

CONFLICT AND NORMATIVE SANCTIONS AMONG GALAPAGOS FISHERMEN

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Abstract.—At the start of this century, aggressive fishermen retaliated against changes in fishing regulations in the Galapagos. To understand this conflict, we examined fishermen's norms regarding sanctions that the Galapagos National Park Service should use for: (a) fishing regulation violations, and (b) aggressive behavior by fishermen. The level of consensus for natural resource and aggressive behavior norms was explored using the Potential for Conflict Index (PCI₂). We hypothesized that the mean normative sanctions and the level of consensus would vary among respondents from three islands in the Galapagos (San Cristobal, Isabela, Santa Cruz). Data were obtained from a sample of Galapagos fishermen ($n = 510$, response rate = 75 percent of the population). Results revealed statistical differences among fishermen from the three islands in their norms for fishing regulation sanctions ($F > 28.4$, $p < .001$, $\eta^2 < .335$, in all cases). Fewer differences among the islands were observed for suggested behavior sanctions against aggressive fishermen.

1.0 INTRODUCTION

The Galapagos Islands have been recognized as a National Park (1959), a World Heritage Site (1979), a Biosphere Reserve (1984), a Marine Resource Reserve (1986), and an International Whale Sanctuary (1990). The fragile nature of the Galapagos archipelago

ecosystem poses natural resource and social management challenges (Finchum 2002). For example, fishermen must comply with regulations that are set by the Galapagos National Park Service (GNPS) and standards (norms) established by both GNPS and their local fishing cooperatives. Acceptance into a fishing cooperative is required to fish in the Galapagos. After an early closure of the 3-month sea cucumber season by GNPS managers in 1995, local fishermen protested by killing endangered giant tortoises, blocking access to the Charles Darwin Research Station, burning effigies of park officials, and threatening managers. It was primarily fishing cooperatives that orchestrated these aggressive behaviors.

To understand this conflict between fishermen and the GNPS, this article examines fishermen's norms regarding sanctions that GNPS should enforce for: (a) fishing regulation violations (e.g., fishing in non-fishing zones, harvesting lobster out of season), and (b) aggressive behavior (e.g., verbal or physical threats against GNPS officials). The level of consensus for both natural resource and aggressive behavior norms was also explored using the Potential for Conflict Index (PCI₂). We hypothesized that the mean support for normative sanctions and the level of consensus would vary among respondents from three islands in the Galapagos (San Cristobal, Isabela, and Santa Cruz). San Cristobal and Isabela have communities whose economy is largely dependent on fishing. Santa Cruz is an international tourism center and headquarters for the GNPS and the Charles Darwin Research Center (now the Charles Darwin Foundation).

1.1 Norms

Norms can refer to what most people are doing (a descriptive norm) or to what people should or ought to do (an injunctive norm) in a given situation (Cialdini et al. 1991). Social norms are defined as "standards shared by the members of a social group" and personal

norms are defined as an individual's own expectations, learned from experience, and modified through interaction (Blake and Davis 1964).

Norms are also intimately tied to the concept of sanctions—punishment for people who break norms or rewards for compliance with norms. Norms that are widely shared by most members of society often become legal mandates complete with formal sanctions (e.g., fines) for noncompliance. Such norms are also likely to be internalized—viewed as being right, legitimate, and hence obligatory. When there is less agreement or the norms are emerging, informal sanctions may be used to encourage acceptable behavior (Heywood 1996).

Different social psychologists define and use the concept of norms differently (see Vaske and Whittaker 2004 for a review). Some concentrate on the variables that serve to focus or activate a norm, while others address how social pressure can influence behavior or aid in the diffusion of ideas. Norm theories also differ in how they measure the concept of norms. Norm focus/activation theories measure norms at the individual level (i.e., personal norms) and then aggregate the data to derive social norms. The theory of reasoned action (Fishbein and Ajzen 1975), in contrast, focuses primarily on perceived social norms (i.e., subjective norms). Under this paradigm, subjective norms refer to what you think others would want you to do.

Galapagos fishermen's aggressive behavior towards marine reserve policies might be explained by the concepts of personal, social, and subjective norms. For example, aggressive fishermen's behavior reflects the social norms of fishing cooperatives that expect their members to aggressively retaliate against park service officials. The role of sanctions applied to fishing violations (e.g., confiscation of fishing permits) can influence fishermen's behavior and evaluations of marine reserve policies. Fishermen's evaluations of appropriate sanctions in regard to fishing violations also reflect fishermen's personal and perceived social norms.

