

The Nullarbor Project

Using the Swat Team Concept
to Address Collections Backlogs



before

after

William F. Simpson
Field Museum of Natural History



The Nullarbor Project



The Nullarbor Project



William D. Turnbull 1922 – 2011
Curator of Fossil Mammals
Field Museum of Natural History

Catching up with Bill Turnbull!

- Washakie Basin; Eocene Collections

- 1948 to 1993
- Angielczyk & Simpson: \$500,000 NSF grant to process Washakie backlog

- Nullarbor Plain Caves Collections

- 1955, 1963/1964





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Ernie Lundelius, University of Texas 1955: Fulbright Fellowship

Bill Turnbull & Ernie Lundelius 1963 & 1964: Joint FMNH/U. Texas
Paleontological Expedition to
Southern Australia

Nullarbor means “no trees”!



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The 13 fossiliferous caves of the Nullarbor Plain:
only 8,000 specimens had been processed and catalogued



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Only the Madura Cave fauna was studied and published



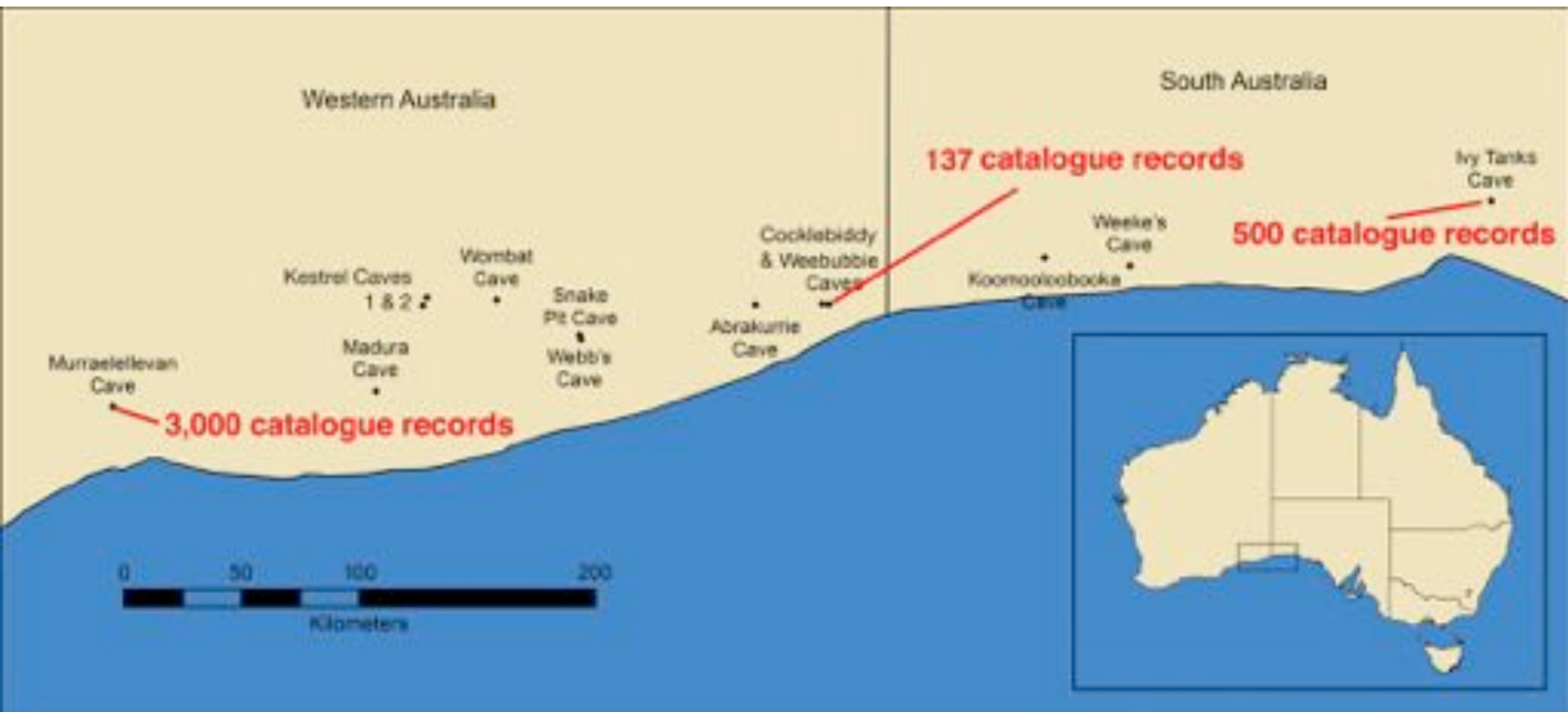
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From 1973 through 1989:
8 papers were published by Bill & Ernie on Madura Cave fossils



