

**JOINT REPORT of**

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Michael Awoyemi

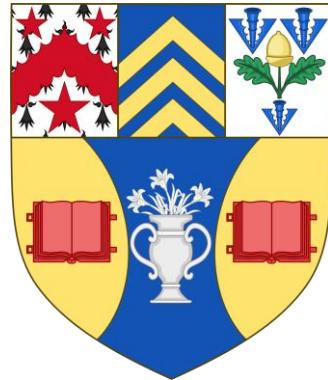
**Unit name and Force: Save the Birds**

**Case against: John Doe**

**Police Reference No:**

**Case Reference No:**

**PF Reference No:**



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## **1. Job Description and Instructions (Michael)**

It was reported to STB (Save the Birds) department from the APD (Abertay Police Department) that an individual named John Doe was suspected of possessing illicit images, searching on the internet, downloading PDF's and other kind of activities related to birds.

Evidence was recovered and brought to the STB office. An exhaustive digital forensics investigation was carried out by James Cameron, Luke Nicolson, Ross Fulton, and Michael Awoyemi.

Every step of the investigation was carried out in a manner that ensures forensic soundness. All the evidence can be identified and authenticated and has not been altered or changed since retrieved.

## **2. Description of Recovered / Examined Items (Michael, James)**

### **2.1 Evidence recovery**

The authorities arrived at the scene and conducted a crime scene investigation, the premises were secured to limit access and possibility to tamper with scene or possible evidence. A disk drive was found at the scene, and it appears to belong to the computer of the main suspect in the case, John Doe.

Pictures were taken to be able to place and identify the evidence at the crime scene if needed in future. Evidence and pictures were logged, transported, and stored appropriately to avoid evidence tampering.

The original evidence retrieved from the initial crime scene was stored within a secure building and the rest of the investigation was conducted on a copy of the evidence. All investigative processes were done with the disk drive on read-only permission, and checksum hash was checked both prior to and post operating on the disk image throughout the investigation the value remained d63dd1b8917ca28bac7c955fc3b6cd25. This was to ensure the disk image was not corrupted by any means whilst being operated on. The chain of custody was respected when either the original or copied evidence were moved or accessed.

### **2. 2 Disk Analysis**

Analyzing the copy of the evidence, it was found that the disk's capacity was approximately 5.37gb. Using various tools like "mmls and fdisk" it was discovered that there were 3 partitions on the disk drive.

Partition	Size	Description
001	31k	Unallocated space
002	2,9G	NTFS / exFAT
003	2,16G	Unallocated space

It was also discovered that inside partition 003, although it came back as an unallocated space, there were several illicit images and documents.

After running Autopsy more information was gained regarding the disk drive of John Doe's computer. Result like files by MME type, file category, and a count of every result type was discovered.

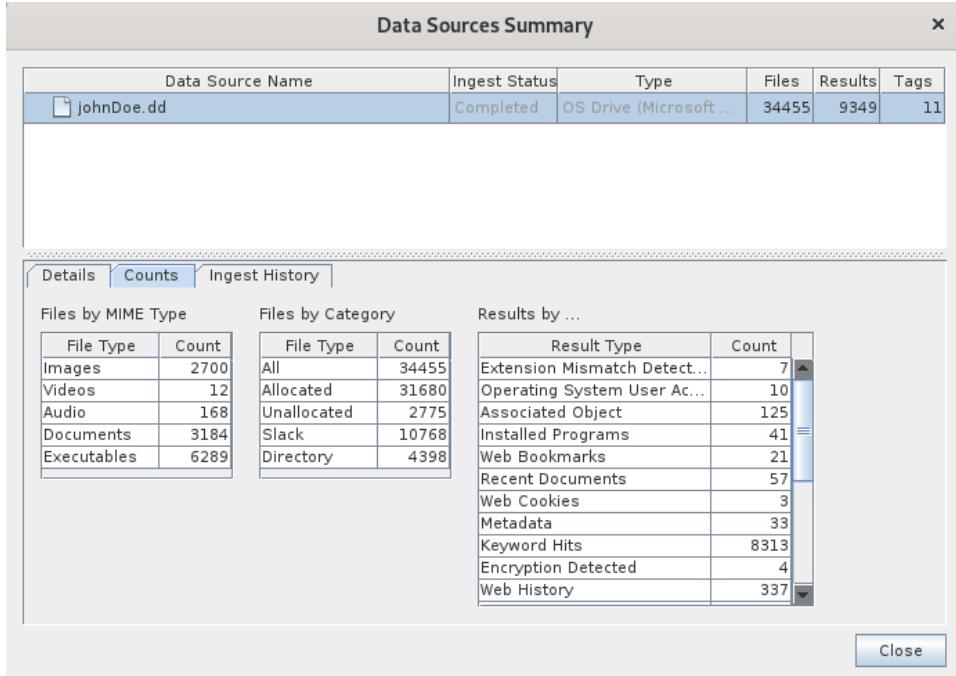


Figure 1. More disk info gained using autopsy

### 3. Analysis (Michael & Luke)

#### 3.1 File carving (Michael)

A physical Search was done in order to retrieve all images and documents from the drive.

The tools used were Foremost and Metacam, which after running the command the result came back in a folder named output with all the file type.

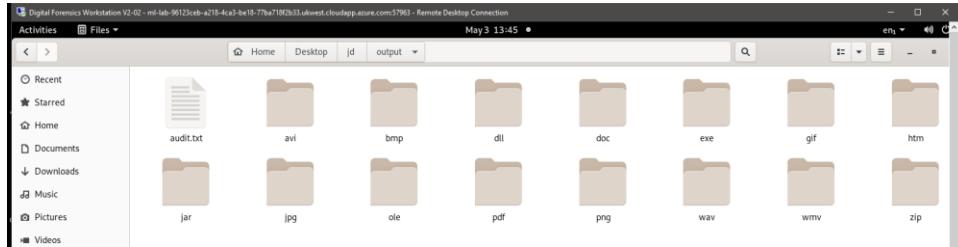


Figure. 2 Output of Foremost

```
May 3 13:48 • audit.txt
1 FOREmost version 1.5.7 by Jesse Kornblum, Kris Kendall, and Nick Mikus
2 Audit File
3
4 FOREmost started at Mon Mar 6 12:35:33 2023
5 Invocation: foremost -i -t johnDoe.dd |
6 Output directory: /home/student/output
7 Configuration file: /etc/foremost.conf
8 -----
9 File: johnDoe.dd
10 Start: Mon Mar 6 12:35:33 2023
11 Length: 5 (5762727936 bytes)
12 -----
13 Num Name (bs=512) Size File Offset Comment
14
15 0: 00160215.jpg 3 KB 86126860
16 1: 00159423.jpg 2 KB 102104576
17 2: 00200951.jpg 2 KB 102888912
18 3: 00864497.gif 600 B 43210384 (14 x 14)
19 4: 00869673.gif 1024 B 49599164 (16 x 16)
20 5: 00900001.gif 298 B 50723244 (16 x 16)
21 6: 00162191.gif 4 KB 53231792 (160 x 42)
22 7: 00164727.gif 1 KB 53629224 (140 x 75)
23 8: 00164735.gif 899 B 53624320 (15 x 15)
24 9: 00164743.gif 899 B 53624416 (15 x 15)
25 10: 00164751.gif 1 KB 53624512 (15 x 15)
26 11: 00164759.gif 902 B 53636668 (15 x 15)
27 12: 00117355.gif 823 B 66177920 (4 x 8)
28 13: 00127439.gif 841 B 65248760 (8 x 8)
29 14: 00129455.gif 808 B 65809348 (8 x 8)
30 15: 00129495.gif 1 KB 66301440 (104 x 20)
31 16: 00135233.gif 1024 B 69239728 (16 x 16)
32 17: 00142311.gif 1 KB 72863232 (138 x 31)
33 18: 00145447.gif 841 B 74571264 (14 x 57)
34 19: 00145456.gif 1 KB 74801856 (208 x 1)
35 20: 00146215.gif 1 KB 74802880 (414 x 1)
36 21: 00153631.gif 1 KB 78659872 (610 x 1)
37 22: 00154367.gif 809 B 79833034 (6 x 1)
38 23: 00154371.gif 809 B 81268806 (6 x 1)
39 24: 00165807.gif 47 KB 84798784 (1824 x 768)
40 25: 00166295.gif 609 B 85143840 (14 x 14)
41 26: 00168095.gif 947 B 86064640 (12 x 12)
42 27: 00196839.gif 947 B 108781568 (12 x 12)
<-- eoe. 00168095..nif 1 KB 107330776 (27 x 11)
```

Figure. 3 Image of full audit.txt by foremost

Information about the pictures was also discovered. It was found that withing the images 2 different brands of cameras were used and 3 different cameras model, this being Canon Eos-1ds, Canon Powershot Sd100 and Sony Cybershot.

More information of this can be found in [Appendix A]

#### 3.2 Browser analysis (Michael)

Before starting with the logical search, the checksum was checked, and it matched. Then the logical search was carried out with “losetup” and “Pasco”.

More browser analysis was done with the Autopsy tool, where it was possible to see the search history logs, bookmarks, cache, and information detailing the use of the browsers. Images of the results can be found in [Appendix B].

### 3.3 Communication – Email (Michael)

Once again, Autopsy was the major tool used to analyze the email sent/received from the suspect.

The suspect was found to be using an open-source cross platform email client called Thunderbird, in which he is registered as [jdoe@exmaple.com](mailto:jdoe@exmaple.com). There were several emails, from 2 user named [ben@example.org](mailto:ben@example.org) and [mailing@birds.example](mailto:mailing@birds.example).

These emails had bird content related, the timestamps, sender/recipient, subject and content of the emails can be seen in the screenshot taken when examining those emails [Appendix C].

### 3.4 Encrypted files (Luke)

The file “birdpics.gpg” was found to be encrypted by GNU Privacy Guard (GPG) which required decryption before it could be examined. In order to decrypt the file an encryption key was needed. The key was found in a password-protected file, so John the Ripper was used to obtain the key. Using the key, the file was decrypted revealing that it was a zip file containing five images of birds [Appendix D; 90, 153-156].

#### **4. Description of incidents / crime (James, Ross)**

Autopsy disk drive incident timeline (Ross, James)

Note: Other users were located within the filesystem, could potentially be investigated due to the shared use of the filesystem.  
- C:\Users\ (E3)

Emails were found in relation to “birdwatching.doc” which can be found in (E5). It was found that the Encryption of the files using GPG was an attempt to hide it, multiple files can be seen in (E6). They were located at C:\\Documents and Settings\\johndoe\\My Documents

The emails John Doe used in order to communicate via thunderbird client can be found at appendix (E7), furthermore John Doe’s recently downloaded and edited files can be found at appendix (E8)

Finally John Does “My Pictures” folder within the file system can be found at appendix (E9).

Figure 3. Disk drive timeline

#### **Description of reconstructed events –**

##### **02/02/2005**

14:11:46 – Google search for “birds”

14:15:42 – Google search for “bird wallpaper”

14:22:25 – Google search for “bird stories”

15:12:09 – “dawn.ram” is downloaded (E1,E2)

15:57:40 – Google search for “windows gnpupg”

15:57:40 – Download GnuPG for windows

16:25:10 – The photos within the encrypted zip are saved, birdwatching.doc (E3)

16:46:32 – birdpics.gpg is created

16:54:20 – Adobe Reader is downloaded

##### **03/02/2005**

12:21:40 – Google search for “bird mating call”  
12:22:52 - “aggressive\_song.wav” was downloaded  
15:01:38 – “177.jpg” was downloaded  
15:04:48 – “birdtrans2.jpg” was downloaded, (E4)  
15:05:03 – “chicks2.jpg” is downloaded  
15:05:44 – “newbies2.jpg” is downloaded  
15:06:42 – “ready2fledge.jpg” is downloaded

## **09/02/2005**

11:08:08 – The Suspects emails are installed to the client email “Thunderbird”  
11:27:00 – Google search for “bird screensavers”  
11:28:00 – “birds.zip” is downloaded from John Doe’s Firefox profile  
15:50:27 – The screensaver “tx\_birds” was set  
17:10:01 – System is shut down for the final time meaning this was the last use prior to seizure.

## 5. Conclusions (James)

Investigators have discovered that John Doe's computer contains a plethora of media related to birds, including bird costumes and bird watching guides. They also found evidence of his communication with another person, Mr. Ben Forbes, in which they exchanged bird pictures. Some of these pictures were taken by John Doe himself, as confirmed by the metadata analysis. Moreover, John Doe and Mr. Forbes attended a bird watching trip, and the pictures taken by John Doe during this excursion were stored within the drive recovered from his personal computer.

The analysis of John Doe's browsing history has revealed that he intentionally accessed various websites containing images of birds and related information, with the intention of adding them to his illegal collection of material.

To conceal his illegal activities, John Doe used different techniques. He created a hidden partition on his disk drive where he stored illegal bird pictures, which was not visible to other computer users. He also used the GNU Privacy Guard program to encrypt the bird-related content to prevent unauthorized access. Additionally, he used a tool to edit the computer's registry, but the changes made are not clear due to the lack of reliable logs.

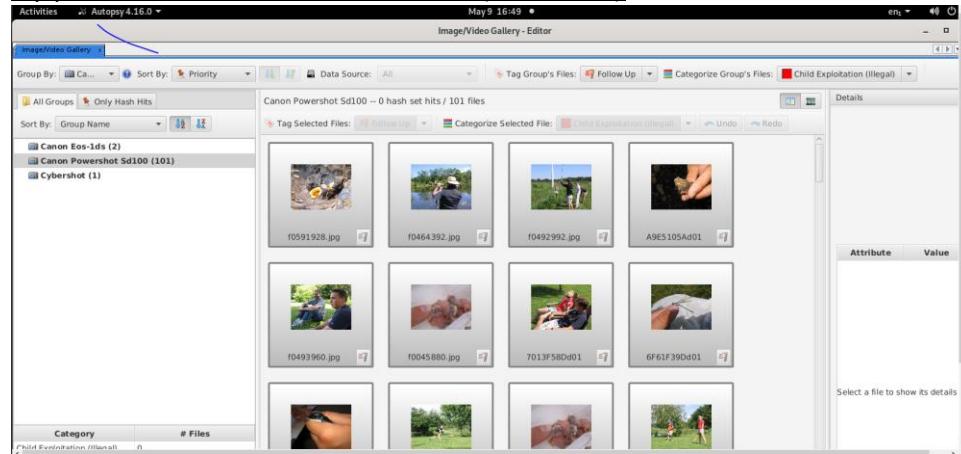
In conclusion, the investigation into John Doe's computer activity has revealed significant evidence of multiple cybercrimes. Doe had amassed a large collection of bird-related media, including pictures of bird costumes, bird watching guides, and illegal bird pictures. The analysis of his communication with Mr. Ben Forbes demonstrated the exchange of bird pictures, some of which were taken by Doe himself, further supporting his involvement in illegal activities.

Moreover, the examination of Doe's browsing history revealed a clear intent to add to his collection of illegal material, with intentional visits to various websites containing bird images and related information. His use of encryption techniques, including creating a hidden partition on his hard drive and using the GNU Privacy Guard program to conceal and encrypt the illegal bird-related content, is further evidence of his intent to hide his activities from others.

Based on the evidence gathered, it is the conclusion of the analysts that John Doe has committed multiple cybercrimes, including possessing, creating, and distributing illicit material.

## 6. Appendices

### Appendix A – Cameras makes (Michael)



### Appendix B. Browser (Michael,James)

A screenshot of the Autopsy browser interface. The title bar says "johnDoe - Autopsy 4.16.0@MI\_RefVm-18750". The main area shows search results for "birds". The search bar says "Search: the web pages from the UK". The results section says "Results 1 - 10 of about 28,800,000 for birds [definition]. (0.11 seconds)". It lists several results: "Birds do have brains - News24 - 5 hours ago", "Birds 'threatened by climate change' - Scotsman - 1 Feb 2005", "Minds of Their Own: Birds Gain Respect - New York Times - 31 Jan 2005", "Birds-Zoom School-Enchanted Learning Software", "The Life of Birds", "Birds - Cornell Lab of Ornithology", and "The Royal Society for the Protection of Birds". On the left, there's a "Directory Tree" showing a hierarchy of data sources and files. On the right, there are "Sponsored Links" for various bird-related websites.

#### B.1. Internet search birds.

johnDoe - Autopsy 4.16.0@MI-RefVm-187550

Case View Tools Window Help

Add Data Source Images/Videos Communications Geolocation Timeline Discovery Generate Report Keyword Lists Keyword Search

Directory Tree

Listing Data Content

Hex Text Application File Metadata Context Results Annotations Other Occurrences

Download Images

Search: bird screensavers Advanced Search Preferences

Results 1 - 10 of about 176,000 for **bird screensavers**. (0.46 seconds)

**Web**

**Bird Screensavers** www.populairscreensavers.com 5000+ Great Screensavers. All Free. Download Many Animal Screensavers!

**Screensavers** ... Scree... ScreenSaver Sunsets. Birds ScreenSaver Birds. Landscapes Screensaver... Texas Myths. Attractions Screensaver Attractions. Birds Screensaver DOWNLOAD: ... www.travelx.com/screen.asp?TN=6245300&LS=0655=1 - 14k - Cached - Similar pages

**3d War Bird Screensaver download page. 3d War Bird Screensaver by ...** ... 3d War Bird Screensaver. 3d War Bird Screensaver download.Screensaver . Cursors.Font Tools,Fonts,Icon Tools,Icons,Screensavers,Shell & ... www.sharewareorder.com/3d-War-Bird-Screensaver-download-16650.htm - 26k - Cached - Similar pages

**Bird Screensaver free of spyware** Bird Screensaver - The most affordable screensavers on the Internet. See 40 birds caring for their young with this Free Bird Screensaver. ... www.nexusmedia.net/bird\_screensaver.htm - 11k - Cached - Similar pages

**Free Screensavers** The Only Screensaver Site That Guarantees No Spyware. Be Original. www.screensavers.com

**Free Desktop Screensavers** Hundreds of screensavers to choose Download your favorite today! www.webssearch.com

**All Free Screensavers** Screensavers For All Occasions. Get Yours For Free Today! www.screensaver.com

### B.1.2 Internet search bird screensavers.

johnDoe - Autopsy 4.16.0@MI-RefVm-187550

Case View Tools Window Help

Add Data Source Images/Videos Communications Geolocation Timeline Discovery Generate Report Keyword Lists Keyword Search

Directory Tree

Listing Data Content

Hex Text Application File Metadata Context Results Annotations Other Occurrences

Download Images

Search: bird mating calls Advanced Search Preferences

Results 1 - 10 of about 57,800 for **bird mating calls**. (0.36 seconds)

**Web**

**Chickadee Karaoke** ... During mating season, Mennill hung out in the woods with a laptop and a speaker. He gathered the birds by playing the familiar chickadee call. ... whyfiles.org/shorties/104chick\_sex - 11k - Cached - Similar pages

**Teacher's Guide - Bird Bander** ... other and rejoin the group through a gathering call. ... other types of communications are used by birds. ... and American woodcocks have elaborate mating dances and ... www.inhs.iuuc.edu/chf/pub/virtual/bird/teacher/lesp16.html - 5k - Cached - Similar pages

**Bird Bander** ... mate and mark the territory necessary to raise young. Each species has its own specific song or songs. Some birds have over a dozen calls and songs ... www.inhs.iuuc.edu/chf/pub/virtual/bird/student/les6.html - 3k - Cached - Similar pages [ More results from www.inhs.iuuc.edu ]

**Rainforest Birds** ! Photos, lists & guides, Far North Queensland ... ... the spring you can hear the rasping mating call of the the birds of paradise and the rainforest is one of the most precious bird watching sightings ... rainforest-australia.com/bird.htm - 12k - Cached - Similar pages

**[PDF] Sound Ideas Just Birds and Animals II Complete Track and Index ...** File Format: PDF/Adobe Acrobat - View as HTML ... 02 IRA01 52-04 BIRD TURKEY FEMALE WILD TURKEY: MATING CALL -03 IRA03

### B.1.3 Internet search bird mating calls.

B.1.4 Index.dat file showing all dates and time of the visited URL's .

## Appendix C – Emails (Michael)

At 11:08:01 of 09/02/2005 John Doe received several emails from [ben@example.org](mailto:ben@example.org) and [mailinglist@birds.example.com](mailto:mailinglist@birds.example.com) .

Email from [mailinglist@birds.example.com](mailto:mailinglist@birds.example.com) .

The screenshot shows the Communications Visualization interface. On the left, there's a sidebar with 'Filters' and 'Account Types' (Device, Email) buttons. The main area displays a list of accounts: jdoe@example.com (johnDoe.dd, Email, 5 items), ben@example.org (johnDoe.dd, Email, 4 items), and mailinglist@birds.example.com (johnDoe.dd, Email, 1 item). To the right, a detailed view of an email thread titled 'Showing Messages for Thread: good pics' is shown. The first message is from ben@example.org to jdoe@example.com on 2005-02-09 11:00:01, with the subject 'good pics'. The message body says 'Hi thought you'd like these enjoy'. Below the message, three attachments are listed: 'Hng\_johnDoe.dd...', 'Hng\_johnDoe.dd...', and 'Hng\_johnDoe.dd...'. The attachments are small images.

Email from ben with subject "Good pics" that states "Hi, thought you'd like these" with 3 attachments.

