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A needs assessment for continuing education of federal wildlife damage management professionals

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Abstract: The complexity of wildlife damage management requires professionals to continually acquire new knowledge and skills that can be obtained through continuing education. Current literature suggests that wildlife damage management personnel are not receiving adequate training either as new professionals entering the field or through continuing training as existing professionals. To better understand the continuing education needs of wildlife damage managers, we conducted a nationwide, on-line needs assessment survey for supervisory personnel of the U.S. Department of Agriculture, Animal and Plant Health Inspection Service, Wildlife Services program (hereafter, WS). The goal of our survey was to identify gaps in continuing education and provide the basis for developing effective, appropriate, and on-going educational programs within the agency. Our survey specifically addressed the availability and importance of several topical categories, the use and desirability of different training delivery methods, and potential barriers to receiving training. Our findings indicate that human dimensions-related topics are the least available of essential training needs for WS employees. Our findings indicate that training needs for wildlife damage management professionals should be addressed at 2 levels: skills required by all personnel, such as communication skills, and skills needed by personnel on a program-specific basis, such as chemical immobilization and euthanasia. Designing training programs around this type of distinctive approach will enable employees to become better equipped for the needs of the profession, as well as their particular job function.

Key Words: continuing education, human dimensions, human–wildlife conflicts, needs assessment, professional development, wildlife damage management

Urbanization, advancing technologies, invasive species, land-use changes, and shifting public values have greatly expanded the traditional responsibilities of wildlife damage management professionals (Berryman 1991, Riley et al. 2002, Miller 2007). In addition to the long-standing role of protecting agriculture, the scope of wildlife damage management has broadened to include such issues as mitigation of human–wildlife conflicts, urban wildlife management, disease control and monitoring, bird–aviation collision prevention, public education, and others. To adequately address the increasing demands and complexity of this profession, expertise in a broad range of disciplines is required. Often, wildlife damage management professionals need skills and knowledge that are beyond the level of conventional wildlife education. Continuing education has been considered the most important criterion for building and maintaining proficiency in a dynamic workplace while adapting to the changing needs of society (Matthews 1999, Arthur et al. 2003).

Johannessen and Olsen (2003) described continuing education as "the management of knowledge" and the foundation for workplace competence. Continuing education, which often is referred to synonymously with training, encompasses all adult education and training, including post-secondary learning and professional development. It allows for employee development of essential job skills and helps ensure competitiveness and relevance in a transitory culture (Matthews 1999, Johannessen and Olsen 2003). Within the field of wildlife damage management, continuing education provides a context whereby wildlife managers can share experiences, impart skills, solve problems, build knowledge, and prepare for career advancement (Gerber 1998, Ryan and Campa 2000). Furthermore,

continuing education ensures that wildlife damage management professionals stay both current in advancing techniques and proficient in traditional competencies (Curnow 2000, Svedarsky et al. 2008).

Over the past several decades, wildlife damage management leaders increasingly have expressed the importance of continuing education in meeting the growing biological and societal needs within the profession (Timm 1985, Conover et al. 1991, Berryman 1994, Curnow 2000, Miller 2007). J. Berryman (1966) predicted that animal damage control practices would spark controversy in a changing society, warranting a new approach to management activities. Berryman added that future effectiveness and even survival of the wildlife damage management profession rests on a highly-skilled and proactive workforce that only aggressive continuing education can provide (Berryman 1966). Colleagues of Berryman (1991) have since echoed his sentiment for professional development needs with recommendations for integrating continuing education into academic, workplace, and professional societies (Wentz 1979, Timm 1985, Fitchner 1987, Acord 1989, San Julian 1989, Reidinger 1990, Curnow 2000, Miller 2007, Svedarsky et al. 2008). Despite repeated appeals and advocacy for continuing education, wildlife damage management leaders reported that recent graduates of university wildlife programs are not adequately prepared for the variety of tasks performed within the discipline (Curnow 2000, DeLany 2004). Likewise, research indicated that seasoned wildlife damage management employees lacked the skills and technical knowledge to meet future challenges of the profession (Curnow 2000, Svedarsky et al. 2008).

