Wildlife Management on Private Lands in Florida

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Abstract: Private landowners and conservation are essential to wildlife management. The Florida Fish and Wildlife Conservation Commission recognized the importance of these landowners and sought to improve their private lands programs through direct landowner input. We collected data on private lands wildlife management, participation in private lands management programs, and landowner demographics through a mail survey. Our results indicated 58% of landowners actively manage for wildlife and 68% believe their regular land management practices benefit wildlife. Demographics and land use varied across Florida, but similarities allowed us to group landowners into three regions for comparisons. Landowners in South Florida had greater incomes, larger parcels, more agriculture, grasslands and rangelands, and managed for upland game birds. Landowners in Central Florida had lesser incomes, moderately-sized parcels, and a mixture of grasslands and forests. North Florida was comprised of landowners with the lowest incomes and smallest properties, was mostly forested, and was being predominantly managed for white-tailed deer (*Odocoileus virginianus*). Forty-four percent of landowners or their families hunted. Land use planning was a common practice among landowners with 24% already having a plan for their property. Our statewide and regional analyses indicated current private lands wildlife programming could be better tailored to meet landowner needs based on preferred species, integrating wildlife management with regular land uses, and addressing problem wildlife concerns.

Key words: Florida, human dimensions, mail survey, private landowners, wildlife

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Isolated protected areas in a landscape of agricultural lands and developed areas will likely never be able to effectively conserve all wildlife as they are too small and fragmented to provide suitable habitat and connectivity required for healthy wildlife populations of some species (Scott et al. 2001). Most natural resource agencies continue to fund programs that purchase land to place in public trust; however, increasing land prices and decreasing resources to properly manage these lands makes a public lands system that could effectively conserve all wildlife species both impractical and improbable. Florida has the greatest percentage of public lands of any state in the Southeast United States but existing public lands inadequately protect 56 of 179 rare species (Kautz and Cox 2001). It is estimated that US$8.2 billion would be required to purchase the remaining 1.65 million ha needed to fully protect more of these species. This estimate would increase dramatically if annual operating costs of these new public lands were included. Therefore, wildlife management agencies must devise programs to encourage landowners to conserve healthy and stable populations of wildlife on private lands to compliment public lands programs.

State fish and wildlife agency personnel have received criticism for designing and producing materials and programs that do not meet the needs of their audiences (DiCamillo 1995). Wildlife programs are often designed without sufficient stakeholder input. In some circumstances, the biases and misperceptions of agency personnel may negatively impact program implementation and stakeholder interactions (Enck and Decker 1997). The Florida Fish and Wildlife Conservation Commission (FWC) identified the need to design programs with stakeholder input and proactively address the needs of its constituents. In December 2007, we initiated a research program to design and administer a survey that addressed participation in private lands wildlife programs. Specifically, the objectives of this study were to obtain baseline data regarding wildlife management with which to monitor future programs, better understand private landowner demography, and recommend private lands programming based on landowner needs.

Study Area

Prior to initiating this study, the FWC identified 11 focus areas encompassing 1,302,256 ha in which to concentrate technical and financial assistance for private landowners (Figure 1). The focus