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Only three of the other caves had many specimens processed & catalogued



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The rest of the collection was unprocessed and consisted of trays of thousands of isolated bones



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The deposits are mostly derived from owl pellets



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Notomys mitchelli —
“Mitchell’s hopping mouse”



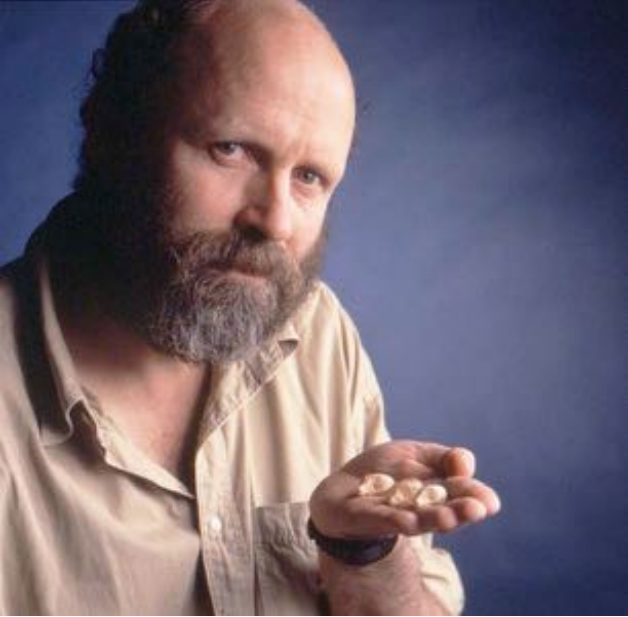


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Over time, they fall apart into many individual bones





Bill Stanley 1957 – 2015
Director of Collections,
Collections Manager, Extant Mammals
Field Museum of Natural History



Bill Stanley's Swat Team Concept:

- For backlogs involving specimens for which we do not have expertise in house.
- Two parts:
 1. Find an expert to come spend some time with us, IDing our specimens
 2. Assemble a team of interns or collections assistants to process the newly catalogued specimens

Nullarbor Solution: Swat Team Project!



The Nullarbor Project



Step 1:
our expert!

Dr. Matthew McDowell, Flinders University

- Endeavour Fellowship from the Australian Government
- Augmented with some funding from Bass Fellowship, Field Museum
- 6 month stay at Field Museum



Mariah Green,
REU intern, Northeastern Illinois U.



Nicole Karpus, recent grad of U. Illinois, Chicago
photographic collections assistant



Natalie Kieruzel,
summer intern from U. of Chicago



Robert North,
summer intern from Northeastern Illinois U.