Continuing education stands to play a crucial role in building and maintaining the relevance, credibility, and capacity of agencies and organizations involved in managing wildlife damage. In its 1989 *Strategic Plan for Animal Damage Control*, Animal and Plant Health Inspection Service (APHIS) administration described "failure by the wildlife profession and academic institutions to adequately train wildlife management personnel in the science of wildlife damage management" as a key factor in the erosion of professional and public credibility (Reidinger 1990). Wildlife leaders have offered numerous reasons behind the deficiency in professional performance, including (1) the failure to prepare wildlife students with continuing education throughout their careers, (2) a lack of accountability on the part of wildlife damage administration and individual employees to pursue professional development, and (3) neglect in identification and prioritization of training needs (Berryman 1966, Reidinger 1990, Conover et al. 1991, Brown 2000, Ostrom 2001, DeLany 2004, Miller 2007). While numerous wildlife publications and discussions have been dedicated to the solicitation for undergraduate and staff professional development, few have expounded upon the process to strategically identify and implement continuing education programs (Slate et al. 1992, Ramey et al. 1994).

Identifying and prioritizing continuing education needs for wildlife damage management personnel is complex and challenging (Moore and Dutton 1978, Slate et al. 1992, Ramey et al. 1994). Workplace performance experts recommend a systematic process to ensure that critical needs are addressed first and that selected educational activities contribute to overall performance improvement (Swanson 1987, Sleezer 1993). For complex, dynamic professions such as wildlife damage management, a needs assessment can provide the framework to build relevant, effective, organizationally appropriate continuing education programs for the greatest number of employees possible. It can also offer people in supervisory positions a useful and justifiable foundation to schedule training activities around the greatest needs of their staff. Ultimately, strategic evaluation of educational needs can provide the missing knowledge needed to employ the demands for a more skilled and better-prepared workforce in wildlife damage management.

To better understand the continuing education needs of today's wildlife damage management professional, we conducted a training assessment of leaders within USDA Wildlife Services (WS). Although our survey was limited to WS personnel, their responses are particularly insightful because of their unique position as international leaders in the discipline. As such, we consider their responses to be reflective of the needs of all wildlife

damage management professionals, regardless of their employing agency. Our objectives were to identify continuing education gaps (the difference between current and desired training outcomes) and to locate incongruities between organizational objectives and individual job functions. For the purpose of our needs assessment, we analyzed the importance of varying training topics relative to the availability of training sources for that topic. Results from the needs assessment may provide a context for administrators to establish outcome-based training programs for both their employees and agencies that lead to improved performance through effective and continued development of competencies.

Methods

Survey implementation

During July and August of 2008, we sent online questionnaire links to 174 employees of WS. We identified survey participants to isolate WS employees that had some responsibility for the direct management of employee training. We sent each participant a cover letter outlining the intent of the survey and instructions for completion. Our letter also included notification of survey confidentiality as mandated through the Mississippi State University Board of Institutional Regulation for the protection of human subjects. During the course of the survey, 2 follow-up e-mail reminders were sent to nonrespondents. A thank-you note was incorporated into the survey following the completion of the instrument. This final page also indicated the end of the questionnaire for respondents.

We asked participants categorical questions based upon their position within WS, including their title, region, and time in service at their current position. We also inquired about the number of employees supervised and approximation of time spent monthly on staff training. The second portion of the questionnaire evaluated the importance and availability of 63 training topics under 6 training categories, including animal handling and care, veterinary techniques, chemical toxicants, research and science, field tools and techniques, human dimensions, and miscellaneous issues (Table 1). We employed a 2-part index measure to rate the importance and availability of training. We measured importance by asking: "How important is each of the following [categories] to the jobs of your staff?" Respondents rated importance from "not important" to "very important". We measured availability by asking: "How difficult is it to obtain high-quality training in each of the following areas for your staff?" Respondents rated availability from "not difficult" to "very difficult". The next part of the questionnaire measured the frequency of use and desirability of 9 training delivery modes, such as live workshops, distance learning, self-directed readings, conferences, and retreats. Respondents were also asked to rate the influence of 11 factors (e.g., cost, travel restrictions, training quality, and upper management directives) on the ability of staff to participate in training programs. Throughout the questionnaire, respondents were invited to make open-ended comments about any training issues pertinent to their staff or program.

