

jay watch



annual report

2008



Science and conservation sometimes make strange bedfellows. Conservation, although reliant on science to make informed decisions, must also be passionate and persuasive. These subjective

pursuits can galvanize data into actions. But science typically embraces objectivity, and sometimes the objective perspective might seem cold, biased or uncaring when viewed through subjective lenses. So, where am I leading?

At Archbold Biological Station, this was a pretty good year for the jays. We banded 225 nestlings. Of those, 154 fledged, and 121 survived to be rebanded in July. Because we follow about 83 territories, that equals about 1.45 independent young per group, above the long-term annual mean. These are objective data, but the subjective conservationist within us smiles. Seeing more jays is a good thing.

Then, nature happened. Beginning in July, we began to see extraordinarily high rates of mortality within the jay population at Archbold. By October, only 53 of the 121 independent young were still alive — a 56 percent mortality rate in only three months. Overall, the entire population declined by 25 percent as many of our oldest breeders disappeared as well. We believe the elevated mortality was the result of an epidemic, likely a mosquito-borne encephalitis but ultimately an unknown disease agent.

As of our October census, we had observed no apparent diminution of the death rate. During previous epidemics the elevated mortality persisted into December or January. We do not know if these patterns are widespread. It seems to be happening in some populations but not in others, a pattern typical of disease. But, if high rates of mortality continue to persist for another two to three months, we could see large declines in many different populations. This would be without a doubt a conservation disaster.

Although that description is subjective, for a species teetering at the brink of extinction, it also can be viewed as a fact. Many small, isolated populations are not resilient enough to withstand that magnitude of loss without a great increase in the risk of extinction. Surely some will disappear. As jay populations become increasingly fragmented and isolated, and as Florida's climate becomes increasingly warm and wet, mosquitoes will thrive, and disease will be an increasing threat to the viability of scrub-jays. Is there an objective perspective that can rescue us from this inevitably depressing conclusion?

To mitigate the increasing threat of disease, we must understand its ecology — the ecology of the vectors, the viruses and the host. But as is often the case, science often capitalizes on serendipity. As part of another investigation in 2008, we measured the immunological response of all nestlings and again for all those that survived to July. And then the disease struck.

Now we have the opportunity to seek patterns — who lived and who died, whose immune system was strong,



whose was weak — that might explain why. Because we know so much now about the genetics of Florida scrub-jays, we also have the opportunity to search for the very genes that encode information about immune responses to diseases. Are some birds, with certain alleles, more resistant? Could some small populations, where genetic diversity has been lost to bottlenecks caused by fragmentation and isolation, be stuck with a pool of alleles that render them vulnerable to disease? Answers to these questions, although potentially years away, can measurably improve our ability to conserve jays. So from a different perspective, it's not likely that this epidemic could have occurred at a better time, a time when we were so well-positioned to understand its ecology and effects. So forgive me if, when asked about this awful epidemic, I smile. I rue the loss of birds, and I worry about the implications for the future survival of jays elsewhere in their range. But I see an opportunity to build on our knowledge base, knowledge that can be translated into more effective conservation.

Nature happens: It has no moral value, and it is neither good nor bad. However, the many changes that humans have wrought to the world in which birds, mosquitoes and viruses live have altered their relationships so that the very viability of a species could be threatened. I believe those changes do have a moral value. It will take continued partnership between science and conservation to undo what we have done. But I take heart in the lessons to be learned from nature and smile even when she, as Lord Tennyson so admirably phrased, is "red in tooth and claw."

Reed Bowman, Ph.D.
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Archbold Biological Station

from the advisor



From the Coordinator

Every year I hear the question: “So how are scrub-jays doing?” and wish I had an answer. The last statewide survey that assessed the status and distribution of Florida scrub-jays was conducted from 1992 through 1993. Last year’s U.S. Fish and

Wildlife Service 5-year review of the listing status of the species reported declines in 75 percent of recently surveyed populations (USFWS 2008), including data collected by Jay Watch citizen-scientists. But the area surveyed was limited, and since 1993 there has not been a comprehensive look at the overall population.

Jay Watch citizen-scientists have monitored scrub sites since 2002. We can — and do in this report — make comparisons across time at sites that Jay Watch volunteers have surveyed across the years. This allows us to detect population trends, but in a limited area. We cannot extrapolate those results to the entire scrub-jay population because they are not necessarily representative. Without sending Jay Watch volunteers to many different sites throughout the range, this is not likely to change soon. But there is an exciting change in store for Jay Watch.

There is growing interest from conservation land managers and biologists who monitor scrub-jays to share their data for inclusion in this report with Jay Watch data. Next year The Nature Conservancy hopes to print a report with data from many more sites, not all collected by Jay Watch citizen-scientists. The power of this will be to have a common place for scrub-jay data that is accessible to all. It should strengthen our ability to detect population trends since the statewide survey, as there will be more points of comparison.

This brings us to the result that we really would like to see from Jay Watch: more scrub in good condition to sustain and grow scrub-jay populations. In odd-numbered years, we collect and map vegetation data to show the habitat condition where scrub-jays are, and where they aren’t. We have already seen these data used to plan vegetation management and controlled burns that have improved habitat at sites like Little Manatee River Southfork tract and Moody Branch in Manatee County and Saddle Blanket Scrub Preserve in Polk County. At these sites, scrub-jays now use areas they did not use before treatment, with increases in the number of scrub-jay groups. Data collected by Jay Watch citizen-scientists makes a difference by informing work to improve scrub-jay habitat.

The continued expansion of Jay Watch is a testament to the dedication and hard work of an increasing number of volunteers and managers who conduct surveys in the scrub during the heat of summer. Thank you for your data and inspiration, and we hope to see you in the scrub again this summer! Meanwhile, if you haven’t signed up to receive the e-newsletter with information about Jay Watch, scrub-jays and scrub, send an e-mail to cmillett@tnc.org to subscribe.

