

**CALGARY BIRD BANDING SOCIETY**  
**2008 ANNUAL TECHNICAL REPORT**



Prepared  
by

Douglas M. Collister  
Ken Foster  
Chris Godwin-Sheppard  
Garry Hornbeck  
and  
Barry Trakalo

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***Custodire aves***  
Keep watch on birds

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## Calgary Bird Banding Society Code of Ethics

**1. Members are jointly responsible for the safety and welfare of the birds they capture and study. Stress, injuries and mortalities must be minimized. The following guidelines must be adhered to:**

- handle each bird carefully, gently, quietly, and with respect
- capture only as many birds as you can safely process
- close traps or nets when predators in the area result in unacceptable risk to bird safety
- do not open nets in inclement weather
- assess the condition of nets frequently and repair or replace them quickly
- members must be properly trained and supervised
- check nets at least every 30 minutes
- close and properly furl all nets at the end of each banding day
- do not double bag birds
- use the correct band size and banding pliers for each bird
- treat all bird injuries in the most humane way

**2. Members must continually assess their own work to ensure that the highest standards possible are maintained. The following guidelines must be adhered to:**

- reassess methods and your approach whenever an injury or mortality occurs
- accept constructive and positive criticism from peers

**3. Members must offer honest and constructive assessment of other members work to help develop and maintain the highest standards possible. The following guidelines must be adhered to:**

- provide criticism to other members in a constructive and positive manner
- inform members and others of innovations and improvements in capture, handling and banding techniques
- any mistreatment of birds or improper conduct by a member must be reported to the BIC and/or a member of the CBBS executive



Blackpoll Warblers - Inglewood Bird Sanctuary (L – male, R- female)  
(Photo by Shonna McLeod)

## TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY .....</b>	<b>1</b>
<b>INTRODUCTION .....</b>	<b>3</b>
<b>FUNDING AND ACKNOWLEDGEMENTS.....</b>	<b>5</b>
<b>MIGRATION MONITORING AT INGLEWOOD BIRD SANCTUARY .....</b>	<b>6</b>
Background .....	6
Methods and Study Site .....	6
Monitoring Schedule and Coverage .....	7
<i>Spring</i> .....	7
<i>Fall</i> .....	7
New Bandings .....	7
<i>Spring</i> .....	7
<i>Fall</i> .....	7
<i>Insight from Mist-netting</i> .....	8
Stable Isotope Ecology.....	9
Daily Estimated Totals (DETs) .....	9
Recaptures.....	9
<b>MONITORING AVIAN PRODUCTIVITY AND SURVIVORSHIP (MAPS) .....</b>	<b>11</b>
Background .....	11
Objectives.....	12
Methods .....	12
Schedule and Coverage .....	13
Results .....	13
Discussion .....	13
<b>MIGRATION MONITORING AT LAS CALETAS, COSTA RICA AND MONITEREO DE SOBREVIVERCIA INVERNAL (MOSI) .....</b>	<b>16</b>
Introduction .....	16
Study Site.....	16
Methods .....	16
Schedule and Coverage.....	16
Captures.....	16
Recaptures.....	17
Discussion .....	19
<b>NORTHERN SAW-WHET OWL MIGRATION MONITORING.....</b>	<b>20</b>
Background .....	20
Methods .....	20
Results .....	20
Discussion .....	21
<b>SIGNIFICANT RE-ENCOUNTERS .....</b>	<b>22</b>
<b>TREND ANALYSES .....</b>	<b>23</b>
<b>PERSONNEL.....</b>	<b>25</b>
Volunteers .....	25
Banders-in-Charge (BIC) .....	25

<b>MORTALITIES AND INJURIES .....</b>	<b>26</b>
<b>REFERENCES .....</b>	<b>27</b>

## **FIGURES**

1. Topographic maps showing location of IBS and NSW0 migration monitoring stations
2. Location of net lanes at Inglewood Bird Sanctuary migration monitoring station
3. New bandings at Inglewood Bird Sanctuary
  - a. Spring 2008
  - b. Fall 2008
4. Map showing location of Las Caletas, Costa Rica
5. Graph of MAPS results 1992-2008
6. New captures of Swainson's Thrush at Las Caletas, Costa Rica
7. Northern Saw-whet Owl new captures SW of Calgary 2008
8. Northern Saw-whet Owl migration monitoring stations across North America
9. CBBS casualty rates 1995-2008

## **TABLES**

1. Migration monitoring dates, net-hours and capture rates at Inglewood Bird Sanctuary
  - a. Spring 2008
  - b. Fall 2008
2. New bandings at Inglewood Bird Sanctuary
  - a. Spring 2002-2008
  - b. Fall 1992-2008
3. Inglewood Bird Sanctuary MAPS new bandings 2008
4. Inglewood Bird Sanctuary MAPS new bandings 1992-2008
5. MoSi and migration monitoring dates and capture rates at Las Caletas, CR 2008
6. New captures at Las Caletas, CR 2002-2008
7. Trend analysis of monitored species at Inglewood Bird Sanctuary
  - a. Fall 1995-2008
  - b. Spring 2002-2008
8. Bander-in-Charge and volunteer effort 2008
9. Injuries and mortalities 2008
10. CBBS 2008 membership list

## APPENDICES

1. New bandings at Inglewood Bird Sanctuary
  - a. Spring 2008
  - b. Fall 2008
2. Top 20 new bandings at Inglewood Bird Sanctuary 1995-2008
3. Monitored species at Inglewood Bird Sanctuary
4. Year-to-year recaptures in Alberta 1992-2008
5. New bandings and other captures in Costa Rica 2008
6. Year-to-year recaptures in Costa Rica 2002-2008
7. Trend analysis charts
8. Pilot bat migration monitoring



Tiny Hawk (imm) – Las Caletas, Costa Rica  
(Photo by Cyndi Smith)

## EXECUTIVE SUMMARY

The Calgary Bird Banding Society (CBBS) was incorporated in March 1995. The main objective of CBBS remains conducting migration monitoring and other banding-based studies at Inglewood Bird Sanctuary (IBS), a federal Migratory Bird Sanctuary. IBS has long been known as an important migration site for Neotropical migrants. Located within 80-km of the Rocky Mountains in southwestern Alberta, the site is a unique component of the Canadian Migration Monitoring Network.

During 2008, in addition to membership dues and member donations CBBS received support from the Alberta Gaming and Liquor Commission, Petro-Canada Volunteer Grant Fund and Baillie Birdathon.

Spring migration monitoring was undertaken at IBS for the 7<sup>th</sup> consecutive year since it was initiated in 2002. The 2007 fall program marks the 14<sup>th</sup> year of migration monitoring and follows pilot programs in 1992 and 1994 and full fall programs in 1995 through 2007. Mist-nets were operated on 30 of the 36 days between 1 May and 6 June (1744 net-hrs) and 67 of the 72 days between 28 July and 7 October (4789 net-hrs). Total new bandings of 589 and 1679 were achieved for the spring and fall programs, respectively. An Eastern Kingbird (at least 8-years old) was recaptured.

The IBS MAPS site was operated again in 2008, the 16<sup>th</sup> replicate since 1992. The 146 new bandings of 31 species was the 3<sup>rd</sup> highest since the project was initiated in 1992. An analysis of IBS MAPS results through 2008 was undertaken in 2009 (Smith et al. 2009 – see website).

MoSi and migration monitoring was continued during 2008 at Las Caletas, Costa Rica on the Osa Peninsula along the Pacific coast. A total of 772 birds of 71 species were captured of which 491 were new bandings. Of 544 new captures 221 were Swainson's Thrushes and 21 were other migrant or overwintering Neotropical migrants. A Northern Waterthrush, banded in April 2003 as an SY-U was again recaptured in 2008 (6-years old) further reinforcing multi-year over-winter site fidelity and year-to-year survival.

2008 marked the 5<sup>th</sup> year of full Northern Saw-whet Owl migration monitoring at a site in the foothills southwest of Calgary. A total of 134 Northern Saw-whet Owls were captured and banded on 34 evenings between 15 September and 31 October. Two-thirds were HY and 68% were female. New owls per net-hour since inception is 0.25, 0.29, 0.27, 0.23 and 0.21 in 2004, 2005, 2006, 2007 and 2008 respectively. A 5-year old bird was recaptured.

Trend analysis was undertaken on 25 and 11 species in fall and spring, respectively, occurring as migrants at IBS and captured in sufficient quantity to allow analysis. It is interesting that six species (Traill's Flycatcher, Least Flycatcher, Tennessee Warbler, Yellow Warbler, Wilson's Warbler, and Lincoln's Sparrow) show significant ( $P < 0.05$ ) increases which is consistent with an increasing supply of second growth and/or shrubby habitat.

Banders-in-Charge and volunteers contributed 414 person-days or approximately 3312 hours to CBBS projects during 2008.

The number of mortalities during 2008 CBBS banding projects was high at 0.43% due to increased predation while the injury rate in 2008 was the lowest ever at 0.61%.

Bat migration monitoring was investigated at IBS in August 2008 but results were not encouraging.



White-nosed Coati – Las Caletas, Costa Rica  
(photo by Cyndi Smith)



## INTRODUCTION

The Calgary Bird Banding Society (CBBS) was incorporated on 22 March 1995 with the following objectives:

- Quantify long-term population trends of Neotropical migratory birds using constant effort mist-netting;
- Promote involvement and expertise in bird banding; and
- Promote conservation of Neotropical migratory birds by fostering public awareness and understanding of Neotropical migratory birds.

Although the primary project of the CBBS is monitoring of migratory birds at Inglewood Bird Sanctuary (IBS) in Calgary, other complementary projects have also been undertaken:

- a Monitoring Avian Productivity and Survivorship (MAPS) station was established at IBS in 1992 and continued in 1993 and 1995-2004 and 2006-2008;
- spring banding was initiated in 1997 at Dunbow Road approximately 22-km SSE of the City of Calgary and continued in 1998 and 1999;
- spring and fall banding/migration monitoring was initiated at the Cominco Natural Area (CNA) in 2000 with spring banding continued in 2001;
- colour-banding and relocation of Red-tailed and Swainson's Hawks at Calgary International Airport was initiated in cooperation with the Calgary Airport Authority in 2000 and continued through 2004;
- pilot spring migration monitoring was initiated at Las Caletas on the Osa Peninsula, Costa Rica in 2002, continued in 2003 and full migration monitoring initiated in 2004 and continued in 2005 and 2007;
- pilot Monitoreo de Sobrevivencia Invernal (MoSI) was undertaken in Costa Rica both at Las Caletas and another site on Isla Violin in 2006 and continued at Las Caletas 2007-2008;
- a pilot Northern Saw-whet Owl migration monitoring pilot program was carried out at Inglewood Bird Sanctuary in 2000;
- pilot Northern Saw-whet Owl migration monitoring was carried out in 2003 and full migration monitoring was initiated in 2004 and continued through 2008 at the De Wit ranch in the foothills southwest of Calgary;
- pilot MAPS was undertaken at Dinosaur Provincial Park (DPP) in 2006; and
- pilot spring migration monitoring was undertaken at DPP in 2007.

As of 1998 the Calgary Bird Banding Society's Inglewood Bird Sanctuary site is a fully designated member of the Canadian Migration Monitoring Network (CMMN) a cooperative initiative of the member stations, Canadian Wildlife Service and Bird Studies Canada. This formal association of migrant monitoring sites across Canada significantly enhances the value of the work conducted at each site. The Calgary Bird Banding Society and Inglewood Bird Sanctuary hosted the 2003 CMMN national meeting and the initial face-to-face meeting of the CMMN Steering Committee in November 2006.

### Canadian Migration Monitoring Network (CMMN)



## FUNDING AND ACKNOWLEDGEMENTS

Funding sources other than membership dues and member donations during 2008:

- funds raised by the CBBS through participation in the Baillie Birdathon;
- proceeds from Alberta Gaming and Liquor Commission arising from CBBS sponsored casinos; and
- a grant from the Petro-Canada Volunteer Grant Program.

Funds were used to provide a per diem to Banders-in-Charge (BICs), cover in-country costs for the Costa Rica migration monitoring and MoSI projects, purchase mist-nets, produce the Annual Technical Report, conduct stable isotope analyses of feather samples and cover migration monitoring miscellaneous costs (field data sheets, batteries, film and processing, storage etc.).

Sincere appreciation goes out to all CBBS members who have helped make 2008 another successful year for CBBS. Many non-members have helped immensely by volunteering at our casino, participating in the Baillie Birdathon and providing expertise such as carpentry and electrical.



*Heliconius* spp – Las Caletas, Costa Rica  
(Photo by Cyndi Smith)

## MIGRATION MONITORING AT INGLEWOOD BIRD SANCTUARY

### Background

Neotropical migrants are birds that breed in the Nearctic biogeographic realm and winter in the Neotropics. The Neotropical migratory bird system involves some 5-10 billion birds of over 150 species (Greenberg 1992). Trends in data from the Breeding Bird Survey indicate that populations of many Neotropical migrants in North America may be decreasing. Although destruction of tropical forests on the wintering grounds has been implicated in declines, increasing concern is being raised about the potential effect of accelerated land-use changes on breeding grounds.

Inglewood Bird Sanctuary (IBS) is a federal Migratory Bird Sanctuary known as an important site for migrating passerines. IBS is strategically located within 80-km of the Rocky Mountains (Figure 1) and is a unique and valuable member of the Canadian Migration Monitoring Network. IBS is located within Calgary which greatly facilitates member involvement. Pilot monitoring, covering only a portion of the fall migration, was undertaken in 1992 and 1994. Full spring and fall migration monitoring has occurred since 2002 and 1995, respectively, and 2008 marks CBBS' 14<sup>th</sup> anniversary. Monitoring songbird population change based on fall mist-netting has been shown to be an effective technique (Dunn *et al.* 1997).

### Methods and Study Site

Spring and fall migration of Neotropical migrants were monitored in 2008 at Inglewood Bird Sanctuary (IBS). IBS's 35 hectares includes mature riverine balsam poplar forest known for its number and diversity of songbirds during spring and fall migration (Sherrington 1975; Elphinstone 1990). Constant-effort mist-netting (i.e. constant number of nets in permanent locations for constant time period each day) and collection of associated morphometric and other data (e.g. age, sex, wing chord, weight, fat reserves, capture net, time of capture) from each bird captured was carried out each day, weather permitting, during spring and fall migration. Twelve 12-m long x 2.6-m high x 30-mm mesh mist-nets were operated in permanent net lanes for approximately 6 hours each day beginning at sunrise. A daily census was obtained when possible. A census was not attempted when the number of migrants or volunteer shortage would result in excessive holding time for captured birds.

The migration monitoring protocol used at IBS was developed from procedures outlined in McCracken *et al.* (1993) (*A Manual for Monitoring Bird Migration*), Hagan *et al.* (1994) (*Recommended Methods for Monitoring Bird Migration*) and Hussell and Ralph (1996) (*Recommended Methods for Monitoring Bird Populations by Counting and Capture of Migrants*). Net locations and the daily census route are shown on Figure 2.

## **Monitoring Schedule and Coverage**

### ***Spring***

Spring migration monitoring at IBS was conducted from 1 May to 6 June 2008. This was the 7<sup>th</sup> year of full spring migration monitoring at IBS. Mist-netting occurred on 30 of the 37 target days (81% coverage) for a total of 1744 net-hours (Table 1a, Figure 3a). Inclement weather (4 days), an ill BIC (2 days) and no volunteer (1 day) resulted in 7 days of the monitoring period without banding. High water in the Bow River during the last portion of the monitoring period also resulted in 15 days with a reduced number of net-hours from the daily target of 72.

### ***Fall***

Fall migration monitoring at IBS was conducted from 28 July to 7 October 2008. In addition to standardized constant-effort mist-netting, observations of other birds present in the reserve were noted. Mist-netting occurred on 67 of the 72 target days (93% coverage) for a total of 4789 net-hours (Table 1b, Figure 3b). Inclement weather (4 days) and no volunteer (1 day) resulted in 5 days of the monitoring period without banding. Inclement weather also resulted in 4 days with a reduced number of net-hours from the daily target of 72.

## **New Bandings**

### ***Spring***

A total of 589 new bands were placed on birds of 46 species (Table 2a, Appendix 1a). At least 20, 30 and 40 new bandings occurred on 12, 7, and 5 days respectively (Figure 3a). New banding totals by species at IBS are presented in Table 2a.

The 20 most frequently banded species over all years, and during 2008, are identified in Appendix 2. The top five in 2008 in descending order were Yellow-rumped Warbler, Swainson's Thrush, Lincoln's Sparrow, House Wren and American Robin compared to Yellow-rumped Warbler, Swainson's Thrush, American Robin, Lincoln's Sparrow and Yellow Warbler for 2002-2008 combined.

Species monitored at IBS based on criteria developed by Bird Studies Canada appear in Appendix 3 along with those criteria. Our experience is that a species that qualifies based on mean new bandings always qualifies based on mean number of days.

### ***Fall***

A total of 1679 new bands were placed on birds of 69 species (Table 2b, Appendix 1b). At least 50, 60 and 70 new bandings occurred on 9, 4 and 1 days, respectively (Figure 3b). Approximately 54% of new bandings occurred in August and 36% in September. The level of new bandings that occur in August versus September at IBS varies considerably from year to year. For example

during 2006 new bandings were equally weighted between August and September (44% in each month) compared to the heavy weighting in August in 2007 and the slightly less heavy weighting in 2008. New bandings at IBS from 1992-2008 are presented in Table 2b.

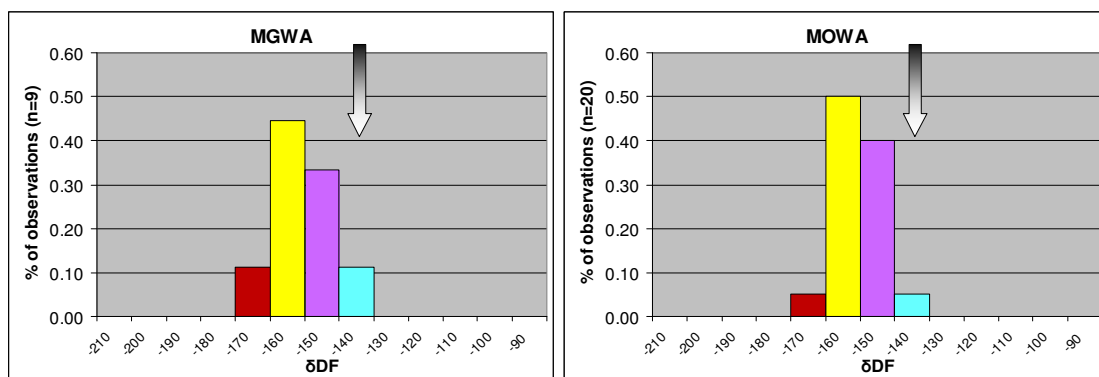
The 20 most frequently banded species over all years, and during 2008, are identified in Appendix 2. House Finch, Western Wood-Pewee and Downy Woodpecker ranked 10<sup>th</sup>, 18<sup>th</sup> and 19<sup>th</sup> respectively in 2008 compared to not making the top 20 over all years. White-crowned Sparrow, Black-capped Chickadee and Ruby-crowned Kinglet did not place in the top 20 in 2008 compared to placing 16<sup>th</sup>, 18<sup>th</sup> and 20<sup>th</sup> respectively over all years. Traill’s Flycatcher and Cedar Waxwing were 15<sup>th</sup> and 3<sup>rd</sup> respectively in 2008 compared to 6<sup>th</sup> and 13<sup>th</sup>, respectively, over all years.

Species monitored at IBS based on criteria developed by Bird Studies Canada appear in Appendix 3 along with those criteria. Our experience is that a species that qualifies based on mean new bandings always qualifies based on mean number of days.

### *Insight from Mist-netting*

Mist-netting can substantially add to understanding the avifauna at a site particularly in detection of rare or elusive species. Single Hairy Woodpecker and Varied Thrush during spring and a single Hammond’s Flycatcher during fall were first bandings at IBS of species rarely observed.

The *Oporornis* warblers are often difficult to detect and identify with binoculars. During 2007 migration monitoring at IBS, four Connecticut Warblers, six Mourning Warblers and three MacGillivray’s Warblers were banded. Although the expectation might be that Mourning Warblers banded at IBS might be from areas farther north than MacGillivray’s Warblers, stable isotope analysis of rectrices collected at IBS in 2003, 2004 and 2008 suggests similar geographic origins. IBS is in an area of hybridization of these species (Hall 1979) and the similarity of their apparent origin may be an artifact of the difficulty in speciating hybrids.



**Origin of MacGillivray’s (MGWA) and Mourning (MOWA) Warbler feather samples obtained at IBS in 2003, 2004 and 2008. More negative  $\delta$ DF values indicate a more northerly origin. The arrow points to the expected value of feather material obtained at IBS.**

Other areas of research have involved, or have the potential to involve, data from IBS. Banding data were provided to Erica Dunn of CWS as part of a cooperative study on mass gain among migrating songbirds at Canadian stopover sites. Her analysis (Dunn 2002) provided insight that IBS appears to be an important refueling stop for Neotropical migrants. A copy of her paper appeared in Appendix 4 of the 2003 ATR and is available on the CBBS website.

### **Stable Isotope Ecology**

Stable isotope ecology, through identifying the geographic origin of birds captured, offers the possibility of confirming the hypothesis that CMMN sites, including IBS, monitor birds from a wide area north-west of their respective locations. Preliminary results involving 1999 samples from Delta Marsh Bird Observatory and Atlantic Bird Observatory indeed indicated that CMMN stations are capturing birds from a broad area, not simply from a small region close to the station. To investigate the origin of birds captured at IBS during the fall migration, feather samples were collected from 54 resident and migrant birds of six species during 2003. A total of 919 feather samples were collected from 28 species at IBS during 2004 while an additional 1028 were collected from 33 species in 2008. The majority of these samples have been analyzed and interpretation is underway in an effort to characterize the breeding and/or natal geographic areas of origin for species monitored at IBS.

### **Daily Estimated Totals (DETs)**

The daily estimated totals (DETs) represent the total number of birds, by species, detected at the IBS migration monitoring site each day. Each DET incorporates capture data as well as a standardized census and any casual observations made during banding operations. DETs, after removal of probable and known stopovers (PKS), can give an overall description of bird migration. DET is secondary, and inferior to, mist-netting as a monitoring measure at IBS. A census (and therefore a DET) is rarely carried out at IBS and therefore is not presented.

### **Recaptures**

Recaptures at IBS during migration monitoring totaled 642 of at least 458 different birds of 48 species (see table on following page). Recapture rates were highest in resident species (e.g. House Wren, Black-capped Chickadee, Downy Woodpecker, Tree Swallow). However some resident species evidenced a relatively low recapture rate suggesting that short-stopover migrants swell the ranks (e.g. American Robin, Least Flycatcher, Yellow Warbler). A few migrant species appear to use IBS for moulting or extended re-migratory foraging as evidenced by high recapture rates (e.g. Northern Waterthrush, Tennessee Warbler, Lincoln's Sparrow, White-throated Sparrow).

Fifty-seven (57) birds banded at IBS in previous years were recaptured in 2008. Year-to-year recaptures from 1992-2008 are presented in Appendix 4. Most year-to-year recaptures occur in the year following banding. However in a few cases birds are recaptured in several subsequent

years and occasionally re-appear a number of years after banding. For example a Baltimore Oriole banded in 2004 was recaptured in 2005 but again until 2008.

Individuals Recaptured at Inglewood Bird Sanctuary during MM 2008					
Species	Recap	Banded	Species	Recap	Banded
Belted Kingfisher	3	14	Blackpoll Warbler	9	18
Downy Woodpecker	17	25	Black-and-white Warbler	1	3
Hairy Woodpecker	1	2	American Redstart	2	15
Northern Flicker	2	5	Ovenbird	3	18
Western Wood-Pewee	4	21	Northern Waterthrush	21	41
Traill's Flycatcher	5	33	Connecticut Warbler	1	2
Least Flycatcher	9	43	Mourning Warbler	4	3
Eastern Kingbird	4	8	Common Yellowthroat	6	13
Warbling Vireo	8	29	Wilson's Warbler	33	160
Tree Swallow	16	34	Canada Warbler	2	2
Northern Rough-winged Swallow	3	9	Western Tanager	1	11
Black-capped Chickadee	46	26	Chipping Sparrow	2	57
White-breasted Nuthatch	7	6	Clay-colored Sparrow	2	29
House Wren	131	154	Savannah Sparrow	1	5
Ruby-crowned Kinglet	2	15	Fox Sparrow	1	4
Gray-cheeked Thrush	2	1	Song Sparrow	5	12
Swainson's Thrush	7	80	Lincoln's Sparrow	39	99
American Robin	28	103	White-throated Sparrow	14	42
Gray Catbird	11	39	White-crowned Sparrow	3	27
Cedar Waxwing	18	166	Rose-breasted Grosbeak	2	6
Tennessee Warbler	31	111	Brown-headed Cowbird	4	9
Orange-crowned Warbler	8	146	Baltimore Oriole	5	9
Yellow Warbler	8	129	House Finch	1	6
Yellow-rumped Warbler	58	488	American Goldfinch	3	1



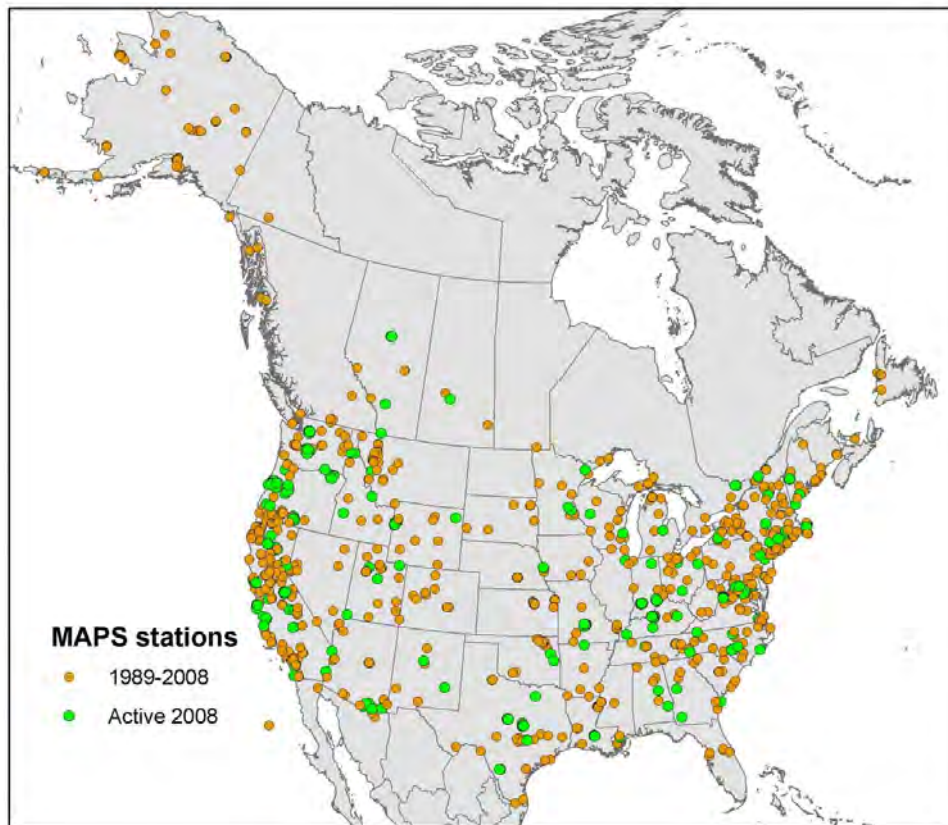
Gray-cheeked Thrush - Inglewood Bird Sanctuary  
(Photo by Shonna McLeod)



## MONITORING AVIAN PRODUCTIVITY AND SURVIVORSHIP (MAPS)

### Background

The Monitoring Avian Productivity and Survivorship (MAPS) Program is a cooperative effort among public agencies, private organizations, and bird banders of North America. It provides long-term data on population and demographic parameters for target landbird species throughout the continent. The 2008 field season was MAPS 20<sup>th</sup> year of North American operation.



MAPS utilizes standardized, constant-effort mist-netting during the breeding season at a continent-wide network of stations. Annual regional indices of adult population size and post-fledging productivity are estimated from capture data during the breeding season. Annual regional estimates are made of adult survivorship, adult population size and recruitment into the adult population from capture-recapture data.

North America is divided into eight major regions based on biogeographical and meteorological considerations, and each region has, within it, target species. IBS falls into the Northwest Region whose target species are:

Dusky Flycatcher	Yellow Warbler;
Western Flycatcher complex	MacGillivray's Warbler;
Swainson's Thrush	Wilson's Warbler;
American Robin	Song Sparrow;
Warbling Vireo	Lincoln's Sparrow;
Orange-crowned Warbler	"Oregon" Dark-eyed Junco

All of these species have been captured at IBS although only American Robin, Warbling Vireo, Yellow Warbler, Song Sparrow, and Lincoln's Sparrow are breeders. MAPS data is provided to the Institute for Bird Populations in Point Reyes, CA where it is integrated with data from more than 500 other North American stations.

## **Objectives**

The overall objective of the MAPS Program is to contribute to an integrated avian population monitoring system for selected North American landbirds. The indices and estimates obtained:

- determine annual changes and, ultimately, longer-term trends in population and demographic parameters of target species in each region;
- relate these trends to readily-measured environmental co-variables such as climatic factors, habitat type, and management practice; and
- refine current population models and develop new ones.