Data analysis

We achieved an 80% response rate, with a total of 139 questionnaires completed. To facilitate statistical analysis, we transformed categorical responses to numerical responses. For ratings of training importance, we re-keyed all "NA" (i.e., not applicable) responses as "Not Important;" for ratings of training availability, we omitted "NA" responses. We also omitted all "don't know" and "no opinion" responses as uninformative. We converted categorical classifications to numerical values to test relationships with survey responses. Subjects who did not respond to any question within a category were removed from the dataset for analysis of that category.

Our first purpose was to determine which topics supervisors considered both important and difficult to obtain. We therefore computed average response values for both importance (IMP) and training availability (TA) for each topic. Importance and availability were rated on a scale of one (least) to four (most). Thus, high mathematical means for both IMP and TA indicated a topic that was considered both important and difficult for which to find appropriate training. We then divided the range of values for IMP and TA into 3 equal ranges and grouped topics into 9 combinations of categories.

Table 1. List of wildlife damage management job-related topics and subtopics evaluated in the needs assessment according to importance and availability by Wildlife Services supervisory staff.

Animal handling and veterinary techniques	Chemical and toxicant agents	Research and science
Chemical immobilization and euthanasia	Chemical handling and storage	Literature searches
Captive animal care	Hazardous materials	Proposal and grant writing
Wildlife identification (sight, scat, tracks, etc.)	General pesticide application	Creating reports and technical publications
Wildlife marking (banding, etc.)	Livestock protection collar	Critical thinking
Wildlife handling techniques	Use of DC-1339	Data management
Biological laboratory procedures	Use of alphachlorolose	Record keeping
Biological sample collections		Basic statistical comprehension and data interpretation
Wildlife disease		Social survey methods
Necropsy		

Various field tools and techniques	Human dimensions	Miscellaneous issues
Geographic information systems	General leadership	Knowledge of wildlife and conservation laws and acts
Global positioning systems	Conflict management and resolution	Basic computer skills
Map reading and orienteering	Personality types (Myers-Briggs)	Agricultural methods and farming techniques
Vehicle operation and safety	Teambuilding	First aid and CPR
Boat operation and safety	Facilitation and meeting administration	Outdoor survival skills
ATV operation and safety	Customer service	Water quality assessment
Snowmobile operation and safety	Time management	Photography and digital imaging
Basic firearms safety	Strategic planning	Plant identification
Advanced firearms use and proficiency	Written communication skills	Wetlands management and regulations
Pyrotechnics	Public speaking and presentation skills	
Rocket net and cannon net	Interpersonal communication	
Wildlife trapping	Public relations	
Wildlife calling	Media relations	
	Development of educational materials	
	Budgeting	
	Risk management	

Because position within APHIS may affect perceptions of need, we calculated IMP for each of the 6 categories of training topics for each respondent and tested whether WS district supervisors regarded the value of training differently than those of higher rank in the organization. Unlike WS state directors and other administration, WS district supervisors often perform fieldwork with the biologists they supervise and have daily interaction with stakeholders in need of assistance. Given the potential for high-speed Internet to facilitate training opportunities, we compared its availability between the more urban Eastern Region (i.e., WS designated region) and its more rural Western Region counterpart. We then compared the effect of region on perceived overall IMP and TA.

We detected a difference between the use and desirability of several continuing education delivery methods, such as distance education and short courses. This discrepancy between interest and utilization may provide insight about which methods to offer in the future. We compared utilization and desirability of the 9 surveyed training delivery modes among regions by comparing interregional correlation of rankings, and within regions using correlation of intraregional rankings. We also tested for trends between supervisor experience and the number of people supervised on the use and desirability of various training modes. Lastly, we evaluated factors contributing to staff participation in training programs by ranking mean responses to a series of 11 possible influencing factors.

We used SAS Proc CORR (SAS Institute Inc., Cary, N.C.) to determine rank correlations. We tested for differences in mean response by region or administrative level using SAS Proc TTEST.

Table 2. Grouping of topics by overall importance to job performance and availability of adequate training for employees of Wildlife Services as indicated by administrative staff, 2008. The shaded box indicates the most important and least available continuing education topics.

