

birding the triangle... and beyond, for over half a century

c/o K. Piplani, 1502 Halifax Rd.
Chapel Hill, NC 27514
k_piplani@alumni.unc.edu

The BULLETIN...
Chapel Hill Bird Club
February 2009
<http://chbc.carolinanature.com>

Vol. 37

> Meeting :Monday, Feb 23, 2009 <

When/Where: 7:15 PM/refreshments; 7:30/Meeting
The lounge, Olin T. Binkley Baptist Church, corner
of Hwy. 15-501 bypass and Willow Dr., behind
University Mall, Chapel Hill.

Who/What: **Jaime Collazo** will be speaking on
**“Shorebird Conservation in the Southeastern
United States; Semi-palmated Sandpipers, a
Case Study”**

Dr. Collazo is a Professor of Biology and Forestry at
NC State. We are all concerned about the recent
decreases of certain bird species. Dr. Collazo’s
research interests are in population dynamics and
estimation, species-habitat relationships, endangered
species research and management, and Gap Analysis.
These allow him to focus with special insight on the
Semi-palmated Sandpiper. Bring yourselves and
your curiosity for a enlightening evening.

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Saturday Morning Field Trips

depart from Glen Lennox Shopping Center Parking
lot off HWY 54 promptly at 7:30 most Saturday
mornings. All skills are welcome. Trips are usually
over by noon. Dress for the weather and for walking.
For further details, call Doug at 942-0479, or see the
CHBC website at: <http://chbc.carolinanature.com/>

To : _____

Corrected No. 2

Attention All Members!
In An Attempt to Cut our Expenses,

All Bulletins
will be sent via E-mail, starting September 2009.

If you do not have e-mail, please call the editor,
Karen Piplani, at (919) 929-6553, or write her at the
address in the top left corner to notify her that you
wish to continue receiving the Bulletin via regular
mail.

As you know, the cost of stamps, paper, and
copying keeps on rising, just as has the rent for our
meeting place and other expenses. Because the
biggest portion of our costs are for delivery of the
Bulletin, changing the method of delivery will save
a lot. Sending the Bulletin by mail cost **\$5.92 per
member** last year, and can only increase this year.

We ask that you provide us with, or update, your e-
mail address so that we may continue to insure that
you will receive the Bulletin. Early notification will
help us save more money.

Sad News

James Coman III, former Orange county resident, member
of the Chapel Hill Bird Club, friend of many birders in our
area, and gracious host to many at his sheep farm in
Alleghany county, died peacefully at his home on January
21 after a long fight with cancer.

At the January CHBC meeting, Patsy Bailey collected several donations for the Blue Ridge Rural Land Trust in Jim's memory.

"Through the rescue and stewardship of a once abused farm and surrounding lands, his leadership in the National Committee for the New River, a highly-productive directorship of the Blue Ridge Rural Land Trust from its beginning, and shepherding Blue Ridge Birders into a unique mountain bird club, Jim has done more than anyone in this region to insure the legacy of high country natural assets and a place for birds."¹

Summary of Doug Pratt's talk on "Kauai's Lost World"

By Karen Piplani

We were treated to a fascinating evening on Jan. 26 when Doug joined us to talk about the birds of Kauai and the evolutionary pressures on them. When Doug was introduced, we discovered that Doug is known not only for his research in ornithology, but is also an artist. His work is found in the National Geographic *Birds of North America* and many other books and magazine articles. When Roger Tory Peterson died in 1996 while painting the last plate for the 5th edition of *A Field Guide to the Birds*, Doug was asked to complete that last plate.

Kaua'i is part of the most isolated archipelago in the world. From the Hawaiian Islands, it is 2500 miles to the next significant land. Almost half of the native birds did not survive the arrival, about 1200 years ago, of the first Hawaiian people. There were huge crashes of multiple species from 1890 – 1910, mostly from diseases. The Hawaiian O'o, common in 1890, was not seen for certain after 1910.

