

How Do Members of the Public and Wildlife Managers Understand Living with Wildlife Versus Coexisting with Wildlife?

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Abstract

‘Coexisting with wildlife’ and ‘living with wildlife’ are commonly used in communication efforts designed to mitigate human-wildlife conflicts. However, there is little information on how the public understands these terms and how their understanding compares to wildlife managers’ intended message. In 2019 we surveyed 1,045 Florida residents and 140 Florida Fish and Wildlife Conservation Commission (FWC) officials to examine their understanding of, and preferences for, the terms ‘coexisting with wildlife’ and ‘living with wildlife.’ We analyzed data using qualitative and quantitative methods. FWC officials were more likely to interpret both terms as people changing their behavior to mitigate human-wildlife conflicts or tolerating conflicts with wildlife, whereas the public tended to focus on reduced nuisance behavior by wildlife. Wildlife managers should clearly define terms to avoid confusion or miscommunication, which may result in the public not altering their behavior or mistakenly taking actions that exacerbate human-wildlife conflicts such as domesticating wildlife.

Keywords: behavior change, Florida, human-wildlife conflicts, qualitative analysis, quantitative analysis, tolerance

Introduction

Human-wildlife conflicts (direct or indirect interactions between people and wildlife that result in negative consequences for people or wildlife) are rising as conversion of wildlife habitats to residential development and other land uses continues (Nyhus, 2016). Wildlife management agencies assist in wildlife conservation efforts by encouraging the public to engage in behaviors that mitigate human-wildlife conflicts and protect wildlife. As part of these efforts, wildlife managers and conservationists disseminate educational materials that use the terms ‘coexisting with wildlife’ or ‘living with wildlife’ to educate the public about actions they should take to prevent or mitigate human-wildlife conflicts and thereby conserve wildlife in human-dominated landscapes. However, to date few researchers have examined how the public interprets these terms or whether the public’s understanding coincides with wildlife managers’ interpretation of these terms as reduced conflicts between people and wildlife. If the public’s understanding of these terms differs from wildlife managers’ understanding then the effectiveness of agencies’ communication, outreach and education efforts will be undermined.

Because humans and wildlife interact at multiple spatial and temporal scales (Crespin & Simonetti, 2019) coexistence has diverse meanings. The research literature seldom clearly defines coexistence (Frank & Glikman, 2019; Knox et al., 2020). Some researchers interpret coexistence as finding solutions to human-wildlife conflicts (Dickman et al., 2011; Madden, 2004; Nyhus, 2016; Woodroffe et al., 2005) that at least partly meet the needs of people and wildlife (Frank, 2016). Coexistence is also defined as people changing their behaviors to mitigate human-wildlife conflicts (Baruch-Mordo et al., 2009; Frank, 2016; Knox et al., 2020), or actively conserving wildlife by creating or maintaining habitat (Frank, 2016). Identifying which actions constitute coexistence with wildlife can be controversial (Harihar et al., 2013; Nyhus, 2016). For

instance, some researchers argue that lethal control of wildlife may promote coexistence of people and wildlife (Nyhus, 2016). Alternatively, coexistence may be interpreted as people tolerating human-wildlife conflicts by not retaliating against wildlife or accepting the risks and damages associated with human-wildlife conflict (Frank, 2016; Skupien et al., 2016). Tolerance pertains to people's attitudes toward wildlife (Skupien et al., 2016), specifically their "ability and willingness ... to endure the negative aspects of living with wildlife" (Knox et al., 2020: 8), rather than changes in people's behavior. Finally, some researchers interpret coexistence as co-occurrence of people and wildlife spatially and temporally (Carter & Linnell, 2016; Nyhus, 2016). The failure by researchers to clearly define coexistence with wildlife and the multiple uses of this term in the research literature (Frank & Glikman, 2019; Knox et al., 2020) are mirrored by wildlife managers, who use 'coexisting with wildlife' without clearly defining the term.

Communicating the concept of coexistence is further complicated by the fact that wildlife managers must engage with multiple stakeholder groups with different, potentially conflicting opinions on how people and wildlife should interact (Madden, 2004; Redpath et al., 2013). Individuals who have experienced conflicts with wildlife may fall into a discourse of blame, which implies conflict is the fault of wildlife, and thus reject the term 'coexistence' as it threatens their framing of conflicts (Hill, 2015). As a result, some communicators and wildlife managers have opted to use the term 'living with wildlife' in their outreach efforts. Although 'living with wildlife' is intended to be synonymous with 'coexisting with wildlife', researchers have not defined 'living with wildlife' or assessed whether this term is a more effective means to communicate with the public.

To address these research gaps, we conducted survey-based research with general members of the public and wildlife managers. Our research objectives were to determine the public's understanding of and preferences for the terms 'coexisting with wildlife' and 'living with wildlife', whether the public's understanding of these two terms differed significantly from wildlife managers' interpretation of the terms, and whether the public and managers considered the terms to be synonymous. We predicted that: (a) individuals would provide diverse interpretations of both terms; (b) individuals would not consider the terms to be synonymous; (c) wildlife managers would display greater consensus on the meaning of the terms 'coexisting with wildlife' and 'living with wildlife' than the public; (d) wildlife managers would focus more on behavior changes by people to mitigate conflicts with wildlife than the public because wildlife management agencies are generally better informed about how human actions affect wildlife conservation; and (e) the public's understanding of both terms would be informed by their previous interactions with wildlife, for example through recreational activities or human-wildlife conflicts.

Methods

Study Area

We conducted this research in Florida, a rapidly developing state with a population of 21.48 million people in 2019 (<https://www.census.gov/programs-surveys/acs>) and an estimated population density of 397.2 residents per square mile (153.4 residents/km²). Current projections suggest that by 2070 34% of Florida's land area will have been converted to urban development, compared to 18% developed land in 2010 (Florida Department of Agriculture and Consumer Services et al., 2016). Florida contains 16,000 native wildlife species (a mix of southern temperate, neotropical, and western species), of which over 147 vertebrate species and

subspecies and over 1,700 invertebrate species are endemic (Florida Fish and Wildlife Conservation Commission, n.d.). From 2017 to 2019, the Florida Fish and Wildlife Conservation Commission (FWC) received over 16,000 calls about conflicts with 13 wildlife species for which the FWC has prepared educational materials (referred to as wildlife assistance documents; FWC, 2019). The FWC seeks to mitigate these human-wildlife conflicts by providing the public with educational information on their website, by phone, and through the dissemination of the wildlife assistance documents. These wildlife assistance documents are titled ‘living with wildlife’, and the term ‘coexisting with wildlife’ is commonly used in the FWC’s public presentations (FWC, 2020).