This screenshot is identical to the one above, showing the same email thread and attachments. The interface includes a sidebar with filters and account types, and a main pane displaying the email details and attachments.

Images attached from the previous email from ben "good pics" .

The screenshot shows the Communications Visualization interface. The sidebar and account list are similar to the previous screenshots. The email thread on the right is titled 'Showing Messages for Thread: expensive birds'. The first message is from ben@example.org to jdoe@example.com on 2005-02-09 11:00:01, with the subject 'expensive birds'. The message body contains a long story about a woman buying an exotic bird. Below the message, there is a large amount of text describing the story.

"Expensive birds" email from [ben@example.org](#) .

The screenshot shows the Communications Visualization interface. The sidebar and account list are consistent. The email thread on the right is titled 'Showing Messages for Thread: some more good ones'. The first message is from ben@example.org to jdoe@example.com on 2005-02-09 11:00:01, with the subject 'some more good ones'. The message body is a short note: 'Thanks for the pics you sent me here are some I really like'.

Email from [ben@example.org](#) "Some more good ones" .

Communications Visualization - Editor@ML-FuYm-10750

Communications Visualization

Filters  Apply  Refresh

Account Types: Device Email

Devices: JohnDoe.dd

Uncheck All Check All

Date Range (UTC/UTC): Start: February 9, 2005 End: February 9, 2005

Communications Limit: Most Recent: All

Browse Visualize

Account Device Type Items

- jdoe@example.com johnDoe.dd Email 5
- ben@example.org johnDoe.dd Email 4
- mailinglist@birds.example johnDoe.dd Email 1

Showing Messages for Thread: some more good ones

Summary Messages Call Logs Contacts Media Attachments Threads

Type From To Date Subject Attachments

E-Mail ben@example.org jdoe@example 2005-02-09 11:00:00 some more good ones

From: ben@example.org; To: jdoe@example.com; CC: Subject: some more good ones

Headers Text HTML Attachments (5) Accounts View in New Window

Table Thumbnail Page 1 of 1 Pages: Go to Page: Images: 1-5 Large Thumbnails

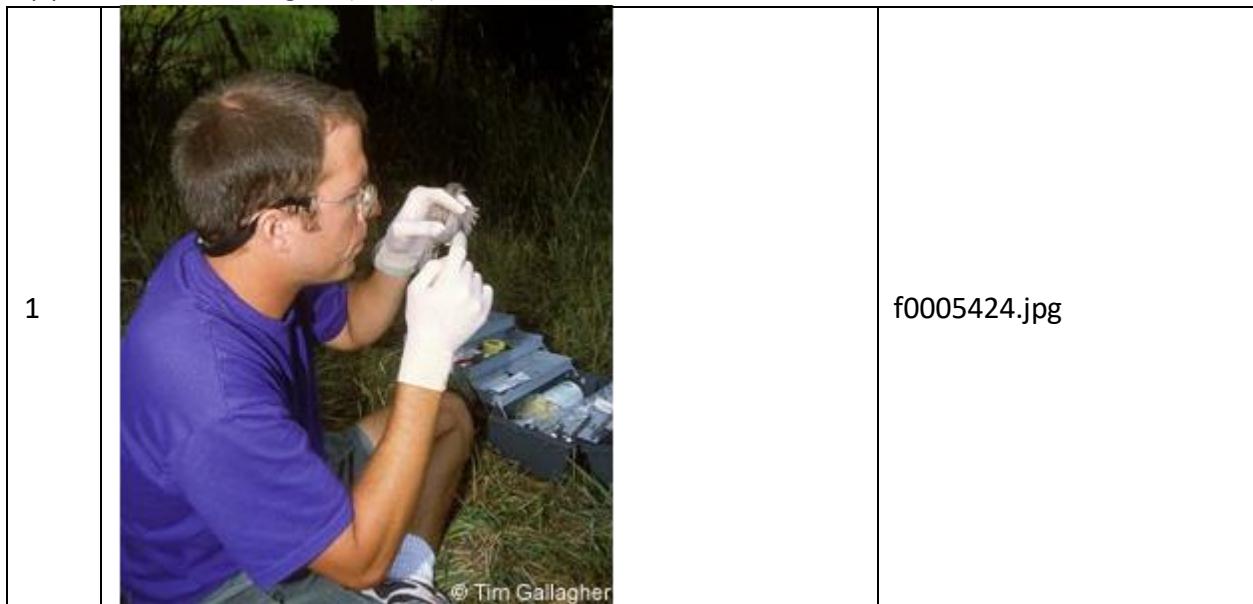
Sort: Sorted by: --



5 Results

Content of previous email from [ben@example.org](mailto:ben@example.org) "some more good ones" .

## Appendix D – Images (Luke)



2	 A photograph showing three people in a grassy field under a clear blue sky. One person in a black shirt and light-colored shorts is standing and holding onto a tall, thin vertical pole. Another person in a white shirt and light-colored pants is standing behind them. A third person is bent over near the base of the pole. In the background, there's a fence and some trees.	f0493176.jpg
3	 A photograph of a person from behind, wearing a wide-brimmed straw hat and a dark vest over a light-colored shirt. They are standing by a body of water, looking through a pair of binoculars. The background shows a line of trees reflecting in the water under a blue sky with some clouds.	f0464568.jpg
4	 A photograph of a person with curly hair and glasses, wearing a blue t-shirt, looking down at a small object they are holding in their hands. They appear to be examining it closely. The background shows a grassy field and a white tent-like structure.	f0360392.jpg

5



KeaRetrievingBakedBeanCanFromTarn.jpg

6



KeaEatingRentalCar.jpg

7



KeaAtTopOfMacKinnonPass0930.jpg

8



KeaAndMountain.jpg

9



junescreen01.jpg

10



june03screen.jpg

11



ImmatureSnowyEgretTaki ngOff.jpg

12



GreenHeronOnChicagoLak eshore.jpg

13	 A close-up, low-angle profile shot of a Green Heron's head and neck. The bird has long, thin, pinkish-purple feathers on its neck, a long, dark blue-grey bill, and a small orange patch around its eye. It is perched on a branch against a dark background.	GreenHeronCloseup.jpg
14	 A photograph showing a Great Egret with its wings spread wide, flying low over a group of four Roseate Spoonbills standing in shallow, reddish water. The spoonbills have distinctive pinkish-purple plumage on their heads and necks. The background shows a grassy bank.	GreatEgretOverflyingRoseateSpoonbills.jpg

15	 A white Great Egret is captured in mid-flight, its long neck and legs extended. It is flying over a wetland area with dense, tall brown reeds in the background and a body of water reflecting the surrounding environment.	GreatInEgretVoloBog.jpg
16	 A Great Blue Heron stands in shallow water, its long blue-grey neck and legs extended. It is holding a small fish in its open beak. The bird is surrounded by green aquatic plants and lily pads.	GreatBlueHeronWithFish.j pg

17



f0000536.jpg

18



f0000888.jpg

19	 A large flock of white pelicans is captured in flight against a clear, pale blue sky. The birds are scattered across the frame, some in sharp focus and others as small white specks in the distance.	f0001224.jpg
20	 A bald eagle is shown in mid-flight, its wings spread wide. It has a white head and tail, and dark brown feathers on its wings and back. The background consists of a calm body of water with gentle ripples.	f0001624.jpg

21



f0002088.jpg

22



f0003752.jpg

23	 A black swan with a long neck and a red beak is swimming in a body of water. Its reflection is visible below it.	f0004248.jpg
24	 A black vulture with its wings spread wide is perched on a wooden post. The background is blurred with autumn foliage.	f0004856.jpg
25	 A small blue bird with white patches on its wings and tail is perched on a thin wire. The background is a soft-focus green.	f0005296.jpg

26		f0310480.jpg
27		f0387624.jpg
28		f0345344.jpg
29		f0345584.jpg
30		f0056928.jpg
31		f0056936.jpg
32		f0056944.jpg

33		f0056952.jpg
34		f0056920.jpg
35		f0056912.jpg
36		f0033928.jpg
37		f0033912.jpg

38		f0002368.jpg
39		f0345656.jpg
40		f0345832.jpg

41		f0382464.jpg
42		f0415008.jpg
43		f0416072.jpg

44		f0440944.jpg
45		f0438640.jpg
46		f0439400.jpg

47		f0441536.jpg
48		f0443520.jpg
49		f0592136.jpg

50



f0526960.jpg

51		J0178932.JPG
52		WB01297_.GIF
53		WB01301_.GIF
54		duck.bmp
55		CrouchingKokako.jpg

56		ChestnutMandibledToucan.jpg
57		CanadaGoose.jpg

58



BrushTurkeyPerching.jpg

59



CanadaGooseWashing.jpg

60

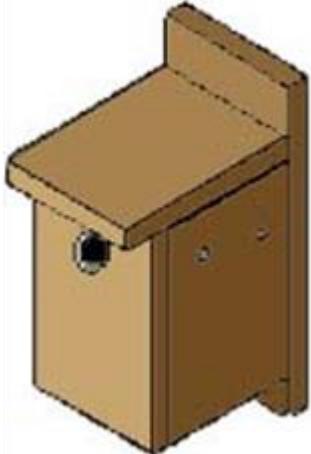


Brolga.jpg

61



brd\_WoodDuck.jpg

62		bluebirdhousepic.jpg
63		IMG_3937_filtered.jpg

64



*Nesting red-winged blackbird/  
Carouge à épaulettes en cours de nidification  
Mike Hopiak / Cornell Lab of Ornithology*

glfs-storm-birds.jpg

65



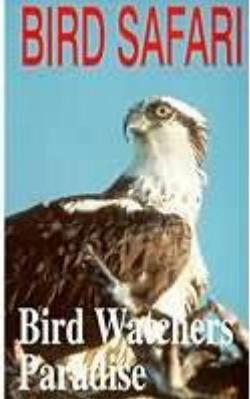
cute\_penguin.jpg

66



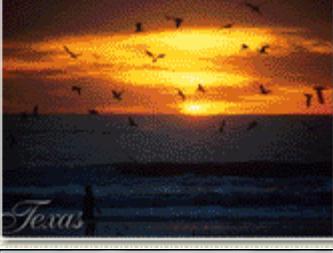
gawall8.jpg

67		colorful-birds.jpg
68		BC7 feeding the birds.jpg
69		7EYBTELF1KAN.jpg

70		7107298.jpg
71		tn_duck_3.jpg
72		snow_geese.jpg

73	 A photograph of two fluffy, downy bird chicks sitting in a nest made of twigs and straw. The chicks are white with dark eyes and small beaks. A watermark for "www.NatureWallpaper.net" is visible at the bottom of the image.	Firefox Wallpaper.bmp
74	 A photograph of a small bird with greyish-blue and orange-brown feathers, perched on a dark, textured branch. The background is blurred green foliage.	image_0.jpg
75	 A movie poster for Alfred Hitchcock's film "The Birds". It features a woman (Tippi Hedren) looking up at several birds flying overhead against a dark, stormy sky. The title "THE BIRDS" is prominently displayed in the center.	40m.jpg

76		5E5570B4d01
77	 <p>Everyone says you're too young for me.</p>	177.jpg
78		chicks2.jpg

79		OE47C6DFd01
80		ready2fledge.jpg
81		83E8FA9Dd01
82		B6E058BDd01

83



blue\_bird2.jpg

84



AmericanAvocetWinterPlu  
mage.jpg

85	 A large flock of white pelicans is captured in flight against a clear blue sky. The birds are scattered across the frame, some in sharp focus and others as small white dots in the distance, creating a sense of depth and movement.	AmericanWhitePelicansCircling.jpg
86	 Two black-necked stilts are shown in mid-stride on a wet, reflective surface, likely a salt flat or marsh. The bird in the foreground has its wings partially spread, revealing white feathers at the base of its long, dark wings. The background shows the textured, light-colored ground of the wetland.	BlackNeckedStiltsFromBehind.jpg

87	 A black swan with its head submerged in the water, looking for food. Its long neck is curved, and its red bill is partially open.	BlackSwan.jpg
88	 A black vulture perched on a wooden post, spreading its wings to dry them. The background is a soft-focus landscape of green and pink vegetation.	BlackVultureSunningOnPo st.jpg

89	 A Great Blue Heron is captured in mid-flight against a clear blue sky. The bird's long legs are extended downwards, and its wings are partially spread, showing its characteristic blue-grey plumage.	AlmondMarshGreatBlueHeronStalling.jpg
90	 A White-throated Sparrow is perched on a bare tree branch. It has a white patch on its wing and a yellow patch on its throat. Red berries are visible on the branch.	E:\birds\birdpics\WhiteThroatedSparrowInTree.jpg
91	 A sunset over a body of water with a small sailboat visible. The word "Texas" is printed in script at the bottom left of the image.	83E8FA9Dd01
92	 A sunset over a body of water with many birds flying in the foreground. The word "Texas" is printed in script at the bottom left of the image.	8FF8EA93d01

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	 A photograph showing a person's hands holding a small bird with its wings spread wide. The bird has dark feathers on its back and a white belly. Two small, rectangular wing tags are attached to its wings. The background is a wooden surface.	112	3E8C62AFd01
	 A photograph showing a person's hand holding a small bird perched on their thumb. The bird has dark feathers on its back and a white belly. The background is a green, outdoor setting.	113	3E8162AFd01

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126		Babyscot_vyoung.jpg

127		BaldEagle7oClock.jpg
128		BarnOwl.jpg
129		BellbirdJumpingOffBranch.jpg
130		birdtrans2.jpg

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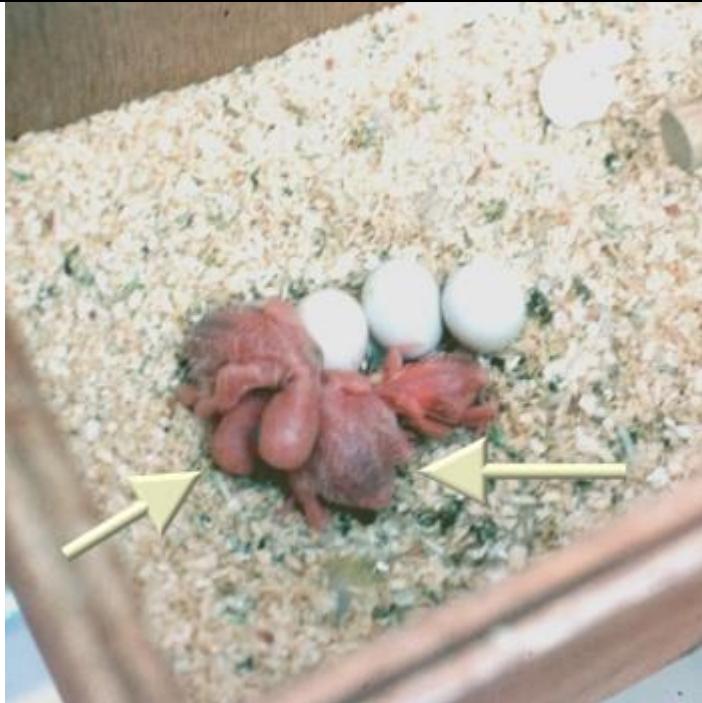
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141	 Cuban Tody © PeteMorris/Birdquest Surfbirds.com	f0009048.jpg
142	 © Christopher Wood Surfbirds.com	f0009168.jpg

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152		newbies2.jpg
153		E:\birds\birdpics\WhiteFacedHeronFlying.jpg

154		E:\birds\birdpics\WhiteFrontedParrot.jpg
155		E:\birds\birdpics\WhoopingCranes.jpg

156



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## **Appendix E – Documents (Luke)**

Document A – birdwatching.doc

### **BIRDWATCHING IN THAILAND Feathered Magic from Mangroves to Mountaintops by Antony Lynam**

One of the great attractions for nature tourists visiting Thailand is the diversity of environments extending across mountain peaks, lowland rainforests, mangroves, coral reefs, farmland and urban jungles. Within a day, or even a few hours travel, one can easily make the transition between these places and witness natural marvels large and small.

For wildlife enthusiasts no group maintains interest and pleasure more than birds. While special efforts are required to see in the wild charismatic species such as elephants and primates, birds are found across the entire spectrum of environments from pristine to severely degraded areas.

Part of the attraction for birds lies in their diversity. Nine hundred and seventy eight bird species have been recorded in Thailand, approximately 10% of the world's total. At the Isthmus of Kra between latitudes 11° and 13°N, a major biogeographic transition between Indochinese and Sundaic forests produces a special diversity of birds with a total of 152 species of birds reaching the northern or southern range limits of their geographic ranges.

Two-thirds of Thai birds are residents, the remainder are seasonal visitors. Locations where migrants congregate, often in large numbers, are highly accessible making Thailand a special destination for birdwatchers.

Many birds are susceptible to human disturbance because they have small geographic ranges, a result of specific habitat requirements. For example, Deignan's babbler - a non-descript forest bird is found on Doi Chiang Dao and nowhere else in the world. Gurney's pitta are only found in lowland rainforests. Fewer than 30 birds remain in the last known population in Thailand at Khao Nor Chuchi, Krabi. Efforts by local and international conservation agencies strive to increase protection efforts and reafforest areas encroached by rubber farmers, though time is running out. With approximately 20% of the birds found in Thailand being globally or regionally endangered species, this makes the country a birdwatching haven for bird enthusiasts.

## **IDENTIFYING**

## **BIRDS**

Birds are distinguished first by their size and shape. They range from diminutive flowerpeckers, sunbirds and white-eyes, about the size of your index finger, to lanky storks and egrets that stand almost a metre tall, and Green peafowl with its spectacular 2m tail. The form of the beak offers vital clues about the bird's diet. For example a thin curved tube for sipping nectar or a sharp hook for tearing flesh. The pattern and colour of plumage can tell apart the sexes as in pheasants where males are bright and striking, and females are drab and dowdy. By far the most useful character for identification is a bird's voice. This is especially true in forests where on average 90% of birds are hidden from view. The most experienced birdwatchers in the tropics know their songs and calls.

## **BEST                    TIMES                    TO                    SEE                    BIRDS**

The nesting season is a good time to be watching birds. During this most active time in a bird's life a variety of vocalizations and behaviours are exhibited. In Thailand, as in other tropical countries, the nesting season coincides with the period when food is in abundant supply. A bird expends much energy in courting, mating, incubating eggs, defending a nest and feeding offspring. Most birds nest during the transition between dry and wet seasons when new leaves and grass shoots sprout. This occurs from February to June. Certain birds depend on the availability of water and nest throughout the rainy season.

Migrants are best observed during their passage into or out of the country, or as they pass through on their way to other places. Most conspicuously, half a million ducks spend their winter in Thailand, feeding and resting in watery roosts from Chiang Saen to Thale Noi. Thousands of garganey and Lesser treeduck flock during January and February.

Shorebirds like sandpipers, stints and plovers migrate long-distances between nesting grounds in Eurasia and tropical Asia and wintering grounds in Australasia. They stop to feed in Thailand's mudflats and mangroves during September to May where they stock up on invertebrates and crustaceans. During October, the southward migration of hawks over peninsular Thailand is an avian spectacle. Chinese goshawks, Japanese sparrowhawks, crested honey buzzards, black bazas, and others are seen coasting on thermals in their thousands daily. Less conspicuous is the blue-winged pitta, a ground dwelling bird that arrives with the rains to nest in deciduous and bamboo

forests, and escapes the hot season for the wetter forests of Malaysia and Sumatra.

**WHERE TO FIND BIRDS**

Given that many birds are denizens of certain times, places, habitats or seasons, the amateur naturalist can remember them by association.

**PARKS, TEMPLES AND GARDENS**

Some species like barn swallows, magpie robins, mynas and starlings can be found around Bangkok and environs. *Lumphini Park*, a heavily-used green area in the city centre supports a variety of birds with over 90 species having been recorded there. Temples near Bangkok and Ayutthaya preserve pockets of the natural landscape including birds such as black kites, parakeets and woodland birds that are characteristic of the habitats.

**RICE PADDIES, MARSHES AND PONDS**

Rice paddies, marshes and ponds away from built-up areas support breeding populations of Asian openbill stork and many other waterbirds. Key sites: *Suphan Buri-Ayutthaya* and *Beung Boraphet*.

**PEAT SWAMP FORESTS**

Almost the last vestige of Thailand's peat swamp forest at *Phru To Daeng* or *Chalerm Phrakiat Wildlife Sanctuary* in Narathiwat supports Lesser adjutants, a kind of stork, along with several birds characteristic of Sundaic forests.

**LAKES, RIVER SANDBANKS AND REEDBEDS**

Lakes, river sandbanks and reedbeds preserve unique assemblages of wintering waterfowl and perching birds.

Key sites: *Chiang Saen*, *Fang Hot Springs*, and *Thaton*.

**AGRICULTURAL LANDSCAPES**

Agricultural landscapes across the country support species that tolerate human presence and include kites, rollers, bee-eaters, coucals, weavers and bulbuls.

**SANDY BEACHES, MANGROVE AND TIDAL FLATS**

Sandy beaches are attractive to tourists but are barren habitats for birds, while little-visited mangroves and tidal flats that are rich in nutrients and microorganisms, are favoured feeding haunts for migrant waders. Some birds like the Brown-winged kingfisher and Mangrove pitta, are entirely restricted

to mangroves while Mangrove whistlers and flyeaters rarely leave the area. Key sites: *Samut Sakhon*, *Ban Laem in Petchburi*, and *Krabi*.