Kaua'i is unique. It is the oldest of the Hawaiian Islands, has heavy annual rainfall and highly eroded landforms. Its highest point is 4,000 foot **Mt. Wai'ale'ale**, the western rim of an ancient caldera, which is located almost in the center of the island. This mountain forms part of the western rim of the original volcanic caldera that formed the island. It is over 4,000 feet high, and receives 640 inches of rain annually. There are resulting highly eroded hills, valleys, swampy areas and streams surrounding the mountain, with lush vegetation. **Waimea Canyon**, west of Wai'ale'ale, is a deeply eroded canyon .

To the north of both is the **Alaka'i "Swamp"**, which is actually a montane rainforest, rather than a swamp. It has many bogs and is an area of densely tangled growth with heavy growth of mosses and epiphytes. This is the area that many thought might harbor some of the most rare and

difficult-to-find bird species.

Breeding seabirds of Kaua'i include the Great Frigatebird, Red-tailed Tropicbird, Brown Booby, Brown Noddy, the Black (Hawaiian) Noddy, the Black Noddy, the Redfooted Booby, the Wedge-tailed Shearwater, and Newell's Shearwater. (Oh I wish you could have been there to see the pictures!) Migratory shorebirds which stop in Kaua'i include the Pacific Golden Plover, the Wandering Tattler, the Bristle-thighed Curlew, and the Ruddy Turnstone. Wetland birds include the Hawaiian Stilt, the Hawaiian Duck (Koloa) which resembles a mallard, and the Common Moorhen. Freshwater birds include the Black-crowned Night Heron (the Auku'u) and the Hawaiian Coot.

For many years there was a club in Hawaii called the Hui Manu (means "bird club"), whose sole purpose was to find and introduce additional species to the islands! By 1960, Kaua'i's introduced nonpasserines include the Ring-necked Pheasant, the Red Jungle Fowl (the domestic chicken), the Spotted Dove and the Ring-necked Dove, and the Zebra Dove. Introduced passerines included the Common Myna, the Northern Cardinal, the Hwa-mei, and the Japanese White-eye.

Native land birds common in 1960 included the Pueo (Short-eared Owl), the Kaua'i 'Elepaio, the Apapane, the 'I'iwi, the 'Anianiau, the Kaua'i 'Amakihi, the 'Akeke'e (Kaua'i 'Akepa), and the 'Akikiki (the Kaua'i Creeper). Species whose continued survival was questionable included the two native thrushes (related to solitaires), the Kama'o (Large Kaua'i Thrush), and the Puaiohi (Small Kaua'i Thrush), 3 Hawaiian honeycreepers, the Kauai Nukupu'u, the 'O'u, and the Kaua'i 'Akialoa, and the 'O'o'a'a, or Kaua'i 'O'o, which was the last (if it survived) member of a family endemic to Hawaii. Of the original four 'o'o species in Hawaii, it is the least impressive visually, but the most brilliant vocally. It is a plain black bird with a set of small, cute frilled yellow feathers appearing at the outside juncture of the body and the leg. Its bill is almost straight, unlike those of some Hawaiian honeycreepers whose long, curved bills fit neatly into the flowers to extract nectar. The 'o'os were long thought to belong to the Australasian honeyEATER family (not to be confused with Hawaiian honeyCREEPERS, in a different family). Although they look, act, and sound just like honeyeaters, just-published DNA studies have revealed them to be related to waxwings and silky-flycatchers. This is a spectacular example of evolutionary convergence, where unrelated species evolve to resemble each other because of similar selection pressures.

