

Anticipating Storage Requirements: Management and Archiving

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- Management and Archiving
 - Best Practices
 - Redundancy
 - Manual vs. Automated
- Storage and Space Requirements
 - File Types and Folders - Examples
 - Access
 - Space Requirements
- Concluding Remarks



U.S. National Archives and Records Administration (NARA)

Technical Guidelines for Digitizing Archival Materials for Electronic Access: Creation of Production Master Files – Raster Images

For the Following Record Types- Textual, Graphic Illustrations/Artwork/Originals, Maps, Plans, Oversized, Photographs, Aerial Photographs, and Objects/Artifacts

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Written by Steven Puglia, Jeffrey Reed, and Erin Rhodes

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SCOPE:

The *NARA Technical Guidelines for Digitizing Archival Materials for Electronic Access* define approaches for creating digital surrogates for facilitating access and reproduction; they are not considered appropriate for preservation reformatting to create surrogates that will replace original records. The *Technical Guidelines* presented here are based on the procedures used by the Digital Imaging Lab of NARA's Special Media Preservation Laboratory for digitizing archival records and the creation of production master image files, and are a revision of the 1998 "*NARA Guidelines for Digitizing Archival Materials for Electronic Access*", which describes the imaging approach used for NARA's pilot Electronic Access Project.

Archiving, Chapter 5: Data Storage Management

More in this Section...



Archiving: Fundamentals of Storage Technology

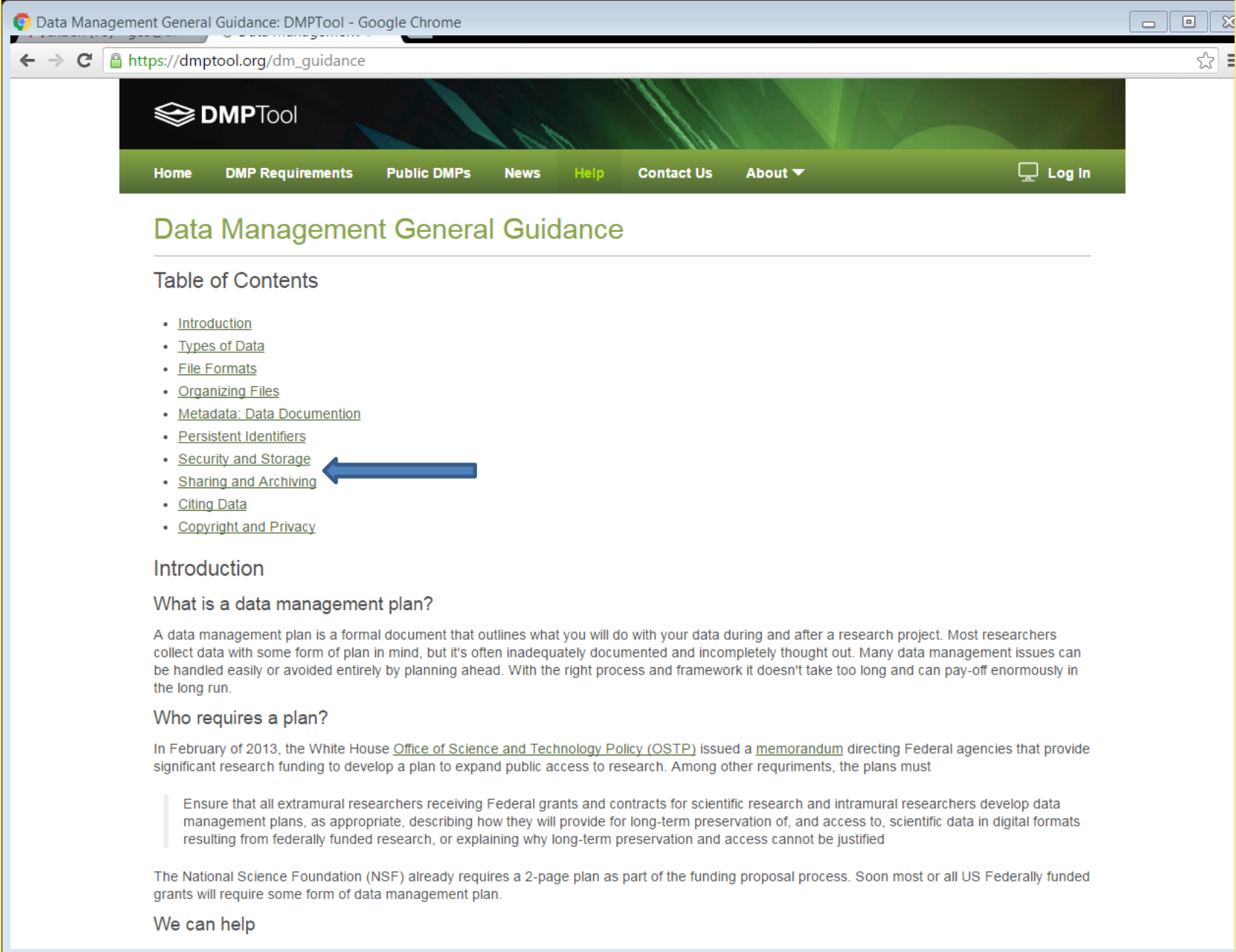
Author:

Robert Glicksman, Medical Imaging Technical Specialist (Retired)

Introduction

Medical image archives can grow to contain enormous amounts of data. Radiology, Cardiology, or Pathology image sets can consume several gigabytes of storage. The sum total of image data associated with many patients and over many years can run into the petabyte (10^{15} bytes) range. Obviously, a practical medical image archive must economize on the cost of raw storage.

DMP Tool



The screenshot shows a web browser window with the URL https://dmptool.org/dm_guidance. The page features a green navigation bar with the following links: Home, DMP Requirements, Public DMPs, News, Help, Contact Us, and About. A 'Log In' button is also present. The main content area is titled 'Data Management General Guidance' and includes a 'Table of Contents' section with the following items:

- [Introduction](#)
- [Types of Data](#)
- [File Formats](#)
- [Organizing Files](#)
- [Metadata: Data Documentation](#)
- [Persistent Identifiers](#)
- [Security and Storage](#) ←
- [Sharing and Archiving](#)
- [Citing Data](#)
- [Copyright and Privacy](#)

The 'Security and Storage' link is highlighted with a blue arrow. Below the table of contents, the 'Introduction' section is visible, starting with the heading 'What is a data management plan?' and a paragraph explaining the purpose of a data management plan. The 'Who requires a plan?' section follows, mentioning a 2013 White House memorandum. A quote box contains the text: 'Ensure that all extramural researchers receiving Federal grants and contracts for scientific research and intramural researchers develop data management plans, as appropriate, describing how they will provide for long-term preservation of, and access to, scientific data in digital formats resulting from federally funded research, or explaining why long-term preservation and access cannot be justified'. The page concludes with the text: 'The National Science Foundation (NSF) already requires a 2-page plan as part of the funding proposal process. Soon most or all US Federally funded grants will require some form of data management plan.' and the heading 'We can help'.

File Formats

Examples of preferred format choices:

- Image: JPEG, JPG-2000, PNG, TIFF
- Text: plain text (TXT), HTML, XML, PDF/A
- Audio: AIFF, WAVE
- Containers: TAR, GZIP, ZIP
- Databases: prefer XML or CSV to native binary formats

Examples of discouraged format choices and better alternatives:

Discouraged Format	Alternative Format
Excel (.xls, .xlsx)	Comma Separated Values (.csv)
Word (.doc, .docx)	plain text (.txt), or if formatting is needed, PDF/A (.pdf)
PowerPoint (.ppt, .pptx)	PDF/A (.pdf)
Photoshop (.psd)	TIFF (.tif, .tiff)
Quicktime (.mov)	MPEG-4 (.mp4)

DMPTool Background

DMPTool Background

The original DMPTool was a grassroots effort, beginning in January 2011 with eight institutions partnering to provide in-kind contributions of personnel and development. The effort was in direct response to demands from funding agencies, such as the National Science Foundation (NSF) and the National Institutes of Health (NIH), that researchers plan for managing their research data. By joining forces the contributing institutions are able to consolidate expertise and reduce costs in addressing data management needs.

The original contributing institutions were:

- [The University of California Curation Center \(UC3\) at the California Digital Library](#)
- [DataONE](#)
- [Digital Curation Centre \(UK\)](#)
- [Smithsonian Institution](#)
- [University of California, Los Angeles Library](#)
- [University of California, San Diego Libraries](#)
- [University of Illinois, Urbana-Champaign Library](#)
- [University of Virginia Library](#)

Redundancy

Backups and storage

Making regular backups is an integral part of data management. You can backup data to your personal computer, external hard drives, or departmental or university servers. Software that makes backups for you automatically can simplify this process considerably. CDs or DVDs are not recommended because they are easily lost, decay rapidly, and fail frequently. The UK Data Archive provides additional [guidelines on data storage, backup and security](#).

Backup Your Data



- Good practice is to have three copies in at least two locations (e.g. original + external/local backup + external/remote backup)
- Geographically distribute your local and remote copies to reduce risk of calamity at the same location (power outage, flood, fire, etc.)