## **OFFSHORE**

## **ISLANDS**

Offshore islands such as *Phi Phi*, *Libong*, *Surin* and the *Similans* support fewer species than similar sized mainland habitats but some such as Nicobar and Pied Imperial pigeon are entirely restricted to these refuges.

## **SEASCAPES**

While there are fewer seabirds in the warm Thai waters compared with those in the northern and southern hemispheres, frigate birds, skuas, boobies, and terns are among the rewards for marine birders.

## **FORESTS**

Most resident Thai birds depend upon forests for their survival. Rainforests in the extreme south support the greatest avian diversity, while seasonally dry dipterocarp, mixed deciduous and evergreen forests in the centre and north. Key sites: *Khao Yai National Park*, *Kaeng Krachan National Park*, *Khao Soi Dao*, *Nam Nao National Park*, *Khao Nor Chuchi*, *Ban Nai Chong*, and *Hala Bala Wildlife Sanctuary*.

## **MOUNTAINS**

Sibias, minlas, and laughing thrushes are relatives of species found in the Himalayas and southern China, and can only be found in mountain forests. Following surveys of high mountain peaks in the last decade, at least 20 new species or 2% of the total have been added to the lists for Thailand. Key sites: *Doi Pha Hom Pok*, *Doi Chiang Dao*, *Doi Inthanon*, *Doi Ang Khang*, and *Doi Suthep*.

By visiting these enchanting destinations, travellers can appreciate the avian wonders that Thailand offers and better understand the importance of the wild and not so wild areas that preserve them.

## **Contact**

Bird Conservation Society of Thailand (BCST)\*  
69/12 Soi Ramindra 24, Joorakaebau, Ladprao, Bangkok 10230, Thailand  
Email: [bcst@box1.a-net.net.th](mailto:bcst@box1.a-net.net.th)  
Tel: 66-(0)-2943-5965  
Web sites:  
[www.bcst.org/index\\_ebird.html](http://www.bcst.org/index_ebird.html)

## **information:**

[www.thai.net/bcst](http://www.thai.net/bcst)

\* The Bird Conservation Society of Thailand (BCST) is a BirdLife Partner

Oriental Bird Club (OBC)  
c/o Uthai Treesucon, 723/1 Mu 2 Soi Ram Intra, Joorakhaebua, Bangkok  
10230.

E-mail:

[utree@loxinfo.co.th](mailto:utree@loxinfo.co.th)

[mail@orientalbirdclub.org](mailto:mail@orientalbirdclub.org)

Web site: [www.orientalbirdclub.org](http://www.orientalbirdclub.org)

Wildlife Conservation Society - Thailand Programme  
P.O. Box 170, Laksi, Bangkok 10210  
Tel: +662-503 4478, +662-503 4479  
Fax: +662-503 4096

Email: [thailand@wcs.org](mailto:thailand@wcs.org)

### **Reference**

Field guide  
Robson, C. 2002.  
A field guide to the birds of Thailand.  
Asia Books, Bangkok. 272pp.

### **information:**

### **TAT PUBLICATIONS ON NATURE TOURISM**

For more information on birdwatching in Thailand, please refer to the following nature tourism guide books in the "National Park" series published by the Tourism Authority of Thailand as part of the Tourism and Employment Creation Plan implemented under the Social Investment Project.

- KHAO YAI: DONG PHAYA YEN FOREST RANGE  
ISBN 974-8252-70-1
- KAENG Amazing Forest of Phetchburi KRACHAN: River  
ISBN 974-8252-72-8
- KHAO Fascinating Limestone Mountains Amid The Verdant Forest of Surat Thani, Thailand SOK  
ISBN 974-679-099-4
- DOI INTHONON - DOI SUTHEP  
The Himalayan Springs of Thailand  
ISBN 974-8252-67-1

## BIRDWATCHING TIPS

- Consult field guides, checklists, and maps prior to arriving at the birdwatching destination.
- Dress in colours that blend in with the surroundings.
- Bring appropriate equipment such as telescope, bird guide, and a notebook.
- Plan to arrive at the destination at sunrise when birds are first out in search for food and are most active.
- Walk slowly stopping at intervals to listen for calling birds.
- Look for the birds in thickets, on the branches of trees, and on the ground.
- Avoid talking, smoking, or walking on dry leaves, all of which will scare birds away.

## CONSERVING BIRD DIVERSITY

Across the world, humans coexist with birds but human activities often affect the survival prospects for birds. Forty-eight species of birds found in Thailand (5% of the total) are globally threatened by the loss or disturbance of their habitats, food resources, and breeding areas, and by other human actions, and so require special conservation attention. A further 97 species (10%) are potentially threatened if current trends persist.

In Thailand, 101 species (10% of the total) are hunted as pests, for food or for the pet trade and are directly threatened by humans. The list of hunted species includes waterbirds, birds of prey, pheasants, parakeets, pigeons, hornbills, pittas weavers, bulbuls, and other forest birds. Worldwide the trade in birds includes 2,600 species and several million birds each year. Ten percent of threatened birds worldwide are affected by the bird trade.

There are a number of ways in which the numbers and distribution of threatened birds are being restored. Habitat conservation programmes are an important mechanism. Feeding habitats for seasonal migrants are being preserved by incorporating mangroves and coastal tidal areas in marine protected areas. Lowland forests that support Gurney's pitta and other diversity are being protected and a reafforestation programme planned. Preventing encroachment around the edges of parks maintains the integrity of forest blocks used by the majority of native birds, including migrant raptors

and songbirds.

In most cases, preserving and protecting natural habitats can bring back even highly endangered populations of rare birds. These measures are relatively cost effective to implement. As an example, a 3-year Khao Yai Conservation Project preserved over 2,000 sq km of wildlife habitat, discouraged poaching, and provided employment alternatives for local forest resource users, at an annual cost of 7 million baht (US\$171,000).

For critically endangered species, whose populations are extremely small, and whose survival in the wild is uncertain due to factors that simply cannot be controlled, other more costly measures such as captive breeding, are being considered. Captive breeding is risky because birds need to be recovered from the wild to establish breeding populations, and injury is possible. Some species do not breed well in captivity because their natural courting and nesting behaviours are no longer possible. Strict controls on who is allowed to breed endangered species, registration of individuals, and enforcement of laws so that commercial sale is not possible, need to be adopted. Without these controls, captive breeding programmes cannot succeed.

## **HOW YOU CAN HELP IN THE CONSERVATION OF BIRDS**

Visitors to Thailand can assist efforts to preserve and maintain the diversity of birds and their habitats simply by visiting national parks and other wilderness areas. Bird enthusiasts can report the species they observe to authorities. Checklists are now available at many popular national parks. Tourists can report evidence of suspicious activity that might lead to the arrest of unscrupulous individuals trapping or hunting birds and can also participate as volunteers in habitat conservation programmes. In these ways, tourists can help reduce the threats to birds, and at the same time enjoy Thailand's birdwatching paradise.

### **Contact information:**

#### **TO REPORT BIRD SPECIES OBSERVED**

- **TO REPORT BIRD SPECIES OBSERVED**  
Please contact the Park Visitor Centre of the National Park or  
Bird Conservation Society of Thailand (BCST)\*  
69/12 Soi Ramindra 24, Joorakaebau, Ladprao, Bangkok 10230,

Thailand  
Email: [bcst@box1.a-net.net.th](mailto:bcst@box1.a-net.net.th)  
Tel: 66-(0)-2943-5965  
Web sites:  
[www.bcst.org/index\\_ebird.html](http://www.bcst.org/index_ebird.html)  
[www.thai.net/bcst](http://www.thai.net/bcst)

\* The Bird Conservation Society of Thailand (BCST) is a BirdLife Partner

- **TO REPORT EVIDENCE OF SUSPICIOUS ACTIVITY**  
Please contact  
Wildlife Protection and Suppression Office  
Department of National Parks, Wildlife, and Plant Conservation  
61 Paholyothin Road, Chatuchak, Bangkok 10900  
Tel: 66-(0)-2579-5266
  
- **HABITAT CONSERVATION VOLUNTEER PROGRAMMES**  
Please contact  
Wildlife Conservation Society - Thailand Programme  
P.O. Box 170, Laksi, Bangkok 10210  
Tel: +662-503 4478, +662-503 4479  
Fax: +662-503 4096  
Email: [thailand@wcs.org](mailto:thailand@wcs.org)

#### **FAMILIES OF BIRDS IN THAILAND UNDER THREAT**

The following bird species are under threat because there is a high demand for them and they are hunted for the local, regional and global bird trade. To help preserve the species, please refrain from purchasing any of the following birds as pets, and if you happen to witness any of the following birds being sold or traded, or note any suspicious activities involving them, please contact:  
The Wildlife Protection and Suppression Office  
Department of National Parks, Wildlife, and Plant Conservation  
61 Paholyothin Road, Chatuchak, Bangkok 10900  
Tel: 66-(0)-2579-5266

1. Phasianidae (wood partridges and pheasants) - 4 species
2. Anatidae (White-winged duck) - 1 species
3. Picidae (woodpeckers and barbets) - 3 species
4. Bucerotidae (hornbills) - 7 species
5. Upupidae (Common hoopoe) - 1 species

6. Cuculidae (Coral-billed ground cuckoo) - 1 species
7. Psittacidae (parrots and parakeets) - 4 species
8. Columbidae (pigeons) - 12 species
9. Accipitridae (birds of prey) - 9 species
10. Threskiornithidae (White-shouldered ibis) - 1 species
11. Ciconiidae (Lesser adjutant) - 1 species
12. Pittidae (pittas) - 3 species
13. Irenidae (Asian fairy bluebird and leafbirds) - 6 species
14. Corvidae (jays, crows, magpies, orioles and minivets) - 14 species
15. Muscicapidae (thrushes, robins, and sharmas) - 3 species
16. Sturnidae (starlings and mynas) - 3 species
17. Paridae (Yellow-cheeked tit) - 1 species
18. Pycnonotidae (bulbuls) - 7 species
19. Zosteropidae (Japanese white-eye) - 1 species
20. Sylvidae (laughing thrushes, mesias, minlas and sibias) - 8 species
21. Nectariniidae (Scarlet-backed flowerpecker) - 1 species
22. Passeridae (weavers and munias) - 7 species
23. Fringillidae (grosbeaks and buntings) - 3 species

<b>About</b>	<b>The</b>	<b>Author</b>
<b>ANTONY</b>		<b>LYNAM</b>

Antony Lynam (Ph.D.), Wildlife Conservation Society (WCS)- Thailand Programme Director and conservation scientist, works with the Thailand Department of National Parks, Wildlife and Plants to develop programmes for the conservation of the country's endangered species, park resources management, and the design and conduct of training curriculum for park rangers.

An Australian citizen, he has authored a number of technical papers and popular articles concerning conservation issues in Australia, North America, and Thailand, and was a contributor to the seminal volume on habitat fragmentation "Tropical Forest Remnants: Ecology, Conservation and Management". He writes frequently on natural history for magazines, journals and newspapers including Wildlife Conservation, The Nation, The Bangkok Post, and The Natural History Bulletin of The Siam Society.

Document B – f0005504\_An\_Insiders\_guide\_to\_Enjoying\_Your\_First\_Birding\_Field\_Trip.doc & guide.doc (Identical aside from file name)

## **An Insider's Guide to Enjoying Your First Birding Field Trip**

by Pete Dunne

Field trips are a lot like going to a dance, and there are two schools of thought. You can just waltz onto the dance floor and let the other person lead or you can learn a few basic dance steps beforehand. Here, for those who want to get a jump on etiquette, are some of the basic rules of the birding field trip. Learn them, and you'll spend more time birding and less time tripping over your feet.

- **Rule 1 - Never miss an opportunity to use a restroom.**

Your capacity for birding may be limitless but your bladder is not. Some leaders are generous with their planned rest stops; some are miserly. Whenever the group arrives at a planned rest stop, take full advantage {and mind your coffee consumption between stops}.

- **Rule 2 - Familiarize yourself with whatever pre-trip information is sent.**

Most organized field trips come with instructions. In the pre-trip material, you will almost certainly find the answers to your most pressing questions: dress, equipment needs, time commitment, lunch plans. Being prepared is the first step toward having a great time.

Re: Clothing. Rule of thumb: In winter, if in doubt, just bring it. In hot weather, cover up for sun protection-this means hat, long-sleeved cotton shirt, long pants. At any time of year, avoid bright colors, particularly white. In the universal language of wild creatures, white means "Danger! Watch Out! Hide ! It's not the message you want to send.

- **Rule 3 - Don't be late.**

When you join a group, you sacrifice a measure of self-determination. One of the quickest ways to annoy the group leader and everyone else, is to arrive late and delay the group's departure.

- **Rule 4 - Don't wander off.**

The second quickest way to annoy the group leader is to wander off. You don't want to be left behind and you don't want to be the focus of an unnecessary search. If you plan to leave the group, for a short time or for the balance of the day, be certain you inform the leader.

It is in your interest to stay close to the leader and the more experienced members of the group so that you can rely on their knowledge and bird-finding skills.

Staying close applies to car caravanning, too. The rule of thumb is one car length back for every ten miles per hour of velocity. Thirty miles per hour; three car lengths behind the bumper ahead of you. Sixty miles per hour; six lengths. Don't trust yourself to keep the pace? Don't drive. Carpool with someone else.

- **Rule 5 - Come prepared.**

If the trip involves driving, make sure you have enough fuel to see you through. If the instructions state "bring lunch," don't assume that you'll be able to stop at a convenience store to pick up a sandwich. Do that, and you'll likely be eating alone.

- **Rule 6 - Check out your equipment before the trip.**

The single greatest frustration first-time trip goers face in not inexperience, but rather the lousy or malfunctioning equipment - usually optics.

If your binoculars aren't working, ask whether a loaner is available. If you don't own binoculars, do not rush out to the nearest discount store and buy some for the trip. People who do this usually end up with instruments they soon replace. Borrow binoculars for the trip. Use your field trip experience to see what instruments experienced birders are using in order to make an educated purchase later.

- **Rule 7 - Speak Softly.**

Human voices put wildlife on alert. Talking may also prevent a leader from hearing songs or calls and keep you from hearing instructions. Field trips are social and conversation is part of the field trip experience. If you want to converse, do so in whispers or stand away from the group.

- **Rule 8 - Keep motion to a minimum.**

More than sound, birds react to motion. In close proximity to birds, don't move quickly and above all do not advance until the leader gives the word. Want to draw the ire of a group? Walk toward "the bird of the day" and scare it away.

- **Rule 9 - Don't monopolize the leader.**

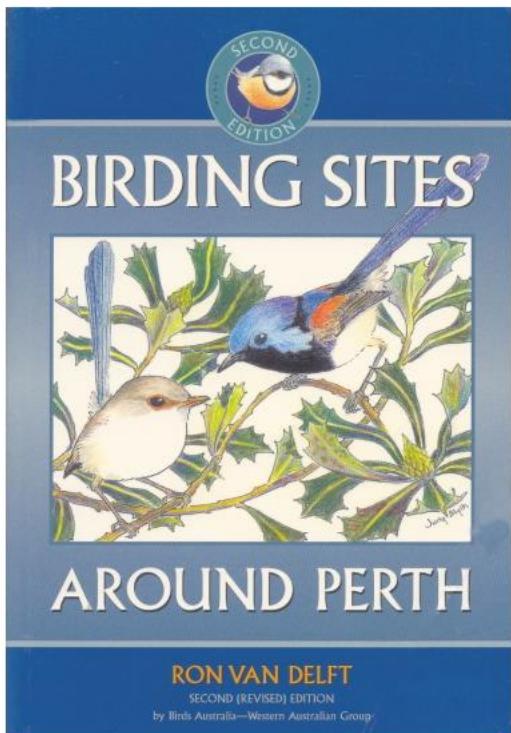
Sure you have questions. Sure you want to get to know the leader, and you want them to come to recognize your wonderful qualities, too. One of those qualities should be deference, because everyone in the group shares your ambition. Deference extends to use of the spotting scopes, too.

When the leader trains his scope on an interesting bird, and you were first to get a glimpse last time, defer to others the next several times. No matter what your place in line, first looks through a scope are quick looks. After you get an identifying glimpse, step quickly aside for the next person. If the bird is moving, reposition the scope so the next user won't have to pan back and forth. After everyone has had their glimpse, more leisurely viewing is possible.

- **Rule 10 - Do ask questions.**

Leaders want to share their knowledge, and questions are the catalyst that unlocks it. Don't be intimidated by what you don't know or what you presume that others know. Chances are your question is shared by others in the group. You may not be the leader, but if you trigger the answer to a question that some other member of the group was too shy to utter, you'll be their hero. That's it. All you need to know to get the most out of your first field trip experience. If it seems like too much to remember, just remember Rule #1. At any other time, there will be someone else around to ask for assistance.

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Number 57ab in a series of  
Bird Guides of Western Australia

*Birding Sites Around Perth* is a comprehensive guide to Perth's best bird watching sites, including Kings Park, John Forrest National Park and Rottnest Island.

This revised and enlarged edition describes forty-six sites within a 60 kilometre radius of the city, with excellent location maps, lists of birds regularly seen, and notes on species of special interest. Also provided are suggested bird watching tours for local enthusiasts and visitors, and a wealth of information on endemic species. Over 200 birds are featured in 165 pages.

Illustrated throughout with colour photographs and pencil drawings, *Birding Sites Around Perth* is an excellent introduction to bird watching and to Perth's wildlife heritage.

Copies of the book are available for purchase from the Birds Australia office during office hours or available by post.

**WHAT IS BIRDS AUSTRALIA?**

Birds Australia is a non-profit national organisation working for the enjoyment, study and conservation of Australia's birds. The WA group of Birds Australia has members statewide and offers a variety of activities for members, including conservation and research projects.

Activities and services include excursions, camp-outs, bird surveys and social activities. We also have a library, books for sale and information about birds.

To view our full range of bird guides and bird lists, visit our web site.

**INTERESTED?**

Contact us at:  
Birds Australia Western Australia Inc.  
71 Oceanic Drive  
Florcat WA 6014 Weekdays 9.30 - 12.30 pm

Phone: (08) 9383 7749  
Fax: (08) 9387 8412  
Email: [birdswa@inet.net.au](mailto:birdswa@inet.net.au)  
Web: [birdswa.inet.net.au](http://birdswa.inet.net.au)



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UNIVERSITY OF CALIFORNIA  
**BOTANICAL**  
**GARDEN**  
NEWSLETTER

Volume 26, Number 2

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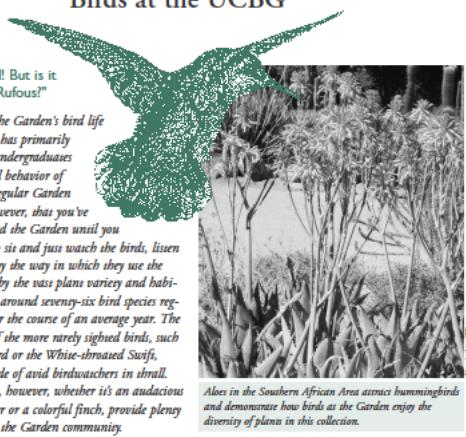
## Birds at the UCBG

"It's a hummingbird! But is it Anna's, Allen's or Rufous?"

*Academic interest in the Garden's bird life over the last few years has primarily been associated with undergraduates studying the territorial behavior of hummingbirds. Any regular Garden visitor can tell you however, that you've never really experienced the Garden until you have taken the time to sit and just watch the birds, listen to their song and enjoy the way in which they use the Garden! Encouraged by the vast plants variety and habitat diversity, there are around seventy-six bird species regularly sighted here over the course of an average year. The hope of spotting one of the more rarely sighted birds, such as the Western Kingbird or the White-throated Swift, keeps our endless parade of avid birdwatchers in thrall.*

*Our resident birds, however, whether it's an audacious jay, a noisy woodpecker or a colorful finch, provide plenty of ongoing interest for the Garden community.*

The diverse collections of the Garden support an equally diverse population of birds, as is apparent in the list from the recent Christmas Bird Count. In addition to providing general shelter for both resident and migrant species, our collection provides food and nesting sites for many different taxa. The Garden environment offers a range of habitats that are rather different from the native chaparral of the canyon. Some visitors to the Japanese Pool, such as belted kingfishers and green and blue herons, might not otherwise stop in Strawberry Canyon. Native chaparral species are found in parts of the Garden that more closely approximate their preferred habitat. Wren tits, California thrashers, and



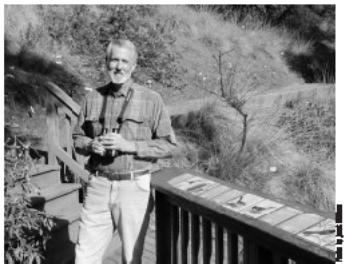
*Aloes in the Southern African Area attract hummingbirds and demonstrate how birds at the Garden enjoy the diversity of plants in this collection.*

spotted towhees are most commonly found in the scrubby areas of the South American and Australasian sections. Similarly, native riparian species are found in the trees along Strawberry Creek, such as Wilson's and orange crowned warblers.

Many birds have identified new food sources among the many non-native plants in our collections. This is particularly obvious when watching humming-

birds feed on both native salvias and penstemons, and also on bird-pollinated plants from other parts of the world. Aloes in the Southern African Area are pollinated by sun birds in their native habitat. These small colorful nectivores perch on the rigid blossom stalks of the aloes. This is a distinct contrast to the hovering feeding habit of the hummingbirds, which as a group are restricted to North and South America. Nonetheless, as a walk through this area at this time of the year demonstrates, hummingbirds utilize aloes extensively and assertively defend their feeding resources against other intruding hummers.