	Available	Somewhat available	Least available
Most important	Basic firearms safety Vehicle operation and safety Wildlife trapping Wildlife identification First aid and CPR ATV operation and safety Chemical handling and storage General pesticide application Pyrotechnics	Basic computer skills Record keeping Global positioning systems Data management Hazardous materials Wildlife handling techniques Teambuilding Media relations Chemical immobilization and euthanasia Biological sample collection	Customer service Interpersonal communication skills Written communication skills Time management Public relations Public speaking and presentation skills Knowledge of wildlife conservation laws and acts General leadership Advanced firearms (use and proficiency) Critical thinking Conflict management and resolution Strategic planning Risk management Budgeting
Somewhat important	Use of DC-1339 Map reading and orienteering Literature searches Use of alphachloralose Use of M-44 (cyanide)	Wildlife calling Necropsy Boat operation and safety Outdoor survival skills Facilitation and meeting administration Rocket net and cannon net Personality types Photography and digital imaging Wildlife marking Biological lab procedures Agricultural methods and farming techniques	Creating reports and technical publications Wildlife diseases Data analysis Geographic information systems Basic statistical comprehension and data interpretation Development of educational programs
Least important		Captive animal care Snowmobile operation and safety Livestock protection collar (compound 1080) Water quality assessment	Proposal and grant writing Water management and regulations Plant identification Social survey methods

We tested categories for equal variance and used Satterthwaite's method when variances were unequal. We used SAS Proc RSREG to test for relationships between responses and supervisor experience or number of people supervised; where lack of fit determined that a simple linear model was inappropriate, we tested categories using Proc GLM. We acknowledged a statistically significant difference if $P \leq 0.05$.

Results

Training importance and availability

Of the 63 topics addressed by the survey, far more were considered very important (n = 33) than not important (n = 8), indicating that the survey addressed appropriate issues (Table 2). Of the 14 topics considered both very important and very difficult to obtain training, eleven were in the human dimensions category. No human dimensions topic was rated as least important ($\bar{x}$ = 3.00), and all were rated as either somewhat or very difficult to obtain training for ($\bar{x}$ = 2.10). Of the remaining subject categories, field tools and techniques were likely to be considered very important ($\bar{x}$ = 2.81), but training for these topics was generally considered readily available ($\bar{x}$ = 1.73). Research and science topics were considered somewhat important overall ($\bar{x}$ =

Table 3. Mean importance[a] of training topic categories to job performance of employees as indicated by Wildlife Services district supervisors and other Wildlife Services administrators working for Operations, 2008.

	WS district supervisors		Other WS administration			
Topic category	$\bar{x}$	SE	$\bar{x}$	SE	$t_{(df)}$	P
Animal handling and care; veterinary techniques	2.63	0.06	2.66	0.08	$0.31_{(119)}$	0.755
Chemical and toxicant agents	2.78	0.08	2.84	0.09	$0.51_{(120)}$	0.608
Human dimensions	2.93	0.08	3.13	0.05	$2.10_{(91.9)}$	0.038
Miscellaneous issues	2.56	0.06	2.48	0.07	$0.92_{(121)}$	0.358
Research and science	2.32	0.09	2.74	0.07	$3.69_{(120)}$	≤0.001
Various field tools and techniques	3.03	0.05	2.96	0.07	$0.79_{(111)}$	0.432

[a] Importance ratings were: 1 = not important, 2 = somewhat important , 3 = important, and 4 = very important.

2.57), and respondents indicated some difficulty in obtaining good training opportunities ($\bar{x}$ = 2.1). The importance of animal handling and care and veterinary techniques was similar to research and science topics ($\bar{x}$ = 2.58), but training availability appeared somewhat better ($\bar{x}$ = 1.82) in these areas. Chemical and toxicant agents topics were of moderate importance ($\bar{x}$ = 2.52), with easily obtainable training ($\bar{x}$ = 1.56). Miscellaneous subjects overall were least important ($\bar{x}$ = 2.37) with moderate difficulty in obtaining training ($\bar{x}$ = 1.90).

We tested the relationship of supervisory experience to mean importance of human dimensions issues using Proc RSREG in SAS. Human dimensions topics were specifically chosen because they occurred most frequently as very important. First, we created an index of the overall importance of human dimensions topics by averaging the responses for each respondent. We categorized years in current position in 5-year increments (i.e., 1–5, 6–10, 11–15, 16–20, and >20 years) and used them as the dependent variable, with importance index as the independent variable. There was no relationship (P = 0.12). Similarly, experience in current position did not affect perceived difficulty of finding suitable training for these subjects (P = 0.13). We also tested the relationship of number of people supervised versus both importance and training difficulty. Categories included 0-10, 11-20, 21-30, and >30 employees supervised. There was no relationship with importance (P = 0.10) or training availability (P = 0.82).