## **Methods**

The MAPS Program consists of standardized constant-effort mist-netting during the breeding season. The breeding season is considered to extend from May through mid-August and is divided into 10 ten-day periods. Mist-netting commences the first ten-day period during which the majority of breeding adults of the target species have established territories and migrant individuals of these species are no longer passing through the area. Ten 12-m long x 2.6-m high x 30-mm mesh mist-nets were operated for 6 hours from sunrise on one day in each of the ten-day periods. The operation of the mist-nets must continue for a minimum of three periods in the adult "super-period" and two periods in the young "super-period". At IBS, MAPS initiates during period 4 (31 May - 9 June) and coverage entails the last 7 of the 10 ten-day periods. In recent years period 10 has been operated during fall migration monitoring. During 2003 period 9 was also operated during fall migration monitoring.

An additional requirement is to record the type and distribution of vegetation present at the MAPS station. Because changes in the vegetation at a station can cause changes in breeding populations and demographic parameters, the habitat is assessed every 5 years. CBBS conducted an initial habitat assessment in 2001 and another in 2007.

### **Schedule and Coverage**

2008 marked the 16<sup>th</sup> year of the MAPS project at IBS since 1992. A shortage of qualified personnel precluded gathering data in 1994. Record rainfall and flooding in 2005 limited effort to 121 net-hours, all during the first two periods and precluded further access to the site until late July. MAPS during period 4 is no longer required at stations at the latitude of IBS we have continued with it in most years out of tradition.

### **Results**

The number of each species banded, by date, during 2008 are summarized in Table 3. The number of each species that was banded is presented in Table 4 and Figure 5 for 2008 as well as the 14 previous years. Note that 7 of the 10 MAPS nets are also MM nets and therefore many new bandings are both MM and MAPS birds and included in tables and appendices for both projects. New MAPS bandings totaled 146 individuals of 31 species. Year-to-year recaptures are an important part of MAPS. In 2008 there were a total of 56 recaptures many of which were birds banded in previous years (see Appendix 4).

### **Discussion**

Lack of regeneration of balsam poplar has been an issue at IBS. The heavy flooding that occurred during 2005 may have stimulated poplar seedling recruitment thereby helping to alleviate this problem. The habitat assessment scheduled for 2012 should identify if regeneration is occurring.

An analysis of IBS MAPS results through 2008 was undertaken in 2009 (Smith et al. 2009 – see website). The objective of the analysis was to detect and compare trends in populations, productivity and survival of target species.

A total of 1642 captures of 52 species were recorded at IBS between 1992 and 2008. There were 1048 new bandings of adult birds. Newly banded birds comprised 64% of the total captures. The most abundant species, with overall capture rates greater than 4.0 adults/600 net-hours were, in descending order: American Robin, Yellow Warbler, Cedar Waxwing, House Wren, Gray Catbird, Warbling Vireo, Baltimore Oriole and Least Flycatcher. Total species richness was 48 species, while the mean number of adults captured was 114 per 600 net-hours, and the mean reproductive index was 0.55 young per adult over the entire period.

Populations of adult birds of nine species pooled indicated a nearly-substantial, highly fluctuating but not significant increasing population trend. All nine species showed substantially fluctuating trends (SE of the slope  $\geq 0.021$ ). Adult populations of three (Warbling Vireo, Black-capped Chickadee and Least Flycatcher) of nine target species showed substantially declining trends, which was offset by substantially increasing trends in three (House Wren, American Robin and Gray Catbird) other species.

Short-term (same 1992-2008 period as IBS operation) population trends of the same nine target species, taken from Breeding Bird Survey (BBS) routes in Alberta, were compared to the IBS results. Two (Least Flycatcher and Warbling Vireo) of the three species showing declining populations at IBS also showed declines on the BBS routes, while the trend for Black-capped Chickadee was opposite, with the BBS showing an increasing trend. Two (House Wren and Gray Catbird) of the three species showing increasing populations at IBS also showed an increase on the BBS routes, while one species (American Robin) had an opposite trend, although the BBS decline was insignificant. Cedar Waxwing, Yellow Warbler and Baltimore Oriole all showed no trends at IBS, but declining trends (-11.03, -1.79 and -6.27, respectively) on BBS routes.

Productivity trends were assessed for nine species. Only American Robin showed a substantially declining trend ( $r \leq -0.3$ ), but it was not significant ( $P > 0.05$ ). Both Black-capped Chickadee and House Wren showed substantially increasing trends ( $r \geq 0.3$ ), but the former was significant and the latter was not significant. Populations of Gray Catbird, Cedar Waxwing, Yellow Warbler and Baltimore Oriole showed non-substantial (absolute  $r < 0.3$ ) and substantially fluctuating (SE of the slope  $\geq 0.021$ ) trends, while Least Flycatcher and Warbling Vireo trends were not substantially fluctuating. Overall, only one of the nine species showed a negative trend, two showed positive trends, and six trends were flat. The 17-year trend of all species pooled represented an average annual substantial ( $r = 0.368$ ), fluctuating increase in productivity of 0.022 (SE = 0.016) per year.

Estimates of annual adult survival rate ranged from a low of 0.320 for Baltimore Oriole to a high of 0.781 for Black-capped Chickadee, with a mean of 0.553. Estimated annual survival for Yellow Warbler (0.349) was below the mean, while estimates for Least Flycatcher (0.612) and American Robin (0.703) were above the mean. The estimates for survival probability for Least Flycatcher and Baltimore Oriole should be viewed with caution because they are based on fewer than five between-year recaptures or the estimate is very imprecise ( $SE(\phi) \geq 0.200$  or  $CV(\phi) \geq 50.0\%$ ).

The estimated mean survival rate for adults at IBS (0.553) appears to be similar compared with values for the Northwest MAPS region (1992-2003; see <http://www.birdpop.org/nbii/surv/default.asp>), but 8.6% higher than that of the North-central Region (0.467). Three species showed substantially higher (>10%) values for IBS than in the North-central Region (Least Flycatcher, Black-capped Chickadee and American Robin), while only the latter two showed substantially higher values for IBS than in the Northwest Region. Yellow Warbler and Baltimore Oriole showed substantially lower (<10%) survival at IBS than in the North-central Region, while Yellow Warbler and Least Flycatcher showed lower survival values for IBS than in the Northwest Region.

Recapture probability varied from a low of 0.033 for American Robin to a high of 0.415 for Yellow Warbler, with a mean of 0.167. Recapture probability for Least Flycatcher (0.073) and Baltimore Oriole (0.137) were below the mean, while the estimate for Black-capped Chickadee (0.175) was above the mean. There were many fewer between-year recaptures at IBS than would be expected for a data set including this many years of operation. Because of the lack of between-year recaptures there were only seven species for which we could attempt survival analysis, and for two of these (House Wren and Gray Catbird) program MARK could not produce estimates. Once at the site, the birds are remaining for entire breeding season as demonstrated by large numbers of within-year recaptures. However, birds are not recaptured in subsequent seasons. We are not sure why this is the case, because the habitat appears to be of good quality. The use of MAPS net locations during spring migration probably has some effect on what is captured during the MAPS season (i.e. net avoidance). Further seasons of data or correlation of these data to weather or habitat variables may answer this question.

Of three substantially decreasing species at INBS, two (Least Flycatcher and Warbling Vireo) had a slightly lower population trend, while one (Black-capped Chickadee) had a slightly higher trend than that for the two MAPS regions; productivity was variable but showing a stable or increasing trend; and survival rate was higher for two species (Least Flycatcher and Black-capped Chickadee) and unavailable for comparison for Warbling Vireo. The evidence suggests that for Least Flycatcher and Warbling Vireo low productivity may be the driving factor of the decline, but that this could improve over time if the positive trend continues, while for Black-capped Chickadee the evidence suggests that both productivity and survival are increasing. Higher-than-expected productivity may also be driving the population trend for two (House Wren and American Robin) of the three significantly increasing species. Assessment is compromised by the unavailability of survival rates for three of the four species.

The 15 years of operation of the Inglewood Bird Sanctuary MAPS Station offers a unique opportunity to look at long-term trends. The two gaps in operation offered challenges for data analysis, though, as did the operation of migration monitoring nets in the same location. As a result we were only able to assess vital rates for eight target species. For some species, the general stability or increase in productivity would suggest that the habitat quality is improving because the adults that are present on the stations can produce more young per adult even as adult population levels are increasing. Looking at the age structure of the population may shed more light on this question. An adult population that is composed mostly of after-second year birds suggests that the habitat is of good quality because these birds “know” and can defend good territories. However, if the adult population is composed mostly of second year birds it suggests that after a single year of occupying a territory the birds are leaving Inglewood to find better habitat. After-second year birds are also assumed to be able to produce more young than inexperienced second year birds and a population high in after-second year birds would therefore have higher productivity.

## **MIGRATION MONITORING AT LAS CALETAS, COSTA RICA and MONITEREO DE SOBREVIVENCIA INVERNAL (MoSI)**

### **Introduction**

A migration monitoring (MM) site on the Osa Peninsula on the Pacific coast of Costa Rica was identified in 1998 and pilot MM was initiated in 2002 and continued in 2003 (Figure 4). A full MM program was initiated in 2004 and continued in 2005 to monitor Neotropical migrants on their northward migration through Central America. During December 2005 thru March 2006 CBBS undertook a pilot initiative based on the Monitero de Sobrevivencia Invernal (MoSI) program of the Institute for Bird Populations primarily aimed at quantifying over-winter survival of Neotropical migrants. During December 2006 and March 2007 CBBS continued MoSi at Las Caletas as well as re-initiating MM from 28 March - 27 April. In 2008 MoSI was carried out from 17-27 March and MM from 28 March – 25 April.

### **Study Site**

The Las Caletas MM/MoSI site is located on the Pacific coast of southwest Costa Rica on the Osa Peninsula just north of Corcovado National Park in the vicinity of the Las Caletas ecotourism lodge. Las Caletas is located on the south coast of Drake Bay, a few kilometres southwest of the small village of Agujitas. The lodge is on a hill looking north over the Pacific Ocean. The monitoring station is 200-m further uphill, south of the lodge.

### **Methods**

Methods used at Las Caletas are similar to those at IBS. Constant-effort mist-netting and collection of associated morphometric and other data (e.g. age, sex, wing chord, weight, fat reserves, capture net, time of capture) from each bird captured was carried out on each day, weather permitting. Twelve to fifteen 12-m long x 2.6-m high x 30-mm mesh mist-nets were operated for approximately 6 hours each day beginning at sunrise (~ 0530 to 1130). USFWS aluminum bands were applied to migrants while CBBS-purchased bands were applied to species resident in the area including hummingbirds.

### **Schedule and Coverage**

Mist-netting was conducted from 27 March – 25 April 2008. Mist-netting occurred on all days for a total of 3165 net-hours (Table 5). Several days had reduced net-hours (<72) due to rain.

### **Captures**

In total, 772 birds of 71 species were captured of which 491 (64%) were new bandings, 228 (30%) were recaptures and 53 (6%) were released or otherwise un-banded (Table 5, Appendix 5). New or unusual resident species captured in 2008 were Double-toothed Kite (1<sup>st</sup> banding), Black-striped

Woodcreeper (3<sup>rd</sup> banding) and Shining Honeycreeper (2<sup>nd</sup> banding). Of the 302 resident new captures, 94 (31%) were hummingbirds. Two hundred and forty-two (45%) of the new captures were Neotropical migrants of which 221 (91%) were Swainson's Thrushes.

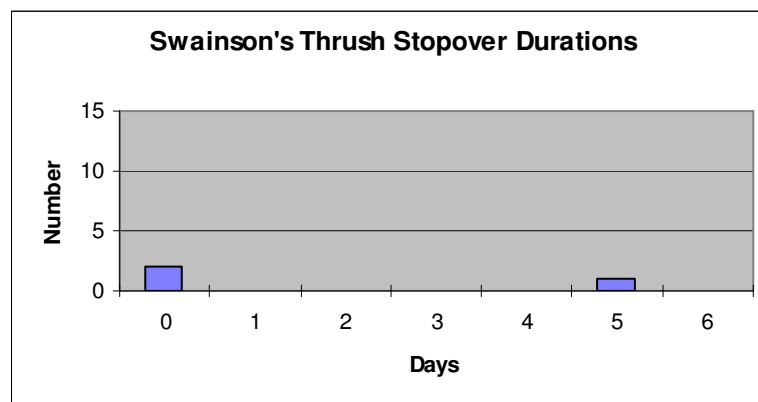
Other new capture Neotropical migrants were:

- Yellow-bellied Flycatcher (n=2)
- Alder Flycatcher (n=2)
- Great Crested Flycatcher (n=2)
- Red-eyed Vireo (n=1)
- Yellow-green Vireo (n=2)
- House Wren (n=1)
- Wood Thrush (n=1)
- Tennessee Warbler (n=1)
- Chestnut-sided Warbler (n=3)
- Northern Waterthrush (n=6)

## Recaptures

Two hundred and twenty-eight (228) recaptures were made of 155 different birds of 44 species. A Northern Waterthrush, banded in April 2003 and recaptured in 2007 was again recaptured in 2008 evidencing multi-year over-winter site fidelity and year-to-year survival. This bird was banded as SY indicating it was 6 years old when re-captured in 2008.

Three Swainson's Thrushes were recaptured in a similar pattern to previous years: 2 (67%) same day and 1 (33%) 5 days after banding.



Recapture of resident birds allows quantification of year-to-year survivorship. One hundred and ten (110) birds banded in previous years (2002-2007) were recaptured (Appendix 6). Based on year-to-year data it is possible to calculate an estimate of survivorship (see below). It should be

kept in mind that many of these survival rates are based on small sample sizes and may not be reliable. Sample sizes (N) greater than 60 appear to provide reliable estimates.

<b>Species</b>	<b>Y-Y survival</b>	<b>N</b>	<b>Species</b>	<b>Y-Y survival</b>	<b>N</b>
Gray-chested Dove	39%	19	Sulphur-rumped Flycatcher	20%	16
Ruddy Quail-Dove	33%	12	Yellow-bellied Flycatcher	17%	5
Bronzy Hermit	8%	12	Bright-rumped Attila	41%	26
Band-tailed Barbthroat	17%	49	Dusky-capped Flycatcher	42%	8
Long-billed Hermit	7%	66	Thrush-like Schiffornis	31%	9
Blue-throated Goldentail	4%	97	Orange-collared Manakin	38%	115
Charming Hummingbird	13%	111	Blue-crowned Manakin	42%	57
Rufous-tailed Hummingbird	10%	47	Red-capped Manakin	28%	195
Black-throated Trogon	25%	10	Tawny-crowned Greenlet	14%	25
Blue-crowned Motmot	50%	7	Lesser Greenlet	22%	7
White-whiskered Puffbird	25%	3	Black-bellied Wren	17%	5
Rufous-tailed Jacamar	20%	4	Riverside Wren	23%	47
Olivaceous Piculet	36%	8	Long-billed Gnatwren	44%	30
Buff-throated Foliage-gleaner	38%	17	Northern Waterthrush	42%	8
Plain Xenops	51%	30	Bananaquit	21%	54
Scaly-throated Leaf-tosser	8%	11	Gray-headed Tanager	36%	51
Tawny-winged Woodcreeper	52%	23	White-throated Shrike-tanager	33%	7
Long-tailed Woodcreeper	22%	7	White-shouldered Tanager	44%	31
Wedge-billed Woodcreeper	46%	77	Black-cheeked Ant-Tanager	31%	54
Northern Barred Woodcreeper	47%	8	Cherrie's Tanager	39%	44
Cocoa Woodcreeper	48%	22	Bay-headed Tanager	42%	7
Black-hooded Antshrike	52%	30	Green Honeycreeper	55%	14
Slaty Antwren	57%	12	Red-legged Honeycreeper	43%	5
Dot-winged Antwren	27%	50	Variable Seedeater	11%	58
Chestnut-backed Antbird	40%	54	Thick-billed Seed-Finch	21%	34
Bicolored Antbird	41%	53	Orange-billed Sparrow	39%	100
Black-faced Antthrush	18%	9	Buff-throated Saltator	19%	29
Ochre-bellied Flycatcher	28%	127	Black-striped Sparrow	23%	10
Northern Bentbill	33%	22	Blue-black Grosbeak	29%	31
Golden-crowned Spadebill	21%	18	Scarlet-rumped Cacique	25%	3
Ruddy-tailed Flycatcher	27%	16			



## Discussion

As in 2007, MoSI provided a limited amount of information on over-winter survival of Neotropical migrants. MoSi is a program that requires many years of data from numerous sites to be effective.

Figure 6 presents daily captures of Swainson's Thrushes since 2002. New captures of this species since initiation of full migration monitoring in 2004 had been remarkably consistent – 547, 546 and 570 in 2004, 2005 and 2007, respectively (Table 6). Captures in 2008 were significantly lower at 221 due to a number of factors, most importantly habitat modification in the vicinity of the nets and denial of access to the land and established net lanes adjacent to Las Caletas. CBBS intends to suspend this project in 2009 while considering how the best course of action to continue research in Costa Rica or elsewhere in Central America. CBBS has published two papers to date based on its research in Costa Rica (see Wilson *et al.* a,b under references). A third paper on year-to-year survivorship of residents is currently in preparation.



Wood Thrush – Las Caletas, Costa Rica  
(Photo by Cyndi Smith)

## NORTHERN SAW-WHET OWL MIGRATION MONITORING

### Background

During 2003 a site in the foothills southwest of Calgary was identified as having potential for monitoring migrating Northern Saw-whet Owls (Figure 1). After disappointing results at Inglewood Bird Sanctuary in 2000, the CBBS was pleased to have another opportunity to initiate a Northern Saw-whet Owl migration monitoring program. Pilot monitoring was undertaken in 2003 from 7 October to 18 November with encouraging results. A full monitoring program was implemented in 2004 and has continued in each year since including 2008.

### Methods

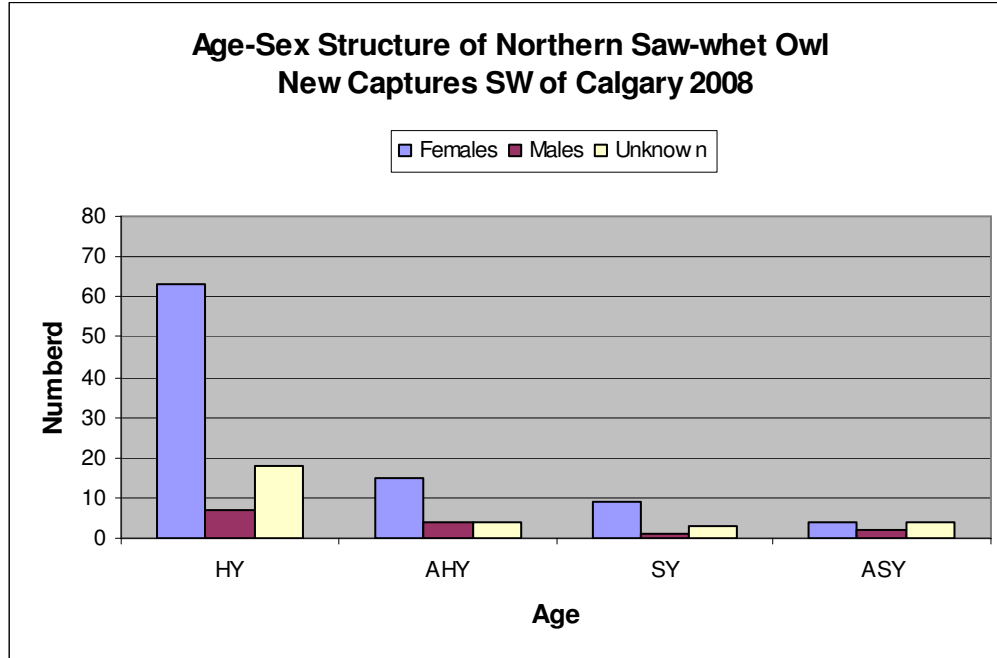
Monitoring began 15 September and continued through 31 October. A continuous recording of Northern Saw-whet Owl calls was played at 80% volume in a portable CD “boom box” from the center of an array (double H) of five 12-m long x 2.6-m high x 60-mm mesh mist-nets. The array was placed beneath a thick canopy of mature spruce trees. The area has been subject to cattle grazing and the understory and tree branches as high as a cow can rub are absent. Call playback commenced approximately 0.5-hrs after sunset and continued for 4-hrs, weather and other factors permitting. Nets were checked at least every 0.75-hrs by a Bander-in-Charge (BIC) and 1 or more volunteers. Sex, age and morphometric data were collected on all owls captured. Basic weather data (wind direction and speed, sky conditions and temperature) were noted at start and finish each evening.

Data from Delta Marsh Bird Observatory and Beaverhill Bird Observatory as well as our own experience indicates that the majority of Northern Saw-whet Owl movement occurs between 15 September and 31 October peaking in early- to mid-October.

### Results

A total of 134 Northern Saw-whet Owls were captured and banded during 640 luring hours on 34 of 47 possible evenings between 15 September and 31 October (Figure 7). The 13 evenings when monitoring did not occur were primarily due to access being denied by the landowner (N=12). One evening was lost and another two evenings were reduced due to weather. Peak movement occurred between 29 September and 17 October although owls were captured as early as 15 September and as late as 30 October.

Of the 134 new Northern Saw-whet Owl bandings, HY, AHY, SY and ASY age birds comprised 66%, 17%, 10% and 7%, respectively (see histogram below). Females comprised 68% and males 10%, while 22% could not be sexed with confidence. The number of Northern Saw-whet Owls per net-hour since inception is **0.25, 0.29, 0.27, 0.23 and 0.21** in 2004, 2005, 2006, 2007 and 2008 respectively.



One owl that was originally banded in 2005 as a TY-F was recaptured (see Significant Re-encounters section). No owls banded elsewhere were captured. However an owl banded by CBBS in 2007 was found dead in SE Calgary on 29 January 2008.

### Discussion

This site, southwest of Calgary, has proven itself a good location for monitoring migration of Northern Saw-whet Owls. Monitoring sites for this species are well established in eastern North America but sparse in western North America (Figure 8). CBBS intends to continue a full monitoring program at this location. CBBS will strive for full coverage during the monitoring period subject to restrictions by the landowner.

## SIGNIFICANT RE-ENCOUNTERS

Significant re-encounters of birds banded in previous years are listed below. All recaptures of birds at CBBS study sites and banded prior to 2008 are indicated in Appendix 4. No recaptures of migrants evidencing stopover site fidelity were recorded. The choice of which recaptures to include below is somewhat arbitrary, although species for which there are many recaptures over the years (e.g. Yellow Warbler, House Wren) are not included unless inferred age is > 5 years. Other species that are recaptured infrequently and for which longevity data may be lacking may be included even if inferred age is < 5 years.

**Northern Saw-whet Owl** 924-21813 Banded as TY-F SW of Calgary, AB on 12 October 2005. Recaptured at the same location on 3 October 2008. 5-years old.

**Northern Saw-whet Owl** 924-45617 Banded as HY-M SW of Calgary on 29 October 2007. Found dead in SE Calgary (47-km ENE (64°) in 92 days) by Mike Browne on 29 January 2008.

**Eastern Kingbird** 1791-21021 Banded as AHY-F by Scott Wilson at Inglewood Bird Sanctuary on 15 August 2001. Recaptured there in 2003, 2004 and 11 August 2008. At least 8-years old.

**Tree Swallow** 1851-03988 Banded as HY-U by Pat Mitchell in Big Hill Springs NW of Calgary, AB on 4 July 2005. Recaptured at Inglewood Bird Sanctuary (37-km SE) as AHY-M on 10 May 2008. 3-years old.

**Northern Waterthrush** 2270-80501 Banded as SY-U by Doug Collister at Las Caletas CR on 17 April 2003. Recaptured there on 20 April 2008. 6-years old.



Scarlet Macaws – Las Caletas, Costa Rica  
(Photo by Cyndi Smith)

## TREND ANALYSES

Table 7 and Appendix 7 present the results of trend analysis on those species that are monitored at Inglewood Bird Sanctuary during spring and fall migration. Monitored species were, for the most part, those for which at least 10 individuals were captured on at least 5 different days (Appendix 3). None of the species for which there were > 10 new captures occurred over < 5 days. Species exhibiting significant ( $P < 0.05$ ) trends during spring migration (2 positive 3 negative) were House Wren (positive), Yellow Warbler (negative), Yellow-rumped Warbler (negative), Common Yellowthroat (negative) and Clay-colored Sparrow (positive). Species evidencing significant trends during fall (7 positive, 3 negative) were Traill's Flycatcher (positive), Least Flycatcher (Positive), Ruby-crowned Kinglet (positive), Tennessee Warbler (positive), Yellow Warbler (positive), Yellow-rumped Warbler (negative), Northern Waterthrush (positive), Wilson's Warbler (positive), Lincoln's Sparrow (positive) and Baltimore Oriole (negative). Fall migration positive trends for Traill's Flycatcher, Least Flycatcher, Tennessee Warbler, Yellow Warbler, Wilson's Warbler, and Lincoln's Sparrow are consistent with an increasing supply of second growth and/or shrubby habitat.

Trend analysis is based on total captures from 1995-2008 and 2002-2008 for fall and spring respectively and was performed by Bird Studies Canada (Tara Crewe). Note that scientific investigation normally requires a P level of < 0.05 and preferably < 0.01 in order to consider results significant. Due to net-lane inconsistencies from year-to-year trends for 11 species could only be analyzed using a subset of the data.

Although the trends with  $P < 0.05$  are likely real, the cause behind them is open to interpretation. Only time and comparison to other CMMN stations and interpretation in the context of other data sets will indicate whether significant trends are due to changes in regional populations or to other confounding variables such as weather. Correlating trends between migration monitoring stations, particularly those monitoring similar regions, adds strength to the interpretation that a trend is reflecting regional population(s). Comparable annual indices from other stations were not available for comparison in this report.

Crewe et al. (2008) (see PDF on CBBS website) investigated examined annual population indices through 2006 at 14 CMMN stations with at least 10 years of migration data during at least one migration season. Using migration data, annual population indices were estimated using a generalized linear model which controls for effects of date. Population trajectories (trends) in annual indices were then modeled for each species and station using linear models for stations having less than 10 years of data, and polynomial models for stations having 10 or more years of data.

Broad regional similarities in population trends were supported by positive between-station correlations of annual indices at relatively short inter-station distances. However, correlations were zero or even negative beyond about 2000 km. Furthermore, trends within a region were more similar than trends among regions, with more positive trends in Ontario (spring and fall) and Western (fall) regions and more negative trends in Prairie (spring and fall) and Eastern (fall)

regions. Taken together across the country, population trends were not affected by migration strategy (temperate vs neotropical migrant) or by ecoregional association (boreal vs non-boreal). Hence, at the national level, roughly equal proportions of neotropical migrants and temperate migrants were declining or increasing. However, regional differences did occur in these patterns. For example, more species in the Prairie region exhibited negative trends in spring and fall for both neotropical and temperate migrants (including species breeding in the boreal forest) than other regions of Canada.

Breeding Bird Survey (BBS) coverage in Canada is primarily restricted to the southern part of the country. For species that have ranges that are predominantly within areas of high BBS coverage, good correlations would be expected between BBS regional trend statistics and those developed from migration monitoring. However, correlations would be expected to be weak or non-existent for species that breed predominantly in northern areas outside the main area of BBS coverage. To investigate this, long-term annual indices and trends (1968-2006) were compared at Long Point Bird Observatory with BBS statistics from Ontario. The analysis indicated that migration monitoring is indeed measuring a similar population signal to BBS for species breeding primarily in the south, particularly in spring. However, this relationship breaks down for species breeding primarily north of BBS coverage. By inference, these results further support the notion that migration monitoring can be used to effectively monitor the status of boreal/northern breeding birds where BBS coverage is weak.

Further scientific advances in migration monitoring are underway with the development of new analytical approaches and a large collaborative isotope project that will help investigate the geographic origins of birds sampled at migration stopover sites.



Sharp-shinned Hawk (imm) - Inglewood Bird Sanctuary  
(Photo by Barry Trakalo)

## **PERSONNEL**

### **Volunteers**

Volunteer participation in all of the CBBS projects continues to be the key to the success of research efforts. Banding at IBS is done in an area of the sanctuary designated "reserve" and off-limits to the public. A condition of operation is that a limited number of people are in the reserve at one time, in order to minimize impact. Thus, on any given day, a Bander-in-Charge and from 1-3 volunteers carry out the banding. CBBS projects not based in IBS are not subject to this restriction. All participants in CBBS projects at IBS are required to complete the IBS orientation each year. In addition before participating in any CBBS project, members are required to complete the CBBS orientation.

Without donated time, primarily by members of the Calgary Bird Banding Society, the high degree of success of CBBS projects would not have been possible. Sincere appreciation is extended to all of the Banders-in-Charge (BICs) and volunteers listed in Table 8 who contributed approximately 8 hours in the field on each day indicated (414 person-days or 3312 hours).

### **Banders-in-Charge (BIC)**

CBBS has no salaried staff. However, a per diem is available to all Banders-in-Charge during most CBBS projects. This arrangement provides an incentive for qualified individuals to assume the BIC duties and imposes accountability on the BIC to complete field data sheets and input data to computer files. No per diems are paid until all duties of the BIC, including data entry, have been fully completed. The per diem established by the General Membership for the 2008 field season was \$125/day for Migration Monitoring and MAPS at IBS and \$40/day for Northern Saw-whet Owl migration monitoring. No per diems were paid for BIC duties during MoSI or migration monitoring in Costa Rica.