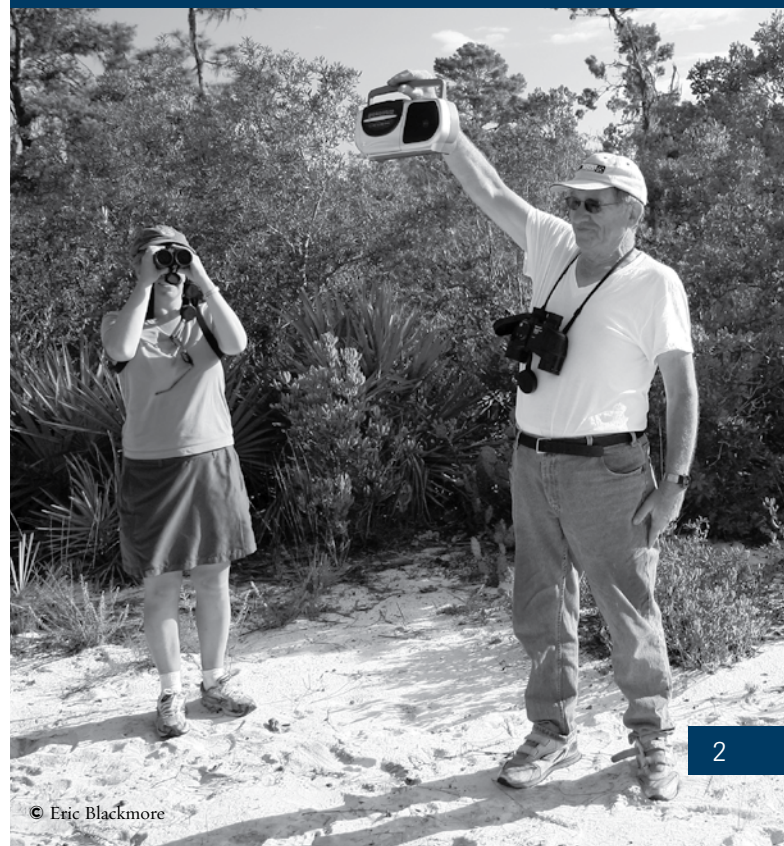
Cheryl Millett
Biologist
The Nature Conservancy

Background

The Florida scrub-jay is endemic to peninsular Florida and is habitat-specific, occurring in fire-dominated oak scrub on well-drained sandy soils. Based on a significant population decline and because of habitat loss and degradation due to urbanization, agriculture and fire suppression, in 1987 the U.S. Fish and Wildlife Service (USFWS) listed the Florida scrub-jay as a threatened species under the federal Endangered Species Act. In 1992 and 1993, Archbold Biological Station conducted a range-wide survey to determine the state of the species and estimated the population at 11,000 birds (Fitzpatrick et al. 1994). They estimated a decline of 25 percent to 50 percent from the 1980s, with the species extirpated from nine of the 39 counties where scrub-jays had previously existed. After that most recent range-wide estimate, survey efforts varied among sites throughout the range, and population trends were difficult to determine except at select, localized areas where scrub-jays were systematically and consistently monitored.

In 2002, The Nature Conservancy — working closely with Archbold Biological Station — developed Jay Watch, engaging volunteer citizen-scientists to annually survey scrub-jays. Jay Watch uses consistent standardized protocols to detect population trends along the Lake Wales Ridge, one of the three largest remaining populations.

New Jay Watch sites have been added every year, as the need for monitoring and impacts of dwindling resources are felt by organizations and agencies in other parts of Florida scrub-jay range.



2008 Jay Watch Sites

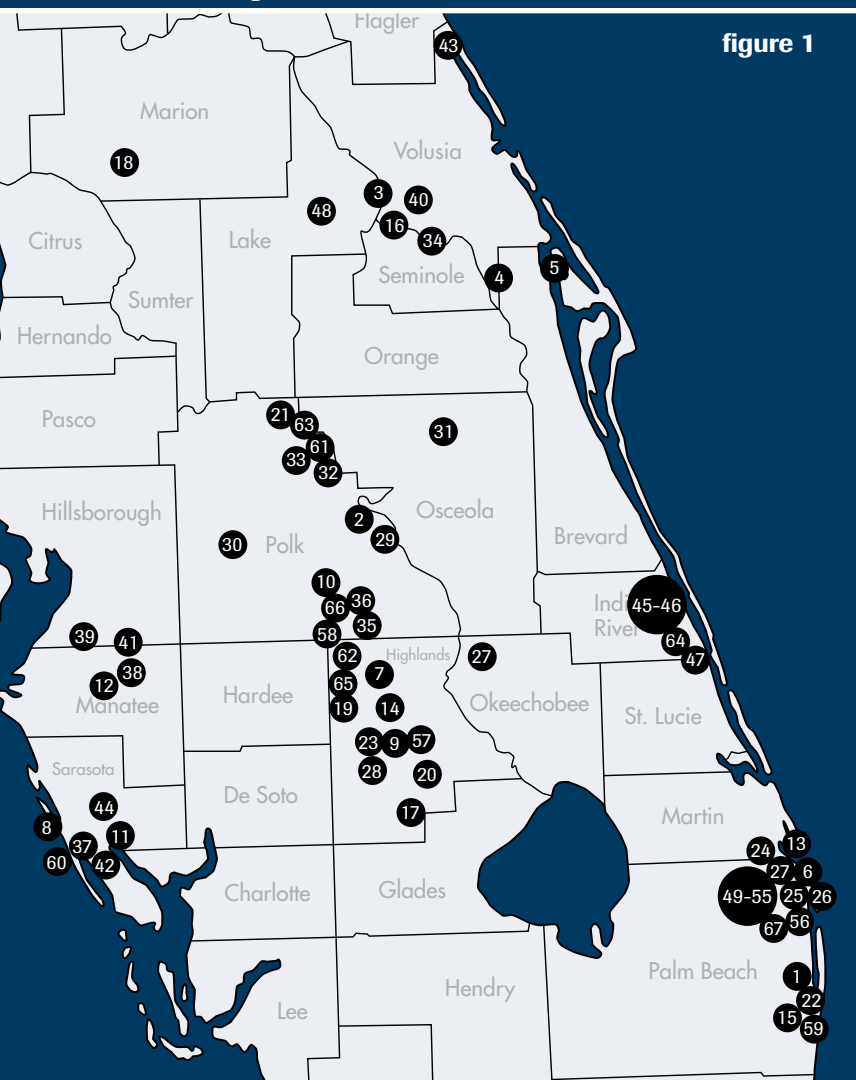


figure 1

2008 Jay Watch Survey Results

The 2008 field season marked the seventh in a coordinated, multiyear effort by Jay Watch citizen-scientists, The Nature Conservancy and land managers to monitor the Florida scrub-jay. In 2008, surveys occurred at 67 sites in 14 counties in peninsular Florida (Figure 1). Jay Watch citizen-scientists observed 625 adults and 222 juveniles in 247 groups for a total of 847 scrub-jays (Table 1).

