REGULATION COMPLIANCE MODEL OF NATIONAL PARK VISITORS

Noppawan Tanakanjana Phongkhieo[*1] and Thanakrit Sangchoey[2]

[1]Department of Conservation, Faculty of Forestry
Kasetsart University, Bangkok, 10900, Thailand
[2]Doctoral Student in Parks, Recreation, and Tourism Program,
Faculty of Forestry Kasetsart University, Bangkok, 10900, Thailand

[*]Corresponding author: ffornwt@ku.ac.th

Abstract

The purpose of this research was to investigate visitor compliance in Thailand's national parks and test a path model of factors influencing visitor compliance. Visitors to five national parks were sampled. Questionnaire was used to collect data from 500 visitors. The data was analyzed by descriptive and SEM methods. The research found that the path model was consistent with empirical data, which was evidenced through a chi-square (x^2) of 42.00, a probability (p) of 0.06, a degree of freedom (df) of 29, a goodness of fit index (GFI) of 0.98, an adjusted goodness of fit index (AGFI) of 0.97, a comparative fit index (CFI) of 0.99, a standard root mean square residual (SRMR) of 0.04, and a root mean square error of approximation (RMSEA) of 0.03. All variables in the model could explain 34% of variance in regulation compliance. The intention to comply had a direct positive effect on visitor compliance, while the perceived injunctive social norm, personal morality, the awareness of regulation compliance, legitimacy, knowledge of park regulations, the perceived environmental problems, and legal sanctions had a direct positive effect on the intention to comply and had an indirect positive effect on visitor compliance through the intention to comply.

Keywords: Regulation compliance; national park visitor; path model

Introduction

National parks are popular natural recreational areas. The U.S. National Park Service reported that the average number of visitors to national parks in the U.S.A from 2008-2016 was 643 million per annum (Statista, 2017). The average number of visitors to national parks in Thailand from 2012-2016 reported by the Department of National Parks, Wildlife and Plant Conservation (DNP) was approximately 12.5 million per annum (DNP, 2017). The increased volume of recreational use exposed national parks to harmful environmental impacts, the major cause of which is visitors' regulation noncompliance, e.g. littering, off-trail hiking, and making bonfires in restricted areas (Gramann et al., 1995; Fredman et al., 2009; Manning and Anderson, 2012; Ward and Roggenbuck, 2003). Regulation noncompliance is a key factor that undermines the goal of conservation and has socio-economic impacts on national park areas (Brashares et al., 2014; Johnson and Vande Kamp, 1996; Solomon et al., 2015).

Regulation noncompliance is one of the top issues for Thailand's national park management, as experienced by many countries. This noncompliance behavior is usually conducted by Thai visitors, including littering, drinking alcoholic beverages, making loud noise, feeding wild animals, using styrofoam containers, engraving trees, and making bonfires (Rueangsut, 2015; Poolsawat, 2013; Loakaewnoo et al., 2015; Luanchawee, 2004; Jantowat et al., 2011; Jarungphan, 2001). There are insufficient studies on this issue, all of which studied in particular areas, and no research on the path model was identified. Thus, knowledge about visitor compliance behavior in Thailand should be researched in a systematic manner.

Based on the significance of this problem, the authors were interested in studying regulation compliance among Thai visitors. The study process started with synthesizing research in Thailand and foreign countries to classify factors associated with protected area users' regulation compliance. The study results served as the conceptual framework for developing the causal relationship model for visitor compliance behavior. Visitor data using in this article was collected from five national parks including Khao Yai National Park, Kaeng Krachan National Park, Chae Son National Park, Nam Tok Phlio National Park, and Khao Luang National Park. The conclusion drawn from this study indicated

the direction and size of the relationship, as well as the direct and indirect effects of related factors. Apart from confirming the consistency between the developed theoretical model and empirical data, the findings of this study are useful for national park managers in developing visitor management strategies to improve visitor compliance.

Literature Review

Concepts about Compliance

Coexisting in society requires rules and regulations to serve as the practice guidelines for all members to comply with. The word "compliance" is defined as "any behaviors of the regulatees that are consistent with behavioral prescriptions in a particular system. The term "behavioral prescriptions" are, therefore, standards of actions and prohibitions that are an order from the regulator and are expected to be followed by members (Young, 1979). Accordingly, compliance can be explained under two main perspectives: the regulator's perspectives and regulatee's perspectives.