Data Backup Options

- Hard drive using software like:
 - Windows 8 [File History](#)
 - OS X [Time Machine](#)
 - Linux/UNIX [rsync](#))
- Tape backup system
- Many institutions provide a service similar to [UCBackup](#) at UC Berkeley. Check with your campus IT support to see if backup service is available. Alternately, your academic department may provide storage space and backup services.
- Cloud storage - some examples of private sector storage resources include:
 - Amazon [S3](#) and [Glacier](#)—Requires client software, no encryption support
 - S3-based Remote Hard Drive Services such as [Elephant Drive](#) and [Jungle Disk](#).
 - [Mozy](#) (from EMC) Free client software, 448-bit Blowfish encryption or AES key
 - [Carbonite Free](#)

Storage and Space Requirements

- File Types and Folders – Examples
- Access
- Space Requirements

start up (LSA-FMS02)

Navigation and Record Management Tools

Records: 0 Total (Unsorted)

Show All | New Record | Delete Record | Find | Sort | Share

Layout: start up | View As: [List View] [Table View] [Grid View] | Preview | Edit Layout

Division of Reptiles and Amphibians Computing

Browse or Find Records

- Catalogue
- Slides
- Tissues
- Xrays
- Digital Images
- Field Notebooks
- MicroSlides

Enter New Data Records

- New Main Catalogue Records
- New Slide Records
- New Tissue Records
- New Xray Records

Prepare an Invoice Transaction

- Prepare a Loan, Gift, Exchange, or Transfer
Catalogued Material
- Prepare a Loan, Gift, Exchange, or Transfer
un-Catalogued Material
- Prepare a Loan **Return**

★ Favorites

- Desktop
- Downloads
- Recent places

This PC

- Desktop
- Desktop on 2379590067.vpn.
- Documents
- Downloads
- Music
- Pictures
- Videos
- Local Disk (C:)
- Local Disk (D:)
- Home Directory (H:)
- Department Share (S:)

Network

Name	Date modified	Type	Size
ADDRESS.fmp12	3/23/2016 11:00 PM	FMP12 File	480 KB
ALLTYPE2.fmp12	12/7/2015 11:01 PM	FMP12 File	1,468 KB
audio.fmp12	12/7/2015 11:01 PM	FMP12 File	124 KB
CATALOG.fmp12	3/9/2016 11:00 PM	FMP12 File	99,848 KB
Digital Images.fmp12	2/3/2016 11:02 PM	FMP12 File	15,716 KB
Field Notebooks.fmp12			388 KB
LOANS.fmp12			296 KB
LOANSTAT.fmp12			9,436 KB
MICHIGAN.fmp12			78,884 KB
MICHIGAN2.fmp12			8,804 KB
MICROSLIDES.fmp12			1,376 KB
NEWDATA.fmp12			2,088 KB
NEWSLIDES.fmp12			164 KB
NEWTISSUES.fmp12			284 KB
NEWXRAYS.fmp12			164 KB
Primary Types.fmp12			18,256 KB
Returns.fmp12			540 KB
site records.fmp12			356 KB
SLIDES.fmp12			2,036 KB
start up.fmp12			232 KB
TISSUES.fmp12			4,468 KB
ummz_herp_xrays.fmp12			17,380 KB
XRAYS.fmp12			1,924 KB

Isa_ummz_herpe Properties ✕

General
Sharing
Security
Previous Versions
Customize

Isa_ummz_herpe

Type: File folder

Location: D:\Backups\Daily_2016-03-24_2300\Databases

Size: 258 MB (271,065,088 bytes)

Size on disk: 258 MB (271,065,088 bytes)

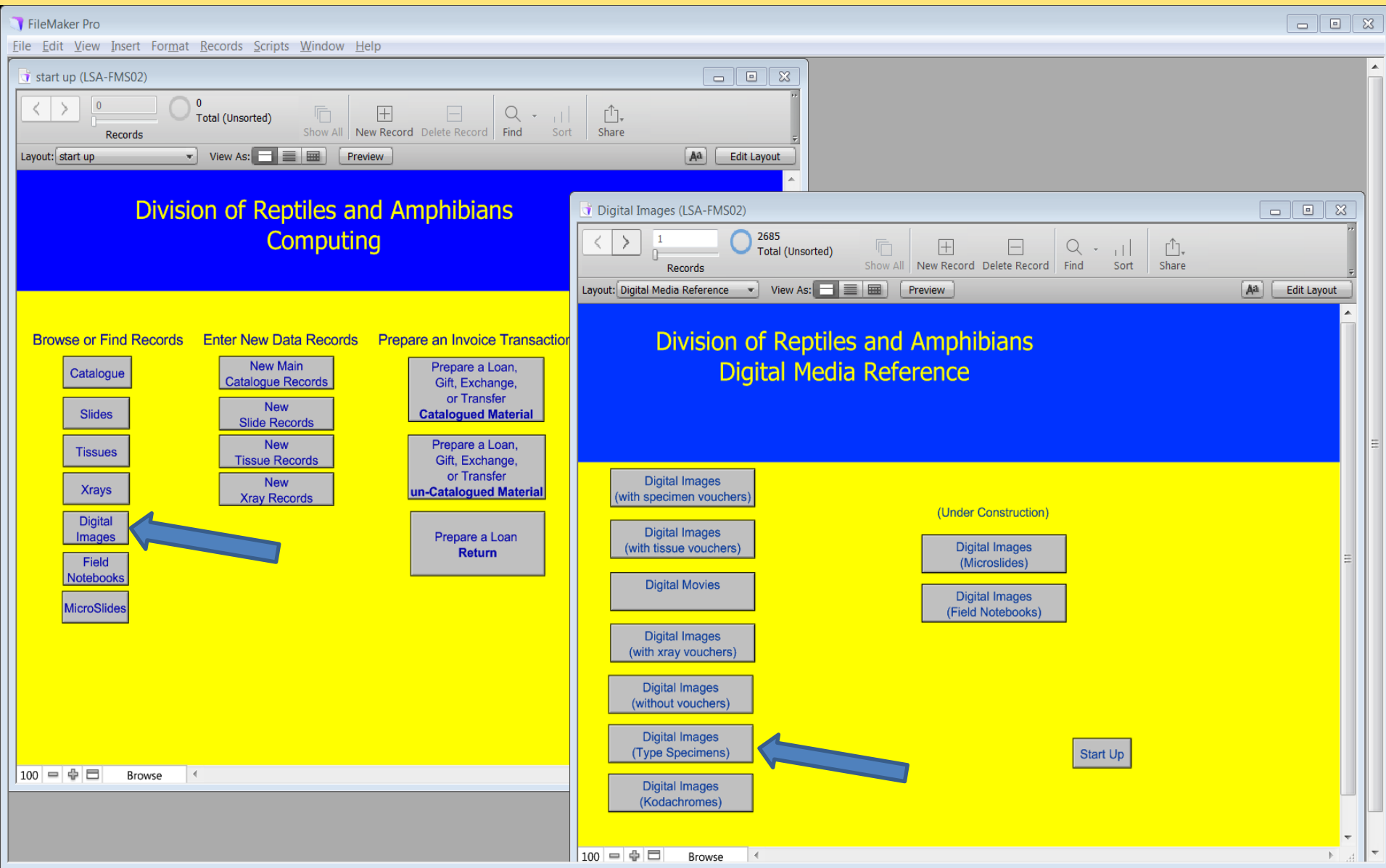
Contains: 23 Files, 0 Folders

Created: Yesterday, March 24, 2016, 11:00:00 PM

Attributes: Read-only (Only applies to files in folder)

Hidden Advanced...

OK
Cancel
Apply



Division of Reptiles and Amphibians Computing

Browse or Find Records Enter New Data Records Prepare an Invoice Transaction

Catalogue

Slides

Tissues

Xrays

Digital Images

Field Notebooks

MicroSlides

New Main Catalogue Records

New Slide Records

New Tissue Records

New Xray Records

Prepare a Loan, Gift, Exchange, or Transfer
Catalogued Material

Prepare a Loan, Gift, Exchange, or Transfer
un-Catalogued Material

Prepare a Loan Return

Division of Reptiles and Amphibians Digital Media Reference

Digital Images (with specimen vouchers)

Digital Images (with tissue vouchers)

Digital Movies

Digital Images (with xray vouchers)

Digital Images (without vouchers)

Digital Images (Type Specimens)

Digital Images (Kodachromes)

(Under Construction)

Digital Images (Microslides)

Digital Images (Field Notebooks)

Start Up

FileMaker Pro

File Edit View Insert Format Records Scripts Window Help

start up (LSA-FMS02)

Records 0 Total (Unsorted)

Layout: start up View As: Preview

Division of Reptiles and Amphibians Computing

Browse or Find Records Enter New Data Records Prepare an Invoice Tra

- Catalogue
- Slides
- Tissues
- Xrays
- Digital Images
- Field Notebooks
- MicroSlides

New Main Catalogue Records

New Slide Records

New Tissue Records

New Xray Records

Prepare a Loan, Gift, Exchange, or Transfer Catalogued Mater

Prepare a Loan, Gift, Exchange, or Transfer un-Catalogued Ma

Prepare a Loan Return

Digital Images (with specimen vouchers)

Digital Images (with tissue vouchers)

Digital Movies

Digital Images (with xray vouchers)

Digital Images (without vouchers)

Digital Images (Type Specimens)

Digital Images (Kodachromes)

Digital Images (LSA-FMS02)

Records 1 2685 Total (Unsorted)

Layout: Digital Media Reference View As: Preview

Division of Digital

Primary Types (LSA-FMS02)



Records 1 / 421 Found (Unsorted)

Layout: Primary Types View As: Preview

UMMZ 89073 (1 HOLOTYPE OF ADELPHICOS VERAEPACIS)

PRESENTLY IDENTIFIED AS: *ADELPHICOS VERAEPACIS*

Dorsal image (click for full image) Ventral image (click for full image)

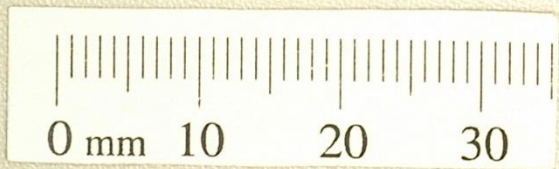


Dorsal Head (reptiles)

Lateral Head (reptiles)

Show Full Record

Return to Media Reference



89073

Windows Explorer window showing a folder hierarchy: Digital Image Catalogue > Type Specimens > Type Images > Type Specimens > Ophidia. The search bar contains "Search Ophidia".