1. AG Holly Hospital
2. Allen David Broussard Catfish Creek Preserve State Park (DEP)
3. Blue Spring State Park (DEP)
4. Buck Lake (SJRWMD)
5. Canaveral National Seashore (NPS)
6. Carlin Park (PBC P&R)
7. Carter Creek (USFWS)
8. Caspersen Beach County Park (Sarasota ES)
9. Clements (FWC)
10. Crooked Lake Prairie (Polk County ELP)
11. Deer Prairie Creek/Schewe (Sarasota ES/SFWWMD)
12. Edward W. Chance Reserve at Gilley Creek [formerly Rutland Ranch] (SFWWMD)

13. F.I.N.D. Park (Jupiter P&R)
14. Flamingo Villas (USFWS)
15. Galaxy Elementary School
16. Gemini Springs (Volusia County LS)
17. Gould Road (FWC)
18. Greenways Triangle (OGT)
19. Highlands Hammock State Park (DEP)
20. Holmes Avenue (FWC)
21. Horse Creek (SFWMD)
22. Hypoluxo Scrub Natural Area (PBC ERM)
23. Jack Creek (SFWWMD)
24. Jonathan Dickinson State Park (DEP)
25. Juno Dunes Natural Area (PBC ERM)
26. Jupiter Ridge Natural Area (PBC ERM)
27. Kissimmee Prairie Preserve State Park (DEP)
28. Lake June-in-Winter Scrub Preserve State Park (DEP)
29. Lake Kissimmee State Park (DEP)
30. Lakeland Highlands Scrub (Polk County ELP)
31. Lake Lizzie Preserve (Osceola PD)
32. Lake Marion (SFWMD)
33. Lake Marion Creek (SFWMD)
34. Lake Monroe (SJRWMD)
35. Lake Wales Ridge State Forest (LWRSF)-Arbuckle (FDOF)
36. LWRSF- Walk-in-Water (FDOF)
37. Lemon Bay Preserve (Sarasota ES)
38. Little Manatee River Southfork tract [formerly Cordell] (SFWWMD)
39. Little Manatee River State Park (DEP)
40. Lyonia Preserve (Volusia County)
41. Moody Branch (FWC)
42. Myakka State Forest-Winchester (FDOF/SFWWMD)
43. North Peninsula State Park (DEP)
44. North Schewe (SFWWMD)
- 45-47. Private properties (3)-Indian River County
48. Private property-Lake County
- 49-55. Private properties (7)-Palm Beach County
56. Radnor (PBC P&R)
57. Royce Ranch (FWC)
58. Saddle Blanket Scrub Preserve (The Nature Conservancy)
59. Seacrest Scrub Natural Area (PBC ERM)
60. Shamrock Park (Sarasota ES)
61. Sherwood Stokes Preserve (Polk ELP)
62. Silver Lake (FWC)
63. Snell Creek (SFWMD)
64. South County Park (IRC P&R)
65. Sun-n-Lake (FWC)
66. Sun Ray (FWC)
67. Tequesta Park (Town of Tequesta)

Volunteer Participation

In 2008, 232 citizen-scientists contributed 2,078.5 hours surveying 67 sites. This increase in volunteer effort from recent years is largely due to the addition of many new sites (Table 2).

Jay Watch Volunteer Participation

Year	Sites	Volunteers	Hours Worked
2008	67	232	2,078.5
2007	41	165	1,627
2006	31	131	1,230
2005	18	65	586
2004	18	116	1,163
2003	12	78	750
2002	11	55	885

table 2

Comparison of scrub-jay findings from Jay Watch (JW) and Archbold Biological Station (ABS) surveys at four test sites.

Site	Year	Number of Groups	
		ABS	JW
Test 1	2004	16	15
	2005	12	12
	2007	12	6
	2008	13	12
Test 2	2004	8	6
	2005	8	8
	2006	7	9
	2007	6	6
Test 3	2006	7	7
	2008	6	7
	2007	17	12
Test 4	2007	17	12
Site	Year	Mean Group Size	
		ABS	JW
Test 1	2004	2.94	2.6
	2005	2.92	3.0
	2007	2.75	3.17
	2008	3.31	2.75
Test 2	2004	2.75	3.5
	2005	4.38	4.25
	2006	4.57	4.44
	2007	3.83	3.67
Test 3	2006	4.29	3.71
	2006	3.43	4.29
	2008	2.67	3.14
Test 4	2007	3.12	3.83
Site	Year	Juveniles Per Group	
		ABS	JW
Test 1	2004	0.63	0.4
	2005	0.75	0.67
	2007	0.5	1
	2008	1	0.67
Test 2	2004	0.38	1.33
	2005	2.13	1.75
	2006	2.14	1.56
	2007	1.33	1
Test 3	2008	1.14	1
	2006	0.43	0.71
	2008	0.83	0.71
Test 4	2007	1.70	1

table 3

Comparison of Jay Watch to Archbold Biological Station Surveys

To ensure Jay Watch information is accurate and consistent, results are compared with data collected from more intensive Archbold Biological Station surveys on test sites (Table 3). In 2008, results were not significantly different ($\chi^2=0.05$, $P=0.82$), with Jay Watch counting one fewer group at one site, one more group at another and the same number of groups at the third. At the site where Jay Watch detected fewer groups, survey points were added this year to improve detection in the interior of the site. The group that was missed was located in a neighborhood near the site that Jay Watch does not cover.

In 2008, mean group sizes were not significantly different from Archbold findings, and neither were the number of juveniles detected per group. However, Jay Watch consistently detected 0.2 fewer juveniles per group than Archbold reported. Trends in productivity are reliable, but actual numbers are undercounted. Color-band reading data are still the least reliable part of Jay Watch because color bands reported by Jay Watch often did not fit the known banded birds at sites. Color-band reading in general is challenging for the best-trained observers because colors, especially in celluloid bands, fade considerably over time. Considering that Jay Watch volunteers often observe only for a handful of days each year, significantly improving this part of the program is a challenge.

Jay Watch Survey Methods

Volunteer training — The Nature Conservancy partners with Archbold Biological Station biologists and land managers each year to recruit and train volunteers to be Jay Watch citizen-scientists. Volunteers learn about Florida scrub-jay identification and biology, scrub ecosystem and Jay Watch survey protocols during spring training workshops. The training begins with lecture presentations followed by a field portion to identify scrub-jays and practice the survey protocol. Experienced citizen-scientists are encouraged to attend trainings to refresh their skills and mentor new volunteers.

Survey methods — All Jay Watch surveys are conducted between mid-June and mid-July. This survey period was chosen because: 1) reproduction is finished, and young of the year are generally independent but still with or near the family group; and, 2) juvenile and adult plumages are most easily distinguishable from each other. Each point is surveyed a minimum of three times on separate days to ensure all scrub-jays present are observed. Three consecutive days is ideal, but if this is not possible, the days are as close together as possible.