In 1960 researchers Frank Richardson, a University of

¹Jim Keighton, "Rare Citings", p.1, Jan2009

Washington ornithologist, and John Bowles, a local High School teacher, decided to try to find out whether any of these rare birds survived in the Alaka'i. They drove from Koke'e in as far as they could go, and then hiked in and across a stream to build a base camp at the Koa'ie Stream cabin. There they found the first Kaua'i O'o that had been seen in 60 years. The specimen was sent to the Bishop Museum in Honolulu. They also documented the existence of all the other species whose continued existence had been questionable. So all historically known native birds of Kaua'i were found in 1960. While Richardson and Bowles were in the midst of their expedition, they were visited by Roger Tory Peterson and his children. Later, Peterson added a section on Hawaiian birds to his *Field Guide to Western Birds* (2nd edition, 1961). Richardson and Bowles's "A Survey of the Birds of Kaua'i, Hawaii" was published in 1964 by the Bishop Museum.

When Doug first saw the new Peterson western guide, he was immediately drawn to the Hawaiian bird section and the reports of the rarities just rediscovered on Kaua'i, and vowed to some day go there to see those birds. He finally succeeded in 1975, but things were not the same then as Richardson and Bowles had found them 15 years earlier.

In the meantime, Richard Warner did some experiments published in 1968. He brought some 'Apapane from Koke'e down to sea level. The birds did well in the screened cage, but when the screening was removed, and they were exposed to mosquitoes, all died in three days. The same thing happened when Laysan Finches were brought down to the main islands. The fatal disease was an avian form of malaria carried by mosquitoes.

Mosquitoes are not native to Hawaii. It is thought that they were introduced in 1826 on Maui by the ship Wellington. (One story, perhaps apocryphal, says that in revenge for missionaries' restriction on access of the sailors to Hawaiian girls, a water barrel with mosquitoes was dumped into a fresh water area.)

It is now accepted that disease is the primary limiting factor for the survival of native birds. Birds which had lived at high altitudes, where mosquitoes didn't breed, were not usually affected. But if they descended to lower valleys, i.e. to escape hurricanes, they were exposed to mosquito borne diseases.

Doug's first trip to Kaua'i, to the Koa'ie stream area was in July 1974. He was working with Phil Brunner on a field guide, but by that time, rare birds had disappeared from the camp area.

The Alaka'i Expedition of 1975, to John Sincock's study area, pushed much deeper inland. The group with Rob Shallenberger, Sheila Conant and Doug Pratt was flown in

by helicopter to an open bog as clouds and rain closed in. They had photographic and sound equipment and permits to collect samples of common species. They had fantastic luck with a whole week of sunny weather. They got the first live photographs of an O'o'a'a, which was heard first thing in the morning. They also got the first and only photos of an O'u. Also they found Puaiohi and Kama'o. Sheila had one sighting of a Nukupu'u, but they did not see an Akialoa. It had last been seen in 1969 by Phil Bruner.

Hurricane 'Iwa in 1983 did lots of damage to the Alaka'i area. After the storm, there was only one known remaining Kau'i O'o, and it was last recorded in 1988. The O'u was much reduced in population, and was last seen in the late '80s. The Kama'o was likewise last seen in the late 1980s.

Hurricane 'Iniki in 1992 seemed to be the final blow. (Ordinarily there is about 1 named hurricane a century.) That was the same year that Hurricane Andrew hit Florida. 'Iniki was a category 5 storm and it hit Kaua'i straight on. There were 200 mph winds at Koko'e. The Kaua'i O'o, the O'u and the Kama'o have not been seen since. But the Puaiohi survived in the stream valleys. It seemed that the old storm strategies of descending to lowland valleys for shelter were now dangerous because of the presence of mosquitoes, especially when two severe storms hit within a 9 year period. It was hypothesized that perhaps the Puaiohi was a highland stream valley specialist, so did not have to leave its habitat during the storms, and this accounted for its survival.)

One of the added problems caused by severe storms is that **invasive plants** provide still another pressure to native flora and fauna. Plants such as Blackberry, Firetree (*Myrica faya*), Banana Poka (*Passiflora mollissima*), Kahili Ginger, and Black-wattle *Acacia* invade areas of wind-damaged native forest. New **alien bird invaders** include the White-rumped Shama, the Greater Necklaced Laughingthrush, the Japanese Bush Warbler, and the Red-crested Cardinal.