Organize Preview Print Burn New folder

Left sidebar (Folder list):

- LCS_TIFF
- Lepidophyma_pajapanensis
- Lithographs
- Microslide photos - Sceloporus jarro
- Miscellaneous
- Morelia boeleni
- Publications
- Test Order
- Tuscola County
- Type Specimens
 - Type Images
 - Thumbnails
 - Type Specimens
 - Anura
 - Caudata
 - Gymnophiona
 - Ophidia
 - Sauria
 - Testudinata
 - Xrays
 - nsf-csbr_images

Main pane (Table view):

Name	Date modified	Type	Size
Adelphicos veraepacis 89073 dorsal	4/7/2006 4:25 PM	JPEG image	3,224 KB
Adelphicos veraepacis 89073 head dorsal	4/26/2006 3:29 PM	JPEG image	2,512 KB
Adelphicos veraepacis 89073 head lateral	4/26/2006 3:29 PM	JPEG image	2,419 KB
Adelphicos veraepacis 89073 ventral	4/7/2006 4:25 PM	JPEG image	2,979 KB
Agkistrodon mokasen laticinctus 75599 d...	4/7/2006 4:36 PM	JPEG image	2,946 KB
Agkistrodon mokasen laticinctus 75599 h...	4/26/2006 3:34 PM	JPEG image	2,935 KB
Agkistrodon mokasen laticinctus 75599 h...	4/26/2006 3:34 PM	JPEG image	2,364 KB
Agkistrodon mokasen laticinctus 75599 v...	4/26/2006 3:34 PM	JPEG image	2,364 KB
Alsophis nicholsi 80648 dorsal	4/26/2006 3:34 PM	JPEG image	2,364 KB
Alsophis nicholsi 80648 head dorsal	4/26/2006 3:34 PM	JPEG image	2,364 KB
Alsophis nicholsi 80648 head lateral	4/26/2006 3:34 PM	JPEG image	2,364 KB
Alsophis nicholsi 80648 ventral	4/26/2006 3:34 PM	JPEG image	2,364 KB
Apostolepis tenuis 64436 dorsal	4/26/2006 3:34 PM	JPEG image	2,364 KB
Apostolepis tenuis 64436 head dorsal	4/26/2006 3:34 PM	JPEG image	2,364 KB
Apostolepis tenuis 64436 head lateral	4/26/2006 3:34 PM	JPEG image	2,364 KB
Apostolepis tenuis 64436 ventral	4/26/2006 3:34 PM	JPEG image	2,364 KB
Arizona lineaticollis 114668 dorsal	4/26/2006 3:34 PM	JPEG image	2,364 KB
Arizona lineaticollis 114668 head dorsal	4/26/2006 3:34 PM	JPEG image	2,364 KB
Arizona lineaticollis 114668 head lateral	4/26/2006 3:34 PM	JPEG image	2,364 KB
Arizona lineaticollis 114668 ventral	4/26/2006 3:34 PM	JPEG image	2,364 KB
Atractus gaigeae 82887 dorsal	4/26/2006 3:34 PM	JPEG image	2,364 KB

Bottom status bar: Adelphicos veraepacis 89073 dorsal Date taken: 4/7/2006 3:25 PM JPEG image Tags: Add a tag

Right pane (Type Specimens Properties dialog box):

Type Specimens Properties

General Security Previous Versions Customize

Type Specimens

Type: File folder

Location: Z:\Digital Image Catalogue\Type Specimens\Type Images

Size: 1.73 GB (1,865,694,561 bytes)

Size on disk: 1.73 GB (1,868,374,016 bytes)

Contains: 1,327 Files, 6 Folders

Created: Friday, November 22, 2013, 4:07:04 PM

Attributes: Read-only (Only applies to files in folder) Hidden Archive

OK Cancel Apply

FileMaker Pro

File Edit View Insert Format Records Scripts Window Help

start up (LSA-FMS02)

Records 0 Total (Unsorted)

Layout: start up View As: Preview

Division of Reptiles and Amphibians Computing

Browse or Find Records Enter New Data Records Prepare an Invoice Transaction

Catalogue

Slides

Tissues

Xrays ←

Digital Images

Field Notebooks

MicroSlides

New Main Catalogue Records

New Slide Records

New Tissue Records

New Xray Records

Prepare a Loan, Gift, Exchange, or Transfer
Catalogued Material

Prepare a Loan, Gift, Exchange, or Transfer
un-Catalogued Material

Prepare a Loan Return

100 Browse

ummz_herp_xrays (LSA-FMS02)

Records 1 19252 Total (Unsorted)

Layout: ummz_herp_xrays View As: Preview

XRAYNUMBER	1	PLATE IMAGES ↑
InstitutionCode	UMMZ	
CatalogNumber	117009	
acronym2	VV	
number2	2985	
order	SAURIA	
family	IGUANIDAE	
genus	ANOLIS	
species	SAGREI	
subspecies		
typestatus		
notes		
FieldNumber	VV 2985	
ScientificName		
Country	BAHAMA ISLAND/S	
State	ANDROS ISLAND/S	
County		
Locality	ANDROS ISLAND BASTIAN POINT ON	
Month	APRIL	
Day	27	
Year	1953	
Collector	G B RABB	
Date		
vertebral count		

Top Next Find Mode Start up
Bottom Previous All Records

2,939 radiograph plates containing 19252 images (records)
4,667 have digital images

XRAY Number 2590
Institution UMMZ (show UMMZ catalog record)
catalog number 187333
Field Number RAN 30436

ORDER GYMNOPIHONA
FAMILY CAECILIIDAE
GENUS SCHISTOMETOPUM
SPECIES THOMENSE
COUNTRY SAO TOME / PRINCIPE
STATE SAO TOME
COUNTY
LOCALITY ROUTE 3 FROM SAO TOME CITY
BETWEEN KM POSTS 5 & 6 / 150
MONTH JUNE
DAY 5
YEAR 1988

map thumbnail (click to enlarge)



map X-2590-M

map image path \\sa.m.storage.umich.edu\lsa-
file extension .jpg

plate thumbnail (click to enlarge)



