



Smithsonian
Institution

DIGITIZATION @ USNM: Where we are

Patricia Gentili-Poole & Jessica Bird

Collection Information Management Unit

Department of Entomology, NMNH, SI

- Updates to Digitization @ USNM
- Rapid Capture Workflow

HISTORY

EMu as the RCIS of record for NMNH

- 2001 Deployment at the Museum
- 2007 Migration of Entomology existing Types & Odonata databases
- 2009 Started updating of Type specimens records
- 2011 Deployment of Transactions Module
- 2012 Started Data clean-up and standardization
Migration of legacy datasets
- 2013 Deployment of Collection Level Index & Taxonomic Lot
Initiated Species Inventory
- 2014 Deployment of Genetic Samples integrated with FreezerPro
Beta version of Field Information Management System
Revamped the online Search interface
Estimated # of records to represent scientific value of collection
Development of Workflow for Rapid Capture at the specimen level

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collections.nmnh.si.edu/search/ento/

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Search the Department of Entomology Collections

Specimen Inventory Search Results - Grid View

Image	Catalog#	Order	Family	Scientific Name	Type Status	Country	Province/State
<input type="checkbox"/>		Hymenoptera	Apidae	Bombus (Bombus) affinis Cresson		United States	Massachusetts
<input type="checkbox"/>		Hymenoptera	Apidae	Bombus (Bombus) affinis Cresson		United States	Massachusetts
<input type="checkbox"/>		Hymenoptera	Apidae	Bombus (Bombus) affinis Cresson		United States	Virginia
<input type="checkbox"/>		Hymenoptera	Apidae	Bombus (Bombus) affinis Cresson		United States	New Hampshire
<input type="checkbox"/>		Hymenoptera	Apidae	Bombus (Bombus) affinis Cresson		United States	Massachusetts
<input type="checkbox"/>		Hymenoptera	Apidae	Bombus (Bombus) affinis Cresson		United States	Virginia
<input type="checkbox"/>		Hymenoptera	Apidae	Bombus (Bombus) affinis Cresson		United States	Massachusetts
<input type="checkbox"/>		Hymenoptera	Apidae	Bombus (Bombus) affinis Cresson		United States	Massachusetts
<input type="checkbox"/>		Hymenoptera	Apidae	Bombus (Bombus) affinis Cresson		United States	New Hampshire
<input type="checkbox"/>		Hymenoptera	Apidae	Bombus (Bombus) affinis Cresson		United States	District of Columbia

Page 1 of 19 | Clear Selections | Export All Results as CSV | Displaying records 1 - 10 of

Entomology Collections | Keyword Search | General Search | Types Search | **Specimen Inventory** | Species Inventory | Illustration Archive | Help

Specimen Inventory

Catalog Number:

Barcode:

Class:

Order:

Family:

Scientific Name:

Type Status:

Country:

Province/State:

Bombus (Bombus) affinis Cresson : Apidae : Hymenoptera : Insecta : Arthropoda

Barcode: USNMENT00835947
 Catalog: Specimen Inventory
 Order: Hymenoptera
 Family: Apidae
 Scientific Name: **Bombus (Bombus) affinis Cresson**
 Preparation: Pinned
 Country: United States
 Province/State: Massachusetts
 District/County: Hampshire
 Precise Locality: Amherst, Notch South
 Collecting Date: VIII, 8, 1904
 Record Last Modified: 18 Jul 2014 14:34:00

Close

Bombus (Bombus) affinis

Title: USNMENT00835947
 Creator: Pixel Acuity LLC
 Format: image/tiff
 Resolutions: 320x174, 640x348, 3501x1901
 Rights Holder: This image may be protected by copyright or have other legal restrictions on use. Permission to publish should be obtained from the National Museum of Natural History, Smithsonian Institution, Washington, D.C.
 Rights: Unless otherwise noted, this image or its contents may be protected by international copyright laws.