A paper titled "Reflections on a 1975 Expedition to the Lost World of the Alaka'i and Other Notes on the Natural History, Systematics, and Conservation of Kaua'i Birds" by Sheila Conant, H. Douglas Pratt and Robert J. Shallenberger was the winner of the E. P. Edwards Award for the best paper in the *Wilson Bulletin* 1998.

The latest disaster in Kaua'i occurred in 2004-2006. The 'Akeke'e was common in 2004, but by 2006 was almost gone, without ever being declared endangered. The 'Akikiki has withdrawn to the highest part of

'Alaka'i. Recent crashes are possibly related to the upward advance of mosquitoes, and perhaps global warming is involved.

The good news is that the Puaiohi has been bred in captivity, and some have been released to breed with wild birds. The Laysan Albatross is returning, and the Nene that escaped from pens during the hurricanes are thriving in the wild. There is some resistance to avian malaria in some species.

Doug noted that John Bowles now lives in Greensboro, North Carolina. He had moved to the mainland and became a college professor specializing in mammals. He retired here because his parents had been Quaker missionaries in Korea, and there is a large Quaker community in Greensboro. He and Doug met purely by coincidence at a Piedmont Bird Club meeting, showing that this is indeed a small world.

It is difficult to convey much of Doug's talk without the benefit of the slides he brought. We all had a great evening, and if you missed the talk, I'd recommend that you take any opportunity to hear Doug speak.

Dues Alert!

The year of renewal for your Chapel Hill Bird Club membership is listed on the top right of the mailing label on your CHBC Bulletin. If the year is marked with **yellow**, this indicates that your membership is due now. Please bring your dues (checks payable to the Chapel Hill Bird Club) to the next meeting, with the completed membership form, or mail them to:

**Patsy Bailey,
277 Mint Springs Rd.
Pittsboro, NC 27312**

Membership Form

Name _____
Address _____

ph _____
E-mail _____

New member: _____ or, RENEWAL: _____

dues: \$15/yr. individuals/family, \$10/year students
Make checks payable to Chapel Hill Bird Club.

2008 Chatham County Fall Bird Count

by Will Cook, compiler

The Chatham County Fall Migration Count on 9/20/2008 was remarkable only for how unremarkable

it was. Unlike last year, when the lake level was very low and therefore there were large numbers of shorebirds, this year the lake was a foot above normal, so there were no mudflats and no shorebirds apart from Killdeer. The total species count of 94 was the lowest since 1996, the first year of the count (106 species is average). The total number of birds counted was also very low, 2597, compared to the average of 3867. Observer effort was a well below normal 51.5 party hours (average 73.8) and the number of birds per party hour was slightly below normal at 50.4 (average 54.5).

One species was new to the count: Orange-crowned Warbler, reported by Nathan Swick, a tad earlier than usual, but not too unexpected. Other goodies included Merlin (second count record, Will Cook's party), 2 Loggerhead Shrikes (second count record, Phil Warren covering the Hank's Chapel Road area), Song Sparrow (surprisingly, our second count record), Northern Rough-winged Swallow, Eastern Kingbird, and Veery.

We did manage to set or tie a few record highs, despite the lackluster overall count: 8 House Wrens (2.2 average), 23 Northern Parulas (ties record, 11.5 average), 44 American Redstarts (21.3 average), 3 Song Sparrows (0.1 average), and 20 House Sparrows (0.6 average).

The biggest miss was Rose-breasted Grosbeak, missed for the first time since the initial count. Overall, though, neotropical migrant numbers were normal, with the count of 18 warblers species, 149 non-Pine individuals, near the long-term average of 18 species, 130 individuals.

Teams with the highest counts: Tom Driscoll's party, covering Farrington Road, came in first in both species (56) and individuals (429), besting Nathan Swick and Will Cook's parties' 53 species each. Effort: 21 counters in 9 parties. 51.5 party hours (46 foot, 5.5 car), 107 party miles (34 foot, 73 car). Owling 2.5 hour, 12 miles.