Elena Peterman,
summer intern from U. of Chicago



Step 2:
**Our
collections
team!**



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- Matt arrived in early May,
 - began familiarizing himself with the Nullarbor collection
 - started identifying tooth-bearing Specimens
 - Began sorting and building up an inventory of identified specimens to be processed by the interns

- 4 interns and photographic assistant began in mid-June
 - Matt trained them to sort specimens
 - I taught them to process specimens
 - enter data into database
 - write numbers on bones or gelcaps
 - print out labels
 - house in gelcaps, plastic vials, ethafoamed trays



- cataloguing is done in 4D database
- then imported into KE EMu at end of project



The Nullarbor Project

328 of 10784 **Avail EMu Rn: 0** Primary Key: **PM64827** Next Available No: **70193** **MASTERFILE INPUT SCREEN** VP Coll: **M**

Synonyms: _____

Higher Taxon 3: **Mammalia**
 Higher Taxon 2: **Theria**
 Higher Taxon 1: **Marsupialia**
 Superorder: **Australidelphia**
 Order: **Dasypromorphia**
 Suborder: **Dasyuroida**
 Infraorder: **Dasyuroida**
 Family: **Dasyuridae**
 Subfamily: **Sminthopinae**

Catalogue No: PM 64827

Genus: **Antechinomys**
 specific epithet: **laniger**
 Author / Year: **Cuvier 1854**
 Morphology: **R maxilla, no teeth**

entry date: **7/11/2016** # of individuals: **1** # of pieces: **1**

Period: **Quaternary or holocene** Epoch: **Pleistocene or holocene**
 Age: _____
 Group: _____
 Formation: _____
 Member: _____
 Horizon: **18-24 inches**

Continent: **Australasia** State: _____ County: _____
 Country: **Australia** **South Australia** **Nullarbor Plain**
 Location: **Nullarbor Plain; near Koonalda; off old Lyne highway; Weekes Cave**

Locality Name: **Weekes Cave**
 Township: **129/8**
 Quad Map: _____
 Lat/Long: **31° 30' 26.2" S, 129° 55' 3.23" E** UTM Co-ords: _____
 Centroid Coords: _____
 Centroid Remarks: _____

Collector: **William D. Turnbull, Ernest L. Lundelius**

Field # **205-64** MADouble: _____ MADconcat: _____
 Date Collected: **May 15-16, 1964** 1964 Year modifier: _____ sigcat Year: **1964**

Old Cat. # (entry fields): _____
 Accession #: **G-4726** Acc Date: **11/1964** Qtype: **1029**

Accession Description: **Joint PMNH-US, Texas Paleontological Expedition to Southern Australia, 1963-64, led by William D. Turnbull & Ernest L. Lundelius, including Priscilla Turnbull & Judith Lundelius**

Remarks: _____

MANUAL SAVE Only for changes to pre-existing record

Save #1 Save new record & update machine number

Save #2 Copy from query, save under next machine #, update machine #

Save #3 Add fill line in GAPS, save, copied under incremented user-supplied # (user updating machine #)

Inventoried by (= prior dates): _____ **Inventory Date:** **07/11/2016**

Specimen Location:
Fossil Mammal Range

Mammal Range
 Oversize Shelf: _____

Location On Loan: _____

Exhibit Name: _____ Exhibit Hall: _____
 Exhibit Section: _____ Exhibit Code: _____ Exhibit Case: _____

Print Note: _____ 2nd Print Note: _____ 3rd Print Note: _____ 4th Print Note: _____