Jay Watch conducts surveys at points set at each site in appropriate habitats following methods set by Fitzgerald et al. (1991). At each point, surveyors play a tape-recording of territorial Florida scrub-jay calls for 1 minute. They then record the number of groups, number of individuals per group, and number of adults and juveniles they see. They also note any band color combinations. Surveyors record the locations of any scrub-jays seen or heard on aerial maps, and these locations are later digitized.

population trends

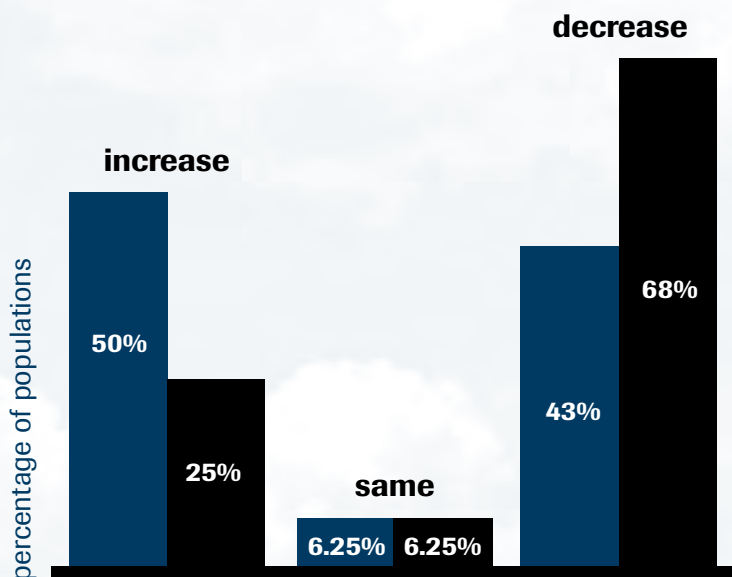


figure 2 – change in number of groups since 1993 (blue) and since 2004 (black)

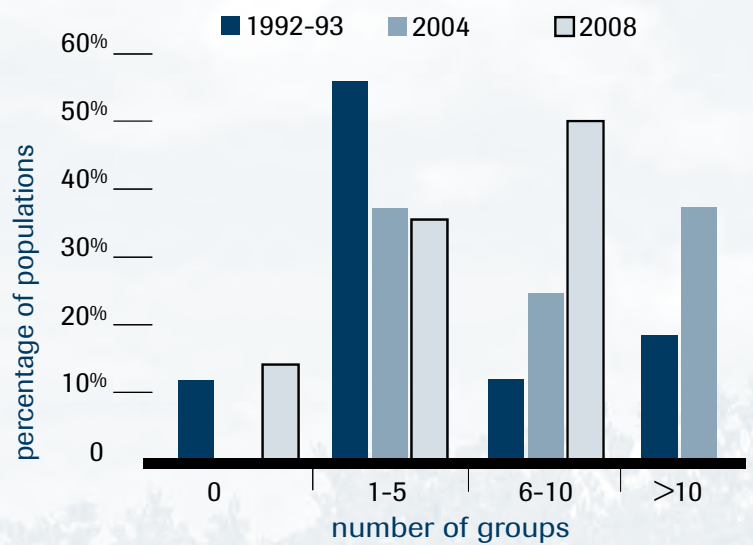


figure 3 – distribution of group sizes

Data collected by Jay Watch citizen-scientists were summarized into three categories to analyze population trends: number of groups, average group size and average number of juveniles per group (Table 1). Florida scrub-jay populations are composed of family groups that include parents, young of the year, and up to several helpers (parents' offspring from previous years). The number of groups and average group size at each site provide insight into trends in overall population sizes, while the number of juveniles in each group gives an indication of productivity. Comparisons among years include the 16 Lake Wales Ridge sites that were surveyed in all the years analyzed (Table 1).

Data available from the 1992-1993 range-wide surveys include the number of scrub-jay family groups at each site. This measure was used to detect longer-term population trends at 16 sites along the Lake Wales Ridge. Numbers of groups from the 1992-1993 surveys to 2008 were compared for longer-term trends, and numbers of groups from 2004 to 2008 were compared for shorter-term trends at those same sites. Longer-term trend analysis showed just under half of sites had fewer scrub-jay groups in 2008, half had more groups, and only one remained the same (Figure 2). Shorter-term trend analysis showed more than two-thirds of sites declined in number of scrub-jay groups since 2004, one-quarter increased, and one remained the same (Figure 2). The 97 scrub-jay groups among these sites along the Lake Wales Ridge during the statewide survey increased to 120 in 2004, and fell to 90 in 2008. Comparisons between

2004 and 2008 are not possible because not all sites were surveyed in the intervening years.

Among 42 sites included in the range-wide surveys and in 2008, nearly one-half had fewer scrub-jay groups, 40 percent had more groups, and 12 percent remained the same. Many sites were on the Lake Wales Ridge (19), with others along the southeast coast (13), in the southwest (6), and in the northeast (5) (Table 1).

Sites with fewer than 10 groups are vulnerable to extirpation, with those having one to five groups being most vulnerable. Nearly all of the 16 Lake Wales Ridge sites surveyed in 1992-1993 and more recently with Jay Watch have small numbers of groups (Figure 3). None had greater than 10 groups in 2008 (Table 1; this only includes similar survey areas within sites, so that findings from points added this year to cover more area are not included). The percentage of populations in this larger category reached a high in 2004 following the boom reproductive year of 2002. The percentage of populations with six to 10 groups has increased over time as those with more than 10 groups in 2004 fell into this category in 2008. The number of sites with one to five groups has decreased slightly, with two sites of this population size decreasing to zero, and one site that had six to 10 groups in 2004 falling to this category.

The number of groups at each site does not tell the entire picture. The other components of population size at each site are group size and productivity. Neither of these measures were available from the 1992-1993 range-wide survey, so the long-term trends are not known.

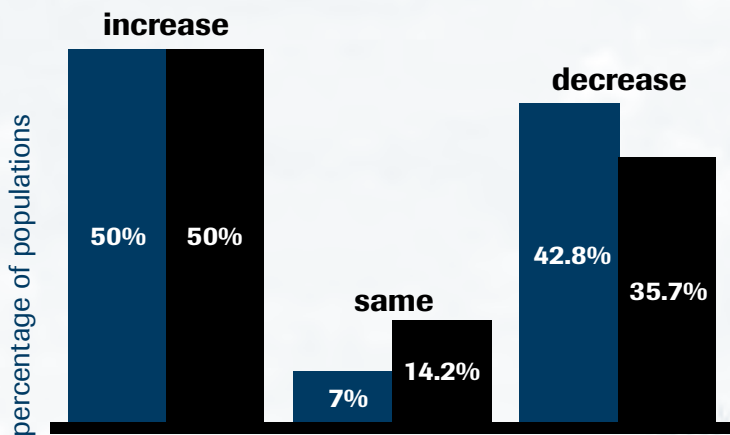


figure 4 – Change in mean group size (blue) and productivity (black) since 2004

Among sites that were surveyed in 2004 and 2008, mean group size and productivity have increased at half of sites and declined at most others, with only one and two, respectively, remaining the same (Figure 4). Long-term studies at Archbold Biological Station have found an average group size of three birds in stable populations, and the average across years has been 3.54 scrub-jays per group, with a median of three in all but 2006 when the average was greater than four scrub-jays per group. Individual sites that differ bear further investigation.