Sampling Design

In June 2019, we administered an online cross-sectional questionnaire to a non-probability sample of fulltime Florida residents using stratified proportional sampling. We used Qualtrics to recruit survey respondents. We instructed Qualtrics to implement sampling quotas based on 2018 demographic data for Florida to ensure that the sample was adequately representative of the Florida population with respect to gender, age, education level, and household income (see Table 1 for sampling quotas). We oversampled rural residents to ensure we captured how greater exposure to wildlife in rural areas affected respondents’ understanding of ‘coexisting with wildlife’ and ‘living with wildlife’. In December 2019, we administered a separate online questionnaire via email to a purposeful sample of FWC officials who communicate directly with the public about human-wildlife conflicts as part of their job duties. The FWC generated this contact list for us from their internal list of employees. Both research efforts were approved by the University of Florida Institutional Review Board (IRB protocols #201901027 and #201902616).

Table 1*Demographic Characteristics of Public Respondents*

Demographics	Qualtrics quota	Number of respondents	Percent of respondents
Florida residency:			
Full-time Florida residents	100	1,045	100
Rural residents	>35	365	35
Urban/suburban residents	<65	680	65
Gender:			
Female	51	537	51
Male	49	508	49
Age:			
20-29 years	15	194	19
30-39 years	15	170	16
40-49 years	16	168	16
50-59 years	17	203	19
60+ years	31	310	30
Education:			
High school	29	305	29
Some college (no degree)	21	275	26
Associates degree	10	135	13
Bachelor's degree	18	205	20
Graduate/professional degree	10	125	12
Household income:			
\$34,999 or less	≥ 11	254	24
\$35,000 to \$49,999	≥ 15	225	22
\$50,000 to \$74,999	≥ 18	264	25
\$75,000 to \$99,999	≥ 11	156	15
\$100,000 or more	≥ 11	146	14

Questionnaire Design

The questionnaire that we administered to the Florida public contained both closed- and open-ended questions. We collected demographic information for public respondents, as well as information on whether they participate in outdoor recreation activities and whether they have experienced conflicts with wildlife. We asked respondents to what extent they believed the terms 'coexisting with wildlife' and 'living with wildlife' overlapped in meaning (*no overlap in meaning; slight overlap in meaning; some overlap in meaning; considerable overlap in meaning; they are completely identical; I don't know*). If respondents selected that the terms were completely identical then they were randomly assigned follow-up questions on only one of the

terms. We asked respondents to provide their interpretation of these two terms (open-ended question) and to choose which of seven potential definitions most closely matched their prior understanding of each term (closed-ended question). Finally, we asked respondents to select which terms (from a predefined list of alternatives) they considered best matched how FWC intended the public to interpret ‘coexisting with wildlife’ and ‘living with wildlife’. We selected potential definitions for ‘coexisting with wildlife’ and ‘living with wildlife’ and alternative terms based on interviews with three FWC officials and two Florida local government officials who communicate with the public about wildlife.

The questionnaire we administered to FWC officials followed the same design, with one exception. Rather than selecting the definition that most closely matched their understanding of the terms, FWC officials were asked whether each of the potential definitions matched their understanding of ‘coexisting with wildlife’ or ‘living with wildlife’ (*match* (1); *unsure* (0); *does not match* (-1)). We adopted this approach to test whether FWC staff selected identical definitions for these terms or whether there was variation in how staff interpreted the terms. We only collected a subset of demographic data (gender, age) for FWC officials because the main focus of the FWC questionnaire was to ascertain how wildlife managers interpret ‘coexisting with wildlife’ and ‘living with wildlife’ for comparison with the public’s understanding.

Pretests

We used cognitive testing (Dillman et al., 2011) to pre-test the public questionnaire with five experts specializing in human dimensions, sociology, environmental education, and social psychology and 23 members of the Florida public with varying degrees of familiarity with wildlife in Florida. Staff in the FWC’s Nuisance Wildlife Division and two government officials who communicate with the public on wildlife issues also provided input on the design of

questionnaire. We pretested the FWC questionnaire with five experts specializing in human dimensions, sociology, environmental education, and social psychology.

Data Analysis

We used the statistical analysis software Stata/SE 16.0 to analyze the quantitative data. We used Cramer's V and Fisher's exact test to test for significant relationships between independent variables (demographics, recreational activities, prior conflict with wildlife, whether the respondent was an FWC staff member or member of the public) and dependent variables (respondents' understanding of, and preference for, terms). We considered results to be statistically significant at the $p \leq .05$ level. We analyzed qualitative information (open-ended answers on how respondents defined 'coexisting with wildlife' and 'living with wildlife') using open coding (Strauss & Corbin, 1994). Both authors independently analyzed the data to ensure consistency and validity of our findings. We discussed how we had generated themes to resolve the few inconsistencies in our findings before finalizing our results.

Results

Qualtrics sent out a total of 101,812 questionnaire invitations to the Florida public, of which 8,145 were opened by recipients. In total, 3,729 questionnaire recipients were eligible to take the questionnaire based on socio-demographic sampling quotas (Table 1) and 1,045 of these individuals completed the questionnaire, resulting in a completion rate of 28% for the public questionnaire. We could not calculate a response rate for this study because we had no information to determine how many of the questionnaire invitations sent by Qualtrics were received by Florida residents who fit our sampling quotas (Table 1). We calculated the completion rate, which was the number of completed questionnaires as a percentage of recipients

who opened the questionnaire and were eligible to participate in this study (Görizt, 2014). We sent 288 questionnaire invitations to FWC staff, of which 140 were opened by recipients. A total of 126 FWC staff completed the questionnaire, resulting in a completion rate of 44%.

