

# COLORADO PARKS AND WILDLIFE (CPW) PHOTO DATABASE

## JAM Workshop

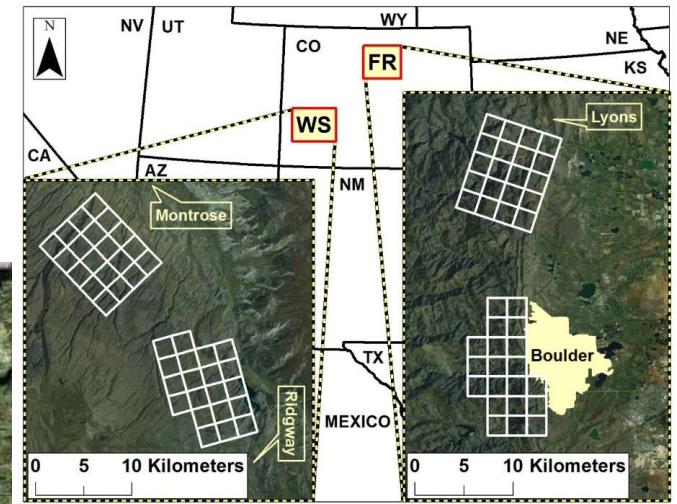
**Jesse Lewis**

**Arizona State University**

1 February 2018



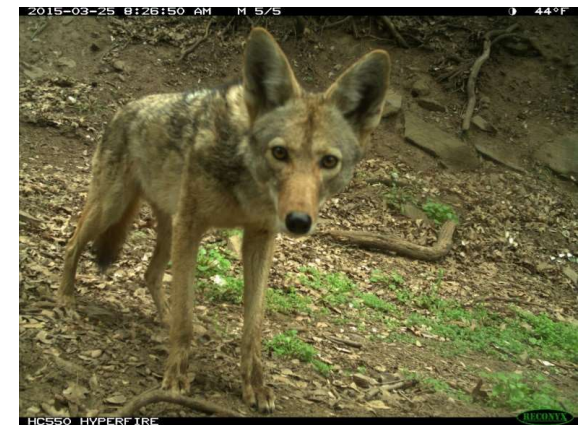
# WHY AM I AN ADVOCATE FOR THE CPW DATABASE?





# INVASIVE WILD PIGS IN CALIFORNIA AND FLORIDA

Millions of Photos – Created a SQL Database using the CPW Database



# OUTLINE OF TOPICS

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- Overview of the CPW database
- Importing photo data
- Classifying and working with photo data
- Exporting and use photo data
- Questions and discussion



# WEBSITE OF COLORADO PARKS AND WILDLIFE DATABASE

- Jake Ivan
- Eric Newkirk
- Microsoft Access

COLORADO PARKS & WILDLIFE

Things To Do Learn Places To Go About Us Buy & Apply

Colorado Parks and Wildlife > Learn > Software: CPW Photo Warehouse

Mammals Research  
Meet the Researchers  
Publications and Reports  
Research Projects  
Software: CPW Photo Warehouse

## Software: CPW Photo Warehouse



### CPW Photo Warehouse

CPW Photo Warehouse is a custom Microsoft Access application designed to facilitate archiving, identifying, summarizing, and analyzing photo data collected from remote wildlife cameras. You can download and distribute the file under terms of the CPW Reciprocal Open Source License Agreement. See the link below for details. Note that you must have a valid Microsoft Access license (2007 or newer) or a copy of the free Microsoft Access Runtime Version (2007 or newer) in order to use this product. For questions or comments contact [cpwphotodb@gmail.com](mailto:cpwphotodb@gmail.com).



# CPW DATABASE IS CONTINUOUSLY UPDATED

## Find New Versions on Website

### **New** features in CPW Photo Warehouse 4.0:

- Redesigned Visits form highlights problems caused by missing or incorrect set visit information and allows creating photo id modules by visit
- More advanced filtering in the PhotoViewer form
- Ability to tag photos with a rectangle to highlight a particular area (click or click and drag on the image in the Photo ID form to add a tag)
- Additional subform on the Individual ID form for totals by category (age and sex) that pertain to the entire sequence of images
- Ability to build detection summary queries based on the sequence data above for calculating relative abundance or density
- Ability to enter camera location coordinates in UTM's or Lat/Long and convert between the two
- Ability to build spatial queries and export to kml
- Ability to assign species to groups (e.g. guilds) for occupancy analysis

### Download CPW Photo Warehouse 4.0

- [CPW Photo Warehouse 4.0 Software](#)
- [User Manual](#)
- [CPW Reciprocal Open Source License Agreement](#)

# USER MANUAL ABOUT THE DATABASE

Super Useful!



CPW Photo Warehouse User Guide

December 2016

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# THE CPW DATABASE HOME PAGE