1.2 Measuring Conflict/Consensus

Although norms help to clarify fishermen's evaluations of GNPS enforced sanctions, they do not illustrate consensus for these actions. This paper applied the second generation of the Potential for Conflict Index (PCI_2) (Vaske et al. 2010) to display consensus among fishermen's norms for appropriate sanctions regarding violations of marine reserve fishing policies and aggressive fishermen behavior.

The Potential for Conflict Index (PCI) was developed to aid the understanding of human dimensions findings to natural resource management concerns (Manfredo et al. 2003, Vaske et al. 2006). The second generation of this statistic (PCI_2) ranges from 0 to 1. A PCI_2 of 1 corresponds to a scenario with the least amount of consensus and the greatest potential for conflict. This occurs when responses are equally divided between the two extreme values on a response scale. A PCI_2 of 0 illustrates a distribution with 100 percent at any one point on the response scale, suggesting complete consensus and no potential for conflict (Vaske et al. 2010).

PCI_2 results are displayed as bubble graphs reflecting the amount of consensus for a given management scenario. Consensus is displayed by bubble size depicting the magnitude of PCI_2 and indicating the extent of potential conflict (or consensus) regarding the acceptability of a particular topic (i.e., degree of dispersion). A small bubble represents little potential for conflict, or high consensus, and a larger bubble represents greater potential for conflict, or less consensus. The center of the bubble represents the mean rating as plotted on the y-axis (i.e., central tendency).

By using PCI_2 , in combination with the concept of norms, this paper examined fishermen's evaluations of appropriate GNPS sanctions for: (a) fishing violations of Galapagos marine reserve policies and (b) aggressive fishermen behavior toward park service officials. To understand norms and consensus for marine reserve policies, we compared fishermen's evaluations among the three Galapagos Islands of San Cristobal, Santa

Cruz, and Isabela. The following hypotheses were advanced:

- H₁: Norms regarding sanctions for fishing violations will vary among the three Galapagos Islands.
- H₂: Norms regarding sanctions for aggressive fishermen behavior will vary among the three Galapagos Islands.
- H₃: The amount of consensus for sanctions applied to fishing violations will vary among the three Galapagos Islands.
- H₄: The amount of consensus for sanctions applied to aggressive fishermen behavior will vary among the three Galapagos Islands.

2.0 METHODS

The study population included all registered fishermen ($N = 682$) on the three islands. Data were obtained from onsite surveys conducted in 2001. A total of 510 surveys were completed (75 percent response rate) by all local fishermen who could be contacted and were willing to participate in the study. The sample sizes and percent of the fishermen population sampled for each island were: San Cristobal ($n = 269$, response rate = 79 percent); Isabela ($n = 132$, response rate = 75 percent); and Santa Cruz ($n = 109$, response rate = 67 percent).

2.1 Variables Measured

Independent variable: Island residence (i.e., San Cristobal, Santa Cruz, Isabela) served as the independent variable.

Dependent variables: The stem to one survey question stated: "To ensure that fishing continues for everyone, the officials should enforce rules. Tell us how you feel the officials for the marine reserve should deal with fishermen that do the following things." Specific items reflected five fishing regulation violations and four aggressive fishermen behaviors. Fishing violations included: (a) fishing in the no-take fishing zone; (b) illegal fishing methods; (c) shark harvest; (d) off-season sea cucumber harvest; and (e) off-season lobster harvest. The aggressive fishermen

behaviors included: (a) verbal threats; (b) physical threats; (c) building damage or stealing property; and (d) physical injury to individuals. For each set of dependent variables, respondents indicated the level of punitive action (sanction) that should be taken by the park service. The sanctions were coded on a unipolar scale and included: 0="do nothing"; 1="give a fine"; 2="take away permit for 15 days"; and 3="take away permit for the rest of the year".

2.2 Analysis Strategy

One-way Analysis of Variance and post hoc tests (Tamhanes, LSD) were used to compare the mean normative sanctions among fishermen from the three Galapagos Islands. Eta (η) served as the effect size measure and was interpreted as: .1 (minimal), .3 (typical), and .5 (substantial) relationship (Vaske 2008). The PCI_2 was used to compare the amount of consensus for fishing violations and aggressive fishermen behavior sanctions among the three Galapagos Islands. PCI_2 is a distance-based measure that allows for different distance (i.e., D_1 , D_2 , D_3) functions (see Vaske et al. 2010 for details). For a unipolar scale (i.e., 0, 1, 2, 3), D_3 is the recommended distance function. Statistical differences between the observed PCI_2 values were calculated using the software available from <http://welcome.warnercnr.colostate.edu/~jerryv>.