For the public questionnaire, females accounted for 51% of the sample, which was consistent with the Florida population (51% of Florida's population is female; Table 1). White residents were overrepresented in the sample (83%) compared to Florida's population (77%; Table 1). Respondents' median age was 50 years, which was slightly higher than the Florida population's median age of 45 to 49 years for adults (Table 1). Respondents' median household income was between \$50,000 to \$74,999 per year, which was consistent with the Florida population's median household income of \$50,888 per year (Table 1). Respondents with a Bachelor's degree or higher accounted for 32% of the sample (compared to 30% of Florida's population; Table 1). For the FWC questionnaire, we only collected data on respondents' age and gender. Females accounted for 54% of the sample, which was greater than the reported percentage of female FWC staff in 2018 (32%; Florida Department of Management Services, 2018). Respondents' median age range was 40-49 years old, which was consistent with the average age of state officials in Florida (43 years; Florida Department of Management Services, 2018).

In total, 214 public respondents (21%) reported having a conflict with wildlife in Florida in the past five years. We undersampled recreational anglers ($n = 352$, 34%; compared to 36% of Florida's population; Florida Department of Environmental Protection, 2017) and hunters ($n = 83$, 8%; compared to 13% of Florida's population; Florida Department of Environmental Protection, 2017) when implementing the public questionnaire. In total, 91 public respondents (9%) fed wildlife and 631 public respondents (60%) participated in outdoor recreational

activities that may not directly involve wildlife such as camping, hiking and nature photography (hereafter referred to as outdoor recreationists). In total, 259 public respondents (25%) and 17 FWC respondents (13%) stated that they considered ‘coexisting with wildlife’ and ‘living with wildlife’ to be completely identical in meaning, and so they only answered questions about one of these terms. On average, both public and FWC respondents indicated that there was some overlap in meaning between these two terms (Table 2).

Table 2

Respondents’ Perception of the Overlap in Meaning between ‘Coexisting with Wildlife’ and ‘Living with Wildlife’

	FWC ^a		Public ^b	
	No.	%	No.	%
No overlap in meaning	6	5	150	14
Slight overlap in meaning	15	12	158	15
Some overlap in meaning	50	38	225	22
Considerable overlap in meaning	43	33	226	22
They are completely identical	17	13	259	25
I don’t know	0	0	27	3

^a*n* = 131. ^b*n* = 1,045.

Qualitative Results

FWC respondents used significantly more words to describe ‘coexisting with wildlife’ (33.65±27.35 words for FWC respondents, 11.01±8.43 words for public respondents) and ‘living with wildlife’ (32.59±26.89 words for FWC respondents, 11.41±10.13 words for public respondents). We identified six major themes from qualitative analysis of how respondents defined ‘living with wildlife’ and ‘coexisting with wildlife’: (a) co-occurrence of people and

wildlife; (b) people and wildlife not interfering with each other; (c) no conflicts between people and wildlife; (d) people changing their behavior to reduce conflicts with wildlife; (e) people tolerating conflicts with wildlife; and (f) people and wildlife directly interacting (Table 3).

Table 3

Respondents' Interpretation of 'Coexisting with Wildlife' and 'Living with Wildlife'

Themes derived from qualitative analysis	Coexisting with wildlife				Living with wildlife			
	FWC ^a		Public ^b		FWC ^c		Public ^d	
	No.	%	No.	%	No.	%	No.	%
Co-occurrence of people and wildlife (CO)	12	12	202	26	24	22	310	38
People and wildlife not interfering with each other (NI)	24	24	187	24	15	14	137	17
No conflicts between people and wildlife (NC)	23	23	198	25	112	14	12	11
People changing their behavior to reduce conflicts with wildlife (BC)	46	46	71	9	43	40	61	8
People tolerating conflicts with wildlife (TC)	24	24	89	11	28	26	73	9
People and wildlife directly interacting (DI)	7	7	42	5	12	11	134	16

^a*n* = 101. ^b*n* = 781. ^c*n* = 108. ^d*n* = 819.

Theme 1: Co-occurrence of people and wildlife

In total, 214 respondents (24%) defined 'coexisting with wildlife' and 334 respondents (36%) defined 'living with wildlife' as people and wildlife living in the same area or sharing

space (CO; Table 3). Respondents did not make assumptions about people's attitudes or behavior towards wildlife, and did not infer the absence of human-wildlife conflicts, for example:

- “[Coexisting with wildlife means] both wildlife and humans occupying the same area. I don't see any correlation or introduction to the possibility of conflict or interaction with wildlife here though.”
- “Living with wildlife means that people and wildlife are living in the same area or sharing the same place. This does not mean that there is peace or no conflict between these two groups.”

The public was more likely to interpret ‘living with wildlife’ as co-occurrence of people and wildlife than ‘coexisting with wildlife’ ($\chi^2 = 28.80$; $p < .001$; $\phi = .213$). Public respondents were slightly more likely than FWC respondents to define both ‘coexisting with wildlife’ ($\chi^2 = 9.52$; $p = .002$; $\phi = .104$) and ‘living with wildlife’ as co-occurrence of people and wildlife ($\chi^2 = 10.11$; $p = .001$; $\phi = .104$). Public respondents were slightly less likely to define ‘coexisting with wildlife’ as co-occurrence of people and wildlife if they had previously experienced conflicts with wildlife ($\chi^2 = 5.16$; $p = .023$; $\phi = .081$).

Some respondents distinguished between human-dominated space ($n = 17$ for ‘coexisting with wildlife’; $n = 50$ for ‘living with wildlife’) and wildlife-dominated space ($n = 20$ for ‘coexisting with wildlife’; $n = 107$ for ‘living with wildlife’) when discussing the space in which people and wildlife interact, for example “living with [wildlife] just implies (to me) that wildlife are present in/around human-inhabited areas, without any implication of how humans perceive/interact with those wildlife.” Hunters ($\chi^2(1) = 4.563$; $p = 0.033$; $\phi = 0.075$) were more likely to define ‘living with wildlife’ as people sharing wildlife-dominated spaces.