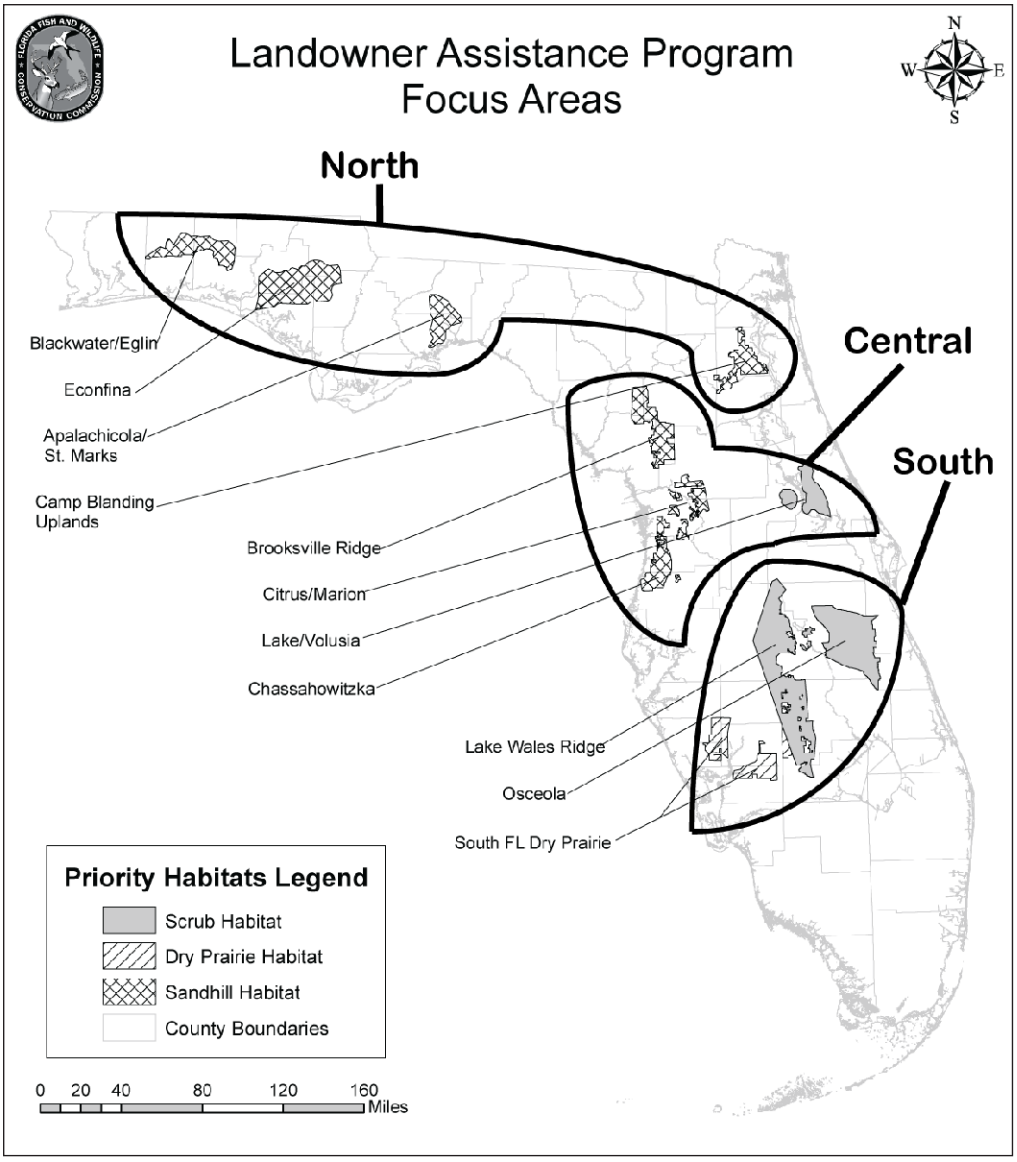

Figure 1. Florida Fish and Wildlife Conservation Commission focus areas and regions (North, Central, South) based on Florida private landowner survey results, 2008.

areas were developed to target: (1) high priority habitats identified in Florida's Comprehensive Wildlife Conservation Strategy, (2) large blocks of private land adjacent to public lands, and (3) clusters of landowners near areas with successful FWC private lands programs. These focus areas contained three different general habitat types: scrub, sandhill, and dry prairie (see Figure 1). Scrub is characterized by well-drained sandy soils dominated by oak shrubs (*Quercus* spp.) and Florida rosemary (*Ceratiola ericoides*) (Myers and Ewel 1990). Scrub can include an open or closed canopy sand pine (*Pinus clausa*) forest, has distinct boundaries where it adjoins pine forests and flatwoods, and is largely restricted to Florida. Sandhill is the elevated xeric portion of the high pine ecosystem and is characterized by sandy soils, an open canopy of primarily pine (*Pinus* spp.) and some oak, and an understory of perennial grasses and forbs. Sandhill high pine is found throughout the coastal plain from Alabama and east Texas to southeastern Virginia. Dry prairie is dominated by expanses of nearly treeless grasses and forbs, acidic soils, and sparse palmettos (*Serenoa repens*) and shrubs. Dry prairie can become inundated with water in the height of the summer rainy season (Myers and Ewel 1990).