Productivity has fluctuated, but the overall average has been one juvenile per group, with the median changing year to year from zero to one. Long-term studies at Archbold Biological Station have found an average of one juvenile per group. Given that our comparisons with Archbold Biological Station data (Table 3) suggest Jay Watch tends to undercount juveniles, productivity appears to be healthy. Sites where the average remains low bear further investigation.

Because assessing the number of juveniles in a group has been a challenge with Jay Watch, we have focused on improving the accuracy of our assessments. In 2006, we wondered if a part of an increasing trend in reproduction may reflect our increased effort rather than an underlying change in the proportion of juveniles. This year Jay Watch detected a decline in that reproductive high, and values remained similar to those determined by Archbold (Table 3), suggesting the high reproduction seen in 2006 was not merely a product of better detection.



habitat condition

Palm Beach County

Seventeen sites were surveyed in Palm Beach County with the direction of the Coalition for Wilderness Islands Inc. and considerable effort of Palm Beach County ERM and Parks and Recreation. A total of five scrub-jay groups was detected, one each at five separate sites (Table 1). Three groups were on public conservation lands (Carlin Park, Juno Dunes Natural Area, and Jupiter Ridge Natural Area), and two were on private property. All 11 birds (including only one juvenile) were in the northern third of the county, with none detected at the four sites surveyed in the south. The number of scrub-jays seen at these sites has declined by more than three-quarters (Figure 5; Coalition for Wilderness Islands, Inc. 2008). The closest population of scrub-jays is at Jonathan Dickinson State Park in southern Martin County (Table 1).

Vegetation Monitoring 2007

Jay Watch includes biennial vegetation monitoring to measure characteristics related to scrub-jay persistence (Woolfenden and Fitzpatrick 1984, Breininger and Carter 2003, Breininger and Oddy 2004). Site-specific results are mapped along with scrub-jay groups to provide managers with information about habitat condition in relation to jays. This aids in planning habitat improvements.

However, overall numbers provide information about the habitat condition. Scrub-jays rely on oaks for nesting habitat, acorns and cover, and they do best in territories with more than 50 percent oak cover. Fewer than 30 percent of survey points were in this category (Figure 6). Scrub-jays do best in areas with an average vegetation height between 1 to 2 meters tall. Just over half of survey points were in this category (Figure 7), with nearly one-third being too tall, suggesting controlled burning to reduce the vegetation height is warranted. Scrub-jays also do best in open habitat, with 20 percent to 50 percent bare ground or low herbaceous cover. Just over one-third of points were in this category, with more than half having too little bare ground (Figure 8). Finally, scrub-jays do best in areas with few pine trees, (less than 15 percent cover). Nearly all survey points were in this category (Figure 8). This is likely because habitat with more pine trees is often not surveyed during Jay Watch. Those areas may be present — and may be potential scrub-jay habitat — but are unoccupied and in poor condition, so they are not included in Jay Watch until logging or prescribed burning is planned to improve their condition.

