

Mission statements of AZA-accredited zoos: Do they say what we think they say?

By: Patricia G. Patrick, Sue Dale Tunnicliffe, [Catherine E. Matthews](#), and [David Franklin Ayers](#).

Patrick, P.G., Tunnicliffe, S.D., Matthews, C.E., & Ayers, D.F. (2007). Mission statements of AZA-accredited zoos: Do they say what we think they say? *International Zoo News* 54 (2), 90-98.

Made available courtesy of Quantum Conservation: <http://www.izn.org.uk/>

*****© Quantum Conservation. Reprinted with permission. No further reproduction is authorized without written permission from Quantum Conservation. This version of the document is not the version of record. Figures and/or pictures may be missing from this format of the document. *****

Abstract:

Most zoos have a ‘mission statement’, or statement of purpose, that directs operational decisions and sets goals for the institution (Mazur and Clark, 2001). It is through their mission statements that zoos share their passion for animals and animal conservation with each other and with the rest of the world. The mission statement is the most important working document in a zoo (Heritage Collections Council, 2004). It provides the basic conceptual framework for the entire organization, guides current, critical, and strategic decision making, identifies the scope of the operations of the organization and reflects its values and priorities. Moreover, a mission statement identifies goals, provides guidance for institutional planning, governance, administration and communication, and focuses the allocation of financial resources (Bart, 1998; Quinley, 1991; Abrahams, 1995; Drohan, 1999).

Keywords: zoos | mission statements | study

Article:

*****Note: Full text of article below**

MISSION STATEMENTS OF AZA-ACCREDITED ZOOS: DO THEY SAY WHAT WE THINK THEY SAY?

BY PATRICIA G. PATRICK, SUE DALE
TUNNICLIFFE, CATHERINE E. MATTHEWS AND
DAVID FRANKLIN AYERS

Introduction

Most zoos have a 'mission statement', or statement of purpose, that directs operational decisions and sets goals for the institution (Mazur and Clark, 2001). It is through their mission statements that zoos share their passion for animals and animal conservation with each other and with the rest of the world. The mission statement is the most important working document in a zoo (Heritage Collections Council, 2004). It provides the basic conceptual framework for the entire organization, guides current, critical, and strategic decision making, identifies the scope of the operations of the organization and reflects its values and priorities. Moreover, a mission statement identifies goals, provides guidance for institutional planning, governance, administration and communication, and focuses the allocation of financial resources (Bart, 1998; Quinley, 1991; Abrahams, 1995; Drohan, 1999).

Journal articles identify the roles, purposes and missions of zoos variously as research, exhibiting animals (facilities), education, conservation, and recreation. Table 1 provides a look at journal articles published over the past 20 years which have addressed the reasons why zoos exist. Zoos also identify their roles, purposes and missions, and they do so through their publicized mission statements. Our study investigates whether or not, and how far, the self-identity zoos outline in their mission statements is similar to the missions of zoos identified in these various journal articles. To this end, we analyzed 136 mission statements of AZA-accredited zoos in North America, identified their main themes and assessed the degree of importance that each zoo places on particular themes.

The Heritage Collections Council document *ReCollections* (2004) states that institutions need mission statements that provide a clear identity, with stated aims understood by the membership and by those who work for the organization. Zoos' mission statements provide them with direction in their quest to inform the public of their conservation goals (Mazur, 1997; Mazur and Clark, 2001). However, not everyone considers that these mission statements achieve their avowed intention. For instance, Hutchins (2003) pleads with zoos to 'think harder [about] why they are there and what role they will fill in conservation, education, and research. Millions of dollars go to house artwork in museums, but there are more Rembrandts in the world than there are Siberian tigers' (p. 15). Zoo professionals must ask how well matched their mission statement is with what they are really trying to accomplish (Clark, 1993) in conservation, education

Table 1. Journal articles identifying the missions of zoos.