Methods

We surveyed FWC regional coordinators and private lands biologists ($n = 16$) to obtain input for questionnaire construction and facilitated focus group meetings of 6–12 landowners in five of the 11 geographical focus areas. Both the private lands biologists and fo-

cus group participants were asked four open-ended questions and then later asked to rank responses based on perceived importance. The four open-ended questions were: 1) What are the benefits of managing for wildlife on private lands?; 2) Based on your knowledge and experience, what management actions can be conducted on private lands to benefit wildlife?; 3) What are the challenges and barriers to implementing wildlife management actions on private lands?; and 4) What types of programs and activities could the FWC provide to help you better manage for wildlife on private lands? A mail back questionnaire survey was subsequently developed based on input received from the survey of private lands biologists and regional coordinators and the private landowner focus groups. The questionnaire included items that measured land use, wildlife management activities, wildlife enterprises and recreation, participation in wildlife management programs, and landowner demographics.

Survey Questions

Wildlife Management and Land Use.—We asked an initial screening question "Do you manage or own 20 or more acres?" to screen for address errors in our sampling frame and eliminate people who had sold their property after the sampling frame was compiled. Land use was measured by asking respondents for their total acreage and acreage of planted timber, native forest, planted grazing land, sod, native grassland or rangeland, wetlands, perennial groves or orchards, industry, and residential development. We also asked landowners: What is your primary land use? (choose one: agriculture, residence, recreation, industrial, or development). Later, data were reclassified by combining residence, industrial, and development into one development variable, as those land uses are all part of developed areas. With regards to wildlife management we asked: 1) Do your regular land management practices promote wildlife and habitat?; 2) Do you actively manage for wildlife on your property; 3) Which wildlife do you manage for? (mark all that apply: deer, songbirds, upland game birds, waterfowl, reptiles and amphibians, rare or threatened species, fish, small to medium sized mammals, and wildlife habitat in general); 4) Do you or your family hunt on your property?; 5) Do you lease your property to hunters?; 6) How many acres do you lease and what do you charge?; 7) Do you conduct guided hunts?; 8) Do you practice Quality Deer Management?; 9) Do you conduct ecotourism, bird watching, or wildlife viewing tours?; 10) Do you have problems with wildlife?; and 11) (if yes to previous) Which types of wildlife cause you problems (mark all that apply: deer, hogs, armadillos, coyotes, panthers, raccoons, bobcats, birds, alligators and crocodiles, bears, rats and rodents, feral cats, and feral dogs).

Technical and Financial Assistance Programs.—Regarding financial and technical assistance programs, landowners were asked: 1) Do you have and maintain a 'Greenbelt' for tax purposes?; 2) Have you ever received financial assistance for land management activities?; 3) (if yes to previous) In which programs have you participated? (mark all that apply: Environmental Quality Incentive Program (EQIP), Wildlife Habitat Incentive Program (WHIP), Landowner Incentive Program (LIP), Partners for Fish and Wildlife, Conservation Reserves Program (CRP), Common Species Common, and Wetlands Reserve Program (WRP)); 4) Do you currently have a management or conservation plan on your property?; and 5) (if yes to previous) Which type of land management plan do you have? (mark all that apply answers included: Forest Stewardship, USDA NRCS Conservation Plan, Personally developed, Private contractor developed).

Demographics.—Demographics were measured by asking: 1) What is your household income? (choose one: US$0–$24,999; $25,000–$49,999; $50,000–$99,999; $100,000–$149,999; $150,000–$199,999; ≥$200,000); 2) What is your gender? (choose one: male or female); 3) How old are you? (choose one: <18 years, 19–24 years, 25–34 years, 35–49 years, 50–64 years, 65–79 years, and ≥80 years); 4) What is your ethnicity? (choose one: White, Asian, Native American, Black/African American, and Latino/Hispanic); and 5) What is the highest level of education have you attained? (choose one: less than high school diploma or equivalent, a high school diploma or equivalent, some college, associates degree, bachelors degree, master's degree, professional degree, and doctorate).