Weather: temp 53-73F, wind N 5-10 mph, no precip, overcast am, partly cloudy in pm, lake level 217.2'.

Chapel Hill Bird Club Officers

President: Amalie Tuffin, amaliel@post.harvard.edu

Vice President: Ginger Travis, (919) 942-7746

ginger_travis@bellsouth.net

Vice President: Dave Gulick d2gulick@earthlink.net

Secretary: Amalie Tuffin, amaliel@post.harvard.edu

Treasurer: Patsy Bailey, (919) 933-5850

Field Trip Coordinator: Doug Shadwick,
(919)942-0479 dougshadwick@nc.rr.com

WebMaster: Will Cook cwcook@duke.edu

Bulletin Editor: Karen Piplani, (919) 929-6553,

k_niplani@alumni.unc.edu

2008 TRIANGLE AREA FALL BIRD COUNTS

9/23 9/24 9/20

— Chatham County observer parties —

Species	FL	KL	CC	notes	NA	PB	WC	TD	NS	ST	AT	AU	PW
Canada Goose	22	283	22				2			6		12	2
Wood Duck	1		26				2		9		5		10
Mallard	1		1						1				
Wild Turkey	7	15	11									11	
Northern Bobwhite													
Pied-billed Grebe		2											
Double-crested Cormorant	16	26	82		11		4	30	33		4		
Great Blue Heron	17	25	37		2		2	8	15	1	3	1	5
Great Egret	5		42				7	13	22				
Black Vulture	8	65	21			1	10	3			1	4	2
Turkey Vulture	25	58	97		24	4	5	16	2	1	29	7	9
Osprey	1	4	13		4			7	1		1		
Bald Eagle 9 ad., 6 imm.	8	15	15		2		1	2	5		1		4
Sharp-shinned Hawk	1	1	1				1						
Cooper's Hawk			2				1		1				
Red-shouldered Hawk	6	1	15		1	1			2	1	3	3	4
Red-tailed Hawk	4	1	3								1	2	
American Kestrel		11	3									1	2
Merlin			1	R			1						
Semipalmated Plover		2											
Killdeer	14	33	26									2	24
Solitary Sandpiper	1												
Spotted Sandpiper		3											
Sanderling	4												
Rock Pigeon	15	19											
Mourning Dove	25	39	40		1	3	2	3	2	5	7	11	6
Yellow-billed Cuckoo	1		7				4	1	2				
Eastern Screech-Owl			5										5
Great Horned Owl	1												
Barred Owl	3		4					1		2			1
Chimney Swift	21	40	123		11		1	32	33	6	19	21	
Ruby-throated Hummingbird	2		14			3		4	1	3		1	2
Belted Kingfisher	5	2	12		1				2		3	2	4
Red-headed Woodpecker	5		18			1	3		2		7	2	3
Red-bellied Woodpecker	19	10	53		8	5	6	5	9	4	11	3	2
Downy Woodpecker	15	8	41		6	1	10	7	6	5	3	1	2
Hairy Woodpecker	3	2	6				3			2	1		
Northern Flicker	16	21	23		5		3	3	2	1	4	1	4
Pileated Woodpecker	2		8				2	1	1	2		2	
Eastern Wood-Pewee	1	4	17		2	1	5	1	1		3	3	1
Acadian Flycatcher	1	1											
<i>Empidonax</i> sp.			3					2	1				
Eastern Phoebe	6	6	16		2		1	4	3		1	2	3
Great Crested Flycatcher			1								1		
Eastern Kingbird			1	R								1	
Loggerhead Shrike	1	1	2	R									2
White-eyed Vireo	2		6			1	1		1			1	2
Blue-headed Vireo			3		1			2					
Yellow-throated Vireo			2				1		1				
Red-eyed Vireo	2		12		1	1	2	1	3		3		1
Blue Jay	28	52	127		11	8	29	15	9	6	24	12	13
American Crow	82	116	168		20	12	9	16	11	5	28	16	51
Fish Crow	1		6				1	3			2		
Horned Lark		7											
Tree Swallow		10											
N Rough-winged Swallow		2	3	R				3					
Barn Swallow		3											
Carolina Chickadee	67	73	185		34	10	40	33	24	7	27	3	7
Tufted Titmouse	71	67	141		18	10	25	28	24	7	19	3	7
White-breasted Nuthatch	12	4	25				4	3	7	3	4	2	2
Brown-headed Nuthatch	16	26	79		8		31	5	8	2	17		8
Carolina Wren	27	46	77		10	4	11	17	5	8	14	4	4
House Wren	1	1	8				4		2		1		1
Blue-gray Gnatcatcher	18		11			1		3	7				
Eastern Bluebird	41	107	74		6	1	3	12	7		9	9	27

