DISCOVERY: A Photo-Identification Data Management System

South African NATIONAL PARKS

14th Savanna Science Network Meeting

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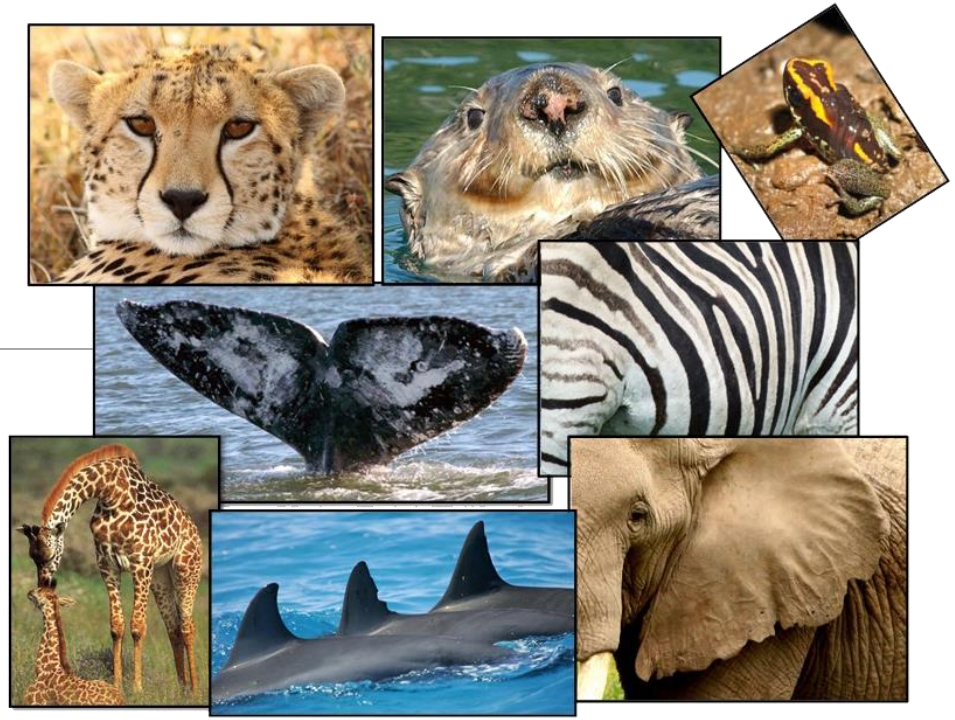


Photo-Identification

???

=

- Time consuming
- Visually fatiguing
- Cross comparisons between databases

Approach

- **Integrative** system
  - Store, visualize, manage and analyze photo-ID/associated data
- **Dynamic** setting
  - Meet various needs of research projects and user preferences
- **Inclusive** of other tools *(e.g. program R)*
- **Compatible** with other software *(e.g. MARK, SocProg, ArcGIS)*
- Efficient to maintain **long-term, multi-team** datasets

Approach

Field Data Collection

Pre-matching Processing
- Filenaming
- Filtering
- Pre-Matching

Sighting Info & Survey Effort
- Start/End time
- Geographic location
- Group info

... etc.

Miscellaneous Data
(e.g. biopsy, behavior, telemetry, etc.)