## MORTALITIES AND INJURIES

The goal of the CBBS is to achieve as low a rate of casualties as possible during all banding projects. Casualties refer to all injuries, minor and serious, including fatalities. Our goal is to come as close to zero as possible.

Table 9 presents all casualties during 2008 for all programs, including the Costa Rica, migration monitoring Northern Saw-whet Owl and MAPS projects. Note that the number captured, by species, is only given where that species experienced injury or mortality. The number of mortalities during CBBS banding projects rose to 0.43% because of predation. Of 17 mortalities, 9 were known to be predation, five were suspected predation (dead in net). Three occurred during extraction or banding. The injury rate in 2008 was 0.61%, the lowest to date (Figure 9).

Increases through 1997 were in part due to an increased awareness of banding personnel to record even slight abrasions. In other words, the data pre-1998 likely underestimates the rate of injury. CBBS BICs and volunteers take each mortality and injury very seriously and continuously endeavour to identify potential for reduction or avoidance of similar occurrences in the future.



Double-toothed Kite – Las Caletas, Costa Rica  
(Photo by Cyndi Smith)



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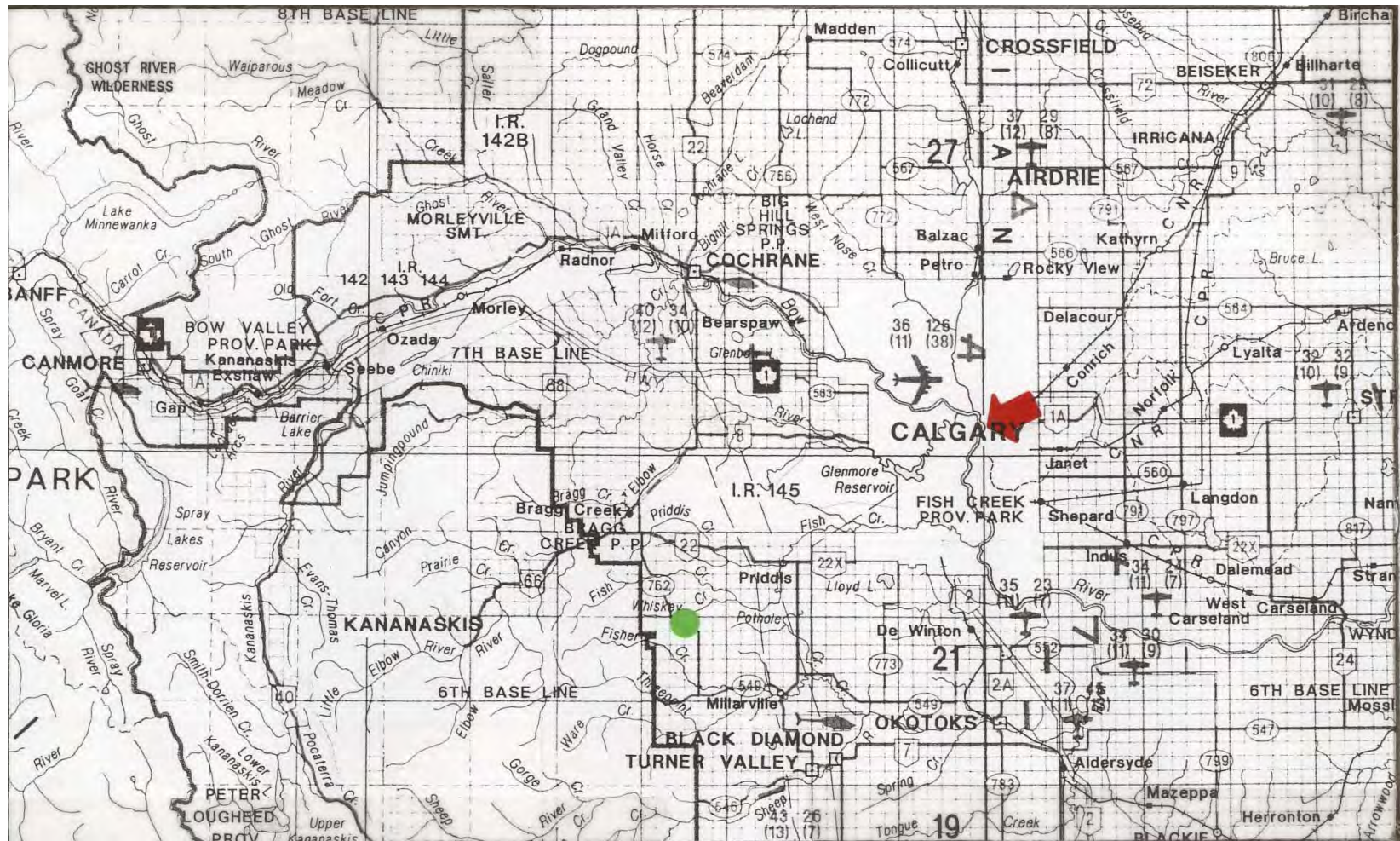
See website

[www.calgarybirdbandingsociety.org](http://www.calgarybirdbandingsociety.org)



Chestnut-mandibled Toucan - Las Caletas, Costa Rica  
(Photo by Cyndi Smith)

## FIGURES

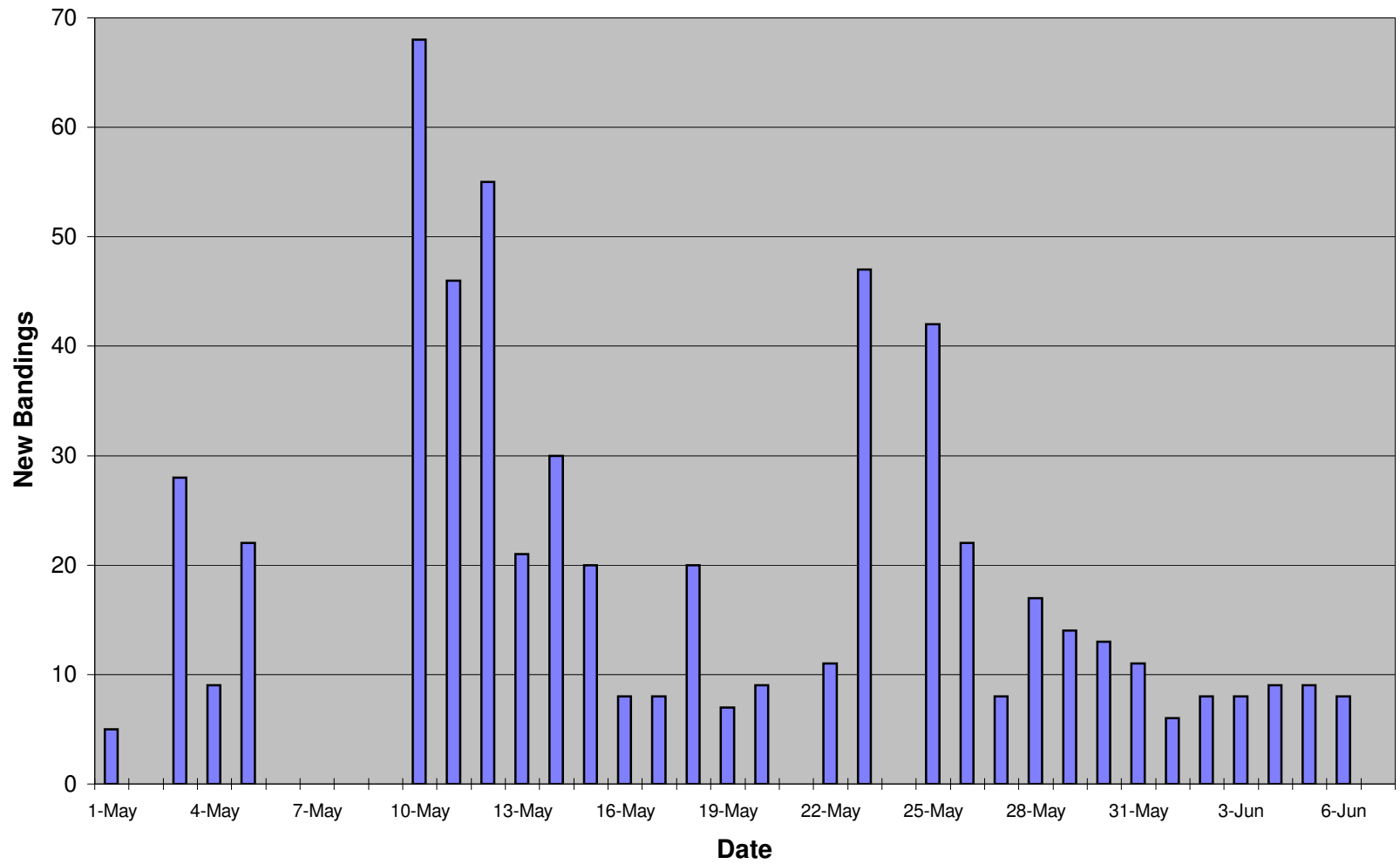


**Figure 1: 1:250,000 NTS topographic map segment showing regional context of Inglewood Bird Sanctuary (red arrow) and the CBS Northern Saw-whet Owl migration monitoring site (green dot)**

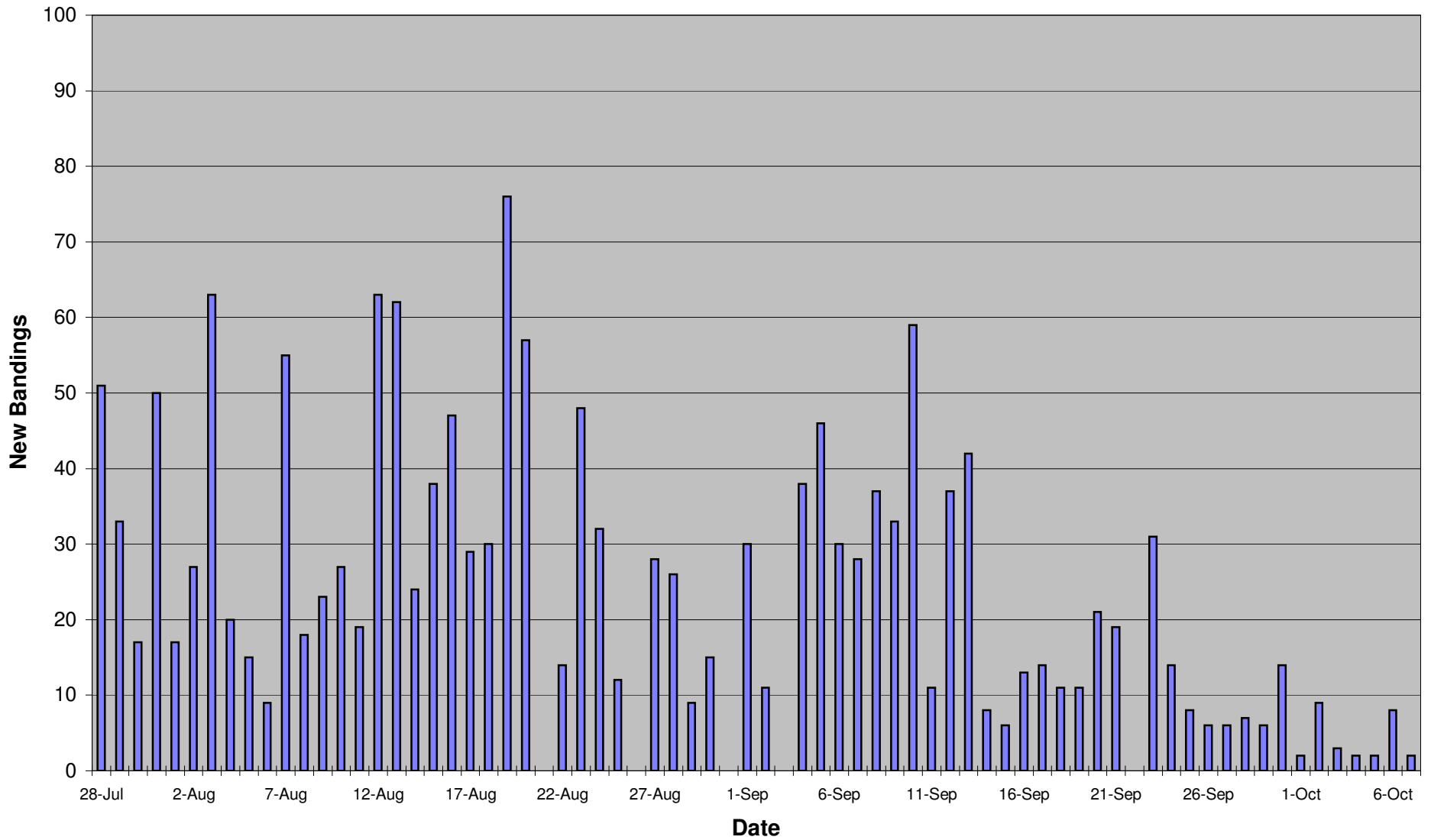


Figure 2. Location of net locations (see legend) and banding area (X) in the southern reserve area of Inglewood Bird Sanctuary.

**Figure 3a. New bandings at Inglewood Bird Sanctuary - Spring 2008**



**Figure 3b. New Bandings at Inglewood Bird Sanctuary - Fall 2008**







**MARINO BALLENA NATIONAL PARK**

**COSTA RICA**  
Central America

**EASTERN SECTION**

**LEGEND**

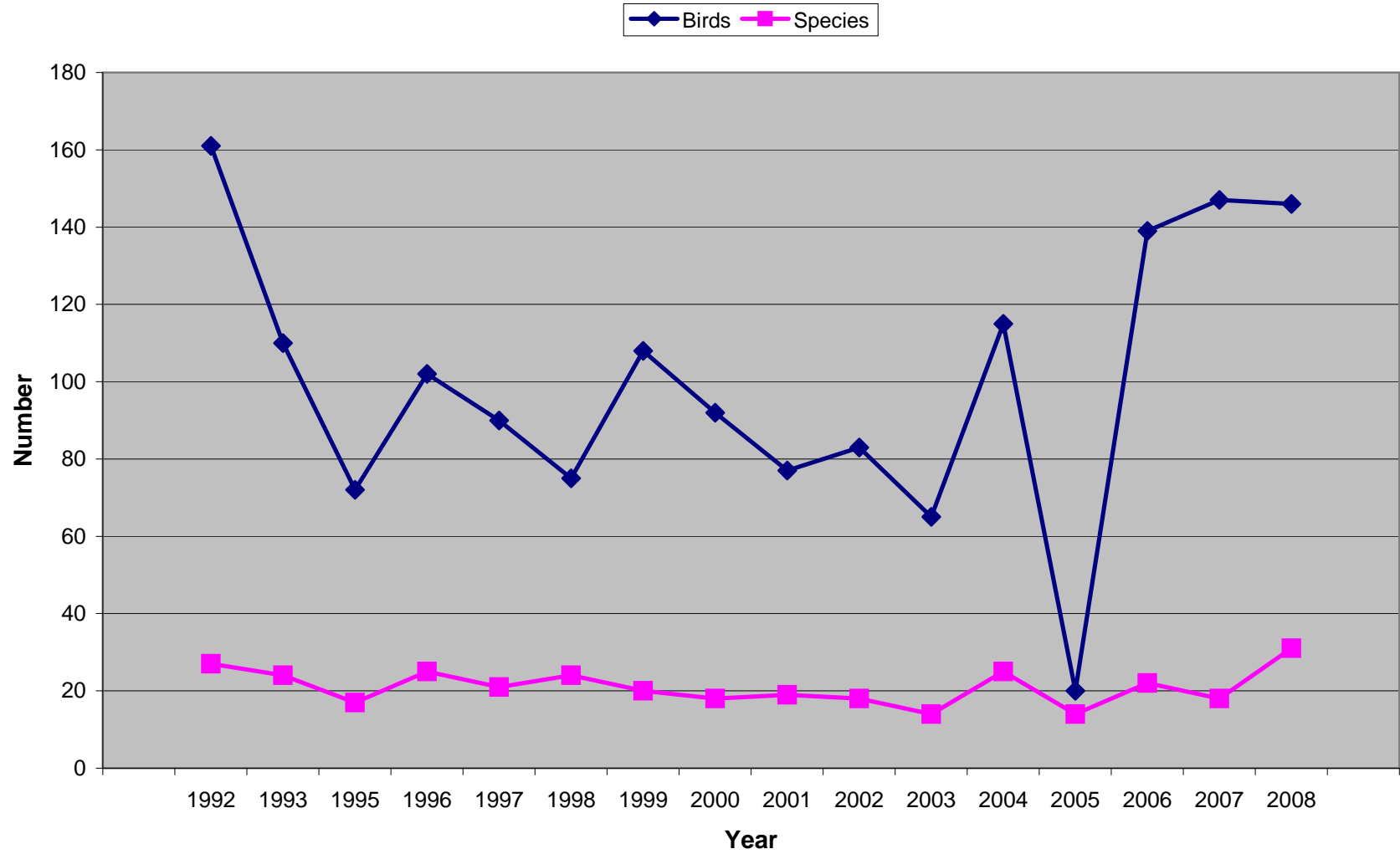
- National Capital **SAN JOSE**
- Provincial Capital **HEREDIA**
- Cantonal Capital **ESCAZU**
- District Town **San Antonio**
- Route Number: Primary Secondary
- Emergency Hospital
- Hotels
- Gasoline Station
- Mountain Peaks **Atenas**
- Distances in Kilometers
- Protected Areas
- Wetland Areas
- Elevation in Meters **Iglesias Hill**

1:200,000 APPROX.  
1 INCH = 6.2 MILES

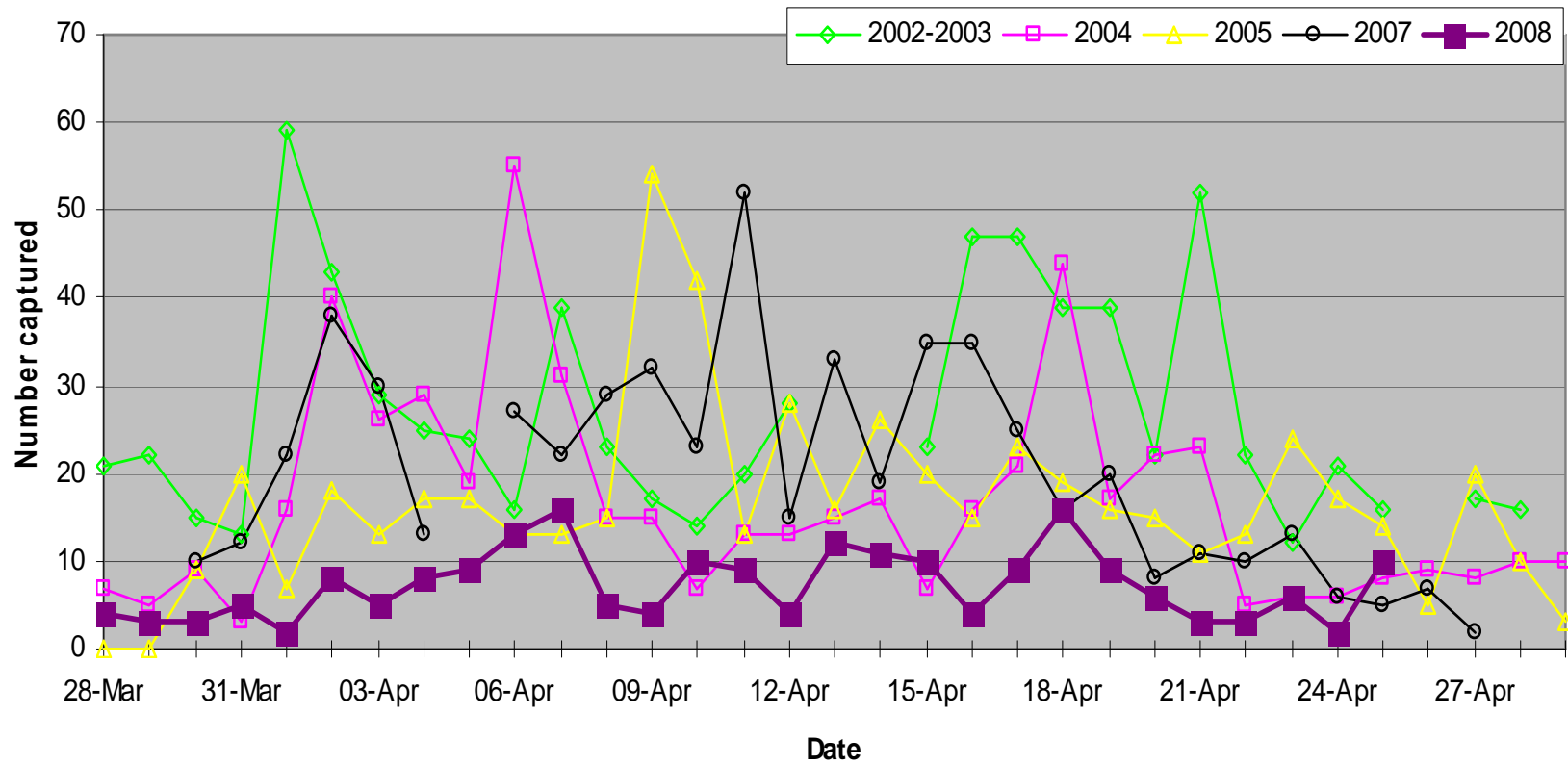
0 30 40 KILOMETERS  
0 20 MILES

**Figure 4. Location of CBBS Migration Monitoring Site at Las Caletas, Costa Rica**

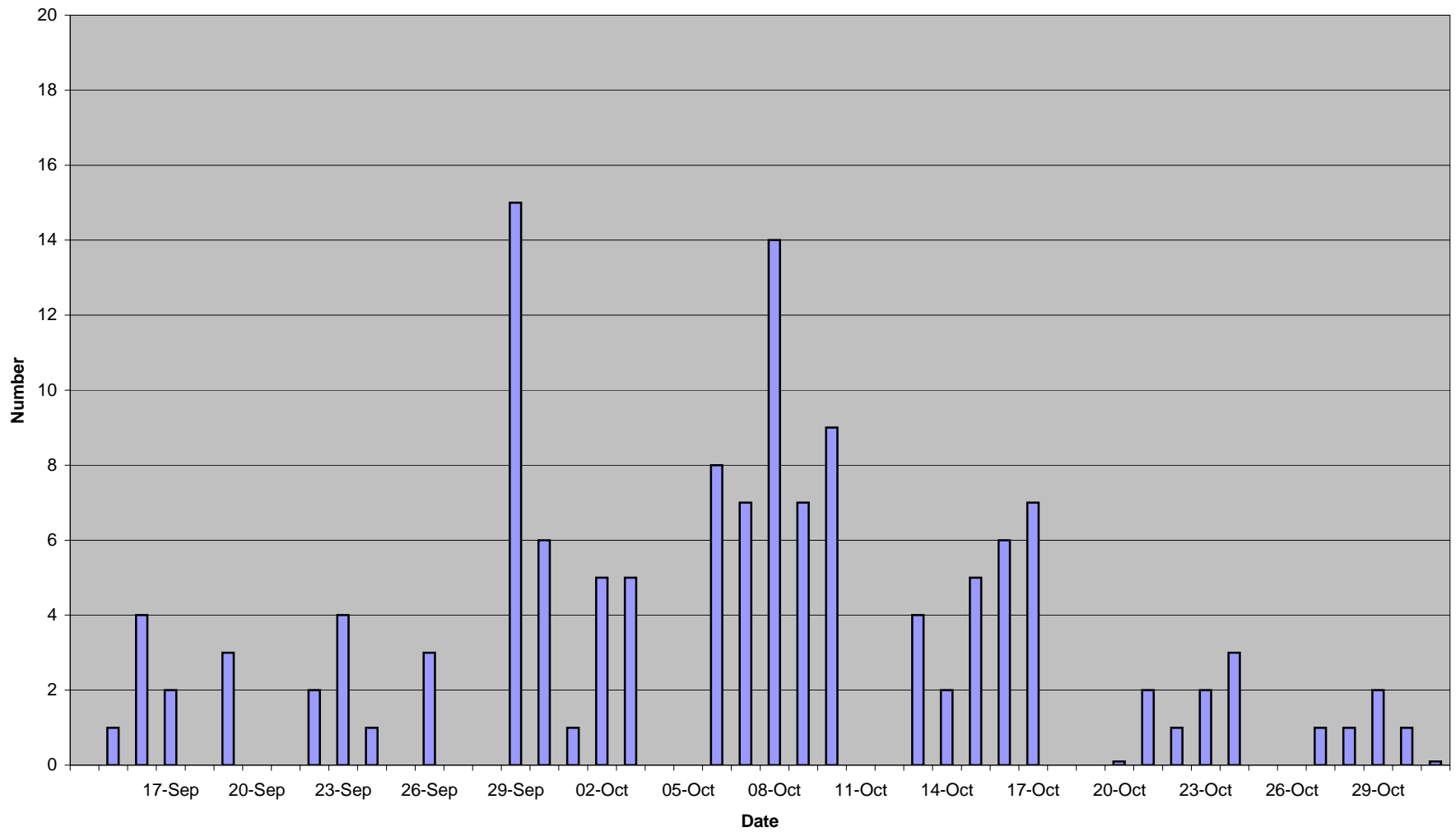
Figure 5. MAPS at Inglewood Bird Sanctuary

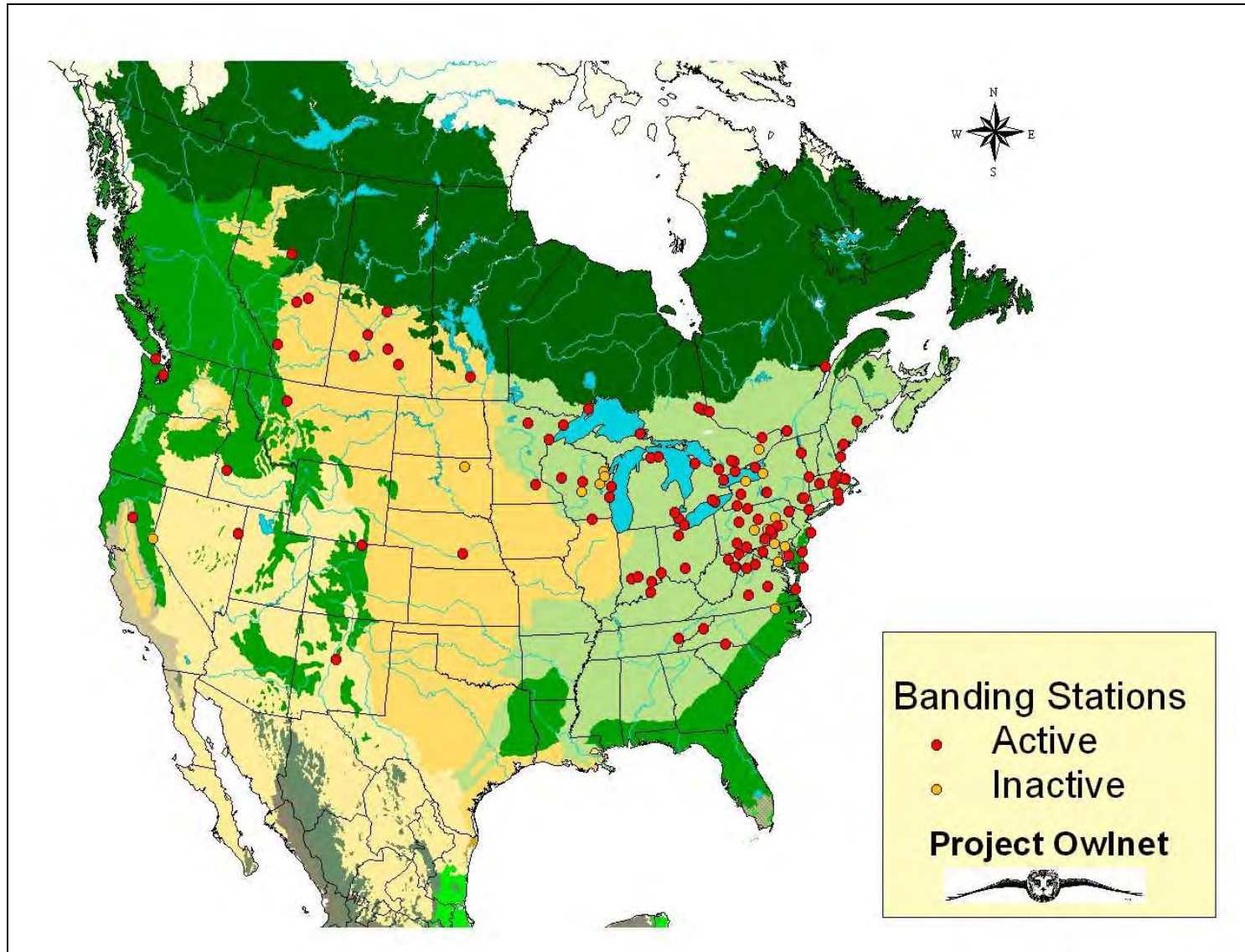


**Figure 6. New Captures of Swainson's Thrush at Las Caletas 2002-2008**



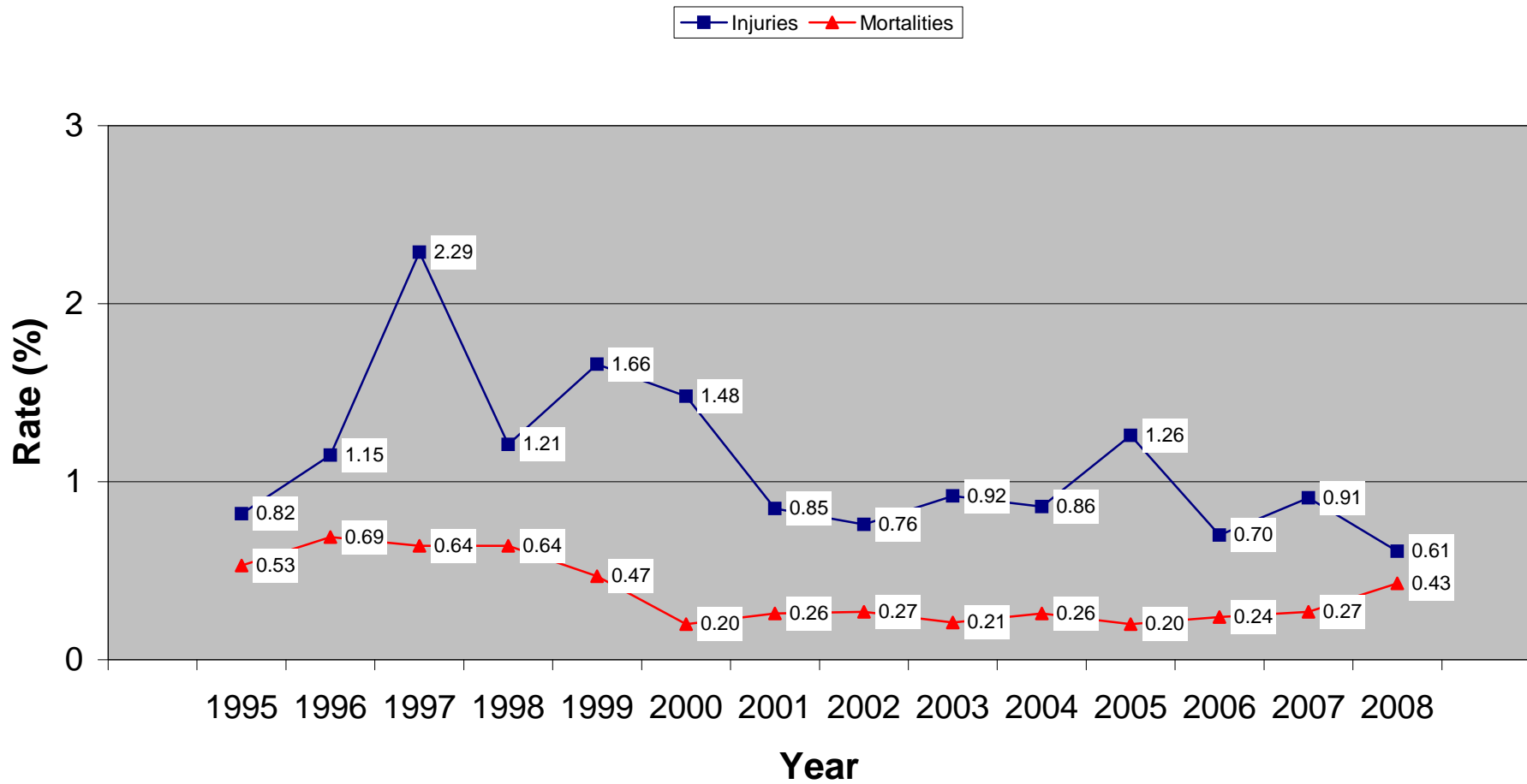
**Figure 7. Northern Saw-whet Owl New Captures 2008**  
(new bands=134, unbanded=0)  
Number = 0.1 indicates nets up but no owls captured