plate no. X-2590-P

map image path \\sa.m.storage.umich.edu\lsa-
file extension .jpg

Vertebral count
Type Status

Top Next Find Mode Start up
Bottom Previous All Records

X-2590

No. 2347

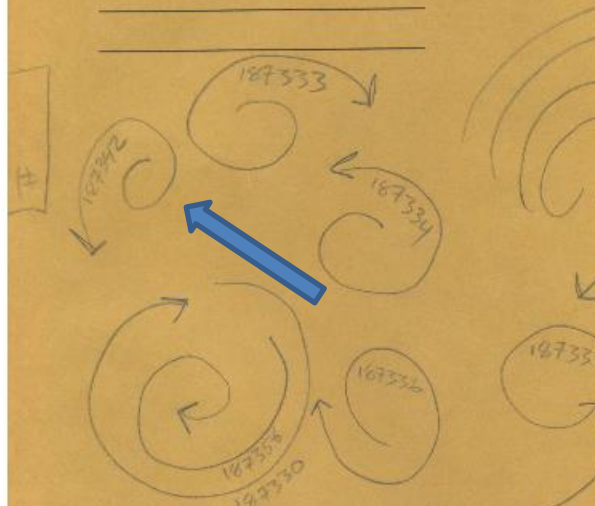
Name _____

Date _____

Dr. _____

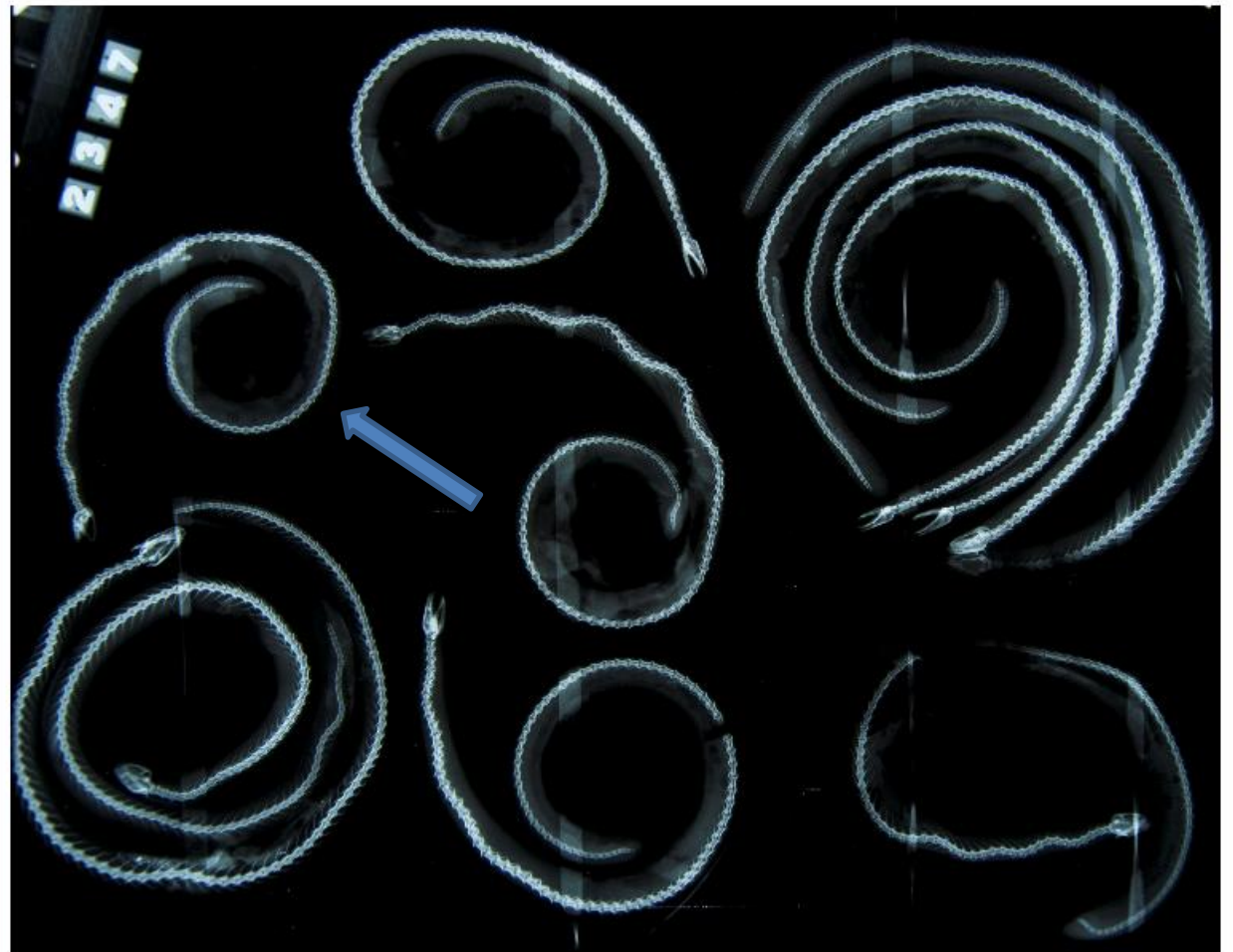
Remarks ALL UMMZ

schistosoma japonicum



CONE INSTRUMENTS

REORDER #410008



« Digital Image Catalogue » Xrays » Plates

Search Plates

Organize Burn New folder


- Chalcides ocellatus Naxos
- Chatfield
- Field Note_TIFF
- Field Notes
- Greece Records
- Hemidactylum
- LCS_JPEG
- LCS_TIFF
- Lepidophyma_pajapanensis
- Lithographs
- Microslide photos - Sceloporus jarrovi
- Miscellaneous
- Morelia boeleni
- Publications
- Test Order
- Tuscola County
- Type Specimens
- Xrays
 - Maps
 - Plates
- nsf-csbr_images

Name	Date modified	Type	Size
X-747-P	1/24/2014 4:42 PM	JPEG image	2,906 KB
X-1037-P	2/16/2014 1:10 PM	JPEG image	1,785 KB
X-1038-P	2/16/2014 1:14 PM	JPEG image	4,020 KB
X-1039-P	2/16/2014 1:16 PM	JPEG image	1,783 KB
X-1224-P	1/24/2014 4:49 PM	JPEG image	2,092 KB
X-1225-P	1/24/2014 5:00 PM	JPEG image	2,584 KB
X-1226-P			
X-1227-P			
X-1228-P			
X-1229-P			
X-1317-P			
X-1318-P			
X-1319-P			
X-1320-P			
X-1321-P			
X-1324-P			
X-1325-P			
X-1326-P			
X-1327-P			
X-1329-P			
X-1330-P			

862 items Offline status: Online Offline availability: Not available

Xrays Properties

General Security Previous Versions Customize

 Xrays

Type: File folder

Location: Z:\Digital Image Catalogue

Size: 4.30 GB (4,627,085,616 bytes)

Size on disk: 4.31 GB (4,630,667,264 bytes)

Contains: 1,725 Files, 2 Folders

Created: Tuesday, February 02, 2016, 11:02:32 AM

Attributes: Read-only (Only applies to files in folder) Hidden Archive

OK Cancel Apply

caecilian xray backup Final 4-29-2014 > UMMZ PLATE IMAGES > UMMZ RAW IMAGES

Search UMMZ RAW IMAGES

Organize Include in library Share with Burn New folder

Name	Date modified	Type	Size
X-747.dng	1/25/2014 6:07 PM	DNG File	11,222 KB
X-1224.dng	1/24/2014 4:42 PM	DNG File	10,541 KB
X-1225.dng	1/24/2014 4:49 PM	DNG File	10,623 KB
X-1226.dng	1/24/2014 5:04 PM	DNG File	10,782 KB
X-1227.dng	1/24/2014 5:17 PM	DNG File	11,023 KB
X-1228.dng	1/24/2014 5:24 PM	DNG File	10,355 KB
X-1229.dng			
X-1329.dng			
X-1330.dng			
X-1483.dng			
X-1484.dng			
X-1485.dng			
X-1486.dng			
X-1487.dng			
X-1488.dng			
X-1765.dng			
X-1766.dng			
X-1809.dng			
X-1867.dng			
X-1868.dng			
X-1869.dng			

caecilian xray backup Final 4-29-2014 Properties

General Sharing Security Previous Versions Customize

caecilian xray backup Final 4-29-2014

Type: File folder

Location: C:\Greg's Stuff\Jason Good

Size: 19.1 GB (20,578,664,355 bytes)

Size on disk: 19.1 GB (20,500,000,000 bytes)

Contains: 3,027 Files, 7 Folders

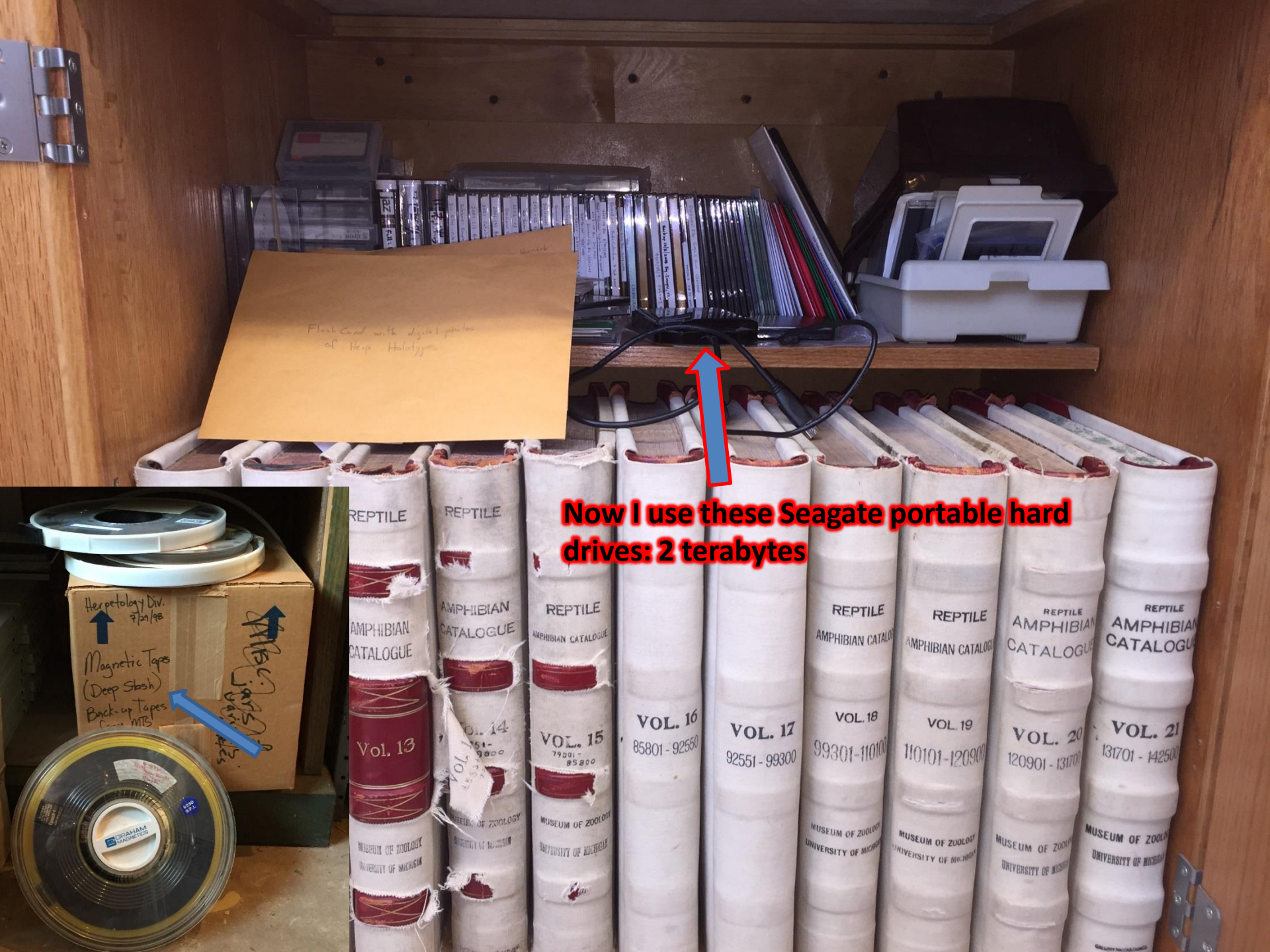
Created: Thursday, August 06, 2015, 10:28:59 AM

