International Journal of Environmental & Science Education
Vol. 5, No. 3, July 2010, 341-352

The conservation knowledge and attitudes of teenagers in Slovenia toward the Eurasian Otter

Gregor Torkar, Petra Mohar, Tatjana Gregorc, Igor Nekrep, Marjana Hönigsfeld Adamič

Received 26 June 2009; Accepted 08 February 2010

This study focused on human-otter interactions in Slovenia. The aim of the study was to obtain data about secondary-school students' knowledge of and attitudes toward the Eurasian otter (Lutra lutra) and its conservation. The survey was carried out in fall 2008 and winter 2008–09 and included 273 teenagers. Their average age was 15.57 (SD = 1.01, Min = 13, Max = 19). The sample consisted of 92 (33.7%) males and 181 (66.3%) females. Participants were asked to complete a detailed self-administered questionnaire with 18 attitude questions and 8 factual-knowledge questions about Eurasian otter conservation. The results showed that teenagers' attitudes toward the Eurasian otter are favourable and pro-conservation. Teenagers' positive attitudes toward otter conservation were registered despite their poor knowledge. The study revealed that better factual knowledge correlates with positive attitudes. The data also indicated that females disagreed more strongly than males with attitude statements expressing opposition to otter conservation.

Keywords: attitudes, knowledge, Eurasian otter, nature conservation, teenagers

Introduction

The Eurasian otter (*Lutra lutra*) is an apex predator that occurs in various aquatic habitats, where it has adapted its foraging behaviour to a broad spectrum of prey such as fish, crayfish, amphibians, and birds (Mason & Macdonald, 1986; Kruuk, 1995). The European otter usually exploits a linear home range encompassing 5 to 20 km of riverbanks and the surrounding wetlands (Green, Green, & Jefferies, 1984; Chanin, 1985). Otters are sensitive to pollution (Mason, 1996; Yamaguchi, Gazzard, Scholey, & Macdonald, 2003), and the species has suffered a severe decline in most European countries (MacDonald, 1996; Robitaille & Laurence, 2002). The Eurasian otter has been listed as an endangered species in the Bern Convention (Council of Europe, 1979), as well as in the Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Council of the European Union, 1992), Annex II and Annex IV; therefore appropriate conservation measures are of international importance. The Habitats Directive contributes toward ensuring biodiversity by providing legal protection for habitats and species with European importance through an EU-wide network of sites, the Natura 2000 network. Protection of Eurasian otter is also important task on a national level. The present study was developed as a public campaign within the project LIFE Natura 2000 entitled "Conservation of the

ISSN 1306-3065

http://www.ijese.com/

Otter Population (*Lutra lutra*) in the Goričko Region – Phase 1" Goričko region is in the northeast of Slovenia neighbouring Austria and Hungary.

The study focused on Slovenian secondary-school students' factual knowledge of and attitudes toward the Eurasian otter and its conservation. Teenagers' attitudes may be different from those of the general public, but because they are future decision-makers we should be aware of and respect their views (Bath & Farmer, 2000). Building positive attitudes is necessary for increasing the pro-environmental behaviour of future citizens (Prokop & Kubiatko, 2008).

Before entering secondary school Slovenian pupils learn about freshwater ecosystems in the 7th grade (pupils aged 11 and 12) of primary school (school subject Science). Approximately 20 hours of curriculum time are devoted towards different types of freshwater ecosystems, their flora and fauna, food webs, water pollution and conservation (see Brumen, Glažar, Logaj, Pufič, Verčkovnik & Zupan, 2002). Eurasian otter is mostly presented as one of the top predators in food chains and food webs. In the 8th grade they learn about ecology, biodiversity and nature conservation (school subject: biology). The curriculum covers topics like interactions between organisms, energy cycles, biodiversity, protected areas and endangered species (Verčkovnik, Zupan, & Novak, 2000). Eurasian otter is often presented to children as an example of an endangered species whose existence was jeopardized by destruction of freshwater ecosystems, water pollution and hunting.

In secondary school Slovenian students learn very little about freshwater ecosystems or otters in particular. Biology curriculum is mostly devoted to cell biology, genetics, evolution, systematic, human biology and ecology (Vilhar, Zupančič, Vičar, Sojar & Devetak, 2008). Eurasian otter can be sometimes mentioned while talking about nature protection and natural heritage, because Eurasian otter is presented as a symbol of Bern Convention (1979).