**Figure 8. Northern Saw-whet Owl Migration Monitoring Stations Across North America**

Figure 9. Casualty Rates for all CBBS Projects



## **TABLES**

**Table 1a. Net-hours and Capture Rates During 2008  
Spring Migration Monitoring at Inglewood Bird Sanctuary**

Date	Net-hours	Captures				Total	Captures/100 Net-hours
		New Bandings	Recaptures	Escapes/ unbanded	Mortalities		
01-May	72.0	5	1			6	8.3
02-May	no volunteer					0	
03-May	74.5	28	6			34	45.6
04-May	72.2	9	4			13	18.0
05-May	72.4	22	6	3		31	42.8
06-May	BIC ill					0	
07-May	BIC ill					0	
08-May	rain					0	
09-May	snow					0	
10-May	76.7	68	12			80	104.3
11-May	72.9	46	13			59	80.9
12-May	74.9	55	6	1		62	82.8
13-May	72.3	21	4	1		26	36.0
14-May	72.5	30	6	2		38	52.4
15-May	71.3	20	5	1		26	36.5
16-May	73.2	8				8	10.9
17-May	72.3	8	2			10	13.8
18-May	72.7	20	1			21	28.9
19-May	72.6	7	5			12	16.5
20-May	72.3	9	6	1		16	22.1
21-May	rain					0	
22-May	31.4	11	1			12	38.2
23-May	63.4	47	5	3	1	56	88.3
24-May	rain					0	
25-May	42.7	42	6	1		49	114.8
26-May	42.2	22	8			30	71.1
27-May	42.0	8	6			14	33.3
28-May	42.2	17	5			22	52.1
29-May	48.4	14	8			22	45.5
30-May	42.4	13	9			22	51.9
31-May	42.0	11	13			24	57.1
01-Jun	42.2	6	9	1		16	37.9
02-Jun	42.2	8	13	1		22	52.1
03-Jun	42.2	8	6			14	33.2
04-Jun	42.0	9	3			12	28.6
05-Jun	41.8	9	4			13	31.1
06-Jun	42.3	8	5	2		15	35.5
<b>Total</b>	<b>1744</b>	<b>589</b>	<b>178</b>	<b>17</b>	<b>1</b>	<b>785</b>	<b>45.0</b>

< 72 net-hrs



**Table 1b. Net-hours and Capture Rates During 2008  
Fall Migration Monitoring at Inglewood Bird Sanctuary**

Date	Net-hours	Captures				Total	Captures/100 Net-hours	
		New Bandings	Recaptures	Escapes	Mortalities			
28-Jul	74.5	51	17	4		72	97	
29-Jul	73.1	33	12	7		52	71	
30-Jul	72.1	17	7	2		26	36	
31-Jul	73.4	50	15	5		70	95	
01-Aug	72.7	17	10	1		28	39	
02-Aug	71.8	27	9	1		37	52	
03-Aug	73.9	63	14			77	104	
04-Aug	71.6	20	4	2		26	36	
05-Aug	60.0	15	7	1		23	38	
06-Aug	69.8	9	3			12	17	
07-Aug	73.4	55	15	3		73	99	
08-Aug	72.0	18	9	1	1	29	40	
09-Aug	72.0	23	10			33	46	
10-Aug	73.2	27	8			35	48	
11-Aug	72.9	19	7			26	36	
12-Aug	72.8	63	7	1	2	73	100	
13-Aug	71.8	62	5	2		69	96	
14-Aug	72.5	24	5	1		30	41	
15-Aug	72.1	38	6	1	1	46	64	
16-Aug	72.0	47	12	1		60	83	
17-Aug	70.5	29	9			38	54	
18-Aug	72.5	30	14			44	61	
19-Aug	72.9	76	24	5	1	106	145	
20-Aug	73.2	57	27	2		86	117	
21-Aug		weather					0	
22-Aug	73.4	14	11			25	34	
23-Aug	74.0	48	18			66	89	
24-Aug	74.9	32	12	1		45	60	
25-Aug	72.1	12	6			18	25	
26-Aug		weather					0	
27-Aug	72.2	28	6			34	47	
28-Aug	72.7	26	14		3	43	59	
29-Aug	72.5	9	8			17	23	
30-Aug	72.0	15	9			24	33	
31-Aug		weather					0	

**Table 1b. Net-hours and Capture Rates During 2008  
Fall Migration Monitoring at Inglewood Bird Sanctuary**

Date	Net-hours	Captures				Total	Captures/100 Net-hours
		New Bandings	Recaptures	Escapes	Mortalities		
01-Sep	72.5	30	4			34	47
02-Sep	72.1	11	4			15	21
03-Sep	no volunteer					0	
04-Sep	71.0	38	9		1	48	68
05-Sep	72.3	46	3	1	4	54	75
06-Sep	72.0	30	11			41	57
07-Sep	75.4	28	5			33	44
08-Sep	72.3	37	4			41	57
09-Sep	72.5	33	1			34	47
10-Sep	63.7	59	12	5	4	80	126
11-Sep	72.9	11	4	1		16	22
12-Sep	72.0	37	8	1		46	64
13-Sep	72.8	42	7	1		50	69
14-Sep	72.0	8	2			10	14
15-Sep	72.1	6	3			9	12
16-Sep	72.5	13	1	2		16	22
17-Sep	72.1	14	1			15	21
18-Sep	72.0	11	1			12	17
19-Sep	72.5	11	5			16	22
20-Sep	72.3	21	2	1		24	33
21-Sep	73.5	19	6			25	34
22-Sep	weather					0	
23-Sep	72.9	31	6	2	1	40	55
24-Sep	72.8	14	3	2		19	26
25-Sep	72.0	8	2	1		11	15
26-Sep	72.7	6	1			7	10
27-Sep	72.0	6	2			8	11
28-Sep	72.0	7	1			8	11
29-Sep	72.2	6	1			7	10
30-Sep	71.8	14	1	1		16	22
01-Oct	72.0	2	3	1		6	8
02-Oct	72.0	9	1			10	14
03-Oct	72.0	3				3	4
04-Oct	72.0	2	3			5	7
05-Oct	53.0	2	3			5	9
06-Oct	72.0	8	3	2		13	18
07-Oct	46.2	2	2			4	9
<b>Total</b>	<b>4789</b>	<b>1679</b>	<b>465</b>	<b>62</b>	<b>18</b>	<b>2224</b>	<b>46</b>

< 72 net-hrs

**Table 2a. New Bandings at Inglewood Bird Sanctuary - Spring**

Year	2002	2003	2004	2005	2006	2007	2008	Total
Start	01-May	01-May	01-May	01-May	01-May	01-May	01-May	
Finish	07-Jun	07-Jun	07-Jun	07-Jun	07-Jun	05-Jun	06-Jun	
# Days	27	31	31	31	33	32	30	
Total	597	230	440	370	311	528	589	3065
Species	46	36	41	41	41	45	45	69
Net-hours	1884	2138	2177	2248	2273	2113	1744	14578
Bandings/100 Net-hours	31.7	10.8	20.2	16.5	13.7	25.0	33.8	21.0
Sharp-shinned Hawk			1	1	1			3
Cooper's Hawk				1			1	2
American Kestrel	1							1
Killdeer						1		1
Solitary Sandpiper	1						1	2
Spotted Sandpiper	2		2		1			5
Belted Kingfisher	1			1	3	1	3	9
Red-naped Sapsucker				1				1
Downy Woodpecker	5	1	1	4	1	4	1	17
Hairy Woodpecker							1	1
Northern Flicker	1		1	1			2	5
Olive-sided Flycatcher			1					1
Western Wood-Pewee	5	1	5		4	4	1	5
Alder Flycatcher	6	4	6	5	1	8	5	35
Willow Flycatcher				1		1		2
Least Flycatcher	16	6	6	7	5	16	20	76
Eastern Phoebe	1							1
Eastern Kingbird		3	1	2	3	2		11
Blue-headed Vireo	2	1						3
Warbling Vireo	4	2			1	3	3	13

**Table 2a. New Bandings at Inglewood Bird Sanctuary - Spring**

Year	2002	2003	2004	2005	2006	2007	2008	Total
Red-eyed Vireo		1						1
Black-billed Magpie			2	1		2	1	6
Tree Swallow	18	6	11	18	14	12	25	104
N Rough-winged Swallow	5		4	5	4	3	5	26
Bank Swallow		1	1	1			2	5
Barn Swallow	1							1
Black-capped Chickadee	3		2	2	1	2	2	12
Red-breasted Nuthatch	1		4	1		1		7
White-breasted Nuthatch	2				2	1		5
House Wren	13	15	8	13	10	18	28	105
Ruby-crowned Kinglet		2			3	1	3	9
Golden-crowned Kinglet					1			1
Gray-cheeked Thrush					1	2	1	4
Swainson's Thrush	54	38	5	25	46	44	44	256
Hermit Thrush	2	2	1	2		2		9
Veery		1					1	2
American Robin	28	35	32	4	37	38	26	200
Varied Thrush							1	1
Gray Catbird	13	13	11	1	15	9	19	81
Brown Thrasher					1			1
Cedar Waxwing	3		12	8	8	1	4	36
Orange-crowned Warbler	19	6	12	18	1	18	24	98
Yellow Warbler	33	2	13	2	21	23	10	104
Magnolia Warbler						1		1
Yellow-rumped Warbler	249	1	136	43	45	61	231	766
Blackpoll Warbler	3	2	1	1			4	11
American Redstart	2	1			2	2	7	14
Ovenbird			1	1	1		1	4
Northern Waterthrush	8	3	7	2	3	4	1	28

**Table 2a. New Bandings at Inglewood Bird Sanctuary - Spring**

Year	2002	2003	2004	2005	2006	2007	2008	Total
MacGillivray's Warbler			1		1	1		3
Common Yellowthroat	21	6	12	4	6	2	7	58
Wilson's Warbler	4	1	3		3	3	2	16
Western Tanager	1		6	1		4	3	15
Chipping Sparrow	3	6	1		6	108	14	138
Clay-colored Sparrow	15	9	1	1	6	63	16	111
Savannah Sparrow	3		2	2	2		5	18
Fox Sparrow		1						1
Song Sparrow	3	1	8	7		2	1	22
Lincoln's Sparrow	19	31	37	42	16	20	32	197
White-throated Sparrow	5	2	7	7	2	2	13	38
White-crowned Sparrow	6	7	7	42	16	17	12	107
Dark-eyed Junco	1						1	2
Rose-breasted Grosbeak	1					1	1	3
Lazuli Bunting				1				1
Red-winged Blackbird	3	5	1	8	5	4	1	27
Common Grackle				1	2	3		6
Brown-headed Cowbird	5	3	7	8	4	8	2	37
Baltimore Oriole	4	7	6		6	3	1	27
American Goldfinch	1	4		2		2		9

\*Note: Traill's Flycatcher includes both Willow and Alder

Table 2b. New Bandings at Inglewood Bird Sanctuary - Fall

Year	1992	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
<b>Total</b>	841	466	1549	1121	1455	1898	1276	1262	1402	1466	1452	1872	1335	1625	1670	1679	22369
<b>Species</b>	52	48	61	59	64	64	66	68	64	66	60	73	67	64	68	69	105
<b>Net-hours</b>	934	1078	3456	4547	4608	4371	4426	3842	5152	4838	4928	4944	4387	4509	4665	4789	42182
<b>Bandings/100 Net-hours</b>	90.0	43.2	44.8	24.7	31.6	43.4	28.8	32.8	27.2	30.3	29.5	37.9	30.4	36.0	35.8	35.1	53.0
Wood Duck			1														1
Mallard							1										1
Green Heron												1					1
Sharp-shinned Hawk	2	2		1	5	4	3	1	1	3		1	2	3	1	3	32
Cooper's Hawk				1	1			1		1							4
Northern Goshawk				1													1
Broad-winged Hawk						1									1		2
Solitary Sandpiper	3	2	3	14	13	14	2	8	4	12	5	8	11	7	7	8	121
Spotted Sandpiper		1	2		3	3	2			5	1	4	4	3	6	1	35
Common Snipe								1		1							2
Mourning Dove												1					1
Belted Kingfisher	2	2	8	8	6	8	10	7	2	5	6	7	4	15	7	11	108
Yellow-bellied Sapsucker			1							1						1	3
Downy Woodpecker		1	2	3	5	7	3	9	9	13	12	16	9	7	13	18	127
Hairy Woodpecker								1		1		2		1		1	6
Northern Flicker	2	1	4	8	7	3	11	2		4	7	6	3	3	1	2	64
Olive-sided Flycatcher	3		3		5	2		2		2		2	3	1	3	1	27
Western Wood-Pewee	6	4	11	2	33	8	10	7	14	14	11	16	17	11	18	19	201
Yellow-bellied Flycatcher			1				1					2			2		6
Trail's Flycatcher*	24	16	29	25	50	36	24	40	46	45	32	197	173	71	99	26	933
Least Flycatcher	16	5	16	9	30	14	11	21	20	21	9	40	45	43	51	20	371
Hammond's Flycatcher																1	1
Dusky Flycatcher			2	1									2				5
Pacific-slope Flycatcher			1		1							1					3
Eastern Phoebe		1						1			1		1				4
Great Crested Flycatcher									1								1
Eastern Kingbird	1	2	7	18	17	19	2	7	17	7	15	17	11	17	15	7	179

**Table 2b. New Bandings at Inglewood Bird Sanctuary - Fall**

Year	1992	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
Yellow-throated Vireo											1						1
Blue-headed Vireo	1		1	1	2			1		2		2		1	1	1	13
Warbling Vireo	8	15	13	18	27	18	8	7	12	9	17	12	1	17	25	24	231
Philadelphia Vireo	1							1	1		1	1			2		7
Red-eyed Vireo	3	1	2	4	3	12	2	4	2	2	4		3	4	5	2	53
Blue Jay				1				1									2
Black-billed Magpie			2	1	8	2	2	1	3	1	3	3	3		2	3	34
Tree Swallow										1			7		5	7	20
N Rough-winged Swallow					2							1	2		2	3	10
Bank Swallow													1		1	1	3
Black-capped Chickadee	9	12	7	17	5	19	10	19	14	13	19	20	28	27	20	13	252
Red-breasted Nuthatch		3		2		4	2	20	7	1	2	4	2	3	3	15	68
White-breasted Nuthatch	1	1	6		4	4	4	5	5	5	7	5	2	2	5	6	62
Brown Creeper	1						1	1				1	1	6			11
House Wren	3	3	50	45	52	49	33	57	59	72	58	138	96	59	99	100	973
Winter Wren								1				2		1			4
Golden-crowned Kinglet	2		2	1	1	1	2	1		2		1	2	5			20
Ruby-crowned Kinglet	3	1	10	18	20	14	5	11	15	14	24	18	11	29	20	13	226
Townsend's Solitaire				1					1		1			1			4
Veery	2					1						1					4
Gray-cheeked Thrush	1					1		1									3
Swainson's Thrush	34	13	17	52	10	28	19	13	30	13	19	31	27	17	34	29	386
Hermit Thrush	4		3	14	6	9	9	4	11	11	5	8	4	3	4	9	104
American Robin	5	11	114	81	81	31	60	32	105	37	89	28	43	29	46	56	848
Varied Thrush									1			5					6
Gray Catbird		1		5	7	6	5	4	14	8	19	14	14	13	12	14	136
Brown Thrasher					3						1		1				5
European Starling			2						4						1		7
Bohemian Waxwing							1										1
Cedar Waxwing	12	1	42	14	67	11	25	26	49	27	21	43	22	24	71	153	608

**Table 2b. New Bandings at Inglewood Bird Sanctuary - Fall**

Year	1992	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
Tennessee Warbler	43	5	33	30	52	74	106	167	46	76	147	98	58	43	87	96	1161
Orange-crowned Warbler	24	36	177	116	86	207	91	84	58	71	115	45	45	154	163	123	1595
Nashville Warbler				1	2	1	1	2	1	1			1	3		1	14
Yellow Warbler	56	19	44	62	137	91	138	89	101	119	82	165	126	75	154	113	1571
Chestnut-sided Warbler	1						1				1	1			1		5
Magnolia Warbler	9	4	2	2	4	4	2	2	1	9	6	4	5	6	5	3	68
Cape May Warbler											2						2
Yellow-rumped Warbler	293	171	496	92	191	638	195	200	246	248	223	148	73	412	207	256	4089
Black-throated Green Warbler					1	1	1										3
Townsend's Warbler	1				1	2	3	1	2	2		1	2	2	1	1	19
Palm Warbler		3	7	4	3	8	7	1	6	4	1	2	1	4			51
Bay-breasted Warbler			1				1	1			1						4
Blackpoll Warbler	17	5	17	8	6	30	5	8	11	7	7	1	11	7	12	14	166
Black-and-white Warbler	4	1	1	2		3			2	3	3	1	2	1	2	3	28
American Redstart	19	4	3	6	4	20	5	3	16	27	18	19	7	16	14	7	188
Ovenbird	22	6	10	30	11	38	11	11	24	7	18	37	16	26	28	16	311
Northern Waterthrush	22	8	23	56	46	26	41	34	44	33	29	78	67	43	53	39	642
Connecticut Warbler	2	2	4	4	1	3	3	3	4	1		6	1	5	4	2	45
Mourning Warbler	4	2	5	10	3	9	1	4	5	7	10	7	5	5	6	3	86
MacGillivray's Warbler	2		3	8	10	6	2	5	4	4	5	6	4	4	2	1	66
Common Yellowthroat		1	6	1	8	10	8	4	12	8	9	7	2	9	7	5	97
Wilson's Warbler	121	68	102	175	119	113	100	167	152	145	224	251	12	168	136	159	2212
Canada Warbler	1			2	1	3	1	1	1	2		8		1	4	2	27
Western Tanager	1	1	12	1	3	2	4	1	5	6	3	5	3		4	8	59



**Table 2b. New Bandings at Inglewood Bird Sanctuary - Fall**

Year	1992	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
American Tree Sparrow			10	3	3	7	2	1	1	2	4	4	3	5	2	3	50
Chipping Sparrow	4	1	29	14	151	27	83	50	47	92	23	155	34	1	34	43	788
Clay-colored Sparrow		1	1	6	21	37	26	9	30	26	6	12	14	15	10	11	225
Brewer's Sparrow							1										1
Savannah Sparrow		1			2			1	1					1			6
Fox Sparrow	1	1	1			2	1		2	1	1	2			1	4	17
Song Sparrow		1	9	9	15	18	21	9	3	13	5	15	21	14	13	10	176
Lincoln's Sparrow	9	7	53	28	13	59	48	30	39	88	43	30	44	58	45	65	659
Swamp Sparrow				2		7	3		1	2	1	2		2	1	3	24
White-throated Sparrow	13	11	73	28	39	77	54	18	35	51	25	40	34	67	24	27	616
Harris' Sparrow			1						1			1	1				4
White-crowned Sparrow	5	4	20	24	22	21	22	23	27	30	18	31	36	17	11	14	325
Dark-eyed Junco	5	3	15	15	3	10	8	6	1	6	3	11	4	14		5	109
Rose-breasted Grosbeak	6				1	3	2	3	1	3	7	5	3	2	1	5	42
Red-winged Blackbird			4				2			3		1			1		11
Rusty Blackbird															1	1	2
Common Grackle			3								1		2	4		5	15
Brown-headed Cowbird			1	2	2	1		2	4	5	1	4	3			4	29
Baltimore Oriole	4		21	12	12	8	5	1	8	9	20	7	11	2	11	7	138
Purple Finch		1			2	1	1	2	6				2	1	1	2	19
House Finch													9	2	35	45	91
Pine Siskin					2							1			2	2	7
American Goldfinch	3			2	4	2	2	1	4	2		2	1	2	5		30
House Sparrow									3							4	7

\*Note: Traill's Flycatcher includes both Willow and Alder

new species

**Table 3. Inglewood Bird Sanctuary MAPS New Bandings - 2008**

	03-Jun	10-Jun	24-Jun	05-Jul	12-Jul	22-Jul	05-Aug	Total
Downy Woodpecker			1		3	2		6
Northern Flicker	1							1
Western Wood-pewee						1		1
Alder Flycatcher	1	1						2
Least Flycatcher			1		1		1	3
Eastern Kingbird						1		1
Warbling Vireo		1				1		2
Tree Swallow		1	1					2
Northern Rough-winged Swallow		1						1
Black-capped Chickadee			1	1		9		11
House Wren	1	1				22	2	26
Swainson's Thrush	5				1		1	7
American Robin	1		2	2	9	5	2	21
Gray Catbird	2		1	1	1	1		6
Cedar Waxwing		4	2	3				9
Tennessee Warbler					5	8		13
Yellow Warbler				2	2	1	1	6
Yellow-rumped Warbler						3		3
American Redstart	1							1
Ovenbird				1				1
Northern Waterthrush							1	1
Common Yellowthroat		1						1
Clay-colored Sparrow						1	1	2
Song Sparrow						1		1
Lincoln's Sparrow	1			1	1	1		4
White-throated Sparrow		1				1		2
White-crowned Sparrow						1		1
Brown-headed Cowbird	2					1		3
Baltimore Oriole						1		1
House Finch					2	3	1	6
American Goldfinch					1			1
<b>Total birds</b>	<b>15</b>	<b>11</b>	<b>9</b>	<b>11</b>	<b>26</b>	<b>64</b>	<b>10</b>	<b>146</b>
<b>Total species</b>	<b>9</b>	<b>8</b>	<b>7</b>	<b>7</b>	<b>10</b>	<b>19</b>	<b>8</b>	<b>31</b>

**Table 4. Inglewood Bird Sanctuary MAPS Summary**

Species	New Bandings															Total	
	1992	1993	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007		2008
American Kestrel			1														1
Downy Woodpecker	1	3	1	5	4	1			1		1	3		5		6	31
Hairy Woodpecker	1	1	1			1											4
Northern Flicker	1	1	3	2			2							2	3	1	15
Western Wood-Pewee	6	1	1	1	1	2		1	3			3		2		1	22
Traill's Flycatcher				3	3		1	1	4	1	1	2	3	2		2	23
Least Flycatcher	14	8	3	2	3	4	2	1	2	1			1	5	9	3	58
Eastern Kingbird	2	1			3	1	3		2	1		3	1	1		1	19
Warbling Vireo	7	7	1	4	2		2	2	1	4	3		1	2	1	2	39
Red-eyed Vireo	1																1
Black-billed Magpie				1	2							2					5
Tree Swallow	3						2					4		8		2	19
Northern Rough-winged Swallow																1	1
Bank Swallow	1																1
Black-capped Chickadee	5	7	5	9	2	3	5	4	4	2	4	10	2	8	5	11	86
White-breasted Nuthatch	3	4		2						1		2		2	1		15
House Wren	5	11	9	9	13	8	9	18	11	2	11	9	1	15	30	26	187
Veery	2					1											3
Swainson's Thrush	10	8	6	4	3	1	4		3	1	1	4	1	4		7	57
Hermit Thrush								1									1
American Robin	21	6	26	25	23	10	8	14	20	19	19	21	1	45	18	21	297
Gray Catbird	3			1	1	4	8	1	6	16	9	12	1	4	8	6	80
European Starling			1														1
Cedar Waxwing	27	8		6	1	9	5	7	5	13	3	17	3	8	20	9	141
Tennessee Warbler	1	6		7	1	3	4	22	1	1	1	5		5	11	13	81
Orange-crowned Warbler						1						1					2
Yellow Warbler	20	14	7	2	6	9	24	13	4	7	9	4	2	10	26	6	163
Yellow-rumped Warbler	10					2		2	1		1	1			3	3	23

**Table 4. Inglewood Bird Sanctuary MAPS Summary**

Species	New Bandings															Total	
	1992	1993	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007		2008
American Redstart		1									1			2		1	5
Ovenbird	3			1		1										1	6
Northern Waterthrush						1	1		1							1	4
Mourning Warbler	1																1
Common Yellowthroat												1	1			1	3
Wilson's Warbler				2		1	1					1					5
Western Tanager		1	3	1	2		4					1					12
Chipping Sparrow		7			1							1		1	2		12
Clay-colored Sparrow		1				6	17	1	2						1	2	30
Song Sparrow		1		1		1	4				1		1		1	1	11
Lincoln's Sparrow		3	1	2	5	2		1				2				4	20
White-throated Sparrow				2						1		2				2	7
White-crowned Sparrow																1	1
Rose-breasted Grosbeak				1													1
Red-winged Blackbird															1		1
Common Grackle			1		2					1							4
Brown-headed Cowbird	6				3			1	1	2		2	1	2		3	21
Baltimore Oriole	3	7	2	8	9	1	2	1	5	9		2			3	1	53
Purple Finch		1						1									2
House Finch														5	4	6	15
American Goldfinch	2	2		1						1				1		1	8
House Sparrow	2					2											4
<b>Total</b>	<b>161</b>	<b>110</b>	<b>72</b>	<b>102</b>	<b>90</b>	<b>75</b>	<b>108</b>	<b>92</b>	<b>77</b>	<b>83</b>	<b>65</b>	<b>115</b>	<b>20</b>	<b>139</b>	<b>147</b>	<b>146</b>	<b>1602</b>
<b>Species</b>	<b>27</b>	<b>24</b>	<b>17</b>	<b>25</b>	<b>21</b>	<b>24</b>	<b>20</b>	<b>18</b>	<b>19</b>	<b>18</b>	<b>14</b>	<b>25</b>	<b>14</b>	<b>22</b>	<b>18</b>	<b>31</b>	<b>47</b>