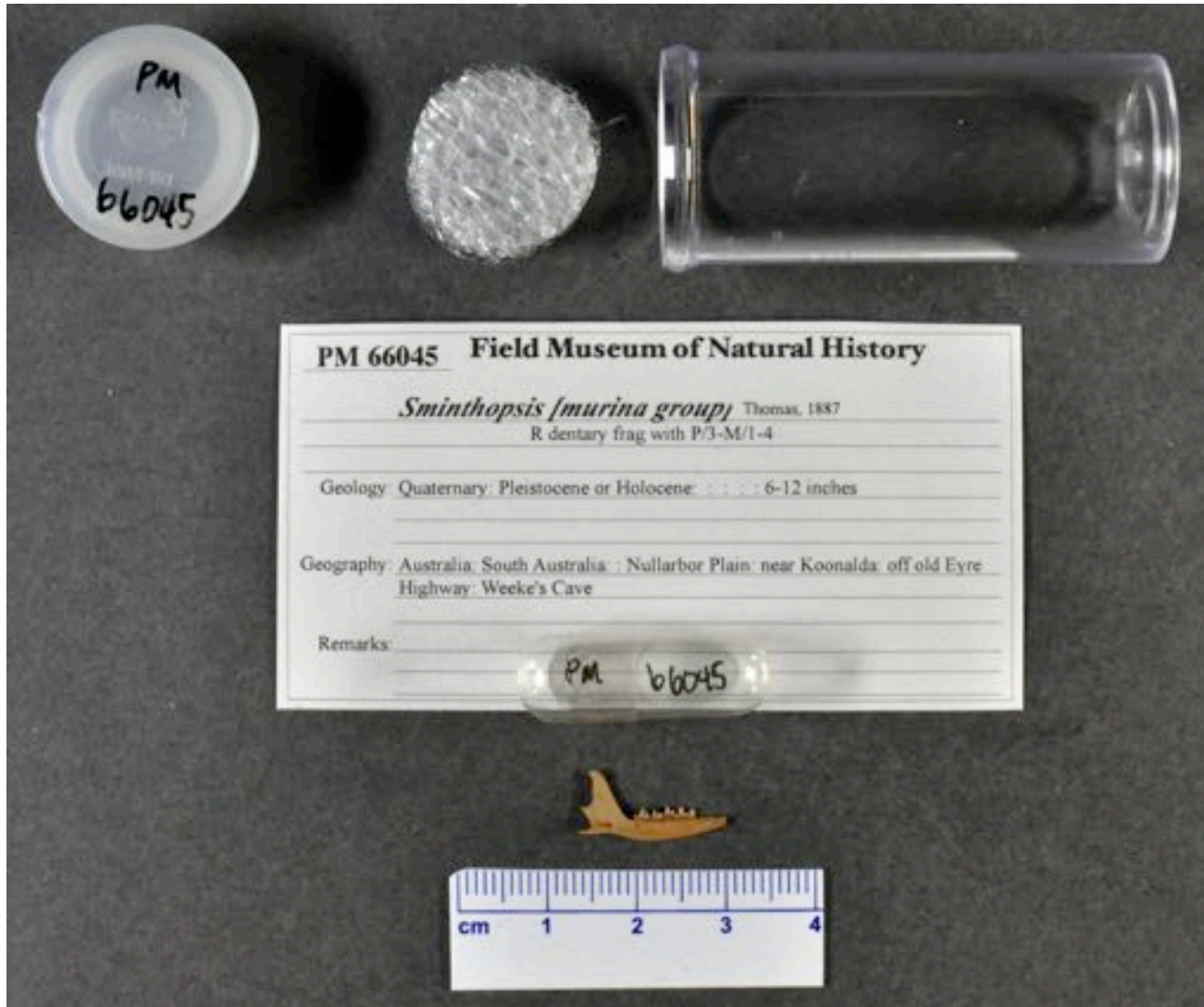
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Most specimens were housed in plastic vials with ethafoam liners



