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PERCEPTIONS OF THE HABITAT EVALUATION PROCEDURES: A SURVEY OF WILDLIFE PROFESSIONALS

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ABSTRACT

1. This study surveyed baseline information on perceptions and attitudes of wildlife professionals towards the Habitat Evaluation Procedures (HEP). 2. Responses were solicited from all 50 states, 21 U.S. Fish and Wildlife Service Refuges and 10 U.S. Forest Service headquarters, with little difference in opinions between the groups towards HEP. 3. Perceived problems included a lack of data for non-game species (and thus for non-game models), extensive training, significant agency effort and resources used, and a lack of a link between model results and animal densities. 4. Perceived benefits included a general acceptance of the procedure, and a belief that results were accurate and reliable.

INTRODUCTION

The U.S. Fish and Wildlife Services' Habitat Evaluation Procedures (HEP) (USFWS 1980) is developing into an important tool in wildlife management. From its conceptual start as a simple method used to assess the effects of water development activities (Daniel and Lamaire 1974), HEP models have become widespread, not only in the original context of offering comparative ranking for alternative management strategies, but increasingly as a species habitat assessment tool. Other agencies have developed similar tools; the U.S. Forest Service (FS) has its unique

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habitat assessment model (Wildlife and Fish Habitat Relationship Program) as has the Corps of Engineers (Habitat Evaluation System). Although HEP is in general use, little is known about the attitudes towards HEP of those biologists which commonly utilize the system. It is the state fish and game biologists, the Fish and Wildlife Service managers, as well as other state and federal biologists who work closely with HEP and are most familiar with the strengths and weaknesses of the system. It was of interest, therefore, to assess the attitudes and perceptions of HEP users towards the most widespread system of wildlife habitat evaluation currently in use.

METHODS

A 10-point Likert-scale survey (1=strongly disagree, 10=strongly agree) was designed following principles outlined in Berdie et al. (1986). Questions were framed to determine perceptions of HEP in general, as well as assumptions upon which HEP rests (Table 1). In an attempt to survey a wide array of potential users of HEP, the survey was sent to heads of wildlife sections in all 50 states (STATES), 10 regional U.S. Forest Service (FS) headquarters, and 21 U.S. Fish and Wildlife Service (FWS) refuges. The survey consisted of 3 separate mailings, each approximately 5 weeks apart. A follow-up letter accompanied the second and third mailings. Due to duplication of responses from 2 STATES and 2 FS offices (different people responded to initial and follow-up questionnaires) and to an unsolicited response from a FWS employee, final possible survey responses totaled 84. Of these, 80 were returned, for an overall return rate of 95%. From these 80, 75 were usable (the rest declined to answer the survey, thus lowering functional return rate to 89%).

Initial sections of the survey consisted of several questions designed to determine group agency and agency use characteristics (cf. Appendix A). No attempt was made to specifically identify the 'rank' of the respondent, i.e., field biologist vs. agency administrator, and this may have introduced some variability into the results. However, voluntary responses, especially in the open comment section, suggested that many of the respondents were actively involved using HEP.

The remainder of the survey was a 10-point Likert scale. We tested mean overall response values against a theoretical non-committal response of 5.5 using a 2-tailed z-test, with an alpha equal to 0.05. If mean response was not significantly different, then results from the entire sample were viewed as neutral towards that question, resulting in no further analysis. If response values differed from 5.5, we used the Kruskal-Wallis ANOVA test to look for differences in response among the 3 groups (STATES, FWS, and FS). For those questions where ANOVA indicated a difference, t-tests were used to test for significance (alpha=0.05) between group means.

RESULTS AND DISCUSSION

Of total agency responses (n=75) (c.f. Appendix A), 50 (67%) were returned by state agencies, 15 (20%) were returned by FWS refuge biologists, and 10 (13%) by FS officials. Survey return rates varied by group with 49 of 50 states responding (98%), 18 of 22 refuges (82%), and 9 of 10 FS offices (90%).

