

RISK PERCEPTION AND ACCEPTANCE OF THE AMERICAN CROCODILE (*CROCODYLUS ACUTUS*) IN SOUTH FLORIDA

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ABSTRACT: *This study used a self-administered questionnaire (n = 249) to examine factors that affect risk perceptions and acceptance of the American crocodile (Crocodylus acutus) in south Florida. Respondents who expressed negative attitudes toward American crocodiles had the greatest probability of considering the species a high risk to humans. Respondents who believed American crocodiles presented a low risk to humans, and expressed positive attitudes toward the species, had the greatest probability of preferring a stable or increased future crocodile population. Knowledge of American crocodiles was not related to risk perceptions, but may indirectly affect risk perceptions through attitudes toward crocodiles. Demographic variables did not relate to risk perceptions or acceptance of American crocodiles. Results indicate that south Florida residents and visitors who have the potential to encounter an American crocodile generally have low risk perceptions of, favorable attitudes toward, and high acceptance capacity for the species.*

Key Words: American crocodile, attitudes, *Crocodylus acutus*, human dimensions, risk perceptions, wildlife stakeholder acceptance capacity

THE FLORIDA population of the American crocodile (*Crocodylus acutus*) has increased, and its distribution has expanded, since it was listed as endangered by the U. S. Fish and Wildlife Service in 1975 (Anon., 2005; Mazzotti and Cherkiss, 2003). The human population of Florida has also been increasing during this time (United States Census Bureau, 2003), and as crocodiles reoccupy parts of their historic range now inhabited by people, human-crocodile interactions and crocodile-related complaints are increasing (Regan, 2002). This presents new challenges for wildlife managers and biologists working to recover this endangered species. Socioeconomic considerations address such concerns and are crucial for effective recovery programs, yet are often ignored or insufficiently considered in endangered species management efforts (Kellert, 1985a; Reading and Kellert, 1993).

The use of biological knowledge for wildlife management will always be essential, but it may no longer be sufficient as an exclusive basis for practicing wildlife management (Riley et al., 2002). Many wildlife managers are increasingly integrating biological knowledge with information on human dimensions in management processes (Riley et al., 2002) as stakeholders become a central component of contemporary wildlife management (Decker et al., 1996). Decker and Purdy (1988) introduced the concept of wildlife acceptance capacity (WAC) to explain how human beliefs and preferences

affect decisions on management of wildlife population levels. Carpenter and co-workers (2000) expanded the concept of WAC to describe wildlife stakeholder acceptance capacity (WSAC). WSAC can describe unwillingness to accept scarcity or extinction of important or popular species, as well as unwillingness to accept overabundance or increases of nuisance or unpopular species. Determinants of WSAC are thought to include perceived positive and negative impacts of the species, characteristics of the species (e.g., aesthetic appeal, economic value), situational specifics (e.g., management actions, proximity of human populations and activities to animal populations), past experiences, beliefs and attitudes about the species, perceptions of population trends, and perceptions of risk (Craven et al., 1992; Carpenter et al., 2000; Zinn et al., 2000).

Risk perceptions of potentially dangerous wildlife are of particular interest since such perceptions often influence management policy (Riley and Decker, 2000a). Far less dread, fear, or worry is typically associated with risks accepted voluntarily, particularly those from familiar events, than new or uncontrollable risks (Slovic, 1987; Savage, 1993). An encounter, or even potential for an encounter, with an American crocodile could represent the type of low probability-high consequence event that leads to dread and elevated risk perceptions (Slovic, 1987), which could subsequently lower WSAC for this species (Riley and Decker, 2000a). Identifying factors that affect risk perceptions of, and acceptance capacity for, American crocodiles could help wildlife agencies select management strategies that meet public approval, and help avoid or reduce conflict over management decisions (Zinn et al., 2000).