**Table 5. Coverage and Capture Rates During 2008  
MoSI and Migration Monitoring at Las Caletas, CR**

Date	Net-hours	Captures				Total	Captures per 100 net- hours
		New Bandings	Recaptures	Unbanded	Mortalities		
17-Mar	72.6	23	17	2	1	43	59
18-Mar	72.4	8	5	1		14	19
19-Mar	78.0	10	9			19	24
20-Mar	78.0	12	5	1		18	23
21-Mar	84.3	8	7			15	18
22-Mar	84.3	10	15			25	30
23-Mar	84.8	7	6			13	15
24-Mar	84.0	6	5			11	13
25-Mar	84.8	13	8			21	25
26-Mar	84.5	12	6			18	21
27-Mar	84.0	3	3			6	7
28-Mar	74.7	10	8			18	24
29-Mar	77.0	12	6			18	23
30-Mar	84.4	12	3			15	18
31-Mar	85.9	10	6			16	19
01-Apr	84.0	6	6			12	14
02-Apr	84.4	19	1			20	24
03-Apr	84.0	10	6			16	19
04-Apr	84.0	16	4	1		21	25
05-Apr	84.1	19	4		1	24	29
06-Apr	82.5	20	5			25	30
07-Apr	81.7	24	7			31	38
08-Apr	81.5	14	6			20	25
09-Apr	42.9	7	3	1		11	26
10-Apr	83.7	16	6	1		23	27
11-Apr	82.1	23	10	1		34	41
12-Apr	63.0	14	2	1		17	27
13-Apr	85.0	15	6	2		23	27
14-Apr	82.9	12	9	4		25	30
15-Apr	82.7	19	8	5		32	39
16-Apr	77.5	6	7	5		18	23
17-Apr	78.4	14	2	2		18	23
18-Apr	81.0	17	2	5		24	30
19-Apr	78.9	14	2	4		20	25
20-Apr	76.9	12	3			15	20
21-Apr	64.4	4	5	2		11	17
22-Apr	73.7	5	4	4		13	18
23-Apr	76.1	8	4	3		15	20
24-Apr	74.7	5	4	2		11	15
25-Apr	81.2	16	3	4		23	28
<b>Total</b>	<b>3165</b>	<b>491</b>	<b>228</b>	<b>51</b>	<b>2</b>	<b>772</b>	<b>24</b>

<72 net-hrs

**Table 6. New captures in Costa Rica 2002-2008**

Species	2002*	2003*	2004	2005	2006**	2007***	2008***	Total
Start date	17 Mar	15 Apr	28 Mar	30-Mar	11-Dec	10-Dec	17-Mar	
Finish date	12-Apr	9 May	29 Apr	29-Apr	10-Mar	27-Apr	25-Apr	
Net-hours	2041	2123	2468	2209	2074	3120	3165	
Double-toothed Kite							1	1
Tiny Hawk	1	2			1		1	5
Barred Forest-Falcon	2	1				1		4
Ruddy Ground-Dove		1		5	1			7
Blue Ground-Dove		1						1
White-tipped Dove	1	1		2	1	1		6
Gray-chested Dove	5	8	4	2	1	4	8	32
Ruddy Quail-Dove			5	3	2	3	3	16
Dove spp.	1			1				2
Pigeon spp.	1							1
Bronzy Hermit		8	6	1	4	4	2	25
Band-tailed Barbthroat	1	20	14	15	8	23	16	97
Long-billed Hermit	2	15	23	34	14	26	13	127
Stripe-throated Hermit		16	7	9	11	13	4	60
White-tipped Sicklebill	2					3		5
White-necked Jacobin	1	5	4	1	11	4	2	28
Violet-crowned Woodnymph		11	13	12	5	8	13	62
Blue-throated Goldentail		59	52	5	24	35	9	184
Charming Hummingbird		40	33	35	28	35	25	196
Mangrove Hummingbird					2			2
Snowy-bellied Hummingbird		1	1					2
Rufous-tailed Hummingbird		10	14	11	8	22	10	75
Purple-crowned Fairy				1		1		2
Hummingbird sp.	89			1				90
Black-throated Trogon	2			3	2	3	1	11
Blue-crowned Motmot	1	4			1	2	1	9
Green Kingfisher			4	1	3	3		11
American Pygmy Kingfisher	2	1	2	1	1			7
White-necked Puffbird		1	1					2
White-whiskered Puffbird	1		1	1		1		4
Rufous-tailed Jacamar		1	1	1	1			4
Fiery-billed Aracari						2		2
Olivaceous Piculet	3	1	1	1	1	1	1	9
Golden-naped Woodpecker			1	1				2
Buff-throated Foliage-gleaner	4	7	1		3	2	1	18
Plain Xenops	5	6	3	8	2	6	5	35
Scaly-throated Leaf-tosser	1	3	3	3		1	2	13
Tawny-winged Woodcreeper	6	2	3	6	3	4		24
Long-tailed Woodcreeper	1	1		2	1	4		9
Wedge-billed Woodcreeper	16	6	11	9	27	12	9	90
Northern Barred-Woodcreeper	2	4		1		3		10
Black-striped Woodcreeper	1			1			1	3
Cocoa Woodcreeper	4	4	7	2	2	2	2	23
Woodcreeper sp.	1							1
Great Antshrike	1							1
Black-hooded Antshrike	8	9	4	3	4	6	3	37

**Table 6. New captures in Costa Rica 2002-2008**

Species	2002*	2003*	2004	2005	2006**	2007***	2008***	Total
Start date	17 Mar	15 Apr	28 Mar	30-Mar	11-Dec	10-Dec	17-Mar	
Finish date	12-Apr	9 May	29 Apr	29-Apr	10-Mar	27-Apr	25-Apr	
Net-hours	2041	2123	2468	2209	2074	3120	3165	
Russet Antshrike	1		2		1			4
Slaty Antwren		2	1	6		3	1	13
Dot-winged Antwren	16	18	7	3	4	4	2	54
Chestnut-backed Antbird	9	15	6	11	8	11	5	65
Bicolored Antbird	2	9	4	12	10	17		54
Black-faced Antthrush	2	1		2	3	1	1	10
Streak-chested Antpitta	1	1		1				3
Ochre-bellied Flycatcher	21	23	35	28	7	19	4	137
Northern Bentbill	5	4	5	3	3	6	3	29
Eye-ringed Flatbill	1							1
Yellow-olive Flycatcher		3						3
Golden-crowned Spadebill	2	1	2	6	4	8	3	26
Ruddy-tailed Flycatcher	2	4	1	2	3	5		17
Sulphur-rumped Flycatcher	1	3	2	4	3	3	4	20
Black-tailed Flycatcher		1	1					2
Yellow-bellied Flycatcher	1		3		1	3	2	10
Acadian Flycatcher				1				1
Alder Flycatcher		35	10	1		3	2	51
Willow Flycatcher		3	3					6
Bright-rumped Attila	7	3	6	5	3	2	3	29
Rufous Mourner		3	1		1	1	1	7
Dusky-capped Flycatcher	4		5	1	1	1		12
Great-crested Flycatcher	2				1		3	6
Sulphur-bellied Flycatcher						1		1
Scale-crested Pygmy-Tyrant						1		1
Thrushlike Schiffornis	2	2	2	2		1	3	12
Rufous Piha					1			1
White-winged Becard		1						1
Orange-collared Manakin	28	16	17	23	6	28	18	136
Blue-crowned Manakin	7	11	12	8	8	13	3	62
Red-capped Manakin	23	31	23	53	28	46	14	218
Red-eyed Vireo	1	6	2	1			1	11
Yellow-green Vireo	9	10	4	4		2	2	31
Philadelphia Vireo			1					1
Tawny-crowned Greenlet	2	1	3	5	4	10	6	31
Lesser Greenlet		1	1		1	6		9
Black-bellied Wren		1	1	1	2	2		7
Riverside Wren	6	7	5	12	15	5	2	52
House Wren	2		1	3	1	2	1	10
Scaly-breasted Wren		2	1		2			5
Long-billed Gnatwren	13	1	3	5	1	8	5	36
Tropical Gnatcatcher		1		3		1		5
Swainson's Thrush	439	406	547	546		570	221	2729
Wood Thrush					1		1	2
Clay-colored Robin			1	2	3	5	1	12
White-throated Robin					5			5

**Table 6. New captures in Costa Rica 2002-2008**

Species	2002*	2003*	2004	2005	2006**	2007***	2008***	Total
Start date	17 Mar	15 Apr	28 Mar	30-Mar	11-Dec	10-Dec	17-Mar	
Finish date	12-Apr	9 May	29 Apr	29-Apr	10-Mar	27-Apr	25-Apr	
Net-hours	2041	2123	2468	2209	2074	3120	3165	
Tennessee Warbler				3	5		1	9
Yellow Warbler			1					1
Mangrove Warbler					1			1
Chestnut-sided Warbler	2			4	2	6	3	17
Prothonotary Warbler						1		
Worm-eating Warbler	1				1			2
Northern Waterthrush	1	1	1	1	3	3	6	16
Louisiana Waterthrush	1							1
Kentucky Warbler	3		1		2	2		8
Mourning Warbler	1		1	2	2	2		8
MacGillivray's Warbler	1							1
Buff-rumped Warbler						2		2
Bananaquit	9	12	9	11	7	13	5	66
Gray-headed Tanager	5	9	5	8	14	12	10	63
White-throated Shrike-Tanager		2	1	4				7
White-shouldered Tanager	4	10	6	3	3	6	3	35
Black-cheeked Ant-Tanager	5	8	6	16	10	11	6	62
Summer Tanager					2	2		4
Scarlet Tanager	1							1
Cherrie's Tanager	7	5	7	10	6	10	9	54
Bay-headed Tanager	2		3			2		7
Golden-hooded Tanager		2		1				3
Blue Dacnis			1					1
Green Honeycreeper	5	4		7		3	4	23
Shining Honeycreeper				1			1	2
Red-legged Honeycreeper		3		2			3	8
Blue-black Grassquit	2		2				1	5
Variable Seedeater	15	10	10	17	14	9	14	89
Yellow-bellied Seedeater		2	4					6
Thick-billed Seed-Finch	6	4	6	7	4	7	7	41
Orange-billed Sparrow	12	17	19	26	5	25	14	118
Black-striped Sparrow	1	1	2	2	4	1	5	16
Buff-throated Saltator	8	4		9	3	6	2	32
Blue-black Grosbeak	4	9	4	5	3	7	5	37
Great-tailed Grackle					2			2
Yellow-billed Cacique				1				1
Scarlet-rumped Cacique			2	1				3
Spot-crowned Euphonia	1	1		2	1	2		7
Species	78	80	79	84	78	82	67	129
Total	871	979	1028	1079	397	1155	544	6052

\* pilot programs

\*\* MoSI including Isla Violin

\*\*\* modified MoSI and MM

Neotropical migrant



**Table 7a. PopulationTrend Analysis of Species Monitored in Fall  
at Inglewood Bird Sanctuary 1995-2008**

Species	Analysis Interval	Trend	P	DQ
		%/year		
Solitary Sandpiper	1996-1998, 2000-2008	-2.0%	.38	red
Western Wood-Pewee	1996-2008	0.7%	.73	orange
Traill's Flycatcher	1995-2008	11.5%	<.01	yellow
Least Flycatcher	1995-2008	8.7%	<.01	yellow
Warbling Vireo	1995-2008	3.2%	.13	orange
Ruby-crowned Kinglet	1995-2008	4.2%	.03	orange
Swainson's Thrush	1995-2008	1.2%	.43	yellow
American Robin	1995-2008	-4.7%	.08	yellow
Tennessee Warbler	1996-1998, 2000-2008	2.4%	.03	green
Orange-crowned Warbler	1995-2008	0.2%	.90	green
Yellow Warbler	1995-2008	2.7%	.01	green
Yellow-rumped Warbler	1996-2008	-2.7%	.03	green
Blackpoll Warbler	1996-2008	-2.5%	.20	red
American Redstart	1995-2008	0.4%	.85	orange
Ovenbird	1996-2008	2.8%	.08	orange
Northern Waterthrush	1996-1998, 2000-2008	3.0%	.01	yellow
Wilson's Warbler	1995-2008	3.4%	<.01	green
Chipping Sparrow	1996-1998, 2000-2008	-2.5%	.09	yellow
Clay-colored Sparrow	1996-1998, 2000-2008	-1.4%	.40	orange
Song Sparrow	1995-1998, 2000-2008	1.6%	.42	orange
Lincoln's Sparrow	1995-2008	4.7%	<.01	green
White-throated Sparrow	1995-2008	-2.6%	.07	yellow
White-crowned Sparrow	1995-2008	0.4%	.80	yellow
Dark-eyed Junco	1995-2008	-4.6%	.06	red
Baltimore Oriole	1995-2008	-7.4%	<.01	red

<b>Data Quality:</b>	
if mean birds/season < 10 or mean observation days/season < 5	DQ=red
if mean birds/season >= 10 and mean days/season >= 5	DQ=orange
if mean birds/season >= 20 and mean days/season >= 10	DQ=yellow
if mean birds/season >= 25 and mean days/season >= 20	DQ=green

**Table 7b. PopulationTrend Analysis of Species Monitored in Spring  
at Inglewood Bird Sanctuary 2002-2008**

Species	Analysis Interval	Trend	P	DQ
		%/year		
House Wren	2002-2008	13.7%	.03	orange
Gray Catbird	2002-2008	4.1%	.50	orange
Swainson's Thrush	2002-2008	-2.9%	.54	yellow
American Robin	2002-2008	3.7%	.67	yellow
Orange-crowned Warbler	2002-2008	4.2%	.61	orange
Yellow Warbler	2002-2008	-12.3%	.01	orange
Yellow-rumped Warbler	2002-2008	-13.3%	.01	yellow
Common Yellowthroat	2002-2008	-22.8%	<.01	orange
Clay-colored Sparrow	2002-2008	26.3%	<.01	orange
Lincoln's Sparrow	2002-2008	-6.9%	.19	yellow
White-crowned Sparrow	2002-2008	12.6%	.12	orange

<b>Data Quality:</b>	
if mean birds/season < 10 or mean observation days/season < 5	DQ=red
if mean birds/season >= 10 and mean days/season >= 5	DQ=orange
if mean birds/season >= 20 and mean days/season >= 10	DQ=yellow
if mean birds/season >= 25 and mean days/season >= 20	DQ=green

**Table 8. Bander-in-Charge and Volunteer Effort 2008**

Member/Guest	Bander-in-Charge (days)				Volunteer (days)					
	Inglewood			NSWO	Costa Rica	Inglewood			NSWO	Costa Rica
	Spring MM	MAPS	Fall MM		MOSI & MM	Spring MM	MAPS	Fall MM		MOSI & MM
Achuff, Peter										9
Bennett, Christine										9
Brennan, Liz						1		1		
Chitrenky, Pat						1		2		
Cole, Amanda								1	1	
Collister, Doug	1		5					2		
Danielson, Grant						1				
Davis, Nancy						3		5	3	
Day, Kelly								4		
Donatti, Alejandro Nava						1			2	10
Dubrovna, Alexandra									6	
Flynn, Lenora									1	
Flynn, Richard									1	
Foster, Ken						4		3	4	
Gahbauer, Marcel						1			1	14
Godwin-Sheppard, Christine							1	5		
Herrero, Steve								1		
Lamb, Tamara								4		
Lane, Stephen	10	3	19		21			1		
McDonald, Christine								2		
McLeod, Shonna	13		20	28			1	1		
Mitchell, Pat	8	2	17	6				1		
Mulligan, Mike						6	2	8		
Peckford, Mike						1				

**Table 8. Bander-in-Charge and Volunteer Effort 2008**

Member/Guest	Bander-in-Charge (days)				Volunteer (days)					
	Inglewood			NSWO	Costa Rica	Inglewood			NSWO	Costa Rica
	Spring MM	MAPS	Fall MM		MOSI & MM	Spring MM	MAPS	Fall MM		MOSI & MM
Peterson, El						4		1		
Peterson, Kevin						3		1		
Smiley, Gwen						3		2	1	
Smith, Cyndi										9
Stauffer, Dick						3		4		
Stiles, Don								6		
Taylor, William						5	4	8		
Tietz, Gwen										16
Trakalo, Barry						2		1		
Tremblay, Marie						1				
Truch, Mike						1		2		
Turnbull, Amy						1		4		
Watson, Catherine								2		
Weerstra, Anne						2		2	2	
Wiggins, Linda						2			1	
Wilson, Amy					16			5		
Wilson, Scott			5							
Young, Colin								9	8	
<b>Total</b>	<b>32</b>	<b>5</b>	<b>66</b>	<b>34</b>	<b>37</b>	<b>46</b>	<b>8</b>	<b>88</b>	<b>31</b>	<b>67</b>
<b>414</b>										

**Table 9. Injuries and Mortalities During 2008 CBBS Projects**

Species	Captures	Injuries		Mortalities	
		Number	Type	Number	Cause
Ochre-bellied Flycatcher	8	1	wing strain		
Northern Saw-whet Owl	135	1	cut leg		
Hairy Woodpecker	3	1	wing abrasion		
Warbling Vireo	36	1	wing strain		
Black-capped Chickadee	60	1	cut on head	1	dead in net
House Wren	290	2	leg abrasion		
		1	wing strain		
Ruby-crowned Kinglet	19			1	dead in net
American Robin	118	2	cut tongue	1	dead in net
		6	wing abrasion		
Gray Catbird	46	1	wing strain		
		1	broken leg		
Cedar Waxwing	182	1	wing strain	1	dead in bag
Tennessee Warbler	132			1	strangled in net
Orange-crowned Warbler	164	1	broken leg		
Yellow Warbler	188			1	deer predation
Yellow-rumped Warbler	551			1	dead in net
Northern Waterthrush	67			1	unknown predation
Wilson's Warbler	197	1	broken leg	1	died during extraction
				1	deer predation
Western Tanager	12	1	wing strain		
Clay-colored Sparrow	31	1	dislocated leg	1	dead in net
Lincoln's Sparrow	142	1	cut tongue		
White-throated Sparrow	56	1	dislocated leg		
		1	wing strain		
Unknown spp.				2	deer predation
				4	unknown predation
<b>Total</b>	<b>3959</b>	<b>26</b>	<b>0.66%</b>	<b>17</b>	<b>0.43%</b>

**TABLE 10. CALGARY BIRD BANDING SOCIETY  
2008 MEMBERSHIP LIST**

Peter Achuff	Mike Peckford
Christine Bennett	El Peterson
Grahame Booth	Kevin Peterson
Liz Brennan	Kent Russell
Tara Caseley	Carl Savignac
Pat Chitrenky	Terry Silverson
Amanda Cole	Gwen Smiley
Doug Collister	Cyndi Smith
Grant Danielson	Dick Stauffer
Erin Dann	Don Stiles
Carla Davidson	Phil Stiles
Nancy Davis	Bill Taylor
Kelly Day	Gwen Tietz
Alejandro Nava Donatti	Barry Trakalo
Alexandra Dubrovna	Marie Tremblay
Dick Flynn	Mike Truch
Lenora Flynn	Amy Turnbull
Ken Foster	Gail Visser
Marcel Gahbauer	Catherine Watson
Chris Godwin-Sheppard	Anne Weerstra
Carole Hachey	Linda Wiggins
Steve Herrero	Amy Wilson
Garry Hornbeck	Bruce Wilson
Bev Kissinger	Scott Wilson
Maryanne Kissinger	Colin Young
Tamara Lamb	
Steve Lane	<b>Executive</b>
Josh Levac	President – Amy Turnbull
Christine McDonald	Vice President – Doug Collister
Shonna McLeod	Treasurer – El Peterson
Greg Meyer	Secretary – Bill Taylor
Pat Mitchell	Annual Report – Doug Collister
Mike Mulligan	Director-at-Large – Amanda Cole
David Musto	Director-at-Large – Marcel Gahbauer
	Director-at-Large – Pat Mitchell

## **Appendix 1**

## Appendix 1a. New Bandings at Inglewood Bird Sanctuary - Spring 2008

Species	May												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Cooper's Hawk													
Solitary Sandpiper										1			
Belted Kingfisher					1					1			
Downy Woodpecker												1	
Hairy Woodpecker													
Northern Flicker													
Western Wood-Pewee													
Alder Flycatcher													
Least Flycatcher													
Warbling Vireo													
Black-billed Magpie													
Tree Swallow										12		2	1
N Rough-winged Swallow										4			
Bank Swallow												1	1
Black-capped Chickadee			2										
House Wren													
Ruby-crowned Kinglet			1										
Veery													
Gray-cheeked Thrush													
Swainson's Thrush													
American Robin	3		2	1	2						2		2
Varied Thrush													
Gray Catbird													
Cedar Waxwing													
Orange-crowned Warbler				1	2					3	1	3	1
Yellow Warbler										1			
Yellow-rumped Warbler	1		22	5	11					39	38	48	15
Blackpoll Warbler													
American Redstart													
Ovenbird													
Northern Waterthrush													
Common Yellowthroat													
Wilson's Warbler													
Western Tanager													
Chipping Sparrow													
Clay-colored Sparrow													
Savannah Sparrow			1		1					2			
Song Sparrow					1								
Lincoln's Sparrow				2	3					3	2		1
White-throated Sparrow											2		
White-crowned Sparrow	1									1	1		
Dark-eyed Junco					1								
Rose-breasted Grosbeak													
Red-winged Blackbird													
Brown-headed Cowbird										1			
Baltimore Oriole													



## Appendix 1a. New Bandings at Inglewood Bird Sanctuary - Spring 2008

Species	May												
	14	15	16	17	18	19	20	21	22	23	24	25	26
Cooper's Hawk													
Solitary Sandpiper													
Belted Kingfisher										1			
Downy Woodpecker													
Hairy Woodpecker													
Northern Flicker			1	1									
Western Wood-Pewee					1								
Alder Flycatcher									1	1		1	
Least Flycatcher									1	3		1	8
Warbling Vireo													
Black-billed Magpie					1								
Tree Swallow		2		2	1	1	1						
N Rough-winged Swallow						1							
Bank Swallow													
Black-capped Chickadee													
House Wren												4	4
Ruby-crowned Kinglet			1							1			
Veery												1	
Gray-cheeked Thrush					1								
Swainson's Thrush									3	7		11	3
American Robin	1	1					2					1	
Varied Thrush													
Gray Catbird										1		1	2
Cedar Waxwing													
Orange-crowned Warbler	2	2	3	1		2						2	
Yellow Warbler										1		1	1
Yellow-rumped Warbler	20	8	1	1	11					10		1	
Blackpoll Warbler										1		1	2
American Redstart										1		3	
Ovenbird												1	
Northern Waterthrush													
Common Yellowthroat							1			1		2	1
Wilson's Warbler										1			
Western Tanager				1		2							
Chipping Sparrow									4	7		2	
Clay-colored Sparrow										8		4	
Savannah Sparrow		1											
Song Sparrow													
Lincoln's Sparrow	3	5	1		3		2		1	2		1	
White-throated Sparrow				1		1	2			1		4	1
White-crowned Sparrow	4	1	1	1	1		1						
Dark-eyed Junco													
Rose-breasted Grosbeak									1				
Red-winged Blackbird					1								
Brown-headed Cowbird													
Baltimore Oriole													

## Appendix 1a. New Bandings at Inglewood Bird Sanctuary - Spring 2008

Species	May					June						Total
	27	28	29	30	31	1	2	3	4	5	6	
Cooper's Hawk			1									1
Solitary Sandpiper												1
Belted Kingfisher												3
Downy Woodpecker												1
Hairy Woodpecker								1				1
Northern Flicker												2
Western Wood-Pewee												1
Alder Flycatcher										1	1	5
Least Flycatcher			1	1	1	1	1		1		1	20
Warbling Vireo	1					1		1				3
Black-billed Magpie												1
Tree Swallow			2	1								25
N Rough-winged Swallow												5
Bank Swallow												2
Black-capped Chickadee												2
House Wren		5	3	5	3	1	1			1	1	28
Ruby-crowned Kinglet												3
Veery												1
Gray-cheeked Thrush												1
Swainson's Thrush	1	6	1	1	1		1	3	1	2	3	44
American Robin	2	1	1	1	2				1	1		26
Varied Thrush					1							1
Gray Catbird	3				1	1	3	1	3	2	1	19
Cedar Waxwing				1		1		2				4
Orange-crowned Warbler			1									24
Yellow Warbler					1		2		2		1	10
Yellow-rumped Warbler												231
Blackpoll Warbler												4
American Redstart			1	1						1		7
Ovenbird												1
Northern Waterthrush			1									1
Common Yellowthroat		2										7
Wilson's Warbler		1										2
Western Tanager												3
Chipping Sparrow		1										14
Clay-colored Sparrow		1	2						1			16
Savannah Sparrow												5
Song Sparrow												1
Lincoln's Sparrow				1		1				1		32
White-throated Sparrow	1											13
White-crowned Sparrow												12
Dark-eyed Junco												1
Rose-breasted Grosbeak												1
Red-winged Blackbird												1
Brown-headed Cowbird				1								2
Baltimore Oriole					1							1







## **Appendix 2**

## Appendix 2. Top 20 New Bandings at Inglewood Bird Sanctuary

Spring				
Species	Total 2002-2008		2008	
	Rank	Number	Rank	Number
Yellow-rumped Warbler	1	865	1	231
Swainson's Thrush	2	301	2	44
American Robin	3	236	5	26
Lincoln's Sparrow	4	197	3	32
Yellow Warbler	5	140	14	10
Chipping Sparrow	6	138	11	14
Clay-colored Sparrow	7	129	10	16
White-crowned Sparrow	8	107	13	12
Tree Swallow	9	104	6	25
Orange-crowned Warbler	10	98	7	24
House Wren	11	96	4	28
Gray Catbird	12	90	9	19
Least Flycatcher	13	76	8	20
Common Yellowthroat	14	58	15/16	7
White-throated Sparrow	15/16	38	12	13
Blackpoll Warbler	15/16	38	20	4
Traill's Flycatcher*	17/18	37	17-19	5
Brown-headed Cowbird	17/18	37		2
Cedar Waxwing	19	36	20	4
Northern Waterthrush	20	28		1
American Redstart		14	15/16	7
N Rough-winged Swallow		26	17-19	5
Savannah Sparrow		14	17-19	5

Fall				
Species	Total 1995-2008		2008	
	Rank	Number	Rank	Number
Yellow-rumped Warbler	1	4089	1	256
Wilson's Warbler	2	2212	2	159
Orange-crowned Warbler	3	1595	4	123
Yellow Warbler	4	1571	5	113
Tennessee Warbler	5	1161	7	96
House Wren	7	973	6	100
Traill's Flycatcher	6	933	15	26
American Robin	8	848	9	56
Chipping Sparrow	9	788	11	43
Lincoln's Sparrow	11	659	8	65
Northern Waterthrush	10	642	12	39
White-throated Sparrow	12	616	14	27
Cedar Waxwing	13	608	3	153
Swainson's Thrush	14	386	13	29
Least Flycatcher	15	371	17	20
White-crowned Sparrow	16	325		
Ovenbird	17	311	20	16
Black-capped Chickadee	18	252		
Warbling Vireo	19	231	16	24
Ruby-crowned Kinglet	20	226		
House Finch			10	45
Western Wood-Pewee			18	19
Downy Woodpecker			19	18

\* includes Alder and Willow Flycatcher

## **Appendix 3**



**CRITERIA USED TO DEFINE AND PRIORITIZE MONITORED SPECIES  
(From Bird Studies Canada)**

**Monitored Species**

Mean number banded each year  $\geq 10$ , and mean number of days each year on which individuals banded  $\geq 5$ .

**Priority for Migration Monitoring**

- A** Those species that have <50% of Canadian and Alaskan breeding range covered by the Breeding Bird Survey and <60% of winter range within Canada and U.S.
- B** Those species that have <50% of Canadian and Alaskan breeding range covered by the Breeding Bird Survey but 60% of their winter range is within Canada and U.S.
- C** Those species with <60% coverage of Canadian and Alaskan breeding range (but 50% of NA range) covered by the Breeding Bird Survey and have <60% of wintering range in Canada and U.S.
- D** Those species with <60% coverage of Canadian and Alaskan breeding range covered by the Breeding Bird Survey but have >60% of their wintering range in Canada and U.S.
- E** Those species with >60% coverage of Canadian and Alaskan breeding range covered by the Breeding Bird Survey but have <60% of their wintering range in Canada and U.S.
- F** Those species with >60% coverage of Canadian and Alaskan breeding range covered by the Breeding Bird Survey and have >60% of their wintering range in Canada and U.S.