Theme 2: People and wildlife not interfering with each other

In total, 211 respondents (24%) defined ‘coexisting with wildlife’ and 152 respondents (16%) defined ‘living with wildlife’ as people and wildlife not interfering with each other (NI) because they do not directly interact. Responses encompassed a “live and let live” attitude by humans and wildlife, for example “I live in a suburban area on a lake. While fishing from a pier I often see a gator, ducks, cormorants, egrets, herons, etc. I don't bother them; they don't bother me.” Public respondents ($\chi^2 = 4.82$; $p = .028$; $\phi = .087$) were more likely to interpret ‘coexisting with wildlife’ as people and wildlife not interfering with each other by not directly interacting than ‘living with wildlife’.

Theme 3: No conflicts between people and wildlife

In total, 221 respondents (25%) defined ‘coexisting with wildlife’ and 124 respondents (13%) defined ‘living with wildlife’ as people and wildlife inhabiting the same area without conflicts (NC) without indicating how absence of conflicts is achieved. In contrast to the NI theme, respondents did not frame their answers in terms of lack of direct interactions between people and wildlife. Respondents frequently interpreted these terms as people living in harmony with wildlife, for example:

- “[Coexisting with wildlife means] humans and wildlife living together in harmony, without causing conflicts among each other.”
- “Living with wildlife is where there is no conflict between humans and other animal species. [For example] wading birds using your pond, squirrels feeding on acorns in your yard, and birds nesting in your trees.”

Some respondents extended this theme beyond an absence of conflicts to people and wildlife living together in a mutually beneficial relationship ($n = 42$ for ‘coexisting with wildlife’; $n = 24$

for ‘living with wildlife’). The public was more likely to interpret ‘coexisting with wildlife’ as no conflicts between people than ‘living with wildlife’ ($\chi^2 = 15.57; p < .001; \phi = .156$).

FWC respondents were more likely than the public to interpret ‘coexisting with wildlife’ ($\chi^2 = 12.747; p < .001; \phi = .120$) and ‘living with wildlife’ as people and wildlife living together in a mutually beneficial relationship ($\chi^2 = 7.34; p = .007; \phi = .089$).

Theme 4: People changing their behavior to reduce conflicts with wildlife

In total, 117 respondents (13%) defined ‘coexisting with wildlife’ and 104 respondents (11.2%) defined ‘living with wildlife’ as people changing their behavior by taking appropriate actions to reduce conflicts with wildlife that inhabit the same area (BC), for example:

- “People living in the same area as wildlife AND are willing to adapt to accommodate the presence of said wildlife”
- “Living with wildlife means being aware of wildlife conflict possibilities and taking steps to avoid conflict. For instance, bear proofing your trash can, not leaving out birdseed if sandhill cranes are an issue, securing food so you do not attract wildlife, and never feeding wild animals such as raccoons or bears.”

Some respondents interpreted human behavior change as people actively protecting habitat and wildlife ($n = 40$ for ‘coexisting with wildlife’; $n = 45$ for ‘living with wildlife’). FWC respondents were more likely than public respondents to interpret ‘coexisting with wildlife’ ($\chi^2 = 103.29; p < .001; \phi = .342$) and ‘living with wildlife’ as people changing their behavior to reduce conflicts with wildlife ($\chi^2 = 100.36; p < .001; \phi = .329$). Public respondents who engaged in outdoor recreational activities were also more likely to interpret ‘living with wildlife’ as people changing their behavior to mitigate conflicts with wildlife than other public respondents ($\chi^2 = 13.306; p < .001; \phi = .128$). FWC respondents were more likely to mention people protecting

habitat and wildlife when defining ‘coexisting with wildlife’ ($\chi^2 = 10.64$; $p = .001$; $\phi = .110$).

Public respondents who hunted ($\chi^2 = 4.71$; $p = .030$; $\phi = .076$), fed wildlife ($\chi^2(1) = 13.065$; $p < .001$; $\phi = .126$) or engaged in outdoor recreation ($\chi^2 = 9.17$; $p = .002$; $\phi = .106$; $n = 819$) were more likely to mention conserving habitat or wildlife when defining ‘living with wildlife.’

Theme 5: People tolerating conflicts with wildlife

In total, 113 respondents (13%) defined ‘coexisting with wildlife’ and 101 respondents (11%) defined ‘living with wildlife’ as people tolerating conflicts with wildlife (TC).

Respondents didn’t suggest that people should alter their behavior to prevent or reduce conflicts with wildlife or that people should have a positive attitude toward wildlife, but rather that people should accept conflicts without harming or retaliating against wildlife, for example:

- “Coexisting with wildlife would entail allowing wildlife to live on your property without harming or hindering its existence, but not necessarily having a positive mindset that the wildlife is there or taking any actions to make your property more suitable for the species. For example, a dog owner with gopher tortoises on their property may coexist with the species by checking their yard for a tortoise outside of its burrow before letting their dog outside, but they would not take significant preventative actions to prevent tortoise-dog conflict (e.g. constructing a run for the dog away from burrows, or leashing their dog when taking it outside).”
- “Living with wildlife would refer to ‘dealing with’ their presence, but interactions may not be entirely positive.”

FWC respondents were more likely to interpret both ‘coexisting with wildlife’ ($\chi^2 = 12.25$; $p < .001$; $\phi = 0.118$) and ‘living with wildlife’ as people tolerating conflicts with wildlife ($\chi^2 = 28.45$; $p < .001$; $\phi = .175$). Public respondents who reported previous conflicts with wildlife were more

likely to interpret ‘coexisting with wildlife’ as tolerating conflicts with wildlife ($\chi^2 = 6.95$; $p = .008$; $\phi = .094$).

Theme 6: People and wildlife directly interacting

Finally, 49 respondents (6%) defined ‘coexisting with wildlife’ and 146 respondents (16%) defined ‘living with wildlife’ as people and wildlife directly interacting (DI), for example people intentionally approaching wildlife or attracting wildlife to their property:

- “[Coexisting with wildlife means] feeding them and allowing them to become familiar with humans.”
- “Living with wildlife to me sounds like the wildlife has been somewhat domesticated, like when people feed raccoons and the raccoons return to the same human for food.”