Governance regime academics hold perspectives as regulators, who attach great importance to two models that lead to compliance: the coercive model and the cooperative model (Timothy, 2003). In the coercive model, the regulator acts as the rational policy implementer, who tries to enforce laws and increase sanctions for violators in order to stimulate regulatees to make reasonable choices for self-interest. In the second model, the assumption is that most of the regulatees are more compliant with laws and more positively respond to persuasion, education, and assistance than sanctions. Applying either of the models depends on the particular situation. In addition, psychological perspectives explain that compliance stems from four internal qualifications, which consist of obedience, assimilation, acceptance, and internalization, which result in the tendency for one to comply (Fischer and Wiswede, 1997).

Factors Associated with Protected Area Users' Regulation Compliance

As national parks are in a protected area system, studies that investigated protected area users' regulation compliance in Thailand and other countries were reviewed to classify variables associated with regulation compliance. The overall analysis results found that protected area users'

regulation compliance is associated with three groups of factors, i.e. institutional factors, social factors, and personal factors. This is in line with the meso paradigm, which explains that human behavior results from linkages between macro theories, which are sociologically related, and micro theories, which are psychologically related (Bronfenbrenner, 1979). Those theories partly applied in this research included the theory of normative social behavior, the norm-activation model, the theory of moral development, and the theory of planned behavior. The synthesizing results of all literature and theories are follows:

Institutional factors are related to protected area policies and management of agencies in charge. They consist of three key factors including law enforcement, legal sanctions, and persuasive communication.

Social factors are related to social situations that direct and affect protected area users' perception, which is influenced by two factors including social norm and mass media.

Individual factors are related to cognition, personal morality, and socialization, consisting of three factors including normative commitment, knowledge of regulations, and awareness of regulations.

Definition of Terms

Based on the results from literature synthesis, 9 variables were chosen to be included in a path model. All variables were defined according to the based theories and in harmony with the real situation of the study areas.

Visitor Compliance (VCP) – Visitors' actions that comply with the regulations for protection and maintenance of national parks in accordance with the National Park Act, B.E. 2504 (1961) and the Royal Forest Department's Regulations on Entry into National Parks, B.E. 2533 (1990), and actions that comply with "what to do" in which Thai national parks request cooperation in order to maintain sound environmental conditions.

Intention to Comply (INC) – Visitors' intention to comply with the regulations for protection and maintenance of national parks in accordance with the National Park Act, B.E. 2504 (1961) and the Royal Forest Department's Regulations on Entry into National Parks, B.E. 2533 (1990), and the intention to comply with "what to do" in which Thai national parks request cooperation in order to maintain sound environmental conditions.

Knowledge of Regulation (KOR) – Visitors' understanding about the facts pertaining to regulations for protection and maintenance of national parks in accordance with the National Park Act, B.E. 2504 (1961) and the Royal Forest Department's Regulations on Entry into National Parks, B.E. 2533 (1990).

Legal Sanctions (LST) – Visitors' perception of legal sanctions in the case of regulation violation, which consists of severity of sanctions, possibility of sanctions, and rapidity of sanctions.

Legitimacy (LEG) – Visitors' perception of the suitability of regulations enforced by national parks.

Injunctive Social Norm (ISN) – Actions that visitors perceive as what they should do during their national park visit and that are accepted by the majority of people.

Personal Morality (MOR) – Visitors' regulation compliance based on moral principles, which consist of adhering to legal principles, respecting the rights of human beings and other living organisms in the ecosystem, and valuing the environment.

Awareness of Regulation Compliance (ARC) – Visitors' consciousness of regulation compliance, which consists of valuing regulation compliance, attaching great importance to regulation compliance, and believing in positive impacts of visitor compliance behavior.

Perceived Environmental Problem (PEP) – Visitors' interest in, and exposure to, news and information about environmental problems in national parks and situations involving environmental problems in national parks through different mass media

Hypotheses

Hypothesis 1: Knowledge of regulations has a direct effect on the intention to comply and has an indirect effect on compliance behavior.

Hypothesis 2: Legal sanctions have a direct effect on the intention to comply and have an indirect effect on compliance behavior.

Hypothesis 3: Legitimacy has a direct effect on the intention to comply and has an indirect effect on compliance behavior.

Hypothesis 4: Perceived injunctive social norm has a direct effect on the intention to comply and has an indirect effect on compliance behavior.

Hypothesis 5: Personal morality has a direct effect on the intention to comply and has an indirect effect on visitor compliance behavior.

Hypothesis 6: Awareness of regulation compliance has a direct effect on the intention to comply and has an indirect effect on compliance behavior.

Hypothesis 7: Perceived environmental problem has a direct effect on the intention to comply and has an indirect effect on compliance behavior.

Hypothesis 8: Intention to comply has a direct effect on compliance behavior.