—Chris Carmichael



When we started birding from the Elated Hawaiian Interpretive Center, where he is pictured here, noted local ornithologist Donald Wolf regularly teaches popular birdwatching classes in the Garden.

### From Killing to Counting

Before 1900, Americans engaged in a holiday tradition known as the Christmas "Side Hunt". People would choose sides and go afield with their guns whoever brought in the biggest pile of feathered quarry won. On Christmas Day 1900, ornithologist Frank Chapman, an early officer in the Audubon Society, called for an end to the slaughter. Rather than shooting birds, he suggested counting them. From Toronto to Pacific Grove, California, the Christmas Bird Count began. In its first year 27 people participated, counting 18,500 individual birds of ninety species.

On Christmas Day 2000, 52,000 people participated in 1,800 counts in the United States and Canada. They sighted 78,436,382 individual birds of 676 species. A century of bird counts has amassed a wealth of data which scientists use to monitor the health of bird species, pinpoint and explain trends, and detect the rise of environmental threats.

Along with three other members of the Audubon Society I came to the rich and varied habitats of the UC Botanical Garden for this annual count. We found a total of 226 individual birds of 38 species, including such rarities as hermit and black-throated warblers.

—Donald Wolf

*Dr. Clark Cormichat, UCBG Manager of Collections and Horticulture, is one of our numerous Herbers, a group which also includes Dr. Jennifer White, Associate Director for Education, and Carter Holly Herber. Clark's academic background in vertebrate ecology spans from its effortfully made the connections between the birds here in the Garden and their relationships to the plants.*

### AUDUBON CHRISTMAS COUNT DECEMBER 17, 2000

American Robin	90
Anna's Hummingbird	25
Steller's Jay	21
Bullock's	16
Golden-Crowned Kinglet	14
Ruby-Crowned Kinglet	12
Yellow-Rumped Warbler	10
Townsend's Warbler	9
Western Scrub-Jay	9
Chestnut-Backed Chickadee	7
Hutton's Vireo	7
Song Sparrow	6
California Towhee	5
Golden-crowned Sparrow	5
Bewick's Wren	4
Fox Sparrow	4
Dark-eyed Junco	4
Turkey Vulture	3
Hermit Thrush	3
Allen/Varied Hummingbird	3
Common Raven	3
Band-Tailed Pigeon	2
Northern Flicker	2
Black Phoebe	2
Red-breasted Nuthatch	2
Brown Creeper	2
California Thrasher	2
Spotted Towhee	2
White-crowned Sparrow	2
Cooper's Hawk	1
Sharp-shinned Hawk	1
Red-breasted Sapsucker	1
Nuttall's Woodpecker	1
Hairy Woodpecker	1
Wren	1
Black-throated Gray Warbler	1
Hermit Warbler	1



## SIBLEY'S GUIDE TO BIRDS

*National Audubon Society: The Sibley Guide to Birds*, written and illustrated by David Allen Sibley; A Chaucerian Press Edition, Alfred A. Knopf, NY, ©2000; 544pp. Flexible Binding, \$35.00.

Most visitors to the Garden come to see and study our special plants, but a surprising number also come to see the animals and birds which feed and take shelter in the hospitable environment. We have news which breed yearly in our Japanese Pool and monarch butterflies visiting our milkweed plants. Now and again we are surprised to learn that we are on the Audubon Society's Hotline, as we were several years ago when dozens of visitors came to see a rare bird sighted in the southwest corner of the Garden.

In past years, the Roger Tory Peterson *Field Guide to Western Birds*, or the National Geographic Society's *Field Guide to Birds of North America*, were seen tucked under the arms of our "Garden Birders". Now there is a new, up-to-date field guide these birders will want to own, although its size and weight make it awkward to carry in the field.

The *Sibley Guide to Birds* is a great user-friendly guide containing over 6600 wonderfully detailed watercolor paintings of 810 species and 550 populations of North American birds. Descriptions and records accompany the illustrations, removing the need to flip back and forth between text and pictures. The birds are shown in similar poses to make comparisons between species easy. All important plumages are depicted and range maps show migration routes, summer, winter,

nesting, and breeding locations, and bird distribution. Of particular interest are the good introductory pages preceding each family or group of families showing bird classification and speciation at a glance.

In many ways the publication of *The Sibley Guide to Birds* can be compared to the publication of *The Jepson Manual: Higher Plants of California* a few years ago. Both were preceded by respected long-used references. It is likely that the *Sibley Guide* will become the current authority for birds, as the *Jepson Manual* has become for plants. But keep your worn, well-loved field guides handy. For this reader, at least, it is hard to think that the beloved

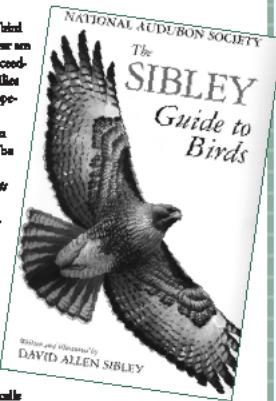
California Quail in the Garden calls "put-way-do" rather than the familiar "chi-ca-go" of old, which we teach the touring school children.

The Garden Shop also carries the following books related to the above review:

■ *Birds of Northern California* by David Pix and Andy Summers; range maps by Don Roberson and David Pix; Lone Pine Pub., Renton, WA, ©1990; 384pp. Paper, \$19.95.

■ *Birds of San Francisco and the Bay Area*, by Chris C. Fisher and Joseph Morand; Lone Pine Pub., Renton, WA, ©1996; 159pp. Paper, \$9.95.

■ *Common Dragonflies of California: A Beginner's Field Guide*, by Kathy Biggs Amaka Cecile Pub., Sebastopol, CA, ©2000. 96pp. Paper, \$9.95.



■ *Newts and Salamanders: Everything about Selection, Care, Nutrition, Disease, Breeding, and Behavior*, by Frank Indiviglio; with photos by Richard D. Bartlett; illus. by Michael E. Bridges; Barron's, Hauppauge, NY, ©1997; 128pp. Paper, \$6.95.

### Brochures:

■ *Birds of the UC Botanical Garden*, UC Botanical Garden Staff. \$1.00.

■ *Butterflies of the San Francisco Bay Region: A Common Species List*, 3rd ed., by John Steiner; San Francisco Bay Wildlife Soc., 1988. \$1.00.

—Elyse Beck

## DIRECTOR'S COLUMN

### Celebrating the Garden

Spring is here again! The hills are green and spangled with flowers. The wind is whipping across the coastal bluffs, and anyone with even the slightest inclination toward geodeling has thick hands in the soil. As I watch the sunsets march across the landscape and think back to the past year, I'm amazed at the amount of progress we have to celebrate here at the Garden.

The living collection is in superior condition. Over the years, the horticultural staff has done an inspired job of maintaining and building the collection. However, with leadership by Manager of Collections and Horticulture, Chris Carmichael, and better access to materials and supplies, they have added new shine to the Garden. I invite you to pass past the construction site in the entrance to get a better look!

Alas, yes, these construction sites. We were so excited when they started. Now, we look forward eagerly to their completion. The Garden has not been a peaceful place to work or visit this year. Staff and volunteers have been wonderful, carrying out their work over the dirt of jackhammers, dump trucks, cement mixers, and more. From all this dirt, mud, and sweat, the Garden is gaining many physical improvements. Some, like the utility upgrades, make our jobs easier but are invisible to visitors. Others, such as renovated bathrooms and PRIMA restoration of pathways in the Mexican and Central American area, are essential but not sensational. Many projects, though, are downright sensational.

Master rock garden creator, Phil Johnson, has just completed a spectacular hedgebank in the Southern African section, and horticulturist Lawrence Lee will soon begin planting it with material obtained during his collecting trips to South Africa. This garden will feature the unusual beauty of bulbs and succulents from the winter rainfall areas of the Karoo and Nyabots semi-arid and desert habitats. It also provides an opportunity to inform visitors about the precarious situation of these habitats in the face of regional development and global climate change.

Our new Arid House is also nearing completion. The name has recently been changed to Arid House from Desert Greenhouse — Arid House being more appropriate for that collection, though we are still making the name transition. This structure will house a substantial number of the most biologically and scientifically valuable plants in our collection, including many living "type" specimens. Type specimens are the exemplar individuals a taxonomist uses to describe a new species. Other specimens belong to species that are now extinct in the wild, and are therefore irreplace-

able. The new house provides the public with excellent visual access to the exciting and unusual plant forms in this collection while ensuring their security.

UC researchers are anxiously awaiting opening of the Center for the Study of Plant Conservation (CSPC) at the Garden. Although the lab is not yet finished, scientists associated with this center are already exploring a diversity of questions related to plant conservation. Richard Shefferson, a graduate student at the Center, writes in this issue about his research devoted to discovering the types of fungi that sustain terrestrial arachids. Another graduate student, Jessica Riquet, recently established a major field experiment to determine whether soil-borne organisms can limit the spread of European beach grass, an invasive species that reduces native plant diversity in sand dunes along the Pacific coast of North America. Work by these students and other scholars will be greatly facilitated by the new Center.

In preparation for our next round of construction, we have just begun design of the Jane Grey Research Greenhouse, which will be an important adjunct of Garden research in plant conservation and ethnobotany. This house will be erected in the place currently occupied by the temporary and honor and will serve researchers from both the CSPC and elsewhere on the Cal campus.

Although construction is the most visible sign of progress that visitors can see, the Garden has many other achievements to celebrate as well. Our educational outreach programs are receiving national recognition. Many partners are joining our Math in the Garden Initiative. Beginning this spring staff at the UC Davis Arboretum, Brooklyn Botanic Garden, Missouri Botanical Garden, Morris Arboretum, and Atlanta Botanical Garden became active partners in the development process of the "Math in the Garden" project as they try out the activities in their own programs. San Francisco Girl Scout Council troops and 4-H programs across California are also partners in this effort. Over the next year their evaluations of the effectiveness of the project's activities will provide crucial information to ensure that the final published materials will fit into different informal settings and programs and work in gardens throughout the country. Collaborations with them, and other partners, provide audiences diverse program opportunities that strengthen this and other aspects of the Garden's Education Programs.

*Cactus drawing by UCBG herbariaria, Judith Flax. Above: Gymnocalystium marginatum and at right Euphorbia c. leucocera.*

Our collaboration with East Bay Municipal Utility District, which resulted in our spectacular and innovative contribution to last year's San Francisco Flower and Garden Show, is now producing exciting new Garden interpretation materials. Garden staff and dedicated volunteers worked with EBMUD staff to develop an extensive and well-received tour of Plants for Water-wise Gardening. (See the Education Director's column for more information about this tour.) The tour takes advantage of our diverse and outstanding collection to illustrate landscape uses of water-conserving plants. Most species highlighted in the tour are available in the horticultural trade, but some are not, which puts the tour on the leading edge of horticultural innovation.

Through all of these changes, the Garden continues to expand its primary mission of support for botanical research. New molecular tools are allowing exciting discoveries in evolutionary biology and plant systematics. These tools work best on DNA extracted from live tissue, which makes living collections such as ours ever more important scientifically. Important new studies that have used UC Botanical Garden specimens are finding exciting and sometimes surprising results. For example, Olmstead, DeFilipps, Young, and colleagues report this spring in the *American Journal of Botany*, (Vol. 88: 948-951, 2001) that the snapdragon family (Scrophulariaceae) is not a natural evolutionary grouping. In their new interpretation, which was based in part on samples from the UC Botanical Garden, the only member of this family in the California flora that will remain in the Scrophulariaceae is the eponymous *Scrophularia californica*. Even the snapdragons (*Antirrhinum*) will no longer be in the "snapdragons" family.

Although living tissue is the sine qua non for molecular phylogenetics, it is still essential that every plant used in such research be voucherized. Vouchering, which involves removing a sample of the plant to produce a herbarium specimen, creates a permanent record that persists after death of the plant itself. It is essential that Garden material be voucherized so that future scientists can examine the specimen that today's botanists are using to classify plants and understand their evolutionary relationships. Thus, an important goal of the Garden is to voucher all accessioned plants in our collection. This academic year, our graduate student assistant, Rich Sheffraim, has helped to voucher 274 plants in our collection.

With all this happening this year, one might ask whether Garden staff has had time to plan very far into the future. In fact, we have caulked over the early stages of strategic planning and, as the first round of construction nears completion, we will continue to move forward on this very important project.

—Ellen Slosson



Garden Visitors

*Left to right:* Horticulture Estate Steward accompanied Mark Flanagan, "Keeper of the Garden" at Wunder Grant Park, and William McNamee, director of Quarryhill Botanical Garden in Glen Ellen, CA, during their visit on April 16th. Mr. Flanagan was the April speaker for the California Horticultural Society meeting.

## Gardening Tips

■ The larvae of the diamond back moth can be a serious pest for members of the cabbage family, including cabbage, broccoli, collards, kale and others. The insects are becoming resistant to BT, which has been used widely to control the insects. A researcher in Florida found that the larvae of the moths prefer feeding on highly fertilized collards more than on any other members of the family. Fields of crucifers to be protected are surrounded by a crop of specially treated collards, resulting in a reduction of sprays from 75 to 100%. In addition, a naturally occurring parasitic insect of diamond backs builds up in the collards, and this helped control them in the treated crop. *Agricultural Research* 67 (3): 26.

■ The old world fern, (*Lygodium microphyllum*), introduced into Florida in 1990, now covers over 40,000 acres. In the last 6 years, there has been a 100 fold increase. A single leaf can be 100 feet long. Fortunately, it is believed that the plant will not move farther north than central Florida. *American Fern Gazette* 191 (3): 10.

■ *Zyphyrus east*, an introduced species in the northern midwestern states, has colonized vast areas of marginal and non-agricultural land, displacing many beneficial plant species. In addition, it is toxic to sheep, cattle and horses. Recently, a gall midge was released which produces galls on the stem tips resulting in their destruction, thus preventing flowering and seed production. The insect may produce 3 or 4 generations in a season though the first generation produces the largest number of adults. It is clear that can be harvested and used for new releases. *Biological Control* 16(2): 128-132.

—Robert D. Reade



## The Overlooked Equation

When I was an undergraduate living in Chicago, I volunteered at local county nature preserves to help rescue Illinois' endangered prairies, savannas, and wetlands. Very often, my work involved monitoring the endangered plants that grew in the area, especially the imperiled populations of native, wild lady's slippers.

The lady's slippers we all know and love (*Paphiopedilum* spp.) are tropical, and have been propagated and hybridized for many years. Should you ever see a lady's slipper of the genus *Cypripedium* on display at a nursery, be warned – it was most likely stolen from the wild. Cypripedoid lady's slippers grow on the wild lands of North and Central America, Europe, and Asia, and have not been propagated successfully at all. Yet, as we have seen in other endangered plants, propagation is very often integral to successful restoration.

Why has propagation been so unsuccessful? The biology of orchids, especially the rare terrestrial orchids that evolved in the temperate regions of the world, is very complex. In fruiting structures known as pods, they produce thousands to millions of seeds no longer than a single millimeter, and half that in width. These seeds very rarely survive to produce a mature plant, and this seems to be why they have evolved to produce so many seeds all at once. The seeds scatter in the wind and find a new place to settle in the soil. Once the winter snows and rains are over, they吸水 water, and then they just sit. Why? Because they cannot progress any further



The *Cypripedium californicum* in the Garden was collected by Gardener-in-Chief, Roger Baldwin.

in their development without the aid of a soil-inhabiting fungus. The orchid family is one of the few plant families that depends completely on soil fungi for germination. This kind of interaction is called "mycorrhizal," and requires some more explanation.

A mycorrhizal is an interface of two organisms – a plant and a fungus. The fungus, which can be one of many different species, grows through the soil as a mass of tiny filaments known individually as hyphae, forming a hyphal network called a mycelium. The fungus grows outward, looking

## GARDEN NOTES

**SUDDEN OAK DEATH...** Horticulturists Judith Rim and Jerry Parsons attended an all day symposium, "Combating the Sudden Oak Death: *Phytophthora*, a new disease", in Marin County, hosted by UC Cooperative Extension on March 9th.

**CHANNEL ISLAND VISIT...** Horticulturist Nathan Smith accompanied Steven Jones, of the Santa Barbara Botanic Garden, on a three-day visit to San Nicolas Island in late March. This island is part of the southern group of Channel Islands off the coast of southern California. They were conducting plant surveys and removing exotic plants. Nathan was able to collect several plants for the Garden's California Area.

**GARDEN SHARING...** Curator Holly Forbes, distributed duplicates of the Garden's epiphytic cactus collection to the

Huntington Botanical Gardens in San Marino and to Goran Welsh-Loudend in Santa Barbara. It is common practice among gardens to share duplicates of collections, providing some protection against loss in any one location. John Trago, Curator of Desert Collections at the Huntington, donated several collections of South African material for the Garden's African Area.

**RESEARCH GRANT...** We are pleased to report that the Genetic Resources Conservation Program at UC Davis funded a grant proposal by Dr. Jason Koontz and Holly Forbes to study the genetic variability of Baker's Lupine, *Diphylleia Achillea*. The research will seek to determine the genetic diversity of this species to obtain base-line data for future research and conservation efforts. The grant money will pay for the cost of DNA analyses to be performed by Dr. Koontz. Baker's

for new patches of mycorrhizae to digest and absorb. Part of the mycelium grows into the root system of a plant, penetrating the root distal half and "colonizes" it. Other parts of the same mycelium grow far beyond the range of the plant's root system, and collect nutrients such as phosphorus and calcium. Amazingly, the mycorrhizal symbiosis that gives the plant vast quantities of these nutrients, which are very often limiting to the plant's growth. But the fungus does not do this out of the goodness of its fungal heart. It gets a very valuable commodity from the plant: carbon. The plant produces sugar in its photosynthetic leaves, and now appears that, on average, at least 20% of all the sugar produced by the plant goes to the fungus. This makes sense: the plant is limited much more by phosphorus, calcium, and other nutrients than carbon. Hence, the fungus and the plant seem to exist in a mutually beneficial system.

The importance of mycorrhizae is evident in the fossil record, which shows that the first land plants (now thought to be *Silvula* species), growing roughly 500 million years ago, actually had mycorrhizal structures in their roots. Indeed, current estimates suggest that 90% of plants are mycorrhizal – a situation that clearly displays the importance of this unusual interaction.

Which brings us back to the orchid. Orchids are unique among other plants. We are discovering that this is true in their biology as well as in their aesthetics. Orchids break all the rules. With most plants, germination and growth are possible

without fungi, although the plant will generally be stunted throughout its life. But orchids do not appear to grow without these organisms. Although some orchids can be cultivated in the lab under very specific conditions, these orchids generally grow poorly relative to their wild-grown kin. More and more we find that most orchids cannot even germinate without a fungus.

Why should this concern us? The kind of interaction that orchids exhibit with mycorrhizal fungi is very different from what we are used to, and this has important ramifications for propagation, and ultimately restoration. First of all, we have as yet not seen any evidence that orchids detest carbon to the fungi. Second, we have found that as seedlings, and in the case of the non-photosynthetic "ghost" and "phantom" orchids even extract sugar from the fungi! Third, orchids are very particular about which fungi they will associate with, and it appears that they choose fungi that are mycorrhizal, or sometimes even pathogenic, on local trees and other plants. So, these unusual plants indirectly acquire their sugar from other plants in the ecosystem. Fourth, orchids native to the northern temperate latitudes generally stay within the soil as seedlings for many years without developing any leaves, relying on mycorrhizae for complete nourishment. Finally, even mature, photosynthetic orchids choose not to break the surface and sprout leaves in some growing seasons. This happens particularly often in lady's slipper populations. In my Midwestern study site, I have found that lady's slippers can stay belowground like this for many years without interruption, while still growing more root and rhizome tissue. Other researchers have found very solid evidence that this "dormant" condition can last for 25 years or more. Considering that lady's slippers have very low sugar reserves, this is an amazing fact.

The key, then, to understanding what can be done to restore native orchid populations, which are in decline all over the world, is to explore this overlooked equation: orchid + appropriate fungus + appropriate conditions = successful growth.

It is an exciting topic. We are now beginning to understand the nature of this puzzling interaction, and modern scientific methods and tools, including molecular techniques, genetic sequencing, carbon-isotopes, and mathematical and statistical theory, are helping us in tackling major environmental questions. My research is an example of the conservation issues which will be investigated by Cal scientists and graduate students at the Garden's new Center for the Study of Plant Conservation.

—Richard P. Siefkes

Lacasper is one of several endangered and rare California native plants the Garden is committed to helping conserve through its participation in the Center for Plant Conservation. Dr. Kovitz studied the genus *Dodecatheon* for his dissertation project. He is now at the Center for Biodiversity of the Illinois Natural History Survey.

**NEW STAFF MEMBER...**  
We extend a warm welcome to Ms. Leslie Wenzak who has joined the staff at the Garden in the capacity of Visitor Services Specialist. Leslie is a long time fan of the Garden and brings a wealth of work skills to the new position.





## EDUCATION AT THE GARDEN

One goal of the Education Program is to encourage visitors to discover the Garden's magnificence collection and to look at plants from new perspectives. While our seasonal self-guided tours showcase different plants in their peak flowering or display seasons, other brochures focus on ethnobotanical (Chinese medicinal herbs) or apocynaceous collections (succulent plants). Building on the interest generated through our successful collaboration at last year's San Francisco Flower and Garden Show, the Botanical Garden and the East Bay Municipal Utility District (EBMUD) have teamed up again, this time to develop a self-guided tour in the Garden. This interpretive tour of the collection focuses on plants that grow successfully in the Bay Area, but use little water.

