York, New York 10024-5192  
 Phone: (212) 769-5492  
 Email: duncan@amnh.org

AUTHORIZED BY: Cody W. Thompson  
 PACKED BY: Cody W. Thompson  
 METHOD OF SHIPMENT: UPS  
 # OF PACKAGES: 1  
 # OF SPECIMENS: 10  
 DUE DATE: N/A  
 CATEGORY: Loan Return

SCIENTIFIC NAME	AMNH #	PREP	CONDITION
<i>Lariscus insignis insignis</i>	78764	Skeleton	1 femur only
<i>Paracerus sp.</i>	187447	Skeleton	1 femur only
<i>Prosciurillus abstrusus</i>	225504	Skeleton	1 femur only
<i>Prosciurillus murinus</i>	225492	Skeleton	1 femur only
<i>Sciurus aestivus</i>	267565	Skeleton	1 femur only
<i>Spermophilus ammodillus interpres</i>	131944	Skeleton	1 femur only
<i>Spermophilus mexicanus mexicanus</i>	203961	Skeleton	1 femur only
<i>Tamias quadrivittatus quadrivittatus</i>	137897	Skeleton	1 femur only
<i>Tamias townsendii senex</i>	121126	Skeleton	1 femur only
<i>Xerus rutilus</i>	187452	Skeleton	1 femur only

Loan Information

- This is a return of loan #2016-007 for use by Jan Wolfer.
- Thank you for the help!

PLEASE SIGN AND RETURN ONE COPY UPON RECEIPT OF THIS INVOICE.  
 Loans are made for a period of 6 months or less. A request for renewal should be made if it is necessary to keep specimens for a longer period.

Received in good order unless noted otherwise. Signed: *Elmer Hoeyer* Date: 3/24/2016



# Working in a Mobile Environment



**Questions???**