Survey Administration

We randomly selected 3,371 participants, stratified by the 11 geographical focus areas, from the list of 6,781 potential participants who owned at least 8 ha in the focus areas according to the Florida property tax parcel Geographic Information Systems database. Our sample size was based on tables published in Bernard (1995) for required sample sizes of various population sizes at a 5% confidence interval. We inflated the suggested sample sizes by 40% to counteract survey nonresponse. We employed a five-wave mailing including a pre-notice letter, the survey with a cover letter, a post card reminder, a replacement survey for nonrespondents, and a second replacement survey for nonrespondents (Dillman 2000). Survey mailings were posted from July-September 2008.

Data Analysis

We used SPSS 16.0 GP and concluded statistical significance at $P \leq 0.05$ for all tests. All data were tested for normality and homogeneity of variance. Those violating test assumptions were rank transformed prior to analysis (Conover 1980). We used Analysis of Variance for total acreage, acreage of different land use, income, and age. We used likelihood ratio for gender, ethnicity, and educa-

tion. Fisher's LSD post-hoc tests were used to compare differences among focus areas.

After preliminary analyses of the differences among focus areas, we grouped them by demographic and land use variables resulting in three regions: North, Central, and South. These criteria were selected because we believed it important to tailor programs based on the typical landowner type in the geographical focus areas or regions. After grouping focus areas into regions, we used likelihood ratio with Fisher's LSD post-hoc tests to conduct regional analyses for all questions related to wildlife management, wildlife recreation, and financial and technical assistance for the remainder of the analyses.

Results

Response and Demographics

One hundred six surveys were returned as undeliverable. Of the 3,271 deliverable addresses, we received 1,658 responses for an overall response rate of 51% ± 0.63% (% ± SE). We were unable to appropriately address nonresponse bias as we had no actual population demographics to compare with our sample and the sampling frame did not contain telephone numbers necessary to conduct a follow-up telephone survey of nonrespondents. The returned questionnaires contained 86 unanswered surveys and 228 surveys from people who did not own 8 or more hectares or were public landowners, resulting in 1,344 usable surveys (45.6% ± 1.22% adjusted response rate).

Most landowner respondents were 50–64 years old (42% ± 1.22%), well-educated (74% ± 1.09% with some college or more), white (95% ± 0.67%), and male (76% ± 1.07%). There were no differences in respondent age among focus areas ($P = 0.450$, $n = 1{,}324$). There were differences among geographical focus areas for respondent ethnic group ($P = 0.017$, $n = 1{,}308$). However, post-hoc comparisons were not conducted, as they would have little practical significance on program development or regional groupings because the white ethnic group (90%–100%) comprised the overwhelming majority of respondents. Respondent gender differed among focus areas ($P \leq 0.001$, $n = 1{,}327$). Southern Florida Dry Prairie and Osceola Scrub had a greater percentage of females than all other focus areas ($P \leq 0.05$).

Statewide, the most frequently reported income category was $50,000–$99,999. Income differed among geographical focus areas (Table 1; $P \leq 0.001$, $n = 1167$). Respondents owning land in Osceola Scrub, Southern Florida Dry Prairie, and Lake Wales Ridge had the highest income, placing them in the fourth and fifth income brackets ($100,000–$149,999 and $150,000–$199,999, respectively). The other two groups had different mean scores but both were in the third income bracket ($50,000–$99,000).

Table 1. Florida private landowner wildlife survey respondent income and hectares owned for each focus area, 2008.