Attributes: Read-only (Only applies to files in folder) Hidden

Advanced...

OK Cancel Apply

This backup resides on my C drive



Flash Card with digital photos
of Herp. Holotypes

**Now I use these Seagate portable hard
drives: 2 terabytes**

Herpetology Div.
7/21/98

Magnetic Tapes
(Deep Slash)
Back-up Tapes
from MTS

REPTILE
AMPHIBIAN
CATALOGUE

REPTILE
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CATALOGUE

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REPTILE
AMPHIBIAN
CATALOGUE

Vol. 13
10101-10900

Vol. 14
10901-11700

VOL. 15
79001-85200

VOL. 16
85801-92500

VOL. 17
92551-99300

VOL. 18
99301-110100

VOL. 19
110101-120900

VOL. 20
120901-131700

VOL. 21
131701-142500

MUSEUM OF ZOOLOGY
UNIVERSITY OF MICHIGAN

FileMaker Pro
File Edit View Insert Format Records Scripts Window Help

start up (LSA-FMS02)

Records 0 Total (Unsorted) Show All New Record Delete Record Find Sort Share

Layout: start up View As: Preview

Division of Reptiles and Amphibians Computing

Browse or Find Records Enter New Data Records Prepare an Invoice Transaction

- Catalogue
- Slides
- Tissues
- Xrays
- Digital Images
- Field Notebooks
- MicroSlides

- New Main Catalogue Records
- New Slide Records
- New Tissue Records
- New Xray Records

- Prepare a Loan, Gift, Exchange, or Transfer **Catalogued Material**
- Prepare a Loan, Gift, Exchange, or Transfer **un-Catalogued Material**
- Prepare a Loan Return

Field Notebooks (LSA-FMS02)

Records 1 274 Total (Unsorted) Show All New Record Delete Record Find Sort Share

Layout: Field Notebooks View As: Preview

Book_no 1
Volume
Collectors Ruthven & Peet
Dates 1907
Geographic Northwest Iowa
Fn_series 1-498
Pages 36
NTD No

Remarks
PDF link file://lsa.m.storage.umich.edu/lsa- [Open PDF](#)

Top Next Find Mode Start up
Bottom Previous All Records

100 Browse



Books on the left side of the shelf, organized in rows. Spines are mostly light-colored with some handwritten text.

Books in the middle section, including some with darker spines and some with labels on top.

Books and binders on the right side, including blue and green binders, and some papers or folders.

Windows Explorer window showing the contents of the 'Field Notes' folder within the 'Digital Image Catalogue'.

Address bar: << Digital Image Catalogue >> Field Notes >

Search: Search Field Notes

Organize | Burn | New folder

Left pane (Folders):

- TheVolumeSettingsFolder
- visitor
- ummz-herp (\\lsa.m.storage.umich.edu)
- Digital Image Catalogue
 - Casarea_dussumieri
 - Casper UP
 - Casper Wisc
 - Chalcides ocellatus Naxos
 - Chatfield
 - Field Note_TIFF
 - Field Notes** (highlighted with a blue arrow)
 - Greece Records
 - Hemidactylum
 - LCS_JPEG
 - LCS_TIFF
 - Lepidophyma_pajapanensis
 - images
 - movies
 - Lithographs
 - Microslide photos - Sceloporus jarrovi
 - Miscellaneous
 - Morelia boeleni

Right pane (Files):

Name	Date modified	Type	Size
Book1_Binder	10/18/2011 1:43 PM	Adobe Acrobat D...	3,063 KB
Book2_Binder	10/18/2011 1:41 PM	Adobe Acrobat D...	46,633 KB
Book2_Portfolio	12/16/2010 3:26 PM	Adobe Acrobat D...	47,313 KB
Book3_Binder	10/18/2011 1:40 PM	Adobe Acrobat D...	3,122 KB
Book4_Binder	10/18/2011 1:39 PM	Adobe Acrobat D...	11,282 KB
Book5_Binder	10/18/2011 1:38 PM	Adobe Acrobat D...	4,482 KB
Book6a_Binder	10/18/2011 1:32 PM	Adobe Acrobat D...	8,743 KB
Book6b_Binder			
Book7_Binder			
Book8_Binder			
Book9_Binder			
Book10_Binder			
Book11_Binder			
Book12_Binder			
Book13_Binder			
Book14_Binder			
Book15_Binder			
Book16_Binder			
Book17_Binder			
Book18_Binder			
Book19_Binder			

Bottom status bar: 148 items | Offline status: Online | Offline availability: Not available

Field Notes Properties dialog box.

Field Notes Properties

General | Security | Previous Versions | Customize

Field Notes

Type: File folder

Location: Z:\Digital Image Catalogue

Size: 2.22 GB (2,393,241,951 bytes)

Size on disk: 2.22 GB (2,393,571,328 bytes)

Contains: 165 Files, 1 Folders

Created: Thursday, November 07, 2013, 12:31:40 PM

Attributes:

- Read-only (Only applies to files in folder)
- Hidden
- Archive

OK | Cancel | Apply

Windows Explorer window showing the folder structure: Digital Image Catalogue > Field Note_TIFF > Vinnie Deem > Book161. The folder 'Field Note_TIFF' is highlighted with a blue arrow. The main pane displays a list of files named Book161_001 through Book161_021, all of which are TIFF images, each 69,917 KB in size.

Name	Date modified	Type	Size
Book161_001	1/27/2015 11:37 A...	TIFF image	69,917 KB
Book161_002	1/27/2015 11:39 A...	TIFF image	69,917 KB
Book161_003	1/27/2015 11:43 A...	TIFF image	69,917 KB
Book161_004	1/27/2015 11:46 A...	TIFF image	69,917 KB
Book161_005	1/27/2015 11:48 A...	TIFF image	69,917 KB
Book161_006	1/27/2015 11:50 A...	TIFF image	69,917 KB
Book161_007	1/27/2015 11:53 A...	TIFF image	69,917 KB
Book161_008			
Book161_009			
Book161_010			
Book161_011			
Book161_012			
Book161_013			
Book161_014			
Book161_015			
Book161_016			
Book161_017			
Book161_018			
Book161_019			
Book161_020			
Book161_021			

Field Note_TIFF Properties dialog box:

- General tab selected
- Field Name: Field Note_TIFF
- Type: File folder
- Location: Z:\Digital Image Catalogue
- Size: 120 GB (129,646,488,878 bytes)
- Size on disk: 120 GB (129,657,290,752 bytes)
- Contains: 2,894 Files, 54 Folders
- Created: Tuesday, May 19, 2015, 1:59:18 PM
- Attributes: Read-only (Only applies to files in folder), Hidden, Archive

These are the individual page scans in .tiff format.