Words used to identify the role or purpose of zoos Author and date of article

Mission of zoos	Research	Walker, 1991; Goodrowe, 2003
	Exhibiting animals	Mazur and Clark, 2001
	Changing visitor behavior and attitudes (education)	Dierking <i>et al.</i> , 2002
	Conservation	Norton <i>et al.</i> , 1995; Miller <i>et al.</i> , 2004; AZA, 2004; WAZA, 2004; Mazur, 1991; Mazur and Clark, 2001
	Recreation	Chiszar <i>et al.</i> 1990; Bostock, 1993; Maple, 1995; Martin, 2000
	Breeding and reintroducing endangered species (conservation)	Walker, 1991
	Education	Chiszar <i>et al.</i> , 1990; Walker, 1991; AZA, 2004; WAZA, 2004; Mazur, 1991; Mazur and Clark, 2001; Butler, 2000
First priority of zoos	Conservation	Koebner, 1994
	Conservation education	Koebner, 1994
Main purpose of zoos	Exhibiting animals for the public	Mazur and Clark, 2001
	Breeding plants and animals (conservation)	Kolbert, 1995
	Providing recreational opportunities (recreation)	Chiszar <i>et al.</i> , 1990; Bostock, 1993; Martin, 2000
(Fundamental) role of zoos	Conservation	Mullan and Marvin, 1987; Kellert and Dunlap, 1989; Dierking <i>et al.</i> , 2002
	Fun, safe place for families (recreation)	Ogden <i>et al.</i> , 2004
	Entertainment facilities (recreation)	Ogden <i>et al.</i> , 2004
	Science (research)	Dierking <i>et al.</i> , 2002
	Education	Dierking <i>et al.</i> , 2002
(Primary) focus of zoos	Instilling care for animals (education)	Ogden <i>et al.</i> , 2004
	Inspiring conservation action (conservation)	Ogden <i>et al.</i> , 2004
Zoos define themselves as	Educational	Falk and Adelman, 2003

and research. The work zoos are doing in these three areas should be reflected in their mission statements.

Some of the journal articles refer specifically to the 'missions' of zoos, while others use words synonymous with mission, such as 'the first priority of zoos', 'the main purpose of zoos', 'the (fundamental) role of zoos', 'the (primary) focus of zoos' or 'zoos define themselves as . . .' Table 1 provides a look at how these articles describe the missions of zoos. Five themes can be consistently identified in them: (1) research, (2) exhibiting animals (facilities), (3) education, (4) conservation and (5) recreation. Currently no research exists to support the claims of the journal articles which state the missions of zoos, and no studies have been completed that analyze these mission statements. However, zoos are being urged by authors to evaluate their missions (Balmford *et al.*, in press; Gwynne, in press; Hatchwell *et al.*, in press; Reading and Miller, in press; Sterling *et al.*, in press; Stevens *et al.*, in press). (All these references are to papers originally presented at the international symposium 'Catalysts for Conservation', Zoological Society of London, February 2004.) Our goals in this study were to discover what zoo mission statements actually say, to determine to what extent these statements describe their missions, and to compare our analysis with the missions of zoos as stated in the journal articles.

Methodology and analysis

In 2004, AZA had 214 accredited zoos and aquariums throughout North America (AZA, 2004). For the purposes of our study we defined zoos as excluding stand-alone aquariums (as opposed to zoos with aquariums) and wildlife parks/centers, which left 142 institutions in the United States which met our criteria. Mission statements were obtained from the zoos' websites (80), by e-mail (51), by phone (3) and by fax (2). The final number of statements analyzed is 136.

The statements were subjected to an intensive analysis, in which we read and re-read them until we all agreed upon the categorizations of word-association responses. Seven predominant themes emerged from our reading: in order of frequency of occurrence, these were: (1) *education*, including *affective*, *cognitive*, and *general*; (2) *conservation*; (3) *recreation*; (4) *facilities*; (5) *research*; (6) *administration*; and (7) *culture*.

Scales, as a way of scoring the statements, were developed for each of the seven themes, so that a quantitative analysis could be undertaken. Each level on the scale represents the amount of information that a zoo provided in its mission statement about a particular theme. Each ascending level (I–VI) includes more detailed information about the particular theme. Thus, Level I means the theme was not mentioned, while Level VI means the theme was described in great detail. Each of the 136 zoos was then assigned a level for each of the seven themes. Table 2 gives the total number of zoos ranked at each level within each theme. The scales used for analyzing education and recreation are found in Table 3, including an example of an analyzed mission statement.

Results and Discussion

In our analysis, three categories of education emerged: affective education, cognitive education and general education. To classify these categories we used Bloom's (1956) taxonomy of educational objectives as our framework. The first level of educational goals Bloom and his colleagues established was the three domains of learning: cognitive (knowledge), affective (emotions) and psychomotor

Table 2. Number of mission statements describing each theme at each level.