Eurasian otters are native species in Slovenia, but very rarely observed. Usually they are seen and talked about by fishermen, hunters or fishpond owners. In everyday talk Slovenians use phrase "to throw up like an otter". This phrase is often used when someone is very sick and vomits a lot. The link between vomiting and otters is unexplainable. Otter is also a symbol presented in the flag of small Slovenian Municipality of Gornji Petrovci (northeast of Slovenia). In the last five years informal education about Eurasian otter in Slovenia was more intensive as a result of already mentioned project LIFE Natura 2000. Articles, posters, leaflets, film and exhibition were presented to public to promote Eurasian otter and its conservation in Slovenia.

An attitude is defined as a tendency to think, feel, or act positively or negatively toward objects in our environment (Eagly & Chaiken, 1993; Petty, 1995). Attitudes toward particular groups of animals, or even toward a single species, often function as an element in relatively intense and complex conflicts between different human groups over natural resource issues (Bath, 1989; Kellert, 1991; Reading & Kellert, 1993; Bjerke, Reitan & Kellert, 1998; Kaczensky, Blazic, & Gossow, 2004; Majić, 2007). Of particular importance are attitudes of those most likely to be affected by the conflict (Reading & Kellert, 1993). Several studies have demonstrated that attitudes toward animals differ between groups delineated by demographic and socioeconomic variables such as gender, age, education, and occupation (Kellert, 1996). Generally, people like dogs, cats, horses, birds, squirrels, and so on the most and dislike snails, rats, snakes, cockroaches, and spiders (Bjerke & Østdahl, 2004; Torkar, Praprotnik, & Bajd, 2007). Some studies have shown that females are generally more supportive of animal conservation than males (Taylor & Signal, 2005). In contrast, Bath and Farmer (2000) reported males having more positive attitudes toward some large carnivores. However, Herzog (2007) showed that gender differences are often overestimated.

Knowledge about animals is an essential precursor of attitudes toward them (Kellert & Westervelt, 1984). Some researchers have confirmed a link between greater knowledge and posi-

tive attitudes toward animals (e.g., Bath & Farmer, 2000; Røskaft, Bjerke, Kaltenborn, Linnell, & Andersen, 2003; Prokop, Kubiatko, & Fančovičová, 2008; Prokop & Tunnicliffe, 2008; Prokop, Fančovičová, & Kubiatko, 2009), but this relationship is often very weak (Ericsson & Heberlein, 2003; Kaczensky et al., 2004). For example, Prokop et al., (2008) found that factual knowledge about birds was positively related to students' attitudes toward them. More-educated respondents showed less fear of large carnivores than less-educated ones (Majić, 2007; Røskaft et al., 2003). However, a link between knowledge and attitudes is not always clear, and it is also unclear whether attitudes lead to increased knowledge or vice versa (Zimmermann, 1996).

Very little is known about human attitudes toward and knowledge of the Eurasian otter. Kranz (2000) reported that in areas where fish farming is an important industry some fish farmers perceive otters as an increasing threat to their livelihood. He also reported that in some European countries (the Czech Republic and Austria) the otter is perceived as a pest species. Bath and Farmer (2000) found that more than one-quarter of teenagers questioned in Northern Ireland were afraid to swim in rivers where otters live. They also reported that knowledge levels correlate with attitudes, with greater knowledge contributing to more positive attitude toward otters.

The aims of this study were to determine (1) what knowledge about and attitudes toward the Eurasian otter and its conservation Slovenian teenagers have, (2) whether their knowledge and attitudes are related, and (3) whether there are any significant differences in attitudes and knowledge with respect to gender.

Methods

The survey was carried out in fall 2008 and winter 2008–09. The sample included 273 Slovenian teenagers from secondary schools. We sent by post 310 questionnaires to students attending secondary schools located near Natura 2000 sites designated for the Eurasian otter. 276 (89%) questioners were returned and three were excluded from analysis, because data were incomplete. The sample consisted of 92 (33.7%) males and 181 (66.3%) females. Their average age was 15.57 years (SD = 1.01, min = 13, max = 19).

The participants were asked to complete a detailed, self-administered questionnaire with eight factual-knowledge questions and 18 attitude statements about the Eurasian otter and its conservation. The attitude and knowledge items were developed with the help of two experts on otter biology and conservation who are also co-authors of the article. Data entry and analysis was conducted using the Statistical Package for the Social Sciences (SPSS).