Demographic variables can significantly affect perceptions of, and attitudes toward, large predators and animals in general. Women (Kellert and Berry, 1987; Zinn and Pierce, 2002), elderly individuals (Kellert, 1985b; Kleiven et al., 2004), and people with limited education (Kellert et al., 1996; Riley and Decker, 2000a) often exhibit greater risk perceptions of, and more negative attitudes toward, large predators. Zinn and Pierce (2002) found women and individuals with children at home were more likely to fear attack by a mountain lion than men and those without children at home. However, not all demographic variables are important for every species. For example, Riley and Decker (2000b) discovered children in household, gender, and level of formal education did not significantly affect acceptance capacity for mountain lions. Understanding influence of demographics on risk perceptions and acceptance of the American crocodile will enable wildlife managers and policy makers to more effectively target their audiences with tailored educational programs.

While risk perceptions and acceptance levels for large mammalian species, such as deer (*Odocoileus virginianus*; Stout et al., 1997), mountain lions (*Puma concolor*; Riley and Decker, 2000b), and black bears (*Ursus americanus*; Siemer and Decker, 2003) have been studied, significant gaps remain in our knowledge and understanding of these issues for large reptilian species and specific information is lacking for dealing with particular management issues. Research

on perceptions and acceptance of large reptiles, such as crocodiles, will broaden the information base available to wildlife managers and decision makers, advance the body of human dimensions research for wildlife management, and enhance conservation and recovery efforts for the American crocodile in Florida.

The challenge of integrating a recovering population of the American crocodile with an ever-increasing use of coastal areas by humans will require knowledge and understanding of how people react to encounters with crocodiles. This study examined variables that affect stakeholders' risk perceptions and acceptance of the American crocodile in Florida. Stakeholders included Florida residents and visitors who are likely to encounter crocodiles.

STUDY AREA—Homestead Bayfront Park, Black Point Marina, and Ocean Reef Club represent three areas in south Florida where American crocodiles are known to co-occur with humans. Homestead Bayfront Park is a 97-acre Miami-Dade County Park adjacent to south Biscayne Bay in Homestead, Florida; Black Point Marina is a 52-acre Miami-Dade County Park located in Cutler Ridge, Florida; and Ocean Reef Club is a private community located in north Key Largo, Monroe County, Florida. Individuals who reside or recreate in the study areas have the potential to encounter an American crocodile and characterize the stakeholder group for this study.

METHODS—*Questionnaire development*—To facilitate questionnaire development, personal interviews conducted at Black Point Marina ($n = 3$) and Ocean Reef Club ($n = 3$) during fall 2003 provided preliminary information on local perceptions and involvement regarding American crocodiles in Florida. The questionnaire design was adapted from Riley (1998) and reflected information gained from preliminary interviews. Pilot tests involving two draft versions of the questionnaire were conducted at Ocean Reef Club ($n = 7$), Black Point Marina ($n = 9$), and Everglades National Park (a preliminary study site, $n = 10$) on October 28–30, 2003, respectively, to evaluate survey design.

Data collection—A modified version of the hand-delivery method presented in Dillman and co-workers (1995) was utilized for adult patrons at Black Point Marina and Homestead Bayfront Park. Individuals over the age of 18 at each site were chosen without regard to race, sex, or disabilities to provide the best representative sample possible of adults visiting the area at the time of data collection. A self-administered questionnaire was hand-delivered to participants and collected upon completion. Approximately one-third of all adults at each study site on the days of data collection were asked to participate in the study. Limited funding and personnel prohibited a comprehensive non-response bias check. However, reasons for non-participation were noted to gain some insight into the non-respondent group. A modified version of the drop-off/pick-up method (Steele et al., 2001) was utilized for residents at Ocean Reef Club. Residents were hand-delivered self-administered questionnaires at a town hall meeting and asked to return completed surveys to the main office within one week.

Sampling periods consisted of at least one weekday and one weekend day at Black Point Marina and Homestead Bayfront Park. Sampling began in the morning and concluded early in the evening at each site. Black Point Marina was sampled from December 27–31, 2003, and Homestead Bayfront Park was sampled from January 1–3, 16–18, and 23, 2004. Questionnaires were hand-delivered to Ocean Reef Club residents on January 16, 2004. Completed questionnaires were collected a week later from the main office.