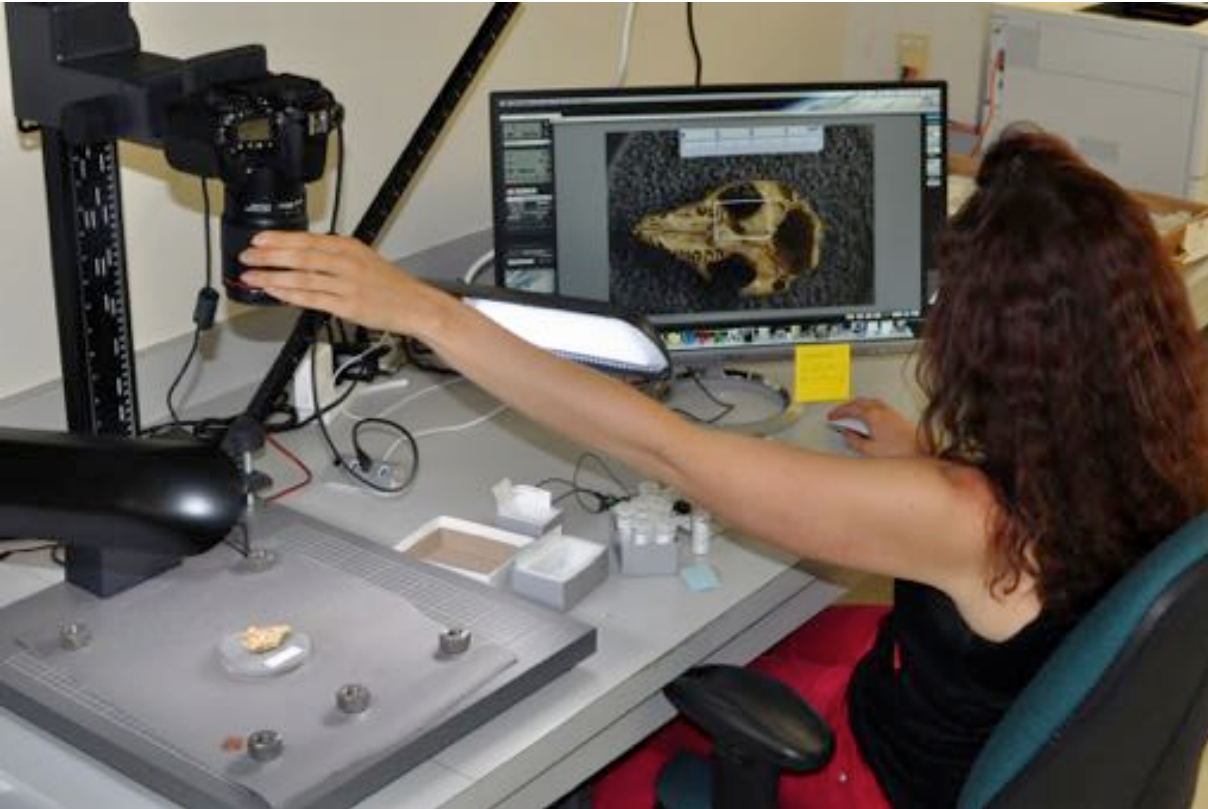
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Many specimens were too small to write on, and were put in gelcaps which received the catalogue numbers



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- Canon EOS 70D camera
- Canon EF 100mm macro lens [f/2.8L Macro IS USM]
- Canon EOS Utility software running on a Mac, & displayed on a 28" monitor
- Kaiser 36" camera stand [RS 1]
- Kaiser dimmable LED lights [RB 5070 DX]

- Nicole set up the photographic work station, taught everyone the most efficient work flow.
- Everyone got to spend a few days taking photographs