Most people have no idea how much water their garden needs. The typical Bay Area residential landscape is irrigated enough each year to flood it six feet deep. This is at least twice as much as plants need for healthy growth. Using water-efficient plants and creative design, local gardeners can create a garden that derives on little more than natural rainfall. Properly designed, a water-efficient garden is easier to maintain than one that is over-watered. It requires less weeding, pruning, mowing, fertilizing, and pest control. It is better adapted to fluctuations in rainfall and seasonal changes. There is no one way to create a water-efficient garden. The Botanical Garden is filled with a plethora of exciting possibilities from around the world.

This walking tour of the Garden introduces you to some of these beautiful plants that thrive in the Bay Area. California's chaparral is our local community of drought tolerant plants. The cistuses and plant communities in Chile's mattoon, South Africa's fynbos, and the



The striking silver leaves of *Leucadendron argenteum*, under is an interesting choice for water conserving landscaping in the Bay Area. Threatened in its native habitat in South Africa it can be seen in the Garden in the Southern African Area, where it is just one of the 125 exciting plants in the new Water-Wise Gardening Tour.

Mediterranean maquis, with their winter rains and summer drought, are but a few of the parts of the world that have water-conserving plants similar to California's chaparral. Most of the plants on this tour have been in our collection for many years. They will give you a good idea of what that seedling in the local nursery will look like once it gets established in your garden.

This new publication is the collaboration of the Garden's horticultural, educational and communications staff working with three knowledgeable and dedicated docents — Barbara Lya, Kathryn Welch and Alison Mills. After hours of walking through the Garden and conversations with horticulturists, Barbara, Kathy and Alison were fascinatied plant friends, horticultural information, name derivations and ethnobotanical information into stories for more than 100 plants. A lot of give and take occurred as the Garden staff vetted the information from different perspectives. Weeding out some plants that we all loved but which did not fit all the criteria was one of our biggest problems. Plants included on the tour use little water, are available (or could be available) in the horticulture trade, and are not weedy or endangered.

The choiced preview versions of the tour are available this Spring in the Garden, at this year's San Francisco Flower and Garden Show and at Earth Day events. Over the next several months, Education staff will be collecting evaluations from visitors. This information will be used to improve the final version of the brochure. I invite you to come to the Garden, go on the tour, and give us your feedback.

We are grateful for EBMUD's participation and support of the process and production of this new exciting self-guided tour of the Garden.

—Jennifer Moore White

## Research at the Garden

The Garden recently provided research materials to these individuals:

Ms. Edna Abramov, dissertation student with Prof. Deoniki Kaplan, UCB Dept. of Plant Biology launched her study of comparative morphology of succulent, drought-tolerant plants. She will be using the desert collections for illustration purposes.

Prof. David D. Achadky, Stanford University, again visited to collect many species in the Iberomaurice (Buckhorn family). He is looking at the evolution of the "evergreen sclerophyll" strategy in California's chaparral. The project is to examine each of the major taxa in comparison with their close relatives from non-chaparral habitats employing a phylogenetic approach where possible.

Dr. Stephen Burgess, post-doc, UCB Dept. of Environmental Science, Policy, and Management, used the Mather Grove for an investigation of the basic physiological ecology of redwoods with the aim of relating climatic and hydrological factors with the growth and distribution of *Sequoia sempervirens* (Coast Redwood). They are particularly interested in quantifying direct fiber absorption of fog water by redwoods and determining its role in mitigating drought and allowing redwoods to grow to extreme heights. This study will principally involve the use of sensitive stem sap flow meters to gauge patterns and amounts of water transport in trunks and stems of redwoods.

Prof. Teddi Dumroos class, Physiological Plant Ecology, used several Garden plants for measurements of photosynthetic rates under sun and shade conditions during the Spring Semester.

Prof. James Eckertwiler, University of Toronto, received leaf bases of *Zizaniopsis miliacea*. These were plants used by Dr. Robert Ornduff for a study published in 1996: Gender performance in a cultivated cohort of the grass *Zizaniopsis miliacea*. *Amer. J. Bot.* 83: 1006-1015.

Mr. Taylor Field, dissertation student at Harvard, visited to take cuttings of primitive angiosperms for his project (*Cleaversia*, *Hedysarum*, *Hedysarum* *imbricatum*, *Schismodes* *hirsutus*).



Ms. Ruth Kickpatrick, dissertation student with Prof. Bruce Mäkitalo, UCB Dept. of Integrative Biology, received funds of several xerophytic ferns for a course project on desiccation tolerance.

Ms. Nancy Kiang, dissertation student with Prof. Deoniki Kaplan, UCB Dept. of Environmental Science, Policy, and Management, tested a sap flow meter on a Garden oak for several weeks prior to using it in the field.

Ms. Jessica Messmer Matthee, graduate student at UC Davis with Prof. Charles Gaines, visited to obtain cuttings of *Esopus secundus* and *Esopus secundus* for her graduate studies in ovule diversification in the angiosperms.

Dr. Sonja Magillen, UC Davis, post-doc with Prof. Michael Sanderson and James Doyle, received a wide range of species for their study of seed plant phylogeny, the age of angiosperms, and the evolution of pentamerous floral whorls.

Ms. Jodi McGraw, dissertation student with Prof. Wayne Slatyer, in Integrative Biology completed her soil and bark study in the Garden's research greenhouses.

Prof. Kai Nees, Oregon Graduate Institute in Beaverton, Oregon, visited the Garden to collect cuticles from several oak species for his study on tannin release by oaks.

Mr. Andrew Sylvester, dissertation student at Arizona State University, is working on the molecular systematics of the Myrsinaceae family. He received cuttings of *Bucania* sp., *Anthonymus dulcis*, *Adenanthera polystachya*, *Syzygium jambos*, and *Ugni molinae*.

Ms. Catharine Stoenberg, dissertation student at UC Berkeley Department of Integrative Biology, received dozens of specimens and associated herbarium vouchers for development of a phyletic reference collection.

Dr. Neal Yashiro, a post-doc at the University of Washington in Seattle, visited to collect *Hibiscus tiliaceus*, *Dillenia*, and *Adenanthera polystachya*. His main object is to find where in the phylogeny of angiosperms particular genes (the RPB2) are duplicated.

—Emily Ferber

## Recognition Contributions received from 2/01/2001 up to and including 4/14/2001.

### New Members

*The Garden wishes to thank our new Individual and Family Members:*

Mr. Merlin Alligood & Ms. Scott Bennett  
Mr. Michael Balchayev  
Mr. Morgan Bandyopadhyay  
Mr. Wendy B. Bergman & Mr. Robert C. Bergman  
Mr. Darren Boever  
Ms. Suzanne M. Briley  
Ms. Michaela Bruckental  
Dr. and Mrs. Daniel Callahan  
Ms. Debrae Daniels Hobble  
Mr. and Mrs. Randy Davis  
Mr. Leobardo Dominguez  
Mr. Rob Edwards  
Mr. Carroll Dickey  
Mr. Anna Entwistle  
Mr. J. M. B. Edwards  
Dr. and Mrs. Roy Enga  
Mr. Raymond Foul  
Mr. Ben Franklin  
Ms. Gisela Galindo  
Ms. Judith B. Garver  
Mr. Koen N. Gevers  
Mr. Patrick Givens Duffy  
Ms. Pratibha H. Goelhat  
Ms. Anna Grosswein  
Ms. Alice Grosswein  
Ms. Janice Hamlin-Lacy  
Mr. and Mrs. Alan Hoben  
Ms. Lynne Hickey  
Mr. and Mrs. David Huang  
Ms. Laura J. Kalbfleisch  
Ms. Gwendolyn Kall  
Ms. Shirley Karto  
Mr. Mark C. Lapeyre  
Ms. A. Lin & Mr. K. K. Lindeboom  
Mr. Klemens Ludwig  
Mr. Chevra Magidson  
Ms. Pranee & Mr. Kankit Makchar  
Ms. Helen McGehee  
Ms. Laura Miller & Mr. Tom Miller  
Mr. Charles L. Moran  
Ms. Alessandra Moreira  
Ms. Neptilia Peacock  
Ms. Neptilia Peacock & Ms. Noreen Underwood  
Mr. Johnathan Russell & Ms. Bruce Soderlin  
Ms. Joyce A. Rydolph  
Ms. Jennifer Shlomo  
Mr. Steven Silver  
Ms. Jean Sodhi  
Ms. Laura Sondre  
Ms. Asia L. Thornton  
Mr. Dan Viana  
Ms. Virginia C. van Calkoen

### Grateful Thanks

*The Garden thanks our new members for their substantial gift over and above membership:*

Mr. Paul Baker  
Mr. and Mrs. David Beuning  
Mr. Bob Beznoski  
Mr. and Mrs. Ronald Chisholm  
Mr. and Mrs. Paul Dainger  
Mr. and Mrs. Jack Delikhanov  
Dr. and Mrs. A. Carl Heilbrunn  
Ms. Pamela Kinsella  
Mr. and Mrs. Ron Lal  
Mr. Jim Lovelace & Prof. Ida Remmertse  
Ms. and Mrs. Geoff Macdonald  
Ms. and Mrs. Dennis McDonald  
Mr. Bill McInnis  
Ms. Ron Morrison  
Ms. Sally O'Connell  
Mr. Ken Reynolds  
Ms. and Mrs. William Riedner  
Mr. Botanic Light & Mr. Green Hand  
Mr. Carol Thompson & Mr. Radcliffe Dawson  
Ms. and Mrs. William D. Whalen  
Mr. Stewart Whittaker  
Mr. Thomas (Tom) Wolf

### Gifts In Kind

*The Garden offers appreciation and thanks for gifts in kind:*

Ms. B. Siegel-Albeck  
Ms. Mary Igau Cox  
Ms. Louise Dunnus  
Ms. Myrtle Wolf

### In Appreciation

*The Garden offers appreciation and thanks to their donors for their generous contribution:*

Mr. and Mrs. Fred Harrel  
Dr. and Mrs. A. Carl Heilbrunn  
Mr. Dennis Tipton & Mr. Owen Head  
Ms. Steven Winkler  
*(Overall Fund for Garden Interpretation & Design Activities)*

**In Memory**

*The Garden offers appreciation and thanks for gifts given after donor's memory of:*

Keith Ning Chien from  
Ms. & Mrs. Kenneth Pollard  
*(Citrus Medicinal Herb Garden)*

Jean & Bert Myla from  
Ms. and Mrs. Harry Shadman  
*(Glycine Wolf Library)*

Jeanette Tang Lamm from  
Mr. and Mrs. Bill Duke  
*(Glycine Wolf Library)*

Ms. Elena Peller

### WISHLIST

*The Garden particularly thanks Dr. and Mrs. David Relifield for their contributions of a sofa and a project for the new Center for the Study of Plant Conservation.*

*This issue we are asking our readers if they could support us by donating:*

- A "point and shoot" camera
  - Card tables
- If you can donate, please call (510) 643-2937—we would appreciate the help.



Pictured after receiving their awards from the Director at the recent ceremony are (back, left to right) John Domankik, Judith Ries, Jerry Parsons, Peter Klemenc, Gould Ford. (Front, left to right) Elinor Sedlacek, Nancy Swerdrup, Holly Forbes and Dr. Ellen Stems, Garden Director.

#### Staff Members Honored

Various members of the Garden staff were recently recognized and applauded for their many years of service. Director Ellen Stems commented that the Garden is the envy of many campus units for the longevity of its staff. University service award pins were given to Holly Forbes, Gould Ford, Jerry Parsons and Nancy Swerdrup for 10+ years of service; to Elinor Sedlacek for 15+ years; to Peter Klemenc and Roger Radtke for 20+; and to John Domankik for 25. Judith Ries had already received her 25-year pin! Congratulations to all you long-timers!

#### Noteworthy Donations...

The Garden Library received several donations of books and journals. Mrs. Mary Ipana Cox donated over 130 books on garden design, horticulture, and botanical subjects. Mr. Myrtle Wolf donated a complete run of *Pacific Horticulturist Magazine*, many issues of the *Journal of the California Horticultural Society*, several volumes of the *Bulletin of the American Rock Garden Society*, the early issues of *The Four Seasons* (journal of the Regional Parks Botanic Garden), and *Fremontia* (journal of the California Native Plant Society), among others. Additional donations of books for the library were made by Mrs. Sonja Aloca and Ms. Louise Dunton. Thank you very much indeed!

#### GARDEN STAFF

Dr. Ellen Stems, *Garden Director*

##### ADMINISTRATION

Alice Nach, *Administrative Assistant*  
Margaret Edmonson, *Procurement Coordinator*  
Michael Himes, *Administrative Assistant*  
Cynthia Schott, *Business Operations Supervisor*  
Nancy Swerdrup, *Volunteer Services Coordinator*  
Jane Williams, *Marketing & Development Officer*  
Lois Woods, *Visitor Services Specialist*

##### COLLECTIONS & HORTICULTURE

Dr. Christopher Compton, *Manager of Collections and Horticulture*  
Holly Forbes, *Growth*  
Bartolo Kalat, *Conservation Architect*  
Anthony Green, *Supervisor of Horticulture and Gardens*  
John Donaldson, *Propagation*  
Julie Flinn, *Horticulturist*  
Peter Klemenc, *Horticulturist*  
Lorraine Lee, *Horticulturist*  
Jerry Parsons, *Horticulturist*  
Dr. Robert Radtke, *Garden Pathology*  
Roger Radtke, *Horticulturist*  
Edie Schmitz, *Horticulturist*  
Mike Sedlacek, *Horticulturist*  
Winton Smith, *Horticulturist*  
Gould Ford, *Banking and Ground Maintenance*

##### EDUCATION

Dr. Jennifer White, *Associate Director for Education*  
Christina Mason, *Program Assistant*

##### FACULTY ADVISORY COMMITTEE

Dr. Ned Coyle, *Arts, Languages, History*  
Dr. Louis Pidcock, *Plant Biology*  
Dr. Jon Miller, *Environmental Sciences*  
*Policy & Management*  
Dr. Bruce Middle, *Arthropoder Biology*  
Dr. Virginia Radtke, *Environmental Science*  
*Policy & Management*  
Dr. Alan Smith, *Botany*

##### NEWSLETTER

Jean Wilkins, *Editor*

Administration 643-0645

Development 643-2657

Directors Office 643-4029

Education 643-2777

Exhibits 643-2755

The Garden Shop 643-0645

Plant Collection 643-8646

Tours/Parties 643-2352

Volunteers 643-1354

Re: 643-3045

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Articles may be submitted with name to the editor and the UC Botanical Garden.

## CALENDAR OF EVENTS

### THREES AND SHREWS OF CALIFORNIA

We are pleased to help launch a new book from University of California Press, "Trees and Shrubs of California" by two distinguished faculty members from Humboldt State University: John Stuckey, Professor of Botany and Julie Stewart, Professor of Botany. Both authors will be with us, to share highlights of their research, and to sign copies of their book. Also on hand will be their illustrator, Andrea Rickart, exhibiting samples of her work.

Wednesday, June 13, 7:30 pm

Free

Registration required.

### TWILIGHT TOURS

Celebrate the long evenings of summer with us in the Garden. Members of our horticulture staff will show their favorite spots and special insights about the Garden on Wednesday evenings at 5:30 pm. Each walk will be different; no plan to come every week during July, beginning July 11, and every week during August.

Free with Garden admission.

University of California Botanical Garden

## Second Annual Garden Party

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Enjoy fabulous food, wine and music,  
stroll around the Garden at the peak of its glory,  
and tour the newly renovated South African Desert Habitat.  
At 4 PM we'll celebrate the opening of  
the new Desert Greenhouse!

Saturday, June 16, 2001, 3 - 6 PM



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The Porter County  
**Birding Guide**

*INDIANA DUNES*  
The Casual Coast





*Amber Grosset*



*Baltimore Oriole*



*Mourning Dove*

Welcome to the Casual Coast, along the southern shore of Lake Michigan. Home to the Indiana Dunes National Lakeshore, the Indiana Dunes State Park and the most diversified flora and fauna in the Midwest, the dunes are complemented by several nearby inland nature preserves. Together, they provide a unique haven for birds and birders that will make your stay on the Casual Coast both enjoyable and memorable.

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*Photography provided by David Oberst*

## 7

BIRD MIGRATION TO THE DUNES

"Without doubt the presence of Lake Michigan affects the movement and distribution of birdlife in the Dunes more than any other single factor. The shores of this enormous lake provide leading lines that control flight paths of numerous migrants, and the vast open waters draw legions of transitory and wintering birds. During autumn the elongate north-south boundaries of the lake become airways along which thousands of migrants navigate toward wintering areas. Southbound birds following the shores are ultimately guided into the

Dunes Area, at the toe of the lake. This avian convergence at the bottom of

Lake Michigan is termed the "funneling effect." The funneling effect explains the unusually high diversity of autumn birds in northwest Indiana.



*Wood Duck*

"Lake Michigan also provides two important avian habitats that are otherwise quite rare in the Midwest: the deep lake and the beach. Waters of the lake attract large numbers of bay and sea ducks, many of which are virtually unrecorded at inland sites in the Midwest. Additionally, the lake attracts a number of rare periodic transients, including the Purple Sandpiper, Red Phalarope, Pomarine Jaeger, Parasitic Jaeger, Great Black-backed Gull, Glaucous Gull, Iceland Gull, Thayer's Gull, Sabine's Gull, Little Gull, Black-legged Kittiwake. Retentive beaches provide resting and feeding areas for shorebirds, especially those species preferring sand rather than mudflats, e.g., Sanderling, Red Knot, and Baird's Sandpiper."

"The deep waters of Lake Michigan also constitute a significant obstacle to migrants. During nocturnal flights many north-bound passersines overfly land's end and daybreak finds them over the lake. When landfall is visible, they often fly directly to the shore, where they immediately land for rest and feeding."

This effect generates an anomalously high concentration of passerines in parks and woodlands immediately adjacent to the lake" (Brock 5).



## WEATHER EFFECTS OF BIRDING

"*That most migrants fly during fair weather when trailing winds are available is well documented in ornithology textbooks. Along the shores of southern Lake Michigan this principle is more clearly evident during the fall.* Beaman (1952) discovered that the number of fall pelagic migrants along the Chicago lakefront tripled (compared to numbers on the day immediately prior to frontal passage) on the days immediately following passage of cold fronts.



Common Loon

"*Similarly, the most exciting autumn birding in the Dunes occurs during or immediately following the passage of cold fronts. In addition to the massive waves that follow the fronts, northerly winds stimulate a general longshore movement of water birds.*

"*On such occasions, an endless stream of loons, ducks, gulls, and terns often flow along the lakefront.*" (Brock 6).

## RAPTOR FLIGHTS

"*Spring hawk flights along the High Dunes must be attributed to the presence of Lake Michigan. North-bound hawks, especially buteos, enjoy a laterally spring migration, winding effortlessly over the Midwest on balmy southerly winds. These raptor species, however, display a marked aversion to flying over large bodies of water. Consequently, upon encountering Lake Michigan to the northwest, movement is abruptly truncated and the birds turn to a course paralleling the shoreline. Thus, the migrating hawks are concentrated in a belt immediately adjacent to the lake. In effect, therefore, the High Dunes rest directly below a narrow flight corridor that extends along the lake's southern margin.*" (Brock 8).



Cooper's Hawk

*During March and April, the major flight months, good daily flights can consist of 100 to 300 birds. Fall flights are limited; the most notable species observed is the Peregrine Falcon, with flight peaks in early October.*

**7****BIRDING SITES****BEVERLY SHORES A**

Whether you drive or walk, Beverly Shores will produce a number of species, seen or heard, that will delight the birder. This "island" in the National Lakeshore supports habitats such as an interdunal marsh, lake, beach and wooded dunes. The interdunal marsh offers excellent habitat for passerines as well as nesting species. Beverly Drive produces many opportunities to see and hear several species of birds. Best observation time is all year.

Types of migration birds seen are loons, waterfowl and gulls. Birds seen and heard in late spring and summer are Willow Flycatcher and warblers.

**COFFEE CREEK WATERSHED PRESERVE B**

The preserve is a 167-acre home to over 500 native plants, trees, sedges and forbs as well as over 4 miles of trails. Wetlands can be found throughout the landscape including swamps, marshes, wet prairies and fens. Birds commonly seen at Coffee Creek include several species of woodpeckers such as the Red-bellied woodpecker, Downy and Hairy Woodpeckers, Herons, hawks, and wood ducks, as well as the state endangered marsh wren can be seen in their respective habitats throughout the preserve. Bridge 5, near the southern end of the corridor is a great place to see Cardinals, Indigo Buntings and the Tufted Titmouse. From the Water Plaza, at the northern area of the preserve, Belted Kingfishers can be seen hunting near the wetlands. Don't miss the Kestrel who often nests near Phillips Pond.



Photo by J. Nease &amp; Associates

**COWLES BOG C**

Wooded edges, savannah, marsh and wooded swamp provide ideal habitats for Common Yellowthroat, Sora, Virginia Rail, American Woodcock, Swamp Sparrow, warblers, and more. Named after the Father of Plant Succession, Professor Henry Cowles, this area is perfect for the nature lover in general. For more information call 219/926-7561 ext. 225.