3.0 RESULTS

The mean normative sanctions for fishing regulation violations such as fishing in a no fishing zone varied significantly among San Cristobal, Santa Cruz, and Isabela fishermen for all five dependent variables ($F > 28.4$, $p < .001$, in all cases, Table 1). Effect sizes ranged from η equals .335 to .405. Post hoc analyses revealed that Isabela fishermen were consistently less likely to agree with punitive sanctions than respondents from San Cristobal or Santa Cruz. Fishermen from these latter two islands did not differ statistically on sanctions for fishing in the no-take zone, illegal fishing methods, and off-season sea cucumber harvesting. The average sanctions for San Cristobal and Santa Cruz respondents were between "give a fine" and "take the permit away for 15 days."

Table 1.—Island differences on fishing violation sanctions

	Island ¹			<i>F</i>	<i>p</i> -value	η
	San Cristobal	Santa Cruz	Isabela			
No take fishing zone	1.29 ^a	1.07 ^a	0.65 ^b	35.98	<.001	.375
Illegal fishing method	1.32 ^a	1.09 ^a	0.63 ^b	42.89	<.001	.405
Off-season lobster harvest	1.57 ^a	1.43 ^a	0.94 ^b	28.47	<.001	.335
Off-season sea cucumber harvest	1.67 ^a	1.59 ^a	0.97 ^b	33.95	<.001	.362
Shark harvest	1.94 ^b	1.34 ^a	1.03 ^a	42.29	<.001	.401

¹ Variables coded on a 4-point scale where 0 = “do nothing,” 1 = “give a fine,” 2 = “take away permit for 15 days,” and 3 = “take away permit for the rest of the year.”

Means with different superscripts differ significantly at $p < .05$ based on the Tamhanes post hoc analysis.

Three of the four normative sanctions for aggressive fishermen behavior (i.e., verbal threats, physical threats, damaging property) did not significantly differ among the islands ($F < 2.59$, $p > .077$, Table 2). The effect sizes for these relationships ranged from .049 to .114, and the mean sanctions were between “give a fine” and “take the permit away for 15 days.” Fishermen from the three islands did differ in their support for sanctions when physical injury was involved ($F = 3.12$, $p = .045$), but the effect size was minimal ($\eta = .133$). Similar to the fishing violation sanctions, Isabela respondents were less likely to support punitive actions by the park service. Fishermen from the other two islands did not differ significantly on the physical threat variable.

Consensus regarding these normative sanctions was measured using PCI_2 (Figures 1 and 2). A PCI_2 value of 0 implies total consensus (i.e., no conflict) and a value of 1 indicates maximum conflict (i.e., no consensus). Across the three islands and all five fishing violation sanctions (Figure 1), the PCI_2 values ranged

from .34 (i.e., San Cristobal—illegal fishing methods) to .74 (i.e., Santa Cruz and Isabela—shark harvesting). These relatively high PCI_2 values (Mean $PCI_2 = .57$) highlight the controversy that existed among the fishermen/fishing cooperatives and the GNPS regulations.

Difference tests for these PCI_2 values indicated that there was more consensus among San Cristobal fishermen than among Santa Cruz and Isabela respondents for sanctions regarding fishing in the no-take fishing zone, illegal fishing methods, and shark harvest (Figure 1). Santa Cristobal differed significantly from Isabela on the amount of consensus for off-season lobster and sea cucumber harvest sanctions.

In general, there was little consensus for aggressive fishermen behavior sanctions (Figure 2). Across the three islands and four behaviors, the PCI_2 values were greater than .70 in 10 of the 12 calculations (Mean $PCI_2 = .75$). The only two exceptions were

Table 2.—Island differences for aggressive fishermen behavior sanctions

	Island ¹			<i>F</i>	<i>p</i> -value	η
	San Cristobal	Santa Cruz	Isabela			
Verbal threats	1.05	1.31	1.01	2.59	.077	.114
Physical threats	1.23	1.40	1.16	1.25	.289	.080
Damaging property	1.75	1.90	1.79	0.40	.674	.049
Physical injury ²	1.69 ^a	1.44 ^a	1.37 ^b	3.12	.045	.133

¹ Variables coded on a 4-point scale where 0 = “do nothing,” 1 = “give a fine,” 2 = “take away permit for 15 days,” and 3 = “take away permit for the rest of the year.”