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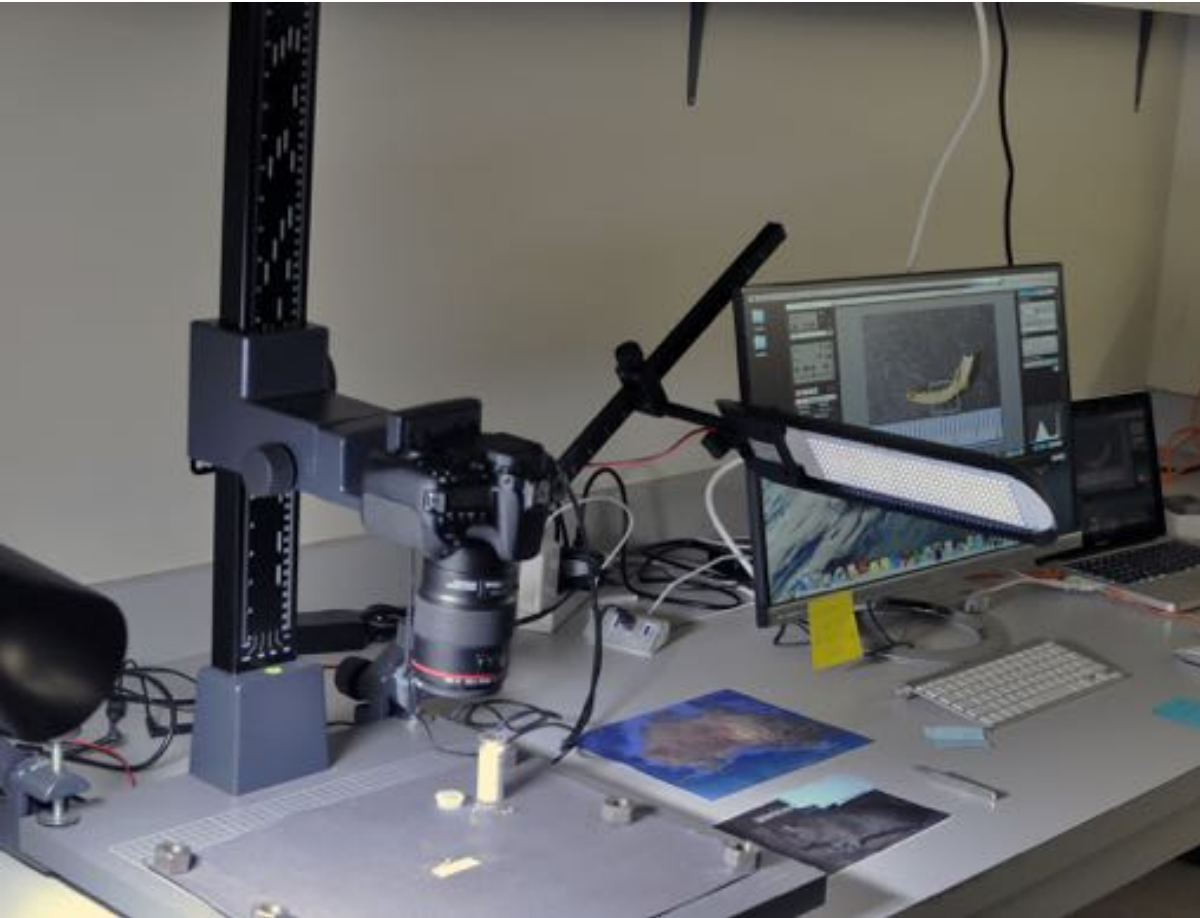
- Canon EOS 70D camera
- Canon EF 100mm macro lens [f/2.8L Macro IS USM]
- Canon EOS Utility software running on a Mac, & displayed on a 28" monitor
- Kaiser 36" camera stand [RS 1]
- Kaiser dimmable LED lights [RB 5070 DX]

- We selected a Canon camera system that others at the museum had used successfully
- The 100mm macro lens gives 1 to 1 close up capability



The Nullarbor Project

- Canon EOS 70D camera
- Canon EF 100mm macro lens [f/2.8L Macro IS USM]
- Canon EOS Utility software running on a Mac, & displayed on a 28" monitor
- Kaiser 36" camera stand [RS 1]
- **Kaiser dimmable LED lights [RB 5070 DX]**



- LED lights were great; cool, and dimmable

lower jaws (dentaries) got three shots:



labial



lingual



occlusal

Each specimen got multiple photographs, depending on the element

upper jaws (maxillae) get two shots:



labial



occlusal

Each specimen got multiple photographs, depending on the element



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Skulls got six shots:



left lateral



posterior



dorsal



right lateral



anterior



ventral (occlusal)

Each specimen got multiple photographs, depending on the element



Some specimens were catalogued
and photographed as a lot:

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36 edentulous (no teeth!) maxillae



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Drawers of Finished Collections!