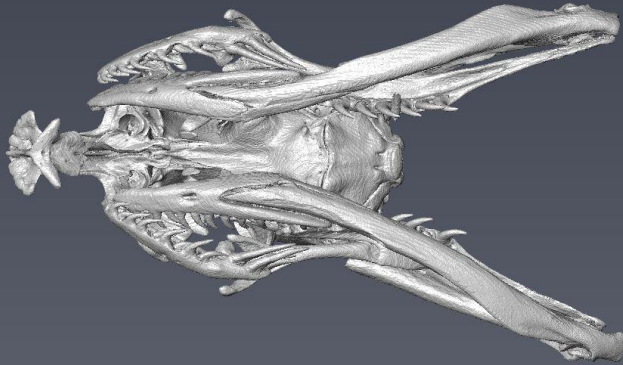
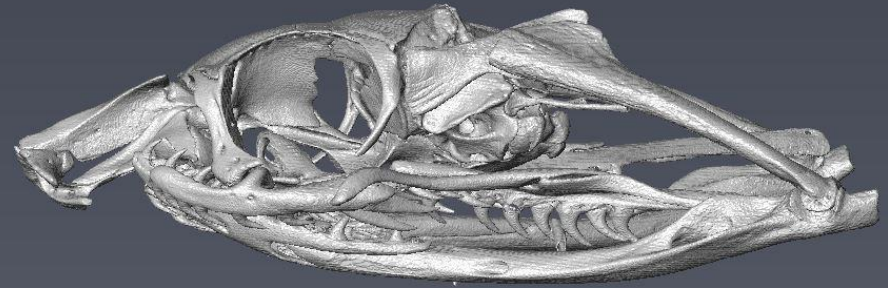
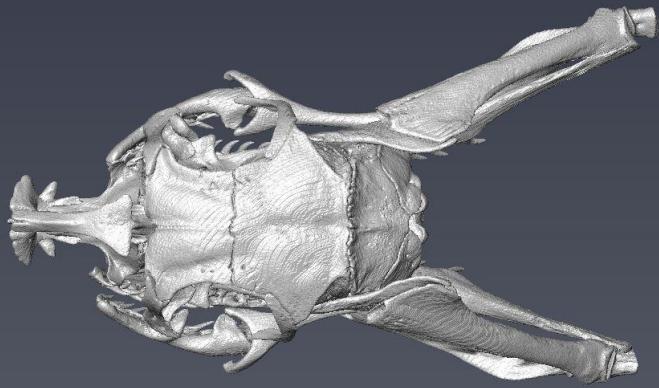
Windows Explorer window showing the folder structure of a Digital Image Catalogue. The address bar indicates the path: Z:\Digital Image Catalogue > Casarea_dussumieri. The left pane shows the folder hierarchy, with 'Casarea_dussumieri' and its subfolder 'movies' highlighted by blue arrows. The right pane displays a list of 14 QuickTime Movie files, each with a 'MOVIE' icon, name, date modified, type, and size.

Name	Date modified	Type	Size
CorCutHeadSkel	6/15/2005 7:47 AM	QuickTime Movie	21,598 KB
CorFlipHeadSkin	6/15/2005 8:59 AM	QuickTime Movie	75,901 KB
HorCutHeadSkel	6/16/2005 7:16 AM	QuickTime Movie	29,301 KB
HorFlipHeadSkin	6/15/2005 9:08 AM	QuickTime Movie	78,112 KB
PitchSpinHeadSkel	6/15/2005 7:31 AM	QuickTime Movie	8,946 KB
PitchSpinHeadSkull	6/15/2005 11:33 A...	QuickTime Movie	8,445 KB
PitchSpinMandible	6/15/2005 12:54 PM	QuickTime Movie	2,349 KB
RollSpinHeadSkel	6/15/2005 7:31 AM	QuickTime Movie	8,946 KB
RollSpinHeadSkull	6/15/2005 11:33 A...	QuickTime Movie	8,445 KB
RollSpinMandible	6/15/2005 12:54 PM	QuickTime Movie	2,349 KB
SagCutHeadSkel	6/15/2005 7:31 AM	QuickTime Movie	8,946 KB
SagFlipHeadSkin	6/15/2005 8:59 AM	QuickTime Movie	75,901 KB
YawSpinHeadSkel	6/15/2005 7:31 AM	QuickTime Movie	8,946 KB
YawSpinMandible	6/15/2005 12:54 PM	QuickTime Movie	2,349 KB

The 'Casarea_dussumieri Properties' dialog box is open, showing the following details:

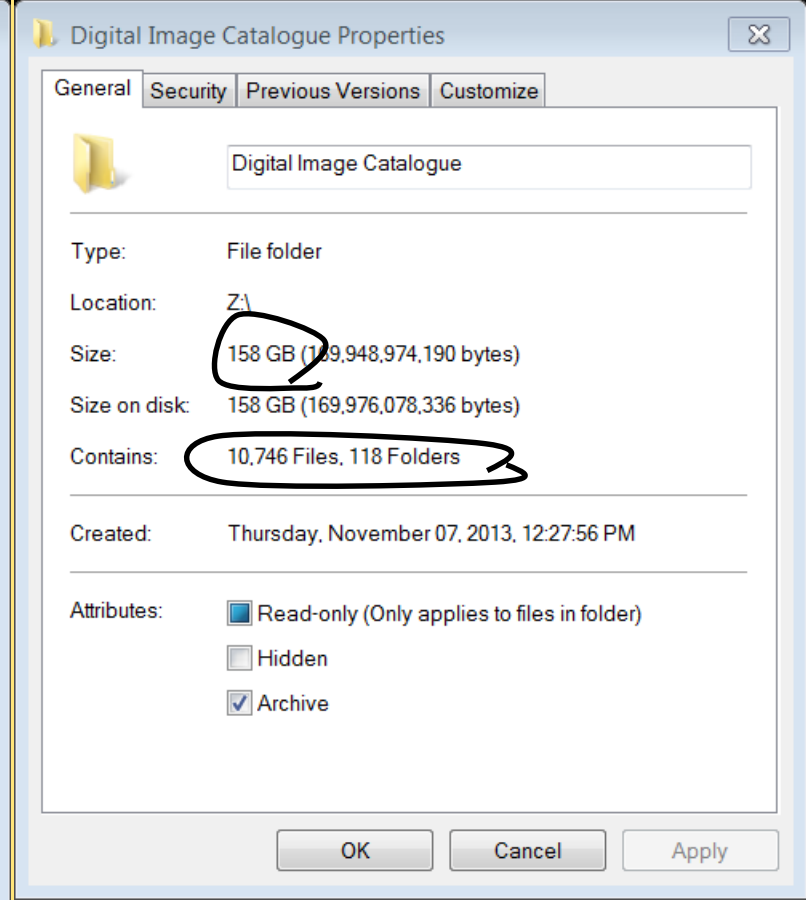
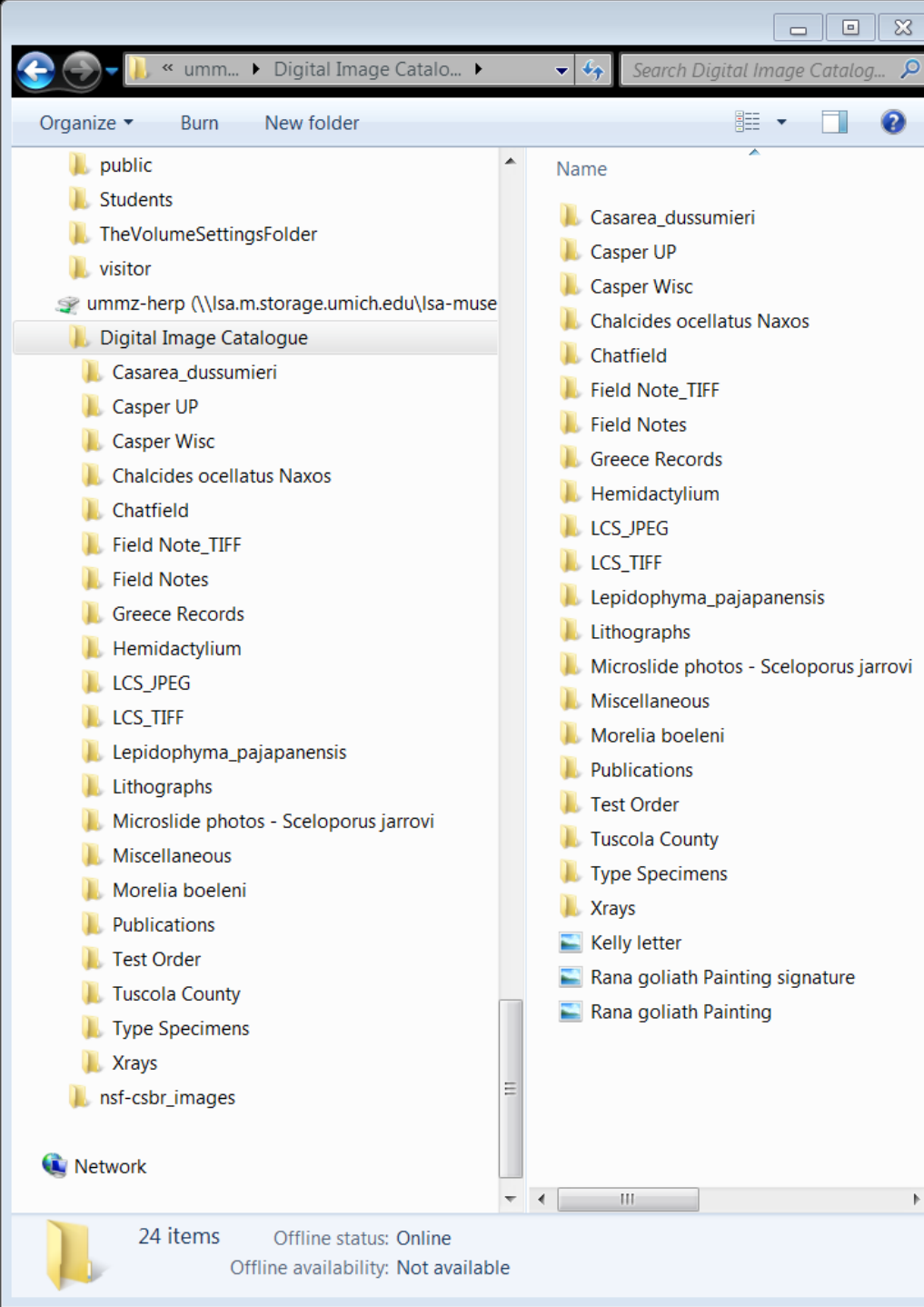
- Folder name: Casarea_dussumieri
- Type: File folder
- Location: Z:\Digital Image Catalogue
- Size: 350 MB (367,090,993 bytes)
- Size on disk: 350 MB (367,128,576 bytes)
- Contains: 14 Files, 0 Folders
- Created: Thursday, November 07, 2013, 12:27:57 PM
- Attributes: Read-only (Only applies to files in folder), Hidden, Archive