Search the Department of Entomology Collections

[New Search](#)

Species Inventory Search Results - Grid View

<input type="checkbox"/>	Order	Family	Scientific Name	Type Status	Bioregion	Distribution
<input type="checkbox"/>	Coleoptera	Dytiscidae	<i>Acilius mediatius</i> (Say)			Canada; United; United States
<input type="checkbox"/>	Coleoptera	Dytiscidae	<i>Acilius semisulcatus</i> Aube			Canada; United States
<input type="checkbox"/>	Coleoptera	Dytiscidae	<i>Acilius sulcatus</i> Linnaeus			France; Germany; Norway; Russia; Sweden;...
<input type="checkbox"/>	Coleoptera	Dytiscidae	<i>Acilius sulcatus</i> Linnaeus			Denmark; Unknown
<input type="checkbox"/>	Coleoptera	Dytiscidae	<i>Acilius sylvanus</i> Hilsenhoff			Canada; United States
<input type="checkbox"/>	Coleoptera	Scarabaeidae	<i>Aclopus</i> unidentified		Neotropical	
<input type="checkbox"/>	Coleoptera	Scarabaeidae	<i>Acoma arizonica</i> Brown		Nearctic	
<input type="checkbox"/>	Coleoptera	Scarabaeidae	<i>Acoma brunnea</i> Casey, 1889		Nearctic	
<input type="checkbox"/>	Coleoptera	Scarabaeidae	<i>Acoma conjuncta</i> Howden, 1962		Nearctic	

Page 2 of 500 Clear Selections Export All Results as CSV

Displaying records 11 - 20 of 5000

Entomology Collections | Keyword Search | General Search | Types Search

Species Inventory

Order:

Family:

Scientific Name:

Biogeographic Region:

Country:

Province/State:

Preparation:

Only Records With: Images:

Record Status:

Search

Clear

Acilius sulcatus Linnaeus : Dytiscidae : Coleoptera : Insecta : Arthropoda

Catalog: Species Inventory

Order: Coleoptera

Family: Dytiscidae

Scientific Name: **Acilius sulcatus Linnaeus**

Stage: Adult

Preparation: Pinned

Distribution: Country (Province/State): France; Germany; Norway; Russia; Turkey; United Kingdom (England); Yugoslavia

Specimen Count: 53

Record Status: Status: Unreviewed Date: 2002 Remarks: prepared by P.Spar

Record Last Modified: 16 Sep 2013 10:19:00

Close

CATALOGS

- **Type Specimens Inventory: ~120,000 expected records**
 - All original information (except for Family) and images
 - Entomology Types [= updated Primary Types]
 - Inquire Types [= migrated database with Primary & Secondary Types]
 - 126,430 current records
- **Species Inventory: ~400-450,000 expected records**
 - Includes unidentified
 - 62,831 current records
- **Specimen Inventory: ~21,000,000 expected records**
 - 'Regular Specimens'
 - Includes secondary Types, Genetic Samples
 - 171,407 current records
- **Illustration Archives: unknown # of records**
 - Published and unpublished illustrations
 - 3,893 current records

Species Inventory

It is a Management Tool

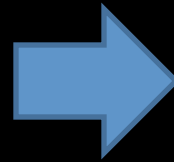
- Includes: Scientific Name, Author, Year; Specimen Count; Country level Distribution, States if United States; Bioregion; Images
- Capture by multiple passes approach:
 - 1) Scientific names and update classification
 - 2) Specimen count and distribution
 - 3) Images
- Migration of legacy datasets and capture *de novo*
- Involves Pre-capture preparation of the Collection

Specimen Inventory

Estimated number of records to represent scientific value of a collection of ~35 million objects is 20,835,735

Pinned	18,813,906	largest problem
Slides	1,392,676	method exists
Fluid	522,717	major problem
Papered	106,436	done (Odonata)

The Challenge



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Search the Department of Entomology Collections

New Search

Specimen Inventory Search Results - Grid View

<input type="checkbox"/>	Catalog#	Order	Family	Scientific Name	Type Status	Country	Province/State
<input checked="" type="checkbox"/>	USNME...	Hymenoptera	Apidae	Bombus (Alpigenobombus) breviceps ...			
<input checked="" type="checkbox"/>	USNME...	Hymenoptera	Apidae	Bombus (Alpigenobombus) breviceps ...			
<input checked="" type="checkbox"/>	USNME...	Hymenoptera	Apidae	Bombus (Alpigenobombus) breviceps ...			
<input checked="" type="checkbox"/>	USNME...	Hymenoptera	Apidae	Bombus (Alpigenobombus) breviceps ...			
<input checked="" type="checkbox"/>	USNME...	Hymenoptera	Apidae	Bombus (Alpigenobombus) breviceps ...			
<input checked="" type="checkbox"/>	USNME...	Hymenoptera	Apidae	Bombus (Alpigenobombus) breviceps ...			
<input checked="" type="checkbox"/>	USNME...	Hymenoptera	Apidae	Bombus (Alpigenobombus) breviceps ...			
<input checked="" type="checkbox"/>	USNME...	Hymenoptera	Apidae	Bombus (Alpigenobombus) breviceps ...			
<input checked="" type="checkbox"/>	USNME...	Hymenoptera	Apidae	Bombus (Alpigenobombus) breviceps ...			