Analysis variables—The final questionnaire contained six primary subject areas: involvement with American crocodiles, knowledge of American crocodiles, risk beliefs associated with American crocodiles, attitudes toward American crocodiles, perceptions of current American crocodile population trends, and preferences for future American crocodile population trends. Questions about wildlife-related activities and information sources preceded questions regarding topics of primary interest. Respondents were also asked to indicate acceptability of management tools and provide information regarding resident status, age, gender, race, number of children and pets in household, level of formal education, income level, and community involvement. “Don’t Know” or “No Opinion” options were provided for all questions. See Smithem (2005) for a complete copy of the questionnaire and a detailed description of analysis variables.

Respondents were provided 10 potential ways of interacting with American crocodiles and asked to indicate which type of interaction they or members of their household had experienced. The experiences were classified into five levels (adapted from Riley and Decker, 2000b): very high, high, moderate, low, and none. Very few respondents (4%) were classified as having a very high involvement level and were therefore grouped with respondents in the high involvement category to form the variable INVOLVE, which had four levels: high, moderate, low, and none.

Five multiple-choice questions regarding the status, habitat, and behavior of American crocodiles assessed respondents’ knowledge level. Respondents were asked to circle the answer they believed correct for each question. A team of experts confirmed one correct answer for each of the five questions. The number of correct answers for the five questions was summed for each respondent. Very few respondents (1%) answered all questions correctly and were therefore grouped with respondents who answered four questions correctly to form the variable KNOWLEDGE, which had five levels: zero, one, two, three, and four or five question(s) answered correctly.

Risk beliefs were measured using a 5-point semantic differential scale with adjective pairs as endpoints (Alreck and Settle, 1995). The eight adjective pairs were derived from Riley (1998), but modified for relevance to crocodiles. Principle components analysis with Varimax rotation (Manly, 1986) indicated two components with one main factor: beliefs related to risks (RBELIEF), which encompassed personal and community risk, ability to live with risks, and willingness to accept risk. Eigenvalues were greater than one and 40% of the variance was explained by the factor. Responses to the four items were averaged to create the variable RBELIEF. Respondents who answered “Don’t Know” to one or more of the four items ($n = 61$, 24%) did not receive a score for RBELIEF.

A 5-point scale (Alreck and Settle, 1995) ranging from disagree strongly to agree strongly assessed respondents’ attitudes toward crocodiles. Participants were asked to circle the number that represented their level of agreement or disagreement to a series of nine belief statements concerning crocodiles. “No Opinion” responses were believed comparable to neither agreeing nor disagreeing with the statement and were recoded to the mid-point value on the 5-point scale. Principle components analysis with Varimax rotation indicated two statements regarding economic considerations of crocodiles did not relate to the remaining belief statements. Subsequent factor analysis, excluding economic statements, produced two components with one main factor: attitudes related to the symbolism, benefits, rights, and threats of crocodiles (ATTITUDE). The second component was an artifact of reverse coded statements. Eigenvalues were greater than one and 37% of the variance was explained by the factor. Responses to the seven items were averaged (weighted using factor loadings) to create the variable ATTITUDE.

Perceptions of current American crocodile population trends during 1998–2003 (CPOP) and preferences for future crocodile population trends during 2004–2009 (FPOP) were measured on 5-point scales that ranged from decrease(d) greatly to increase(d) greatly. Both variables treated decreasing responses and stable or increasing responses as two separate categories (Riley and Decker, 2000b). Respondents who answered “No Opinion” did not receive a score for that variable ($n = 72$, 29% for CPOP and $n = 49$, 20% for FPOP).