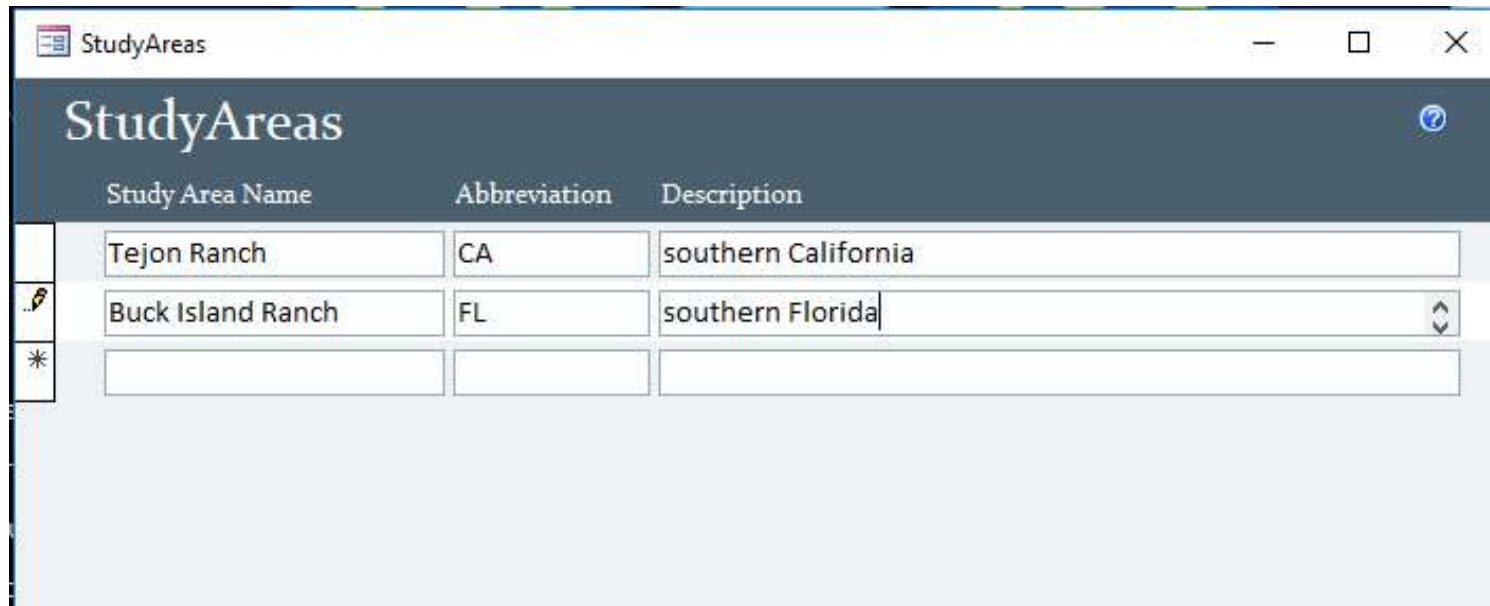


# ADD STUDY AREA



# NAME STUDY AREA(S)

Can Store Data From Multiple Study Areas



The screenshot shows a web application window titled "StudyAreas". The window has a dark blue header bar with the title "StudyAreas" and a help icon (question mark in a circle). Below the header is a table with three columns: "Study Area Name", "Abbreviation", and "Description". The table contains three rows. The first row has "Tejon Ranch" in the first column, "CA" in the second, and "southern California" in the third. The second row has "Buck Island Ranch" in the first column, "FL" in the second, and "southern Florida" in the third. The third row is empty, with a small asterisk icon in the first column. The table has a light blue background and white text. The window also has standard Windows window controls (minimize, maximize, close) in the top right corner.

	Study Area Name	Abbreviation	Description
	Tejon Ranch	CA	southern California
	Buck Island Ranch	FL	southern Florida
*			

## ADD LOCATIONS (SURVEY SITES)





# CREATE LIST OF CAMERA LOCATIONS FOR A STUDY AREA

EditDeployments

## Step 2 - Camera Deployments

Enter the information for camera deployments, including location and dates.  
You can add more deployments or edit this information later through the startup form, but you can't import photos until the relevant deployment has been added to the database.

Study Area	Location Code	UTM Easting	UTM Northing	UTM Zone	UTM Datum	Start Date	End Date	Notes
Uncompahgre	A1_C1	258838	4230972	13	83	8/20/2009	12/9/2009	Ridgway Rim
Uncompahgre	A1_C2	256321	4229742	13	83	8/20/2009	11/28/2009	Escarpment Tower Trail
Uncompahgre	A1_C3	255142	4229838	13	83	8/21/2009	12/9/2009	Fire Station Trail
Uncompahgre	A1_C4	255550	4231842	13	83	8/20/2009	12/9/2009	Hummingbird
Uncompahgre	A1_C5	256166	4231948	13	83	8/21/2009	12/9/2009	Kraft
Uncompahgre	A1_C6	258668	4232983	13	83	8/21/2009	12/11/2009	Waterview
Uncompahgre	A1_C7	258718	4233663	13	83	8/21/2009	12/11/2009	Reservoir Trail
Uncompahgre	A1_C8	257259	4233257	13	83	8/20/2009	12/11/2009	Caterwauler Draw
Uncompahgre	A1_C9	254043	4234296	13	83	8/20/2009	12/11/2009	Fisher Rim
Uncompahgre	A1_C10	252592	4233519	13	83	8/20/2009	12/11/2009	Flowers Pond Road
Uncompahgre	A1_C11	251768	4234191	13	83	8/20/2009	12/11/2009	Flowers Upper McKenzie
Uncompahgre	A1_C12	253700	4235077	13	83	8/20/2009	12/11/2009	Flowers East McKenzie Rim
Uncompahgre	A1_C13	254879	4236444	13	83	8/20/2009	12/9/2009	Bennet McKenzie Rim

Done

# CREATE SPECIES LIST



# CREATE SPECIES LIST

## With Short-cut Keyboard Keys



SetupSpecies

### Step 3 - Species List

Enter the common and latin names of the species you expect to find in your photos, and assign keyboard shortcuts if desired.

You can edit the species list later through the startup form, or add species one at a time through the PhotoID form.

Common Name	Latin Name	Shortcut
GM Ground Squirre		
Gray Fox		G
Grouse		
Hiker		H
Horse Livestock		
Hunter		F
Jack Rabbit		
MountainLion		M
Mule Deer		D
Peromyscus		
Pine Squirrel		P

Done



# CAN INCLUDE ADDITIONAL DETECTION DETAILS FOR SPECIES

Collared, Male/Female, Adult/Juvenile, etc



EditDetails

### Detection Detail List

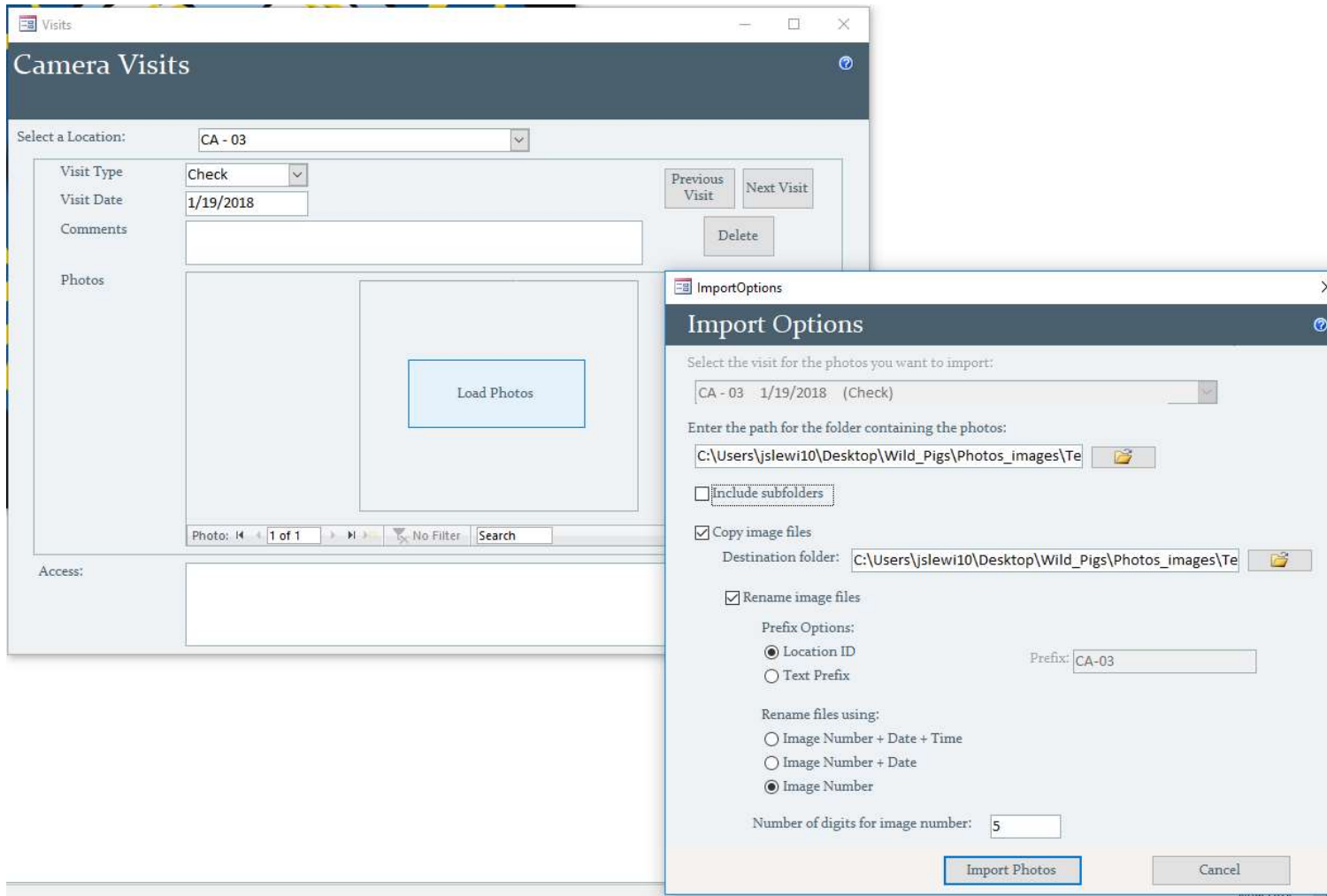
Species	Detail	Shortcut
Bobcat	Collared	C
MountainLion	Collared	C
Mule Deer	Collared	C