These are renditions from CT Scanning
(but, I don't have the individual slice files)

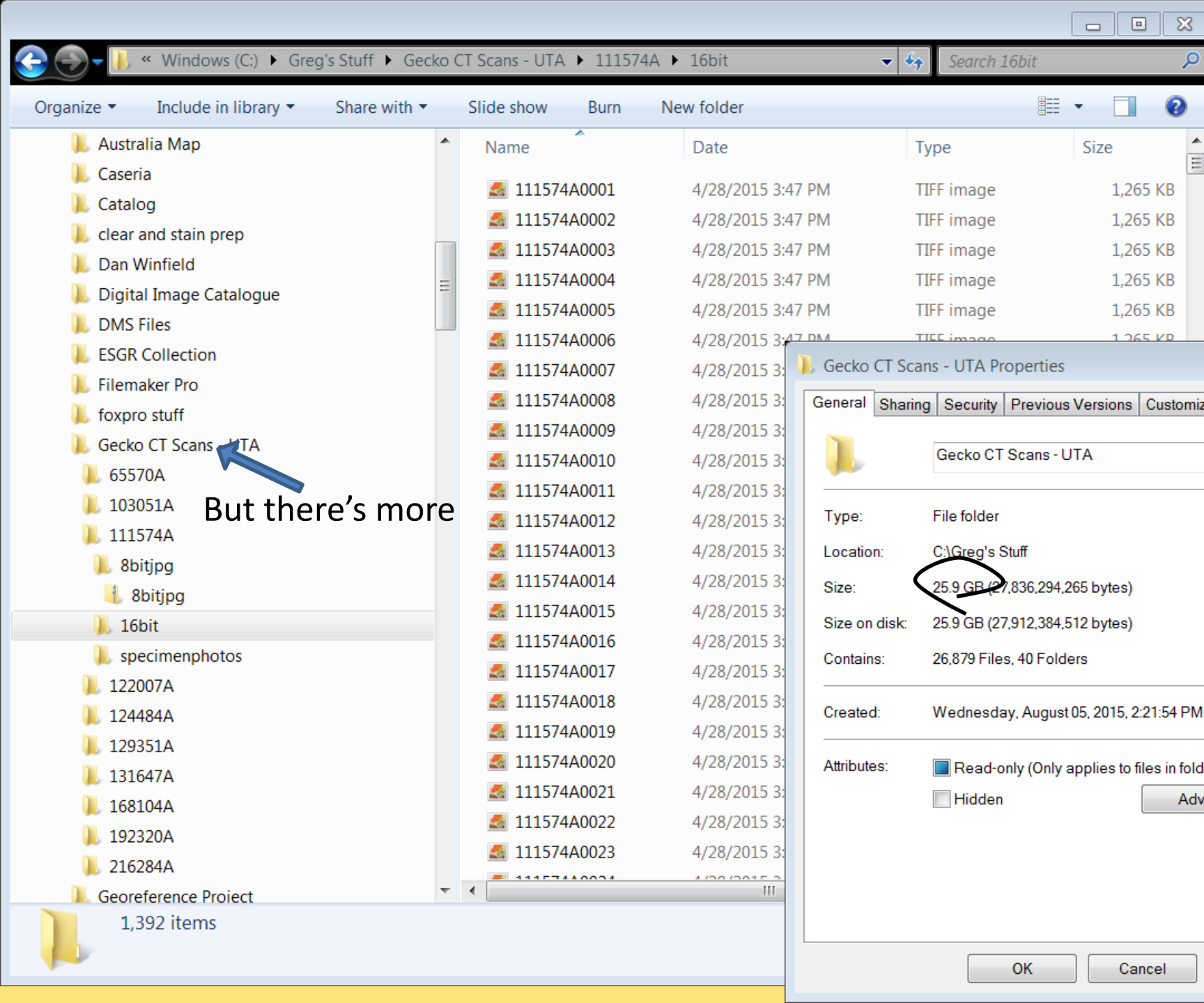


CT Scan Pilot Project for UMMZ snake skulls

- The resolution was at 20 microns.
- The surface rendition model is a file size of 543 MB.
- There are 503 slices, each is 4.34 MB, thus the total size of the folder is 2.17 GB



These are the digital images that reside on our LS&A Server that has automatic backups daily and weekly.



Search 16bit

Organize Include in library Share with Slide show Burn New folder

- Australia Map
- Caseria
- Catalog
- clear and stain prep
- Dan Winfield
- Digital Image Catalogue
- DMS Files
- ESGR Collection
- Filemaker Pro
- foxpro stuff
- Gecko CT Scans - UTA
- 65570A
- 103051A
- 111574A
 - 8bitjpg
 - 8bitjpg
 - 16bit
 - specimenphotos
- 122007A
- 124484A
- 129351A
- 131647A
- 168104A
- 192320A
- 216284A
- Georeference Project

Name	Date	Type	Size
111574A0001	4/28/2015 3:47 PM	TIFF image	1,265 KB
111574A0002	4/28/2015 3:47 PM	TIFF image	1,265 KB
111574A0003	4/28/2015 3:47 PM	TIFF image	1,265 KB
111574A0004	4/28/2015 3:47 PM	TIFF image	1,265 KB
111574A0005	4/28/2015 3:47 PM	TIFF image	1,265 KB
111574A0006	4/28/2015 3:47 PM	TIFF image	1,265 KB
111574A0007	4/28/2015 3:47 PM	TIFF image	1,265 KB
111574A0008	4/28/2015 3:47 PM	TIFF image	1,265 KB
111574A0009	4/28/2015 3:47 PM	TIFF image	1,265 KB
111574A0010	4/28/2015 3:47 PM	TIFF image	1,265 KB
111574A0011	4/28/2015 3:47 PM	TIFF image	1,265 KB
111574A0012	4/28/2015 3:47 PM	TIFF image	1,265 KB
111574A0013	4/28/2015 3:47 PM	TIFF image	1,265 KB
111574A0014	4/28/2015 3:47 PM	TIFF image	1,265 KB
111574A0015	4/28/2015 3:47 PM	TIFF image	1,265 KB
111574A0016	4/28/2015 3:47 PM	TIFF image	1,265 KB
111574A0017	4/28/2015 3:47 PM	TIFF image	1,265 KB
111574A0018	4/28/2015 3:47 PM	TIFF image	1,265 KB
111574A0019	4/28/2015 3:47 PM	TIFF image	1,265 KB
111574A0020	4/28/2015 3:47 PM	TIFF image	1,265 KB
111574A0021	4/28/2015 3:47 PM	TIFF image	1,265 KB
111574A0022	4/28/2015 3:47 PM	TIFF image	1,265 KB
111574A0023	4/28/2015 3:47 PM	TIFF image	1,265 KB

But there's more

Gecko CT Scans - UTA Properties

General | Sharing | Security | Previous Versions | Customize

Gecko CT Scans - UTA

Type: File folder

Location: C:\Greg's Stuff

Size: 25.9 GB (27,836,294,265 bytes)

Size on disk: 25.9 GB (27,912,384,512 bytes)

Contains: 26,879 Files, 40 Folders

Created: Wednesday, August 05, 2015, 2:21:54 PM

Attributes: Read-only (Only applies to files in folder) Hidden

Advanced...

OK Cancel Apply

These 155 folders of CT Scan data (bat skulls) use 1.67 Terabytes on an external hard drive.

Windows Explorer window showing a list of folders on the DATA (D:) drive. The folders are listed in a table with columns for Name, Date modified, Type, and Size. A blue arrow points to the DATA (D:) drive in the left sidebar, and another blue arrow points to the 'Fish Photos' folder in the main pane. A third blue arrow points to the '155 items' label at the bottom left. A 'DATA (D:) Properties' dialog box is open on the right, showing a pie chart of disk usage with '1.67 TB' circled in blue. A 'Fish Photos Properties' dialog box is also open in the foreground, showing details for the 'Fish Photos' folder.