Data analysis—Missing data were excluded listwise for regression analyses and pairwise for all other analyses. “Don’t Know” and “No Opinion” responses were excluded for descriptive

statistics. Pearson product-moment correlations were used to measure relationships among variables and between variables and age, education, income, and community involvement. T-tests were used to test for differences between variables (i.e., INVOLVE, KNOWLEDGE, ATTITUDE, and RBELIEF) and gender and children in household (yes or no). Chi-square statistics were used to test for differences in proportions between variables (i.e., CPOP and FPOP) and gender and children in household (yes or no).

Multiple regression with stepwise variable selection ($p \leq 0.05$) was used to construct a model that best predicted risk perceptions of American crocodiles. Independent variables selected *a priori* included INVOLVE, KNOWLEDGE, ATTITUDE, and CPOP. Logistic regression with stepwise variable selection ($p \leq 0.05$) was used to construct a model that best predicted preferences for future crocodile population trends, a measure of wildlife stakeholder acceptance capacity for the American crocodile (Decker and Purdy, 1988; Riley and Decker, 2000b). Independent variables selected *a priori* included INVOLVE, KNOWLEDGE, ATTITUDE, CPOP, and RBELIEF. Six demographic variables: age, gender, formal education (six levels ranging from some high school to graduate degree or beyond), income (six levels ranging from under \$20,000 to over \$500,000), children in household (yes or no), and community involvement (four levels ranging from participation in no local organizations to participation in three or four organizations) were used in both regression models.

RESULTS—Survey response—Questionnaires were presented to 213, 226, and 114 individuals at Black Point Marina, Homestead Bayfront Park, and Ocean Reef Club, respectively. The overall response rate was 45% ($n = 249$), with individual return rates equaling 50% ($n = 107$), 46% ($n = 103$), and 35% ($n = 39$) for Black Point Marina, Homestead Bayfront Park, and Ocean Reef Club, respectively. Common explanations for non-participation included inability to speak English, leaving to go boating, and time constraints, suggesting non-respondents were unable to participate in the study rather than uninterested in participating.

Respondents ranged in age from 18 to 89, with a median age of 48. The majority of respondents were male (64%), white (89%), and permanent Florida residents (75%). The proportions of seasonal Florida residents (14%) and visitors to Florida (11%) were approximately equal. Formal education attainment was normally distributed, with 62% of respondents having completed some college or obtained a college degree. Most respondents did not have children at home (67%). Miami-Dade County's population is 48% male, 70% white, and 57% Hispanic, and Monroe County's population is 53% male, 91% white, and 16% Hispanic (United States Census Bureau, 2003). The median age for Miami-Dade County and Monroe County is 36 and 43, respectively. Older individuals, white individuals, and males were likely over-represented in the sample population and respondents of Hispanic origin (22%) were potentially under-represented in the sample population.

Analysis variables—Observing a crocodile in the wild was the most common type of involvement with American crocodiles experienced by respondents. Though nearly two-thirds of respondents (64%) indicated they had observed a crocodile in the wild, fewer than 4% reported a threatening experience. The majority of respondents (53%) were classified as having a moderate level of involvement with American crocodiles. Few respondents

TABLE 1. Relationships (r) among stakeholders' (n = 249) involvement with American crocodiles, knowledge of American crocodiles, risk perceptions of American crocodiles, attitudes toward American crocodiles, perceptions of current American crocodile population trends, and preferences for future American crocodile population trends in Florida, 2003–2004.

| Variable ^a | INVOLVE | KNOWLEDGE | RBELIEF | ATTITUDE | CPOP | FPOP |
|-----------------------|---------|-----------|---------|----------|--------|----------|
| INVOLVE | 1 | 0.043 | 0.147* | -0.028 | 0.095 | 0.010 |
| KNOWLEDGE | | 1 | -0.160* | 0.241** | 0.157* | 0.061 |
| RBELIEF | | | 1 | -0.454** | 0.104 | -0.461** |
| ATTITUDE | | | | 1 | 0.000 | 0.425** |
| CPOP | | | | | 1 | -0.076 |
| FPOP | | | | | | 1 |

^a INVOLVE = involvement with crocodiles, KNOWLEDGE = knowledge of crocodiles, RBELIEF = risk perceptions of crocodiles, ATTITUDE = attitudes toward crocodiles, CPOP = perceptions of current crocodile population trends, and FPOP = preferences for future crocodile population trends.