Photo by R. Rappaport

**7****BIRDING SITES**

**PORTER BEACH HAWK WATCH** **D**  
*Formerly known as the Johnson Beach hawk watch, this stabilized dome allows prime viewing of several hawk flights, especially in the spring.*

**WEST BEACH & LONG LAKE** **E**

*Following the West Beach trails which take you by the beach, an intertidal pond, and wooded areas, one may discover a Hairy Woodpecker or two and perhaps a Common Yellowthroat. Long Lake may grace one with the presence of Least Bitterns, warblers and scores of waterfowl. A parking fee is required in the summer.*

**INDIANA DUNES STATE PARK** **F**

*Indiana Dunes State Park encompasses a variety of habitats: climax forest, savannah, marshy grass covered dunes, bluffs, beaches and marshes. Several trails run through these areas, providing opportunities to view and hear field sparrows, flycatchers, thrushes, warblers, owls and more. Optional observation areas would include the forest and the marsh-wood boundary along with trails 2 and 10. Trail 9 allows for eye level bird watching because of its higher elevation. Wilson's Warbler also attracts several birds during spring migration. Entrance fee.*

**PORT OF INDIANA** **G**

*During winter one can best observe the Horned Larks, Lapland Longspurs, Snow Buntings, Common Murres and bay ducks from the public access area of the Port of Indiana. On windy days, birds fly directly over the public access area.*

**SUNSET HILL FARM  
COUNTY PARK** **H**

*Porter County's ongoing commitment to ecological restoration, this former 235-acre dairy farm is filled with woods, meadows, and three ponds. Part-time naturalists are available during three seasons of the year to offer a wide range of opportunities including nature/science projects on ponds, trees, birds, wildflowers or fields. With over ten miles of trails, bird watchers, nature photographers, or woods walk observers can enjoy endless outdoor opportunities. Birds commonly seen at Sunset Hill Farm include: field sparrows, flycatchers, thrushes, warblers, herons, owls, ducks, geese and more.*



**7****BIRDING SITES****TALTREE ARBORETUM & GARDENS I**

*Taltree Arboretum & Gardens offers the birder a wide variety of habitats to explore. Prairie, Savanna, Woods, Wooded Edge, Swamp, Pond and open Wetland can all be easily observed at this 350+ acre site. With over 4 miles of trail, Taltree is a special place to bird. For more information on special birding opportunities visit them at [www.taltree.org](http://www.taltree.org). Entrance fee. (Closed Mondays)*

**ROGERS LAKWOOD PARK J**

*A 122-acre facility of the Vicksburg Park Department, it is home to hiking trails, a beach, fishing, boating, and swimming. Birds commonly seen at Rogers-Lakewood Park include native waterfowl such as Canada geese and mallard ducks, herons, hawks, and common songbirds. Daily entry fees are collected from Memorial Day through Labor Day and are charged by the carload.*

**JASPER-PULASKI FISH AND WILDLIFE AREA K**

*The Jasper-Pulaski Fish and Wildlife Area has long been the sight of the annual migration of Sandhill Cranes. View this awesome spectacle during the fall to see thousands of these birds as they rest from their journey and feed. Springtime also brings the cranes, but in a lesser amount. Don't forget the bluegillers or a scope! During the spring and summer, the area boasts ducks, geese, and egrets that are viewable from the observation trail. Jasper-Pulaski Fish and Wildlife Area is also a public hunting area. Please check in at the headquarters to obtain information about the affected areas before setting out.*

**HERON ROOKERY L**

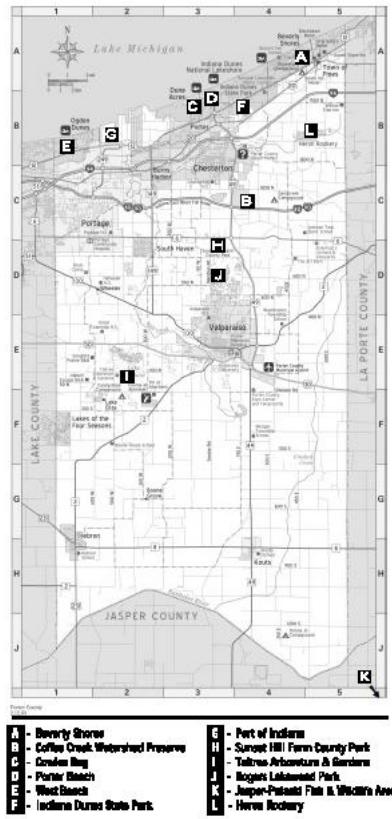
*Observe the Great Blue Heron in the spring and summer at this mature woodland located along the Little Cahaba River. Migrant watchers are present in the spring along the channel among other species.*

**7 ACCOMMODATIONS CHART**

Classification	Portage	Time	Valparaiso	Bed & Breakfast	Campgrounds
700+ Lovco Lodge State Road 40 and Indiana Boundary Road 226/763-4400 or 870-55-55000					
700+ State Road 40 and Indiana Boundary Road 226/763-4400 or 870-55-5500					
700+ Indiana State Road 1 and 150, Hwy 226/763-4400 or 870-55-5500					
700+ Indiana State Road 40 and Indiana Boundary Road 226/763-4400 or 870-55-5500					
700+ Indiana State Road 40 and Indiana Boundary Road 226/763-4400 or 870-55-5500					
700+ Confluence Motel State Road 314 and U.S. Highway 20 226/763-4400 or 870-55-5500					
700+ Chamber Inn State Road 200 and U.S. Highway 30 226/763-4400 or 870-55-5500					
700+ Grey Fox Inn U.S. Highway 20 and U.S. Highway 20 226/763-4400 or 870-55-5500					
700+ Peller Inn State Road 200 and U.S. Highway 20 226/763-4400 or 870-55-5500					
700+ Grey Fox Inn U.S. Highway 20 and U.S. Highway 20 226/763-4400 or 870-55-5500					
700+ Chamber Inn State Road 314 and U.S. Highway 20 226/763-4400 or 870-55-5500					
700+ Grey Fox Inn U.S. Highway 20 and U.S. Highway 20 226/763-4400 or 870-55-5500					
700+ Chamber Inn U.S. Highway 20 and Indiana Boundary Road 226/763-4400 or 870-55-5500					
700+ A. B. Soly's Motel U.S. Highway 12 226/373-4700 or 870-55-5500					
700+ Chamber Motel U.S. Highway 12 226/373-4700 or 870-55-5500					
700+ Chamber Inn Motel U.S. Highway 12 226/373-4700 or 870-55-5500					
700+ Deseret by Deseret State Road 40 and U.S. Highway 20 226/449-5700 or 870-55-5500					
700+ Park Inn Motel State Road 40 and U.S. Highway 20 226/449-5200 or 870-55-5500					
700+ Deseret Inn Motel State Road 40 and U.S. Highway 20 226/449-5200 or 870-55-5500					
700+ Deseret Inn Motel U.S. Highway 12, Valparaiso, Indiana 226/449-5200 or 870-55-5500					
700+ Super 8 Motel State Road 40 and Indiana Boundary Road 2 226/763-4400 or 870-55-5500					
700+ State Road 40 and State Road 2 Valparaiso Motel U.S. Highway 12 and State Road 2 226/449-4700					
700+ Super 8 Motel U.S. Highway 12, County Line 226/449-4700					
700+ Grey Fox Inn State Road 40 and Indiana Boundary Road, Valparaiso 226/449-4700					
700+ Chamber Deseret Motel County Road 10 North, Valparaiso, Indiana 226/449-4700					
700+ The Inn at Abberley State Road 2, Valparaiso, Indiana 226/449-4700					
700+ Chamber Motel County Road 10 North, Valparaiso, Indiana 226/449-4700 or 877-40-CHAM					
700+ Willow Tree Inn County Road 100 West, Valparaiso 226/449-4700					
700+ CountrySide Campground Indiana 40, Indianapolis, Indiana 226/449-4700					
700+ Chamber Motel County Road 200 East, Valparaiso 226/763-4200					
700+ Indianapolis Campground Indiana 40, Indianapolis, Indiana 226/449-7000 or 870-55-5500					
700+ Indiana 40, Indianapolis, Indiana 226/449-7000					
700+ Chamber Motel County Road 200 East, Valparaiso 226/763-4200					
700+ Valley Park Campground State Road 40, Indiana Drive State Park, Covington 226/763-4200					
700+ Bear's Adventure Camp Resort Covington, Indiana 226/763-4200					
8 825-900 price per room 800-900 price per room 800+ price per room	800-900 price per room 800+ price per room	800-900 price per room 800+ price per room			
800+ 825-900 price per room 800-900 price per room 800+ price per room	800-900 price per room 800+ price per room	800-900 price per room 800+ price per room			

6

7 PORTER COUNTY MAP





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Call 219.929.4600 or 866-DUNES-00  
or visit [www.springhouseinn.com](http://www.springhouseinn.com)

Call 219.929.4600 or 866-DUNES-CO  
or visit [www.springhouse.com](http://www.springhouse.com)

Call 219.929.4600 or 866-DUNES-CO  
or visit [www.springhouse.com](http://www.springhouse.com)

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## 7

## WELCOME TO BIRDING

**WELCOME TO THE WONDERFUL WORLD OF BIRDING!**  
If you like watching birds in your backyard or you want to travel the world to see all 10,000 bird species, use these ten tips to get started! You might also want to visit [WildBirds.com](http://WildBirds.com), a great site for newer birders!



- Hint #1:** You need a *field guide* for your area. A *field guide* is a book with pictures of the birds and tips for identifying them.
- Hint #2:** You need a *binocular* to see the birds. (But, you'd need four eyes to use binoculars.)
- Hint #3:** You need to know what to expect in your area. *Checklists* of birds in your area will tell you this. See pages 13-19 for the Porter County Bird Checklist.
- Hint #4:** You need to be able to find the birds. To do this, you should learn about the habitat each species of bird prefers. See page 13 for *Habitat* information and the *Bird Checklist* for where to spot each species.
- Hint #5:** Join a group of other birders. Birders are very friendly and helpful. They are always willing to share their knowledge. We were all beginners once.
- Hint #6:** Try a birding trip or tour. Local bird trips are sometimes advertised in the newspapers. Check out the *Birding State Information* on pages 3-5 for information on local bird trips.
- Hint #7:** Read about birds. There are many good magazines about birds and birding. For North American birds, *Birds of North America*, *Bird Watcher's Digest*, *Birding* and *WildBirds* are magazines you might like.
- Hint #8:** Bring the birds to you. You can attract birds to your yard with just a little work. Planting the right flowers will attract hummingbirds. Sunflower seeds will bring lots of new birds to your house. You might even want to build a bluebird house.
- Hint #9:** Record your bird sightings. You might want to keep a "diary" or list of the birds you see in your yard. You can also keep a list of birds you see in your town or on your vacation. Birders often keep lists for their county, state or country. The Porter County Bird Checklist can be found in this guide on pages ...
- Hint #10: HAVE FUN. ASK LOTS OF QUESTIONS. BE KIND TO BIRDS.**

*These hints are from the popular birding website - [Birding.com](http://Birding.com)*

## **(7) PORTER COUNTY BIRDS CHECKLIST**

### **SEASONAL ABUNDANCE CODES:**

A = Abundant: Often observed and widespread throughout county  
C = Common: Frequent in appropriate habitat  
U = Uncommon: Infrequent in appropriate habitat  
R = Rare: Unlikely, but possible in county

### **HABITAT TYPES & LOCATIONS**

I-Lake: I-Beach: *Lake Michigan and its beachfront including Beverly Shores, Indiana Dunes State Park, Indiana Dunes National Lakeshore*

D-Dunes: *Indiana Dunes State Park, Indiana Dunes National Lakeshore*

F-Forest: *Cultivated and roadside fields, open areas and prairies such as those found at Tahree Arboretum & Gardens, Indiana Dunes National Lakeshore, Sunset Hill Farm County Park and Coffee Creek Watershed Preserve*

M-Marsh: *Observed in flight*

M-Marsh: *Areas regularly inundated by shallow water for much of the year. Intertidal marshes are found along Lake Michigan at Beverly Shores, Indiana Dunes National Lakeshore & Indiana Dunes State Park. Marshes are also found along county rivers, the most notable being the Kankakee River at the southern border of the county and at Keechaka Fish & Wildlife Area in neighboring St. Joseph County*

P-Ponds: *Permanent bodies of water that include small lakes, ponds and wetlands: Long Lake, Tahree Arboretum & Gardens, Rogers Lakewood Park, Coffee Creek Watershed Preserve, Sunset Hill Farm County Park and Indiana Dunes National Lakeshore*

S-Swamp: *Wetlands that are poorly drained with trees growing throughout. There are numerous types of swamps in the county and they can be found at Indiana Dunes State Park, Indiana Dunes National Lakeshore, Beverly Shores (along Beverly Drive), Coffee Creek Watershed Preserve, Tahree Arboretum & Gardens and the Kankakee River Floraoplata*

W-Woods: *Beverly Shores, Indiana Dunes National Lakeshore, Sunset Hill Farm County Park, Tahree Arboretum & Gardens, Indiana Dunes State Park, Coffee Creek Watershed Preserve*

Wl-Woodland Edge: *Coffee Creek Watershed Preserve, Tahree Arboretum & Gardens, Sunset Hill Farm County Park, Indiana Dunes National Lakeshore, and Indiana Dunes State Park*

U-Urban: *Urban areas throughout the county*

**7 PORTER COUNTY BIRDERS CHECKLIST**

Bird	Seasons					Habitat
	SP	S	F	W		
<b>Loon &amp; Grebes</b>						
<input type="checkbox"/> Common Loon	C	R	C	R	L	
<input type="checkbox"/> Pied-billed Grebe	C	C	C	R	M,P	
<input type="checkbox"/> Horned Grebe	U	C	C	R	L,H	
<b>Cormorants</b>						
<input type="checkbox"/> Double-crested Cormorant	C	U	C	R	L	
<b>Bitterns &amp; Herons</b>						
<input type="checkbox"/> American Bittern*	U	U	U	R	M	
<input type="checkbox"/> Least Bittern*	R	R	R	R	M	
<input type="checkbox"/> Great Blue Heron	A	A	A	R	M,P	
<input type="checkbox"/> Great Egret	C	U	C	R	M	
<input type="checkbox"/> Green Heron	C	C	C	R	M,P	
<input type="checkbox"/> Black-crowned* Night Heron	U	U	U	R	M	
<input type="checkbox"/> Yellow-crowned* Night Heron	U	U	U		M	
<b>Swans, Geese &amp; Ducks</b>						
<input type="checkbox"/> Mute Swan	C	C	C	C	L,P	
<input type="checkbox"/> Tundra Swan	A	A	A	R	L	
<input type="checkbox"/> Canada Goose	A	A	A	A	L,M,P	
<input type="checkbox"/> Wood Duck	A	A	C	R	P,S	
<input type="checkbox"/> Green-winged Teal	C	R	U	R	M,P	
<input type="checkbox"/> Black Duck	C	R	C	U	L,M	
<input type="checkbox"/> Mallard	A	A	A	C	L,P,M	
<input type="checkbox"/> Northern Pintail	U	R	U	R	M,P	
<input type="checkbox"/> Blue-winged Teal	C	U	C	R	M,P	
<input type="checkbox"/> Northern Shoveler	C	R	U	R	M,P	
<input type="checkbox"/> Gadwall	C	R	C	R	M,P	
<input type="checkbox"/> American Wigeon	C	R	C	R	M,P	
<input type="checkbox"/> Canvasback	U	R	R	U	M,P	
<input type="checkbox"/> Redhead	C	R	U	R	L,P	
<input type="checkbox"/> Ring-necked Duck	C	R	C	R	M,P	
<input type="checkbox"/> Greater Scaup	U	R	C	U	L,P	
<input type="checkbox"/> Lesser Scaup	C	R	C	U	L,P	
<input type="checkbox"/> Black Söter	R	R	U	R	L	
<input type="checkbox"/> White-winged Söter	R	R	U	R	L,L	
<input type="checkbox"/> Common Goldeneye	C	R	C	A	L,L	
<input type="checkbox"/> Bufflehead	C	R	C	A	L	
<input type="checkbox"/> Hooded Merganser	U	R	U	R	L	
<input type="checkbox"/> Common Merganser	U	R	U	C	L	
<input type="checkbox"/> Red-breasted Merganser	C	R	C	U	L,P	
<input type="checkbox"/> Ruddy Duck	C	R	U	R	L,P	
<b>Vultures</b>						
<input type="checkbox"/> Turkey Vulture	A	A	C	R	FL	
<b>Eagles &amp; Hawks</b>						
<input type="checkbox"/> Bald Eagle*	U	R	R	R	FL	
<input type="checkbox"/> Northern Harrier*	U	R	U	R	F	
<input type="checkbox"/> Sharp-shinned Hawk	C	C	C	C	WE,W	
<input type="checkbox"/> Cooper's Hawk	C	C	C	C	WE,W	
<input type="checkbox"/> Northern Goshawk	R	R	R	R	W	
<input type="checkbox"/> Red-shouldered Hawk	U	R	U	R	WE	
<input type="checkbox"/> Broad-winged Hawk	U	U	U	W		

\* State endangered      14

**7 PORTER COUNTY BIRDERS CHECKLIST**

Bird	Seasons				Habitat
	SP	S	F	W	
<input type="checkbox"/> Red-tailed Hawk	C	C	C	C	F,WE
<input type="checkbox"/> Rough-legged Hawk	U	U	U	U	F,M
<b>Osprey &amp; Falcons</b>					
<input type="checkbox"/> Osprey*	U	R	U	R	L
<input type="checkbox"/> American Kestrel	C	C	C	C	F
<input type="checkbox"/> Peregrine Falcon*	U	U	U	U	FL
<b>Quail, Pheasant, Turkey</b>					
<input type="checkbox"/> Northern Bobwhite	U	U	U	U	F,WE
<input type="checkbox"/> Ring-necked Pheasant	U	U	U	U	F
<input type="checkbox"/> Wild Turkey	U	U	U	U	F,W
<b>Rails &amp; Coots</b>					
<input type="checkbox"/> Virginia Rail*	U	U	U	U	M
<input type="checkbox"/> Sora Rail	C	U	U	U	M
<input type="checkbox"/> Common Moorhen	R	R	R	R	M
<input type="checkbox"/> American Coot	A	A	A	U	M,P,L
<b>Crane</b>					
<input type="checkbox"/> Sandhill Crane (Jasper-Pulaski Site)	C	U	C	U	F,M
<b>Plovers</b>					
<input type="checkbox"/> Black-bellied Plover	U	R	U		B,P
<input type="checkbox"/> American Golden Plover	C	R	U		B,P
<input type="checkbox"/> Semipalmated Plover	U	R	U		B,P
<input type="checkbox"/> Piping Plover*	R	R			B
<input type="checkbox"/> Killdeer	A	A	C	R	M,D,F
<b>Sandpipers &amp; other Shorebirds</b>					
<input type="checkbox"/> Greater Yellowlegs	U	R	R		M,P
<input type="checkbox"/> Lesser Yellowlegs	U	U	U		M,P
<input type="checkbox"/> Solitary Sandpiper	C	U	U		M
<input type="checkbox"/> Spotted Sandpiper	C	C	U		M,S
<input type="checkbox"/> Semipalmated Sandpiper	U	R	C		B,P
<input type="checkbox"/> Least Sandpiper	U	U	U		B,P
<input type="checkbox"/> Pectoral Sandpiper	C	R	U		M,P
<input type="checkbox"/> Baird's Sandpiper		R	U		B
<input type="checkbox"/> Ruddy Turnstone	U	R	U		B
<input type="checkbox"/> Sanderling	R	C	C		B
<input type="checkbox"/> Dunlin	U	R	U		B,P
<input type="checkbox"/> Red Knot	R	R	R		B
<input type="checkbox"/> Purple Sandpiper	R	R	R		B
<input type="checkbox"/> Short-billed Dowitcher	R	R	R		P
<input type="checkbox"/> Red Phalarope			U		L,B
<input type="checkbox"/> Common Snipe	U	R	U		M,P
<input type="checkbox"/> American Woodcock	C	C	C	R	S,W
<b>Jaegers</b>					
<input type="checkbox"/> Parasitic Jaeger			U		L,B
<input type="checkbox"/> Pomarine Jaeger			R		L,B
<b>Gulls</b>					
<input type="checkbox"/> Little Gull	R	R	U	R	L
<input type="checkbox"/> Bonaparte's Gull	C	R	C	U	L,B
<input type="checkbox"/> Laughing Gull	U	R	R	R	L
<input type="checkbox"/> Ring-billed Gull	A	C	A	C	L,B

\* State endangered

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## PORTER COUNTY BIRDERS CHECKLIST