Keyboard sho

# IMPORT PHOTOS



# IMPORT PHOTOS THROUGH SITE VISITS

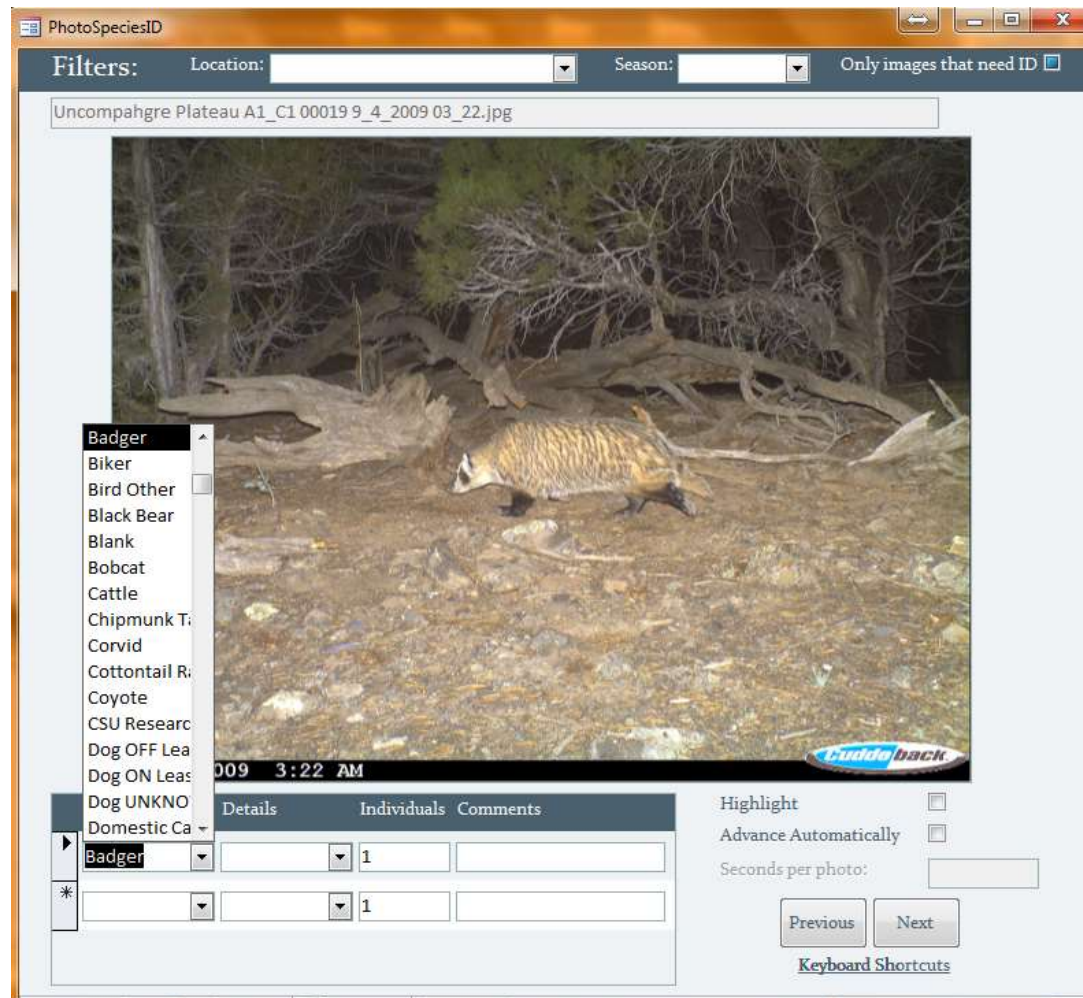




# IDENTIFY PHOTOS



# PHOTO IDENTIFICATION





# PHOTO IDENTIFICATION WITH “DETAILS”

PhotoSpeciesID

Filters: Location:  Season:  Only images that need ID ☐

Uncompahgre Plateau A1\_C1 00015 9\_1\_2009 18\_51.jpg



9/01/2009 6:51 PM 

Species	Details	Individuals	Comments
▶ MountainLic	Collared	1	
* <input type="text"/>	<input type="text"/>	1	

Highlight ☐  
Advance Automatically ☐  
Seconds per photo:

[Keyboard Shortcuts](#)



# VIEW PHOTOS




# VIEW PHOTOS THAT ARE CLASSIFIED

PhotoViewer

## Camera Trapping Photo Viewer

Uncompahgre Plateau A1\_C10 00272 11\_27\_2009 07\_38.jpg



11/27/2009 7:38 AM

[Edit Species ID](#) [Assign Individual ID](#) [View Query Results](#) [Copy Photos](#)

Advance Automatically ☐ Seconds per photo:

### Filters

Area: Uncompahgre Plateau  
Location: A1\_C10  
Field Season: 2009  
Species: Bobcat  
[Multiple Species](#)

Highlights only: ☐

Date:   
Time:

### Image Data

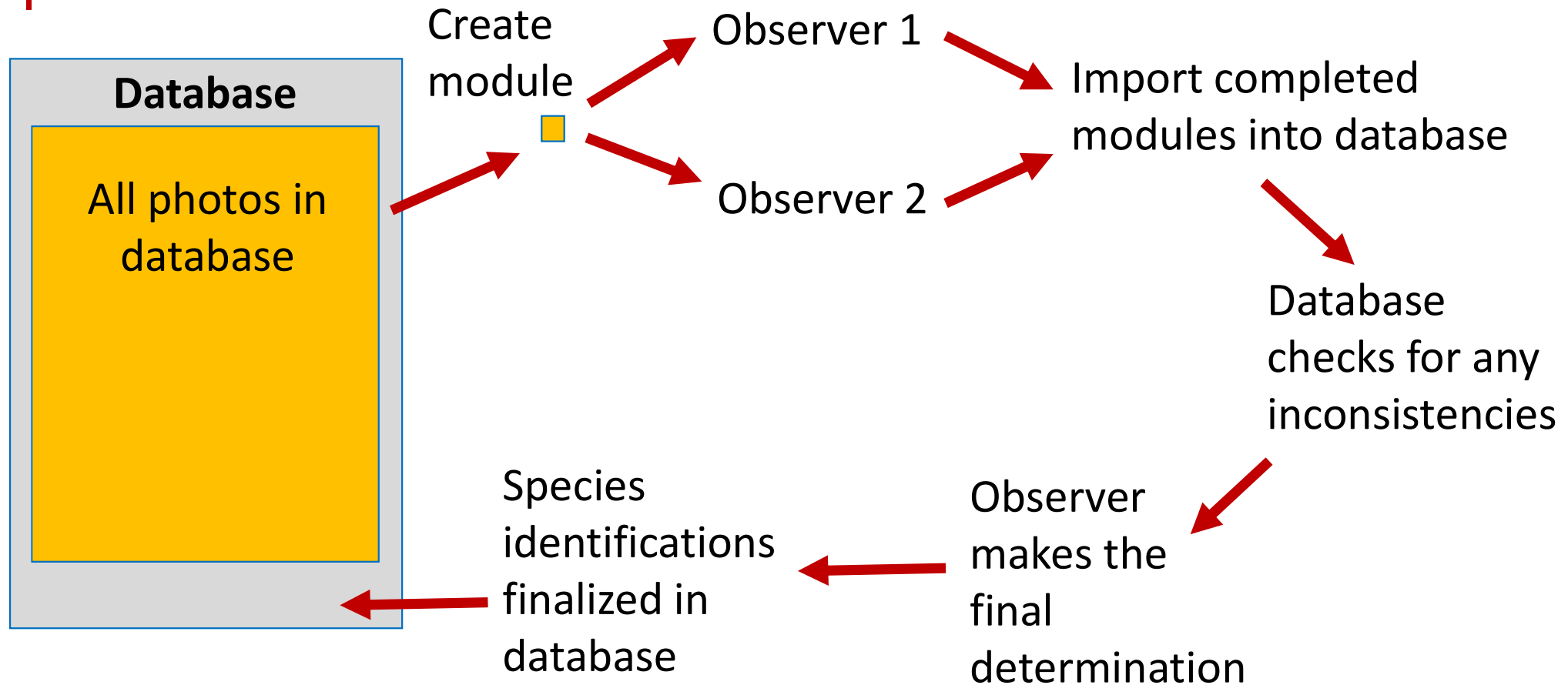
Date: 11/27/2009  
Time: 07:38 AM  
UTM E: 252592  
UTM N: 4233519  
Species: Bobcat

# CREATE PHOTO MODULES

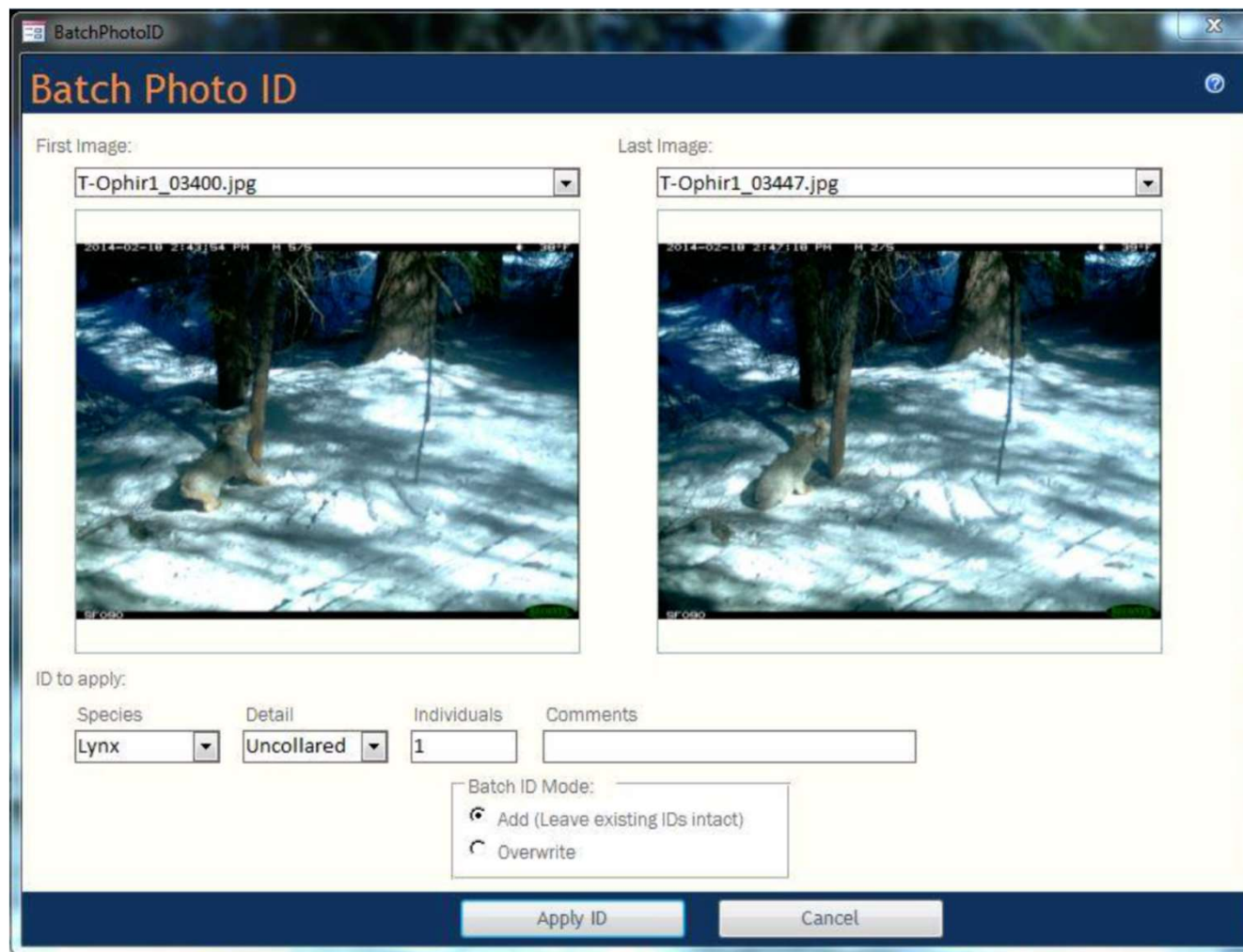




# CREATING PHOTO MODULES AND USING DOUBLE OBSERVERS



# BATCH IDENTIFICATION



# BUILT IN DATA QUERIES





# DATA QUERIES

## Occupancy Input File

OccupancyQueryBuilder

### Occupancy Query Builder

Select the species: Coyote  Auto-Update Results ☒  
Require 2 Observers ☐

Start Date Options:  
☐ Relative  
☒ Absolute Enter start date for first interval: 3/15/2015   
Start Time: 12:00 PM

[View/Edit Active Dates](#)

Interval Options:  
Number of occasions: 3   
Duration: 1  Week(s)   
Buffer period: 0

Filters:  
Study Area: Tejon Ranch   
North of:   
South of:   
East of:   
West of:   
Survey year: 2015

Open Query Save Export Close

Results Preview:

Location	Occasion1	Occasion2	Occasion3
CA - 16	0	0	.
CA - 17	1	0	0
CA - 18	0	0	0
CA - 19	0	0	0
CA - 20	0	0	0
CA - 21	0	1	1
CA - 22	0	1	0
CA - 23	0	0	0
CA - 24	0	0	0
CA - 25	1	0	0
CA - 26	0	0	0
CA - 27	1	1	1
CA - 28	0	0	0
CA - 29	1	0	0
CA - 30	0	0	1
CA - 31	0	1	0
CA - 32	0	0	0
CA - 33	1	0	0
CA - 34	1	1	0
CA - 35	0	0	0
CA - 36	1	0	1
CA - 37	1	0	0
CA - 38	1	1	0