Methodology

The research methodology was as follows:

1. Literature Synthesis and Conceptual Framework Development

Sixty-two (62) studies on compliance behavior of protected area users were synthesized in order to classify related factors, and the effect size was estimated by means of meta-analysis. The meta-analysis involved the vote-counting method (Hedges and Olkin, 1985). The analysis results found six groups of factors associated with visitor compliance behavior of protected area users. That were social norm had a high positive relationship (r = 0.90); knowledge of regulations had a high positive relationship (r = 0.86); awareness of regulation compliance had a high positive relationship (r = 0.83); normative commitment had a high positive relationship (r = 0.81); mass media had a relatively high positive relationship (r = 0.76); and legal sanctions had a relatively high positive relationship (r = 0.62). After that, a conceptual framework model and a causal relationship model were developed.

2. Selection of Study Areas

Study areas were selected by assessing relevant indicative factors, i.e. 1) The level of problems associated with regulation compliance (assessed based on the opinions of 119 national park superintendents), 2) The number of visitors (assessed based on the statistics of visitors at each national park), and 3) The diversity of recreational activities (assessed based on the number of recreational activities in each national park obtained from park superintendent survey).

National parks that earned top scores within their group were selected, and representative areas were selected by drawing lots. The selected representative areas consisted of Khao Yai National Park (Nakhon Ratchasima), Kaeng Krachan National Park (Phetchaburi), Chae Son National Park (Lampang), Nam Tok Phlio National Park (Chanthaburi), and Khao Luang National Park (Nakhon Si Thammarat).

3. Defining the Sample Size

The samples of the research were male and female Thai visitors aged 15 or above who participated in recreational activities and stayed overnight at the representative national parks. The sample size was determined using the program G*Power 3 (Faul et al., 2007; Suksawang, 2013). The value of the effect size equated to 0.30 at a statistical significance level of 0.05, the power of test was 0.80, and the degree of freedom of the model was 45. Based on a calculation, the minimum sample size for the research model analysis equated to 322 samples. The researchers used 500 samples, 100 in each national park, as sample size of this research.

4. Development of Data Collection Tools

Steps involved in developing the tools were as follows:

4.1 Defining operational definitions to measure variables in the research model, which were derived from the synthesis of previous researches.

4.2 Creating variable measurement tools, which consisted of the questionnaires about regulation compliance and all variables associated with visitor compliance behavior from the research model.

5. Examination of Research Tool Quality

5.1 *Validity* – The developed research tools were sent to five experts to check for validity and the objectivity of the questions. Then they were analyzed to identify the index of item-objective congruence (IOC) (Rovinelli and Hambleton, 1977). The analysis results found that the IOC value of respective question items was over 0.60, which passed the criteria.

5.2 *Reliability* – The revised questionnaires were tried out with 70 visitors at Khao Yai National Park and were checked for internal consistency with respect to the intention to comply, the perception of legal sanctions, the

perception of injunctive social norm, personal morality, awareness of regulation compliance, and the perception of environmental problems, using Cronbach's alpha coefficient (Cronbach, 1951). The analysis results manifested that the internal consistency of respective question items was over 0.60, which passed the criteria. The questionnaire pertaining to knowledge of national park regulations was examined using the KR-21 formula (Guilford and Fruchter, 1988). The analysis results demonstrated that the internal consistency value was equal to 0.72, which was considered to be at a suitable level.

5.3 *Difficulty* – The difficulty of the questionnaire pertaining to knowledge of park regulations was examined using the level of difficulty of the items (p) (Crocker and Algina, 1986). The analysis results demonstrated that the difficulty of each item ranged between 0.37-0.88 which was considered to be at an acceptable level.

5.4 *Discrimination* – The questionnaires were checked for discrimination with respect to regulation compliance and legitimacy. T-test statistics (Piyapimonsit, 2005) were used to test item discrimination power. This aimed to test the difference between the high-score group and the low-score group. The analysis of respective question items of both questionnaires revealed that the average scores of the high-score group were higher than the low-score group at a statistical significance level of $p < 0.05$, for all question items. Thus, their item discrimination power was considered to pass the criteria.

6. Data Collection

The questionnaires were distributed to Thai male and female visitors aged 15 years or over who engaged in recreational activities and stayed overnight in any of the five national parks. The research objectives were clarified, and group representatives were asked to provide their data. Data collection was conducted for all 500 samples.

7. Testing of Assumptions

7.1 *Normality*, which was based on the statistics of the Kolmogorov-Smirnov test – The test results revealed that each of the nine variables had a statistical significance level over .05 ($p > .05$), which indicated that the data had a normal distribution.

7.2 *Autocorrelation*, which was based on the Durbin-Watson statistics – The test results showed the statistical value of 1.71, which was near 2. This indicated no autocorrelation (Montgomery et al., 2001).