* Correlation is significant at p ≤ 0.05 (2-tailed).

** Correlation is significant at p ≤ 0.01 (2-tailed).

were classified as having a high level of involvement (19%) or no involvement (19%) with American crocodiles and even less were classified as having a low involvement (9%) with crocodiles. On a scale from zero (no involvement) to four (high involvement), the mean level of involvement for respondents was 1.71 ± 0.06 (SE).

Significant relationships exist among some, but not all, variables (Table 1) and between some, but not all, variables and demographics (Table 2). Relationships between variables and remaining demographics (i.e., gender and children in household) are discussed below. Involvement with American crocodiles did not differ between males and females or between respondents with and without children at home.

The majority of respondents answered one (27%) or two (40%) of the five questions regarding the status, habitat, and behavior of crocodiles correctly

TABLE 2. Relationships (r) between stakeholders' (n = 249) involvement with American crocodiles, knowledge of American crocodiles, risk perceptions of American crocodiles, attitudes toward American crocodiles, perceptions of current American crocodile population trends, preferences for future American crocodile population trends, and age, education, income, and community involvement in Florida, 2003–2004.

| Variable ^a | Age | Education | Income | Community involvement |
|-----------------------|----------|-----------|---------|-----------------------|
| INVOLVE | 0.039 | -0.023 | 0.139* | 0.179** |
| KNOWLEDGE | 0.080 | 0.087 | 0.113 | 0.082 |
| RBELIEF | -0.011 | -0.049 | 0.044 | 0.035 |
| ATTITUDE | -0.209** | 0.087 | -0.081* | -0.061 |
| CPOP | 0.204** | 0.040 | 0.022 | -0.086 |
| FPOP | -0.067 | 0.045 | -0.108 | 0.002 |

^a INVOLVE = involvement with crocodiles, KNOWLEDGE = knowledge of crocodiles, RBELIEF = risk perceptions of crocodiles, ATTITUDE = attitudes toward crocodiles, CPOP = perceptions of current crocodile population trends, and FPOP = preferences for future crocodile population trends.

* Correlation is significant at p ≤ 0.05 (2-tailed).

** Correlation is significant at p ≤ 0.01 (2-tailed).

TABLE 3. Response of questionnaire participants (n = 249) to semantic differential items related to risks from American crocodiles in Florida, 2003–2004.

| Semantic Differential Item ^a | Factor Analysis | | |
|---|-----------------|------|--------------------|
| | Mean | SE | Score |
| Are encounters between American crocodiles and people a “new” event or an “old” event? | 3.73 | 0.10 | 0.255 |
| Are crocodile-human encounters “increasing” or “decreasing” in south Florida? | 2.89 | 0.11 | 0.405 |
| Do you believe that you are personally at “no” risk or “great” risk? | 1.65 | 0.07 | 0.753 ^b |
| Do you believe the community is at “no” risk or “great” risk? | 1.93 | 0.07 | 0.799 ^b |
| People will be “able” or “unable” to learn to live with the risks associated with crocodiles? | 1.93 | 0.08 | 0.786 ^b |
| Risks from American crocodiles are accepted “voluntarily” or “involuntarily”? | 2.17 | 0.09 | 0.749 ^b |
| The risks from having crocodiles in Florida are “well” or “not well” understood by experts? | 2.33 | 0.10 | 0.556 |
| The benefits and risks of American crocodiles to people are “matched” or “mismatched”? | 2.67 | 0.11 | 0.541 |

^a Respondents indicated the number between two words (in quotations) along the 1–5 scale that best represented their opinion.