Overall, 53 respondents (71%) said their organization used HEP in some form.

Use of HEP did not exclude use of some other formal method of habitat evaluation. Forty-nine of 75 respondents (65%) replied to the questions concerning additional methods; 27 (55%) did use another method, while 22 (44%) did not. Assuming no response meant no use of additional methods, then 26 of 75 (35%) responding agencies relied solely on HEP for evaluation needs. Of those which did not use HEP (n=22), 6 (27%) did use another formal method for evaluating wildlife habitat (type unknown). Thus, 16 of 75 respondents (21%) indicated that their agency did not use any formal method of evaluating wildlife habitat, including HEP.

Of those responding that their agency used HEP, twenty-one percent had been using HEP for the last 3 years, 47% for 4-7 years, and 33% for 8 years or more. Mean length of time an agency had been using HEP was 6.05 years (SD=2.75 years) with no significant differences among the 3 response groups.

The biologists as a group felt that HEP either was, or would be, a useful tool for their agency (Question 1 (Q.1), see Table 1 for all mean response values), with a significant difference among the 3 groups (P=0.0036). Although both STATES and the FWS indicated positive attitudes, the FWS was more so (P=0.0156). The FS and the STATES also differed (P=0.0148), with a perceptual difference between the FWS and the FS as well (P=0.0002). As evidence for the utility of HEP, 7 respondents indicated that their agency (e.g. Pennsylvania Game Commission) either used HEP to form a shorter version, or used its principles to create their own system. [Others in this group included the states of Arkansas, Colorado, Idaho, New York, and two Forest Service Regions (Alaska, Colorado).]

In a related question (Q.21), the biologists felt that use of HEP should be continued within their unit. Group response was neutral when asked if their agency expected to use HEP regularly in the future (Q.20).

The FWS conducts several training sessions annually to instruct biologists on proper use of HEP. We thus asked whether use of HEP required extensive formal training (Q.2). Overall, biologists felt this to be true. A related question asked whether a qualified wildlife biologist would provide a more accurate evaluation than HEP (Q.3). The total response was non-committal.

As HSI models are largely based upon data gathered from literature sources, we wished to determine whether biologists felt enough data were available for adequate model building. The entire group agreed that data were plentiful for game species (Q.18), but disagreed with the assertion that data were plentiful for non-game species (Q.19). There was strong agreement with a statement (Q.14) that model development to date did not adequately cover all groups of animals. Several individuals dissented with the validity of the models in general. One state biologist noted, "HSI models in many cases are nonsense, because they were developed with the attitude that the literature contains everything you need for such a model."

Published validations of HSI models have been scant (e.g., Lancia et al. 1982, Cole and Smith 1983, Bart et al. 1984). Published models generally rely upon use of species authorities, with little or no field validation trials (e.g., Allen 1982, Hamilton and Nelson 1984, Rorabaugh and Zwank 1983). The surveyed biologists strongly agreed that HEP had not been widely validated for accuracy of results (Q.7), yet they did feel that species authorities give accurate model validations (Q.13). A significant minority opinion was evident, however. One state biologist said, ". . . the HSI models . . . were never adequately field-tested and improved to the point where our agency has sufficient trust in the results of using HSI models for land use

planning." A FS respondent replied, "Just because species experts review models does not enhance the credibility to any great degree." All 3 groups strongly agreed that resource agencies should be involved with model validation efforts (Q.17). This seems to indicate that while species authorities may be appropriate for initial model development and verification, models are still seen as lacking validity until field tested.