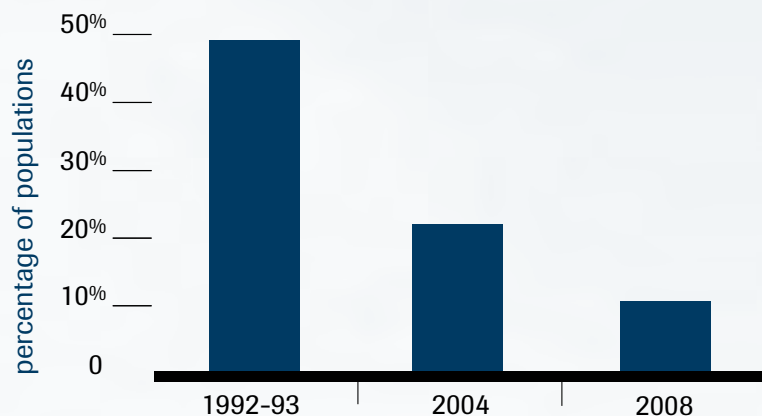


figure 5 — Change in number of Florida scrub-jays at 14 Palm Beach County sites

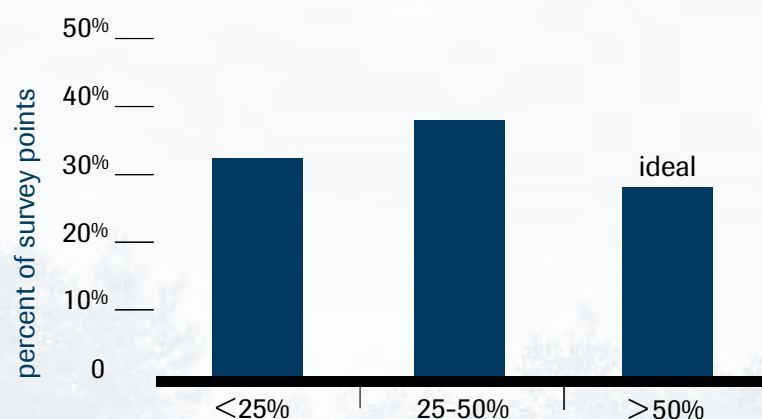


figure 6 — Percent oak cover at Jay Watch survey points 2007

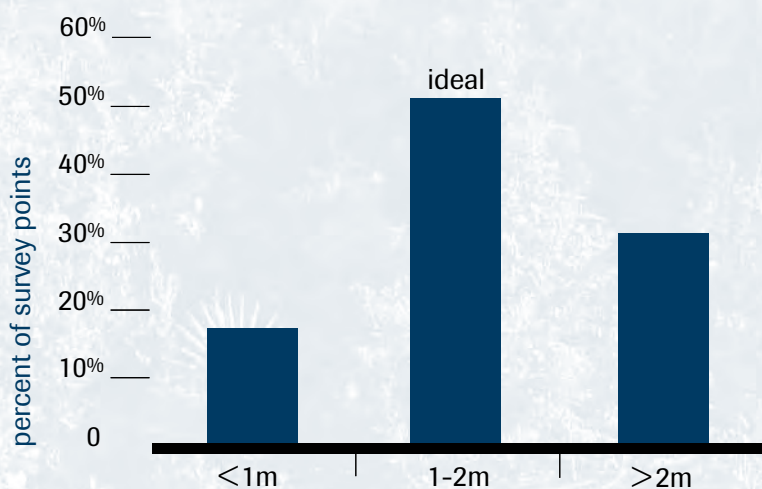
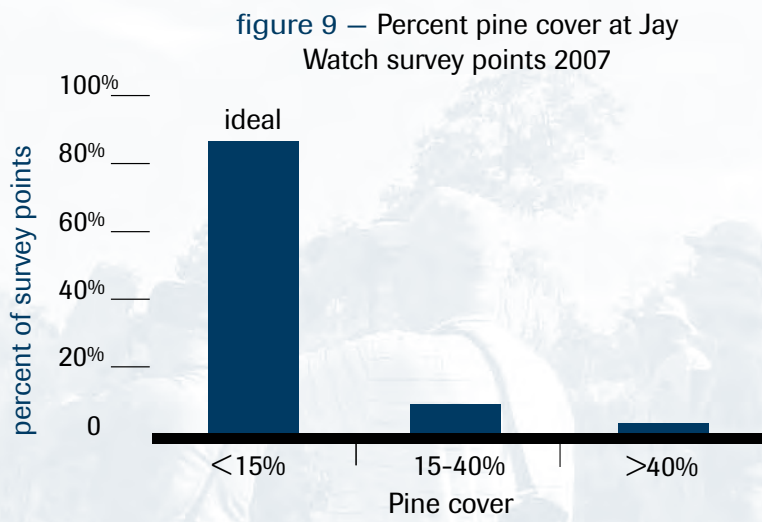
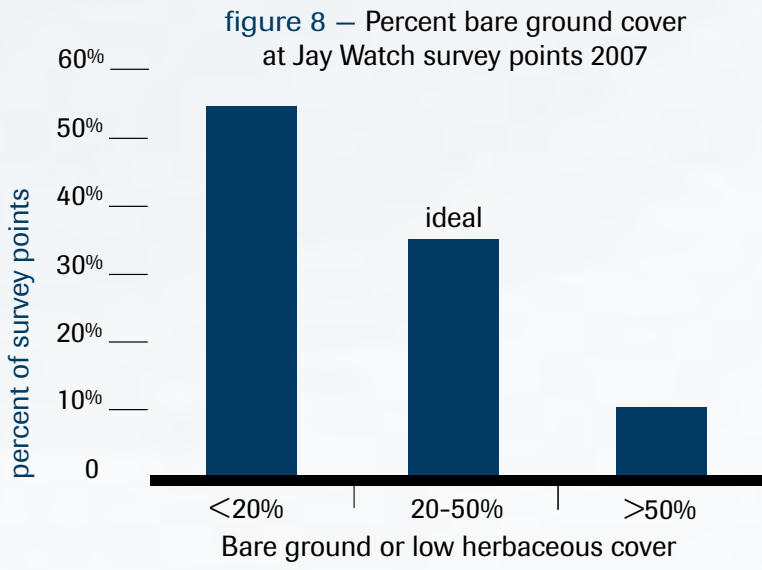


figure 7 — Average vegetation height at Jay Watch survey points 2007





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Conclusion

Jay Watch surveyed more sites than ever in 2008: 63 percent more sites were surveyed by 41 percent more citizen-scientists who donated 28 percent more volunteer hours.

Population comparisons among 42 sites surveyed during the range-wide surveys and in 2008 showed fewer scrub-jays groups in nearly one-half of sites, with 40 percent having more groups and 12 percent remaining the same. Among 16 sites surveyed along the Lake Wales Ridge during the 1992-1993 range-wide survey and monitored by Jay Watch in 2004 and this year, all are vulnerable populations with fewer than 10 groups each. Nearly the same percentage of those populations has declined as has increased in numbers of scrub-jay groups since 1992-1993, though two-thirds have declined since 2004. The average group size and number of juveniles per group are similar to the average of three and one found in stable populations by Archbold Biological Station research, but the small size of those populations makes them vulnerable to stochastic events.

Findings of Jay Watch citizen-scientists are not significantly different from those reported by Archbold Biological Station biologists at test sites, and the undercounting of juveniles in previous years has improved with targeted training in recent years. The accuracy of color-band reading data still needs improvement. This will be emphasized in the next year with more tools to practice outside of the scrub-jay survey season.

It all comes down to habitat. The biennial vegetation monitoring in 2007 found one-third of points surveyed had habitat too tall, and more than half were too dense to be ideal for scrub-jays. Site-specific habitat conditions need to be assessed to improve areas that are not currently suitable for scrub-jays. Trends at individual sites can be found in the central table of this report, and a more in-depth look at each is separately written to provide more information to each manager. The future of the species depends upon it.

Working Together to Save Florida Scrub-jays

Jay Watch provides valuable information to land managers, conservation organizations and agencies. Managers use Jay Watch information to track changes in scrub-jay populations and productivity on their properties and to monitor which areas scrub-jays are using and not using. Jay Watch helps agencies design prescribed fire plans and measure the success of habitat restoration activities like prescribed burning. For example, Jay Watch data enables land managers to design burn units around scrub-jay areas and indicates which areas need to be burned.

Jay Watch helps researchers, too. By recording sightings of banded scrub-jays that can be individually identified, Jay Watch citizen-scientists help researchers track dispersal of scrub-jays. This information helps researchers better understand trends and spatial distribution of scrub-jays on a landscape scale.

Finally, Jay Watch raises public awareness and participation that results in increased support for the conservation of scrub-jays, their habitat and the land management activities required to keep their habitat healthy. Volunteers are also ambassadors for wildlife and conservation to friends, family and others in the community.

Jay Watch Supporters

The Jay Watch program is supported with donations from private organizations and the in-kind support of The Nature Conservancy's partners and volunteers. Funding and in-kind support for 2008 has been provided by:

Archbold Biological Station*
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 Osceola County*
 Palm Beach County Environmental
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 Palm Beach County Parks and Recreation*
 Polk County Environmental Lands Program*
 Sarasota County Environmental Services*
 South Florida Water Management District
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 St. Johns River Water Management District*
 U.S. Fish & Wildlife Service
 Volusia County Land Acquisition and Management*

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The mission of The Nature Conservancy is to preserve the plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive.