7.3 *Multicollinearity*, which was based on the Collinearity Diagnostics statistics – The test results showed that the tolerance values of all the variables ranged from .39 to .83, which was greater than .01 and that the VIF (variance inflation factor) values ranged from 1.20 to 2.50, which was less than 10. Both parts of data revealed that the variables in the model had no issue of the relationship among the variables at a high level (Meyers et al., 2013).

8. Data Analysis

8.1 *Descriptive analysis* – Descriptive analysis on the samples was conducted by means of descriptive statistics, using the SPSS program to describe their characteristics and national park visit behavior and to classify data associated with visitor compliance behavior.

8.2 *Hypotheses testing* – This aimed to investigate the consistency of the hypothesis model through the analysis of the structural equation model using the LISREL 8.80 program. The statistical criteria were as follows: 1) The chi-square must have a *p*-value greater than 0.05; 2) The RMSEA must be lower 0.05; 3) The GFI must be greater than 0.95; and 4) The AGFI must be greater than 0.95 (Suksawang, 2013).

Results and Discussions

1. Visitors' Background and National Park Visit Behavior

Most of the samples were female (53.2%), aged 21-30 years (40.0%), and held a bachelors' degree (55.6%). Most of them were students (28.8%), followed by company employees (25.0%). They mostly came from provinces that were not home to the national parks that comprised the study areas (71.6%). Most of them had visited the one of the studied national parks (56.8%). Most of them stayed overnight in one of the studied national parks for one night (95.8%).

2. Visitors' Compliance Behavior

The analysis results revealed that most visitors (67.0%) complied with the regulations at a high level, and the minority (33%) complied with the regulations at a low level. The results of the visitor compliance behavior survey through 20 question items, composed of 16 negative-behavior question items and four positive-behavior question items, found that their top three negative behaviors were: taking selfie photos and making loud noise while walks along natural trails (33.4%), buying food packed in styrofoam containers for a picnic (31.2%), and taking cooking utensils outside of the campsite for convenience (24.8%). Their positive behaviors were: separating waste and disposing of it in a separate bin provided (75.6%), putting waste into a bag and disposing of it outside the national park area (70.8%), avoiding using plastic bottles or plastic bags as food containers (58.8%), and bringing food containers made with natural materials (51.0%), as shown in table 1.

Table 1: Number and Percentage of Visitors Classified by Compliance Behaviors

n = 500

Behavior	I have done it.		I've never done it.	
	Number	%	Number	%
1. Buying food packed in styrofoam containers for a picnic. (-)	156	31.2	334	68.8
2. Eating and drinking alcoholic beverages as part of a group party. (-)	93	18.6	407	81.4
3. Bringing a weapon for protection in case of unexpected incidents. (-)	40	8.0	460	92.0
4. Using chemicals for repelling ants or other insects at the campsite. (-)	57	11.4	443	88.6

Table 1: (Continued)

Behavior	I have done it.		I've never done it.	
	Number	**%**	**Number**	**%**
5. Avoiding using plastic bottles or plastic bags as food containers. (+)	294	58.8	206	41.2
6. Bringing food containers made with natural materials. (+)	255	51.0	245	49.0
7. Bringing pets to expose them to natural surroundings. (-)	49	9.8	451	90.2
9. Taking cooking utensils outside of the campsite for convenience. (-)	124	24.8	376	75.2
10. Washing containers and utensils beside the campsite. (-)	100	20.0	400	80.0
11. Playing music, singing, and playing the guitar at the campsite. (-)	94	18.8	406	81.2
12. Taking selfie photos and making loud noise while walks along natural trails. (-)	167	33.4	333	66.6
13. Using dried branches or twigs to make a fire for cooking or creating a boisterous atmosphere. (-)	63	12.6	437	87.4
14. Feeding wild animals or fish in water bodies for fun. (-)	104	20.8	396	79.2
15. Picking beautiful flowers, leaves, stones, or forest products as souvenirs. (-)	44	8.8	456	91.2
16. Going off-trail hiking to get closer to natural surroundings. (-)	76	15.2	424	84.8

Table 1: (Continued)

Behavior	I have done it.		I've never done it.	
	Number	**%**	**Number**	**%**
17. Engraving a tree to symbolize your visit (-)	30	6.0	470	94.0
18. Disposing of food waste or other waste in a spot that is not a trash bin because the bin is placed too far away. (-)	37	7.4	463	92.6
19. Separating waste and disposing of it in a separate bin provided. (+)	122	25.0	378	75.0
20. Putting waste into a bag and disposing of it outside the national park area. (+)	146	70.8	354	29.2