### Appendix 3. Monitored Species at Inglewood Bird Sanctuary

Species	Spring	Fall	Priority
	2002-2008	1995-2008	
	Mean	Mean	
	New Bandings	New Bandings	
Western Wood-Pewee		14	C
Traill's Flycatcher		67	A
Least Flycatcher	13	27	C
Eastern Kingbird		13	C
Warbling Vireo		17	C
Tree Swallow	17		C
House Wren	18	70	E
Ruby-crowned Kinglet		16	B
Swainson's Thrush	43	28	A
American Robin	33	61	D
Gray Catbird	14	43	E
Cedar Waxwing			D
Tennessee Warbler		83	A
Orange-crowned Warbler	16	114	A
Yellow Warbler	17	112	C
Yellow-rumped Warbler	128	292	B
Blackpoll Warbler		12	A
American Redstart		13	C
Ovenbird		22	C
Northern Waterthrush		46	A
Wilson's Warbler		158	A
Chipping Sparrow	23	56	C
Clay-colored Sparrow	19	16	C
Song Sparrow		13	D
Lincoln's Sparrow	33	47	A
White-throated Sparrow		44	B
White-crowned Sparrow		23	B
Total	3	8	A
	1	4	B
	5	9	C

## **Appendix 4**

**Appendix 4. Year-to-Year Recaptures at Inglewood Bird Sanctuary,  
Dunbow Road, Cominco Natural Area, Dinosaur Provincial Park and De Wit Ranch**

Species	Band	Location	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Northern Saw-whet Owl	1204-23480	De Wit ranch													B	d	FD in next L-L N		
Northern Saw-whet Owl	1204-25371	De Wit ranch													B	x	r		
Northern Saw-whet Owl	0924-21506	De Wit ranch														B	r		
Northern Saw-whet Owl	0924-21813	De Wit ranch														B	x	x	r
Northern Saw-whet Owl	1204-25383	De Wit ranch													B	x	x	r	
Belted Kingfisher	1283-88929	IBS															B	r	
Belted Kingfisher	1363-70918	IBS			B	r													
Belted Kingfisher	1363-70961	IBS											B	r					
Belted Kingfisher	1363-71000	IBS															B	r	
Yellow-bellied Sapsucker	8051-65119	Dunbow						B	r										
Yellow-bellied Sapsucker	8001-77959	DPP															B	r	
Yellow-bellied Sapsucker	8001-77960	DPP															B	r	
Red-naped Sapsucker	8041-54901	Dunbow							B	r									
Downy Woodpecker	1451-67033	IBS				B	r	r	x	x	x	r							
Downy Woodpecker	1461-02314	IBS					B	r	r	r									
Downy Woodpecker	1461-05307	Dunbow						B	x	r									
Downy Woodpecker	1461-50837	Cominco									B	r							
Downy Woodpecker	1461-63690	IBS			B	r													
Downy Woodpecker	1461-84563	Cominco									B	r							
Downy Woodpecker	1761-28014	Cominco									B	r							
Downy Woodpecker	1791-28009	IBS											B	r	r	r			
Downy Woodpecker	1791-28131	IBS										B	r	r	r				
Downy Woodpecker	1811-73700	IBS													B	x	r		
Downy Woodpecker	1871-73165	IBS														B	r		
Downy Woodpecker	1871-73196	IBS														B	r		
Downy Woodpecker	1871-73382	IBS														B	r		
Downy Woodpecker	1871-73457	IBS													B	r	r	r	
Downy Woodpecker	1901-94973	IBS																B	r
Hairy Woodpecker	0962-90911	IBS				B	x	x	x	x	r	x	r						
Hairy Woodpecker	1152-38713	IBS							B	x	r	x	r						
Hairy Woodpecker	8041-83240	IBS													B	x	r		
Northern Flicker	1383-76804	IBS							B	x	x	r							
Northern Flicker	1383-76830	IBS											B	r	r				

**Appendix 4. Year-to-Year Recaptures at Inglewood Bird Sanctuary,  
Dunbow Road, Cominco Natural Area, Dinosaur Provincial Park and De Wit Ranch**

Species	Band	Location	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	
Northern Flicker	1453-31301	IBS				B	r													
Western Wood-Pewee	2160-19068	IBS							B	x	x	r								
Western Wood-Pewee	2160-19487	IBS								B	x	r								
Western Wood-Pewee	2190-10406	IBS										B	r							
Western Wood-Pewee	2200-47351	IBS										B	r	r	r	r				
Western Wood-Pewee	2290-37207	IBS															B	r		
Western Wood-Pewee	2290-88513	IBS													B	r				
Least Flycatcher	2050-70767	Dunbow						B	x	r										
Least Flycatcher	2290-37714	DPP															B	r		
Least Flycatcher	2290-37255	IBS															B	r		
Least Flycatcher	2430-31064	IBS															B	r		
Least Flycatcher	2490-22361	IBS																B	r	
Eastern Kingbird	1451-38640	IBS	B	x	x	r														
Eastern Kingbird	1461-31482	IBS							B	x	x	x	r							
Eastern Kingbird	1461-50853	Cominco									B	r							recaptured at IBS	
Eastern Kingbird	1461-50898	Cominco									B	r								recaptured at IBS
Eastern Kingbird	1461-50899	Cominco									B	r								
Eastern Kingbird	1461-63719	IBS					B	r	x	r	x	x	r							
Eastern Kingbird	1461-63727	IBS					B	x	x	x	r									
Eastern Kingbird	1461-63750	IBS						B	r	r	x	x	r							
Eastern Kingbird	1761-28292	IBS										B	r							
Eastern Kingbird	1791-21021	IBS										B	x	r	r	x	x	x	r	
Eastern Kingbird	1811-73189	IBS												B	x	x	r			
Eastern Kingbird	1871-73181	IBS														B	r	r	r	
Eastern Kingbird	1871-73452	IBS													B	r				
Eastern Kingbird	1901-94517	IBS															B	r		
Warbling Vireo	1950-45045	IBS			B	r														
Warbling Vireo	1950-45076	IBS			B	x	r	r	r											
Warbling Vireo	1950-48110	IBS		B	x	r														
Warbling Vireo	1990-57936	IBS									B	x	r	r						
Warbling Vireo	2050-70837	IBS						B	r											
Warbling Vireo	2050-70961	IBS					B	x	r											
Warbling Vireo	2091-55780	IBS														B	r	r		

**Appendix 4. Year-to-Year Recaptures at Inglewood Bird Sanctuary,  
Dunbow Road, Cominco Natural Area, Dinosaur Provincial Park and De Wit Ranch**

Species	Band	Location	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Warbling Vireo	2161-14605	IBS				B	x	x	r										
Warbling Vireo	2171-56330	Cominco									B	r							
Warbling Vireo	2190-10445	IBS										B	r						
Warbling Vireo	2220-34455	Cominco									B	r							
Warbling Vireo	2270-23115	IBS											B	x	r	r			
Warbling Vireo	2270-80426	IBS												B	r				
Warbling Vireo	2490-22596	IBS																B	r
Warbling Vireo	3101-45254	IBS								B	r								
Warbling Vireo	3101-89999	IBS								B	x	x	r						
Warbling Vireo	3121-21265	Cominco									B	r							
Black-billed Magpie	0624-79522	IBS												B	x	x	x	r	
Black-billed Magpie	1363-70976	IBS													B	x	x	r	
Tree Swallow	1671-56106	IBS												B	r				
Tree Swallow	1671-56108	IBS												B	x	x	r		
Tree Swallow	1671-56126	IBS												B	r	r	x	x	r
Tree Swallow	2161-08849	IBS													B	x	x	r	
Tree Swallow	2161-08859	IBS													B	r	r		
Tree Swallow	2161-08860	IBS													B	r			
Tree Swallow	2161-08869	IBS													B	r			
Tree Swallow	2161-08872	IBS													B	r			
Tree Swallow	2171-56486	IBS											B	x	r				
Tree Swallow	2171-56493	IBS											B	x	r				
Tree Swallow	2181-72921	IBS															B	r	
Tree Swallow	2181-72922	IBS															B	r	
Tree Swallow	2181-72930	IBS															B	r	
Tree Swallow	2181-72952	IBS															B	r	
Tree Swallow	2181-72955	IBS															B	r	
Tree Swallow	2221-30533	IBS																B	r
Northern Rough-winged Swallow	2290-88401	IBS													B	r			
Northern Rough-winged Swallow	2290-37070	IBS														B	x	r	
Northern Rough-winged Swallow	2290-37386	IBS														B	r		
Black-capped Chickadee	1950-45065	IBS			B	r													
Black-capped Chickadee	1950-45186	IBS			B	r	r	r											

**Appendix 4. Year-to-Year Recaptures at Inglewood Bird Sanctuary,  
Dunbow Road, Cominco Natural Area, Dinosaur Provincial Park and De Wit Ranch**

Species	Band	Location	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Black-capped Chickadee	1950-45254	IBS			B	r	r	x	x	r	r	r							
Black-capped Chickadee	1950-45255	IBS			B	x	x	x	x	x	r	r							
Black-capped Chickadee	1950-45256	IBS			B	r	r												
Black-capped Chickadee	1950-45258	IBS			B	r	r	r	r										
Black-capped Chickadee	1950-45786	IBS					B	r											
Black-capped Chickadee	1980-79991	IBS				B	r	r	r	r	r	r							
Black-capped Chickadee	1990-57154	IBS						B	r										
Black-capped Chickadee	2050-70142	IBS				B	x	r											
Black-capped Chickadee	2050-70427	IBS					B	r											
Black-capped Chickadee	2050-70848	IBS						B	x	x	x	x	x	x	x	x	x	r	
Black-capped Chickadee	2050-70849	IBS						B	r										
Black-capped Chickadee	2120-00102	Dunbow						B	r	r									
Black-capped Chickadee	2120-00103	Dunbow						B	r										
Black-capped Chickadee	2120-00105	Dunbow						B	r	r									
Black-capped Chickadee	2120-00107	Dunbow						B	r	r									
Black-capped Chickadee	2120-00109	Dunbow						B	r	r									
Black-capped Chickadee	2120-00110	Dunbow						B	r										
Black-capped Chickadee	2120-00113	Dunbow						B	r										
Black-capped Chickadee	2120-00114	Dunbow						B	r										
Black-capped Chickadee	2120-00117	Dunbow						B	r	r									
Black-capped Chickadee	2120-00124	Dunbow						B	x	r									
Black-capped Chickadee	2120-00125	Dunbow						B	r										
Black-capped Chickadee	2120-00128	Dunbow						B	r										
Black-capped Chickadee	2120-00197	Dunbow						B	r										
Black-capped Chickadee	2160-18085	Dunbow							B	r									
Black-capped Chickadee	2160-18119	IBS							B	x	x	x	x	x	x	x	x	r	
Black-capped Chickadee	2160-18180	IBS						B	r										
Black-capped Chickadee	2160-18704	IBS							B	r									
Black-capped Chickadee	2160-19059	IBS							B	r									
Black-capped Chickadee	2160-19120	IBS							B	r	r	r	r	r					
Black-capped Chickadee	2160-19174	IBS							B	r									
Black-capped Chickadee	2160-19522	IBS								B	r	r	r	r	r				
Black-capped Chickadee	2190-10126	IBS									B	r	r						

**Appendix 4. Year-to-Year Recaptures at Inglewood Bird Sanctuary,  
Dunbow Road, Cominco Natural Area, Dinosaur Provincial Park and De Wit Ranch**

Species	Band	Location	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Black-capped Chickadee	2190-10128	IBS									B	x	r						
Black-capped Chickadee	2200-47365	IBS										B	r						
Black-capped Chickadee	2220-13397	IBS											B	x	x	x	x	x	r
Black-capped Chickadee	2220-34017	Cominco									B	r							
Black-capped Chickadee	2220-34132	Cominco									B	r							
Black-capped Chickadee	2220-34593	Cominco									B	r							
Black-capped Chickadee	2270-23454	IBS											B	r	r	r	r		
Black-capped Chickadee	2270-80108	IBS											B	r	r	r			
Black-capped Chickadee	2270-80454	IBS												B	r	r	r	r	
Black-capped Chickadee	2270-80480	IBS												B	r				
Black-capped Chickadee	2270-80687	IBS												B	r				
Black-capped Chickadee	2270-80989	IBS													B	r			
Black-capped Chickadee	2270-81230	IBS														B	r		
Black-capped Chickadee	2270-81297	IBS														B	x	r	
Black-capped Chickadee	2270-81338	IBS															B	r	
Black-capped Chickadee	2290-37241	IBS															B	r	
Black-capped Chickadee	2290-37640	IBS															B	r	
Black-capped Chickadee	2290-37793	DPP															B	r	
Black-capped Chickadee	2290-88414	IBS													B	x	x	r	
Black-capped Chickadee	2290-88658	IBS													B	r	r	r	r
Black-capped Chickadee	2290-92058	IBS												B	r				
Black-capped Chickadee	2290-92141	IBS												B	r	r	r	x	r
Black-capped Chickadee	2290-92174	IBS												B	r				
Black-capped Chickadee	2290-37242	IBS															B	r	
Black-capped Chickadee	2290-37348	IBS														B	r		
Black-capped Chickadee	2390-30780	IBS										B	r						
Black-capped Chickadee	2390-30780	IBS										B	x	r					
Black-capped Chickadee	2390-30962	IBS											B	r					
Black-capped Chickadee	2430-31003	IBS															B	r	
Black-capped Chickadee	2490-22455	IBS																B	r
Black-capped Chickadee	2490-22713	IBS																B	r
Black-capped Chickadee	2500-72501	IBS																B	r
Black-capped Chickadee	3500-89670	Dunbow						B	r	r									



**Appendix 4. Year-to-Year Recaptures at Inglewood Bird Sanctuary,  
Dunbow Road, Cominco Natural Area, Dinosaur Provincial Park and De Wit Ranch**

Species	Band	Location	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
White-breasted Nuthatch	1461-31479	IBS							B	r	r								
White-breasted Nuthatch	1461-84757	IBS				B	r	x	r										
White-breasted Nuthatch	1761-15767	IBS											B	r					
White-breasted Nuthatch	1761-28100	IBS																	
White-breasted Nuthatch	1791-28150	IBS										B	r						
White-breasted Nuthatch	1811-73193	IBS												B	x	r			
White-breasted Nuthatch	1901-94527	IBS															B	r	r
White-breasted Nuthatch	2221-45958	IBS																B	r
House Wren	1910-52261	IBS	B	r	x	r	r	r	r										
House Wren	1950-45790	IBS					B	r											
House Wren	1950-45886	IBS					B	r											
House Wren	1950-48126	IBS		B	x	r													
House Wren	1990-57803	Cominco									B	r							
House Wren	1990-57943	IBS									B	r							
House Wren	1990-57981	IBS									B	r	r	r	r	r			
House Wren	2060-28447	IBS						B	r										
House Wren	2160-18063	Dunbow							B	r									
House Wren	2160-18082	Dunbow							B	r									
House Wren	2160-19002	Dunbow							B	r									
House Wren	2190-10308	IBS									B	r							
House Wren	2190-10325	IBS										B	r						
House Wren	2200-47352	IBS										B	r						
House Wren	2200-47377	IBS										B	r	r	r				
House Wren	2220-13252	IBS											B	x	r	x	r		
House Wren	2220-13258	IBS											B	x	r				
House Wren	2270-23312	IBS											B	r					
House Wren	2270-23375	IBS											B	r					
House Wren	2270-23485	IBS											B	r					
House Wren	2270-80132	IBS											B	r					
House Wren	2270-80192	IBS												B	r				
House Wren	2270-80296	IBS												B	x	x	r		
House Wren	2270-80297	IBS												B	r	r			
House Wren	2270-80314	IBS												B	x	r			

**Appendix 4. Year-to-Year Recaptures at Inglewood Bird Sanctuary,  
Dunbow Road, Cominco Natural Area, Dinosaur Provincial Park and De Wit Ranch**

Species	Band	Location	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
House Wren	2270-80336	IBS												B	r				
House Wren	2270-80346	IBS												B	r				
House Wren	2270-80400	IBS												B	r				
House Wren	2270-80454	IBS												B	r				
House Wren	2270-81375	IBS															B	r	
House Wren	2270-81418	IBS													B	x	r		
House Wren	2290-37017	IBS														B	r		
House Wren	2290-37184	IBS														B	r		
House Wren	2290-37206	IBS															B	x	r
House Wren	2290-37286	IBS															B	r	
House Wren	2290-37293	IBS															B	r	
House Wren	2290-37313	IBS														B	x	r	
House Wren	2290-37331	IBS														B	r		
House Wren	2290-37483	IBS														B	r		
House Wren	2290-37489	IBS														B	r	r	
House Wren	2290-37638	IBS																B	r
House Wren	2290-37710	DPP															B	r	
House Wren	2290-37724	DPP															B	r	
House Wren	2290-37732	DPP															B	r	
House Wren	2290-37748	DPP															B	r	
House Wren	2290-37762	DPP															B	r	
House Wren	2290-37770	DPP															B	r	
House Wren	2290-88409	IBS													B	r			
House Wren	2290-88460	IBS													B	r			
House Wren	2290-88533	IBS													B	x	x	r	r
House Wren	2290-92112	IBS												B	r				
House Wren	2290-92203	IBS												B	r				
House Wren	2430-31067	IBS															B	r	r
House Wren	2490-22377	IBS																B	r
House Wren	2490-22484	IBS																B	r
House Wren	2490-22526	IBS																B	r
House Wren	2500-72525	IBS																B	r
House Wren	2500-72564	IBS																B	r

**Appendix 4. Year-to-Year Recaptures at Inglewood Bird Sanctuary,  
Dunbow Road, Cominco Natural Area, Dinosaur Provincial Park and De Wit Ranch**

Species	Band	Location	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
House Wren	2500-72584	IBS																B	r
Swainson's Thrush	1451-67159	IBS					B	x	r										
Swainson's Thrush	1461-63572	IBS						B	r										
Swainson's Thrush	1461-63682	IBS			B	x	r												
Swainson's Thrush	1461-63692	IBS			B	x	x	r											
Swainson's Thrush	1461-63741	IBS					B	r											
Swainson's Thrush	1461-69595	IBS					B	r											
Swainson's Thrush	1541-17673	IBS								B	r	x	r						
Swainson's Thrush	1871-73214	IBS														B	x	r	
American Robin	0942-93625	IBS											B	d					
American Robin	0942-93635	IBS											B	r					
American Robin	0942-93643	IBS											B	r					
American Robin	0942-93654	IBS												B	r				
American Robin	0942-93655	IBS												B	r	x	r		
American Robin	0942-93660	IBS												B	r				
American Robin	0942-93686	IBS												B	x	x	x	d	
American Robin	0942-93694	IBS												B	x	d			
American Robin	0942-93747	IBS												B	r				
American Robin	0942-93786	IBS												B	x	r			
American Robin	0962-90991	IBS				B	x	r											
American Robin	0972-30082	IBS										B	r						
American Robin	0972-30083	IBS										B	r	r					
American Robin	0972-30087	IBS										B	r						
American Robin	0972-30095	IBS										B	x	r					
American Robin	0972-30466	IBS				B	x	r											
American Robin	0942-93731	IBS												B	x	x	r		
American Robin	1142-49046	IBS						B	r										
American Robin	1142-49201	Dunbow						B	r										
American Robin	1142-49212	Dunbow						B	x	r									
American Robin	1142-49217	Dunbow						B	r										
American Robin	1142-49221	Dunbow						B	r										
American Robin	1142-49261	IBS											B	r		r			
American Robin	1142-49270	IBS											B	x	r				

**Appendix 4. Year-to-Year Recaptures at Inglewood Bird Sanctuary,  
Dunbow Road, Cominco Natural Area, Dinosaur Provincial Park and De Wit Ranch**

Species	Band	Location	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
American Robin	1142-49272	IBS											B	x	x	x	r		
American Robin	1142-55013	IBS										B	x	x	x	x	r		
American Robin	1142-55058	IBS																	
American Robin	1152-38703	Dunbow							B	r									
American Robin	1152-38721	IBS							B	x	x	x	x	x	r	r	r		
American Robin	1152-38740	IBS							B	r	x	r	x	r					
American Robin	1152-38887	IBS									B	r							
American Robin	1202-13232	IBS													B	r			
American Robin	1202-13233	IBS														B	r		
American Robin	1202-13232	IBS													B	r			
American Robin	1202-13243	IBS													B	r			
American Robin	1202-13272	IBS													B	r	r		
American Robin	1202-13302	IBS														B	r	r	
American Robin	1202-13308	IBS														B	r		
American Robin	1202-13333	IBS														B	r		
American Robin	1202-13337	IBS														B	r		
American Robin	1202-13338	IBS														B	r		
American Robin	1202-13340	IBS														B	x	r	
American Robin	1202-13345	IBS														B	r		
American Robin	1202-13368	IBS														B	r		
American Robin	1202-13384	IBS														B	r		
American Robin	1202-13386	IBS														B	r	r	r
American Robin	1202-13431	IBS															B	r	
American Robin	1202-13475	IBS															B	r	
American Robin	1202-13476	IBS															B	r	
American Robin	1202-13520	IBS																B	r
American Robin	1202-13521	IBS																B	r
American Robin	1202-13524	IBS																B	r
American Robin	1202-13528	IBS																B	r
American Robin	1202-13571	IBS																B	r
American Robin	1202-13572	IBS																B	r
American Robin	1202-13576	IBS																B	r
American Robin	1202-13581	IBS																B	r

**Appendix 4. Year-to-Year Recaptures at Inglewood Bird Sanctuary,  
Dunbow Road, Cominco Natural Area, Dinosaur Provincial Park and De Wit Ranch**

Species	Band	Location	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Gray Catbird	1681-67028	Cominco									B	r							
Gray Catbird	1681-67080	IBS										B	r						
Gray Catbird	1681-67087	IBS										B	r						
Gray Catbird	1871-73213	IBS														B	r		
Gray Catbird	8001-77934	DPP															B	r	
Gray Catbird	8001-77944	DPP															B	r	
Gray Catbird	8001-77952	DPP															B	r	
Gray Catbird	8001-77955	DPP															B	r	
Gray Catbird	8041-54948	IBS							B	r									
Gray Catbird	8041-54987	IBS								B	x	r	x	r					
Gray Catbird	8041-59443	Cominco										B	x	x	x	x	r		recap
Gray Catbird	8041-83021	Cominco									B	r							
Gray Catbird	8041-83028	Cominco									B	r			recaptured at IBS				
Gray Catbird	8041-83041	Cominco									B	r							
Gray Catbird	8041-83086	IBS											B	r					
Gray Catbird	8041-83101	IBS												B	r				
Gray Catbird	8041-83211	IBS													B	x	x	r	
Gray Catbird	8041-83301	IBS														B	x	r	r
Gray Catbird	8041-83314	IBS															B	x	r
Gray Catbird	8041-83381	IBS																B	r
Cedar Waxwing	1461-50802	Cominco									B	r							
Cedar Waxwing	1461-63733	IBS					B	r											
Tennessee Warbler	2300-06276	IBS														B	r		
Orange-crowned Warbler	2160-18542	IBS							B	r									
Yellow Warbler	1910-52230	IBS	B	x	x	r													
Yellow Warbler	1950-45519	IBS				B	r	x	r										
Yellow Warbler	1950-45878	IBS					B	r	r										
Yellow Warbler	1950-48086	IBS		B	x	r													
Yellow Warbler	1950-48129	IBS		B	x	r	r												
Yellow Warbler	1950-48133	IBS		B	x	r													
Yellow Warbler	1980-79983	IBS				B	r	r	r	r									
Yellow Warbler	1990-57104	Dunbow						B	r										
Yellow Warbler	1990-57734	Cominco									B	r							

**Appendix 4. Year-to-Year Recaptures at Inglewood Bird Sanctuary,  
Dunbow Road, Cominco Natural Area, Dinosaur Provincial Park and De Wit Ranch**

Species	Band	Location	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Yellow Warbler	1990-57738	Cominco									B	r							
Yellow Warbler	1990-57802	Cominco									B	r							
Yellow Warbler	1990-57864	Cominco									B	r							
Yellow Warbler	1990-57898	Cominco									B	r							
Yellow Warbler	1990-57916	Cominco									B	r							
Yellow Warbler	1990-57935	IBS									B	x	r						
Yellow Warbler	2050-70144	IBS				B	r												
Yellow Warbler	2070-42756	IBS						B	r										
Yellow Warbler	2120-00181	Dunbow						B	r										
Yellow Warbler	2160-19158	IBS							B	r									
Yellow Warbler	2160-18045	Dunbow							B	r									
Yellow Warbler	2160-18068	Dunbow							B	r									
Yellow Warbler	2160-18077	Dunbow							B	r									
Yellow Warbler	2160-19059	IBS							B	r									
Yellow Warbler	2160-19576	IBS								B	x	r							
Yellow Warbler	2160-19766	IBS								B	r	r							
Yellow Warbler	2190-10407	IBS										B	x	r					
Yellow Warbler	2200-47358	Cominco										B	x	r					
Yellow Warbler	2200-47371	IBS										B	x	x	r				
Yellow Warbler	2200-47400	IBS										B	r						
Yellow Warbler	2220-13037	IBS											B	r					
Yellow Warbler	2220-13250	IBS											B	r					
Yellow Warbler	2220-13252	IBS											B	x	x	x	r	r	
Yellow Warbler	2220-13258	IBS											B	r					
Yellow Warbler	2220-13262	IBS											B	r					
Yellow Warbler	2220-13397	IBS											B	r					
Yellow Warbler	2220-34098	Cominco									B	r							
Yellow Warbler	2220-34171	Cominco									B	r							
Yellow Warbler	2220-34293	Cominco									B	r							
Yellow Warbler	2220-34320	Cominco									B	r							
Yellow Warbler	2220-34370	Cominco									B	x	x	x	x	x	r		
Yellow Warbler	2220-34423	Cominco									B	r							
Yellow Warbler	2220-34438	Cominco									B	r							

**Appendix 4. Year-to-Year Recaptures at Inglewood Bird Sanctuary,  
Dunbow Road, Cominco Natural Area, Dinosaur Provincial Park and De Wit Ranch**

Species	Band	Location	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Yellow Warbler	2270-23132	IBS											B	r					
Yellow Warbler	2270-23288	IBS											B	r					
Yellow Warbler	2270-23333	IBS											B	r					
Yellow Warbler	2270-23346	IBS											B	r					
Yellow Warbler	2270-23419	IBS											B	x	x	r	x	r	r
Yellow Warbler	2270-80288	IBS												B	r	r			
Yellow Warbler	2270-80303	IBS												B	x	x	r		
Yellow Warbler	2270-80307	IBS												B	r				
Yellow Warbler	2270-80319	IBS												B	x	x	x	r	
Yellow Warbler	2270-80347	IBS												B	x	r			
Yellow Warbler	2270-80421	IBS												B	r				
Yellow Warbler	2270-80447	IBS												B	x	x	r		
Yellow Warbler	2270-80596	IBS													B	x	r		
Yellow Warbler	2270-80777	IBS													B	r	r		
Yellow Warbler	2270-80781	IBS													B	r			
Yellow Warbler	2270-80785	IBS													B	x	r		
Yellow Warbler	2270-80861	IBS													B	r			
Yellow Warbler	2270-81400	IBS															B	r	
Yellow Warbler	2290-37023	IBS														B	r		
Yellow Warbler	2290-37050	IBS														B	r		
Yellow Warbler	2290-37231	IBS															B	r	
Yellow Warbler	2290-37253	IBS															B	r	
Yellow Warbler	2290-37258	IBS															B	r	
Yellow Warbler	2290-37297	IBS															B	r	
Yellow Warbler	2290-37311	IBS														B	r		
Yellow Warbler	2290-37383	IBS														B	r		
Yellow Warbler	2290-37757	DPP															B	r	
Yellow Warbler	2290-37761	DPP															B	r	
Yellow Warbler	2290-88365	IBS													B	x	r	r	r
Yellow Warbler	2290-88550	IBS													B	r	r	r	
Yellow Warbler	2290-92164	IBS												B	x	x	r		
Yellow Warbler	2290-92197	IBS												B	r	r			
Yellow Warbler	2390-30570	IBS										B	r	x	r	x	x	r	

**Appendix 4. Year-to-Year Recaptures at Inglewood Bird Sanctuary,  
Dunbow Road, Cominco Natural Area, Dinosaur Provincial Park and De Wit Ranch**

Species	Band	Location	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Yellow Warbler	2430-31256	IBS															B	x	r
Yellow Warbler	2490-22209	IBS																B	r
Yellow Warbler	2490-22329	IBS																B	r
Yellow Warbler	2490-22344	IBS																B	r
Yellow Warbler	2490-22349	IBS																B	r
Yellow Warbler	2490-22356	IBS																B	r
Yellow Warbler	2490-22383	IBS																B	r
Yellow Warbler	2490-22424	IBS																B	r
Yellow Warbler	2500-72656	IBS																B	r
Yellow Warbler	2500-72604	IBS																B	r
Yellow Warbler	3500-89667	Dunbow						B	x	r									
Yellow-rumped Warbler	1910-52603	IBS	B	r															
Yellow-rumped Warbler	2290-37137	IBS														B	r		
Spotted Towhee	8001-77974	DPP															B	r	
Clay-colored Sparrow	1990-57805	Cominco									B	x	x	r					
Clay-colored Sparrow	2050-70675	Dunbow						B	x	r									
Clay-colored Sparrow	2120-00157	Dunbow						B	r	r									
Clay-colored Sparrow	2120-00170	Dunbow						B	x	r									
Clay-colored Sparrow	2120-00176	Dunbow						B	r										
Clay-colored Sparrow	2160-18022	Dunbow							B	r									
Clay-colored Sparrow	2160-18028	Dunbow							B	r									
Clay-colored Sparrow	2160-18030	Dunbow							B	r									
Clay-colored Sparrow	2160-19504	IBS								B	x	x	r						
Clay-colored Sparrow	2220-34456	Cominco									B	r							
Clay-colored Sparrow	2220-34615	Cominco									B	r							
Clay-colored Sparrow	2270-23483	IBS									B	r							
Clay-colored Sparrow	2270-81350	IBS															B	r	
Clay-colored Sparrow	2390-30503	IBS										B	x	r					
Vesper Sparrow	1461-05331	Dunbow						B	r										
Vesper Sparrow	1461-31412	Dunbow							B	r									
Savannah Sparrow	2171-56304	Cominco									B	r							
Song Sparrow	1541-17836	Cominco									B	r							
Song Sparrow	1541-17895	Cominco									B	r							





**Appendix 4. Year-to-Year Recaptures at Inglewood Bird Sanctuary,  
Dunbow Road, Cominco Natural Area, Dinosaur Provincial Park and De Wit Ranch**