The participants' knowledge was measured by true/false statements and multiple-choice questions. For a detailed list of knowledge items, see Table 2. For each correct answer a score of "1" was assigned. Incorrect answers received zero points. A total score of eight factual knowledge questions and statements was used in the following analysis.

The participants' attitudes toward the Eurasian otter and its conservation were measured by Likert-type items (Likert, 1932). Attitude items were scored by participants from 1 (strongly disagree) to 5 (strongly agree). Items were formulated positively or negatively. In further analysis for all statements representing a negative attitude, the scores were reversed. A higher total score indicates a more positive attitude toward the Eurasian otter and its conservation.

Attitude scores were subjected to factor analysis (with varimax rotation) and two factors with an eigenvalue greater than 1.5 were derived. These two factors explained 36.5 % of the total variance. According to Reckase (1979), the prime factor should explain at least 20 % of the total variance. In agreement with this suggestion, the first factor explained 26.6 % of total variance and the second factor 9.8 % of the total variance. One item with loadings lower than 0.35 was omitted (omitted item: "I agree that road construction or reconstruction should consider animal

migration paths and appropriate passages should be built."), which is similar to what other researchers have done (e.g., Anastasi, 1996; Palaigeorgiou, Siozos, Konstantakis, & Tsoukalas, 2005; Prokop et al., 2008). One item loaded with more than one factor (item "Otters are important for maintaining natural balance in freshwater ecosystems.") was excluded from further analysis (Palaigeorgiou et al., 2005, Prokop et al., 2008). Crombach's alpha coefficient for the resulting instrument with 16 items was 0.79. "Concern for Otter Conservation" (alpha = 0.76) with nine items and "Opposition to Otter Conservation" (alpha = 0.68) with seven items. Nunnaly (1978) reported, reliability is satisfactory, when alpha is minimally 0.70. And Fraser (1989) reported that alpha coefficients in the range 0.58 – 0.81 indicate that the instrument has satisfactory reliability. All of the dimensions showed acceptable reliability (Anastasi, 1996). The range of scores was 16 to 80. A detailed description of item loadings is shown in Table 1.

We used multivariate analysis of covariance (MANCOVA) for investigating differences in our results. Gender was defined as an independent variable, age as covariate, and the attitudes and knowledge as dependent variables. Finally we used Pearson's product moment correlation coefficient for exploring the relationship between attitudes and knowledge. We could also compare means of two groups by simple test of means (t-test), but this statistical technique does not allow us to control for other factors. Therefore, we used MANCOVA which is a statistical technique that is the extension of analysis of covariance (ANCOVA). MANCOVA was used to filter out the influence of age (covariate) on results and at the same time find out if age had any influence on results.

Results

Knowledge of the Eurasian otter and its conservation

Out of eight knowledge items, only two were answered correctly by more than 50% of participants (Table 2). Almost two-thirds of teenagers knew that otters are protected animal species, and just over half of the students knew that otters do not climb trees. The remaining six items were correctly answered by less than half of the students. The item with the least frequently correct answer is a question about the Eurasian otter's length, with only 27.5% correct answers. In general, teenagers showed poor factual knowledge. Only 70 (25.6%) of all teenagers answered more than 50% of the questions correctly.

We examined gender and age differences in knowledge about the Eurasian otter and its conservation. Gender ($F(1,247) = 1.916$, $p = 0.168$) and age ($F = 2.711$, $p = 0.101$) didn't have any significant influence on students' knowledge.

Attitudes toward the Eurasian otter and its conservation

Detailed description of items from Concern for Otter Conservation Dimension: Overall, the mean score (3.62) in this inquiry indicates that teenagers possessed pro-conservation attitudes toward the Eurasian otter. The majority (95%) of teenagers (strongly) agreed that it is important to maintain a healthy population of Eurasian otters in Slovenia and that endangered species like otters have a right to live in Slovenia (88%). Only a minority (26%) of teenagers (strongly) agreed that the existence of otters in Slovenia has a positive impact on tourism. The majority (92%) of teenagers also (strongly) agreed it is important to maintain the otter population in the future and they supported otter conservation whether or not they would get to see otters themselves (78%). Only half (55%) of them supported otter conservation for future generations, and less than half (48%) supported it for other people's enjoyment. One-third (32%) of teenagers were willing to contrib-