Page 1 of 500 | Clear Selections | Export All Results as CSV | Displaying records 1 - 10 of 5000

Entomology Collections | Keyword Search | General Search | Types Search | **Specimen Inventory** | Species Inventory | Illustration Archive | Help

Specimen Inventory

Catalog Number:	<input type="checkbox"/>	Catalog Number:	USNMENT 1008892
Barcode:	<input type="checkbox"/>	Barcode:	USNMENT01008892
Class:	<input type="checkbox"/>	Catalog:	Specimen Inventory
Order:	<input type="checkbox"/>	Order:	Hymenoptera
Family:	<input type="checkbox"/>	Family:	Apidae
Scientific Name:	<input type="checkbox"/>	Scientific Name:	Bombus (Alpigenobombus) breviceps Smith, 1852
Type Status:	<input type="checkbox"/>	Adult:	
Country:	<input type="checkbox"/>	Preparation:	Pinned
Province/State:	<input type="checkbox"/>	Record Status:	Status: Unreviewed Date: 9 Jul 2014 Remarks: RCPB Bumblebee, SI
District/Country:	<input type="checkbox"/>	Record Last Modified:	09 Jul 2014 23:18:00

Close

How to get there in a reasonable length of time ?



Bombus ♂
affinis
Cresson
det. Franklin
Jan. 1908

UIUC USDA BBDP
012770

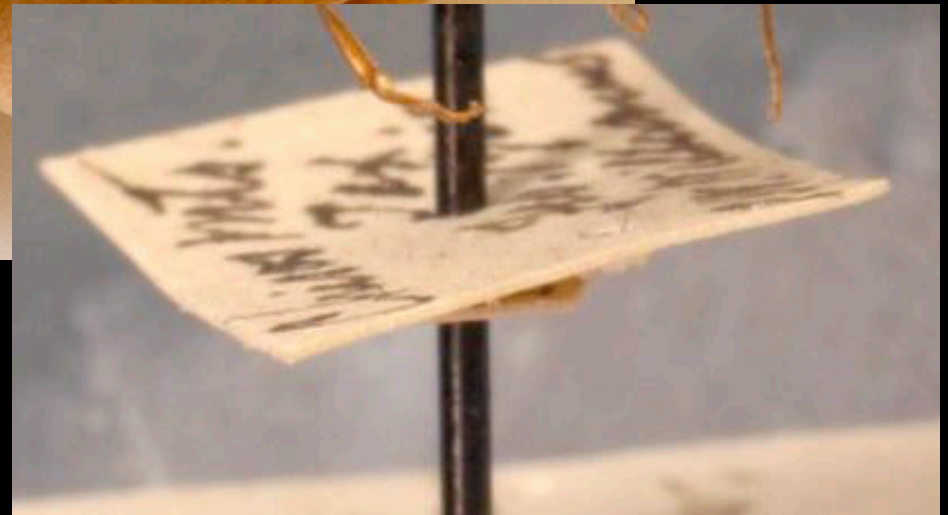
Amherst, Mass
Hotell, South
VIII, '08, 1904

HOMOTYPE
H. J. Franklin
M. A. C.

Bombus
affinis ♂
Cress.