Species	Band	Location	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Song Sparrow	1861-68929	IBS													B	r			
Song Sparrow	1871-73157	IBS														B	r		
Song Sparrow	1871-73227	IBS														B	r		
Song Sparrow	1901-94717	IBS															B	r	
Lincoln's Sparrow	1671-56128	IBS												B	r				
Lincoln's Sparrow	2091-55732	IBS														B	r		
Lincoln's Sparrow	2161-14607	IBS				B	r												
Lincoln's Sparrow	3121-21261	Cominco									B	r							
White-throated Sparrow	1791-28046	IBS											B	r					
White-throated Sparrow	1871-73465	IBS													B	r			
Red-winged Blackbird	8041-83032	Cominco									B	r							
Brown-headed Cowbird	1461-05333	Dunbow						B	r										
Brown-headed Cowbird	1461-31414	Dunbow							B	r									
Brown-headed Cowbird	1541-17842	Cominco									B	r							
Brown-headed Cowbird	1681-67124	IBS											B	x	x	x	x	r	
Brown-headed Cowbird	1761-28251	IBS										B	r						
Brown-headed Cowbird	1791-28013	IBS											B	r	r	r	r		
Brown-headed Cowbird	1811-73648	IBS													B	r			
Brown-headed Cowbird	1871-73167	IBS														B	r		
Brown-headed Cowbird	1871-73199	IBS														B	r		
Brown-headed Cowbird	1901-94903	IBS																B	r
Brown-headed Cowbird	1901-94914	IBS																B	r
Brown-headed Cowbird	8041-54991	Cominco									B	r							
Brown-headed Cowbird	8041-54992	Cominco									B	r							
Brown-headed Cowbird	8041-83003	Cominco									B	r							
Brown-headed Cowbird	8041-83005	Cominco									B	r							
Brown-headed Cowbird	8041-83019	Cominco									B	r							
Brown-headed Cowbird	8041-83245	Cominco														B	x	r	
Baltimore Oriole	8041-54908	IBS							B	r									
Baltimore Oriole	8041-83030	Cominco									B	r							
Baltimore Oriole	8041-83090	IBS											B	r					
Baltimore Oriole	8041-83201	IBS													B	r			
Baltimore Oriole	8041-83221	IBS													B	r	x	x	r

**Appendix 4. Year-to-Year Recaptures at Inglewood Bird Sanctuary,  
Dunbow Road, Cominco Natural Area, Dinosaur Provincial Park and De Wit Ranch**

Species	Band	Location	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Baltimore Oriole	8041-83222	IBS													B	x	r		
Baltimore Oriole	8041-83274	IBS														B	r	r	
Baltimore Oriole	8041-83326	IBS															B	x	r
Baltimore Oriole	8041-83388	IBS																B	r
Baltimore Oriole	8051-65131	IBS						B	r										
American Goldfinch	1990-57875	Cominco									B	r							
American Goldfinch	2120-00188	Dunbow						B	x	r									
American Goldfinch	2190-10309	IBS									B	x	r	r	r				
American Goldfinch	2220-34131	Cominco									B	r							
American Goldfinch	2220-34245	Cominco									B	r							
American Goldfinch	2270-23364	IBS											B	x	r				
American Goldfinch	2270-80350	Cominco												B	r				
American Goldfinch	2270-80353	Cominco												B	r				
American Goldfinch	2290-37381	IBS														B	r		
American Goldfinch	2500-72519	IBS																B	r
American Goldfinch	2500-72588	IBS																B	r

B year banded  
r recaptured  
d bird dead or remains found  
x not detected but survival deduced from re-encounter in subsequent year

 change in species  
 banding location different than recapture location

## **Appendix 5**

## Appendix 5. New captures during MoSI and Migration Monitoring at Las Caletas 2008

SPECIES	Total	Monitoreo de Supervivencia Invernal (MoSI)										Migration Monitoring (MM)									
		17-Mar	18-Mar	19-Mar	20-Mar	21-Mar	22-Mar	23-Mar	24-Mar	25-Mar	26-Mar	27-Mar	28-Mar	29-Mar	30-Mar	31-Mar	01-Apr	02-Apr	03-Apr	04-Apr	05-Apr
Double-toothed Kite	1						1														
Tiny Hawk	1								1												
Gray-chested Dove	7		1							1		1								1	
Ruddy Quail-Dove	3			1																	
Bronzy Hermit	2	1																			
Band-tailed Barbthroat	11	1			1							1								1	1
Long-billed Hermit	7	1	1	1						1				1		1					1
White-necked Jacobin	2	2																			
Violet-crowned Woodnymph	8	2					1					1		1		1	1				
Blue-throated Goldentail	4																				1
Charming Hummingbird	18			3			3	1	1			1	1	2	1		1			1	
Rufous-tailed Hummingbird	2				1																1
Black-throated Trogon	1																				
Blue-crowned Motmot	1																				
Olivaceous Piculet	1							1													
Buff-throated Foliage-gleaner	1													1							
Plain Xenops	5			2	1							1									
Scaly-throated Leaf-tosser	2									1											
Wedge-billed Woodcreeper	9	1			2					1											
Cocoa Woodcreeper	2																1				
Black-striped Woodcreeper	1								1												
Black-hooded Antshrike	3																1				
Slaty Antwren	1											1									
Dot-winged Antwren	2																		1		
Chestnut-backed Antbird	5				1			1			1								1	1	
Black-faced Antthrush	1							1													
Ochre-bellied Flycatcher	4	1	1													1					
Northern Bentbill	1																				
Golden-crowned Spadebill	3					1															
Sulphur-rumped Flycatcher	4																			1	
Yellow-bellied Flycatcher	2	1								1											
Alder Flycatcher	2																				
Bright-rumped Attila	3	1																			
Rufous Mourner	1															1					

## Appendix 5. New captures during MoSI and Migration Monitoring at Las Caletas 2008

SPECIES	Total	Monitoreo de Supervivencia Invernal (MoSI)										Migration Monitoring (MM)									
		17-Mar	18-Mar	19-Mar	20-Mar	21-Mar	22-Mar	23-Mar	24-Mar	25-Mar	26-Mar	27-Mar	28-Mar	29-Mar	30-Mar	31-Mar	01-Apr	02-Apr	03-Apr	04-Apr	05-Apr
Great Crested Flycatcher	3	1																			
Thrush-like Schiffornis	3									1										1	
Orange-collared Manakin	18	4				1			1				1	1	1						1
Blue-crowned Manakin	1								1												
Red-capped Manakin	14	1	1	1					2	1	1	1								1	1
Red-eyed Vireo	1																				
Yellow-green Vireo	2																				
Tawny-crowned Greenlet	6	1				1	1														
Riverside Wren	2													1					1		
House Wren	1																				
Long-billed Gnatwren	5				2									1			1				
Swainson's Thrush	217		1			1	2	1	5	1	1	4	3	3	5	2	8	5	8	9	
Wood Thrush	1								1												
Clay-colored Robin	1																				
Tennessee Warbler	1												1								
Chestnut-sided Warbler	3															1	1				
Northern Waterthrush	5							2												1	1
Bananaquit	5		1																	1	
Gray-headed Tanager	9					1							3								
White-shouldered Tanager	3									2									1		
Black-cheeked Ant-Tanager	6		1		1										1	1					
Cherrie's Tanager	9	1		1	1								1								
Green Honeycreeper	4					4															
Shining Honeycreeper	1					1															
Red-legged Honeycreeper	3																				
Blue-black Grassquit	1																				1
Variable Seedeater	14				1					2				1	1						
Thick-billed Seed-Finch	7	2		1									1	1			2				
Orange-billed Sparrow	13	2			1	1			1								2				1
Black-striped Sparrow	5			1																	1
Buff-throated Saltator	2							1													
Blue-black Grosbeak	4		1			1															
<b>Species</b>	66	16	8	7	10	5	8	6	5	8	10	3	7	8	9	6	5	10	6	9	11
<b>Total new bandings</b>	491	23	8	10	12	8	10	7	6	13	12	3	10	12	12	10	6	19	10	16	19

## Appendix 5. New captures during MoSI and Migration Monitoring at Las Caletas 2008

SPECIES	Total	Monitoreo de Supervivencia Invernal (MoSI)										Migration Monitoring (MM)									
		17-Mar	18-Mar	19-Mar	20-Mar	21-Mar	22-Mar	23-Mar	24-Mar	25-Mar	26-Mar	27-Mar	28-Mar	29-Mar	30-Mar	31-Mar	01-Apr	02-Apr	03-Apr	04-Apr	05-Apr
<b>Other unbanded captures</b>																					
Gray-chested Dove	1																				
Band-tailed Barbthroat	5	1																			
Long-billed Hermit	6																				
Stripe-throated Hermit	4	1	1																	1	
Violet-crowned Woodnymph	5																				
Blue-throated Goldentail	5																				
Charming Hummingbird	7				1																
Rufous-tailed Hummingbird	8																				
Antwren spp																					
Northern Bentbill	2																				
Orange-collared Manakin	2																				
Swainson's Thrush	4																				
Northern Waterthrush	1	1																			
Gray-headed Tanager	1																				
Orange-billed Sparrow	1																				
Blue-black Grosbeak	1																				1
<b>Total unbanded other captures</b>	53	3	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
<b>Total new captures</b>	544	26	9	10	13	8	10	7	6	13	12	3	10	12	12	10	6	19	10	17	20
<b>Net hrs</b>	3165	72.6	72.4	78.0	78.0	84.3	84.3	84.8	84.0	84.8	84.5	84.0	74.7	77.0	84.4	85.9	84.0	84.4	84.0	84.0	84.1
<b>New captures/net-hour</b>	0.17	0.36	0.12	0.13	0.17	0.09	0.12	0.08	0.07	0.15	0.14	0.04	0.13	0.16	0.14	0.12	0.07	0.23	0.12	0.20	0.24

Neotropical migrant

## Appendix 5. New captures during MoSI and Migration Monitoring at Las Caletas 2008

SPECIES	Total	Migration Monitoring (MM)																			
		06-Apr	07-Apr	08-Apr	09-Apr	10-Apr	11-Apr	12-Apr	13-Apr	14-Apr	15-Apr	16-Apr	17-Apr	18-Apr	19-Apr	20-Apr	21-Apr	22-Apr	23-Apr	24-Apr	25-Apr
Double-toothed Kite	1																				
Tiny Hawk	1																				
Gray-chested Dove	7			1									1		1						
Ruddy Quail-Dove	3	1									1										
Bronzy Hermit	2				1																
Band-tailed Barbthroat	11	1	2			2	1														
Long-billed Hermit	7																				
White-necked Jacobin	2																				
Violet-crowned Woodnymph	8							1													
Blue-throated Goldentail	4		1	1	1																
Charming Hummingbird	18	1				1	1														
Rufous-tailed Hummingbird	2																				
Black-throated Trogon	1					1															
Blue-crowned Motmot	1		1																		
Olivaceous Piculet	1																				
Buff-throated Foliage-gleaner	1																				
Plain Xenops	5												1								
Scaly-throated Leaf-tosser	2					1															
Wedge-billed Woodcreeper	9	2													1				1	1	
Cocoa Woodcreeper	2																				1
Black-striped Woodcreeper	1																				
Black-hooded Antshrike	3					1															
Slaty Antwren	1																				
Dot-winged Antwren	2																				
Chestnut-backed Antbird	5																				
Black-faced Antthrush	1																				
Ochre-bellied Flycatcher	4					1															
Northern Bentbill	1																			1	
Golden-crowned Spadebill	3										1			1							
Sulphur-rumped Flycatcher	4										1										
Yellow-bellied Flycatcher	2																				
Alder Flycatcher	2																				
Bright-rumped Attila	3				1											1					
Rufous Mourner	1																				

## Appendix 5. New captures during MoSI and Migration Monitoring at Las Caletas 2008

SPECIES	Total	Migration Monitoring (MM)																			
		06-Apr	07-Apr	08-Apr	09-Apr	10-Apr	11-Apr	12-Apr	13-Apr	14-Apr	15-Apr	16-Apr	17-Apr	18-Apr	19-Apr	20-Apr	21-Apr	22-Apr	23-Apr	24-Apr	25-Apr
Great Crested Flycatcher	3									1											1
Thrush-like Schiffornis	3				1																
Orange-collared Manakin	18						1	1				1	1	1		1	1				1
Blue-crowned Manakin	1																				
Red-capped Manakin	14			2																	2
Red-eyed Vireo	1									1											
Yellow-green Vireo	2		1							1											
Tawny-crowned Greenlet	6	1	1			1															
Riverside Wren	2																				
House Wren	1					1															
Long-billed Gnatwren	5						1														
Swainson's Thrush	217	13	16	5	4	10	9	4	12	11	9	3	9	15	9	6	3	3	6	2	9
Wood Thrush	1																				
Clay-colored Robin	1						1														
Tennessee Warbler	1																				
Chestnut-sided Warbler	3					1															
Northern Waterthrush	5														1						
Bananaquit	5					1				1											1
Gray-headed Tanager	9	1			2			1				1									
White-shouldered Tanager	3																				
Black-cheeked Ant-Tanager	6					1				1											
Cherrie's Tanager	9		1			2							1				1				
Green Honeycreeper	4																				
Shining Honeycreeper	1																				
Red-legged Honeycreeper	3			3																	
Blue-black Grassquit	1																				
Variable Seedeater	14			1			3			2										1	2
Thick-billed Seed-Finch	7																				
Orange-billed Sparrow	13					1		1		2					1						
Black-striped Sparrow	5					1				1	1										
Buff-throated Saltator	2														1						
Blue-black Grosbeak	4		1			1															
<b>Species</b>	66	7	8	7	4	6	13	9	4	2	9	3	6	3	6	6	2	3	3	4	6
<b>Total new bandings</b>	491	20	24	14	7	16	23	14	15	12	19	6	14	17	14	12	4	5	8	5	16



## Appendix 5. New captures during MoSI and Migration Monitoring at Las Caletas 2008

SPECIES	Total	Migration Monitoring (MM)																			
		06-Apr	07-Apr	08-Apr	09-Apr	10-Apr	11-Apr	12-Apr	13-Apr	14-Apr	15-Apr	16-Apr	17-Apr	18-Apr	19-Apr	20-Apr	21-Apr	22-Apr	23-Apr	24-Apr	25-Apr
<b>Other unbanded captures</b>																					
Gray-chested Dove	1																				1
Band-tailed Barbthroat	5				1	1	1							1							
Long-billed Hermit	6								1		1	2		1					1		
Stripe-throated Hermit	4										1										
Violet-crowned Woodnymph	5							1	1						1			1	1		
Blue-throated Goldentail	5									2	1	2									
Charming Hummingbird	7									1			2		1			1		1	
Rufous-tailed Hummingbird	8									1				1			2	1	1		2
Antwren spp																					
Northern Bentbill	2														1					1	
Orange-collared Manakin	2										1				1						
Swainson's Thrush	4										1	1		1							1
Northern Waterthrush	1																				
Gray-headed Tanager	1																	1			
Orange-billed Sparrow	1													1							
Blue-black Grosbeak	1																				
<b>Total unbanded other captures</b>	53	0	0	0	1	1	1	1	2	4	5	5	2	5	4	0	2	4	3	2	4
<b>Total new captures</b>	544	20	24	14	8	17	24	15	17	16	24	11	16	22	18	12	6	9	11	7	20
<b>Net hrs</b>	3165	82.5	81.7	81.5	42.9	83.7	82.1	63.0	85.0	82.9	82.7	77.5	78.4	81.0	78.9	76.9	64.4	73.7	76.1	74.7	81.2
<b>New captures/net-hour</b>	0.17	0.24	0.29	0.17	0.19	0.20	0.29	0.24	0.20	0.19	0.29	0.14	0.20	0.27	0.23	0.16	0.09	0.12	0.14	0.09	0.25

Neotropical migrant

## **Appendix 6**

### Appendix 6. Year-to-Year Recaptures at Las Caletas, Costa Rica

Species	Band	2002	2003	2004	2005	2006	2007	2008
Gray-chested Dove	1204		B	x	r			
Gray-chested Dove	1210		B	r	r			
Gray-chested Dove	1211		B	x	x	r	r	
Gray-chested Dove	1215			B	r			
Gray-chested Dove	1231						B	r
Gray-chested Dove	1234						B	r
Ruddy Quail-Dove	2806			B	x	r		
Ruddy Quail-Dove	2808			B	x	r		
Ruddy Quail-Dove	2813				B	x	r	
Bronzy Hermit	0066			B	r			
Band-tailed Barbthroat	0072			B	r			
Band-tailed Barbthroat	0086			B	x	r		
Band-tailed Barbthroat	0290(0094)			B	r	r		
Band-tailed Barbthroat	0166				B	r		
Band-tailed Barbthroat	0237				B	r		
Band-tailed Barbthroat	0285					B	r	
Band-tailed Barbthroat	0329					B	r	
Band-tailed Barbthroat	0574						B	r
Long-billed Hermit	0097				B	r	r	
Long-billed Hermit	0099				B	r		
Long-billed Hermit	0260				B	r		
Long-billed Hermit	0330					B	r	
Long-billed Hermit	0379					B	r	
Violet-crowned Woodnymph	0332(0190)				B	r		
Violet-crowned Woodnymph	0338(0156)					B	r	
Blue-throated Goldentail	0050			B	x	x	r	
Blue-throated Goldentail	0101			B	r	r		
Blue-throated Goldentail	0116			B	x	r		
Blue-throated Goldentail	0137			B	x	r		
Blue-throated Goldentail	0225					B	r	
Charming Hummingbird	0016			B	r			
Charming Hummingbird	0017			B	x	x	x	r
Charming Hummingbird	0047			B	r			
Charming Hummingbird	0163				B	r		
Charming Hummingbird	0177				B	r		
Charming Hummingbird	0196				B	r		
Charming Hummingbird	0197				B	r		
Charming Hummingbird	0326					B	r	
Charming Hummingbird	0328					B	r	
Charming Hummingbird	0375					B	r	
Charming Hummingbird	0382					B	r	
Charming Hummingbird	0546						B	r
Rufous-tailed Hummingbird	0090			B	x	r		
Rufous-tailed Hummingbird	0160				B	r		
Rufous-tailed Hummingbird	0162				B	r		
Rufous-tailed Hummingbird	0278					B	r	
Black-throated Trogon	839	B	x	r				
Black-throated Trogon	0481						B	r
Blue-crowned Motmot	1203		B	r				

### Appendix 6. Year-to-Year Recaptures at Las Caletas, Costa Rica

Species	Band	2002	2003	2004	2005	2006	2007	2008
Blue-crowned Motmot	1208		B	r	x	r	r	r
White-whiskered Puffbird	666			B	r			
Rufous-tailed Jacamar	774		B	r				
Olivaceous Piculet	0038	B	r					
Olivaceous Piculet	0099	B	r					
Olivaceous Piculet	0650				B	r	x	r
Buff-throated Foliage-gleaner	813	B	r	x	r	r	r	
Buff-throated Foliage-gleaner	0904	B	r	r	r	r		
Buff-throated Foliage-gleaner	0463						B	r
Plain Xenops	0009	B	x	x	x	r	r	r
Plain Xenops	0037	B	r	r	r	r		
Plain Xenops	0046	B	r	r	r			
Plain Xenops	0049	B	r	x	r	x	r	
Plain Xenops	00120		B	r	x	r		
Plain Xenops	0194			B	x	r		
Plain Xenops	0346				B	r		
Plain Xenops	0363				B	r		
Plain Xenops	0422					B	r	
Plain Xenops	0485						B	r
Plain Xenops	0494						B	r
Scaly-throated Leaf-tosser	746		B	r				
Tawny-winged Woodcreeper	791		B	r				
Tawny-winged Woodcreeper	897		B	r				
Tawny-winged Woodcreeper	0705	B	r	r				
Tawny-winged Woodcreeper	0714	B	r	x	r	r	r	r
Tawny-winged Woodcreeper	0720	B	r					
Tawny-winged Woodcreeper	736		B	x	x	r	r	
Tawny-winged Woodcreeper	795			B	r			
Tawny-winged Woodcreeper	0286				B	r		
Tawny-winged Woodcreeper	0300				B	r		
Tawny-winged Woodcreeper	0302				B	r		
Tawny-winged Woodcreeper	0626				B	r	r	r
Tawny-winged Woodcreeper	0636				B	r		
Tawny-winged Woodcreeper	0665				B	r		
Long-tailed Woodcreeper	0286				B	r		
Long-tailed Woodcreeper	0419					B	r	
Wedge-billed Woodcreeper	0006	B	r	r				
Wedge-billed Woodcreeper	0016	B	r					
Wedge-billed Woodcreeper	0022	B	r					
Wedge-billed Woodcreeper	0041	B	r	r	x	x	x	r
Wedge-billed Woodcreeper	0047	B	r	r	r			
Wedge-billed Woodcreeper	0082	B	r					
Wedge-billed Woodcreeper	0097	B	x	x	x	r		
Wedge-billed Woodcreeper	00139		B	r	r	x	r	
Wedge-billed Woodcreeper	0118		B	x	r			
Wedge-billed Woodcreeper	0151		B	r				
Wedge-billed Woodcreeper	0154		B	r	r	x	r	
Wedge-billed Woodcreeper	0212			B	r	r	r	
Wedge-billed Woodcreeper	0218			B	r			

### Appendix 6. Year-to-Year Recaptures at Las Caletas, Costa Rica

Species	Band	2002	2003	2004	2005	2006	2007	2008
Wedge-billed Woodcreeper	0219			B	x	x	r	r
Wedge-billed Woodcreeper	0223			B	r			
Wedge-billed Woodcreeper	0233			B	r	r		
Wedge-billed Woodcreeper	0254			B	r	r		
Wedge-billed Woodcreeper	0279				B	r	r	r
Wedge-billed Woodcreeper	0300				B	r		
Wedge-billed Woodcreeper	0302				B	r		
Wedge-billed Woodcreeper	378					B	r	
Wedge-billed Woodcreeper	0385					B	x	r
Wedge-billed Woodcreeper	0390					B	r	r
Wedge-billed Woodcreeper	0393					B	r	r
Wedge-billed Woodcreeper	0418					B	r	r
Wedge-billed Woodcreeper	0471						B	r
Northern Barred-Woodcreeper	920		B	x	x	r		
Northern Barred-Woodcreeper	924		B	x	r	x	r	
Cocoa Woodcreeper	0701	B	r					
Cocoa Woodcreeper	755		B	x	r			
Cocoa Woodcreeper	0602			B	x	x	x	r
Cocoa Woodcreeper	783			B	r			
Cocoa Woodcreeper	785			B	r			
Cocoa Woodcreeper	787			B	r			
Cocoa Woodcreeper	789			B	r	x	r	
Cocoa Woodcreeper	791			B	x	r	r	
Cocoa Woodcreeper	714					B	r	
Cocoa Woodcreeper	0316				B	r	r	
Black-hooded Antshrike	0810	B	r	x	x	r		
Black-hooded Antshrike	0816	B	r	r	x	r		
Black-hooded Antshrike	0819	B	r					
Black-hooded Antshrike	0824	B	r	x	x	r		
Black-hooded Antshrike	737		B	r	r	r	r	r
Black-hooded Antshrike	738		B	x	r	r		
Black-hooded Antshrike	0563		B	r	x	x	r	
Black-hooded Antshrike	769		B	x	x	r	x	r
Black-hooded Antshrike	1657			B	r			
Black-hooded Antshrike	1665			B	r			
Black-hooded Antshrike	1660			B	x	r	r	
Black-hooded Antshrike	0643				B	r		
Black-hooded Antshrike	0666				B	r		
Black-hooded Antshrike	0561						B	r
Slaty Antwren	00153		B	r				
Slaty Antwren	0187			B	r	r		
Slaty Antwren	00172			B	x	r	x	r
Slaty Antwren	0350				B	x	r	
Slaty Antwren	0354				B	x	r	r
Slaty Antwren	0370				B	r		
Dot-winged Antwren	00104		B	r				
Dot-winged Antwren	00106		B	r				
Dot-winged Antwren	0033	B	x	r	r	x	r	
Dot-winged Antwren	0110	B	x	r				

### Appendix 6. Year-to-Year Recaptures at Las Caletas, Costa Rica

Species	Band	2002	2003	2004	2005	2006	2007	2008
Dot-winged Antwren	0131		B	r	x	x	x	r
Dot-winged Antwren	0199			B	x	r		
Dot-winged Antwren	0238			B	x	r		
<b>Chestnut-backed Antbird</b>	<b>0832</b>	<b>B</b>	<b>r</b>					
Chestnut-backed Antbird	901	B	r	r	r	r	r	
Chestnut-backed Antbird	0902	B	r					
Chestnut-backed Antbird	1602		B	r				
Chestnut-backed Antbird	758		B	r	r	r	x	r
Chestnut-backed Antbird	868		B	x	x	r		
Chestnut-backed Antbird	780			B	r			
Chestnut-backed Antbird	1637			B	r			
Chestnut-backed Antbird	1638			B	r			
Chestnut-backed Antbird	1662			B	r	r		
Chestnut-backed Antbird	0322				B	r		
Chestnut-backed Antbird	0331				B	r	r	
Chestnut-backed Antbird	0343					B	x	r
Chestnut-backed Antbird	0351					B	x	r
Chestnut-backed Antbird	0382					B	r	r
Chestnut-backed Antbird	0392					B	r	
Chestnut-backed Antbird	0395					B	r	
Chestnut-backed Antbird	0472						B	r
<b>Bicolored Antbird</b>	<b>0713</b>	<b>B</b>	<b>r</b>					
Bicolored Antbird	893		B	r	r	r	r	
Bicolored Antbird	0604			B	r	r	r	
Bicolored Antbird	0605			B	r	r	r	r
Bicolored Antbird	0357				B	r		
Bicolored Antbird	0358				B	r	r	
Bicolored Antbird	0368				B	r	r	
Bicolored Antbird	0369				B	r	r	
Bicolored Antbird	0668				B	r		
Bicolored Antbird	0669				B	r		
Bicolored Antbird	0670				B	r		
Bicolored Antbird	0690					B	r	
Bicolored Antbird	0724					B	r	r
Bicolored Antbird	0731						B	r
Bicolored Antbird	0742						B	r
Bicolored Antbird	0743						B	r
Bicolored Antbird	0747						B	r
Bicolored Antbird	0758						B	r
<b>Black-faced Antthrush</b>	<b>957</b>					<b>B</b>	<b>r</b>	
Black-faced Antthrush	958					B	r	
<b>Ochre-bellied Flycatcher</b>	<b>0008</b>	<b>B</b>	<b>r</b>	<b>r</b>				
Ochre-bellied Flycatcher	00128		B	r				
Ochre-bellied Flycatcher	0014	B	r					
Ochre-bellied Flycatcher	0021	B	r	r				
Ochre-bellied Flycatcher	0060	B	r	r				
Ochre-bellied Flycatcher	0067	B	r	r				
Ochre-bellied Flycatcher	0094	B	r					
Ochre-bellied Flycatcher	0134		B	r				

### Appendix 6. Year-to-Year Recaptures at Las Caletas, Costa Rica

Species	Band	2002	2003	2004	2005	2006	2007	2008
Ochre-bellied Flycatcher	0144		B	x	r	x	r	
Ochre-bellied Flycatcher	0101			B	r			
Ochre-bellied Flycatcher	0177			B	r	r		
Ochre-bellied Flycatcher	0202			B	r			
Ochre-bellied Flycatcher	0203			B	r			
Ochre-bellied Flycatcher	0206			B	r	x	r	
Ochre-bellied Flycatcher	0207			B	r			
Ochre-bellied Flycatcher	0226			B	r			
Ochre-bellied Flycatcher	0247			B	r			
Ochre-bellied Flycatcher	0250			B	x	r		
Ochre-bellied Flycatcher	0252			B	x	r	r	
Ochre-bellied Flycatcher	0276				B	r	r	
Ochre-bellied Flycatcher	0277				B	r		
Ochre-bellied Flycatcher	0289				B	r		
Ochre-bellied Flycatcher	0306				B	r		
Ochre-bellied Flycatcher	0307				B	r	r	
Ochre-bellied Flycatcher	0327				B	x	x	r
Ochre-bellied Flycatcher	0416					B	r	
Ochre-bellied Flycatcher	0424					B	r	
Ochre-bellied Flycatcher	0425					B	r	
Ochre-bellied Flycatcher	0432					B	r	
Ochre-bellied Flycatcher	0455						B	r
Ochre-bellied Flycatcher	0538						B	r
<b>Northern Bentbill</b>	<b>0004</b>	<b>B</b>	<b>r</b>					
Northern Bentbill	00121		B	r				
Northern Bentbill	00149		B	r				
Northern Bentbill	0101			B	r	r		
Northern Bentbill	00164			B	r			
Northern Bentbill	0120				B	r	r	
Northern Bentbill	00162			B	x	r		
Northern Bentbill	00185				B	r		
<b>Golden-crowned Spadebill</b>	<b>00187</b>				<b>B</b>	<b>r</b>		
Golden-crowned Spadebill	0142						B	r
Golden-crowned Spadebill	0149						B	r
Golden-crowned Spadebill	0209						B	r
<b>Ruddy-tailed Flycatcher</b>	<b>00159</b>		<b>B</b>	<b>r</b>				
Ruddy-tailed Flycatcher	0024	B	r					
Ruddy-tailed Flycatcher	0096	B	r	x	r	r		
Ruddy-tailed Flycatcher	00182				B	r	r	
Ruddy-tailed Flycatcher	0165				B	r		
<b>Sulphur-rumped Flycatcher</b>	<b>0284</b>				<b>B</b>	<b>x</b>	<b>r</b>	
Sulphur-rumped Flycatcher	0420					B	r	
Sulphur-rumped Flycatcher	0450					B	r	
<b>Yellow-bellied Flycatcher</b>	<b>230006703</b>	<b>B</b>	<b>r</b>					
<b>Bright-rumped Attila</b>	<b>0767</b>		<b>B</b>	<b>r</b>	<b>x</b>	<b>r</b>		
Bright-rumped Attila	0852	B	x	r	x	r	r	
Bright-rumped Attila	0609			B	r	r	r	r
Bright-rumped Attila	798			B	x	x	x	r
Bright-rumped Attila	0675				B	x	r	