# DATA QUERIES

## Activity Pattern File

ActivityQueryBuilder

Activity Query Builder

Select the species:  

Black\_Bear

Select Multiple Species

Auto-Update Results ☒  
Require 2 Observers ☐

Quiet Period (minutes):  

0

Zone Options:  

☒ Use Study Areas  
☐ Use Custom Zones

Time Field Calculation Options:  

☒ Decimal  
☐ Radians

Location Filters:  

Study Area:  
North of:  
South of:  
East of:  
West of:

Tejon Ranch  

(Enter UTM Northing)

Date Filters:  

Absolute Date Filters  
Images between:  
And:

Relative Date Filters  
Starting:  
Ending:

Day(s)

after set date

Week(s)

after start

Additional Fields:  

Image Date ☒  
Location Name ☒  
UTM Fields ☐  
Camera Set Date ☐

Open Query

View Chart

Export

Close

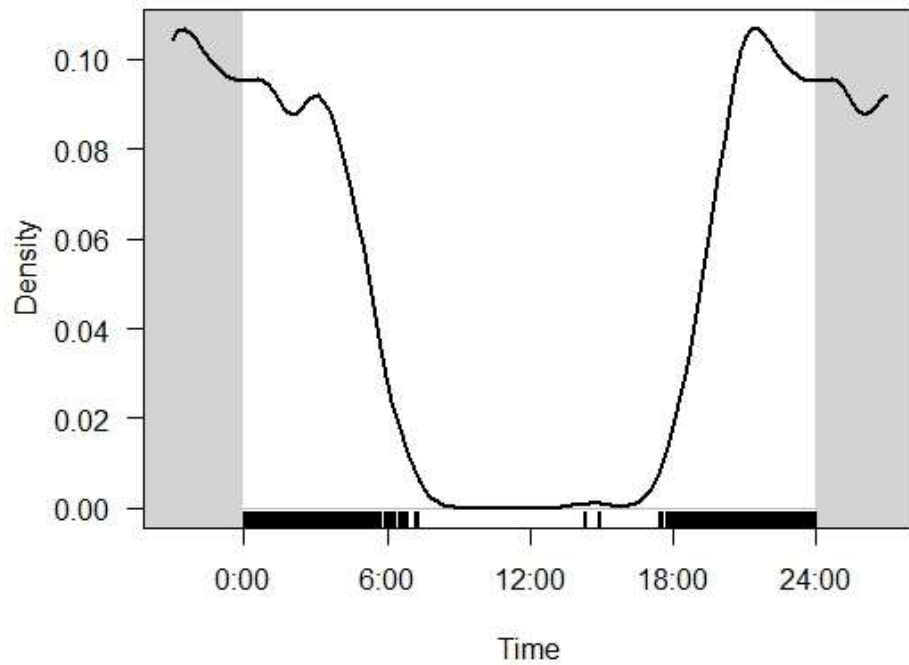
Results Preview:

Zone	Species	Time	ImageDate	LocationName
1	Black_Bear	0.008	15 12:12:28 AM	39
1	Black_Bear	0.008	15 12:12:29 AM	39
1	Black_Bear	0.008	15 12:12:30 AM	39
1	Black_Bear	0.008	15 12:12:31 AM	39
1	Black_Bear	0.024	15 12:35:58 AM	18
1	Black_Bear	0.065	015 1:33:32 AM	17
1	Black_Bear	0.065	015 1:33:33 AM	17
1	Black_Bear	0.065	015 1:33:33 AM	17
1	Black_Bear	0.065	015 1:33:34 AM	17
1	Black_Bear	0.065	015 1:33:35 AM	17
1	Black_Bear	0.065	015 1:33:36 AM	17
1	Black_Bear	0.145	015 3:29:41 AM	44
1	Black_Bear	0.145	015 3:29:42 AM	44
1	Black_Bear	0.145	015 3:29:43 AM	44
1	Black_Bear	0.145	015 3:29:43 AM	44
1	Black_Bear	0.145	015 3:29:44 AM	44
1	Black_Bear	0.589	015 2:08:04 PM	18
1	Black_Bear	0.589	015 2:08:05 PM	18
1	Black_Bear	0.589	015 2:08:06 PM	18
1	Black_Bear	0.589	015 2:08:07 PM	18
1	Black_Bear	0.649	015 3:35:21 PM	20
1	Black_Bear	0.649	015 3:35:22 PM	20
1	Black_Bear	0.649	015 3:35:23 PM	20
1	Black_Bear	0.649	015 3:35:24 PM	20
1	Black_Bear	0.649	015 3:35:25 PM	20
1	Black_Bear	0.649	015 3:35:31 PM	20
1	Black_Bear	0.649	015 3:35:32 PM	20
1	Black_Bear	0.649	015 3:35:33 PM	20
1	Black_Bear	0.649	015 3:35:34 PM	20
1	Black_Bear	0.649	015 3:35:35 PM	20
1	Black_Bear	0.649	015 3:35:36 PM	20
1	Black_Bear	0.649	015 3:35:38 PM	20
1	Black_Bear	0.649	015 3:35:39 PM	20
1	Black_Bear	0.649	015 3:35:40 PM	20
1	Black_Bear	0.751	015 6:01:05 PM	20