² Means with different superscripts differ significant at $p < .05$ based on the LSD post hoc analysis.

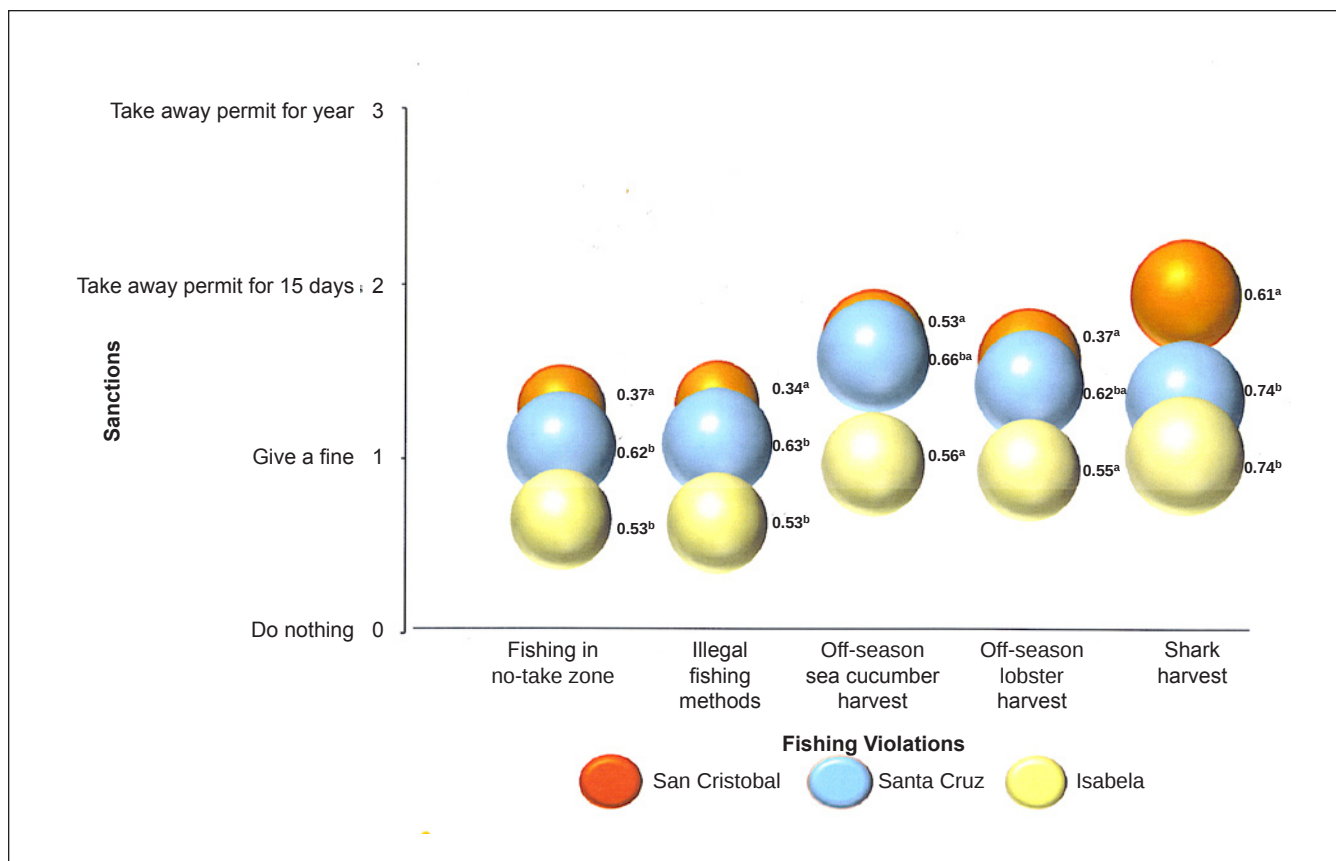


Figure 1.—The amount of consensus for fishing regulation violation sanctions. Different superscripts correspond to significant differences in PCI_2 values at $p < .05$.