^b Values given are for items used to form the variable RBELIEF.

and 18% correctly answered three questions. Few respondents (9%) answered four or five questions correctly and less (6%) answered no questions correctly. The mean knowledge level for respondents was 1.98 ± 0.07 (SE). Knowledge of American crocodiles did not differ between males and females or between respondents with and without children at home.

The majority of respondents did not consider encounters between American crocodiles and people as something new, and many did not perceive encounters to be increasing (Table 3). Very few respondents believed they were personally at risk or that communities were at risk from American crocodiles. Most respondents indicated they could learn to live with the risks and that risks from crocodiles were generally accepted voluntarily. Risk perceptions of American crocodiles did not differ between males and females or between respondents with and without children at home.

Attitudes toward American crocodiles were generally favorable among respondents who offered an opinion. Based upon a scale from one to five, where one was a very negative attitude and five was a very positive attitude, the mean score was greater than three for eight of nine belief statements regarding American crocodiles in Florida (Table 4). Most respondents believed that presence of crocodiles signals a healthy environment and many indicated having crocodiles in Florida increased their quality of life. The majority of respondents did not consider crocodiles an unacceptable threat to humans or pets, and nearly half thought crocodiles should have the right to exist wherever they may occur. However, over half expressed concern about living close to crocodiles by disagreeing with the idea that overall quality of life would increase if crocodiles resided near their home. Males ($t_{247} = 2.414$, $p = 0.016$)

TABLE 4. Percentage of questionnaire participants (n = 249) who agreed, disagreed, or neither agreed nor disagreed to belief statements about American crocodiles in Florida, 2003–2004.

| Belief Statements ^a | % response | | | Mean | SE | Factor Analysis Score ^c |
|--|------------|---------|-------|-------------------|------|------------------------------------|
| | Disagree | Neither | Agree | | | |
| The presence of crocodiles is a sign of a healthy environment | 7 | 21 | 73 | 4.05 | 0.07 | 0.638 |
| The presence of crocodiles in Florida increases my overall quality of life | 19 | 37 | 44 | 3.37 | 0.08 | 0.749 |
| The presence of crocodiles near my home increases my overall quality of life | 53 | 31 | 15 | 2.38 | 0.08 | 0.692 |
| The presence of crocodiles decreases property value | 44 | 26 | 30 | 2.71 ^b | 0.09 | |
| Crocodiles could benefit the local economy by being a tourism attraction | 19 | 26 | 55 | 3.54 | 0.09 | |
| Crocodiles should have the right to exist wherever they may occur | 30 | 24 | 47 | 3.32 | 0.09 | 0.561 |
| Crocodiles are an unacceptable threat to humans and pets | 58 | 21 | 21 | 2.41 ^c | 0.09 | 0.546 |
| I think the crocodile is a likable species | 27 | 31 | 41 | 3.20 | 0.09 | 0.536 |
| Crocodiles threaten people's livelihoods by raiding fish and crab traps | 59 | 26 | 15 | 2.24 ^d | 0.09 | 0.496 |

^aScores were derived from a 5-point scale, where 1 indicated strong disagreement, 5 strong agreement, and 3 neither agreement nor disagreement with the statement.
^{b,c,d}Reverse coded values equal 3.29, 3.59, and 3.76, respectively.

^eValues for items used to form the variable ATTITUDE; statements with missing values were not included in subsequent factor analysis.

had more positive attitudes than females. Attitudes toward American crocodiles did not differ between respondents with and without children at home.

The greatest proportion of respondents (39%) believed the American crocodile population in south Florida had increased during 1998–2003. Over one-fourth of respondents (29%) indicated they did not know what the population trend had been over the previous five years and 22% believed the population had decreased. Few respondents (10%) thought the American crocodile population had remained the same from 1998–2003. Males were more likely to believe the crocodile population had remained the same or increased during 1998–2003 and females were more likely to believe the crocodile population had decreased during this time period ($\chi^2_1 = 5.829$, $p = 0.016$). There was not an association between perceptions of current American crocodile population trends and respondents with and without children at home.