High-speed Internet was available to approximately 25% more Eastern Region employees than to Western Region (t_{103} = -4.72, P ≤ 0.001) employees and may facilitate training opportunities. There was no difference between regions regarding overall importance of training (t_{106} = 0.59, P = 0.55). The regional difference regarding training availability approached significance (t_{106} = 1.80, P = 0.08), but Western Region respondents perceived training as more available than those in the Eastern Region, contrary to expectations.

Perceptions regarding the value of training often differed among district supervisors and those of higher rank within WS operations (Table 3). We first calculated a training importance index for each of the 6 categories of training topics for each respondent. We then performed t-tests to compare perceived importance for each category. Administrative level affected perceptions regarding the value of 2 of the 6 training categories. Top administrators within WS operations considered training in human dimensions ($t_{91.9}$ = 2.10 $P \leq 0.04$), research, and science (t_{120} = 3.69 $P \leq 0.001$) topics as more

Table 4. Region-specific use and desirability of 9 training modes for providing training to Wildlife Services employees as indicated by administrative staff, 2008.

	Eastern Region		Western Region		Overall	
Training mode	Use[a]	Desirability[b]	Use	Desirability	Use	Desirability
Live local workshop or short course	2.12	3.49	2.07	3.16	2.09	3.31
Workshop or short course requiring travel	2.16	2.17	2.02	2.24	2.08	2.21
In-service (on-the-job) training	2.71	3.73	2.46	3.38	2.58	3.54
Distance learning via Internet	2.40	2.42	2.11	1.95	2.24	2.16
Distance learning via CD or DVD	2.25	2.50	2.32	2.36	2.29	2.42
Self-directed reading	1.93	2.24	2.00	2.16	1.97	2.20
Weekend retreats	1.09	1.67	1.02	1.67	1.05	1.67
Professional conferences	2.37	3.17	2.18	3.02	2.27	3.09
USDA Wildlife Services programs	2.59	3.27	2.52	3.38	2.55	3.33

[a] 1 = never; 2 = occasionally; 3 = regularly.
[b] 1 = not at all desired; 2 = not desired, but acceptable; 3 = desired; 4 = highly desired.

important than did district supervisors. There was no statistical significance in the way that both levels of administration rated topics in the remaining 4 categories.

Training delivery mode

Rankings of both use and desirability of delivery modes were highly correlated between the Eastern and Western regions (r = 0.90 for both; Table 4), indicating that supervisors in each region placed similar values on training methodologies and used similar types of training. Use of on-the-job training and WS programs and conferences figured most prominently in both regions, and use of self-directed reading and weekend retreats lowest. Rankings of use and desirability were fairly well-correlated within each region (r_{East} = 0.67; r_{West} = 0.79). The greatest discrepancy was in use versus desirability of local, live workshops or short-course seminars, which was ranked as the second or third most desirable delivery mode, but only sixth or seventh in usage. Use of training delivery modes differed only slightly among regions, with Eastern Region respondents making somewhat greater use of on-the-job training (t_{103} = 2.16, P = 0.03) and distance learning via the Internet (t_{103} = 2.42, P = 0.02).

Supervisory experience had little influence on either utilization or desirability of the 9 modes of training delivery. Utilization of distance learning via CD or DVD module increased with experience (P = 0.04), but the amount of variation explained by the model was extremely low (r^2 = 0.03). Utilization of all other modes was similar regardless of experience ($P \geq 0.17$). Although workshops ranked second or third in terms of overall desirability, interest in them decreased somewhat with increasing experience of the respondents (P = 0.03); but, the model explained very little of the variation (r^2 = 0.04), indicating that this is not an important relationship. All other relationships between experience and desirability of delivery mode were not significant ($P \geq 0.33$).

The number of people supervised had little impact on either the utilization or desirability of the training delivery mode. Use of on-the-job training was positively correlated with the number of people supervised (P = 0.017), but the model explained only a small part of the variation (r^2 = 0.04). Utilization of all other modes was similar regardless of number of

Table 5. Mean influence of factors on Wildlife Services staff participation in training programs as indicated by administrative staff, 2008.