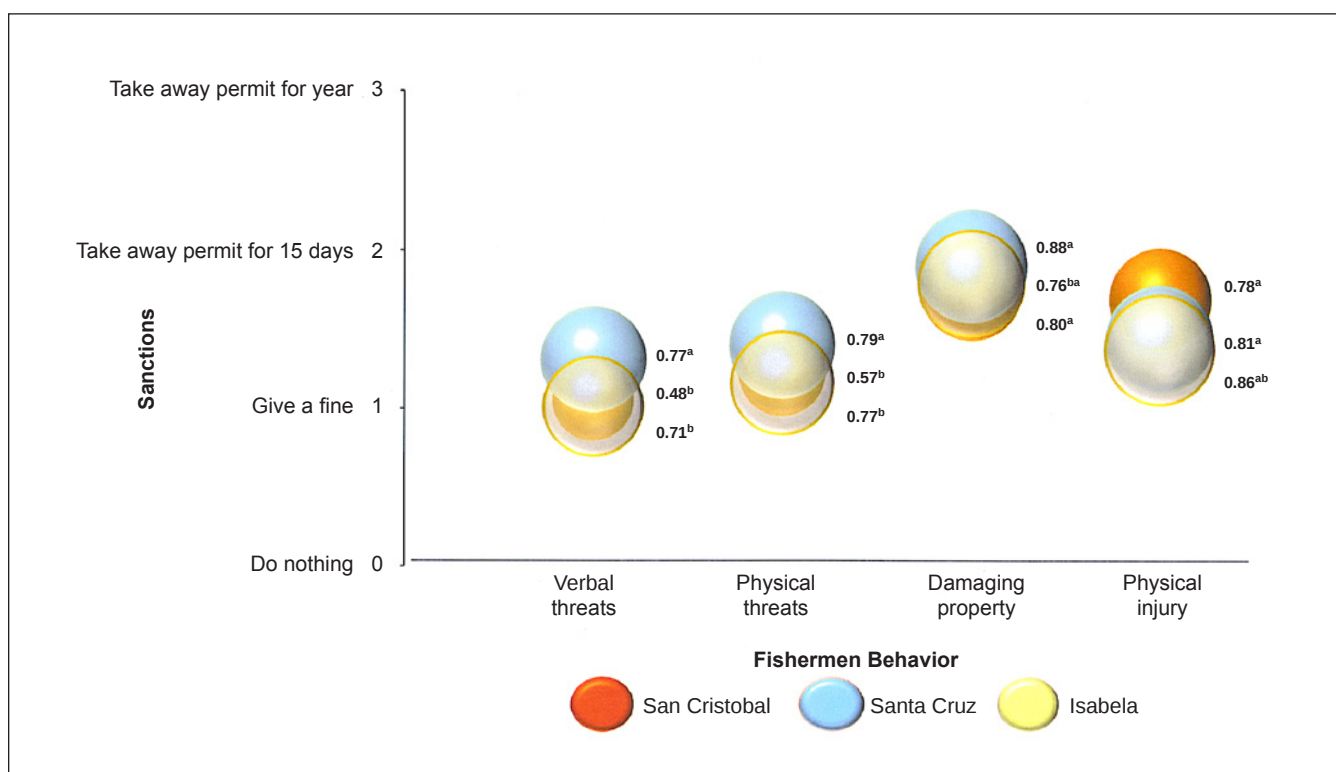


Figure 2.—The amount of consensus for aggressive fishermen behavior sanctions. Different superscripts correspond to significant differences in PCI_2 values at $p < .05$.

San Cristobal fishermen's evaluations of verbal ($PCI_2 = .48$) and physical ($PCI_2 = .57$) threats against the GNPS. For these two variables, San Cristobal differed significantly from Santa Cruz ($PCI_2 = .77$ and $.79$, respectively) and Isabela ($PCI_2 = .71$ and $.79$, respectively). Significant differences were also noted between: (a) San Cristobal and Santa Cruz for damaging property ($PCI_2 = .76$ vs. $.88$, respectively) and (b) San Cristobal and Isabela for physical injury ($PCI_2 = .78$ vs. $.86$, respectively). Given the magnitude of these PCI_2 values, however, these findings highlight the potential for a high level of conflict between the fishermen and the Galapagos National Park.

4.0 DISCUSSION

Results support the predicted mean differences among the three islands for fishing regulation violations (H_1), but generally not for average island differences in aggressive fishermen behavior (H_2). The exception for these latter comparisons was physical injury to park service personnel, where Isabela fishermen were statistically less likely to agree with the normative sanctions than those from San Cristobal or Santa Cruz. Some differences were observed in the levels of consensus for acceptable sanctions for fishing violations (H_3) and aggressive fishermen behavior (Hypothesis 4) among the islands. However, the average PCI_2 values for both fishing regulation violations ($M = .57$) and aggressive behavior ($M = .75$) were large and consistent with the actual violent behaviors that existed at the time the study was conducted; these results provide a partial validation of PCI_2 . These findings also have managerial and theoretical implications.