The greatest proportion of respondents (43%) indicated they wanted American crocodile populations to increase over the next five years. Only 9% expressed a preference for fewer crocodiles and over one-fourth of respondents (29%) wanted populations to remain the same. Nearly 20% of respondents did not care whether crocodile populations increased, decreased, or remained stable from 2004–2009. Preferences for future American crocodile population trends did not differ between males and females or between respondents with and without children at home.

*Factors affecting risk perceptions and acceptance of American crocodiles—*Attitudes toward American crocodiles formed the most parsimonious model to predict risk perceptions of American crocodiles ($R^2 = 0.230$, $p \leq 0.001$). The coefficients for the regression equation, with SE in parentheses, were $RBELIEF_{(predicted)} = 3.592 (0.301) - 0.860 (0.142) ATTITUDE$. People who expressed negative attitudes toward crocodiles had the greatest probability of considering crocodiles a high risk to humans. Knowledge of American crocodiles is not a predictor of risk perceptions of American crocodiles, but it is positively correlated with attitudes. Therefore, knowledge of American crocodiles may have an indirect effect on risk perceptions of American crocodiles through attitudes toward American crocodiles.

Risk perceptions of, and attitudes toward, American crocodiles formed the most parsimonious model to predict preferences for future American crocodile population trends ($R^2 = 0.521$, $p \leq 0.001$). The coefficients for the logistic regression equation, in stepwise order with SE in parentheses, were $\log(P_i)/(1 - P_i) = -0.706 (2.499) - 1.502 (0.453) RBELIEF + 3.184 (1.297) ATTITUDE$, where P_i = probability that a respondent will desire a stable or larger crocodile population. The model correctly predicted preferences for future American crocodile population trends for 53% of respondents who chose a smaller crocodile population and 99% of respondents who chose a stable or larger crocodile population. Overall, the model predicted 94% of respondents'

preference for future American crocodile population trends. People who believed American crocodiles presented a low risk to humans and expressed positive attitudes toward the species had the greatest probability of preferring a stable or increased future American crocodile population.

DISCUSSION—South Florida residents and visitors who have potential to encounter an American crocodile generally have low risk perceptions of, and favorable attitudes toward, the species. Many people perceive benefits from crocodiles as indicated by the common response that crocodiles signify a healthy environment and increase overall quality of life in Florida. Although over half of respondents expressed concern about crocodiles living near their home, most did not feel personally threatened by crocodiles. Acceptance capacity for crocodiles expressed by many respondents was high. However, continued human population growth and residential development in south Florida will increase potential for human-crocodile encounters near human habitation.

Attitudes toward American crocodiles were significantly related to both risk perceptions and acceptance of American crocodiles. Management aimed at increasing favorable attitudes toward crocodiles is desirable, although ability to influence attitudes is complex and often a debated subject (Hungerford and Volk, 1990; Gardner and Stern, 1996; Trumbo, 1999). Simply providing more facts to stakeholders will not necessarily result in more favorable attitudes (Reading and Kellert, 1993). However, comprehensive knowledge is a necessary condition for stable beliefs (Fischhoff, 1995). Results from this study indicate that high knowledge of American crocodiles corresponds with positive attitudes toward the species. People with positive attitudes toward American crocodiles were more likely to have lower risk perceptions of, and higher acceptance capacities for, crocodiles.

Overall knowledge of American crocodiles and information received regarding crocodiles was rather low (Smithem, 2005), indicating opportunity for outreach efforts. Most respondents revealed they watch wildlife-related TV programs, visit zoos or aquariums, and would utilize Internet sources to learn more about American crocodiles (Smithem, 2005). TV programs and zoo exhibits offer viewers stimulating visual displays and interpretive information, yet typically at high costs to the supplier. The Internet may be more cost effective for presenting interactive information regarding crocodiles to a large number of people.