Matching to Catalog

Data Management

Data Visualization, Summary & Analysis

Import & Export Data

Pre-Matching Procedures

- **Image processing**
- **Image filtering**

User-defined folders from dynamic setup

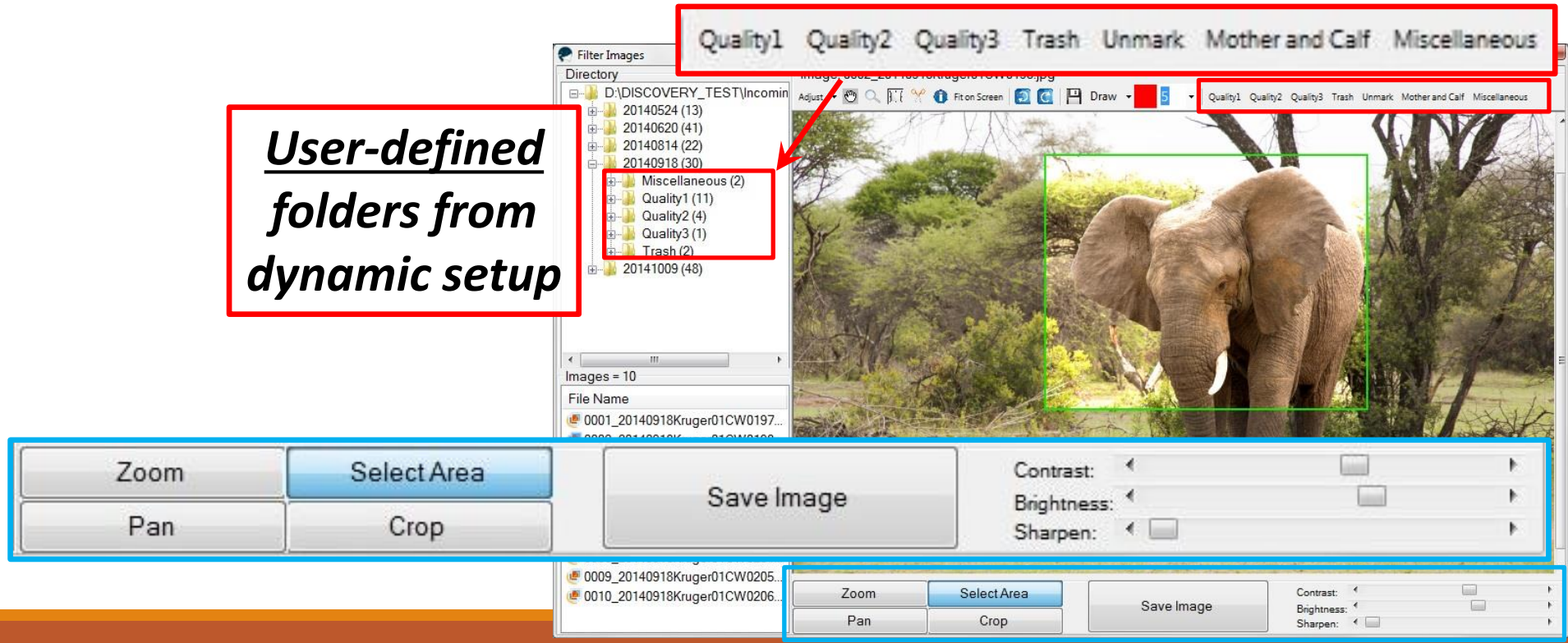
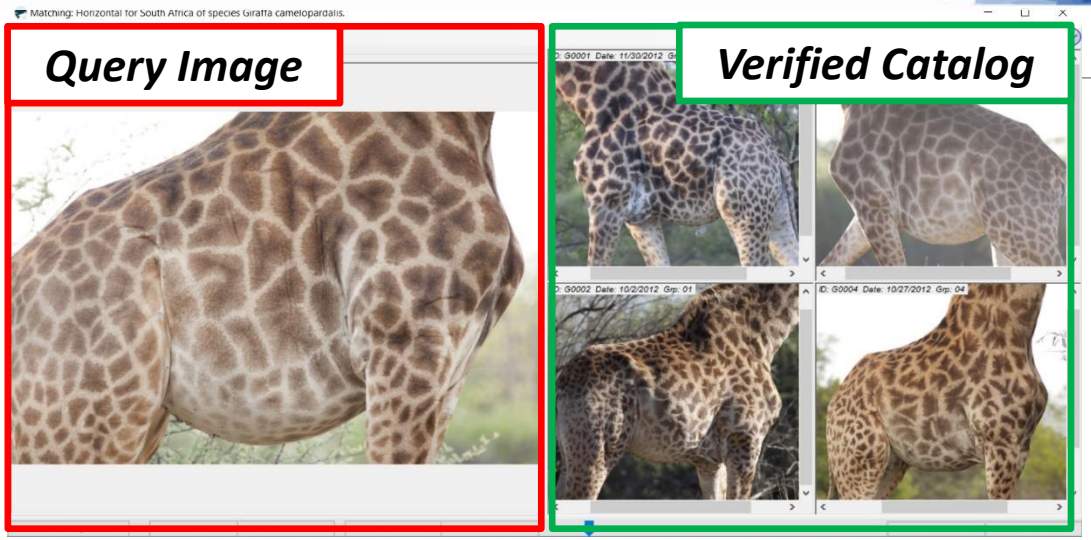
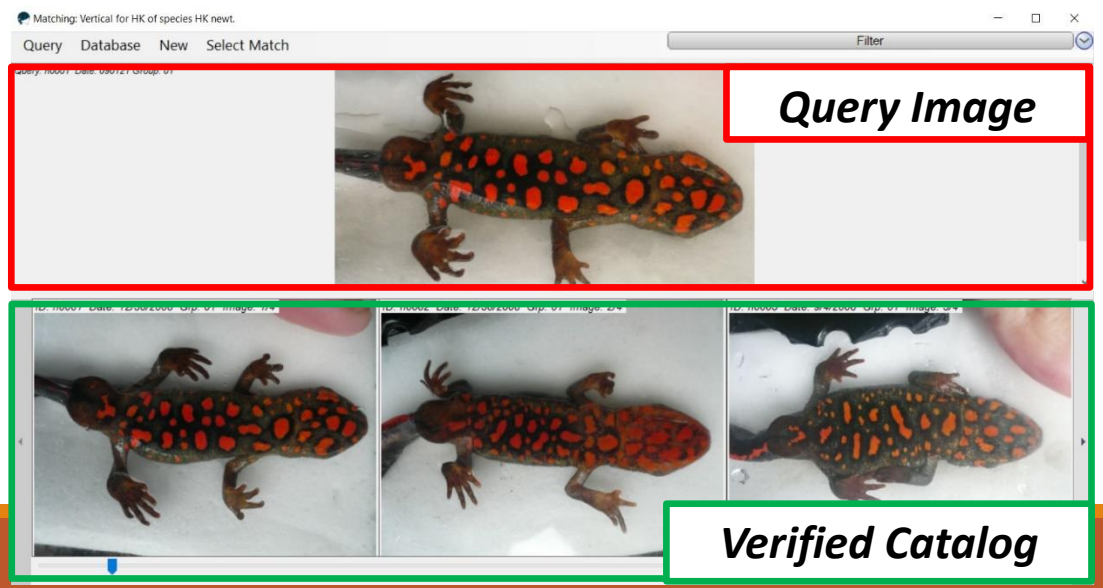