Note. (+) *Positive question*, (-) *Negative question.*

3. Correlation among the Variables

The analysis of correlation coefficients among the variables was based on the Pearson's correlation coefficient, which aimed to analyze the relationship between the antecedent variables and outcome variables. The analysis demonstrated that knowledge of regulation (KOR), legal sanctions (LST), legitimacy (LEG), injunctive social norm (ISN), personal morality (MOR), awareness of regulation compliance (ARC), and perceived environmental problem (PEP) had a significant positive relationship with the intention to comply (INC) (r = 0.23, 0.22, 0.26, 0.64, 0.63, 0.62, 0.34, respectively). It also revealed that the intention to comply (INC) had a significant positive relationship with visitor compliance (VCP) (r = 0.31), which indicated that the antecedent variables had a positive relationship with the intention to comply and visitor compliance, as shown in table 2

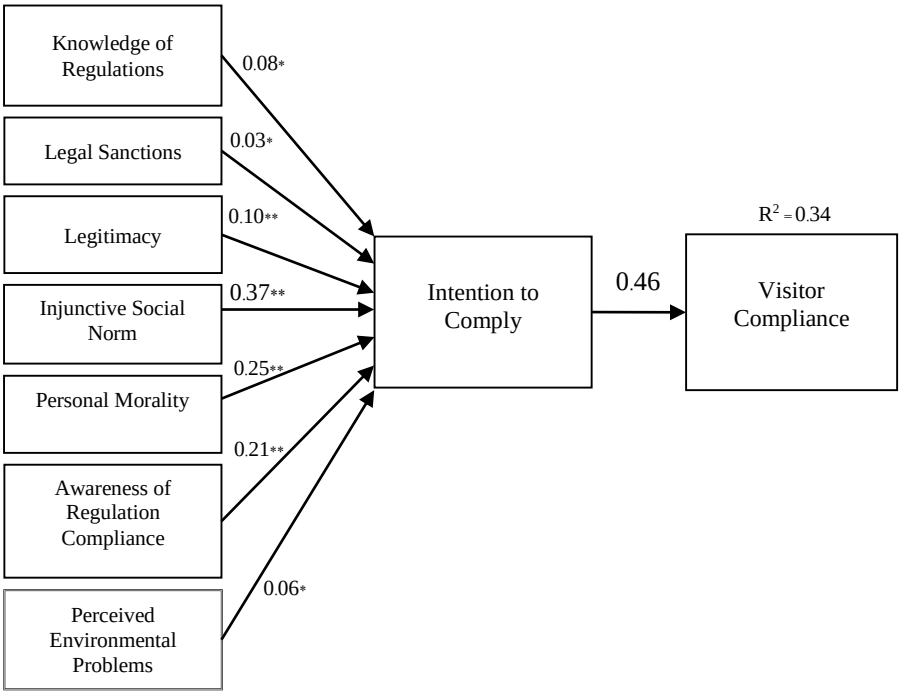
Table 2: Inter-Correlations and Descriptive Statistics of Variables in the Study

Variables	**Mean**	***SD***	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
INC	5.25	0.76	1								
VCP	18.85	3.12	0.31**	1							
KOR	7.90	2.21	0.23**	0.34**	1						
LST	4.52	1.00	0.22**	0.42	-0.06	1					
LEG	4.06	1.10	0.26**	0.28**	0.35**	-0.20**	1				
ISN	5.06	0.91	0.64**	0.25**	0.10*	0.25**	0.12**	1			
MOR	5.31	0.67	0.63**	0.24**	0.22**	0.27**	0.22**	0.45**	1		
ARC	5.32	0.73	0.62**	0.25**	.27**	0.19**	0.29**	0.44**	0.66**	1	
PEP	4.70	0.94	0.34**	0.11*	0.07	.30**	-0.04	0.30**	0.32**	0.35*	1

*Note. *p<.05, ** p < .01.*

4. Results of the Causal Relationship Model Analysis

The analysis of the path model of visitor compliance behavior revealed that the model was consistent with empirical data at an acceptable level. This was evidenced through a chi-square (χ^2) of 42.00, a probability (*p*) of 0.06, a degree of freedom (*df*) of 29, a goodness of fit index (GFI) of 0.98, an adjusted goodness of fit index (AGFI) of 0.97, a comparative fit index (CFI) of 0.99, a standard root mean square residual (SRMR) of 0.04, and a root mean square error of approximation (RMSEA) of 0.03. The coefficient of prediction of the dependent variables and visitor compliance behavior was 0.34, which displayed that all variables in the model could jointly explain the variance of visitor compliance behavior by 34%, as presented in figure 1.



Note. ** *p = .01,* * *p < .05.*

Figure 1: A Path Model of Visitor's Regulation Compliance in Thailand's National Park.