Similar to Riley and Decker (2000b), a “Not in my backyard!” attitude was detected when respondents were asked about quality of life regarding American crocodiles near their home. Many respondents were unaware there has never been a documented American crocodile attack on a human in south Florida and believed crocodiles were more aggressive than alligators (*Alligator mississippiensis*; Smithem, 2005), which may have contributed to concern for crocodiles near their home. Wildlife management has traditionally used translocation to separate a potentially dangerous animal from situations that

cause concern among stakeholders (Riley et al., 1994). Most respondents indicated translocation as an acceptable tool for American crocodiles found near human habitation (Smithem, 2005). However, translocation of crocodiles has not been a desirable management option because of the potential for injury or distress to crocodiles and catchers during relocation or for return of the crocodile after relocation.

Modification of human behaviors offers managers an alternative to direct removal or relocation of crocodiles. Appropriate personal decisions can reduce personal risk far greater than any government action (Zeckhauser and Viscusi, 1990; Keeney, 1995). Just as life can never be risk free, risks from crocodiles cannot be completely eliminated (Keeney, 1995). There are, however, steps that can be taken to reduce personal risks from crocodiles (e.g., never feed crocodiles, do not discard fish scraps at boat ramps or near water's edge, do not swim where crocodiles live, fencing). Educational programs aimed at teaching appropriate behavior in the presence of crocodiles can lead to feelings of empowerment and a sense of security, subsequently reducing risk perceptions of crocodiles. Effort directed towards ameliorating voluntary risks (Zeckhauser and Viscusi, 1990) can have more impact than removing or relocating crocodiles, signifying education may do more to reduce risk perceptions than relocation.

Human-wildlife encounters, particularly negative encounters, are often highly publicized by the media (Corbett, 1992). In the spring of 2006, several fatal alligator attacks that occurred within a one-week period in Florida were widely covered. Events such as these could be opportunities for mass media to discuss the differences between alligators and American crocodiles and to positively influence risk perceptions of crocodiles. Since the majority of respondents considered risks from American crocodiles to be low, media coverage that emphasizes the unlikelihood of a crocodile attack will likely reinforce existing perceptions rather than amplify perceived risk (Gore et al., 2005). Such media coverage may even improve people's risk perceptions or increase the number of people who believe risks from American crocodiles to be low, particularly if the coverage occurs immediately after a disconcerting incident such as an alligator attack (Gore et al., 2005).

Findings from this study are consistent with Riley and Decker (2000b) who studied acceptance capacity for mountain lions. Risk perceptions and attitudes were predictors of desired future population trends in both studies. This study, however, did not find a correlation between perceptions of current population trends and acceptance capacity for the crocodile. Most respondents perceived low risks from American crocodiles and felt risks are generally accepted voluntarily, which supports the principle that less fear is typically associated with voluntary risks (Slovic, 1987; Savage, 1993). Demographic variables can significantly affect perceptions of, and attitudes toward, large predators (Kellert, 1985b; Kellert and Berry, 1987; Kleiven et al., 2004). Similar to Riley and Decker (2000a, 2000b), however, demographic variables did not affect risk perceptions or acceptance of the American crocodile.

We studied people likely to encounter American crocodiles in an effort to better plan for expected increases in human/crocodile interactions. Results from this project underscore the importance of education programs aimed at south Florida residents and visitors who live and recreate near crocodile habitat. Research indicates that increasing knowledge of crocodiles and teaching appropriate behavior near crocodile habitat will be most effective for increasing positive attitudes toward, and decreasing risk perceptions of, crocodiles. Individuals with favorable attitudes toward American crocodiles will be more likely to support measures to recover and protect this endangered species (and hopefully less likely to call for removal of crocodiles), than those possessing negative attitudes (Hungerford and Volk, 1990; Stern, 2000). An informed, supportive public is vital for the continued growth and recovery of south Florida's American crocodile population. These findings should be viewed as a starting point for understanding public perceptions of the crocodile. Researchers are encouraged to examine these issues further with various stakeholder groups to improve the human dimensions of crocodile management.

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