2008 TRIANGLE AREA FALL BIRD COUNTS

9/23 9/24 9/20

— Chatham County observer parties —

Species	FL	KL	CC	notes	NA	PB	WC	TD	NS	ST	AT	AU	PW
Veery			1	R									1
Swainson's Thrush			1										
Wood Thrush			4				1		1	2			
American Robin	4	5	10					3	7				
Gray Catbird	12		13			2	2	4			3	2	
Northern Mockingbird	20	14	26					4	1	4	1	10	6
Brown Thrasher	6	3	4				3		1				
European Starling	35	175	51										51
Blue-winged Warbler	1												
Tennessee Warbler			2		1			1					
Nashville Warbler	1	1											
Orange-crowned Warbler			1	NC					1				
Northern Parula	7	8	23	H	4	1	1	12	2	1			2
Yellow Warbler													
Chestnut-sided Warbler	1		2							2			
Magnolia Warbler	4	2	8		3	2	1	2					
Cape May Warbler			2							1	1		
Black-throated Blue Warbler	5	6	4		1					3			
Black-throated Green Warbler	2		6					5			1		
Blackburnian Warbler			1					1					
Yellow-throated Warbler		1	3					2					1
Pine Warbler	133	93	273		102		68	19	7	2	47	2	26
Prairie Warbler	1	1	2		1			1					
Palm Warbler	5	2	3		1		1	1					
Black-and-white Warbler	13	4	19		4	1	6	2	1	1	2		2
American Redstart	19	19	44	H	10	2	7	11	5	2	2	2	3
Worm-eating Warbler	2												
Ovenbird		1	1							1			
Northern Waterthrush	2												
Connecticut Warbler	1												
Common Yellowthroat	7	4	26			3	12	7	1			1	2
Hooded Warbler		2	2			1			1				
Summer Tanager	2		14		1		2		2	1	3		5
Scarlet Tanager		2	14				5	3	2	2		1	1
Eastern Towhee	9	1	31			2	10	8	1	2	6		2
Song Sparrow			3	H, R					3				
Chipping Sparrow	5	72	11					2			3	6	
Field Sparrow		2	5				5						
Northern Cardinal	40	82	101		12	10	7	15	13	7	12	16	9
Rose-breasted Grosbeak													
Blue Grosbeak		4	9					9					
Indigo Bunting	1	3	32				13	17					2
Red-winged Blackbird			4								4		
Eastern Meadowlark			2										2
Common Grackle			9								9		
Brown-headed Cowbird	120	220											
Baltimore Oriole			2				1	1					
House Finch	5	10	15					13				1	1
American Goldfinch	9	15	55		2	1	5	2	8	5	22	6	4
House Sparrow			20	H								20	
TOTAL SPECIES 112	77	69	94		35	28	53	56	53	35	45	40	49
TOTAL INDIVIDUALS	1123	1965	2597		331	93	387	429	322	113	372	210	340