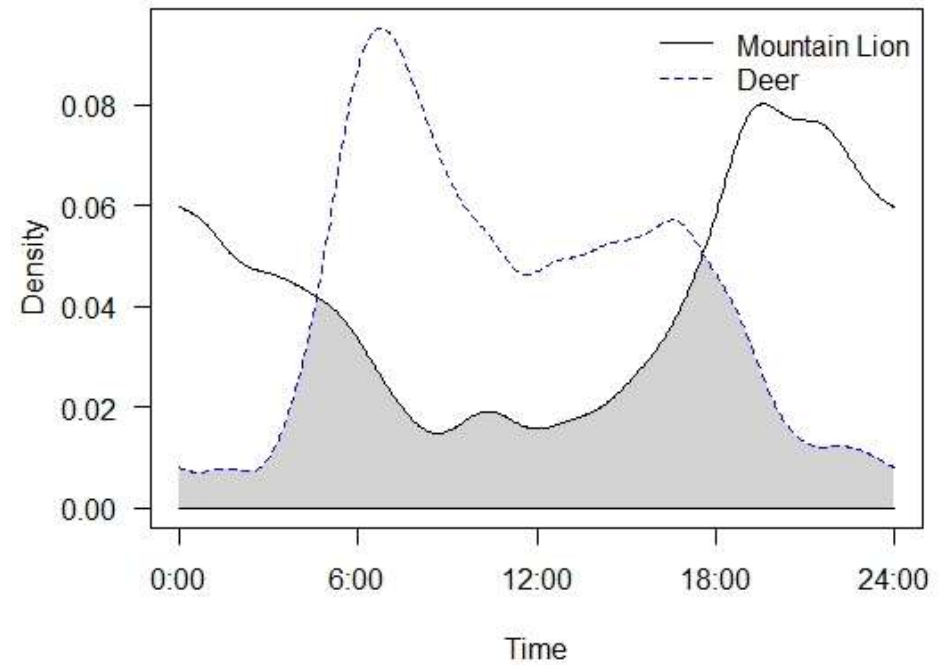
# DATA QUERIES

## Activity Pattern File

**Striped Skunk**



**Mountain Lion and Deer Tejon**





# DATA QUERIES

## Mark-Recapture File

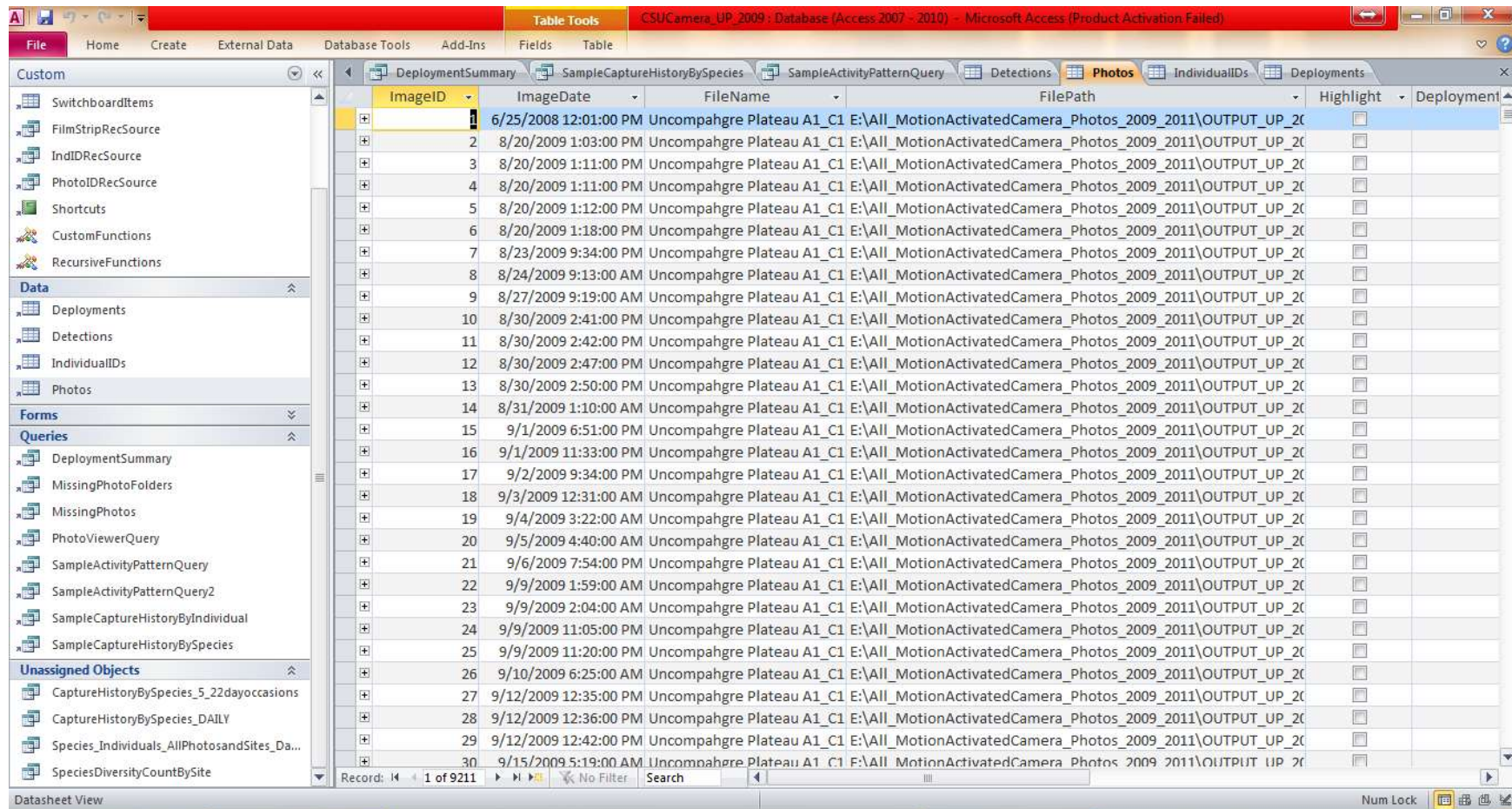
The screenshot shows the 'Mark-Recapture Query Builder' window, which is part of a software suite including 'ActivityQueryBuilder' and 'SECRQueryBuilder'. The interface is organized into several sections for configuring a query:

- Select the species:** A dropdown menu with a red asterisk icon, followed by an 'Auto-Update Results' checkbox.
- Start Date Options:** Includes radio buttons for 'Relative' (selected) and 'Absolute'. The 'Relative' option has a sub-field 'First occasion starts' with a value of '0' and the text 'days after camera set date'. Below this is a 'Start Time' field with a note '(Leave blank to use time from first photo)'.
- Interval Options:** Includes 'Number of occasions' (value: 4) and 'Duration' (value: 2) with a unit dropdown set to 'Week(s)'.
- Output Format:** Includes radio buttons for 'SECR (R/DENSITY)' (selected) and 'Mark'.
- Detector Type:** Includes radio buttons for 'Count' (selected) and 'Proximity'.
- Filters:** Includes fields for 'Study Area' (dropdown), 'North of:', 'South of:', 'East of:', 'West of:', and 'Survey year' (dropdown).

At the bottom of the window are four buttons: 'Open Query', 'Save', 'Export', and 'Close'.

# BEHIND THE SCENES

## Photo Spreadsheet



The screenshot displays the Microsoft Access application window titled "CSUCamera\_UP\_2009 : Database (Access 2007 - 2010) - Microsoft Access (Product Activation Failed)". The interface includes a ribbon with tabs like File, Home, Create, External Data, Database Tools, Add-Ins, Fields, and Table. On the left, a navigation pane shows a hierarchy of objects: Custom (SwitchboardItems, FilmStripRecSource, IndIDRecSource, PhotoIDRecSource, Shortcuts, CustomFunctions, RecursiveFunctions), Data (Deployments, Detections, IndividualIDs, Photos), Forms, and Queries (DeploymentSummary, MissingPhotoFolders, MissingPhotos, PhotoViewerQuery, SampleActivityPatternQuery, SampleActivityPatternQuery2, SampleCaptureHistoryByIndividual, SampleCaptureHistoryBySpecies, and Unassigned Objects). The main area shows the "Photos" table in Datasheet View. The table has columns: ImageID, ImageDate, FileName, FilePath, Highlight, and Deployment. It contains 30 records of photo data. The status bar at the bottom indicates "Record: 1 of 9211" and "No Filter".