USNM ENT
00835947

♂



The goal is to capture the **label data**, not the specimen image per se

Bumble Bee RCPP

To develop a **workflow** to digitize the pinned collection

SI DPO conditions

- Medium size
- With some volume
- One shot fits all
- One camera setting fits all
- Use of SI Transcription Center

Entomology conditions

- Pre-capture ready = species inventory complete
- Important to the scientific community
- Appealing to the general public to attract digital volunteers
- Candidates: bees & wasps

The Workflow

A clear three step process:



Step 1: Specimen processing



Collection



Removing labels from pins



Staging

Adding barcode labels



Replacing labels on pins
Replacing specimens in trays and drawers



Imaging

Results on Specimen Handling

Personnel in staging	Specimens processed	Average
4x9.5 days [228 hrs]	6,732	708/day [29/hr]
5x13 days [390 hrs]	15,732	1,210/day [40/hr]
6x10.5 days [378 hrs]	13,675	1,302/day [36/hr]
7x5 days [210 hrs]	7,916	1,583/day [37/hr]

Results on Specimen Handling

Traditional method

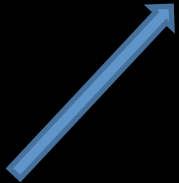
Records in EMu with label data
No images of labels captured
Processed 100 specimens/person/day
3,800 records in 38 calendar days

RCPP Method

Records in EMu without label data
Images captured for preservation
Processed 184 specimens/person/day
44,047 records in 201 work days (=38 calendar days)

Step 2: Imaging and post-processing

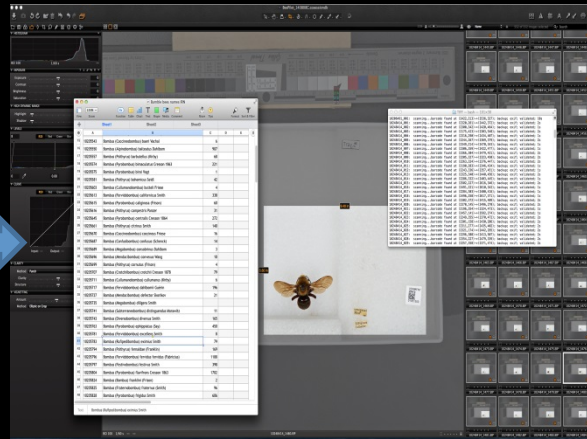
Quality Control



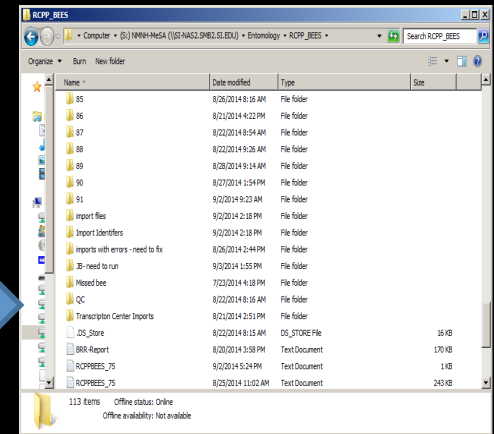
Capture



Crop



Rename files with Barcode Number
Embed Metadata
Generate report



Create folders in Staging Server



Bombus ♂
affinis
Cresson
det. Franklin
Jan. 1908

UIUC USDA BBDP
012770

Amherst, Mass
Hotchkiss South
VIII, 1908, 1904

HOMOTYPE
H. J. Franklin
M. A. C.

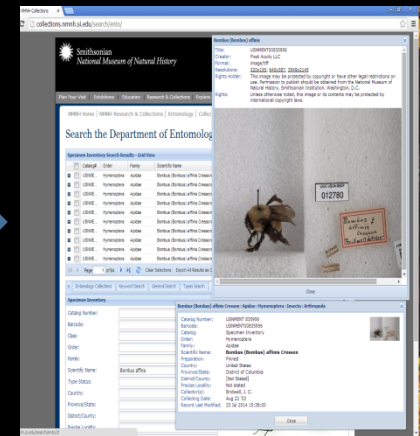
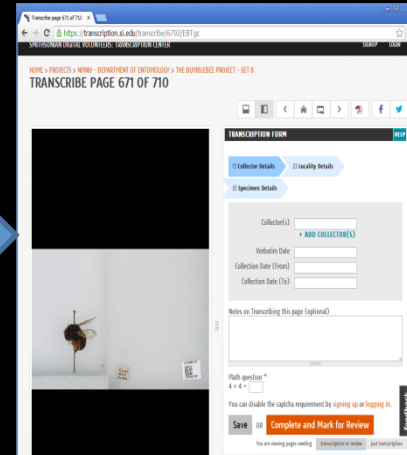
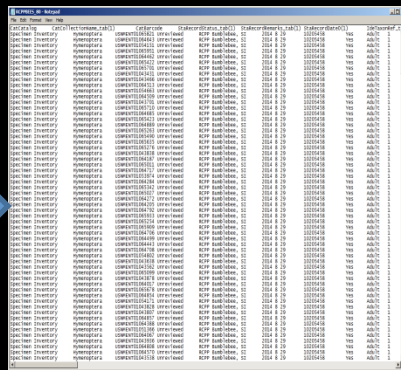
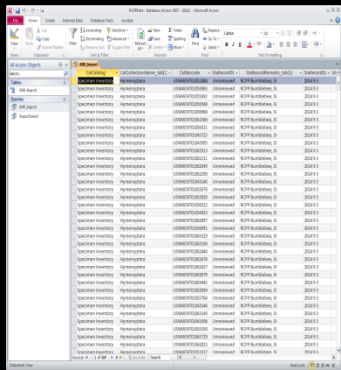