A subset of respondents further defined these terms as people domesticating wildlife, treating wildlife as pets or livestock, or caring for them in captivity ($n = 11$ for ‘coexisting with wildlife’; $n = 95$ for ‘living with wildlife’). No FWC respondents interpreted ‘coexisting with wildlife’ as domestication of wildlife, and only 5 FWC respondents (5%) mentioned domestication when defining ‘living with wildlife.’ Public respondents were slightly more likely to define ‘living with wildlife’ as domesticating wildlife ($\chi^2 = 4.20$; $p = .041$; $\phi = .067$). Older members of the public were less likely to define ‘living with wildlife’ as directly interacting with wildlife (24% of respondents in their 20s; 18% of those in their 30s; 13% of those in their 40s; 17% of those in their 50s; 9% of respondents ≥ 60 years old; $\chi^2 = 19.21$; $p = .001$; $\phi = .153$) or domesticating wildlife (17% of respondents in their 20s; 13% of those in their 30s; 9% of those in their 40s; 10% of those in their 50s; 6% of respondents ≥ 60 years old; $\chi^2 = 17.29$; $p = .002$; $\phi = .145$).

Quantitative Results

Public respondents most commonly selected “people and wildlife living in the same area without conflict” (D1) as matching their understanding of ‘coexisting with wildlife’ and ‘living with wildlife’, whereas FWC respondents most commonly selected “people and wildlife living in the same area, with people changing their behavior to live alongside wildlife” (D2; Table 4).

Public respondents were more likely than FWC respondents to select D1 as the appropriate definition for ‘coexisting with wildlife’ ($\chi^2 = 7.21$; $p = .007$; $\phi = .084$) and ‘living with wildlife’ ($\chi^2 = 12.42$; $p < .001$; $\phi = .111$). Public respondents were also slightly more likely to select D1 to define ‘coexisting with wildlife,’ as opposed to ‘living with wildlife’ ($\chi^2 = 10.03$; $p = .002$; $\phi = .113$). FWC respondents were more likely than public respondents to select D2 as most closely matching their definition of ‘coexisting with wildlife’ ($\chi^2 = 9.43$; $p = .002$; $\phi = .097$). Older members of the general public were more likely to select D1 to define both ‘coexisting with wildlife’ (37% of respondents in their 20s; 35% of those in their 30s; 39% of those in their 40s; 47% of those in their 50s; 48% of respondents ≥ 60 years old; $\chi^2 = 11.72$; $p = .020$; $\phi = .113$) and ‘living with wildlife’ (25% of respondents in their 20s; 28% of those in their 30s; 29% of those in their 40s; 40% of those in their 50s; 44% of respondents ≥ 60 years old; $\chi^2 = 20.86$; $p < .001$; $\phi = .151$). Higher income members of the general public were also more likely to select D1 to define ‘living with wildlife’ (43% of respondents with income $< \$34,999$; 34% of respondents with $\$35,000$ - $\$49,999$ in income; 39% of respondents with $\$50,000$ - $\$74,000$ in income; 30% of respondents with $\$75,000$ - $\$99,000$ in income; 29% of respondents with income $\geq \$100,000$; $\chi^2 = 10.38$; $p = .034$; $\phi = .106$). Public respondents who engaged in outdoor recreation were slightly more likely to select D2 to define ‘living with wildlife’ ($\chi^2 = 9.59$; $p = .002$; $\phi = .102$).

Table 4

FWC and Florida Public Respondents' Selected Definitions for 'Coexisting with Wildlife' and 'Living with Wildlife'