Factor	Influence[a]	SE
Relevance of courses offered	3.57	0.05
Cost of travel and budgeting	3.41	0.06
Work loads	3.35	0.06
Upper management directive	3.21	0.07
Quality of training	3.15	0.07
Timing of courses	3.10	0.06
Travel restrictions	2.99	0.07
Cooperator expectations	2.78	0.09
Contract time lines and restrictions	2.61	0.08
Inadequate notification of training	2.58	0.08
Staff shortages	2.58	0.08

[a] Influence ratings were: 1 = no influence, 2 = somewhat influential, 3 = influential, and 4 = very influential.

people supervised ($P \geq 0.08$). Desirability was also unaffected by the number of people supervised ($P \geq 0.116$).

Training participation factors

We evaluated factors contributing to staff participation in training programs by averaging responses to a series of 11 possible influencing factors (Table 5). Relevance of the topic was the most influential factor, followed closely by cost of travel and budgeting. Additional factors identified by participants included time commitment too great, poor attitudes stemming from previous training experiences, and restrictive travel policies hamper attendance.

Discussion

Our study reveals that training in human dimensions topics is the most substantial need for wildlife damage management professionals. Supervisors at all levels cited skills, such as customer service, public relations, conflict management, and communication, among the highest-rated needs for current wildlife damage management professionals. This perception is reiterated in other literature and possibly reflects urban expansion, changing public attitudes, a shift in wildlife valuation, and increased public participation in natural resources management (Timm 1985, Reidinger 1990, Hawthorne 1993, Decker et al. 2001, Miller 2007). In the past several decades, increased public involvement with natural resource management and policy have resulted in the need for wildlife managers to expand their skill set to include social, political, economic, and legal expertise (McAninch 1991, Prukop and Regan 2002, Lindsey and Adams 2006). Berryman (1994) recognized the need of human dimensions training within wildlife and stated: "I think public relations should be in the job description and plan of work for every worker."

Our findings uncovered the different perceptions regarding training priorities in some key areas for WS district supervisors versus all other WS administrators. District supervisors placed more emphasis on skills needed in the field; one might expect this result given their day-to-day involvement with field activities. This difference is important because higher-level administrators are often the ones who make final decisions about which training opportunities to provide. To ensure that upper administration has an accurate understanding of training needs at the field level, organizations such as WS must involve all supervisors in the process of choosing continuing education for their employees.

Our results indicate that instruction in field tools and techniques are more available than those in the human dimensions arena. This finding is consistent with conventional wildlife damage management practices that rely on science rather than people-based decision models (Gigliotti and Decker 1992). Further, human-dimensions-based training is relatively new to the discipline of wildlife management, which limits the pool of expert in-house training. Another impediment to providing human dimensions education is the lack of space in current pre-service wildlife education curricula or continuing education in-service training programs (Pomerantz 1991). In this

case, managers and educators are faced with the difficulty of deciding whether or not to replace another course or workshop deemed equally essential as human dimensions. Ultimately, most wildlife damage management professionals view human-dimensions-based training as necessary, but accessibility to this training has been limited or absent from most agency programs (Jacobson and McDuff 1998, Kroll 2005).

Our needs assessment uncovered a discrepancy among the high desirability and low usage of local, live workshops or short-course seminars as preferred training delivery modes among wildlife damage management supervisors. Supervisors indicated a need for more efforts to secure or supply local training opportunities. Allocating resources to this type of training could increase public cooperation with wildlife damage management techniques and address local issues, while maximizing funds and the scope of training (Kroll 2005). Supervisors also indicated a strong desirability to continue use of in-service training programs provided by WS to educate employees. Although it is utilized frequently, this type of training is limited mainly to technical and agency-mandated courses. The use of self-directed, Internet-based training programs has become increasingly popular, specifically in wildlife agencies where field staff availability is unpredictable and budgets are limited (USDA 2008). This method, however, is not the most highly desired among wildlife damage management personnel (Tegt et al., Mississippi State University, unpublished data). Our needs assessment shows that only 9% of wildlife management supervisors chose Internet training to be highly-desirable out of the 9 listed training delivery modes, whereas 60% chose on-the-job training. This discrepancy in training method use and desirability could reflect the function of skill needed and delivery effectiveness (Arthur et al. 2003). For instance, an online training program regarding customer interactions (e.g., aglearn.net) is useful in conveying the proper procedures for customer service but lacks the capacity to apply that information to actual wildlife management situations (Resnick 1987, Arthur et al. 2003). Considering that wildlife professionals respond more positively in learning situations containing direct feedback and application of skills, effective education delivery mode is influential to successful continuing education programs (Ryan and Campa 2000, Buch and Bartley 2002, Millenbah and Millspaugh 2003). Furthermore, flexibility within different training programs and a use of mixed delivery modes was found to be directly correlated with both positive learning outcomes and post-training proficiency (Sadler-Smith and Smith 2004). Our needs assessment findings suggest that supervisor preference for 1 delivery method over another may be eclipsed by factors such as budget, technology, and staff shortages. While all attempts should be made to provide training in the most cost effective, yet, valuable manner, we perceive the need for an overall increased investment in wildlife continuing education regardless of the delivery method.