Bombus
affinis ♂
Cresson



Final image ready to be uploaded into NMNH RCIS-EMu
(Image file name: USNMENT00835947)

Step 3: Data Processing



Access query to produce import file (developed by Informatics)

Creation of new records in EMu in one pass, publish to Internet

Capture by TC
Transcription by DV
Final validation by DoE

Appending data into existing records in EMu

Catalog (1) - Display

File Edit Select View Genetic Sample Tools Tabs Multimedia Window Help

[SPECIMEN INVENTORY] *Bombus (Funebribombus) funebris funebris* Smith : Apidae : Hymenoptera : Insecta : Arthrc 11334163

Collection Custody

Museum: NMNH USNM
 Department: Entomology
 Division:
 Catalog: Specimen Inventory
 Collection name: 1 Hymenoptera

Cataloging Details

Prefix: Catalog number: Suffix:
 Barcode: USNMENT01009920 Part Number:
 Whole/Part: Whole
 Cataloged by: Bird, Jessica
 Date cataloged: 21 Jul 2014
 Kind of object: Specimen/Lot

Counts

Specimen count: 1 Modifier: Original count: 1 Modifier:

Other Counts

Kind	Value

Other Numbers

Other Numbers Kind:...	Source	Value

Catalog Counts Status Identification Biology Zoology (1) Zoology (2) Curation Measurements

Display Object 9097 of 10327 gentilip Ento SA nmnhlive

Skeleton Descriptive Record in NMNH RCIS-EMu
 (Unique Identifier Number highlighted)

Catalog (1) - Display

File Edit Select View Genetic Sample Tools Tabs Multimedia Window Help

[SPECIMEN INVENTORY] Bombus (Funebribombus) funebris funebris Smith : Apidae : Hymenoptera : Insecta : Arthrc 11334163

Object Data from time of Collecting Event

Event/Site:

Collectors: Primary coll number:

Verbatim locality:

Specimen/Lot description: Microhabitat description:

Substrate: Ethnobia used part:

Ethnobia use:

Specimen

Live at collection: Unknown Yes No

Chromosome count:

Count by:

Publish Locality Data on Web

User: Yes No

System: Yes No

System Reason:

Biology Zoology (1) Zoology (2) Curation Measurements Accession Legacy Deacc. Transaction Acquire

Display Object 9097 of 10327 gentilip Ento SA nmnhlive

Skeleton Descriptive Record in NMNH RCIS-EMu

(Note empty fields for label information)

Catalog (1) - Display

File Edit Select View Genetic Sample Tools Tabs Multimedia Window Help

[SPECIMEN INVENTORY] *Bombus (Funebribombus) funebris funebris* Smith : Apidae : Hymenoptera : Insecta : Arthrc 11334163

Note Details

Note: Available for Transcription

Date: 21 Jul 2014 Kind: Crowdsourcing Attributed To: Publish: Yes No

Notes

	Note	Date	Kind	Attributed To	Publish
1	NMNHENTO_TR_BUMBLEBEES_SET18	21 Jul 2014	Transcription Set		No
2	Available for Transcription	21 Jul 2014	Crowdsourcing		Yes
*					

DwC 1.2 (1) DwC 1.2 (2) DwC (1.3) DwC MaNIS (1) DwC MaNIS (2) DwC OBIS (1) DwC OBIS (2) Notes Multimedia


Display Object 9097 of 10327 gentilip Ento SA nmnhlive

Skeleton Descriptive Record in NMNH RCIS-EMu
 (Notes indicating the record is ready for Transcription Center capture)