		Hectares	
Focus area	**Income category[a]**	**Mean[a]**	**SE**
Osceola Scrub	$150,000–$199,999A	8,050A	4,829
Southern Florida Dry Prairie	$100,000–$149,999AB	533C	90
Lake Wales Ridge	$100,000–$149,999AB	982B	791
Chassahowitzka	$100,000–$149,999BC	249BD	76
Lake/Volusia Scrub	$50,000–$99,999CDE	91E	18
Citrus/Marion	$50,000–$99,999CE	470BC	217
Camp Blanding Uplands	$50,000–$99,999CE	174E	90
Apalachicola/St. Marks	$50,000–$99,999DE	124E	42
Ecofina	$50,000–$99,999DE	307DE	178
Brooksville Ridge	$50,000–$99,999DE	136E	49
Blackwater/Eglin	$50,000–$99,999E	113E	46

a. Within a column, areas with the same letter are not different ($P > 0.05$)

Land Use

Statewide, landowners owned parcels 457 ± 139 ha ($\bar{x}$ ± SE) in size. Hectares per landowner varied considerably by focus area from 8,050 ha in Osceola Scrub to 91 ha in Lake/Volusia Scrub (Table 1). Statewide, 71% ± 1.16% of landowners indicated their primary land use was agriculture, followed by development (20% ± 1.02%), and recreation (9% ± 0.73%). Differences existed among focus areas ($P \leq 0.001$, $n = 1255$) and indicated two focus area groupings. Southern Florida Dry Prairie, Lake Wales Ridge, Osceola Scrub, and Brooksville Ridge respondents classified themselves as agriculturalists more often than all other focus areas ($P \leq 0.05$). In the subsequent question further clarifying land use, respondents in the focus areas of the Panhandle and northern parts of the state (i.e., Apalachicola/ St. Marks, Blackwater/Eglin, Camp Blanding Uplands, Ecofina, Lake/Volusia Scrub) had >50% planted timber and native forest. The central portions of the state (i.e., Brooksville Ridge, Chassahowitzka, Citrus/Marion) were fairly diverse containing <50% planted timber and native forest and >20% planted grazing land and native range. The southern areas (i.e., Osceola Scrub, Lake Wales Ridge, Southern Florida Dry Prairie) were dominated by planted grazing land and native range (>40%), with little planted timber and native forest (<20%).

Regional Groupings

We examined the demographic and land use data to understand overall patterns with respect to income, land size, and land use. The demographic and land use variables with major tangible differences among areas were income, total acreage, and land use. Osceola Scrub, Lake Wales Ridge, and Southern Florida Dry Prairie were grouped together because landowners were typically from higher income brackets ($100,000–$149,999 and $150,000–

$199,999), had the most agriculture, land acreage was larger (533–4,830 ha), and lands contained a large proportion of native and planted grasslands (45%–60%). We formed a second group with Chassahowitzka, Citrus/Marion, and Brooksville Ridge as properties in these areas were moderately sized (136–470 ha), landowners had the second highest income ($50,000–$99,999), and land use was mixed between grassland and forest uses (30%–40% grassland, 35%–45% forest). The final grouping contained Apalachicola/St. Marks, Camp Blanding Uplands, Ecofina, and Lake/Volusia Scrub. These areas were primarily native forests and planted timber (50%–85%), landowners had lower incomes ($50,000–$99,999), and smaller properties (91–307 ha). From here on, these groupings will be referred to as South, Central, and North (Figure 1).

Wildlife Management, Recreation, and Conservation

Statewide, 68% ± 1.14% of landowners thought that their regular land management practices benefitted wildlife and habitat. There were differences among regional groups ($P \leq 0.001$, $n = 1{,}333$), with the North (73% ± 1.73%) more often reporting their land management benefiting wildlife than the Central (61% ± 2.33%; $P \leq 0.001$, $n = 1016$), but not the South (68% ± 2.56%; $P = 0.165$, $n = 920$). The Central region did not differ from the South ($P = 0.165$, $n = 730$). Fifty-eight percent ± 1.21% of landowners indicated that they actively managed for wildlife on their property. Regionally, there were differences among groups ($P \leq 0.001$, $n = 1{,}337$) with the North (65% ± 1.85%) actively managing for wildlife more so than the Central (50% ± 2.38%; $P \leq 0.001$, $n = 1{,}020$) and South (55% ± 2.73%; $P = 0.002$, $n = 922$) but no difference between the Central and South ($P = 0.179$, $n = 732$).