2008 Jay Survey Results

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	Total Number of Groups								Average Group Size						Juveniles Per Group								
	1992-93	2002	2003	2004	2005	2006	2007	2008	2002	2003	2004	2005	2006	2007	2008	2002	2003	2004	2005	2006	2007	2008	
AG Holly Hospital								0							0.00							0.00	
Allen David Broussard Catfish Creek Preserve State Park 1,2,3	30	7	9	13	9	8	6	12	3.29	3.80	3.77	3.44	4.38	3.00	3.57	1.20	1.00	1.62	0.89	2.25	0.83	1.36	
Blue Spring State Park 1	1					6	7	10					3.67	3.71	4.70					0.83	0.14	1.50	
Buck Lake Conservation Area 1	4						5	6						2	3						0.40	0.33	
Canaveral National Seashore 1	6				6	6	5	7				3.83	4.67	5.20	4.00				1.17	1.33	1.60	1.00	
Carlin Park 1	1					1#		1					1		2					0.00		0.00	
Carter Creek (USFWS) 1,2	1			1	1	0	0	0			1.00	1.00	0.00	0.00	0.00			0.00	0.00	0.00	0.00	0.00	
Caspersen Beach County Park 1	4/5*							3							2.67							0.33	
Clements/ Royce Ranch Unit 1,2,4	10	3+	5+	6+	8+	7+	12	9	3.33+	2.40+	4.00+	4.00+	4.29+	3.08	3.22	1.00+	0.40+	1.17+	0.75+	0.71+	0.42	0.67	
Crooked Lake Prairie		5	5	4	3	2	1	1	3.50	3.00	3.25	3.00	4.00	3.00	1.00	0.83	0.20	1.25	0.00	0.50	0.00	0.00	
Deer Prairie Creek 1	1					4	4	4							3.25	2.00	1.25				1.00	0.00	0.00
Edward W. Chance Reserve at Gilley Creek (formerly Rutland Ranch)						6	5	4					4.17	3.20	3.75					1.00	1.00	1.00	
E.I.N.D. Park								0							0							0	
Fleming's Villas 1,2,4	5		7	12	7	8	8	7		3.70	2.42	3.14	4.13	3.13	3.63		0.60	0.50	1.29	1.50	0.88	1.29	
Galaxy Elementary School								0							0							0	
Gemini Springs						1	1	0					4.00	3.00	0.00					2.00	1.00	0.00	
Gould Road 1,2	13			6	8	9	6	7			3.50	4.25	4.44	3.67	3.71			1.33	1.75	1.56	1.00	1.00	
Greenways Triangle 1	7							9							3.44							0.67	
Highlands Hammock State Park 1,4	12					3	4	5					3.33	2.75	1.60					0.33	0.75	0.20	
Highland Park Estates	12						10							3.70							1.40		
Holmes Avenue 1,2,4	16	6	6	15	12	7	6	12	3.00	2.80	2.60	3.00	4.43	3.17	2.75	1.60	0.60	0.40	0.67	1.29	1.00	0.67	
Horse Creek						0		0					0.00		0.00					0.00		0.00	
Hypoluxo Scrub Natural Area 1	1							0							0.00							0.00	
Jack Creek 1,2	5/8*		2	2	2	4	2	1		3.00	3.50	3.00	2.75	2.50	2.00		0.00	0.50	0.50	0.25	0.00	0.00	
Jonathan Dickinson State Park 1,4	0/60*						11	14						3.00	2.93						0.55	0.64	
Juno Dunes Natural Area 1	2/7*							1							1.00							0.00	
Jupiter Ridge Natural Area 1	1			0#				1							4.00							1.00	
Kissimmee Prairie Preserve State Park							4	3						4.00	2.67						1.75	0.67	
Lake June-in-Winter Scrub Preserve 1	9	11				7	11	7	3.27				4.29	3.00	4.29	1.00				1.29	0.11	2.00	
Lake Kissimmee State Park 1,2	2	2	13	9	9	8	11	7		3.50	3.44	3.33	3.50	3.45	3.14		1.00	0.56	0.78	0.88	1.00	1.47	
Lakeland Highlands Scrub 1,2	2	4	5	3	4	4	3	2	4.25	3.20	4.00	5.00	4.50	3.67	2.00	1.75	1.00	1.00	3.00	1.50	2.00	0.50	
Lake Lizzie Preserve						1	1	1					1.00	1.00	1.00					0.00	0.00	0.00	
Lake Marion 1,2	9			12	9	8	8	10			3.50	2.78	4.75	5.00	5.10			1.25	0.11	2.00	1.88	1.30	
Lake Marion Creek						0		0					0.00		0.00					0.00		0.00	
Lake Monroe Conservation Area							6	7						3.83	2.57						1.83	0.14	
LWRSF Arbuckle 1,2	0/6*	13#	13#	13#	10#	8#		4	3.4	2.9	2.8	2.8	3.4		3.5	0.0	0.3	0.0	0.3	1.0		1.50	
LWRSF Walk-in-Water 1,2	0/7*	24#	20#	23#	23#	18#		8	3.7	3.1	2.2	2.6	2.9		3.00	0.6	0.5	0.3	0.3	1.2		0.88	
Lemon Bay Preserve 1	4							6							3							0.00	

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2008 Jay Survey Results

table 1 - page 2

	Total Number of Groups								Average Group Size								Juveniles Per Group							
	1992-93	2002	2003	2004	2005	2006	2007	2008	2002	2003	2004	2005	2006	2007	2008	2002	2003	2004	2005	2006	2007	2008		
Little Manatee River Southfork tract (formerly Cordell)				2	2	2	4	4			2.00	3.50	3.50	2.00	3.00			0.00	1.00	1.00	0.00	1.00		
Little Manatee River State Park 1	0/1*						2#	1						2*	4						n/a	0		
Lyonia Preserve 4						32	26	27					4.22	3.65	4.37					0.88	0.31	1.19		
Moody Branch 1,4	2				3	2	3	3				3.67	3.50	3.67	4.00				0.67	1.00	1.00	1.33		
Myakka State Forest-Winchester							2	2						2.50	2.50						0.00	0.00		
North Peninsula State Park 1	5					3	3	4					2.33	3.67	2.50					0.67	1.00	0.00		
North Schewe								2							2.00							0.00		
Private- Indian River County 1							1	2						5.00	4.00						1.00	1.50		
Private- Indian River County 2 1	1/2*						1	2						7.00	4.50						3.00	2.00		
Private- Indian River County 3							0							0.00							0.00			
Private- Indian River County 4								1							2.00							0.00		
Private-Lake County							4	4						4.25	3.25						1.50	1.89		
Private- Palm Beach County 1						1#		1					1.00		2.00					0.00		0.00		
Private- Palm Beach County 2 1	1					0#		0					0		0					0		0		
Private- Palm Beach County 3								0							0							0		
Private- Palm Beach County 4 1	2/3*				0#			0				0			0				0			0		
Private- Palm Beach County 5 1	1							0							0							0		
Private- Palm Beach County 6					1#	1#		1				2	2		2				0	0		0		
Private- Palm Beach County 7 1	1							0							0							0		
Private- Polk County							1							3.00							0.00			
Radnor 1	4							0							0.00							0.00		
Saddle Blanket Scrub Preserve 1,2,5	2	2#	1#	2#	2#	2#	2#	4#	2.00	3.00	3.00	2.00	5.50	6.00	3.75	0.00	0.00	0.00	0.00	2.50	1.50	1.00		
Seacrest Scrub Natural Area								0							0.00							0.00		
Shamrock Park 1	5							3							4.00							1.33		
Sherwood Stokes Preserve 1	1					0		0					0.00		0.00					0.00		0.00		
Silver Lake 1,2,4	8	9	8	13	13	7	7	8	3.67	3.75	3.25	2.54	3.57	3.71	2.75	1.00	0.63	0.42	0.15	1.14	1.00	0.71		
Snell Creek						0		0					0.00		0.00					0.00		0.00		
South County Park 1	1						1	1						2.00	2.00						0.00	0.00		
Sun-N-Lake 1,2,4	4/6*			4	4	4	5	6			3.50	4.00	5.50	4.00	4.50			1.50	1.75	2.00	1.00	1.67		
Sun Ray 1	3						0	0						0.00	0.00					0.00	0.00			
Tequesta Park								0							0.00							0.00		
Tiger Creek Preserve 1,2,5	1	2#	1#	0#	0#	0#	0#	0#	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		