Bird	Seasons					Habitat
	SP	S	F	W		
<input type="checkbox"/> Herring Gull	A	U	A	A		LB
<input type="checkbox"/> Thayer's Gull	R		R	U		LB
<input type="checkbox"/> Iceland Gull	U		R	R		L
<input type="checkbox"/> Glaucous Gull	R		R	U		LB
<input type="checkbox"/> Great Black-backed Gull	U	R	R	U		L
<input type="checkbox"/> Sabine's Gull						
<input type="checkbox"/> Black-legged Kittiwake	R	R	R	R		L
<b>Terns</b>						
<input type="checkbox"/> Caspian Tern	C	U	R	R		LB
<input type="checkbox"/> Common Tern	C	R	U			LB
<input type="checkbox"/> Forster's Tern	U	R	U			LB
<input type="checkbox"/> Black Tern*	R	U	R			M,B
<b>Doves</b>						
<input type="checkbox"/> Rock Dove	C	C	C	C		U
<input type="checkbox"/> Mourning Dove	A	A	A	A		F,W
<b>Cuckoos</b>						
<input type="checkbox"/> Black-billed Cuckoo	U	U	U			WE
<input type="checkbox"/> Yellow-billed Cuckoo	U	U	U			WE
<b>Owls</b>						
<input type="checkbox"/> Short-eared Owl	R	R	R	U		F,M
<input type="checkbox"/> Great Horned Owl	C	C	C	C		W
<input type="checkbox"/> Snowy Owl			R	R		B
<input type="checkbox"/> Barred Owl	C	C	C	C		S
<input type="checkbox"/> Northern Saw-whet Owl	R		R	R		W
<input type="checkbox"/> Eastern Screech Owl	C	C	C	C		W
<b>Goatsuckers</b>						
<input type="checkbox"/> Common Nighthawk	C	A	C			WE,F
<input type="checkbox"/> Whip-poor-will	C	U	U			W
<b>Swifts</b>						
<input type="checkbox"/> Chimney Swift	A	A	A			U
<b>Hummingbirds</b>						
<input type="checkbox"/> Ruby-throated Hummingbird	C	C	C			F,WE
<b>Kingfishers</b>						
<input type="checkbox"/> Belted Kingfisher	C	C	C	R		M,P
<b>Woodpeckers</b>						
<input type="checkbox"/> Red-headed Woodpecker	C	C	C	C		W
<input type="checkbox"/> Red-bellied Woodpecker	C	C	C	C		W
<input type="checkbox"/> Yellow-bellied Sapsucker	C	R	U	R		W
<input type="checkbox"/> Downy Woodpecker	C	C	C	C		W,WE
<input type="checkbox"/> Hairy Woodpecker	U	U	U	U		W
<input type="checkbox"/> Northern Flicker	C	C	C	U		W
<input type="checkbox"/> Pileated Woodpecker	U	U	U	U		W

\* State endangered

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## PORTER COUNTY BIRDERS CHECKLIST

Bird	Seasons				Habitat
	SP	S	F	W	
<b>Flycatchers</b>					
<input type="checkbox"/> Olive-sided	U	R	U		S
<input type="checkbox"/> Flycatcher	C	C	C		W
<input type="checkbox"/> Eastern Wood Pewee	U	U	U		M
<input type="checkbox"/> Yellow-bellied Flycatcher	U	R	R		M
<input type="checkbox"/> Acadian Flycatcher	C	C	R		W
<input type="checkbox"/> Alder Flycatcher	U	U	U		M
<input type="checkbox"/> Willow Flycatcher	C	U	R		M
<input type="checkbox"/> Least Flycatcher	C	R	C		W,WE
<input type="checkbox"/> Eastern Phoebe	C	C	U		F,W,WE
<input type="checkbox"/> Great-crested Flycatcher	C	C	U		W
<input type="checkbox"/> Eastern Kingbird	C	C	U		F,M
<b>Larks</b>					
<input type="checkbox"/> Horned Lark	C	U	U		F
<b>Swallows</b>					
<input type="checkbox"/> Purple Martin	C	C	C		F,P
<input type="checkbox"/> Tree Swallow	C	A	C		F,M
<input type="checkbox"/> Rough-winged Swallow	U	U	U		F,M
<input type="checkbox"/> Bank Swallow	C	C	C		B,D
<input type="checkbox"/> Cliff Swallow	R	R	R		F
<input type="checkbox"/> Barn Swallow	C	A	C		F
<b>Jays &amp; Crows</b>					
<input type="checkbox"/> Blue Jay	A	A	A	A	W,WE
<input type="checkbox"/> American Crow	A	A	A	A	ALL
<b>Titmice</b>					
<input type="checkbox"/> Black-capped Chickadee	C	C	C	C	W
<input type="checkbox"/> Tufted Titmouse	C	C	C	C	W
<b>Nuthatches</b>					
<input type="checkbox"/> Red-breasted Nuthatch	U	R	U	U	W
<input type="checkbox"/> White-breasted Nuthatch	C	C	C	C	W
<b>Creepers</b>					
<input type="checkbox"/> Brown Creeper	C	R	C	U	W
<b>Wrens</b>					
<input type="checkbox"/> Carolina Wren	U	U	U	U	WE,U
<input type="checkbox"/> House Wren	C	C	C		WE,U
<input type="checkbox"/> Winter Wren	U	R	U	R	W
<input type="checkbox"/> Marsh Wren*	U	U	U	U	M
<input type="checkbox"/> Sedge Wren*	U	R	R		F,M
<b>Old World Warblers, Thrushes &amp; Allies</b>					
<input type="checkbox"/> Golden-crowned Kinglet	C	R	C	R	W
<input type="checkbox"/> Ruby-crowned Kinglet	C	R	C	R	W
<input type="checkbox"/> Blue-gray Gnatcatcher	C	U	R		W
<input type="checkbox"/> Eastern Bluebird	C	C	C	U	F,WE
<input type="checkbox"/> Veery	U	U	U	U	W
<input type="checkbox"/> Gray-cheeked Thrush	U	U	U	U	W

\* State endangered

**7 PORTER COUNTY BIRDERS CHECKLIST**

Bird	Seasons				Habitat
	SP	S	F	W	
<input type="checkbox"/> Swainson's Thrush	U		C		W
<input type="checkbox"/> Hermit Thrush	C		C	R	W
<input type="checkbox"/> Wood Thrush	U	U	U	R	W
<input type="checkbox"/> American Robin	A	A	A	U	F,W
<b>Thrashers</b>					
<input type="checkbox"/> Gray Catbird	C	C	C		WE
<input type="checkbox"/> Northern Mockingbird	U	U	U	R	F,WE
<input type="checkbox"/> Brown Thrasher	C	C	C	R	WE
<b>Waxwings</b>					
<input type="checkbox"/> Cedar Waxwing	C	U	C	U	W,M
<b>Starlings</b>					
<input type="checkbox"/> European Starling	A	A	A	A	ALL
<b>Vireos</b>					
<input type="checkbox"/> White-eyed Vireo	U	R	U		W
<input type="checkbox"/> Solitary Vireo	U	R	U		W
<input type="checkbox"/> Yellow-throated Vireo	C	U	U		W
<input type="checkbox"/> Warbling Vireo	C	C	U		WE,P
<input type="checkbox"/> Philadelphia Vireo	U	R	U		W
<input type="checkbox"/> Red-eyed Vireo	C	C	C		W
<b>Warblers</b>					
<input type="checkbox"/> Blue-winged Warbler	C		U		WE
<input type="checkbox"/> Golden-winged*	R	R	R		WE
Warbler					
<input type="checkbox"/> Tennessee Warbler	C	R	C		W
<input type="checkbox"/> Nashville Warbler	C	R	C		W
<input type="checkbox"/> Northern Parula	U	R	R		W
Warbler					
<input type="checkbox"/> Orange-crowned	U	R	U		W
Warble					
<input type="checkbox"/> Yellow Warbler	C	C	R		WE,M
<input type="checkbox"/> Chestnut-sided	C	R	U		W,WE
Warbler					
<input type="checkbox"/> Magnolia Warbler	C	R	C		W
<input type="checkbox"/> Cape May Warbler	C	R	C		W
<input type="checkbox"/> Yellow-rumped	C	R	C		W,M
Warbler					
<input type="checkbox"/> Black-throated	C	R	C		W
Green Warbler					
<input type="checkbox"/> Blackburnian	C	R	C		W
Warbler					
<input type="checkbox"/> Prairie Warbler	U		R		D
<input type="checkbox"/> Palm Warbler	C	R	C		WE,M
<input type="checkbox"/> Bay-breasted	C	R	C		W
Warbler					
<input type="checkbox"/> Blackpoll Warbler	C	R	C		W
<input type="checkbox"/> Cerulean Warbler	C	C	R		W
<input type="checkbox"/> Black and White	C	R	C		W
Warbler					
<input type="checkbox"/> American Redstart	C	U	C		W
<input type="checkbox"/> Ovenbird	C	C	U		W
<input type="checkbox"/> Northern	U	R	U		WE,M
Waterthrush					
<input type="checkbox"/> Louisiana Waterthrush	U	R	U		S
<input type="checkbox"/> Mourning Warbler	R	R	R		WE

\* State endangered



## PORTER COUNTY BIRDERS CHECKLIST

Bird	Seasons					Habitat
	SP	S	F	W		
Common Yellowthroat	C	C	C			M
Hooded Warbler	U	R	R			S
Wilson's Warbler	C	R	C			W
Canada Warbler	C	R	C			W
Yellow-breasted Chat	U	R	R			M,WE
Tanagers						
Scarlet Tanager	C	C	U			W
Cardinals & Buntings						
Northern Cardinal	A	A	A	A		F,WE
Rose-breasted Grosbeak	C	C	C			W
Indigo Bunting	C	C	C			F,WE
Dickcissel	U	U	U			F
Sparrows						
Eastern Towhee	C	C	C	R		WE
Tree Sparrow	C	C	C			F,WE
Chipping Sparrow	C	C	C			F,WE,D
Field Sparrow	C	C	C	U		F,D,M
Vesper Sparrow	U	U	U			F,D
Savannah Sparrow	U	U	U			F,D
Grasshopper Sparrow	U	U	U			F
Fox Sparrow	C	U	C	R		WE
Song Sparrow	C	C	C	U		M,WE
Lincoln's Sparrow	U	U	C	U		W
Swamp Sparrow	C	C	C	U		M,S
White-throated Sparrow	C	C	C	R		WE
White-crowned Sparrow	C		C	R		WE
Dark-eyed Junco	C		C	A		WE
Lapland Longspur	R		R	R		B
Snow Bunting	R		U	U		F,B
Blackbirds & Orioles						
Bobolink	C	C	R			F
Red-winged Blackbird	A	A	A	U		F,M,S
Eastern Meadowlark	C	C	C			F
Western Meadowlark	R	R	R			F
Yellow-headed Blackbird	R	R	R			M
Rusty Blackbird	U	R	U	R		S
Common Grackle	C	C	C	U		M,F
Brown-headed Cowbird	C	C	C	U		W,WE
Orioles						
Baltimore Oriole	C	C	U			W,WE
Orchard Oriole	U	U	U			W,WE
Finches						
Purple Finch	U	U	U	U		W
House Finch	A	A	A	A		U
Common Redpoll	R	R	R	U		WE
Pine Siskin	R	R	R	U		WE
American Goldfinch	A	A	A	A		F,WE,U
Evening Grosbeak	R	R	R	U		WE
Old World Sparrows						
House Sparrow	A	A	A	A		U

\* State endangered

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## ACKNOWLEDGEMENTS

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The Porter County Convention, Recreation & Visitors Commission (PCCVC) would like to give special thanks to David Oberst, Director of Education and Naturalist at Taltree Arboretum & Gardens, and Taltree board member, Laurie Eberhardt, Ph.D., for their help in creating this guide. The PCCVC is truly grateful for their help.

### TALTREE ARBORETUM & GARDENS:

#### "A SPECIAL PLACE TO BIRD"

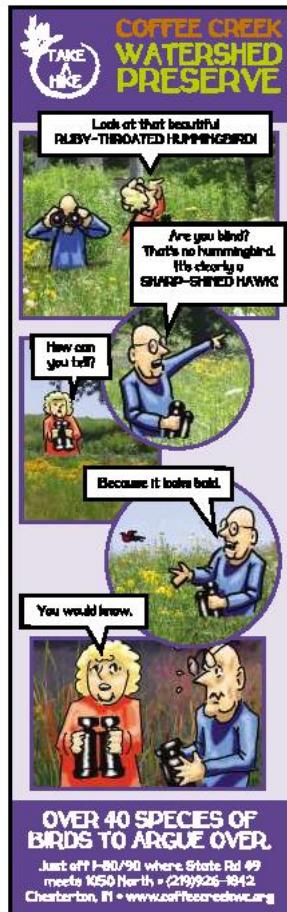
Taltree offers the visitor a wide variety of habitat at one location: Prairie, Savanna, Woods, Wooded Edge, Swamp, Pond and open Wetland, can all be easily observed at this 300+ acre site. More than 60 species of birds have been identified on Taltree's property. The Blaukirt Trail derives its name from the numerous Blaukirt nesting boxes along its route. Eastern Bluebirds are a common site at Taltree. The trail directs visitors along the perimeter of the prairie in an effort to reduce disturbance to wildlife and restore habitat to natural nesting conditions. As a result grassland-nesting birds, such as the Bobolink, that need a large area of undisturbed habitat for survival have abundantly returned. This trail also traverses a 7-acre open wetland, which holds abundant migratory waterfowl in the spring. Wood Ducks are a common site as they utilize nesting boxes in the wetland. In 2002, a Hooded Merganser successfully nested at Taltree. Migrating spring warblers can be viewed in abundance along the Heron Pond Woodlands and Owl Trails. Taltree is an excellent site to view raptors. Red-tailed, Cooper's and Sharp-shinned Hawks are year round residents. During the winter and early spring months a pair of Northern Harrier Hawks regularly patrol the open space at the arboretum. Wild Turkey, Ring-necked Pheasant and Bobwhite Quail are also present. Other birds of particular interest are American Woodcock, Eastern Meadowlarks, Dickcissels, Indigo Buntings, Rose-breasted Grosbeaks, Baltimore Orioles and the Savanna and Green-tipped Sparrows. Taltree Arboretum & Gardens: A Natural Inspiration....

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- Brock, Kenneth J. *Birds of the Indiana Dunes*. (Revised Edition) Shiley Nature Environmental Fund, 1997.  
Shiley, David Allen. *The Shiley Guide to Birds*. Alfred A. Knopf, Inc., 2000.  
United States. *Birds of the Indiana Dunes National Lakeshore*. (Revised Edition) Indiana Dunes National Lakeshore, 1991.

*Special thanks to Ken Brock for permission to use information about birding in the Indiana Dunes directly from his book, Birds of the Indiana Dunes.*

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**There's still more...**

to see and do at the Casual Coast. There are several more specialty guides, each geared to people's special interests!

The Porter County Golf Guide

The Porter County Fishing Guide

The 2010 Porter Guide Calendar of Events

The Porter County Kids Guide

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## Document F – nestboxtips.txt

### Tips for Nest Boxes this spring/summer

If you have old boxes in your garden, clean out any of last years nesting material or any old bits of food that may have been stored in there.

If you are putting up new nest boxes make sure that they are out of the reach of cats and Squirrels.

Check that the box isn't in full sun otherwise young birds may literally bake in the heat.

Experiment with different kinds of bird boxes – the open-fronted “Robin” boxes may even attract Spotted Flycatchers.

Make sure any boxes are at least 15mm in thickness.

Face boxes away from prevailing winds.

Don't put nest boxes too close together in a small area as this will only lead to territorial fights.

Always make sure that there is enough food and fresh water made available close by.

Do not put bird boxes with perches attached – the birds do not need them and it may only invite predators.

Never buy a bird table with a nest box built in, as nesting birds will only come into conflict with feeding ones.

## Appendix E – Timeline (Ross, James)

### E1.

Wed Feb 02 2005 15:12:06	35	m...	r/rrwxrwxrwx	0 0	15349-128-1	C:/Documents and Settings/john doe/Local Settings/Temp/dawn.ram
	82	macb	r/rrwxrwxrwx	0 0	15349-48-3	C:/Documents and Settings/john doe/Local Settings/Temp/dawn.ram (\$FILE_NAME)
Wed Feb 02 2005 15:12:09	35	..cb	r/rrwxrwxrwx	0 0	15349-128-1	C:/Documents and Settings/john doe/Local Settings/Temp/dawn.ram

### E2.

Wed Feb 02 2005 15:12:10	94	mac...	r/rrwxrwxrwx	0 0	15351-48-2	C:/Documents and Settings/john doe/Application Data/Real/RealPlayer/realeplayer.sto (\$FILE_NAME) (deleted)
Wed Feb 02 2005 15:12:12	20448	...b	r/rrwxrwxrwx	0 0	15353-128-3	C:/Documents and Settings/john doe/Application Data/Real/RealPlayer/clickthson
	86	macb	r/rrwxrwxrwx	0 0	15353-48-2	C:/Documents and Settings/john doe/Application Data/Real/RealPlayer/clickthson (\$FILE_NAME)
	1879	...b	r/rrwxrwxrwx	0 0	15354-128-3	C:/Documents and Settings/john doe/Application Data/Real/RealPlayer/History/dawn.ink
	82	macb	r/rrwxrwxrwx	0 0	15354-48-2	C:/Documents and Settings/john doe/Application Data/Real/RealPlayer/History/dawn.ink (\$FILE_NAME)
	380016	m.c.	r/rrwxrwxrwx	0 0	16838-128-3	C:/Documents and Settings/john doe/Application Data/Real/RealPlayer/skins/data/normal/imgcache.dat
Wed Feb 02 2005 15:12:13	1879	mac.	r/rrwxrwxrwx	0 0	15354-128-3	C:/Documents and Settings/john doe/Application Data/Real/RealPlayer/History/dawn.ink
Wed Feb 02 2005 15:12:15	1879	macb	r/rrwxrwxrwx	0 0	15355-128-4	C:/Documents and Settings/john doe/Application Data/Real/RealPlayer/History/The Life of Birds- Dawn Bird.ink
	130	macb	r/rrwxrwxrwx	0 0	15355-48-2	C:/Documents and Settings/john doe/Application Data/Real/RealPlayer/History/The Life of Birds- Dawn Bird.ink (\$FILE_NAME)
Wed Feb 02	16392	macb	r/rrwxrwxrwx	0 0	15356-128-4	C:/WINNT/WS/Prefetch/RUN1.32.EXE-1A8F9790.nf

### E3.

Type dir / in	Name	Written	Accessed	Changed	Created	Size	U
d / d	..	2005-02-09 13:14:53 (GMT)	2005-02-09 16:33:54 (GMT)	2005-02-09 13:14:53 (GMT)	2005-01-24 15:56:15 (GMT)	56	4
d / d	..	2005-02-03 11:23:04 (GMT)	2005-02-09 16:42:01 (GMT)	2005-02-03 11:23:04 (GMT)	2005-01-24 16:09:58 (GMT)	56	0
d / d	All Users/	2005-01-24 16:21:37 (GMT)	2005-02-09 16:42:01 (GMT)	2005-01-24 16:21:37 (GMT)	2005-01-24 16:09:58 (GMT)	56	0
d / d	bob/	2005-02-03 10:12:39 (GMT)	2005-02-09 16:59:25 (GMT)	2005-02-03 10:12:39 (GMT)	2005-02-03 10:12:34 (GMT)	56	0
d / d	Default User/	2005-01-24 16:21:37 (GMT)	2005-02-09 13:03:04 (GMT)	2005-01-24 16:21:37 (GMT)	2005-01-24 16:09:58 (GMT)	56	0
d / d	jane/	2005-02-03 11:23:08 (GMT)	2005-02-09 16:59:25 (GMT)	2005-02-03 11:23:08 (GMT)	2005-02-03 11:23:04 (GMT)	56	0
d / d	john doe/	2005-01-28 16:51:42 (GMT)	2005-02-09 16:51:54 (GMT)	2005-01-28 16:51:42 (GMT)	2005-01-24 15:56:56 (GMT)	56	0
d / d	LocalService/	2005-01-24 15:53:50 (GMT)	2005-02-09 13:03:05 (GMT)	2005-01-24 15:53:50 (GMT)	2005-01-24 15:53:49 (GMT)	56	0
d / d	NetworkService/	2005-01-24 15:53:36 (GMT)	2005-02-09 13:03:05 (GMT)	2005-01-24 15:53:36 (GMT)	2005-01-24 15:53:33 (GMT)	56	0

### E4.

Type	Name	Written	Accessed	Changed	Created	Size	UID	GID	META
d / d	adl	2005-01-28 16:51:42 (GMT)	2005-02-09 16:51:54 (GMT)	2005-01-28 16:51:42 (GMT)	2005-01-24 15:56:56 (GMT)	56	0	0	10152-144-5
d / d	adl	2005-02-03 15:04:48 (GMT)	2005-02-09 16:59:56 (GMT)	2005-02-03 15:04:48 (GMT)	2005-01-24 15:56:56 (GMT)	512	0	0	10292-144-1
r / r	AdobeDr70.exe_full.exe	2005-02-02 16:54:42 (GMT)	2005-02-02 16:58:44 (GMT)	2005-02-02 17:00:21 (GMT)	2005-02-02 16:53:13 (GMT)	20798256	0	0	15389-128-9
r / r	birdtrans2.jpg	2005-02-03 15:04:48 (GMT)	2005-02-03 15:04:48 (GMT)	2005-02-03 15:04:48 (GMT)	2005-02-03 15:04:48 (GMT)	59614	0	0	17163-128-4

E5.

Conservation Society of Thailand (BCST) is a BirdLife Partner Oriental Bird Club (OBC)

c/o Uthai Treesucon, 723/1 Mu 2 Soi Ram Intra, Joorakhaebua, Bangkok 10230.  
E-mail:

HYPERLINK "mailto:utree@loxinfo.co.th" \t "\_blank" utree@loxinfo.co.th  
HYPERLINK "mailto:mail@orientalbirdclub.org" \t "\_blank"  
mail@orientalbirdclub.org  
Web site: HYPERLINK "http://www.orientalbirdclub.org" \t "\_blank"  
www.orientalbirdclub.org

Wildlife	Conservation	Society	-	Thailand	Programme
P.O.	Box	170,	Laksi,	Bangkok	10210
Tel:		+662-503	4478,	+662-503	4479
Fax:			+662-503		4096

Email: HYPERLINK "mailto:thailand@wcs.org" \t "\_blank" thailand@wcs.org Reference information:

Field guide  
Robson, C. 2002.