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Specimen processing results:

- This project was to serve as a test case, a pilot project for use later by Ken and me in producing a larger grant proposal.
- Ken Angielczyk and I had hoped the summer phase of the project might:
 - create 3,000 – 5,000 new specimen records
 - create photographs for maybe half of these

BUT!

- **By the end of the summer:**
 - **11,098 new specimen records!**
 - **nearly 6,000 specimens photographed (more counting lots!)**
- **Nicole came back for a second stint to continue photographing specimens and finished all 11,098 in about six months**
- **She is now formatting the 34,000 photographs for inclusion in KE EMu**



Photo Formatting for KE EMu:

- Originally each shot was saved as a raw image (CR2) and a JPEG.
- Since we started, IT has settled on a DNG format.
- Nicole is using Adobe Lightroom to format the photos:
 - Each CR2 is saved as a TIFF (to standardize different camera raw formats)
 - Then, each TIFF is used to produce a DNG and also a JPEG (for a preview)



So What? Why is this collection worth all this effort?

This collection documents the pre-European ecosystem of the Nullarbor.

- some taxa driven to extinction
- many still present, but now live in marginal habitats, far from their original range
- this collection provides land managers with a target for restoring the small mammal component of this fractured and fragmented ecosystem

Additional research outcomes Matt McDowell is working on with these faunas:

- small mammals appear less influenced by aridity than large mammals
- evidence of climate-driven faunal change

Latest: we have sent 36 specimens out for carbon-14 dating to get a better handle on the age of these deposits

Acknowledgements



The Nullarbor Project



The Nullarbor Project Team

Post-doc: **Matt McDowell**

Interns: **Mariah Green**
Natalie Kieruzel
Robert North
Elena Peterman

Photographic Assistant: **Nicole Karpus**

- Bill Stanley
- Financial support:
 - The Negaunee Foundation
 - Endeavour Foundation of Australia
 - Field Museum Bass Fellowship Fund
- Ken Angielczyk
- Paul Mayer and Crystal Maier



Gil Nelson & his team
Jillian Goodwin
Erica Clites
Pat Holroyd
Talia Karim

Postscript: Specimens!

The Nullarbor Project was featured as the concluded section of a new Field Museum exhibit called:



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Antechinomys laniger – Kultarr