ImageID	ImageDate	FileName	FilePath	Highlight	Deployment
1	6/25/2008 12:01:00 PM	Uncompahgre Plateau A1_C1	E:\All_MotionActivatedCamera_Photos_2009_2011\OUTPUT_UP_20	<input type="checkbox"/>	
2	8/20/2009 1:03:00 PM	Uncompahgre Plateau A1_C1	E:\All_MotionActivatedCamera_Photos_2009_2011\OUTPUT_UP_20	<input type="checkbox"/>	
3	8/20/2009 1:11:00 PM	Uncompahgre Plateau A1_C1	E:\All_MotionActivatedCamera_Photos_2009_2011\OUTPUT_UP_20	<input type="checkbox"/>	
4	8/20/2009 1:11:00 PM	Uncompahgre Plateau A1_C1	E:\All_MotionActivatedCamera_Photos_2009_2011\OUTPUT_UP_20	<input type="checkbox"/>	
5	8/20/2009 1:12:00 PM	Uncompahgre Plateau A1_C1	E:\All_MotionActivatedCamera_Photos_2009_2011\OUTPUT_UP_20	<input type="checkbox"/>	
6	8/20/2009 1:18:00 PM	Uncompahgre Plateau A1_C1	E:\All_MotionActivatedCamera_Photos_2009_2011\OUTPUT_UP_20	<input type="checkbox"/>	
7	8/23/2009 9:34:00 PM	Uncompahgre Plateau A1_C1	E:\All_MotionActivatedCamera_Photos_2009_2011\OUTPUT_UP_20	<input type="checkbox"/>	
8	8/24/2009 9:13:00 AM	Uncompahgre Plateau A1_C1	E:\All_MotionActivatedCamera_Photos_2009_2011\OUTPUT_UP_20	<input type="checkbox"/>	
9	8/27/2009 9:19:00 AM	Uncompahgre Plateau A1_C1	E:\All_MotionActivatedCamera_Photos_2009_2011\OUTPUT_UP_20	<input type="checkbox"/>	
10	8/30/2009 2:41:00 PM	Uncompahgre Plateau A1_C1	E:\All_MotionActivatedCamera_Photos_2009_2011\OUTPUT_UP_20	<input type="checkbox"/>	
11	8/30/2009 2:42:00 PM	Uncompahgre Plateau A1_C1	E:\All_MotionActivatedCamera_Photos_2009_2011\OUTPUT_UP_20	<input type="checkbox"/>	
12	8/30/2009 2:47:00 PM	Uncompahgre Plateau A1_C1	E:\All_MotionActivatedCamera_Photos_2009_2011\OUTPUT_UP_20	<input type="checkbox"/>	
13	8/30/2009 2:50:00 PM	Uncompahgre Plateau A1_C1	E:\All_MotionActivatedCamera_Photos_2009_2011\OUTPUT_UP_20	<input type="checkbox"/>	
14	8/31/2009 1:10:00 AM	Uncompahgre Plateau A1_C1	E:\All_MotionActivatedCamera_Photos_2009_2011\OUTPUT_UP_20	<input type="checkbox"/>	
15	9/1/2009 6:51:00 PM	Uncompahgre Plateau A1_C1	E:\All_MotionActivatedCamera_Photos_2009_2011\OUTPUT_UP_20	<input type="checkbox"/>	
16	9/1/2009 11:33:00 PM	Uncompahgre Plateau A1_C1	E:\All_MotionActivatedCamera_Photos_2009_2011\OUTPUT_UP_20	<input type="checkbox"/>	
17	9/2/2009 9:34:00 PM	Uncompahgre Plateau A1_C1	E:\All_MotionActivatedCamera_Photos_2009_2011\OUTPUT_UP_20	<input type="checkbox"/>	
18	9/3/2009 12:31:00 AM	Uncompahgre Plateau A1_C1	E:\All_MotionActivatedCamera_Photos_2009_2011\OUTPUT_UP_20	<input type="checkbox"/>	
19	9/4/2009 3:22:00 AM	Uncompahgre Plateau A1_C1	E:\All_MotionActivatedCamera_Photos_2009_2011\OUTPUT_UP_20	<input type="checkbox"/>	
20	9/5/2009 4:40:00 AM	Uncompahgre Plateau A1_C1	E:\All_MotionActivatedCamera_Photos_2009_2011\OUTPUT_UP_20	<input type="checkbox"/>	
21	9/6/2009 7:54:00 PM	Uncompahgre Plateau A1_C1	E:\All_MotionActivatedCamera_Photos_2009_2011\OUTPUT_UP_20	<input type="checkbox"/>	
22	9/9/2009 1:59:00 AM	Uncompahgre Plateau A1_C1	E:\All_MotionActivatedCamera_Photos_2009_2011\OUTPUT_UP_20	<input type="checkbox"/>	
23	9/9/2009 2:04:00 PM	Uncompahgre Plateau A1_C1	E:\All_MotionActivatedCamera_Photos_2009_2011\OUTPUT_UP_20	<input type="checkbox"/>	
24	9/9/2009 11:05:00 PM	Uncompahgre Plateau A1_C1	E:\All_MotionActivatedCamera_Photos_2009_2011\OUTPUT_UP_20	<input type="checkbox"/>	
25	9/9/2009 11:20:00 PM	Uncompahgre Plateau A1_C1	E:\All_MotionActivatedCamera_Photos_2009_2011\OUTPUT_UP_20	<input type="checkbox"/>	
26	9/10/2009 6:25:00 AM	Uncompahgre Plateau A1_C1	E:\All_MotionActivatedCamera_Photos_2009_2011\OUTPUT_UP_20	<input type="checkbox"/>	
27	9/12/2009 12:35:00 PM	Uncompahgre Plateau A1_C1	E:\All_MotionActivatedCamera_Photos_2009_2011\OUTPUT_UP_20	<input type="checkbox"/>	
28	9/12/2009 12:36:00 PM	Uncompahgre Plateau A1_C1	E:\All_MotionActivatedCamera_Photos_2009_2011\OUTPUT_UP_20	<input type="checkbox"/>	
29	9/12/2009 12:42:00 PM	Uncompahgre Plateau A1_C1	E:\All_MotionActivatedCamera_Photos_2009_2011\OUTPUT_UP_20	<input type="checkbox"/>	
30	9/15/2009 5:19:00 AM	Uncompahgre Plateau A1_C1	E:\All_MotionActivatedCamera_Photos_2009_2011\OUTPUT_UP_20	<input type="checkbox"/>	

# BEHIND THE SCENES

## Linking Photos to Identification Information

CSUCamera\_UP\_2009 - Database (Access 2007 - 2010) - Microsoft Access (Product Activation Failed)

DetectionID	SpeciesID	DetailID	Individuals	Comments	ImageID	Click to Add
1	13		1		76	
2	13		1		77	
3	13		1		78	
4	13		1		79	
5	13		1		80	
6	1		1		81	
7	25		1		82	
8	25		1		83	
9	10		1		84	
10	25		1		85	
11	10		1		86	
12	10		1		87	
13	25		1		88	
14	13		1		89	
15	13		1		90	
16	2	2	1		91	
17	10		1		92	
18	10		1		93	
19	10		1		94	
20	22		1		95	
21	10		1		96	
22	13		1		97	
23	13		1		98	
24	13		1		99	
25	13		1		100	
26	20		1		1	
27	13		1		2	
28	13		1		3	
29	13		1		4	
30	13		1		5	

Record: 1 of 9211



# ADDITIONAL BUILT IN DATA QUERIES

## Standard Queries

Custom

Other Tables

- DetailShortcuts
- DetectionDetails
- Individuals
- Observers
- ObsPhone
- Species
- SpeciesShortcuts

Queries

- Activity Pattern Query
- Deployment Summary
- Missing Photo Folders
- Missing Photos
- Observer Comparison
- Occupancy Query
- Photo ID Summary
- Photo Viewer Query
- SECR Detector Query
- SECR Query
- Species by Study Area
- Species by Year
- Study Area Summary
- Year Summary