Of respondents who indicated they actively managed for wildlife, they primarily managed for deer (64% ± 1.62%) followed by upland game birds (53% ± 1.69) and general wildlife habitat (34% ± 1.60; Table 2). Considering five most frequently reported species of wildlife, there were regional differences in management objectives. Deer management was greater in the North than Central ($P \leq 0.001$) and South ($P = 0.022$), and greater in the South than Central ($P = 0.011$). Upland game bird management was greater in the South than North ($P \leq 0.001$) and Central ($P \leq 0.001$) but did not differ between the North and Central ($P = 0.151$). General wildlife habitat management was not different between South and Central ($P = 0.424$) or Central and North ($P = 0.079$) but South was greater than North ($P = 0.010$). No differences were detected among groups for small mammals (e.g., squirrels, rabbits, raccoons; $P = 0.171$) or songbirds ($P = 0.149$).

Statewide, 52% ± 1.28% of landowners reported having wildlife problems. The South (67% ± 2.71%) reported having wildlife problems more than North (48% ± 2.01%; $P \leq 0.001$, $n = 859$) and Central (47% ± 2.49%; $P \leq 0.001$, $n = 671$), but there was no difference between Central and North ($P = 0.612$, $n = 950$). Of those indicating they had wildlife problems, landowners reported coyotes (*Canis latrans*; 59% ± 1.85%), hogs (*Sus scrofa*; 36% ± 1.81%), nine-banded armadillos (*Dasypus novemcinctus*; 33% ± 1.77%), raccoons (*Proyon lotor*; 28% ± 1.69%), and rodents (17% ± 1.42%) caused most problems. Of those with problem wildlife, 58% ± 1.87% controlled or attempted to control them. The South (71% ± 3.22%) reported actively controlling for problem wildlife more than the North (51% ± 2.99%; $P \leq 0.001$, $n = 463$) and Central (54% ± 3.75%; $P = 0.005$, $n = 367$), with the North and Central having no difference ($P = 0.238$, $n = 442$).

Forty-four percent ± 1.25% of landowner respondents or their families hunted. Respondents from the Central (28% ± 2.18%) region hunted less than in the North (52% ± 1.98%; $P \leq 0.001$, $n = 981$) and South (51% ± 2.85%; $P \leq 0.001$, $n = 694$), and the North and South were not different ($P = 0.882$, $n = 877$). Statewide, 6% ± 0.60% of landowners leased their land to hunters with no differences among regions ($P \leq 0.244$, $n = 1{,}277$). Twenty-two percent ± 1.05% of landowners believe they practice quality deer management. The North (28% ± 1.79%) and South (26% ± 2.53%) did not differ for quality deer management ($P = 0.207$, $n = 868$), but both were greater than the Central (12% ± 1.59%; $P \leq 0.001$, $n = 972$

Table 2. Management objectives, by wildlife group, of the number of Florida landowner respondents by wildlife group and region, 2008.

		Region (%)			
Wildlife group	**Response**	**South**	**Central**	**North**	**Total**
Deer	No	65 (37)	104 (50)	109 (28)	278 (36)
	Yes	109 (63)	103 (50)	285 (72)	497 (64)
Upland game birds	No	61 (35)	108 (52)	199 (51)	368 (48)
	Yes	113 (65)	99 (48)	195 (50)	407 (53)
General habitat	No	104 (60)	132 (64)	279 (71)	515 (67)
	Yes	70 (40)	75 (36)	115 (29)	260 (34)
Small mammals (squirrels,	No	126 (72)	135 (65)	255 (65)	516 (67)
rabbits, raccoons, etc.)	Yes	48 (28)	72 (35)	139 (35)	259 (33)
Songbirds	No	128 (74)	138 (67)	258 (66)	524 (68)
	Yes	46 (26)	69 (33)	136 (35)	251 (32)
Fish	No	137 (79)	171 (83)	290 (74)	598 (77)
	Yes	37 (21)	35 (17)	104 (26)	176 (23)
Reptiles and amphibians	No	134 (77)	157 (76)	326 (83)	617 (80)
	Yes	40 (23)	50 (24)	68 (17)	158 (20)
Rare, threatened, and	No	138 (79)	182 (88)	354 (90)	674 (87)
endangered species	Yes	36 (21)	25 (12)	39 (10)	100 (13)
Total per region		394 (100)	207 (100)	174 (100)	775 (100)

and $P \leq 0.001$, $n = 684$, respectively). Three percent ± 0.43% of landowners conducted guided hunts and 4% ± 0.50 conducted ecotourism, bird watching, or wildlife viewing tours.