Photo-ID Matching



Horizontal View Mode

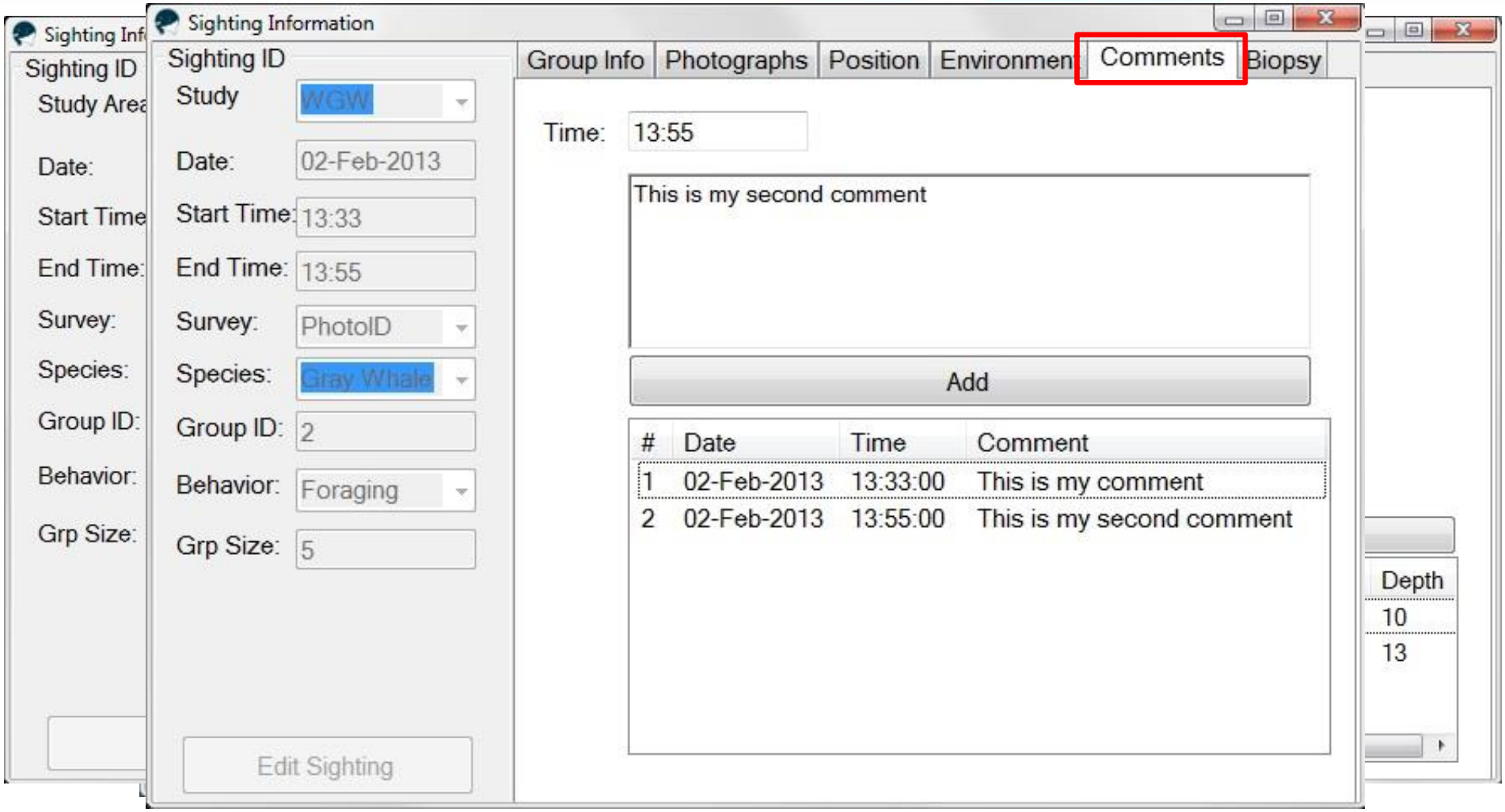
- ✓ Enhanced searching of IDs by **categorizing database**