THEMES (Number of times mentioned in zoo mission statements)	LEVELS					
	I	II	III	IV	V	VI
Education (131)	5 (3%)	20 (15%)	15 (11%)	33 (24%)	43 (32%)	20 (15%)
Conservation (118)	18 (13%)	20 (15%)	8 (6%)	77 (57%)	13 (9%)	0 (0%)
Recreation (94)	42 (31%)	23 (17%)	15 (11%)	16 (12%)	29 (21%)	11 (8%)
Facilities (74)	62 (46%)	40 (29%)	23 (17%)	10 (7%)	1 (1%)	0 (0%)
Research (30)	106 (78%)	0 (0%)	22 (16%)	3 (2%)	5 (4%)	0 (0%)
Administration (30)	106 (78%)	17 (13%)	9 (7%)	3 (2%)	0 (0%)	1 (1%)
Culture (23)	113 (83%)	23 (17%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)

Each number represents the number of missions identified in each level, followed by the percentage.

(physical skills). Any educational themes in mission statements that were not identified as cognitive or affective were labeled general education. Sixty-four percent of zoos described education using affective terms, 31% used a cognitive description and 51% provided only a general description. Twenty-two mission statements used only the word education. Surprisingly, only 3% of zoo mission statements directly mention conservation as a cognitive education goal and only 13% identify conservation as an affective education goal. The following are examples of conservation education directly mentioned in zoo mission statements: (1) understanding of wildlife and habitat conservation, (2) understanding, support and participation in global conservation of animal species and their environment, generating new conservation knowledge, and (3) enhancing conservation efforts through education.

The fact that there are twice as many affective references (88/64%) as cognitive references (43/31%) points perhaps to the response of zoos to the call in the literature for a new educational mission. In 1995, Kolbert issued a call for affective education, arguing that little had changed in public education in zoos and maintaining that zoos give out more scientific information on animals and conservation, but do little to encourage different relationships with animals and the natural world. Ogden *et al.* (2004) state that the goal of zoo education is shifting from giving animal facts (cognitive goals) to focusing more on instilling caring for animals (affective goals) and inspiring conservation action (behavioral

Table 3. Example of the levels assigned to mission statements.

Each scale name and level assigned are in bold or italicized in the mission statement below. In this mission statement the themes: Conservation, Facilities, Research, and Administration were not described so these ordinate categories were assigned a Level I.

'The mission of the zoo is to provide *positive educational* and **entertaining experiences** that will *stimulate the visitors' appreciation of nature.*'

The levels for each scale are *Education V*, **Recreation III**, Conservation I, Facilities I, Research I, Administration I.

Scales	Education	Recreation
Items used to create scales for themes.	1. General Education words: ethical thinking skills, relate learning to experiences, educational, educating people, learning process, education saves wildlife, environmental education, wildlife education, educate/teach, environmental education.	1. Mission statements provide descriptive recreational words. Mission statements use the following words: play, leisure, fun, adventure, enjoyment, entertainment, delight, excitement, social outing, entertaining.
Theme is mentioned in three ways.	2. Cognitive Education words: knowledge of, understanding of.	2. Mission statements describe recreation as a recreational opportunity or experience.
	3. Affective Education words: promote, cultivate, nurture, inspire, encourage, stimulate, instill, motivate, influence, increase, create, develop, awareness, appreciation, discover, explore, empower, enrich.	3. Mission statements describe for whom they provide recreation. Mission statements use the following words: nurture, message, promote protection, promote awareness, promote conservation, convey ethics, encourage commitment, advocate stewardship, advocate leadership, advocate involvement.
Scale Level I	Education is not mentioned.	Recreation is not mentioned.
Scale Level II	Only the word education is mentioned.	Only the word recreation is mentioned.
Scale Level III	Examples from item no. 1 are included.	Examples from item no. 1 are included.
Scale Level IV	Examples from either no. 2 or number 3 are included.	Examples from either no. 2 or number 3 are included.
Scale Level V	Examples from two of the three descriptions above are included.	Examples from two of the three descriptions above are included.
Scale Level VI	Examples from all three of the descriptions above are included.	Examples from all three of the descriptions above are included.

goals). As these goals begin to shift, zoo mission statements must be written to reflect these systemic changes in the mission of zoological institutions.

The conservation policies and goals of the zoo should be easily recognized in the mission statement (Mazur and Clark, 2001). One hundred and sixteen mission statements (85%) specifically use the word conservation, but 18 of these do not describe their conservation efforts in any detail – they only use the word. Even though the 2006 AZA *Guide to Accreditation of Zoological Parks and Aquariums* (AZA, 2005) clearly states that conservation must be an element of the mission statement, 13% of AZA-accredited zoos make no mention at all of conservation in their statements.