Wildlife Management and Conservation Programs

Twenty-four percent ± 1.10% of landowners indicated they had a land management plan, with no differences among regions ($P = 0.112$, $n = 1{,}234$). Of the respondents who had management plans, 50% ± 2.85% were personally developed, 32% ± 2.67% had a Forest Stewardship Plan, 13% ± 1.92% had NRCS conservation plans, and 8% ± 1.55% had private contractor developed plans. There were no differences among regions for personally developed plans ($P = 0.129$, $n = 294$) or private contractor developed plans ($P = 0.799$, $n = 293$). The North (39% ± 2.79%) and Central (35% ± 2.73%) did not differ in Forest Stewardship Plans prepared ($P = 0.561$, $n = 217$), but both were greater than the South (17% ± 2.15%; $P \leq 0.001$, $n = 220$; $P = 0.010$, $n = 151$, respectively). Landowners living in the South (23% ± 2.41%) reported having NRCS conservation plans more so than the North (7% ± 1.46%; $P = 0.001$, $n = 220$). The Central (19% ± 2.24%) was greater than the South ($P = 0.009$, $n = 216$), and the South and Central did not differ ($P = 0.530$, $n = 150$).

Fourteen percent ± 0.88% of landowners indicated they had received financial assistance for land management activities with no differences among regions ($P = 0.397$, $n = 1273$). Of the landowners who had participated in assistance programs, the most frequent financial assistance program reported was EQIP (36% ± 3.60%), followed by LIP (32% ± 3.50%), CRP (23% ± 3.25%), and WHIP (13% ± 2.52%). Landowners in the South (69% ± 6.72%) participated in EQIP more than the North (16% ± 4.08%; $P \leq 0.001$, $n = 129$) and the Central (38% ± 7.29%; $P = 0.003$, $n = 93$), and the Central was greater than the North ($P = 0.007$, $n = 126$). There were no differences among regions for WHIP ($P = 0.877$, $n = 174$) or LIP ($P = 0.534$, $n = 174$). The North (37% ± 4.08%) participated in CRP more than the South (8% ± 3.94%; $P \leq 0.001$, $n = 129$), but was not different from the Central (22% ± 6.23%; $P = 0.082$, $n = 126$), and the Central was not different than the South ($P = 0.058$, $n = 93$). Forty-two percent ± 1.25% of landowners participated in Greenbelt, a program that assesses agricultural lands differently for tax benefits. The South (61% ± 2.80%) had more landowners with a Greenbelt than the North (36% ± 1.91%) and the 37% ± 2.36% in the Central ($P \leq 0.001$, $n = 869$ and $P \leq 0.001$, $n = 869$, respectively), but the North and Central were not different ($P = 0.121$, $n = 972$).

Discussion

Wildlife management already plays a major role on private lands in Florida with nearly 70% of respondents indicating that their routine land management activities benefit wildlife and nearly 60% actively managing to promote wildlife on their property. Wildlife management is by no means a completely positive experience, as more than 50% of landowners had wildlife problems. This dichotomy of both managing to promote some wildlife populations and managing to prevent damage from others is not new in the Southeast. In 1994, agriculturalists in this region reported spending the most money nationally to increase wildlife populations while at the same time spending the second greatest amount of money to control problem wildlife (Conover 1998). It is therefore important when designing or modifying private lands wildlife management programs to be aware that both positive and negative wildlife population objectives may exist, sometimes on the same property. Because our results show this duality exists in Florida, in order to meet landowner wildlife objectives, private lands wildlife biologists need to be able to address these issues simultaneously to achieve goals that include protecting some land uses from destructive animals while increasing wildlife populations elsewhere on the property. One possible avenue is to increase landowner tolerance for native wildlife damage by increasing positive landowner wildlife perceptions (Conover 2002, Messmer 2009). This can be accomplished by increasing the actual or perceived economic, personal, and social incentives related to increasing native wildlife management (Svoboda 1980a).