CC = Chatham County fall bird count totals, FL = Falls Lake, KL = Kerr Lake

Notes: H = Record High, L = Record Low, NC = New to Count, R = Rare

ovlp = estimated overlap (birds counted by 2 parties)

Weather: temp 53-73F, wind N 5-10 mph, no precip, overcast am, partly cloudy in pm, lake level 217.2'

Start		530		720	1020	740	740		630	730	530	530
End		1800		1530	1800	1650	1215		1730	1215	1200	1400
Parties	5	5	9	1	1	1	1	1	1	1	1	1
Individuals	7	6	21	2	2	8	3	1	1	1	2	1

2008 TRIANGLE AREA FALL BIRD COUNTS

9/23 9/24 9/20 — Chatham County observer parties —

Species	FL	KL	CC	notes	NA	PB	WC	TD	NS	ST	AT	AU	PW	
Regular Party Hours: Total		22	29.25	51.5		6.5	3.5	9	4.25	8	3	4.75	5.5	7
Party Hours: On Foot		18.25	17.25	46		6.5	3.5	9	3.75	6	3	4.75	4.5	5
Party Hours: By Car		3.75	12	5.5					0.5	2		1	2	
Party Hours: By Boat				0										
Party Miles: Total		44.5	116.5	107		5.5	1.5	6	5	14	1.5	3.5	18	52
Party Miles: On Foot		16	16.5	34		5.5	1.5	6	4	4	1.5	3.5	3	5
Party Miles: By Car		28.5	100	73					1	10			15	47
Party Miles: By Boat				0										
Owling Hours		1.5	1	2.5									1	1.5
Owling Miles		0	0	12									1	11

Area

Ebenezer Point, Vista Point
 Bear Cr., SW Chatham Co.
 Old Hope Valley Farm Rd.

Farrington Road
 751 Bridge, Wildlife Observation Site, O'Kelly Chapel Rd
 Boothe Hill Rd.
 Big Woods Road
 Jay Shambley Rd, Rocky River, etc.
 Hank's Chapel Road

Party Party Members

NA Nick Anich, Paula Spaeth
 PB Parker Backstrom & Holly Weston
 WC Will Cook, Samantha Fernandez, Grant Firl, Ted Gilliland,
 Julia Gruber, Maria Prieto, Carl Rothfels, Jean Still
 TD Tom Driscoll, Robert "Bo" Howes, Jane Oliver
 NS Nathan Swick
 ST Shelley Theye
 AT Amalie Tuffin
 AU Andy Upshaw, Rouse Wilson
 PW Phil Warren

Past Counts

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	avg
Date	9/20	9/19	9/18	9/16	9/15	9/21	9/20	38248	38612	38976	39340	39711	
Species	99	107	115	107	103	95	98	96	114	98	123	94	102.5
Birds	3125	3805	4609	3887	4895	3471	3381	2256	3728	4037	4599	2597	3536.5
Parties	10	12	13	13	17	9	13	10	11	12	11	9	11.3
Counters	14	19	27	23	37	14	17	12	18	17	22	21	19.5
Party Hours	54	70	86.7	88.25	132	53.75	67.25	42.3	68.5	66.2	62.7	51.5	67.3
Birds per Hour	57.87	54.36	53.16	44.05	37.08	64.58	50.28	53.33	54.42	60.98	73.35	50.43	54.2

Warblers

species	18	16	23	21	22	18	19	14	17	17	17	18	18.0
individuals	295	433	570	505	411	340	208	120	294	285	342	422	335.9
non-Pine individuals	108	111	293	125	187	136	130	36	111	79	136	149	131.2

Shorebirds

species	5	12	5	3	3	1	2	6	11	2	20	1	5.6
individuals	47	187	26	16	9	30	19	20	298	5	940	26	125.9
non-Killdeer individuals	23	58	4	3	4	0	1	12	131	2	757	0	76.6
lake level	214.7	213.9	223.5	216.2	216.2	214	217.1	216.4	213.8	217	211.9	217.2	216.6

Shorebirds vs Lake Level