The path analysis conducted on variables in the model demonstrated that the intention to comply had a direct positive effect on visitor compliance behavior at a level of 0.46, at a statistical significance level of 0.01. A path analysis conducted on variables affecting the intention to comply revealed that all the variables had a direct positive effect i.e. the injunctive social norm, at a level of 0.37 (p = 0.01), personal morality, 0.25 (p = 0.01), awareness of regulation compliance, 0.21 (p = 0.01), legitimacy, 0.10 (p = 0.01), knowledge of regulations, 0.08 (p<0.05), perceived environmental problems, 0.06 (p<0.05), and legal sanctions, 0.03 (p<0.05), and, as presented in figure 1.

Based on the analysis results, it can be explained that visitors' intention to comply had a direct positive effect on visitor compliance behavior at a statistical significance level. This revealed that if visitors have a high level of intention to comply, they will be more likely to comply with national park regulations. The study results are in line with the results of other relevant studies, which found that visitors' intention to comply with national park regulations has a direct effect on actual behavior (Brown et al., 2010; Goh, 2015; Lawhon et al, 2013; Vagias, et al., 2014). In addition, it was consistent with the Theory of Planned Behavior, which explains that the central factor that determines individual behavior is intention – the more determined individuals are to implement a behavior, the more likely they will implement it (Ajzen, 1988).

The seven causal variables had a direct positive effect on visitors' intention to comply at a statistical significance level. The effect of the injunctive social norm was the greatest, which showed that national park visitors' perception of injunctive social norm resulted in their compliance behavior. The study results were consistent with the meta-analysis results. It was found that the effect size of norm-related factors on protected area users' regulation compliance was significant (r = 0.90). It was also consistent with results of other relevant researches, which have confirmed that the perceived injunctive social norm has an effect on visitor compliance behavior (Cialdini et al., 2006; Jafarpour, 2015; Winter, 2006).

The situational factor in the research model was legal sanctions, which had a low effect on the intention to comply and visitor compliance behavior. This was consistent with the analysis results, which found that most visitors' perceived legal sanctions was at a moderate level. In this research, to measure

the perceived legal sanctions was to measure the perceived severity of legal sanctions and the risk of legal sanctions in case of regulation violation. The results showed that most visitors perceived that legal sanctions were not serious enough or law enforcement was not strict enough to create fear among visitors or the feeling that they are at risk of legal sanctions, which can lead to their regulation compliance.

5. Hypothesis Test Results

The results of testing the causal relationship between related factors were consistent with the hypotheses, as follows:

1. Knowledge of regulations had a direct positive effect on the intention to comply at a level of 0.08 (p<0.05) and had an indirect effect on the compliance behavior through the intention to comply at a level of 0.04 (p<0.05), which was consistent with the hypothesis.

2. Legal sanctions had a direct positive effect on the intention to comply at a level of 0.03 (p<0.05) and had an indirect effect on the compliance behavior through the intention to comply at a level of 0.02 (p<0.05), which was consistent with the hypothesis.

3. Legitimacy had a direct positive effect on the intention to comply at a level of 0.10 (p = 0.01) and had an indirect effect on the compliance behavior through the intention to comply at a level of 0.05 (p = 0.01), which was consistent with the hypothesis.

4. Injunctive social norm had a direct positive effect on the intention to comply at a level of 0.37 (p = 0.01) and had an indirect effect on the compliance behavior through the intention to comply at a level of 0.17 (p = 0.01), which was consistent with the hypothesis

5. Personal morality had a direct positive effect on the intention to comply at a level of 0.25 (p = 0.01) and had an indirect effect on the compliance behavior through the intention to comply at a level of 0.11 (p = 0.01), which was consistent with the hypothesis.

6. Awareness of regulation compliance had a direct positive effect on the intention to comply at a level of 0.21 (p = 0.01) and had an indirect effect on the compliance behavior through the intention to comply at a level of 0.09 (p = 0.01), which was consistent with the hypothesis.

7. Perceived environmental problems had a direct positive effect on the intention to comply at a level of 0.06 (p<0.05) and had an indirect effect on the compliance behavior through the intention to comply at a level of 0.03 (p<0.05), which was consistent with the hypothesis.

8. Intention to comply had a direct positive effect on compliance behavior at 0.46 (p = 0.01), which was consistent with the hypothesis.