Name	Date modified	Type	Size
Acerodon_jubatus_F_7847_161197	11/10/2015 2:53 PM	File folder	
Anoura_caudifer_F_8543_168864	1/29/2016 5:44 PM	File folder	
Anoura_geoffroyi_F_8542_108647	1/29/2016 5:44 PM	File folder	
Antrozous_pallidus_F_7080_86542	6/1/2015 10:38 AM	File folder	
Artibeus_anderseni_F_8541_160648	1/29/2016 5:45 PM	File folder	
Artibeus_fimbriatus_F_8520_125943	1/29/2016 6:01 PM	File folder	
Artibeus_glaucus_F_8549_126742	1/29/2016 5:39 PM	File folder	
Artibeus_lituratus_F_8521_169102	1/29/2016 6:01 PM	File folder	
Artibeus_phaeotis_F_8539_65093	1/29/2016 5:46 PM	File folder	
Artibeus_planirostris_F_8528_126736	1/29/2016 5:53 PM	File folder	
Artibeus_toltecus_F_8546_108586	1/29/2016 5:42 PM	File folder	
Balantiopteryx_plicata_F_8017_102659	9/10/2015 4:33 PM	File folder	
Brachyphylla_cavernarum_F_8519_68201	1/29/2016 5:36 PM	File folder	
Carollia_brevicauda_F_8527_126789	1/29/2016 5:37 PM	File folder	

Fish Photos Properties

General | Sharing | Security | Previous Versions

Fish Photos

Type: File folder

Location: C:\Users\annabarg\Pictures

Size: 56.0 GB (60,152,368,621 bytes)

Size on disk: 56.0 GB (60,161,499,136 bytes)

Contains: 4,526 Files, 1,017 Folders

Created: Thursday, May 14, 2015, 12:07:56 PM

Attributes: Read-only (Only applies to files in folder) Hidden

DATA (D:) Properties

General | Previous Versions | Quota | Customize

General | Tools | Hardware | Sharing

DATA

Type: Local Disk

File system: NTFS

Used space: 1,842,025,697,280 bytes **1.67 TB**

Free space: 2,158,625,185,792 bytes 1.96 TB

Capacity: 4,000,650,883,072 bytes 3.63 TB

Drive D:

Compress this drive to save disk space

Allow files on this drive to have contents indexed in addition to file properties

In Comparison:
Fish Photos (Great Lakes Invasive Species Project) include 4,526 image files using 56 GB (which is only about 3% of the original goal)

« Department Share (S:) » dept » HERP » work in progress » Recordings » Search Recordings

Organize Burn New folder

RON
work in progress
Anat
Data Entry
DMSCat
Geography
Hayden Hedman
Helen
Ike
Jason
pygopodids
Jay Reed
John Emerick
Kinsey
Manny
Marino
Matt
Pascal
Recordings
specimen images
Type Images
Vinnie Deem
INSECT
MAMMAL
Mindell-ummz
MOLLUSK

Name	Date modified	Type
Acris gryllus crepitans	12/23/2003 8:44 A...	File folder
Bufo	7/16/2003 9:13 AM	File folder
Bufo cavifrons	7/16/2003 9:17 AM	File folder
Bufo fowleri	7/30/2003 12:40 PM	File folder
Bufo terrestris	7/16/2003 9:20 AM	File folder
Eleutherodactylus carolinensis	7/30/2003 12:10 PM	File folder
Florida night sounds	7/17/2003 7:31 AM	File folder
Four-toed frogs		
Frog choruses		
Frogs Alabama		
Gastrophryne carolinensis		
Hyla avivoca		
Hyla cinerea		
Hyla femoralis		
Hyla miotympanum		
Hyla regilla		
Hyla spp		
Hyla squirella		
Hyla versicolor		
Mexican frogs 1959		
Misc Frogs		
Night sounds		
PML1		
PML2		

54 items Offline status: Online
Offline availability: Not available

And these

Recordings Properties

General Security Previous Versions DFS Customize

Recordings

Type: File folder

Location: S:\dept\HERP\work in progress

Size: 2.65 GB (2,849,655,705 bytes)

Size on disk: 2.65 GB (2,850,029,568 bytes)

Contains: 193 Files, 38 Folders

Created: Monday, April 09, 2012, 5:54:20 PM

Attributes: Read-only (Only applies to files in folder)
 Hidden
 Archive

OK Cancel Apply

Computer > Windows (C:) > Greg's Stuff > Pascal_Australia2015

Organize > Extract all files

Name	Type	Compressed size
IMG_8192	JPEG image	1,000 KB
IMG_8193	JPEG image	1,628 KB
IMG_8194	JPEG image	1,695 KB
IMG_8195	JPEG image	1,683 KB
IMG_8196	JPEG image	1,884 KB
IMG_8197		
IMG_8198		
IMG_8199		
IMG_8201		
IMG_8203		
IMG_8204		
IMG_8205		
IMG_8206		
IMG_8207		
IMG_8208		
IMG_8209		
IMG_8210		
IMG_8211		
IMG_8212		
IMG_8213		
IMG_8214		
IMG_8215		
IMG_8217		
IMG_8218		

Gecko CT Scans - UTA
Georeference Project
Hayden Hedman
HERP
Invoices
Jason Good
Jay Reed
Kaplan Collection
Kinsey Brock Scans
Larry Stuart
Library
Marino
Massasauga
mexico georeference
NASAMAD
Pascal
Recordings
Sonora semiannulata
Type Specimens
Pascal_Australia2015
Intel
MSOCache
PerfLogs
Program Files
Program Files (x86)
ProoramData

IMG_8197 Compressed size: 1.62 MB
Size: 1.65 MB

Ratio: 2%

Date modified: 5/11/2015 8:49 AM

And what about these

Pascal_Australia2015 Properties

General Security Details Previous Versions

Pascal_Australia2015

Type of file: Compressed (zipped) Folder (.zip)

Opens with: Windows Explorer Change...

Location: C:\Greg's Stuff

Size: 1.71 GB (1,837,838,792 bytes)

Size on disk: 1.71 GB (1,837,842,432 bytes)

Created: Wednesday, August 05, 2015, 1:43:48 PM

Modified: Monday, May 11, 2015, 1:09:35 PM

Accessed: Wednesday, August 05, 2015, 1:43:48 PM

Attributes: Read-only Hidden Advanced...

OK Cancel Apply



This one image (by Pascal Title) from our Australia trip last year is 19 MB (.jpg). We have a lot of these to process.

Computer > Windows (C:) > Greg's Stuff > Invoices

Search Invoices

Organize Include in library Share with Burn New folder


- Digital Image Catalogue
- DMS Files
- ESGR Collection
- Filemaker Pro
- foxpro stuff
- Gecko CT Scans - UTA
- Georeference Project
- Hayden Hedman
- HERP
- Invoices**
- Jason Good
- Jay Reed
- Kaplan Collection
- Kinsey Brock Scans
- Larry Stuart
- Library
- Marino
- Massasauga
- mexico georeference
- NASAMAD
- Pascal
- Recordings
- Sonora semiannulata
- Type Specimens
- Pascal_Australia2015
- Intel

57 items

Name	Date modified	Type	Size
2014-15 no. 1	7/21/2014 2:17 PM	Adobe Acrobat D...	17 KB
2014-15 no. 2	7/21/2014 2:17 PM	Adobe Acrobat D...	17 KB
2014-15 no. 3	7/22/2014 2:38 PM	Adobe Acrobat D...	17 KB
2014-15 no. 4	8/19/2014 9:44 AM	Adobe Acrobat D...	17 KB
2014-15 no. 5	8/19/2014 4:15 PM	Adobe Acrobat D...	17 KB
2014-15 no. 6	9/11/2014 11:10 A...	Adobe Acrobat D...	17 KB
2014-15 no. 7			
2014-15 no. 8			
2014-15 no. 9			
2014-15 no. 10			
2014-15 no. 11			
2014-15 no. 12			
2014-15 no. 13			
2014-15 no. 14			
2014-15 no. 15			
2014-15 no. 16			
2014-15 no. 17			
2014-15 no. 18			
2014-15 no. 19			
2014-15 no. 20			
2014-15 no. 21			
2014-15 no. 23			
2014-15 no. 25			
2015-16 no. 1			

2014-15 no. 10.pdf - Adobe Reader

File Edit View Window Help



INVOICE OF SPECIMENS

DIVISION OF REPTILES AND AMPHIBIANS
MUSEUM OF ZOOLOGY
THE UNIVERSITY OF MICHIGAN
ANN ARBOR, MICHIGAN, U.S.A 48109-1079

Invoice No. 2014
Transaction: Loan

To: Dr. Carol L. Spencer
Museum of Vertebrate Zoology
3101 Valley Life Sciences Building
University of California
Berkeley, CA 94720-3160
USA

LOANS ARE ORDINARILY MADE FOR A PERIOD OF SIX MONTHS OR LESS. A REQUEST FOR RENEWAL SHOULD BE MADE IF IT IS NECESSARY TO KEEP SPECIMENS FOR A LONGER PERIOD.

UMMZ NO.	# of Specimens	Genus	Species	Comments
111325	1	CHIROPTEROTRITON	MULTIDENTATUS	
111326	1	CHIROPTEROTRITON	MULTIDENTATUS	

There are a total of 2 catalogued lot/s representing 2 individual specimen/s.

Concluding Remarks

- Space Requirements – a lot
 - Database data – maybe up to 1 GB
 - Image data – up to 250 GB (and rapidly growing, especially with CT imaging)
 - Redundancy – How many copies / backups ?
- Data Management Plan – DMP Tool
 - Everyone should have one – I wish I did
 - Where will we store it and at what cost
 - Who is responsible