- ✓ **User-defined settings** to optimize efficiency

Vertical View Mode

Survey Associated Info.



Data Management
- Individual Catalog

Individuals

Individuals

ID	# Images	# Sightings	First Year	Last Year	Sex
a0001	4	3	2005	2014	C
a0002	14	8	2005	2014	C
a0003	8	4	2004	2014	C
a0004	5	5	2003	2014	C
a0005	9	5	2005	2014	C
a0006	6	4	2006	2014	C
a0007	11	5	2004	2014	C
a0008	7	5	2005	2014	C
a0009	6	4	2006	2014	C
a0010	11	5	2004	2014	B
a0011	9	5	2004	2014	B
a0012	8	4	2006	2014	B
a0013	11	5	2005	2014	B
a0014	1	1	2014	2014	B
a0015	1	1	2014	2014	B
a0016	1	1	2016	2016	

Catalog of Individuals

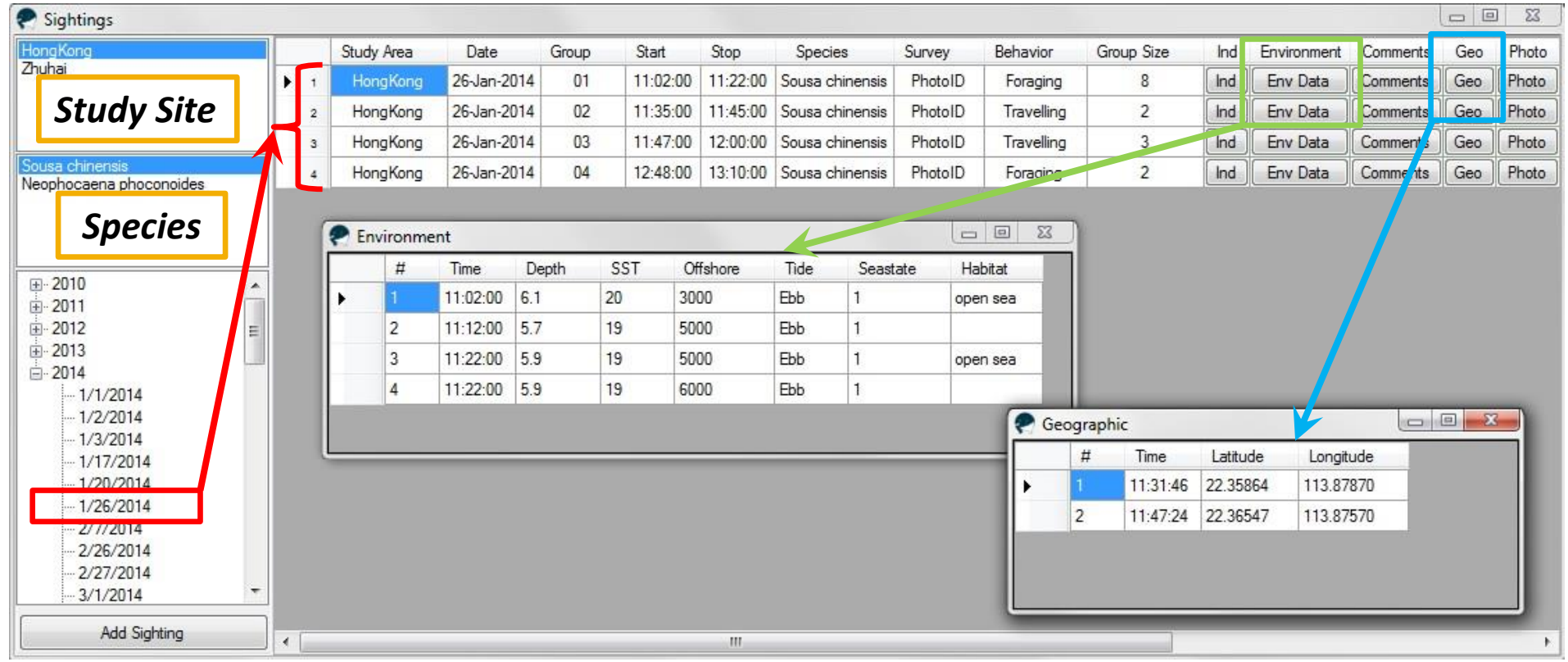
Left | Right | Front

Images of a0016

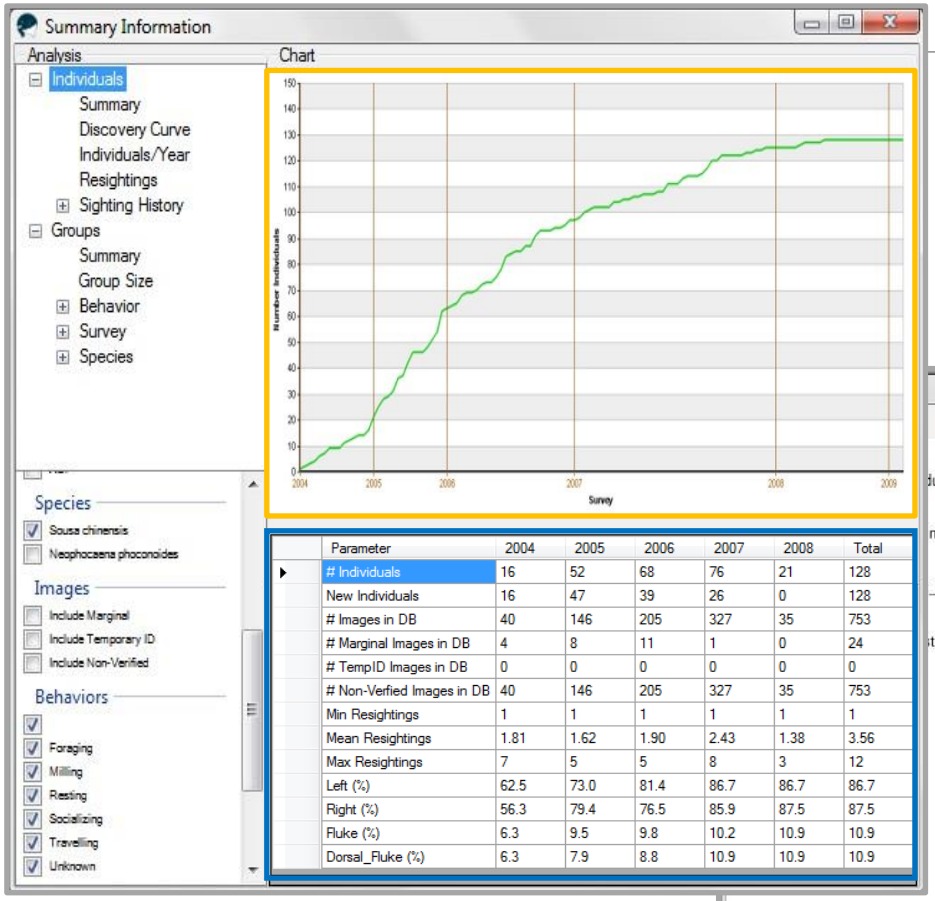
Image	GROUP_IMG	Date	Aspect
a0016_2016031...	01	10-Mar-16	Right