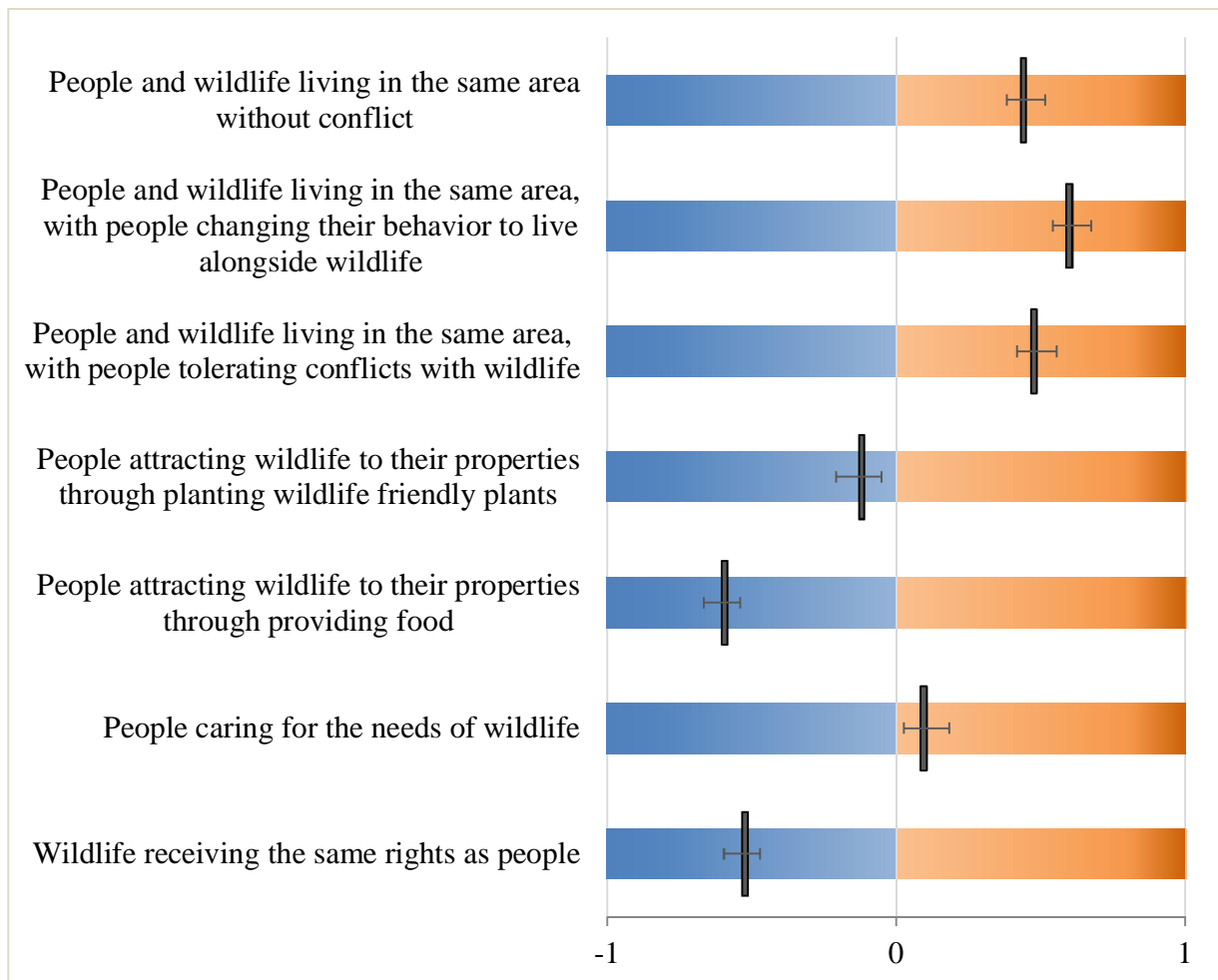
Definition selected by respondents	Coexisting with wildlife				Living with wildlife			
	FWC ^a		Public ^b		FWC ^c		Public ^d	
	No.	%	No.	%	No.	%	No.	%
D1: People and wildlife living in the same area without conflict.	32	32	392	43	18	18	332	36
D2: People and wildlife living in the same area, with people changing their behavior to live alongside wildlife.	40	40	234	26	34	35	240	26
D3: People and wildlife living in the same area, with people tolerating conflicts with wildlife.	24	24	168	18	31	32	186	20
D4: People attracting wildlife to their properties through planting wildlife friendly plants.	0	0	24	3	7	7	36	4
D5: People caring for the needs of wildlife.	3	3	33	4	6	6	46	5
D6: Wildlife receiving the same rights as people.	0	0	35	4	1	1	26	3
D7: People attracting wildlife to their properties through providing food.	1	1	15	2	1	1	45	5
Other	0	0	012	1	0	0	7	1

^a*n* = 100. ^b*n* = 913. ^c*n* = 98. ^d*n* = 918.

Respondents also commonly chose “people and wildlife living in the same area, with people tolerating conflicts with wildlife” (D3) to define ‘coexisting with wildlife’ and ‘living with wildlife’ (Table 4). FWC respondents were more likely than public respondents to select D3 to define ‘living with wildlife’ ($\chi^2 = 6.817$; $p = .009$; $\phi = .082$). Public respondents who engaged in hunting were slightly less likely to select D3 to define ‘living with wildlife’ ($\chi^2(1) = 3.85$; $p = .050$; $\phi = .065$). FWC respondents only selected three of the predefined definitions (D1, D2, D3) as matching (*match* (1); *unsure* (0); *does not match* (-1)) their understanding of ‘coexisting with wildlife’ (0.439±0.689 for D1; 0.598±0.685 for D2; 0.477±0.705 for D3; Figure 1) and ‘living with wildlife’ (0.196±0.757 for D1; 0.464±0.697 for D2; 0.455±0.750 for D3; Figure 2).

Figure 1

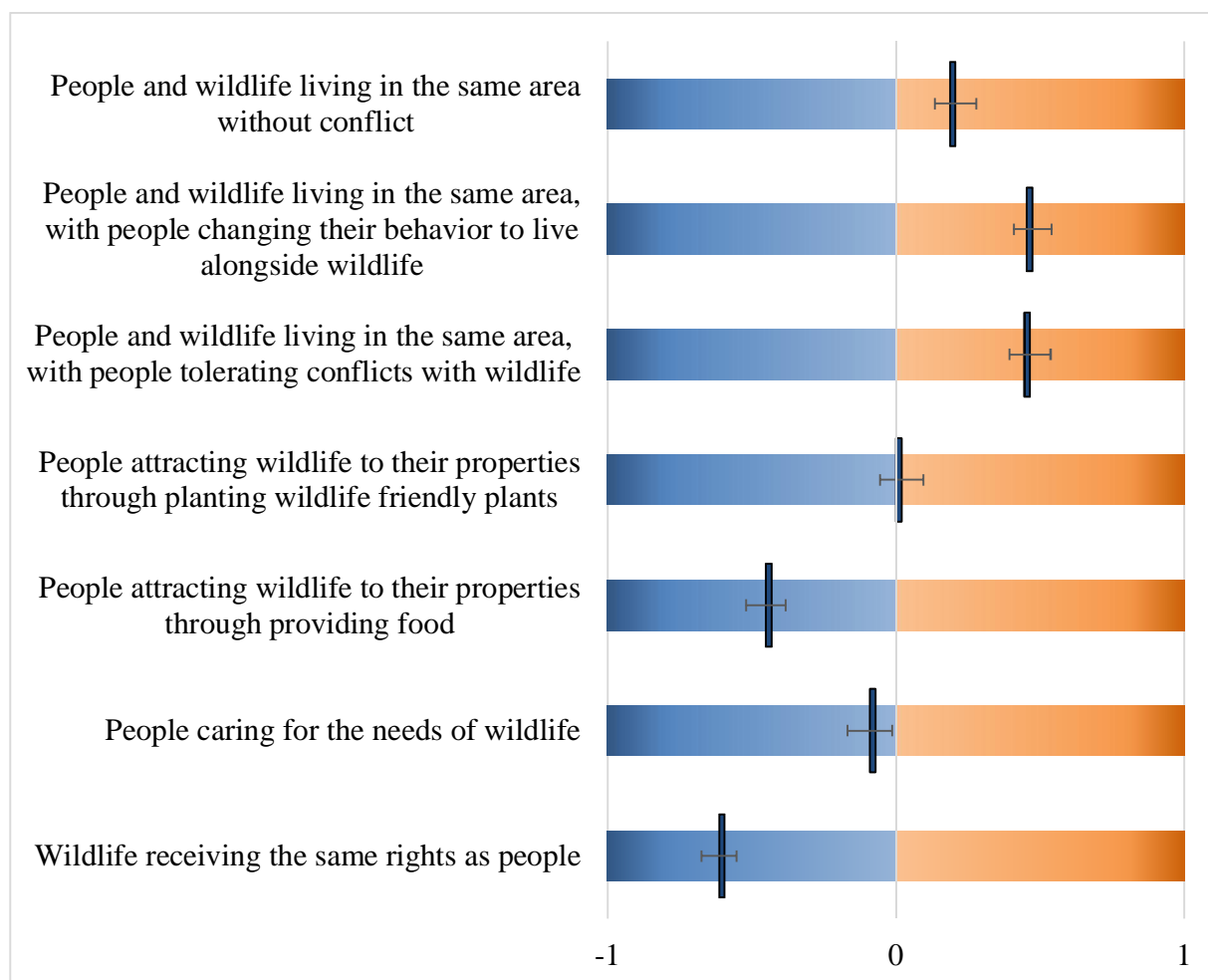
FWC Respondents' Assessment Whether Potential Definitions of 'Coexisting with Wildlife' Matched Their Understanding of the Term