Table 1. Factor analysis (with varimax rotation) for students' attitudes toward the Eurasian otter and its conservation

	Dimension	
	Concern for Otter Conservation	**Opposition to Otter Conservation**
Positive feelings toward the Eurasian otter.	**0.537**	0.317
It is important to maintain a healthy Eurasian otter population in Slovenia.	**0.637**	0.256
Otters have positive impact on tourism in Slovenia.	**0.535**	0.015
Eurasian otters reduce fish and crayfish populations to unacceptable levels.	−0.017	**0.483**
There are too many otters in Slovenia and they are a great danger to the balance of water organisms.	0.187	**0.546**
The law should allow otter hunting.	0.166	**0.606**
The Eurasian otter is a dangerous beast.	0.050	**0.615**
It is important to maintain the Eurasian otter population in Slovenia in the future.	**0.520**	0.347
It is unnecessary to maintain the Eurasian otter population in Slovenia because they also exist in other parts of Europe.	0.160	**0.539**
It is important to maintain the Eurasian otter population for future generations.	**0.543**	0.089
Whether or not I get to see otters, it is important to me that they exist in Slovenia.	**0.691**	0.105
It is important to me if other people enjoy the otter's existence in Slovenia.	**0.598**	−0.102
Endangered species, like the Eurasian otter, have a right to live in Slovenia.	**0.521**	0.285
If a Eurasian otter repeatedly causes damage to a fishpond, I would agree with killing this animal.	0.091	**0.728**
I agree with the statement that riverbanks or lakeshores should be cleared even though this reduces the habitat of many freshwater animals, including otters.	0.212	**0.354**
I am willing to contribute (work, money, etc.) to Eurasian otter conservation in Slovenia.	**0.540**	0.204
Eigenvalues	**4.680**	**1.588**

ute work or money for otter conservation. Interestingly, only 6 (2%) of all teenagers expressed negative feelings toward otters.

Detailed description of items from Opposition to Otter Conservation Dimension: The mean score (2.12) indicates that teenagers generally disagree with attitude statements in this dimension. Only a few (11%) of them (strongly) agreed that otters reduce fish and crayfish populations to an unacceptable level. Similarly, only 8% (strongly) agreed that the law should allow otter hunting. Furthermore, only 3% agreed that otters are a threat to the balance of water ecosystems and 3%

Table 2. Teenagers' knowledge of the Eurasian otter
(the choices are in parentheses and the correct one is underlined)

	Responded correctly (%)	Don't know (%)
The Eurasian otter can eat up to . . . of fish per day. (0.3 kg / 0.6 kg / 1 kg / <u>1.5 kg</u> / 2 kg / more / don't know)	35.5	36.6
The otter chews bark, including that of fruit trees. (true / <u>false</u> / don't know)	39.6	46.5
The Eurasian otter is active mostly at dusk and at night. (<u>true</u> / false / don't know)	37.7	42.1
Eurasian otters have well-developed claws enabling them to climb trees and hunt young birds. (true / <u>false</u> / don't know)	53.5	33.0
The Eurasian otter's length (including its tail) is . . . (0.5 m / 0.8 m / <u>1.2 m</u> / 1.5 m / don't know)	27.5	24.2
The Eurasian otter is a protected animal species in Slovenia. (<u>true</u> / false / don't know)	64.1	28.6
The Eurasian otter is a . . . in Slovenia. (<u>native species</u> / non-native species introduced by humans / don't know)	39.9	29.3
In areas with a high density of Eurasian otters we can often find well conserved watercourses, with naturally shaped streams and riversides with rich vegetation. (<u>true</u> / false / don't know)	46.5	45.4

agreed that otters are dangerous beasts. As expected, with respect to results from the first dimension, only 7% of teenagers agreed that it is unnecessary to protect otters in Slovenia because they also exist in other European countries. Only 9% of teenagers (strongly) agreed with killing an otter if it repeatedly causes damage to a fishpond. Last but not least, only 17% of teenagers agreed with the statement that riverbanks or lakeshores should be cleared despite the fact that this reduces the habitat for many freshwater animals, including otters.

Influence of gender ($F(1,247) = 4.216$, $p = 0.041$) for overall attitudes toward otter conservation was significant, and age ($F = 2.541$, $p = 0.112$) wasn't. Females expressed more positive attitudes toward Eurasian otter and its conservation than males.