### Appendix 6. Year-to-Year Recaptures at Las Caletas, Costa Rica

Species	Band	2002	2003	2004	2005	2006	2007	2008
Dusky-capped Flycatcher	784			B	x	x	r	
Dusky-capped Flycatcher	790			B	r			
Dusky-capped Flycatcher	0775						B	r
Thrush-like Schiffornis	841	B	x	r	r			
Thrush-like Schiffornis	753		B	r				
Orange-collared Manakin	0503	B	x	r	r			
Orange-collared Manakin	0504	B	r					
Orange-collared Manakin	0506	B	x	r				
Orange-collared Manakin	0509	B	r					
Orange-collared Manakin	0518	B	r					
Orange-collared Manakin	0520	B	r	r				
Orange-collared Manakin	0531	B	r	r				
Orange-collared Manakin	0537	B	r					
Orange-collared Manakin	0546	B	r	r				
Orange-collared Manakin	0556	B	r	r				
Orange-collared Manakin	0557	B	x	r	x	x	r	
Orange-collared Manakin	0146		B	r	r	r	r	
Orange-collared Manakin	0567		B	r	r	r	r	
Orange-collared Manakin	0567		B	r	x	r		
Orange-collared Manakin	0568		B	r				
Orange-collared Manakin	0602		B	r	r			
Orange-collared Manakin	0618		B	r	r			
Orange-collared Manakin	0651				B	r		
Orange-collared Manakin	0272				B	r	r	r
Orange-collared Manakin	0280				B	r	r	r
Orange-collared Manakin	0274				B	r		
Orange-collared Manakin	0343				B	r		r
Orange-collared Manakin	0344				B	r	r	
Orange-collared Manakin	0349				B	x	x	r
Orange-collared Manakin	0355				B	x	x	r
Orange-collared Manakin	0368				B	r		
Orange-collared Manakin	0355				B	x	x	r
Orange-collared Manakin	1100						B	r
Orange-collared Manakin	1101						B	r
Orange-collared Manakin	1141						B	r
Orange-collared Manakin	1145						B	r
Orange-collared Manakin	1162						B	r
Blue-crowned Manakin	0007	B	r	r	x	r	r	r
Blue-crowned Manakin	00133		B	r				
Blue-crowned Manakin	0059	B	x	r				
Blue-crowned Manakin	00109		B	x	r	r		
Blue-crowned Manakin	0119		B	r	r	r	r	
Blue-crowned Manakin	0126		B	x	r			
Blue-crowned Manakin	0140		B	x	r	r		
Blue-crowned Manakin	00142		B	x	r			
Blue-crowned Manakin	0160		B	r				
Blue-crowned Manakin	0176		B	x	r	r		
Blue-crowned Manakin	0230			B	r	r	r	
Blue-crowned Manakin	0244			B	r	r		



### Appendix 6. Year-to-Year Recaptures at Las Caletas, Costa Rica

Species	Band	2002	2003	2004	2005	2006	2007	2008
Blue-crowned Manakin	0287				B	r		
Blue-crowned Manakin	0305				B	x	x	r
Blue-crowned Manakin	0323				B	r		
Blue-crowned Manakin	0371				B	r		
Blue-crowned Manakin	0392					B	r	
Blue-crowned Manakin	0453						B	r
Red-capped Manakin	0511	B	r	r	r			
Red-capped Manakin	0512	B	x	r	r			
Red-capped Manakin	0514	B	x	x	x	r		
Red-capped Manakin	0516	B	x	x	r			
Red-capped Manakin	0519	B	x	r	r			
Red-capped Manakin	0522	B	x	x	r			
Red-capped Manakin	0529	B	x	x	r			
Red-capped Manakin	0532	B	r					
Red-capped Manakin	0535	B	r					
Red-capped Manakin	0540	B	x	r				
Red-capped Manakin	0550	B	r	r	r			
Red-capped Manakin	0552	B	x	r				
Red-capped Manakin	0554	B	x	x	r			
Red-capped Manakin	0125		B	r	r	r	r	
Red-capped Manakin	0569		B	r	x	r		
Red-capped Manakin	0570		B	x	r			
Red-capped Manakin	0572		B	r				
Red-capped Manakin	0578		B	r	r	x	r	
Red-capped Manakin	0579		B	r				
Red-capped Manakin	0601		B	r				
Red-capped Manakin	0612		B	x	x	r		
Red-capped Manakin	0626		B	r	r	x	x	r
Red-capped Manakin	0659				B	r		
Red-capped Manakin	0674				B	x	r	
Red-capped Manakin	1001			B	r			
Red-capped Manakin	1005			B	r			
Red-capped Manakin	1011			B	r			
Red-capped Manakin	1012			B	x	x	r	
Red-capped Manakin	1025			B	r			
Red-capped Manakin	1046			B	x	r		
Red-capped Manakin	1067					B	r	
Red-capped Manakin	0696					B	r	
Red-capped Manakin	1089						B	r
Red-capped Manakin	1094						B	r
Red-capped Manakin	1097						B	r
Red-capped Manakin	1120						B	r
Tawny-crowned Greenlet	13	B	r					
Tawny-crowned Greenlet	0208			B	r			
Tawny-crowned Greenlet	0512						B	r
Lesser Greenlet	00161			B	x	r		
Black-bellied Wren	0306				B	r		
Riverside Wren	816	B	x	x	x	r		
Riverside Wren	731		B	r				

### Appendix 6. Year-to-Year Recaptures at Las Caletas, Costa Rica

Species	Band	2002	2003	2004	2005	2006	2007	2008
Riverside Wren	739		B	x	x	r		
Riverside Wren	788			B	r			
Riverside Wren	0618				B	r	r	
Riverside Wren	0676					B	r	
Riverside Wren	0678					B	r	
Riverside Wren	0721					B	r	
Long-billed Gnatwren	0023	B	r	r	x	r		
Long-billed Gnatwren	0053	B	r					
Long-billed Gnatwren	0063	B	r	x	r			
Long-billed Gnatwren	0103	B	r					
Long-billed Gnatwren	0508	B	x	r	r	r	r	
Long-billed Gnatwren	0269				B	r	r	r
Long-billed Gnatwren	288				B	r		
Long-billed Gnatwren	0433						B	r
Long-billed Gnatwren	0544						B	r
Northern Waterthrush	227080501		B	x	x	x	r	r
Northern Waterthrush	229037603				B	r		
Chestnut-sided Warbler	230006803				B	r		
Bananaquit	0029	B	r	r				
Bananaquit	0070	B	r					
Bananaquit	0093	B	r					
Bananaquit	00115		B	x	r	x	x	r
Bananaquit	00191				B	r		
Bananaquit	00197				B	r		
Bananaquit	0114					B	r	
Bananaquit	0124					B	r	
Bananaquit	0134						B	r
Gray-headed Tanager	1623		B	r	r	r	r	
Gray-headed Tanager	0823	B	r					
Gray-headed Tanager	0843	B	r					
Gray-headed Tanager	748		B	r	x	x	x	r
Gray-headed Tanager	881		B	x	x	x	r	
Gray-headed Tanager	0630				B	r	r	r
Gray-headed Tanager	0388					B	r	
Gray-headed Tanager	0399					B	x	r
Gray-headed Tanager	0686					B	r	
Gray-headed Tanager	0694					B	r	
Gray-headed Tanager	0720					B	x	r
Gray-headed Tanager	0435						B	r
White-throated Shrike-tanager	0303				B	x	x	r
White-shouldered Tanager	0722	B	x	r				
White-shouldered Tanager	0730	B	r					
White-shouldered Tanager	0597		B	r				
White-shouldered Tanager	0582		B	x	x	x	r	
White-shouldered Tanager	0586		B	x	r			
White-shouldered Tanager	794			B	r			
White-shouldered Tanager	797			B	r	x	r	r
White-shouldered Tanager	1006			B	x	x	x	r
White-shouldered Tanager	1024			B	r			

### Appendix 6. Year-to-Year Recaptures at Las Caletas, Costa Rica

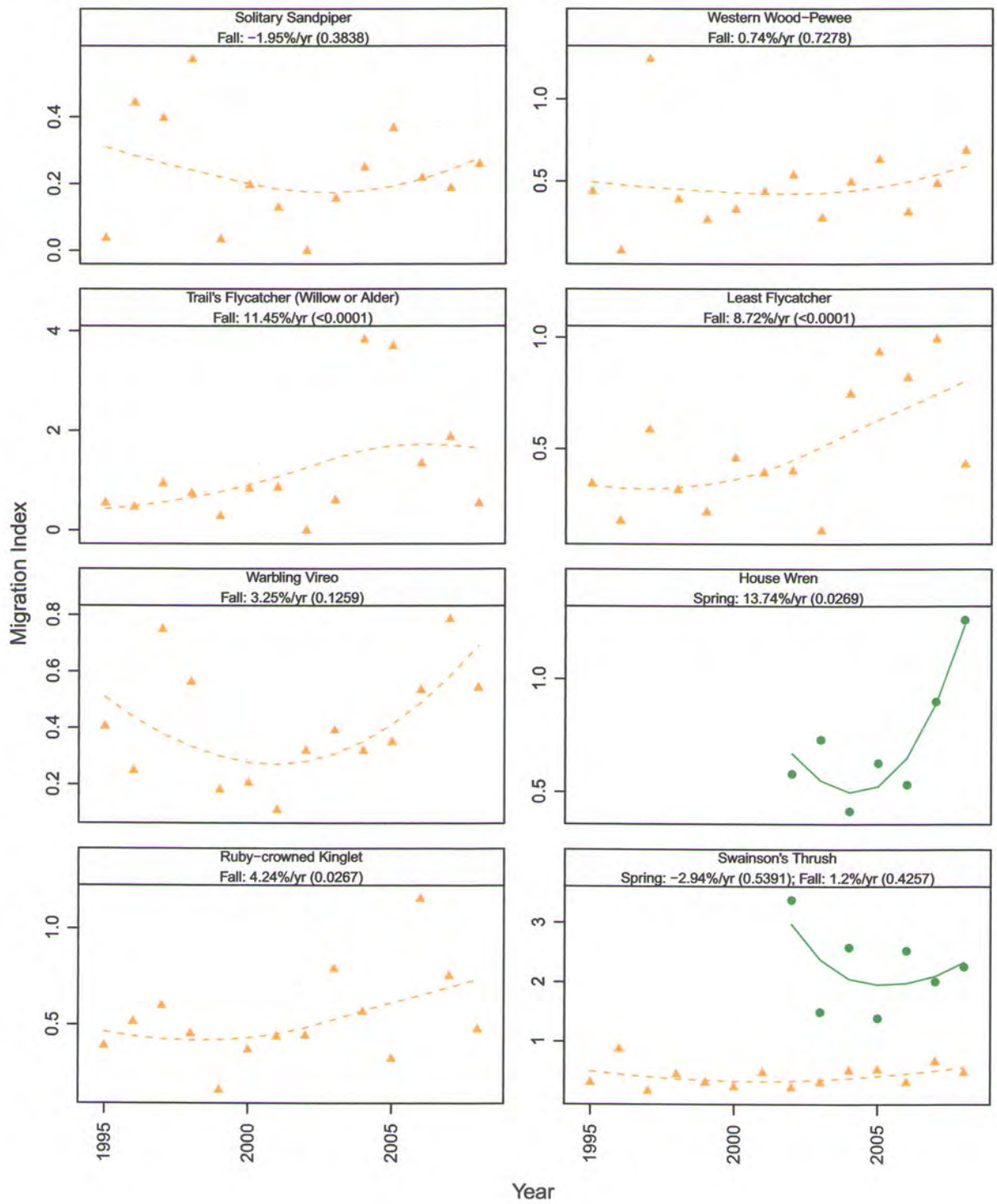
Species	Band	2002	2003	2004	2005	2006	2007	2008
White-shouldered Tanager	0695					B	r	
White-shouldered Tanager	0760						B	r
<b>Black-cheeked Ant-Tanager</b>	<b>0859</b>	<b>B</b>	<b>r</b>					
Black-cheeked Ant-Tanager	1604		B	r	x	r		
Black-cheeked Ant-Tanager	865		B	r	r			
Black-cheeked Ant-Tanager	1700		B	x	r			
Black-cheeked Ant-Tanager	0302				B	r		
Black-cheeked Ant-Tanager	0319				B	r	r	
Black-cheeked Ant-Tanager	1696				B	x	r	r
Black-cheeked Ant-Tanager	1697				B	r	r	r
Black-cheeked Ant-Tanager	0682					B	x	r
Black-cheeked Ant-Tanager	0418					B	r	
Black-cheeked Ant-Tanager	0701					B	r	
Black-cheeked Ant-Tanager	0763						B	r
<b>Cherrie's Tanager</b>	<b>1606</b>		<b>B</b>	<b>r</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>r</b>
Cherrie's Tanager	0805	B	r	r	x	x	x	r
Cherrie's Tanager	771		B	x	x	x	r	
Cherrie's Tanager	1650			B	r	r		
Cherrie's Tanager	0315				B	x	r	
Cherrie's Tanager	0324				B	r		
Cherrie's Tanager	0327				B	r		
Cherrie's Tanager	0421					B	x	r
Cherrie's Tanager	0452						B	r
Cherrie's Tanager	0737						B	r
<b>Bay-headed Tanager</b>	<b>0725</b>	<b>B</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>r</b>	
<b>Green Honeycreeper</b>	<b>708</b>	<b>B</b>	<b>x</b>	<b>x</b>	<b>r</b>			
Green Honeycreeper	604		B	x	r			
Green Honeycreeper	0593		B	x	r	x	r	r
Green Honeycreeper	0652				B	x	r	
Green Honeycreeper	0658				B	x	r	
Green Honeycreeper	0659				B	x	x	r
<b>Red-legged Honeycreeper</b>	<b>0631</b>				<b>B</b>	<b>x</b>	<b>r</b>	<b>r</b>
<b>Variable Seedeater</b>	<b>0141</b>		<b>B</b>	<b>x</b>	<b>r</b>	<b>r</b>		
Variable Seedeater	0448					B	x	r
Variable Seedeater	500						B	r
Variable Seedeater	0530						B	r
<b>Thick-billed Seed-Finch</b>	<b>0527</b>	<b>B</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>r</b>	
Thick-billed Seed-Finch	0528	B	x	r				
Thick-billed Seed-Finch	1066					B	r	
Thick-billed Seed-Finch	1070					B	r	
<b>Orange-billed Sparrow</b>	<b>801</b>	<b>B</b>	<b>r</b>	<b>r</b>	<b>r</b>	<b>x</b>	<b>r</b>	<b>r</b>
Orange-billed Sparrow	0802	B	r					
Orange-billed Sparrow	0806	B	r					
Orange-billed Sparrow	0818	B	r	r	r	x	x	r
Orange-billed Sparrow	0842	B	r					
Orange-billed Sparrow	0848	B	r					
Orange-billed Sparrow	0851	B	x	x	r	x	r	r
Orange-billed Sparrow	0861	B	r	x	r			
Orange-billed Sparrow	869		B	r	r	x	r	r

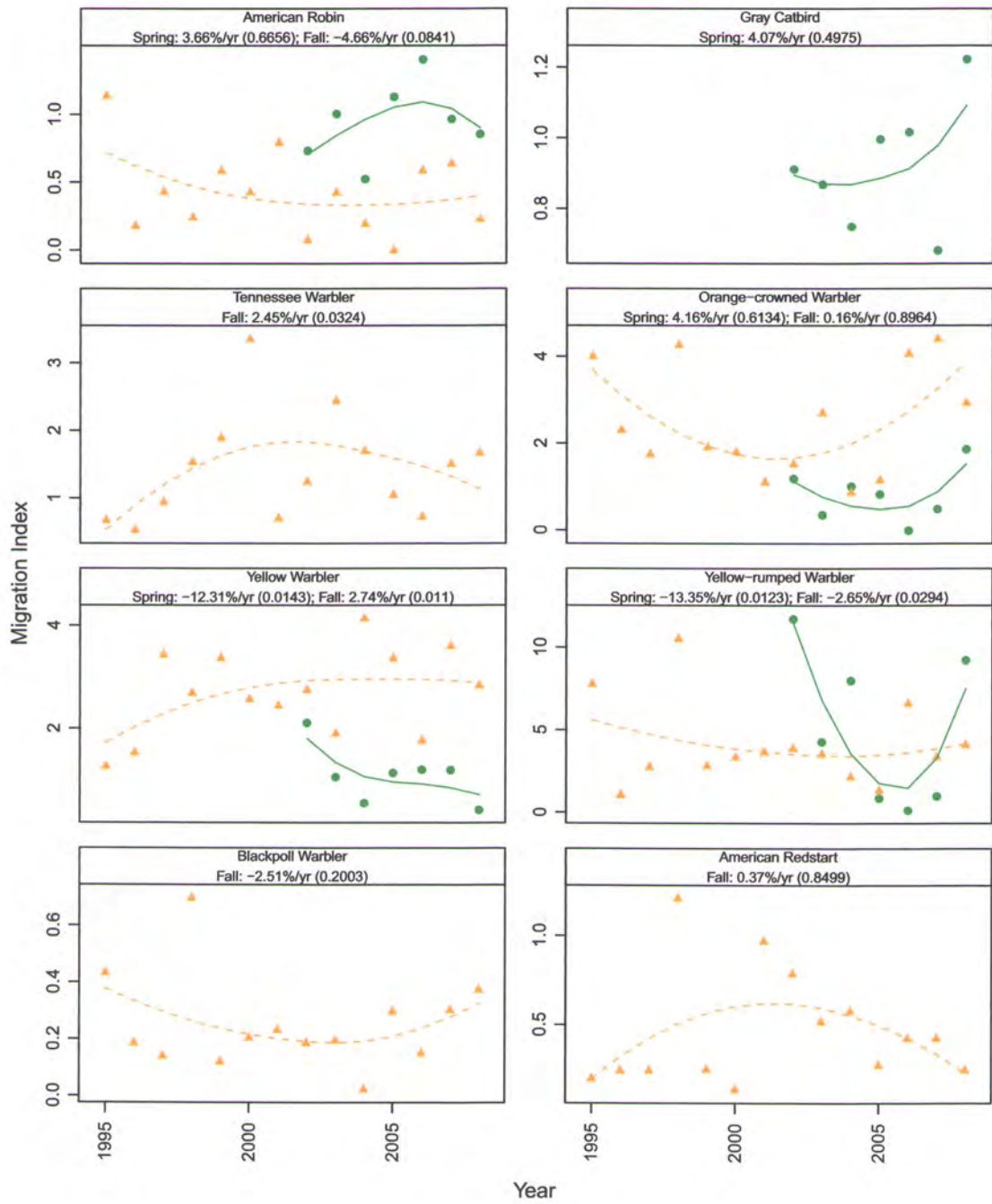
## Appendix 6. Year-to-Year Recaptures at Las Caletas, Costa Rica

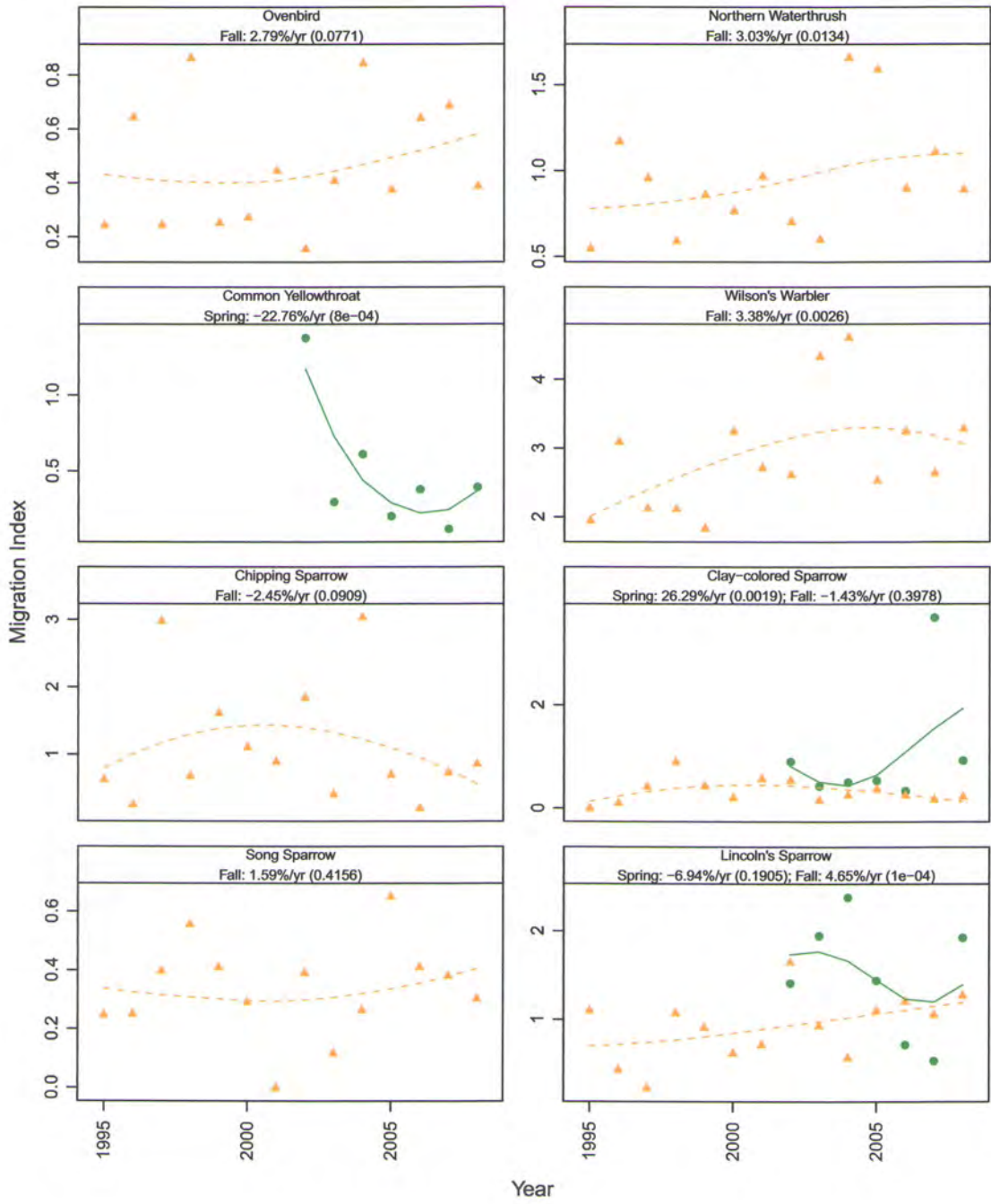
Species	Band	2002	2003	2004	2005	2006	2007	2008
Orange-billed Sparrow	873		B	r				
Orange-billed Sparrow	880		B	r	r	x	x	r
Orange-billed Sparrow	888		B	x	x	x	r	
Orange-billed Sparrow	889		B	x	x	x	r	
Orange-billed Sparrow	1629			B	r	r		
Orange-billed Sparrow	1644			B	r	r	r	r
Orange-billed Sparrow	1664			B	r			
Orange-billed Sparrow	1688			B	r			
Orange-billed Sparrow	0310				B	r		
Orange-billed Sparrow	0323				B	x	x	r
Orange-billed Sparrow	0328				B	r		
Orange-billed Sparrow	0334				B	r		
Orange-billed Sparrow	0614				B	r		
Orange-billed Sparrow	0639				B	r		
Orange-billed Sparrow	0386					B	r	
Orange-billed Sparrow	0427						B	r
Black-striped Sparrow	1619		B	x	r			
Black-striped Sparrow	0374					B	r	
Buff-throated Saltator	922		B	x	x	x	r	
Buff-throated Saltator	933				B	r		
Buff-throated Saltator	0336				B	x	r	
Blue-black Grosbeak	878		B	r	r			
Blue-black Grosbeak	883		B	r				
Blue-black Grosbeak	890		B	r	r	r		
Blue-black Grosbeak	0416 (1651)			B	x	r		
Blue-black Grosbeak	0313				B	r		
Blue-black Grosbeak	0371					B	r	r
Blue-black Grosbeak	0566						B	r
Scarlet-rumped Cacique	2804			B	r			

- B year banded
- r recaptured
- d bird dead or remains found
- x not detected but survival deduced from re-encounter in subsequent year
- change in species
- Neotropical migrant

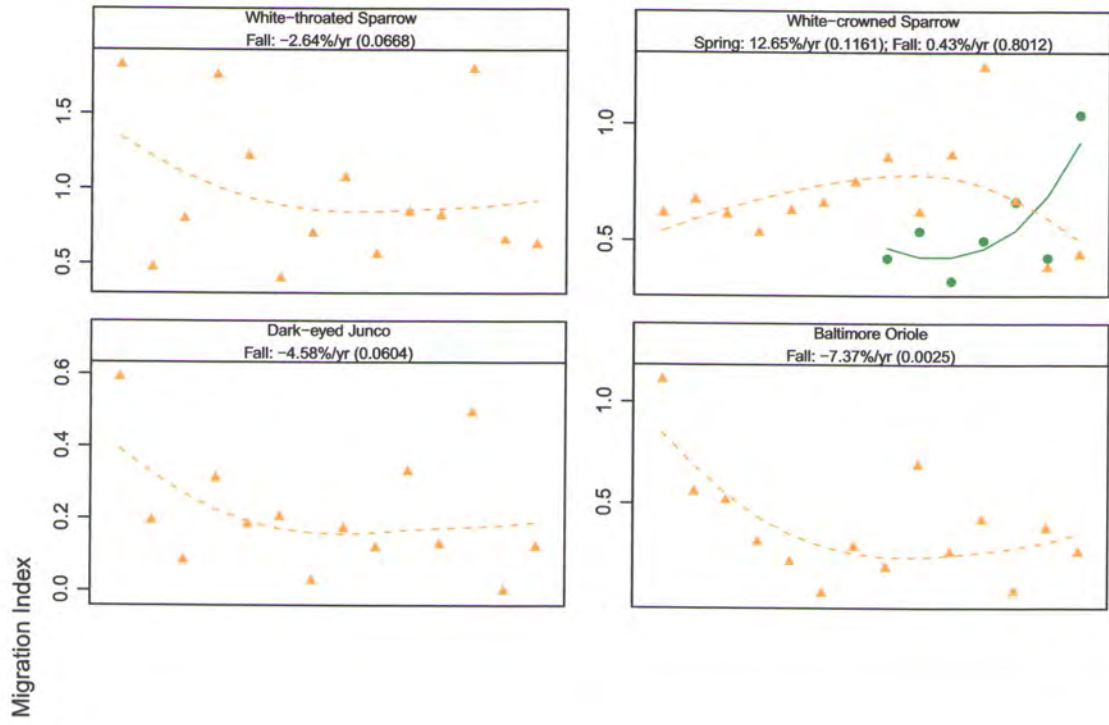
## **Appendix 7**











Year

## **Appendix 8**

## PILOT BAT MIGRATION MONITORING 2008

The Calgary Bird Banding Society initiated a pilot program in 2008 to test whether the array of mist-nets used to monitor spring and fall migration at Inglewood Bird sanctuary might be useful to monitor and band migratory bats. Banding of migratory bats would be useful to help in determining the significance of mortality at wind farm sites in southern Alberta.

Fifteen 2.6-m x 12-m x 30-mm mesh mist-nets located in the reserve area at the south end of Inglewood Bird Sanctuary were opened for approximately 3 hours starting at sunset on each of 10-17 and 22 August 2008 for a total of 405 net-hrs. The only captures were 2 adult female Little Brown Bats on the evening of 16 August. An Anabat detector was deployed each evening near the banding station to record bat foraging echo-location calls, a measure of bat activity. Results are tabulated below.

2008	Myotis	MYLU	LANO/ EPFU	LACI	LABO	Low Freq	Unk	Total
Aug. 10	5	18	10			3		36
Aug. 11		7	18	1		3	1	30
Aug. 12	16	23	12			3	14	68
Aug. 13	2	4	8	1		3	1	19
Aug. 14	1	15	5	1				22
Aug. 15	18	36	4	2			2	62
Aug. 16	2	9	3	1		1		16
Aug. 17	1	9	5	2	1	1	3	22
Aug. 22	3	17	65	3		16	6	110
<b>Total</b>	<b>48</b>	<b>138</b>	<b>130</b>	<b>11</b>	<b>1</b>	<b>30</b>	<b>27</b>	<b>385</b>

Myotis: potentially little brown or other small bat species

MYLU: little brown bat (*Myotis lucifugus*)

LANO/EPFU: silver-haired bat (*Lasiorycteris noctivagans*) or big brown bat (*Eptesicus fuscus*) - difficult to distinguish between the calls of these two species

LACI: hoary bat (*Lasiurus cinereus*)

LABO: red bat (*Lasiurus borealis*)

Low Freq: potentially silver-haired, big brown, or hoary bat

Unk: the quality of the recorded call was too poor to identify

Although migratory bats were active in the area when the nets were open it appears that the net positions were not suitable to result in captures. Modification of net locations would likely be required to achieve desired results of capturing migratory bats.