Relevance of the training course to wildlife damage management personnel was deemed the most influential factor on staff participation in a particular program. Wildlife supervisors shared their reasons for requiring applicability through open-ended comments such as, "We need relevant, timely training directed at our folks and not one-size-fits-all," and "Relevant training that can be as local as possible is most useful since I have a large staff and we are typically tight on funds." It is important to note that training course applicability may be relative to each WS office, reaffirming the importance of understanding individual and general training needs. Resnick (1987) validates the opinion that situation-specific training is meaningful, stating, "to be truly skillful outside school, people must develop situation-specific forms of competence." Kroll (2005) recommends nurturing individual interests and establishing a managerial framework into wildlife education to prepare properly the workforce for present and future professional challenges. Many of the other factors we found to influence staff continuing education participation, such as budgeting, is beyond the ability of either WS personnel or training suppliers to address. However, Lynch and Black (1995) found that diligent coordination with supervisors regarding timing and location of training could possibly increase staff participation and maximize resources. Lynch and Black (1995) further concluded that

supervisors who overcame training obstacles to invest in employee training experienced a more highly-skilled workforce (i.e., greater return on investment) and lower turnover. Consequently, the supervisors who provided training, regardless of barriers, observed higher employee productivity and improved job performance.

Conclusions

The wildlife damage management profession is quickly becoming more complex, with more and more demands being placed upon agencies and individuals. Additional complications arise as our workforce becomes increasingly diverse, with new employees arriving from various different backgrounds and with different skill sets. As a result, agencies can no longer assume that new employees begin the job with competencies possessed by their counterparts of the past. These complexities call for a rigorous approach to continuing education that matches current employee skills with their specific job function and the larger needs of the organization.

In assessing the relative value of continuing education for each job function, one must consider that our study analyzed needs on an organizational level, but one must also recognize that continuing education occurs on a personal level, as well. Thus, it is important to resist a simple application of these data to employee training programs. For example, the fact that human dimension topics were generally rated as most important reflects the level of importance of these topics, but perhaps more so the broad applicability of these topics. Every wildlife damage management professional likely needs skill in conflict management, and that broad applicability leads to most respondents giving these topics high importance scores. On the other hand, chemical immobilization and euthanasia are fairly specialized topics that may be needed only by a small percentage of WS employees, which leads to a relatively low importance score. However, for those individuals who commonly use chemicals to immobilize or euthanize wildlife, that topic may be one of the most important for their job function. Thus, WS and other agencies must develop continuing education opportunities that reflect the broad scope of needs at the organizational level but that also recognize and fulfill the needs of individual job functions. For highly-specialized topics, the most efficient approach would be to identify professionals in need of those specific skills and deliver the training directly.

As our society changes, the arena of human-wildlife conflicts is certain to become more complex and the need for wildlife damage management more essential. The distribution and abundance of wildlife species will change, and with it the ecology and biology that influence how we manage wildlife problems. Further, as our society diversifies, so will our stakeholders' expectations of our profession. To meet these coming challenges, we must abandon the philosophy that education occurs from kindergarten through college. Instead, we must adopt the philosophy that formal education is simply a preparatory stage and that learning must be emphasized and supported throughout a professional's career. In developing such continuing education programs, it is vital to have a clear understanding of training needs and efficacy of delivery modes. We hope this study initiates such thought in the wildlife damage management community.

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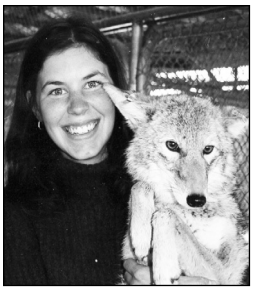

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