Individual Images

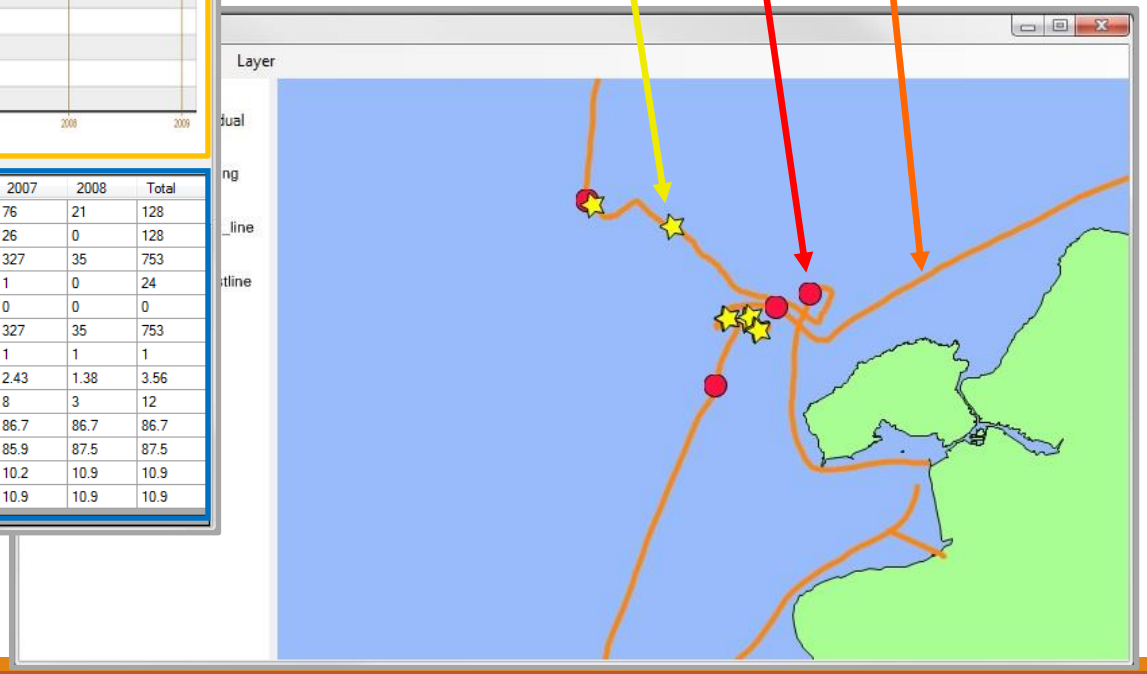
Data Management
- Sighting Records



Data Visualization, Summary & Analysis



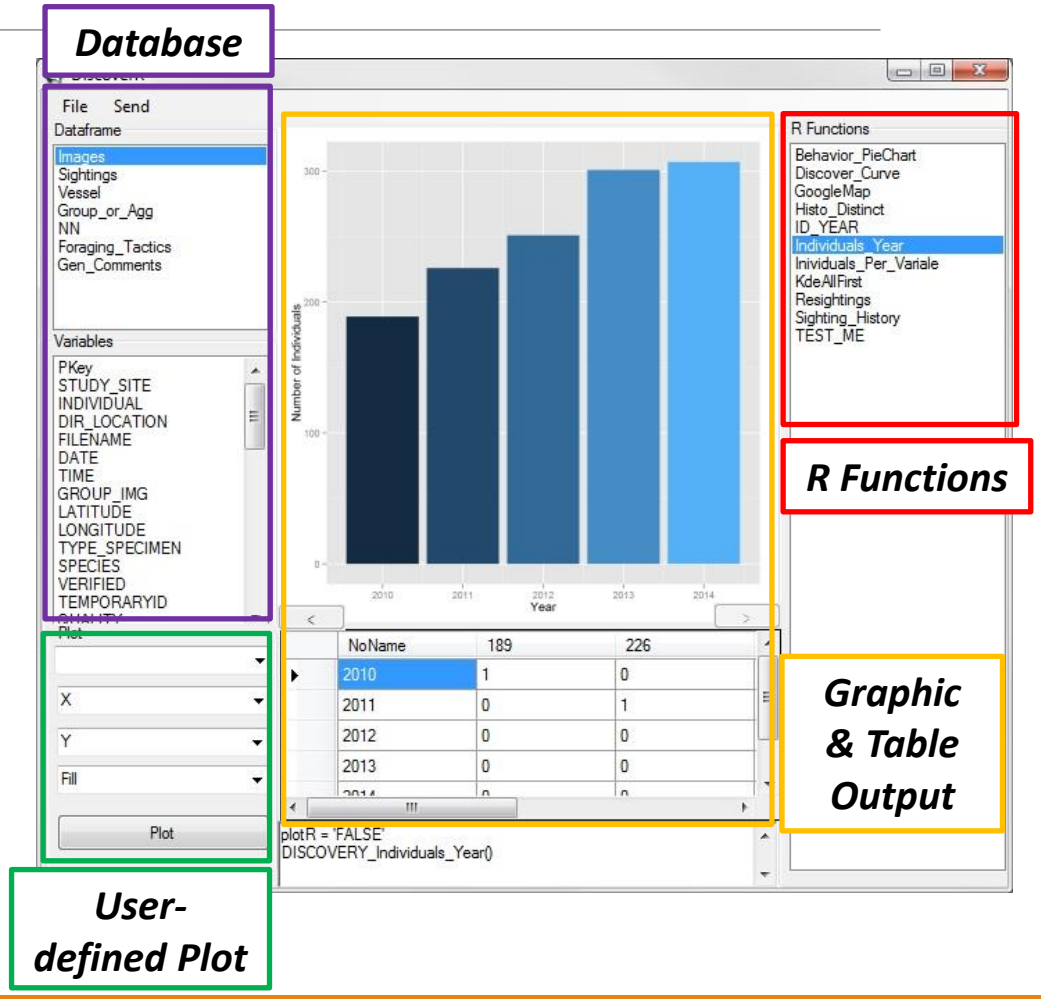
Parameter	2004	2005	2006	2007	2008	Total
# Individuals	16	52	68	76	21	128
New Individuals	16	47	39	26	0	128
# Images in DB	40	146	205	327	35	753
# Marginal Images in DB	4	8	11	1	0	24
# TempID Images in DB	0	0	0	0	0	0
# Non-Verfied Images in DB	40	146	205	327	35	753
Min Resightings	1	1	1	1	1	1
Mean Resightings	1.81	1.62	1.90	2.43	1.38	3.56
Max Resightings	7	5	5	8	3	12
Left (%)	62.5	73.0	81.4	86.7	86.7	86.7
Right (%)	56.3	79.4	76.5	85.9	87.5	87.5
Fluke (%)	6.3	9.5	9.8	10.2	10.9	10.9
Dorsal_Fluke (%)	6.3	7.9	8.8	10.9	10.9	10.9



Discovery R

DISCOVERY + R

- Wide range of analytical and display functions (open source)
- Built-in interface for users not familiar with R



Discovery R

Plot on Google Map

Behavior Activity Budget

R Graphics: Device 2 (ACTIVE)

File History Resize

DiscoverR

File Send

Dataframe

Images
Sightings
Vessel
Group_or_Agg
NN
Foraging_Tactics
Gen_Comments

Variables

PKey
STUDY_SITE
DATE_SIGHT
GROUP_SIGHT
TIME_START
TIME_END
SPECIES
SURVEY_TYPE
BEHAVIOR
GRP_MIN
GRP_BEST
GRP_MAX
TIME_SIGHT
LATITUDE
LONGITUDE