Note. Mean and standard error; match = 1; unsure = 0; does not match = -1; $n = 112$.

Figure 2

FWC Respondents' Assessment Whether Potential Definitions of 'Living with Wildlife' Matched their Understanding of the Term



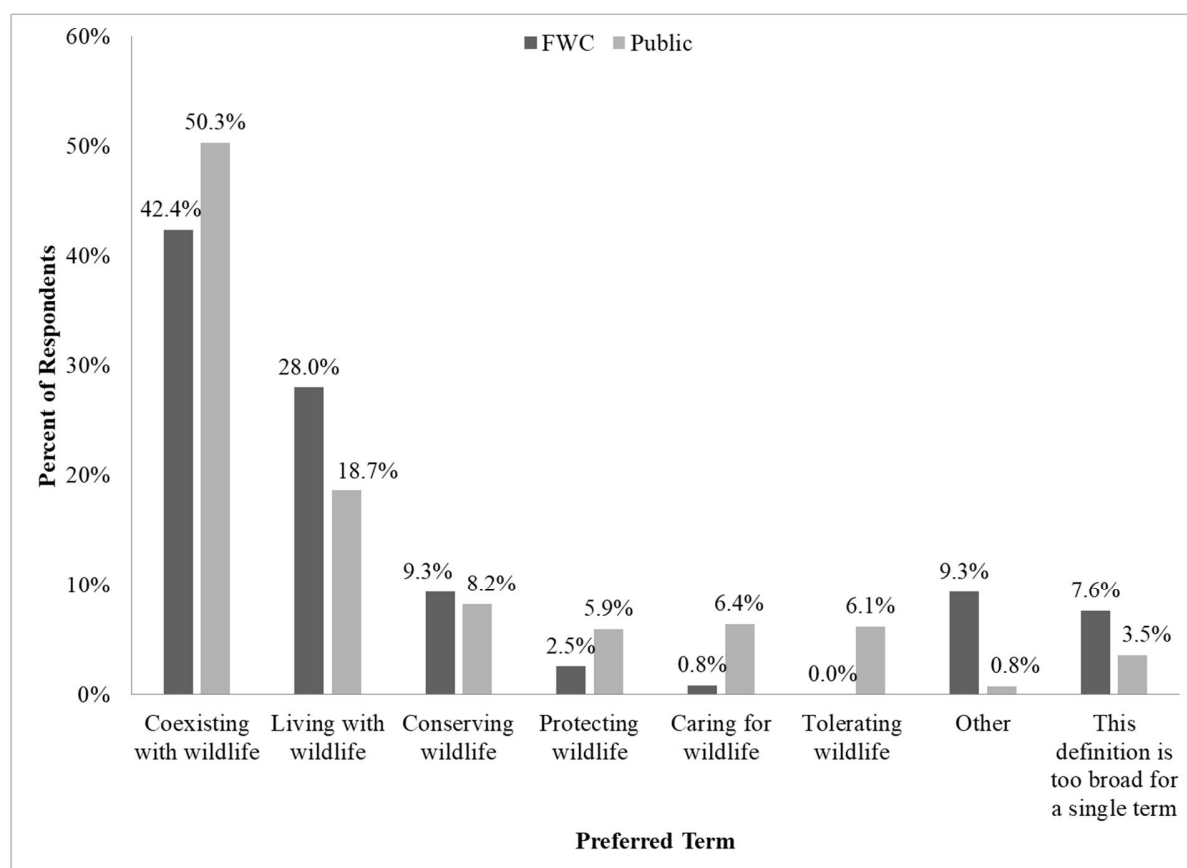
Note. Mean and standard error; match = 1; unsure = 0; does not match = -1; $n=108$.

FWC intended both 'coexisting with wildlife' and 'living with wildlife' to mean 'people and wildlife living in the same area, with people changing their behavior to live alongside wildlife' (D2). After being provided with this intended definition, respondents indicated that 'coexisting with wildlife' (42% of FWC respondents; 50% of public respondents; Figure 3) is the term that they prefer to convey the FWC's message. Public respondents who were suburban

residents (54% of suburban respondents) were more likely to select ‘coexisting with wildlife’ as their preferred term compared to rural (50% of rural respondents) and urban respondents (42% of urban respondents; $\chi^2 = 7.64$; $p = .022$; $\phi = .086$). Older public respondents were also more likely to prefer ‘coexisting with wildlife’ (42% of respondents in their 20s; 42% of those in their 30s; 43% of those in their 40s; 53% of those in their 50s; 61% of respondents ≥ 60 years old; $\chi^2(4) = 34.96$; $p < .001$; $\phi = .183$). Finally, white public respondents (53% of white respondents) were more likely to prefer ‘coexisting with wildlife’ (40% of minority respondents; $\chi^2 = 9.145$; $p = .002$; $\phi = .094$).