4.1 Managerial Implications

Fishermen's acceptance of normative sanctions and the amount of consensus for those sanctions illustrate the potential for conflict that existed for current regulations. For example, San Cristobal favored the highest level of punitive actions for fishing in no-take fishing zones and illegal fishing methods. San Cristobal also had the highest amount of consensus for these sanctions. Isabela, on the other hand, generally favored the lowest level of punitive action and

exhibited less consensus about these fishing violations. The differences among these islands could imply that Isabela fishermen would be less likely to comply with current and future regulatory scenarios, particularly those that deal with taking fishing permits away for the rest of the year. San Cristobal findings indicate a relatively high likelihood for compliance with current and future regulatory scenarios. Santa Cruz favored a lower level of punitive action than San Cristobal, and there was less consensus regarding sanctions given to fishing violations. Such findings suggest a relatively high likelihood for conflict to occur in Santa Cruz. The presence of park headquarters in Santa Cruz could have influenced the findings, as some fishermen worked for the park service and tourism related businesses. Whether these findings would generalize to the current situation in the Galapagos is a topic for future research.

4.2 Theoretical Implications

Although numerous studies of recreation norms have been published, relatively few have explicitly incorporated the concept of sanctions. An understanding of the acceptability of sanctions for different behaviors, however, can illustrate the extent to which people are willing to have their personal and social norms enforced. Future researchers are encouraged to incorporate normative sanctions into their studies when appropriate.

The second generation of PCI (PCI_2) is a new statistic (Vaske et al. 2010). This article represents the first application of PCI_2 to a unipolar scale (i.e., "do nothing" to "take away a permit for a year"). Similar to other studies that have used PCI with bipolar scales (e.g., strongly agree to strongly disagree), presenting findings as bubbles provides a convenient and manager-friendly technique for illustrating the amount (or lack thereof) of consensus regarding a given topic. Tools for calculating, graphing and comparing PCI_2 values, as well as an explanation of and previous applications of the statistic, are available at <http://welcome.warnercnr.colostate.edu/~jerryv>. Researchers are encouraged to use PCI_2 when communicating with statistically challenged audiences.

5.0 LITERATURE CITED

- Blake, J.; Davis, K. 1964. **Norms, values, and sanctions.** In: Faris, R.E.L., ed. Handbook of modern Sociology. Chicago, IL: Rand McNally: 456-484.
- Cialdini, R.B.; Kallgren, C.A.; Reno, R.R. 1991. **A focus theory of normative conduct: a theoretical refinement and reevaluation of the role of norms in human behavior.** Advances in Experimental Social Psychology. 24: 201-34.
- Finchum, R. 2002. **The beliefs and perceptions of fishermen regarding management actions, regulations, and the protection of the Galapagos Marine Reserve, Ecuador.** Fort Collins, CO: Colorado State University. M.S. thesis.
- Fishbein, M.; Ajzen, I. 1975. **Belief, attitude, intention, and behavior: an introduction to theory and research.** Reading, MA: Addison-Wesley.
- Heywood, J.L. 1996. **Conventions, emerging norms, and norms in outdoor recreation.** Leisure Sciences. 18: 355-364.
- Manfredo, M.J.; Vaske, J.J.; Teel, T.L. 2003. **The potential for conflict index: a graphic approach to practical significance of human dimensions research.** Human Dimensions of Wildlife. 8: 219-228.
- Vaske, J.J. 2008. **Survey research and analysis: applications in parks, recreation and human dimensions.** State College, Pennsylvania: Venture Publishing. 658 p.
- Vaske, J.J.; Beaman, J.; Barreto, H.; Shelby, L.B. 2010. **An extension and further validation of the potential for conflict index.** Leisure Sciences. 32: 240-254.
- Vaske, J.J.; Needham, M.D.; Newman, P.; Manfredo, M.J.; Petchenick, J. 2006. **Potential for conflict index: hunters' responses to chronic wasting disease.** Wildlife Society Bulletin. 34(1): 44-50.
- Vaske, J.J.; Whittaker, D. 2004. **Normative approaches to natural resources.** In: Manfredo, M.J.; Vaske, J.J.; Bruyere, B.L.; Field, D.R.; Brown, P.J., eds. Society and natural resources. Jefferson, MO: Modern Litho: 238-294.

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