The difference between males and females in the total score of attitudes in the Opposition to Otter Conservation Dimension was found to be significant ($F(1,247) = 4.104$, $p = 0.044$), but gender differences in the Concern for Otter Conservation Dimension were not significant ($F(1,247) = 1.676$, $p = 0.197$). Females more strongly disagreed with attitude statements in Opposition to Otter Conservation Dimension than males (Figure 1). The influence of age in the Concern for Otter Conservation Dimension and the Opposition to Otter Conservation Dimension was also examined and no significant differences were found.

Next, we found out that students with greater knowledge had more positive attitudes toward the Eurasian otter and its conservation (Figure 2). However, more detailed examination of the two categories revealed that the Concern for Otter Conservation Dimension displayed a low positive correlation with the student's knowledge ($r = 0.153$; $p = 0.015$; $n = 273$) and the Opposition to Otter Conservation Dimension displayed more significant negative correlation with the knowledge ($r = -0.315$; $p < 0.001$; $n = 273$). This means that greater knowledge especially reduces the student's opposition to otter conservation.

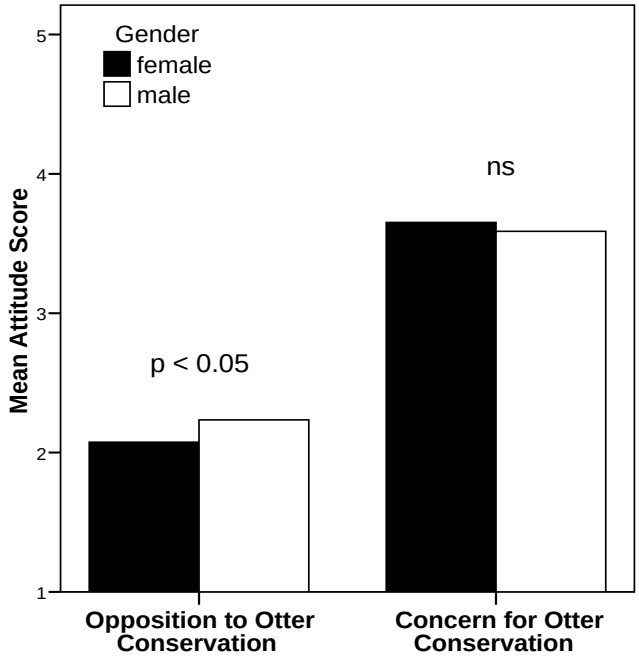

Figure 1. Comparison of gender differences in attitude dimensions

Discussion

The Slovenian teenagers had poor factual knowledge of Eurasian otters and their conservation. Gender and age did not influence on total score of knowledge. Eurasian otters are rarely observed in nature. They are usually seen and talked about by fishermen, hunters or fishpond owners. The lack of actual experiences with these animals could be one of the main reasons for the poor factual knowledge among teenagers. Despite some communicational and educational efforts in the last few years results do not show any major progress in teenager's level of knowledge about Eurasian otters and their conservation. But this could be changed in future if the results of the project LIFE Natura 2000 and other educational efforts will be efficiently implemented and used by educators in Slovenia. Teenagers nevertheless showed positive attitudes toward otter conservation. Teenagers showed more positive attitudes toward otters in the *Concern for Otter Conservation Dimension* in comparison to the *Opposition to Otter Conservation Dimension*.

Knowledge about animals is considered an essential precursor of attitudes toward them (Kellert & Westervelt, 1984). This study confirmed a weak link between teenagers' knowledge and attitudes. Greater factual knowledge correlated with positive attitudes toward the Eurasian otter and its conservation. Similar results were found in some previous studies (Bath & Farmer, 2000; Røskaft et al., 2003; Prokop et al., 2008; Prokop & Tunnicliffe, 2008; Prokop et al., 2009). A closer look at the correlation showed that the *Opposition to Otter Conservation Dimension* has a much stronger negative correlation with greater factual knowledge than the *Concern for Otter Conservation Dimension*. This indicates that greater knowledge above all reduces opposition to conservation activities and other negative attitudes toward otters. This is an important issue in