Due to apparent controversy over perceived relationships between animal population densities and habitat suitability (e.g., Van Horne 1983), we queried the biologists to determine whether they felt a positive relationship to hold true (Q.9). The response was significantly positive although there was concern over lack of a definitive link between HSI model results and densities. Said one FS biologist, "Critical issues are . . . disclosure of expected relationships between HSI scores and animal density . . ." Another FS biologist felt that it would be difficult to "transcend the chasm between suitability index values and estimates of animal numbers." Whether or not HEP was designed to estimate animal numbers from the Habitat Suitability Index (it was not, 101 ESM, Sect. 4.4, USFWS 1980) seems irrelevant to some HEP users. Many seem to feel some link should exist and HEP was not much help in establishing a desired relationship in field situations.

We also asked if HSI models inaccurately reflected species-habitat relationships (Q.8). The group disagreed, feeling that HSI models were accurate. All 3 agency respondents felt HSI models adequately integrated habitat variables into one final evaluation result (Q.11).

Several questions sought general views on HEP. Overall response was neutral when asked if HEP was widely used by both federal and state agencies (Q.4). This was somewhat surprising. The impression given is that although a particular agency may use HEP regularly, they had no real notion if others did as well.

Group response was again neutral to the question of whether HEP provided a fast evaluation result (Q.5), however, the biologists agreed that HEP provided a reliable evaluation result (Q.6). There were significant differences among the 3 groups on this question (P=0.0086). The FWS more strongly agreed with this question than did the STATES (P=0.0499), who in turn agreed more strongly than did the FS (P=0.0355). Consequently, the FWS and the FS also differed (P=0.0034). It would seem that HEP is viewed as a reliable, though not necessarily fast, procedure.

The group was asked whether HEP models were easily used in field evaluations (Q.10), and the overall response did not differ from neutral. However, the biologists felt strongly that HEP had to be modified for local conditions (Q.16). The response was neutral when asked if extensive modifications were necessary (Q.12). Although HEP was designed to allow for local modifications of HSI models, most states operate under a limited time frame, thus forcing them either to use valuable time for modification or to make inadequate changes. Thus, the ability to modify HSI models for local conditions could prove to be a negative factor under some time constraints. We also wondered whether data necessary for implementation of HEP, even without model modification, were easily collected within agency time constraints (Q.15). The responding biologists felt not. A FS biologist noted, "Our problem is that HEP is too data intensive. We do not often have the time to collect the required data." Many STATES generally agreed with this view. Other respondents indicated that, while not a panacea, HEP was the best option currently

available. One state biologist remarked, "Although we have heard criticisms of HEP, we are generally pleased with the results of its use, and feel it is the best tool we have available to us at this time!"

SUMMARY

This survey served to evaluate initial perceptions and opinions from biologists who use the Habitat Evaluation Procedures (HEP). Likert-type surveys were sent to all 50 states, 21 U.S. Fish and Wildlife Service refuges, and 10 U.S. Forest Service regional headquarters. HEP has been accepted for use in many locations and under varying circumstances and is viewed as a valuable tool in wildlife and resource management. It is used by state and federal agencies alike and there appear to be few differences in opinion between the three surveyed groups about several aspects of HEP. Perceived problems identified through this survey include the need for extensive training, a lack of data for non-game species for constructing models, as well as a general lack of models for many animal groups. Species authority validation as an initial step was seen as acceptable, although field tests were seen as necessary, along with agency participation in the process. HEP was seen as taking significant effort and resources relative to agency time constraints, but was also seen to provide an accurate evaluation result. Biologists felt some definitive link between animal densities and habitat suitability needs to be established.

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Table 1. Mean response values, on a 10-point Likert scale, by state fish and wildlife agencies (STATE), the U.S Fish and Wildlife Service (FWS), and the U.S. Forest Service (FS).