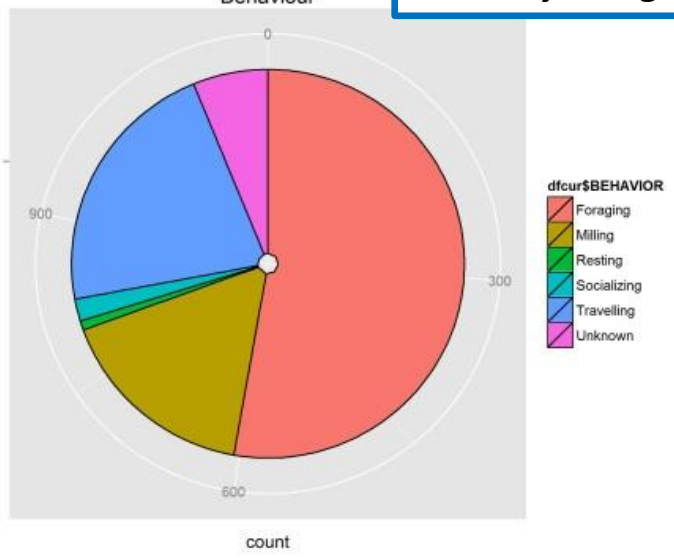
Plot

X

Y

Fill

Plot



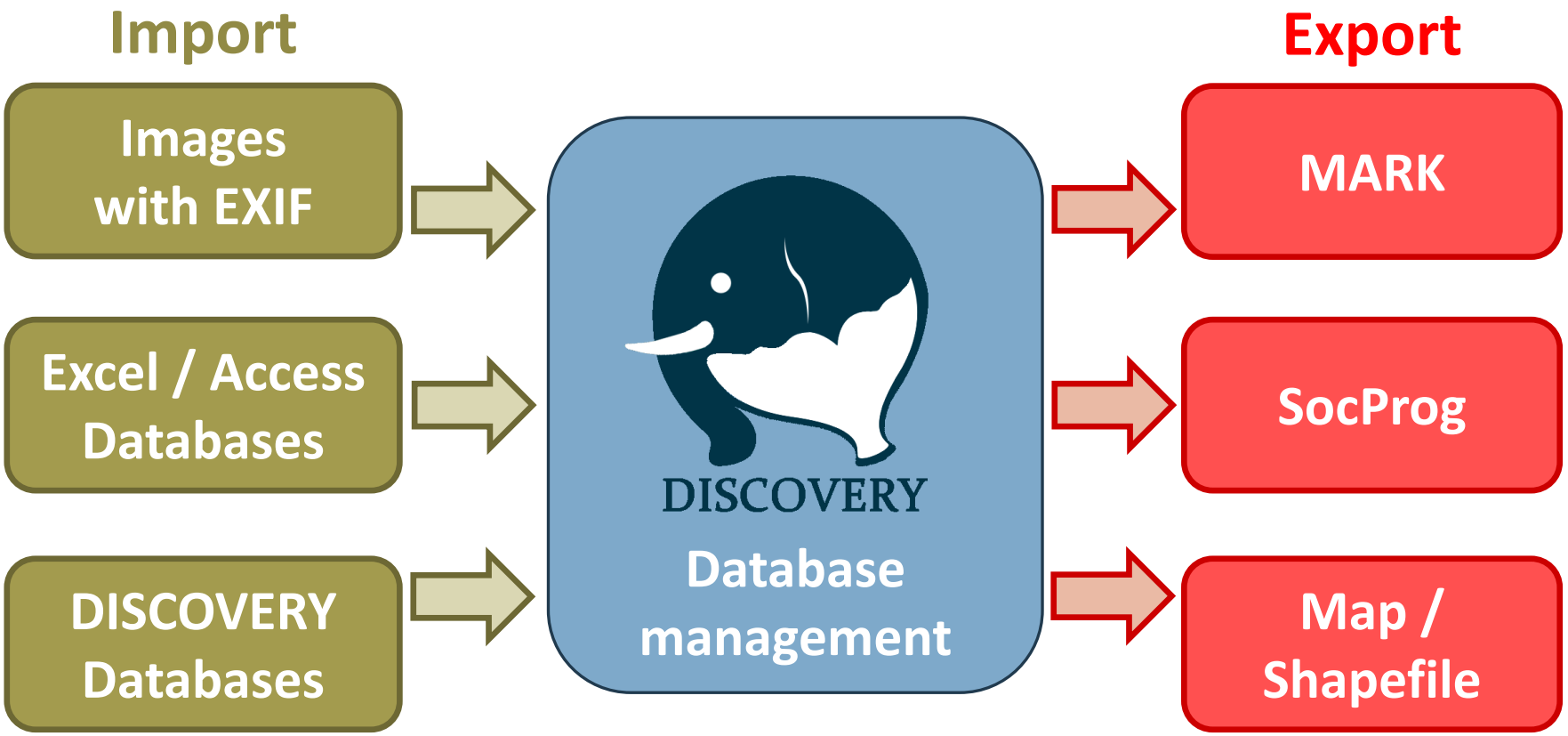
NoName	Var1	Freq	Percent
1	Foraging	605	0.527923211169...
2	Milling	191	0.166666666666...
3	Resting	9	0.007853403141...
4	Socializing	21	0.018324607329...
5	Travelling	249	0.217277486910...

plotR = 'FALSE'
DISCOVERY_Behavior_PieChart()

R Functions

Behavior_PieChart
Discover_Curve
GoogleMap
Histo_Distinct
ID_YEAR
Individuals_Year
Inividuals_Per_Variale
KdeAllFirst
Resightings
Sighting_History
TEST_ME

Data Management
- Import & Export



Website (program download and manual):

http://www.biosch.hku.hk/ecology/staffhp/lk/Discovery/

(New version out soon! Stay tuned!)

OR

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THE UNIVERSITY OF HONG KONG

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鯨豚生態研究小組

格物 明德
SAPIENTIA·ET·VIRTUS