Table 3: Direct Effect, Indirect Effect, and Total Effect of the Path Model of Causal Relationships between Visitor Compliance, Intention to Comply and Related Factors

Causal Variables	INC			VCP		
	Direct Effect	**Indirect Effect**	**Total Effect**	**Direct Effect**	**Indirect Effect**	**Total Effect**
KOR	0.08*	-	0.08*	-	0.04*	-
LST	0.03*	-	0.03*	-	0.02*	-
LEG	0.10**	-	0.10**	-	0.05**	-
ISN	0.37**	-	0.37**	-	0.17**	-
MOR	0.25**	-	0.25**	-	0.11**	-
ARC	0.21**	-	0.21**	-	0.09**	-
PEP	0.06*	-	0.06*	-	0.03*	-
INC	-	-	-	0.46**	-	0.46**

*Note. ** $p = 0.01$, * $p < 0.05$.*

KOR = Knowledge of regulations
LST = Legal sanctions
LEG = Legitimacy
ISN = Injunctive social norm
MOR = Personal morality
ARC = Awareness of regulation compliance
PEP = Perceived environmental problems
INC = Intention to comply
VCP = Visitor compliance

Conclusion

This research aimed to validate a path model of cognitive factors, situational factors, the intention to comply, and visitor compliance behavior and identify factors that have direct and indirect influence on visitor compliance behavior. The samples of this research were 500 Thai visitors who engaged in recreational activities and stayed overnight at one of the following national parks – Khao Yai National Park, Kaeng Krachan National Park, Chae Son National Park, Nam Tok Phlio National Park, and Khao Luang National Park.The development of the path model involved synthesizing research in Thailand and foreign countries to classify factors associated with protected area users' regulation compliance and estimating the effect size of related factors using meta-analysis. Based on those factors, the path model was developed. The consistency between the model and empirical data was examined, which showed that the causal factors pertaining to visitor compliance behavior was consistent with empirical data.

The analysis of the path model revealed that the injunctive social norm, awareness of regulation compliance, knowledge of national park regulations, legitimacy, personal morality, legal sanctions, and perceived environmental problems in national parks had a direct positive effect on the intention to comply and had an indirect positive effect on visitor compliance behavior through the intention to comply. In addition, it manifested that intention to comply could predict visitor compliance behavior.

A key recommendation for national park management is the development of persuasive communication strategies and interpretive media to communicate with visitors to ensure their awareness that they should comply with national park regulations; and the development of injunctive social norm. As for situational factors, park managers should attach great importance to development of a regulation enforcement standard. For example, they should schedule inspections at areas where visitors conduct recreational activities or they should randomly check the behavior of visitors in order to create situations that result in them being aware of the risk of legal sanctions in the case of a regulatory breach. This will deter visitors' regulation noncompliance. Overall, this research revealed a contribution of behavioral science to natural resource recreation management in

Thailand's national parks. Future research on park visitors, thus, should search for in-depth analysis on behavioral variables and apply the results to the management in the real situation.

References

Ajzen, I. (1988) *Attitudes, Personality, and Behavior*. Chicago: Dorsey Press.

Brashares, J. S., Abrahms, B., Hojnowski, C., Marsh, R., McCauley, D., Nunez, T., Seto, K., and Withey, L. (2014) Wildlife declines and social conflict. *Science* 345: 376-378.

Bronfenbrenner, U. (1979) *The Ecology of Human Development: Experiments by Nature and Design*. Cambridge. MA: Harvard University Press.

Brown T. J., Ham, S. H., and Hughes, M. (2010) Picking up litter: An application of theory-based communication to influence tourist behaviour in protected areas. *Journal of Sustainable Tourism* 18(7): 879-900.

Cialdini, R. B., Demaine L. J., Sagarin, B. J., Barrett, D.W., Rhoads, K., and Winter, P.L. (2006) Managing social norms for persuasive impact. *Social Influence* 1(1): 3-15.

Crocker, L., and Algina, J. (1986) *Introduction to Classical and Modern Test Theory.* New York: Holt, Rinehart and Winston.

Cronbach, L. J. (1951) Coefficient alpha and the internal structure of tests. *Psychometrika* 6: 297-334.

Department of National Parks, Wildlife and Plant Conservation (2017) *Statistics for Tourists in National Parks Fiscal Year 2555-2559*. [Online URL: www.dnp.go.th/NPRD/develop/data/stat59/5year_59.pdf] accessed on March 10, 2017.

Faul, F., Erdfelderan, E., Lang, A. G. and Buchner, A. (2007) G*power 3: a flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods* 39(2): 175-191.

Fischer, L., and Wiswede, G. (1997) *Grundlagen der Sozialpsychologie*. München: Oldenbourg.

Fredman, P., Romild, U., Emmelin, L. and Yuan, M. (2009) Non-compliance with on-site data collection in outdoor recreation monitoring. *Visitor Studies* 12(2): 164-181.