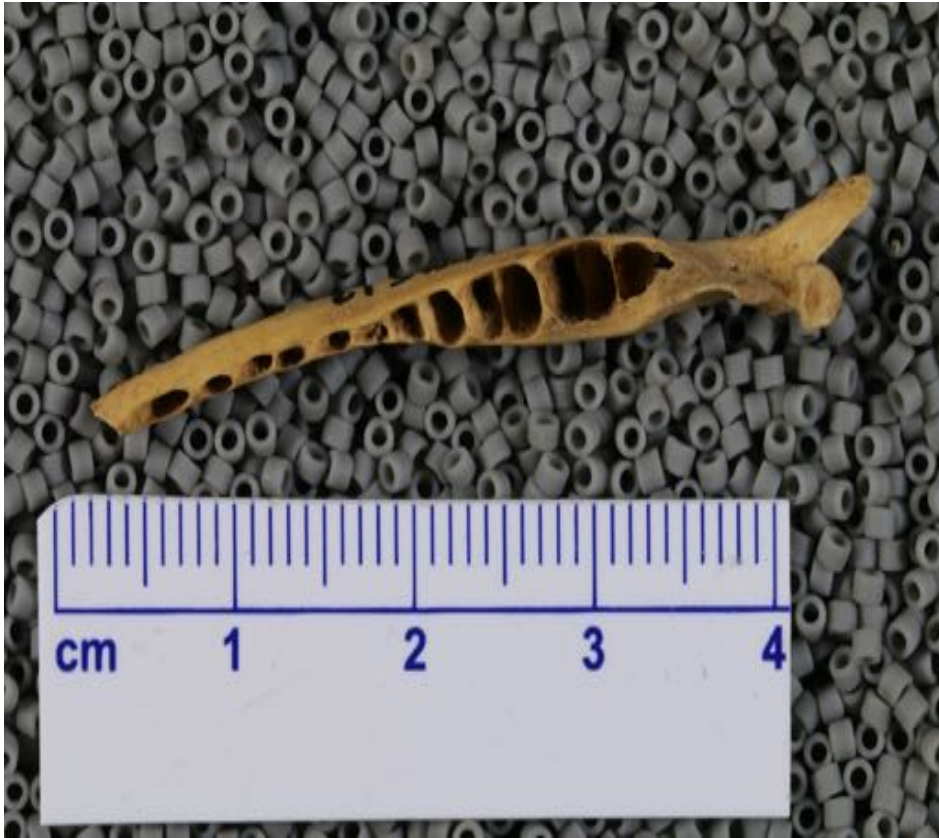
Dasymercus sp. – Mulgara



Perameles bougainville – Western barred bandicoot



Macrotis lagotis – Greater bilby



Trichosurus Vulpecula – Brush tailed possum



Cercartetus concinnus – Western pygmy-possum



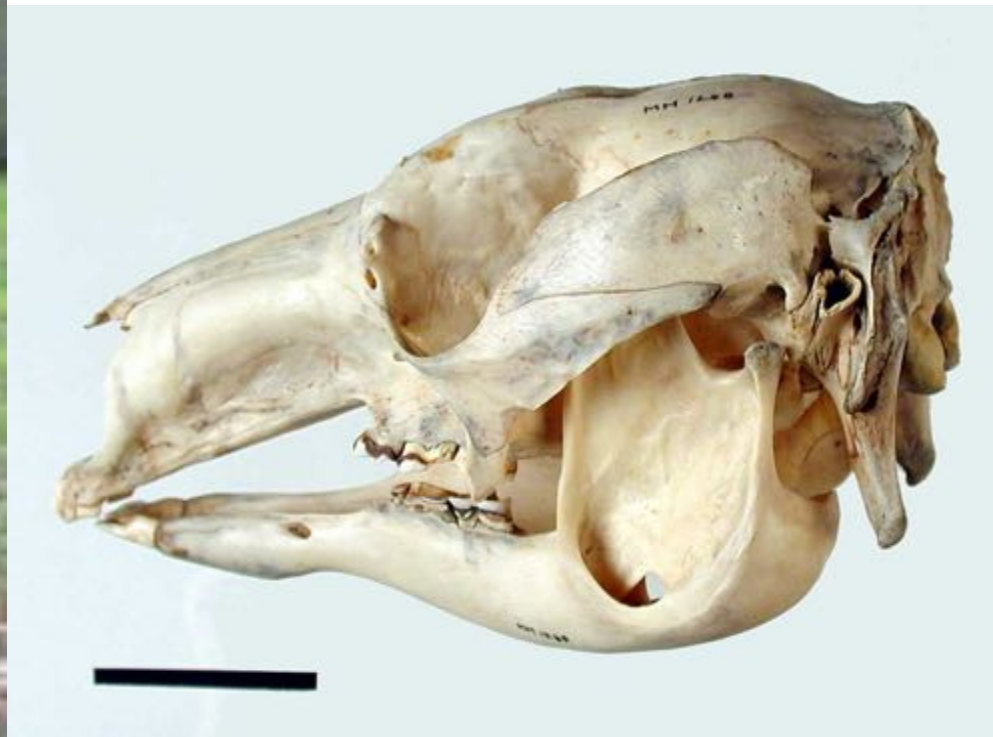
Bettongia lusueur – Burrowing bettong



Onychogalea lunata – Crescent nail-tailed wallaby



Macropus fuliginous – Western grey kangaroo



Leporillus conditor – Stick nest rat



Notomys mitchellii – Mitchell's hopping mouse



Pseudomys bolami - Bolam's Mouse



Pseudomys australis – Plains mouse