Mazur and Clark (2001) state that zoos should support conservation through participation in local and global conservation programs. Our study shows that 19 (14%) of the 136 zoos mention conservation programs supporting diversity: of these, nine (6%) mention global programs, six (4%) mention local programs and five (3%) mention national programs. In addition to supporting conservation programs, zoos need to be involved in the conservation of biodiversity through specialized animal breeding, research, and education programs (Rabb, 1994) and must participate in endangered species conservation plans (Mazur and Clark, 2001). However, our data show that only four (2%) mission statements mention the Species Survival Plan (SSP), and of these three (2%) mention husbandry and three (2%) mention captive breeding.

Recreation is promoted in 94 (69%) zoo mission statements. Zoos are perceived by visitors as places of recreation; however, zoos often prefer to perceive themselves as places where scholarly, scientific, conservation pursuits occur (Kellert and Dunlap, 1989). Since zoo mission statements are a reflection of zoo policy, zoos should think carefully about evaluating their missions.

Facilities are addressed in 74 (54%) mission statements. The most prominent type of facility mentioned is exhibits (69/50%). Exhibits should demonstrate a dedication to the values and mission of the zoo (Bierlein, 2003). Moreover, visitors report increased interest in conservation after visiting interactive, naturalistic exhibits (Derwin and Piper, 1988; Ogden, 1992). Our study shows that 14 (10%) zoos describe exhibits as naturalistic.

Research, administration and culture are mentioned less frequently in zoo mission statements. According to Goodrowe (2003) many zoos and aquariums include research as a mandate in their missions or goals. However, our findings show research is mentioned in only 30 (22%) mission statements. Research is conducted by scientists or staff, or through agreements with other institutions (Conway and Hutchins, 2001). Our study found that only two (1%) zoos mentioned researchers. In 2002, the AZA Conservation Education Committee (CEC) began a visitor studies project to determine the overall impact of visits to zoos on the knowledge of visitors (Dierking *et al.*, 2002). However, the research focus in zoo mission statements is clearly scientific. No zoo mission statements specifically mention educational research or visitor studies.

Thirty (22%) mission statements address the administration of the organization. Twenty-two (16%) zoos identify finance in their statements. Three (2%) zoos identify themselves as a business. Some mission statements also refer to funding – four (2%) mention funding of zoo operations and six (4%) identify the sources of funding.

Zoos are important cultural institutions, which both mirror and project culture in our society (Tarlow, 2001). In their article 'Trends in conservation education: a primer', Ogden *et al.* (2004) identify 16 trends that are critical to conservation

education in zoos and aquariums. Trend VI specifically recognizes the 'growing diversity in the American population that is not reflected in our visiting audience or workforce'. As demographic changes become represented in zoo visitors, the authors suggest, zoos must find ways to attract and engage culturally diverse audiences. Our study found that culture is mentioned in only 23 mission statements (17%), (and only using the words 'culture' or 'cultural', with no further description). To catch up with Trend VI, zoos should take culture into consideration and make it a part of their mission statements.

A major portion of this study is dedicated to determining the Level at which each zoo mission statement described the seven prominent themes (Table 2). The Levels were determined by the words used in the statements and the extent to which each theme was explained (Table 3).

The most surprising finding is that no statement describes conservation goals at Level VI—in other words, no zoo mission statement provides all of the following: a general description of conservation, conservation advocacy and conservation action. Another interesting finding is that zoos do not provide an interpretation of their involvement in research. No fewer than 106 zoos are assigned Level I, which means that the word 'research' did not even occur in their mission statements. Additionally, not one zoo describes their research efforts at Level VI. The theme culture is mentioned less than any other theme and with less detail even though it is becoming a stated goal of zoo conservation education.

While we understand that not all zoo mission statements may reflect equally all the themes described in this study, a mission statement should acknowledge the fundamental commitments of the institution. This study identifies both the major themes in the statements and those which journal articles claim are the themes of zoos. Our study found that while we were able to identify the five themes mentioned in the various journal articles, two more themes emerged, finances and culture.

We were able to order the themes from zoo mission statements in order of prominence based on our analysis of the statements themselves. Furthermore, we felt it important to try to gauge the level of commitment that zoos had to various themes and various aspects of those themes. We contend that our study is the first systematic analysis of zoo mission statements and has value as such, especially with our aim of initiating a conversation about the roles and purposes of zoos. Zoos must use their mission statements to describe why they exist. The statements should be used as a reference when evaluating the success of the organizations. We suggest two questions that all zoological institutions should ask themselves: (1) What is our mission statement saying about our organization? and (2) Are we achieving the goals we set forth in our mission statement?