Multimedia (1) - Display

File Edit Select View Tools Tabs Multimedia Window Help

USNMENT01009920 (image/Tiff) 10719034



Resource Information

Title: USNMENT01009920

Creator: 1 Pixel Acuity LLC

MIME Type: image MIME Format: tiff

Identifier: USNMENT01009920.tif

Description

Multimedia Details Characteristics EXIF IPTC XMP Resolutions Supple

Display Item 1 of 1 gentilp Ento SA nmnhlive

Multimedia (1) - Display

File Edit Select View Tools Tabs Multimedia Window Help

USNMENT01009920 (image/Tiff) 10719034

Subject/Keywords

- 1 Insecta
- 2 Hymenoptera
- 3 Apidae
- 4 Bombus (Funebribombus) funebris funebris Smith

Publisher

Other Contributor(s)

Source

Specimen from Department of Entomology, NMNH, Smithsonian Institution

Relation

Resource Details

Date:

Resource Type: Specimen/Object

Language:

Collection Name

- 1 RCPP2014-Specimen Inventory

Coverage

Rights

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Multimedia Details Characteristics EXIF IPTC XMP Resolutions Supple

Display Item 1 of 1 gentilp Ento SA nmnhlive

Multimedia Record in NMNH RCIS-EMu
 (Note the File Title bearing the Unique Identifier Number)

Transcription Center Set Up

- Prior to RCPP production, a help file, template and in-line text were created in collaboration with the TC team
- At time of import, a note is added to skeleton records that “tags” images for upload into transcription center
- Administrators have access to data sets and publish sets as needed
- Digital volunteers transcribe specimen labels into a template
- Keep in touch with volunteers through email and social media

Transcription Center Data Entry

Smithsonian
SMITHSONIAN DIGITAL VOLUNTEERS: TRANSCRIPTION CENTER

HOME > PROJECTS > NMNH - DEPARTMENT OF ENTOMOLOGY > A-Z
BROWSE PROJECTS

Show: NMNH - Department of Entomology Sort: A-Z Include Completed Projects

30% COMPLETE
360 Total Pages
31 Contributing Members
START CONTRIBUTING TODAY.

THE BUMBLEBEE PROJECT - SET 11
Please help us create digital records for the United States National Entomological Collection! We will be transcribing the labels of specimens of bumblebees. Bumblebees are found in the Bumblebe genus (*Bombus* spp.). They are social insects that feed on nectar and collect pollen to feed their young. Bumblebees are very important pollinators!

1% COMPLETE
439 Total Pages
10 Contributing Members
START CONTRIBUTING TODAY.

THE BUMBLEBEE PROJECT - SET 12
Please help us create digital records for the United States National Entomological Collection! We will be transcribing the labels of specimens of bumblebees. Bumblebees are found in the Bumblebe genus (*Bombus* spp.). They are social insects that feed on nectar and collect pollen to feed their young. Bumblebees are very important pollinators!



TRANSCRIBE PAGE 190 OF 360

TRANSCRIPTION FORM

1) Collector Details 2) Locality Details 3) Specimen Details

Collector(s) + ADD COLLECTOR(S)

Verbatim Date

Collection Date (From)

Collection Date (To)

This is the date the specimen was collected. Please enter the date or date range exactly as it is written. Examples: Fall 1902, 19-1943. If no date information is present, please enter: "Not Stated".

Notes on Transcribing this page (optional)

Save OR **Complete and Mark for Review**

You are viewing page number: 190 of 360. | Transcription of review | Just Transcription | Just Review