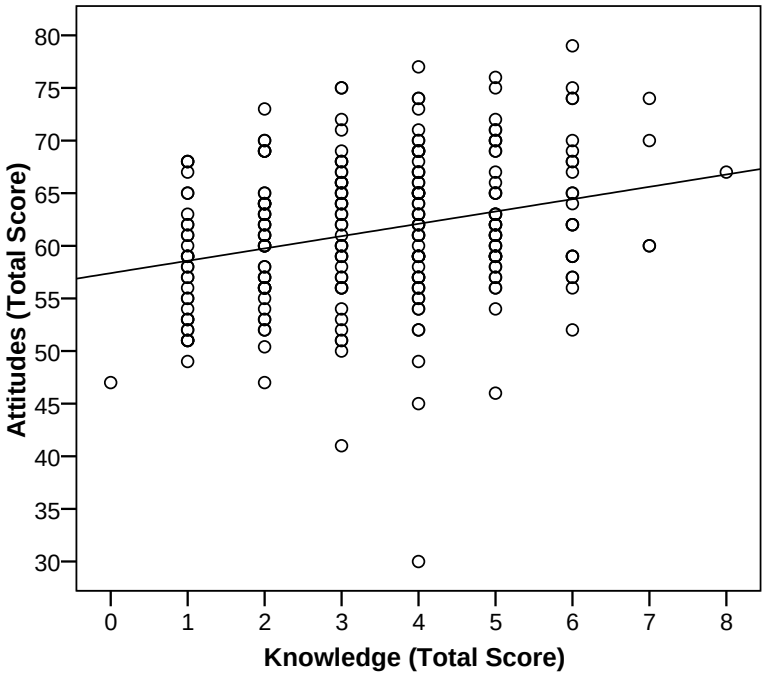

Figure 2. Relationship between the knowledge of and attitudes toward the Eurasian otter and its conservation (r = 0.27, p < .001, n = 253)

intense and complex conflicts between different human groups over natural resource issues, for example, attitudes toward large carnivores (Bath, 1989; Kellert, 1991; Bjerke et al., 1998; Kaczensky et al., 2004; Majić, 2007).

In contrast to Bath and Farmer's (2000) study, this research showed that Slovenian teenagers have almost no fear of otters. Because Slovenia is a country where humans successfully coexist with large carnivorous species, such as the brown bear, grey wolf, Eurasian lynx, and golden jackal, this result is not a great surprise.

Previous studies have demonstrated that attitudes toward animals differ between groups delineated by demographic variables (Kellert, 1996). We were interested in age and gender differences. Although males and females were both generally positive toward otter conservation, there were some significant differences in attitudes in favour of females. They more strongly disagreed with attitude statements in Opposition to Otter Conservation dimension than males. These data confirm that females are more supportive of animal conservation and protection (Taylor & Signal, 2005). We did not found any significant age differences in attitudes toward Eurasian Otter Conservation.

Conclusion

Overall, we can conclude that Slovenian teenagers showed positive attitudes toward Eurasian otter conservation and that they have a clear vision of freshwaters with otters in them. Teenagers with greater knowledge had more positive attitudes. Females were more supportive of otter con-

servation than males and age was not significant factor. Knowing more facts and information will not always result in more supportive attitudes (for example, see Reading & Kellert, 1993). Further research is needed and necessary to determine other factors influencing teenagers' attitudes toward otter conservation, such as social norms, personal values and experiences.

Because teenagers are future decision-makers and citizens (Bath & Farmer, 2000; Prokop & Kubiatko, 2008), we should not underestimate the importance of conservation education. More attention to conservation education programs, both formal (e.g., in schools) and informal (e.g., documentary films, books, the internet, and visitor centers), is needed. The Eurasian otter is an apex predator and endangered animal species living in freshwaters (Mason & Macdonald, 1986; Kruuk, 1995), and it could therefore be considered good educational material for conservation, also covering a large number of naturally co-occurring species and various other components of freshwater ecosystems.

References

Anastasi, A. (1996). *Psychological testing* (7th ed.). New York: Macmillan.

Bath, A.J. (1989). The public and wolf reintroduction in Yellowstone National Park. *Society and Natural Resources*, *2*, 297-306.

Bath, A.J., & Farmer, L. (2000). *Europe's carnivores: a survey of children's attitudes towards wolves, bears and otters.* Godalming, United Kingdom: World Wildlife Fund.

Bjerke, T., Reitan, O., & Kellert, S.R. (1998). Attitudes towards wolves in southeastern Norway. *Society and Natural Resources, 11*, 169-178.