References

- Abrahams, J. (1995): *The Mission Statement Book*. Ten Speed Press, Berkeley, California.
- AZA (2004): *American Zoo and Aquarium Association* [online]. Retrieved from www.aza.org on 11 December 2004.
- AZA (2005): *2006 AZA Guide to Accreditation of Zoological Parks and Aquariums* [online]. Retrieved from www.aza.org on 21 December 2005.
- Balmford, A., Leader-Williams, N., Mace, G.M., Manica, A., Walter, O., West, C., and Zimmerman, A. (in press): Message received? Quantifying the impact of informal conservation education on adults visiting UK zoos. In *Zoos in the 21st Century*:

- Catalysts for Conservation?* (eds A. Zimmerman, M. Hatchwell, L. Dickie and C. West). Cambridge University Press, U.K.
- Bart, C. (1998): Mission matters. *The CPA Journal* 68 (8): 56–57.
- Bierlein, J. (2003): Exhibit design and the aesthetic of nature. *AZA Communiqué* (March): 8–10.
- Bloom, B. (1956): *Taxonomy of Educational Objectives. Book 1: Cognitive Domain*. Longman, New York.
- Bostock, S.StC. (1993): *Zoos and Animal Rights*. Routledge, London.
- Butler, S. (2000): *AZA Collective Impact Study* [online]. <http://aza.org/dept/dmd/Tourism/report.htm>.
- Chiszar, D., Murphy, J.B., and Iliff, W. (1990): For zoos. *Psychological Record* 40 (1): 3–13.
- Clark, T. (1993): Creating and using knowledge for species and ecosystem conservation: science, organizations, and policy. *Perspectives in Biology and Medicine* 36 (3): 497–525.
- Conway, W., and Hutchins, M. (2001): Introduction. In *AZA Field Conservation Resource Guide* (eds. W. Conway, M. Hutchins, M. Souza, Y. Kapetanakos and E. Paul), pp. 1–17. Zoo Atlanta and Wildlife Conservation Society, Atlanta, Georgia.
- Derwin, C., and Piper, J. (1988): The African Rock Kopje exhibit: evaluation and interpretive elements. *Environment and Behavior* 20 (4): 23–29.
- Dierking, L., Burtnyk, K., Buchner, K., and Falk, J. (2002): *Visitor Learning in Zoos and Aquariums: a Literature Review*. Institute for Learning Innovation, Annapolis, Maryland.
- Drohan, W. (1999): Writing a mission statement. *Association Management* 51: 117.
- Falk, J., and Adelman, L. (2003): Investigating the impact of prior knowledge and interest on aquarium visitor learning. *Journal of Research in Science Teaching* 40 (2): 163–176.
- Goodrowe, K. (2003): Programs for invasive research in North American zoos and aquariums. *Institute for Lab Animal Research Journal* 44 (4): 222–236.
- Gwynne, J.A. (in press): Inspiration for conservation: motivating audiences to care. In *Zoos in the 21st Century: Catalysts for Conservation?* (eds A. Zimmerman, M. Hatchwell, L. Dickie and C. West). Cambridge University Press, U.K.
- Hatchwell, M., Rübél, A., Dickie, L.A., West, C.D., and Zimmerman, A. (in press): The future of zoos. In *Zoos in the 21st Century: Catalysts for Conservation?* (eds A. Zimmerman, M. Hatchwell, L. Dickie and C. West). Cambridge University Press, U.K.
- Heritage Collections Council (2004): *ReCollections: caring for collections across Australia*. Heritage Collections Council, Canberra. (Available online at <http://amol.org.au/recollections>.)
- Hutchins, M. (2003): Zoo and aquarium animal management and conservation: current trends and future challenges. *International Zoo Yearbook* 38: 14–28.
- Kellert, S.R., and Dunlap, J. (1989): *Informal Learning at the Zoo: a Study of Attitude and Knowledge Impacts*. Zoological Society of Philadelphia, Pennsylvania.
- Koebner, L. (1994). *Zoo Book: the Evolution of Wildlife Conservation Centers*. Tom Doherty Associates, New York.
- Kolbert, C. (1995): What are we trying to teach? *Journal of the International Association of Zoo Educators* 32: 6–9.
- Maple, T. (1995): Towards a responsible zoo agenda. In *Ethics on the Ark: Zoos, Animal Welfare, and Wildlife Conservation* (eds. B.G. Norton, M. Hutchins, E.F. Stevens and T.L. Maple), pp. 20–30. Smithsonian Institution Press, Washington, D.C.
- Martin, S. (2000): The value of shows. Presentation, International Association of Avian Trainers and Educators National Conference, Memphis, Tennessee.
- Mazur, N. (1991): A study of attitudes towards the role of city zoos in conservation: case study of the Adelaide Zoo. Unpublished master's thesis, University of Adelaide, South Australia.