All Projects

NAME ONLINE OWNER IMAGE OPERATIONS

NAME	ONLINE	OWNER	IMAGE	OPERATIONS
6775 The Bumblebee Project - Set 1	Yes	NMNH - Department of Entomology		Edit Project Manage Assets Review Transcriptions Export
6780 The Bumblebee Project - Set 2	Yes	NMNH - Department of Entomology		Edit Project Manage Assets Review Transcriptions Export
6781 The Bumblebee Project - Set 3	Yes	NMNH - Department of Entomology		Edit Project Manage Assets Review Transcriptions Export
6782 The Bumblebee Project - Set 4	Yes	NMNH - Department of Entomology		Edit Project Manage Assets Review Transcriptions Export
6789 The Bumblebee Project - Set 5	Yes	NMNH - Department of Entomology		Edit Project Manage Assets Review Transcriptions Export
6790 The Bumblebee Project - Set 6	Yes	NMNH - Department of Entomology		Edit Project Manage Assets Review Transcriptions Export
6791 The Bumblebee Project - Set 7	Yes	NMNH - Department of Entomology		Edit Project Manage Assets Review Transcriptions Export
6792 The Bumblebee Project - Set 8	Yes	NMNH - Department of Entomology		Edit Project Manage Assets Review Transcriptions Export
6793 The Bumblebee Project - Set 9	Yes	NMNH - Department of Entomology		Edit Project Manage Assets Review Transcriptions Export
6794 The Bumblebee Project - Set 10	Yes	NMNH - Department of Entomology		Edit Project Manage Assets Review Transcriptions Export

1 2 3 4 5 6 7 8 9 next last >



TRANSCRIBE PAGE 83 OF 360

TRANSCRIPTION FORM

1) Collector Details 2) Locality Details 3) Specimen Details

Verbatim Locality

Country

State / Province

District / County

Precise Locality

Elevation (from)

Elevation (to)

Elevation Unit

Longitude

Latitude

Notes on Transcribing this page (optional)

Reopen for Editing OR **Mark as Complete**

You are viewing page number: 83 of 360. | Transcription of review | Just Transcription | Just Review

Final Data Import

- After labels are transcribed they must be validated by Collections Information Unit staff
- Validated data is exported in .csv format
- Data must be “massaged” in order for it to be imported back in to EMu for complete records.
 - Parse out any items in notes that have a dedicated EMu field, such as sex and the identifier
 - Match irns for parties records (collector, identifier, etc)
 - Add note type and descriptions for all note fields
 - Un-publish previous transcription center notes and add a new note to signify that the record was transcribed by digital volunteers
 - Make sure that all data entered is standardized
- Map to EMu fields, and perform final import

Catalog (1) - Display

File Edit Select View Genetic Sample Tools Tabs Multimedia Window Help

[SPECIMEN INVENTORY] **Bombus (Bombus) affinis Cresson : Apidae : Hymenoptera : Insecta : Arthropoda; ; : : Unil** 11307874

Object Data from time of Collecting Event

Event/Site: :: United States : North Carolina : Macon : : : Wayah Bald : : : A. Shadle

Collectors: 1 Shadle, A. R. Primary coll number:

Verbatim locality: Wayah Bald N.C.

Specimen/Lot description: Microhabitat description:

Substrate: Ethnobia used part:

Ethnobia use:

Specimen

Live at collection: Unknown Yes No

Chromosome count:

Count by:

Publish Locality Data on Web

User: Yes No

System: Yes No

System Reason:

Catalog Counts Status Identification **Biology** Zoology (1) Zoology (2) Curation Measurements

Display Object 10314 of 10327 gentilip Ento SA nmnhlive

Completed Descriptive Record in NMNH RCIS-EMu

(Note the label data transcribed and appended to the existing skeleton record)

Catalog (1) - Display

File Edit Select View Genetic Sample Tools Tabs Multimedia Window Help

[SPECIMEN INVENTORY] *Bombus (Bombus) affinis* Cresson : Apidae : Hymenoptera : Insecta : Arthropoda; ; : : U 11307874

Note Details

Note: Transcribed by digital volunteers

Date: 18 Jul 2014 Kind: Crowdsourcing Attributed To: Publish: Yes No

Notes

	Note	Date	Kind	Attributed To	Publish
1	NMNHENTO_TR_BUMBLEBEES_SET01	25 Jun 2014	Transcription Set		No
2	Available for Transcription	25 Jun 2014	Crowdsourcing		No
3	[Female symbol] 09. <i>Bombus affinis</i> Cresson Det. by ...		Label		Yes
4	B.a. [female symbol]		Label		Yes
5	Transcribed by digital volunteers	18 Jul 2014	Crowdsourcing		Yes
*					

DwC MaNIS (1) DwC MaNIS (2) DwC OBIS (1) DwC OBIS (2) Notes Multimedia Security Admin

Display Object 10314 of 10327 gentilip Ento SA nmnhlive

Completed Descriptive Record in NMNH RCIS-EMu
 (Notes indicating data was transcribed by Digital Volunteers)