Figure 3

Respondents’ Preference for Different Terms That Are Intended to Mean ‘People and Wildlife Living in the Same Area, with People Changing Their Behavior to Live Alongside Wildlife’



Note. $n = 118$ for FWC respondents; $n = 1,045$ for public respondents.

Limitations

We measured respondents' understanding of 'coexisting with wildlife' and 'living with wildlife' as stand-alone terms rather than in textual context. Future research should examine the role that the textual context of educational materials plays in people's understanding of these two terms. While we conducted rigorous pretests of the surveys prior to implementation, our qualitative analysis of people's interpretation of 'coexisting with wildlife' and 'living with wildlife' showed that there were potential definitions of these terms that we did not include in the surveys. We did not measure how respondents' interpretation of terms differed according to wildlife species, in particular if species could be considered threatening or a nuisance. Further research is required to assess if the wildlife that is the focus of educational efforts is an important determinant of people's response to the terms 'living with' and 'coexisting with' wildlife species. Finally, because we paid Qualtrics to implement the public survey we were unable to conduct non-respondent follow-up surveys, although we used quotas to ensure that the sample was representative of the Florida population.

Discussion

As we predicted, both FWC officials and members of the Florida public had diverse understandings of the terms 'coexisting with wildlife' and 'living with wildlife,' and FWC respondents demonstrated greater consensus in their interpretation of these terms than the public. Nonetheless, FWC respondents did not uniformly select FWC's intended definition for 'living with wildlife' and 'coexisting with wildlife', which highlights the complexity of these terms. Only 13% of FWC respondents recognized that FWC intended both 'living with wildlife' and 'coexisting with wildlife' to be identical in meaning, namely 'people and wildlife living in the same area, with people changing their behavior to live alongside wildlife'. The complexities

associated with coexisting with wildlife that have been highlighted in the research literature (Knox et al., 2020; Madden, 2004; Redpath et al., 2013) were reflected in how respondents interpreted these terms.

While some themes were more common (for example, no conflict with wildlife or sharing space) in how respondents defined the terms, no single theme or definition was predominant in either the qualitative or quantitative analysis. Over a quarter of public respondents and at least 12 percent of FWC respondents interpreted ‘living with wildlife’ and ‘coexisting with wildlife’ as spatial and temporal co-occurrence of people and wildlife, with no clear indication whether interactions between people and wildlife are positive or negative. However, simple co-occurrence of people and wildlife is a controversial definition for ‘coexisting with wildlife’ (Harihar et al., 2013) because this view omits any attitudes, beliefs or behavior changes that may exacerbate or mitigate human-wildlife conflicts. In general, respondents were more likely to interpret ‘living with wildlife’ as co-occurrence of people and wildlife, whereas they were more likely to interpret ‘coexisting with wildlife’ in terms of human-wildlife interactions.

Commensurate with our predictions, FWC respondents most frequently described ‘coexisting with wildlife’ as people changing their behavior to reduce conflicts with wildlife, which is necessary to attain wildlife conservation (Baruch-Mordo et al., 2009; Frank, 2016). By contrast, public respondents tended to interpret this term as an idealized situation in which people and wildlife live in peace or do not interfere with one another. A subset of public respondents recognized that both ‘coexisting with wildlife’ and ‘living with wildlife’ require human tolerance of conflicts with wildlife, which is also a necessary condition for wildlife conservation (Frank, 2016). However, it is concerning that some public respondents interpreted ‘living with wildlife’ as people approaching, feeding or domesticating wildlife, which is likely to

generate human-wildlife conflicts and undermine wildlife conservation. Since respondents tended to prefer the use of the term ‘coexisting with wildlife’ to denote ‘people and wildlife living in the same area, with people changing their behavior to reduce conflicts with wildlife’, education and outreach materials may be more successful in communicating that behavior change by people is needed to conserve wildlife if this term is used. The use of ‘living with wildlife’ in education and outreach may lead to unintended consequences in terms of people either passively living in the same area as wildlife or attempting to tame wildlife.

We found some evidence that public respondents’ understanding of both ‘coexisting with wildlife’ and ‘living with wildlife’ was informed by their previous interactions with wildlife and their demographics. Respondents who had experienced conflicts with wildlife tended to interpret ‘coexisting with wildlife’ as tolerance of conflicts, which is important for wildlife conservation (Frank, 2016; Frank & Glikman, 2019). Respondents who engaged in hunting and outdoor recreation were more likely to interpret ‘living with wildlife’ as people sharing wildlife-dominated spaces, changing their behavior to mitigate human-wildlife conflicts, and protecting wildlife habitat, perhaps because these recreational activities depend on the continued existence of wildlife and habitat. Finally, we found that older and higher income respondents tended view coexisting with wildlife as an idealized situation in which humans and wildlife do not come into conflict. This is a cause for concern given the rapid rate of urban development in Florida, in particular to cater to an older demographic and retirees. Wildlife conservation efforts will be hampered unless the public understands that human-wildlife interactions are common in Florida and that people must alter their behavior to mitigate conflicts with wildlife.

Management Implications

Framing communication efforts effectively is vital to educate the public about how to reduce conflicts with and conserve wildlife. Wildlife managers and conservation educators need to keep in mind that the public has a diverse understanding of ‘coexisting with wildlife’ and ‘living with wildlife’ and so messaging should take the audience into account. In addition, wildlife management officials and other communicators cannot expect the public’s understanding of these terms to match their own and should ensure that they define what they mean by ‘coexisting with wildlife’ or ‘living with wildlife.’ Wildlife managers and conservation educators must also consider the ultimate goal of the communication effort when choosing to use ‘coexisting with wildlife’ or ‘living with wildlife.’ While ‘living with wildlife’ may seem a more approachable framing than ‘coexisting with wildlife,’ this term may inadvertently discourage behavior change by people. If behavior change is the goal, wildlife managers and conservation educators should use the term ‘coexisting with wildlife’ in their educational materials and explicitly define what they mean by that term.

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