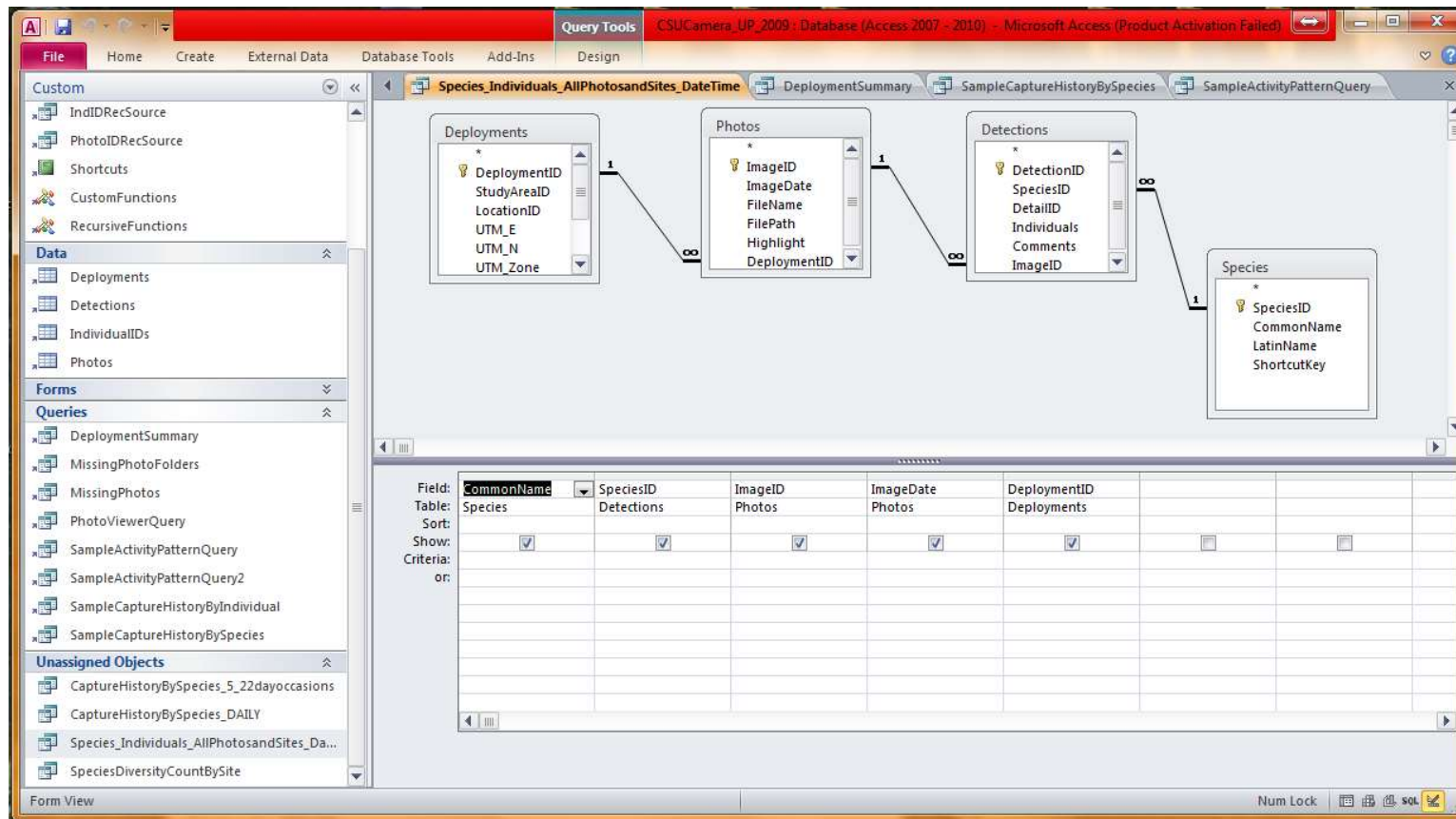
CameraYear	StudyAreaID	CommonName	Images
2015		1 Bird	463
2015		1 Black_Bear	222
2015		1 Bobcat	1842
2015		1 CA_Ground_Sq	2276
2015		1 Cattle	62286
2015		1 Chipmunk_Tan	61
2015		1 Cottontail_Rab	202
2015		1 Coyote	524
2015		1 CSP_Research	10072
2015		1 Deer	753
2015		1 Dog_Feral	25
2015		1 Elk	4924
2015		1 Gray_Fox	802
2015		1 Gray_Squirrel	3677
2015		1 Hunter_On_Fo	109
2015		1 Jack_Rabbit	25
2015		1 Mountain_Lion	1545
2015		1 None	26453
2015		1 Peromyscus	16
2015		1 Quail	221
2015		1 QUESTION	3
2015		1 Raccoon	28
2015		1 Ranch_Person	83
2015		1 Spotted_Skunk	24
2015		1 Striped_Skunk	1255
2015		1 Turkey	7

Record: 1 of 30

Datasheet View

# CAN CUSTOMIZE YOUR DATA QUERIES!

## Create Your Own – Field Relationships



# CUSTOM DATA QUERIES MORE ADVANCED

## Create Your Own – Writing SQL Code

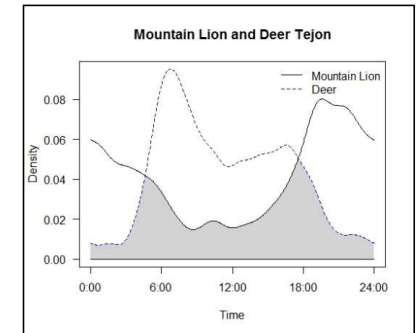




# ULTIMATELY, A DATABASE IS A LIFESAVER!



	Location	Occasion1	Occasion2	Occasion3
	CA - 16	0	0	.
	CA - 17	1	0	0
	CA - 18	0	0	0
	CA - 19	0	0	0
	CA - 20	0	0	0
	CA - 21	0	1	1
	CA - 22	0	1	0
	CA - 23	0	0	0



*Ecological Applications*, 19(7), 2011, pp. 1880–1890  
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## The effects of urbanization on population density, occupancy, and detection probability of wild felids

JOHN S. LEWIS,<sup>1,2</sup> KENNETH A. LOGAN,<sup>2</sup> MAT W. ALLSHOUSE,<sup>2</sup> LAUREN L. BAKER,<sup>1</sup> SUE YARDWOODS,<sup>4</sup>  
and KERRY R. CHODKO<sup>3</sup>

[illegible][illegible]

# WANT MORE INFORMATION

## Website, Paper, and Email

- **CPW camera database website**

<http://cpw.state.co.us/learn/Pages/ResearchMammalsSoftware.aspx>

- Camera database
- User's manual
- Actively updating website with new versions and features of the database

- Paper published about the database

- My email: [jslewi10@asu.edu](mailto:jslewi10@asu.edu)

### Methods in Ecology and Evolution



*Methods in Ecology and Evolution* 2016, 7, 499–504

doi: 10.1111/2041-210X.12503

#### APPLICATION

**CPW Photo Warehouse: a custom database to facilitate archiving, identifying, summarizing and managing photo data collected from camera traps**

Jacob S. Ivan\* and Eric S. Newkirk

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