A field guide to the birds of Thailand.  
Asia Books, Bangkok. 272pp. TAT PUBLICATIONS ON NATURE TOURISM  
For more information on birdwatching in Thailand, please refer to the following nature tourism guide books in the "National Park" series published by the Tourism Authority of Thailand as part of the Tourism and Employment Creation Plan implemented under the Social Investment Project. KHAO YAI: DONG PHAYA YEN FOREST RANGE

ISBN	974-8252-70-1	KAENG	KRACHAN:
Amazing	Forest	Phetchburi	River
ISBN	974-8252-72-8	KHAO	SOK

Fascinating Limestone Mountains Amid The Verdant Forest of Surat Thani, Thailand  
ISBN 974-679-099-4 DOI INTHONON - DOI SUTHEP

The Himalayan Springs of Thailand

◆ISBN 974-8252-67-1 PHU LUANG  
The Kingdom of Plants

ISBN 974-8252-73-6 BIRDWATCHING TIPS Consult field guides, checklists, and maps prior to arriving at the birdwatching destination. Dress in colours that blend in with the surroundings. Bring appropriate equipment such as telescope, bird guide, and a notebook. Plan to arrive at the destination at sunrise when birds are first out in search for food and are most active. Walk slowly stopping at intervals to listen for calling birds. Look for the birds in thickets, on the branches of trees,

and on the ground. Avoid talking, smoking, or walking on dry leaves, all of which will scare birds away. CONSERVING BIRD DIVERSITY Across the world, humans coexist with birds but human activities often affect the survival prospects for birds. Forty-eight species of birds found in Thailand (5% of the total) are globally threatened by the loss or disturbance of their habitats, food resources, and breeding areas, and by other human actions, and so require special conservation attention. A further 97 species (10%) are potentially threatened if current trends persist. In Thailand, 101 species (10% of the total) are hunted as pests, for food or for the pet trade and are directly threatened by humans. The list of hunted species includes waterbirds, birds of prey, pheasants, parakeets, pigeons, hornbills, pittas weavers, bulbuls, and other forest birds. Worldwide the trade in birds includes 2,600 species and several million birds each year. Ten percent of threatened birds worldwide are affected by the bird trade. There are a number of ways in which the numbers and distribution of threatened birds are being restored. Habitat conservation programmes are an important mechanism. Feeding habitats for seasonal migrants are being preserved by incorporating mangroves and coastal tidal areas in marine protected areas. Lowland forests that support Gurney's pitta and other diversity are being protected and a reafforestation programme planned. Preventing encroachment around the edges of parks maintains the integrity of forest blocks used by the majority of native birds, including migrant raptors and songbirds.

In most cases, preserving and protecting natural habitats can bring back even highly endangered populations of rare birds. These measures are relatively cost effective to implement. As an example, a 3-year Khao Yai Conservation Project preserved over 2,000 sq km of wildlife habitat, discouraged poaching, and provided employment alternatives for local forest resource users, at an annual cost of 7 million baht (US\$171,000). For critically endangered species, whose populations are extremely small, and whose survival in the wild is uncertain due to factors that simply cannot be controlled, other more costly measures such as captive breeding, are being considered. Captive breeding is risky because birds need to be recovered from the wild to establish breeding populations, and injury is possible. Some species do not breed well in captivity because their natural courting and nesting behaviours are no longer possible. Strict controls on who is allowed to breed endangered species, registration of individuals, and enforcement of laws so that commercial sale is not possible, need to be adopted. Without these controls, captive breeding programmes cannot succeed. HOW YOU CAN HELP IN THE CONSERVATION OF BIRDS

Visitors to Thailand can assist efforts to preserve and maintain the diversity of birds and their habitats simply by visiting national parks and other wilderness areas. Bird enthusiasts can report the species they observe to authorities. Checklists are now available at many popular national parks. Tourists can report evidence of suspicious activity that might lead to the arrest of unscrupulous individuals trapping or hunting birds and can also participate as volunteers in

habitat conservation programmes. In these ways, tourists can help reduce the threats to birds, and at the same time enjoy Thailand's birdwatching paradise. Contact information: TO REPORT BIRD SPECIES OBSERVED TO REPORT BIRD SPECIES OBSERVED

Please contact the Park Visitor Centre of the National Park or

Bird Conservation Society of Thailand (BCST)\*  
69/12 Soi Ramindra 24, Joorakaebau, Ladprao, Bangkok 10230, Thailand  
Email: [HYPERLINK "mailto:bcst@box1.a-net.net.th"](mailto:bcst@box1.a-net.net.th) \t "\_blank" bcst@box1.a-net.net.th

Tel: 66-(0)-2943-5965

Web sites:

[HYPERLINK "http://www.bcst.org/index\\_ebird.html"](http://www.bcst.org/index_ebird.html) \t "\_blank"  
[www.bcst.org/index\\_ebird.html](http://www.bcst.org/index_ebird.html)

[HYPERLINK "http://www.thai.net/bcst"](http://www.thai.net/bcst) \t "\_blank" www.thai.net/bcst

\* The Bird Conservation Society of Thailand (BCST) is a BirdLife Partner  
TO REPORT EVIDENCE OF SUSPICIOUS ACTIVITY

Please contact

Wildlife Protection and Suppression Office  
Department of National Parks, Wildlife, and Plant Conservation  
61 Paholyothin Road, Chatuchak, Bangkok 10900

Tel: 66-(0)-2579-5266

HABITAT CONSERVATION VOLUNTEER PROGRAMMES

Please contact

Wildlife Conservation Society - Thailand Programme  
P.O. Box 170, Laksi, Bangkok 10210  
Tel: +662-503 4478, +662-503 4479  
Fax: +662-503 4096

Email: [HYPERLINK "mailto:thailand@wcs.org"](mailto:thailand@wcs.org) \t "\_blank" thailand@wcs.org FAMILIES  
OF BIRDS IN THAILAND UNDER THREAT

The following bird species are under threat because there is a high demand for them and they are hunted for the local, regional and global bird trade. To help preserve the species, please refrain from purchasing any of the following birds as pets, and if you happen to witness any of the following birds being sold or traded, or note any suspicious activities involving them, please contact:

The Wildlife Protection and Suppression Office  
Department of National Parks, Wildlife, and Plant Conservation  
61 Paholyothin Road, Chatuchak, Bangkok 10900

Tel: 66-(0)-2579-5266 Phasianidae (wood partridges and pheasants) - 4 species  
Anatidae (White-winged duck) - 1 species Picidae (woodpeckers and barbets) - 3 species  
Bucerotidae (hornbills) - 7 species Upupidae (Common hoopoe) - 1 species  
Cuculidae (Coral-billed ground cuckoo) - 1 species Psittacidae (parrots and parakeets) - 4 species Columbidae (pigeons) - 12 species Accipitridae (birds of prey) - 9 species Threskiornithidae (White-shouldered ibis) - 1 species Ciconiidae (Lesser adjutant) - 1 species Pittidae (pittas) - 3 species Irenidae (Asian fairy

bluebird and leafbirds) - 6 species Corvidae (jays, crows, magpies, orioles and minivets) - 14 species Muscicapidae (thrushes, robins, and sharmas) - 3 species Sturnidae (starlings and mynas) - 3 species Paridae (Yellow-cheeked tit) - 1 species Pycnonotidae (bulbuls) - 7 species Zosteropidae (Japanese white-eye) - 1 species Sylvidae (laughing thrushes, mesias, minlas and sibias) - 8 species Nectariniidae (Scarlet-backed flowerpecker) - 1 species Passeridae (weavers and munias) - 7 species Fringillidae (grosbeaks and buntings) - 3 species About The Author

ANTONY

LYNAM

Antony Lynam (Ph.D.), Wildlife Conservation Society (WCS)- Thailand Programme Director and conservation scientist, works with the Thailand Department of National Parks, Wildlife and Plants to develop programmes for the conservation of the country's endangered species, park resources management, and the design and conduct of training curriculum for park rangers. An Australian citizen, he has authored a number of technical papers and popular articles concerning conservation issues in Australia, North America, and Thailand, and was a contributor to the seminal volume on habitat fragmentation "Tropical Forest Remnants: Ecology, Conservation and Management". He writes frequently on natural history for magazines, journals and newspapers including Wildlife Conservation, The Nation, The Bangkok Post, and The Natural History Bulletin of The Siam Society. Contact information:

Bird Conservation Society of Thailand (BCST)\*  
 69/12 Soi Ramindra 24, Joorakaebau, Ladprao, Bangkok 10230, Thailand  
 Email: [HYPERLINK "mailto:bcst@box1.a-net.net.th"](mailto:bcst@box1.a-net.net.th) \t "\_blank"  
[bcst@box1.a-net.net.th](mailto:bcst@box1.a-net.net.th)

Tel: 66-(0)-2943-5965

Web sites:

[HYPERLINK "http://www.bcst.org/index\\_ebird.html"](http://www.bcst.org/index_ebird.html) \t "\_blank"  
[www.bcst.org/index\\_ebird.html](http://www.bcst.org/index_ebird.html)

[HYPERLINK "http://www.thai.net/bcst"](http://www.thai.net/bcst) \t "\_blank" [www.thai.net/bcst](http://www.thai.net/bcst)

\* The Bird Conservation Society of Thailand (BCST) is a BirdLife Partner

E6.

Type	Name	Written	Accessed	Changed	Created	Size	UID	GID	META
d / d	<u>..</u>	2005-01-28 16:51:42 (GMT)	2005-02-09 16:51:54 (GMT)	2005-01-28 16:51:42 (GMT)	2005-01-24 15:56:56 (GMT)	56	0	0	10152-144-5
d / d	<u>..</u>	2005-02-09 17:03:59 (GMT)	2005-02-09 17:03:59 (GMT)	2005-02-09 17:03:59 (GMT)	2005-01-24 15:56:56 (GMT)	56	0	0	10275-144-6
r / r	<a href="#">aa018703a.htm</a>	2005-02-02 14:26:01 (GMT)	2005-02-03 15:02:44 (GMT)	2005-02-02 14:26:01 (GMT)	2005-02-02 14:25:59 (GMT)	53719	0	0	15243-128-4
d / d	<a href="#">aa018703a.htm</a>	2005-02-02 16:13:11 (GMT)	2005-02-09 16:59:23 (GMT)	2005-02-02 16:13:11 (GMT)	2005-02-02 14:25:59 (GMT)	176	0	0	15184-144-6
r / r	<a href="#">birdbios.jpg</a>	2005-02-02 16:46:39 (GMT)	2005-02-03 11:45:43 (GMT)	2005-02-02 16:46:32 (GMT)	2005-02-02 16:46:31 (GMT)	985597	0	0	15386-128-3
r / r	<a href="#">desktop.ini</a>	2005-01-24 15:57:30 (GMT)	2005-02-09 16:56:25 (GMT)	2005-01-24 15:57:30 (GMT)	2005-01-24 15:57:05 (GMT)	78	0	0	10367-128-1
r / r	<a href="#">kalango.ram</a>	2005-02-02 15:11:41 (GMT)	2005-02-02 16:13:03 (GMT)	2005-02-02 15:11:51 (GMT)	2005-02-02 15:11:51 (GMT)	37	0	0	15278-128-1
d / d	<a href="#">My_Music/</a>	2005-02-03 14:18:54 (GMT)	2005-02-09 16:59:22 (GMT)	2005-02-03 14:18:54 (GMT)	2005-01-24 15:57:05 (GMT)	488	0	0	10371-144-1
d / d	<a href="#">My_Pictures/</a>	2005-02-03 15:05:03 (GMT)	2005-02-09 16:51:54 (GMT)	2005-02-03 15:05:03 (GMT)	2005-01-24 15:57:05 (GMT)	56	0	0	10368-144-6
r / r	<a href="#">nestboxtiss.txt</a>	2005-02-02 14:29:30 (GMT)	2005-02-02 14:29:30 (GMT)	2005-02-02 14:29:30 (GMT)	2005-02-02 14:29:30 (GMT)	1017	0	0	15265-128-4
r / r	<a href="#">newbieis2.jpg</a>	2005-02-03 15:05:44 (GMT)	2005-02-09 16:57:54 (GMT)	2005-02-03 15:05:44 (GMT)	2005-02-03 15:05:44 (GMT)	55740	0	0	17168-128-3
r / r	<a href="#">os1tba2b.htm</a>	2005-02-03 15:02:45 (GMT)	2005-02-09 11:28:21 (GMT)	2005-02-03 15:02:45 (GMT)	2005-02-03 15:02:45 (GMT)	4490	0	0	15180-128-3
r / r	<a href="#">stuF.doc</a>	2005-02-09 16:57:46 (GMT)	2005-02-09 16:57:46 (GMT)	2005-02-09 16:57:46 (GMT)	2005-02-09 16:56:50 (GMT)	19968	0	0	11979-128-3

E7.

Current Directory: C:\Documents and Settings\John Doe\										
Add Note		Generate MD5 List of Files								
Dir.	Type	Name	Written	Accessed	Changed	Created	Size	UID	GID	Meta
d/d	dir	..	2005-02-08 16:51:42 (GMT)	2005-02-09 16:51:54 (GMT)	2005-01-24 15:56:56 (GMT)	56	0	0	0	10152-144-5
d/d	dir	..	2005-02-02 15:04:44 (GMT)	2005-02-09 17:03:54 (GMT)	2005-02-09 17:03:55 (GMT)	2005-01-24 15:56:56 (GMT)	56	0	0	10293-144-5
r/r	index.dat		2005-02-09 17:03:55 (GMT)	2005-01-24 15:56:57 (GMT)	2005-02-09 17:03:55 (GMT)	2005-01-24 15:56:57 (GMT)	32768	0	0	10352-128-4
r/r	john doe microsoft file.txt		2005-01-24 16:15:43 (GMT)	2005-02-02 14:57:23 (GMT)	2005-01-24 16:15:43 (GMT)	2005-01-24 16:15:43 (GMT)	127	0	0	10921-128-1
r/r	john doe office microsoft file121.txt		2005-01-25 11:16:48 (GMT)	2005-01-25 11:16:48 (GMT)	2005-01-25 11:16:48 (GMT)	2005-01-25 11:16:48 (GMT)	209	0	0	14724-128-1
r/r	john doe real121.txt		2005-02-02 15:04:44 (GMT)	2005-02-09 16:33:54 (GMT)	2005-02-02 15:04:44 (GMT)	2005-02-02 15:04:49 (GMT)	1232	0	0	15293-128-4

E8.

r/r	AlmondMarrysGreatBlueHeronStalling.jpg.lnk	2005-02-09 17:00:50 (GMT)	2005-02-09 17:00:50 (GMT)	2005-02-09 17:00:50 (GMT)	2005-02-09 17:00:50 (GMT)	1222631 (GMT)				
r/r	audio.lnk	2005-02-03 12:22:51 (GMT)	2005-02-03 14:49:38 (GMT)	2005-02-03 12:22:51 (GMT)	2005-02-03 12:22:51 (GMT)	122251 (GMT)				
r/r	babyshot_2weeks1.jpg.lnk	2005-02-03 15:00:27 (GMT)	2005-02-03 15:00:27 (GMT)	2005-02-03 15:00:27 (GMT)	2005-02-03 15:00:27 (GMT)	150027 (GMT)				
r/r	babyshot_vyoung.jpg.lnk	2005-02-03 15:00:19 (GMT)	2005-02-03 15:00:19 (GMT)	2005-02-03 15:00:19 (GMT)	2005-02-03 15:00:19 (GMT)	150019 (GMT)				
r/r	BirdingGuide.pdf.lnk	2005-02-03 15:00:24 (GMT)	2005-02-03 15:00:24 (GMT)	2005-02-03 15:00:24 (GMT)	2005-02-03 15:00:24 (GMT)	150024 (GMT)				
r/r	birds.lnk	2005-02-03 14:49:29 (GMT)	2005-02-03 14:49:38 (GMT)	2005-02-03 14:49:29 (GMT)	2005-02-03 14:49:29 (GMT)	144929 (GMT)				
r/r	birds.zip.lnk	2005-02-09 11:28:00 (GMT)	2005-02-03 11:28:00 (GMT)	2005-02-09 11:28:00 (GMT)	2005-02-09 11:28:00 (GMT)	112800 (GMT)				
r/r	birdtrem2.jpg.lnk	2005-02-03 15:04:48 (GMT)	2005-02-03 15:04:48 (GMT)	2005-02-03 15:04:48 (GMT)	2005-02-03 15:04:48 (GMT)	150448 (GMT)				
r/r	birdsynchronization.doc.lnk	2005-02-03 12:20:20 (GMT)	2005-02-03 14:49:39 (GMT)	2005-02-03 12:20:20 (GMT)	2005-02-03 12:20:20 (GMT)	121959 (GMT)				
r/r	chicks2.jpg.lnk	2005-02-03 15:05:03 (GMT)	2005-02-03 15:05:03 (GMT)	2005-02-03 15:05:03 (GMT)	2005-02-03 15:05:03 (GMT)	150503 (GMT)				
r/r	cookies.txt.lnk	2005-02-03 12:19:07 (GMT)	2005-02-03 14:49:51 (GMT)	2005-02-03 12:19:07 (GMT)	2005-02-03 12:19:07 (GMT)	121907 (GMT)				
r/r	Desktop.ini	2005-01-28 16:51:42 (GMT)	2005-02-09 11:27:54 (GMT)	2005-01-28 16:51:42 (GMT)	2005-01-28 16:51:42 (GMT)	165142 (GMT)				
r/r	Doc1.doc.lnk	2005-02-03 14:17:47 (GMT)	2005-02-03 14:49:39 (GMT)	2005-02-03 14:17:47 (GMT)	2005-02-03 14:17:47 (GMT)	141747 (GMT)				
r/r	EvanstonWoodpecker.jpg.lnk	2005-02-03 14:14:59 (GMT)	2005-02-03 14:49:52 (GMT)	2005-02-03 14:14:59 (GMT)	2005-02-03 14:14:59 (GMT)	141459 (GMT)				
r/r	kakapo.lnk	2005-02-02 15:11:51 (GMT)	2005-02-02 14:49:54 (GMT)	2005-02-02 15:11:51 (GMT)	2005-02-02 15:11:51 (GMT)	151151 (GMT)				
r/r	Killdeer.jpg.lnk	2005-02-03 14:49:29 (GMT)	2005-02-03 14:49:55 (GMT)	2005-02-03 14:49:29 (GMT)	2005-02-03 14:49:29 (GMT)	144929 (GMT)				

E9.

Dir.	Type	Name	Written	Accessed	Changed	Created	Size	UID	GID	Meta
d/d	dir	..	2005-02-09 17:03:59 (GMT)	2005-02-09 17:03:59 (GMT)	2005-02-09 17:03:59 (GMT)	2005-01-24 15:56:56 (GMT)	56	0	0	10275-14
d/d	dir	..	2005-02-03 15:05:03 (GMT)	2005-02-09 16:51:54 (GMT)	2005-02-03 15:05:03 (GMT)	2005-01-24 15:57:05 (GMT)	56	0	0	10368-14
r/r	127.jpg		2005-02-03 15:01:39 (GMT)	2005-02-03 15:05:01 (GMT)	2005-02-03 15:01:39 (GMT)	2005-02-03 15:01:38 (GMT)	9310	0	0	15178-12
r/r	4m.jpg		2005-02-02 14:43:36 (GMT)	2005-02-03 15:00:17 (GMT)	2005-02-02 14:43:36 (GMT)	2005-02-02 14:43:36 (GMT)	6195	0	0	15271-12
r/r	2107288.jpg		2005-02-02 14:20:33 (GMT)	2005-02-03 11:14:06 (GMT)	2005-02-02 14:20:33 (GMT)	2005-02-02 14:20:33 (GMT)	10357	0	0	15167-12
r/r	babyshot_2weeks1.jpg		2005-02-03 15:00:27 (GMT)	2005-02-03 15:01:36 (GMT)	2005-02-03 15:00:27 (GMT)	2005-02-03 15:00:27 (GMT)	34102	0	0	15172-12
r/r	babyshot_vyoung.jpg		2005-02-03 15:00:19 (GMT)	2005-02-03 15:00:25 (GMT)	2005-02-03 15:00:19 (GMT)	2005-02-03 15:00:19 (GMT)	38541	0	0	15169-12
r/r	chicks2.jpg		2005-02-03 15:05:03 (GMT)	2005-02-03 15:05:38 (GMT)	2005-02-03 15:05:03 (GMT)	2005-02-03 15:05:03 (GMT)	39119	0	0	17166-12
r/r	Desktop.ini		2005-01-24 15:57:30 (GMT)	2005-02-09 16:56:26 (GMT)	2005-01-24 15:57:30 (GMT)	2005-01-24 15:57:05 (GMT)	185	0	0	10369-12
r/r	Sample Pictures.lnk		2005-01-24 15:57:05 (GMT)	2005-02-03 15:05:38 (GMT)	2005-01-24 15:57:05 (GMT)	2005-01-24 15:57:05 (GMT)	668	0	0	10370-12