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2008 Jay Survey Results

table 1 - page 3

	Total # of Jays							Total # of Adults							Total # of Juveniles						
	2002	2003	2004	2005	2006	2007	2008	2002	2003	2004	2005	2006	2007	2008	2002	2003	2004	2005	2006	2007	2008
AG Holly Hospital							0							0							0
Allen David Broussard Catfish Creek	30	34	49	43	35	18	39	23	25	28	32	17	13	26	7	9	21	11	18	5	13
Blue Spring State Park					22	26	47					17	25	32					5	1	15
Buck Lake Conservation Area						12	15						10	13						2	2
Canaveral National Seashore				23	28	26	28				16	20	18	21				7	8	8	7
Carlin Park					1		2					1		2					0		0
Carter Creek (USFWS)			1	1	0	0	0			1	1	0	0	0			0	0	0	0	0
Caspersen							8							7							1
Clements/Royce Ranch Unit	10+	12+	24+	32+	30+	37	29	7	10	17	26	32	23	23	3	2	7	6	5	5	6
Crooked Lake Prairie	22	16	13	10	8	3	1	16	15	8	10	7	3	1	5	1	5	0	1	0	0
Deer Prairie Creek					13	8	5					9	8	5					4	0	0
Edward W. Chance Reserve at Gilley Creek (formerly Rutland Ranch)					25	16	15					19	11	11					6	5	4
FIND Park							0							0							0
Flamingo Villas		26	29	22	33	25	29		22	23	13	21	18	20		4	6	9	12	7	9
Galaxy School							0							0							0
Gemini Springs					4	3	0					2	2	0					2	1	0
Gould Road			21	34	40	22	26			13	20	26	16	17			8	14	14	6	9
Greenways Triangle							31							25							6
Highlands Hammock State Park					10	11	8					9	9	7					2	1	1
Highland Park Estates						37							23							14	
Holmes Avenue	22	14	39	36	22	19	33	12	11	33	28	22	13	25	10	3	6	8	9	6	8
Horse Creek					0		0					0		0					0		0
Hypoluxo Scrub Natural Area							0							0							0
Jack Creek		6	7	6	11	5	2		6	6	5	10	5	2		0	1	1	1	0	0
Jonathan Dickinson State Park						33	41						27	32						6	9
Juno Dunes Natural Area				11*			1							1							0
Jupiter Ridge Natural Area				0*			4							3							1
Kissimmee Prairie Preserve State Park						16	8						9	6						7	2
Lake June-in-Winter Scrub Preserve	36				30	29	30	25				21	28	16	11				9	1	14
Lake Kissimmee State Park		46	31	30	28	38	22		33	26	23	21	27	16		13	5	7	7	11	6
Lakeland Highlands Scrub	17	16	12	15	18	11	4	10	11	9	9	12	7	3	7	5	3	6	6	4	1
Lake Lizzie Preserve					1	1	1					1	1	1					0	0	0
Lake Marion			42	25	38	40	51			27	24	22	25	38			15	1	16	15	13
Lake Marion Creek					0		0					0		0					0		0
Lake Monroe Conservation Area						23	18						12	17						11	1
LWRSF Arbuckle	44	38	36	28	27		14		34	36	25	19		8		4	0	3	8		6
LWRSF Walk-in-Water	88	62	50	60	52		24		53	43	52	30		17		9	7	8	22		7
Lemon Bay Preserve							17							17							0

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2008 Jay Survey Results

table 1 - page 4

	Total # of Jays						Total # of Adults						Total # of Juveniles								
	2002	2003	2004	2005	2006	2007	2008	2002	2003	2004	2005	2006	2007	2008	2002	2003	2004	2005	2006	2007	2008
Little Manatee River Southfork tract (formerly Cordell)			4	7	7	8	12			4	5	5	8	8			0	2	2	0	4
Little Manatee River State Park						4*	2						n/a	2						n/a	0
Lyonia Preserve					135	95	118					107	95	86					28	8	32
Moody Branch				11	7	11	12				9	5	8	8				2	2	3	4
Myakka State Forest-Winchester						5	5						5	5						0	0
North Peninsula State Park					7	11	10					5	8	10					2	3	0
North Schewe							4							4							0
Private-Indian River County 1						5	8						4	5						1	3
Private-Indian River County 2						7	9						4	5						3	4
Private-Indian River County 3						0							0							0	
Private-Indian River County 4							2							2							0
Private-Lake County						17	13						11	10						6	3
Private-Palm Beach County 1					1		2					1		2					0		0
Private-Palm Beach County 2					0		0					0		0					0		0
Private-Palm Beach County 3							0							0							0
Private-Palm Beach County 4				0			0			0				0			0				0
Private-Palm Beach County 5				3	2		0							0							0
Private-Palm Beach County 6				2	2		2				2	2		2				0	0		0
Private-Palm Beach County 7							0							0							0
Private-Polk County Radnor					3	3	0					3	3	0					0	0	0
Saddle Blanket Scrub Preserve	4	3	6	4	11	12	15	4	3	6	4	6	9	11	0	0	0	0	5	3	4
Seacrest Scrub Natural Area							0							0							0
Shamrock Park							12							8							4
Sherwood Stokes Preserve					0		0					0		0					0		0
Silver Lake	33	30	42	33	25	26	35	24	25	37	33	17	19	22	9	5	5	0	8	7	13
Snell Creek					0		0					0		0					0		0
South County Park						2	2						2	2						0	0
Sun-N-Lake			14	17	22	20	27			8	10	14	15	17			6	7	8	5	10
Sun Ray						0	0						0	0						0	0
Tequesta Park							0							0							0
Tiger Creek Preserve	4	2	0	0	0	0	0	4	2	0	0	0	0	0	0	0	0	0	0	0	0

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