Goh, E. (2015) *Understanding non-compliance in national parks: An extension of the theory of planned behavior*. Ph.D. Thesis: University of Queensland.

Gramann, J. H., Bonifeld, R. L., and Kim, Y. (1995) Effect of personality and situational factors on intentions to obey rules in outdoor recreation areas. *Journal of Leisure Research* 27(4): 326-343.

Guilford, J. P., and Fruchter, B. (1988) *Fundamental Statistics in Psychology and Education*. McGraw Hill New Delhi: ISE.

Hedges, L. V., and Olkin, I. (1985) *Statistical Methods for Meta-Analysis*. Florida: Academic Press.

Jafarpour, M. (2016) Comparative Influence of Social Norms on Tourist Behaviour in Wildlife. *UMP-SAGE Publications Young Writer's Award 2015* 176-190.

Jantowat, H., Phongkhieo, N. T., and Kaitpraneet. S. (2011) Responses toward Regulations and Recreational User Management Measures of Visitors to Doi Suthep-Pui National Park, Chiang Mai Province. *Thai Journal of Forestry* 30(2): 39-47.

Jarungphan, K. (2001) *Nonconforming behaviors of visitors to national park: A case study of Erawan National Park, Kanchanaburi province*. Master's thesis. Kasetsart University.

Johnson, D. R., and Vande Kamp, M. E. (1996) Extent and control of resource damage due to noncompliant visitor behavior: A case study from the US National Parks. *Natural Areas Journal* 16(2):131-141.

Lawhon, B., Newman, P. Taff, D., Vaske, J., Vagias, W. M., Lawson, S., and Monz, C. (2013) Factors influencing behavioral intentions for leave no trace behavior in national parks. *Journal of Interpretation Research* 18(1): 23-38.

Loakaewnoo, T., Phumsathan, S. and Phongkhieo, N.T. (2015) Environmental awareness of visitors to Erawan National Park, Kanchanaburi province. *Kasetsart Journal of Social Sciences* 36: 34-46.

Luanchawee, L. (2004) *Legal Measures for the Management of Ecotourism Resources: Specifically the Case of National Parks.* Bangkok: Faculty of Law Pridi Banomyong, Dhurakij Pundit University.

Manning, R. E., and Anderson, L. E. (2012) *Managing Outdoor Recreation: Case Studies in the National Parks*. New York: CABI.

Meyers, L.S., Gamst, G., and Guarino, A.J. (2013) *Applied Multivariate Research: Design and Interpretation*, 2nd ed., Thousand Oaks. CA: Sage Publications.

Montgomery, D.C., Peck, E.A., and Vining, C.G. (2001) *Introduction to Linear Regression Analysis*, 3rd ed., New York: John Wiley and Sons Inc.

Piyapimonsit, C. (2005) *Using SPSS for Data Analysis*, 5th ed., Songkhla: Thaksin University.

Poolsawat, A. (2013) *Normative behaviors in recreation settings of Thai and foreign visitors to national park: A case study of Khao Yai National Park*. Master's thesis. Kasetsart University.

Rovinelli, R. J., and Hambleton, R. K. (1977) On the use of content specialists in the assessment of criterion-referenced test item validity. *Dutch Journal of Educational Research* 2: 49-60.

Rueangsut, A. (2015) *Deviant behaviors of visitors to Khao Yai National Park*. Master's thesis. Kasetsart University.

Solomon, J. N., Michael, C. V., and Meredith, L. G. (2015) Detecting and understanding non-compliance with conservation rules *Biological Conservation* 189: 1-4.

Statista. (2017) *Number of Recreational Visitors to National Park Service sites from 2008 to 2017*. [Online URL: www.statista.com/statistics/206820 /number-of-visitors-to-national-park-service-sites-since-2010.] accessed on March 10, 2017.

Suksawang, P. (2013) *Structural Equation Modeling*. Bangkok: Thai Watana Panich Printing House.

Timothy, R. M. (2003) Regulation, compliance, and the firm. *Temple Law Review* 76: 451.

Vagias, W. M., Powell, R. B., Moore, D.D., and Wright, B.A. (2014) Predicting behavioral intentions to comply with recommended leave no trace practices. *Leisure Sciences* 00: 1-19.

Ward, C., and Roggenbuck, J. (2003) Understanding park visitor's responses to interventions to reduce petrified wood theft. *Journal of Interpretation Research* 8(1): 67-82.

Winter, P.L. (2006) The impact of normative message types on off-trail hiking. *Journal of Interpretation Research* 11 (1): 35-52.

Young, O.R. (1979) Compliance and public authority. *A Theory with Practical International Applications*, Baltimore and London: John Hopkins University Press.