- Mazur, N. (1997): Contextualising the role of zoos in conservation: an Australasian experience. Unpublished doctoral dissertation, University of Adelaide, South Australia.
- Mazur, N., and Clark, T. (2001): Zoos and conservation: policy making and organizational challenges. *Bulletin Series, Yale School of Forestry and Environmental Studies* 105: 185–201.
- Miller, B., Conway, W., Reading, R., Wemmer, C., Wildt, D., Kleiman, D., Monfort, S., Rabinowitz, A., Armstrong, B., and Hutchins, M. (2004): Evaluating the conservation mission of zoos, aquariums, botanical gardens, and natural history museums. *Conservation Biology* 18 (1): 86–93.
- Mullan, B., and Marvin, G. (1987): *Zoo Culture*. Weidenfeld and Nicholson, London.
- Norton, B.G., Hutchins, M., Stevens, E., and Maple, T. (eds.) (1995): *Ethics on the Ark: Zoos, Animal Welfare, and Wildlife Conservation*. Smithsonian Institution Press, Washington, D.C.
- Ogden, J. (1992): A comparative evaluation of naturalistic habitats for captive lowland gorillas (*Gorilla gorilla gorilla*). Unpublished doctoral dissertation, Institute of Technology, Atlanta, Georgia.
- Ogden, J., Gentile, C., and Revard, B. (2004): Trends in conservation education: a primer. *AZA Communiqué* (August): 18–20.
- Quinley, J. (1991). *Assessing the College Mission: an Excellent Starting Point for Institutional Effectiveness*. ERIC Reproduction Service No. ED 333 913, Central Piedmont Community College, Charlotte, North Carolina.
- Rabb, G. (1994): The changing roles of zoological parks in conserving biological diversity. *American Zoologist* 34: 159–164.
- Reading, R.P., and Miller, B.J. (in press): Attitudes and attitude change among zoo visitors. In *Zoos in the 21st Century: Catalysts for Conservation?* (eds A. Zimmerman, M. Hatchwell, L. Dickie and C. West). Cambridge University Press, U.K.
- Sterling, E., Lee, J., and Wood, T. (in press): Conservation education in zoos: an emphasis on behavioral change. In *Zoos in the 21st Century: Catalysts for Conservation?* (eds A. Zimmerman, M. Hatchwell, L. Dickie and C. West). Cambridge University Press, U.K.
- Stevens, B., Ogden, J., and Sams, K.R. (in press): Creating a culture of conservation: a case study of a backyard approach. In *Zoos in the 21st Century: Catalysts for Conservation?* (eds A. Zimmerman, M. Hatchwell, L. Dickie and C. West). Cambridge University Press, U.K.
- Tarlow, S. (2001): Decoding ethics. *Public Archaeology* 1: 245–259.
- Walker, S. (1991): Education and training in captive animal management. *Perspectives in Zoo Management*, Zoo Outreach Organization, Peelamedu, Coimbatore, India.
- WAZA (2004): World Association of Zoos and Aquariums [online]. www.waza.org.

Patricia G. Patrick, Doctoral Student, Department of Curriculum and Instruction, 340 Curry Building, University of North Carolina, Greensboro, NC 27402, U.S.A. (*E-mail*: seaturtletrish@hotmail.com); Dr Sue Dale Tunnicliffe, Research Associate, School of Science, Technology and Maths, Institute of Education, University of London, 20 Bedford Way, London, WC1H 0AL, U.K. (*E-mail*: s.tunnicliffe@ioe.ac.uk); Dr Catherine E. Matthews, Associate Professor, Department of Curriculum and Instruction, 340 Curry Building, University of North Carolina, Greensboro, NC 27402, U.S.A. (*E-mail*: cmatthews@uncg.edu); Dr David Franklin Ayers, Assistant Professor, Department of Curriculum and Instruction, 308 Curry Building, University of North Carolina, Greensboro, NC 27402, U.S.A. (*E-mail*: dfayers@uncg.edu).