Question	Overall[a]	Sig.[b]	STATE	FWS	FS
1. HEP is or would be a useful tool for my agency.	6.97 2.19	*	6.96 2.20	8.45 1.13	5.22 1.92
2. Use of HEP requires extensive formal training.	6.64 2.35	*	7.04 2.38	5.55 1.15	6.00 2.67
3. A qualified wildlife biologist would provide a more accurate habitat evaluation than would HEP.	5.24 2.40		5.23 2.42	4.80 2.74	5.88 1.96
4. HEP is widely used in resource agencies (Federal and State) throughout the United States.	5.24 2.14		5.13 2.04	3.80 1.79	6.63 2.20
5. HEP does not provide a fast evaluation result.	5.87 2.84		6.13 2.83	5.25 2.71	5.00 3.12
6. HEP provides a reliable evaluation result.	6.68 2.29	*	6.71 2.28	8.13 1.81	5.22 1.99
7. HEP has been widely validated for accuracy of results.	3.54 2.17	*	3.75 2.31	3.83 2.23	2.38 0.92
8. HEP Habitat Suitability Index (HSI) models generally are not an accurate reflection of species-habitat relationships.	4.27 2.24	*	4.44 2.29	3.82 1.94	4.00 2.40
9. Wildlife population densities generally are directly related to habitat suitability.	7.23 2.39	*	7.32 2.40	7.64 1.98	6.20 2.82
10. HEP models are easily used in field evaluations.	6.03 2.25		5.91 2.34	6.44 2.13	6.25 2.05
11. HSI models adequately integrate habitat variables into one final result.	6.21 2.33	*	6.24 2.22	6.36 2.42	5.90 2.96
12. HEP requires extensive modification to make it a useful technique.	5.66 2.69		5.84 2.75	4.88 2.70	5.43 2.44
13. Use of recognized authorities on each species provides accurate HSI model validation.	6.23 2.47	*	5.96 2.58	7.20 1.99	6.50 2.27
14. Model development to date does not adequately cover all groups of animals.	8.25 1.99	*	8.20 2.08	8.00 2.11	9.00 1.00
15. Data necessary to implement HEP are easily collected within time constraints of my agency.	4.36 2.42	*	4.30 2.40	4.44 2.46	4.50 2.73
16. HEP models must often be modified to satisfy local conditions.	8.27 1.84	*	8.14 2.09	8.13 0.99	9.00 0.82

Table 1. (Continued)

Question	Overall[a]	Sig.[b]	STATE	FWS	FS
17. Resource agencies should be involved with validating HEP models.	8.42 1.79	*	8.47 1.66	8.58 1.44	8.00 2.67
18. Data on habitat relationships are plentiful for game species.	6.56 2.41	*	6.57 2.39	7.45 1.13	5.50 3.21
19. Data on habitat relationships are plentiful for non-game species.	3.16 1.90	*	3.28 1.91	3.25 1.86	2.50 1.96
20. My agency expects to use HEP on a regular basis for the foreseeable future.	5.05 3.04		5.05 3.12	6.09 2.91	3.78 2.54
21. Use of the Habitat Evaluation Procedures should be discontinued in my agency.	2.75 2.31	*	2.85 2.49	2.80 2.15	2.00 1.15

[a]Values arranged as mean (top) and standard deviation (bottom).
[b]Indicates a significant difference between overall mean and 5.5 (neutral).

Appendix A. Questions asked of potential Habitat Evaluation Procedures (HEP) users to determine group affiliation and agency characteristics.

1. What resource agency do you represent? (State or Federal)
   (Response as % of survey mailed): FWS 71 FS 90 STATE 98

2. Does your agency use the U.S. Fish and Wildlife Services' Habitat Evaluation Procedures (HEP) in any form?
   (Respondents [n = 75]: YES = 53 NO = 22)

3. Does your agency use any formal standardized methods for evaluation of wildlife habitat quality? If so, what method is used?
   (Respondents to initial question: YES = 59 NO = 16)

4. How long has your agency been using HEP?
   (last 3 years: 11 4-7 years: 25 >8 years: 17)

5. Has your agency ever used any other standardized evaluation methods in conjunction with HEP or by itself? If so, which methods have been used?
   (Respondents to initial question: YES = 27 NO = 22 NA = 26)