With hunting remaining popular with the landowners we studied in Florida, agencies should consider expanding their game species management programs. Although currently only 6% of landowners lease their lands to hunters, recent trends indicate landowners are increasingly selling hunting rights and access to augment their income (Brown and Messmer 2009). Additionally, agencies may want to consider tailoring wildlife-specific programs to regions where game species are most popular and educating non-hunter landowners on the potential economic benefits of leasing land to hunters. Our results showed a strong preference for deer management in the North whereas landowners in the South showed an inclination toward upland game birds. Furthermore, landowners across the State were interested in general wildlife habitat management. Even where agency goals primarily focus on nongame or rare, threatened, and endangered species, tailoring programs to popular game species with similar needs can directly and indirectly accomplish those goals as many of these animals share similar habitats. Also, landowner-preferred species programs can initiate and strengthen positive relationships, potentially increasing the opportunity to promote other wildlife programs.

Land management and conservation plans are popular with landowners in our study. Agencies should continue to support and provide technical assistance to landowners that request planning

assistance and consider expanding planning programs. With 50% of these plans being personally developed by landowners, the FWC should consider developing a program to review these plans and to provide technical advice to interested landowners. Land planning exercises also have the potential to initiate working relationships among landowners and agency staff (Hadlock and Beckwith 2002). Regional approaches should be considered based on the popularity of different types of plans in different regions. There is a clear gradient among the two most popular agency plans, with Forest Stewardship Plans more prevalent in the North, NRCS conservation plans in the South, and the Central being mixed. In many cases, tailoring plans to the satisfaction of landowners can optimize land use objectives while providing wildlife habitat (Svoboda 1980b). Our data indicate that Florida agricultural landowner participation in the Greenbelt tax assessment program is high. In 2009, the Florida legislature passed a constitutional amendment extending tax relief to conservation lands similar to those provided to agriculturalists under Greenbelt. Agency private lands planning initiatives will likely influence participation in this tax relief program because, if precedents from other financial assistance programs are followed, a management plan would be required to enroll in such a program.

The FWC has taken several major steps to increase landowner participation in wildlife programs. They have increased the number of private lands biologists, focused their programs to critical habitats, made partnerships with agricultural agencies and research organizations, recognized good wildlife stewards with awards, and increased outreach materials through the production of an annual private lands wildlife calendar. Our research was part of this effort to increase landowner wildlife services and collect baseline wildlife management data to evaluate wildlife programs in the future. Since completion of this research we have produced a booklet summarizing key survey results and describing current private lands programs that was mailed to approximately 7,600 landowners living in or near current focus areas. With the increased knowledge regarding private landowners and wildlife, the FWC will continue modifying programs to more directly address landowner objectives. Currently, the FWC is revaluating its assistance programs for private landowners, preparing its private lands biologists to address problem wildlife and preferred wildlife simultaneously, and pairing a preferred species focus (i.e., upland game birds in the South and deer in the North) with general wildlife habitat management. By tailoring its programs to landowner preferences, the FWC hopes to strengthen landowner relationships and increase opportunities to promote other wildlife programs.

Private landowners in Florida perceive themselves as stewards of the vast majority of wildlife and wild places. Agencies should be encouraged by this and modify their current private lands programs based on regional or individual landowner needs. The primary focus of private lands in Florida remains agriculture and agencies should design wildlife programs knowing that they will usually not be the main objective of the landowner. The best approach may be through holistic land and conservation planning that integrates wildlife into normal land use operations where possible, addresses wildlife issues contrary to the primary land use, and tailors programs to increase wildlife quantity and quality specific to landowner preferred wildlife and habitat. The planning process should facilitate the passage of technical knowledge between landowner and agency biologists so that they can work together to effectively integrate wildlife management on private lands.

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