Bjerke, T., & Østdahl, T. (2004). Animal-related attitudes and activities in an urban population. *Anthrozoös, 17*(2), 109-129.

Brumen, M., Glažar, S.A., Logaj, V., Pufič, T., Verčkovnik, T., & Zupan, A. (2002). *Učni načrt:program osnovnošolskega izobraževanja, Naravoslovje 7.* Ljubljana: Ministrstvo za šolstvo, znanost in šport; Zavod Republike Slovenije za šolstvo.

Chanin, P. (1985). *The Natural History of Otters*. London: C. Helm.

Council of Europe (1979). *Convention on the conservation of European wildlife and natural habitats*. Bern, Switzerland.

Council of the European Union (1992). *Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora* (Habitat directive).

Eagly, A.H, & Chaiken, S. (1993). *The psychology of attitudes*. Fort Worth, TX: Harcourt Brace Jovanovich.

Ericsson, G., & Heberlein, T. (2003). Attitudes of hunters, locals and the general public in Sweden now that the wolves are back. *Biological Conservation, 111*, 149-159.

Green, J., Green, R., & Jefferies, D.J. (1984). A radio-tracking survey of otters Lutra lutra (L. 1758) on a Perthshire river system. *Lutra, 27*, 85-145.

Herzog, H.A. (2007). Gender differences in human–animal interactions: A review. *Anthrozoös, 20*(1), 7-21.

Kaczensky, P., Blazic, M., & Gossow, H. (2004). Public attitudes towards brown bears (Ursus arctos) in Slovenia. *Biological Conservation, 118*(5), 661–674.

Kellert, S.R. (1991). *Public views of wolf restoration in Michigan*. Transactions of the North American wildlife and natural resources conference, *56*, 152-161.

Kellert, S.R. (1996). *The Value of Life: Biological Diversity and Human Society*. Washington, DC: Island Press.

Kellert, S.R., & Westervelt, M.O. (1984). Children's attitudes, knowledge and behaviors towards animals. *Children's Environments Quarterly*, *1*, 8-11.

Kranz, A. (2000). Otters (Lutra lutra) increasing in Central Europe: From the threat of extinction to locally perceived overpopulation? *Mammalia*, *64*(4), 357-368.

Kruuk, H. (1995). *Wild Otters. Predation and Populations*. Oxford: Oxford University Press.

Likert, R. (1932). A technique for the measurement of attitudes. *Archives of Psychology*, *140*, 1–55.

MacDonald, S. (1996). Otter distribution in Europe. *Cahiers d'Ethologie*, *15*, 143-148.

Majić, A. (2007). *Human Dimensions in Wolf Management in Croatia: Understanding Public Attitudes toward Wolves over Time and Space*. St. John's, Newfoundland: Memorial University of Newfoundland.

Mason, C.F. (1996). Impact of pollution on the European Otter. *Cahiers d'Ethologie*, 15, 307-320.

Mason, C.F., & Macdonald, S.M. (1986). *Otters, ecology and conservation*. Cambridge: Cambridge University Press.

Palaigeorgiou, G.E., Siozos, P.D., Konstantakis, N.I., & Tsoukalas, I.A. (2005). A computer attitude scale for computer science freshmen and its educational implications. *Journal of Computer Assisted Learning*, *21*(5), 330–342.

Petty, R. (1995). Attitude change. In: A Tesser (Eds.), *Advanced Social Psychology* (pp. 195-255). New York: McGraw-Hill.

Prokop, P., & Kubiatko, M. (2008). Bad wolf kills lovable rabbits: children's attitudes toward predator and prey. *Electronic Journal of Science Education*, *12*(1), 55-70.

Prokop, P., Kubiatko, M., & Fančovičová, J. (2008). Slovakian pupils' knowledge of and attitudes toward birds. *Anthrozoös*, *21*(3), 221-235.

Prokop, P., & Tunnicliffe, S.D. (2008). "Disgusting animals": Primary school children's attitudes and myths of bats and spiders. *Eurasia Journal of Mathematics, Science & Technology Education*, *4*(2), 87-97.

Prokop, P, Fančovičová, J., & Kubiatko, M. (2009). Vampires are still alive: Slovakian students' attitudes toward bats. *Anthrozoös*, *22*(1), 19-30.

Reading, R.P., & Kellert, S.R. (1993). Attitudes toward a proposed black-footed ferret (*Mustela nigripes*) reintroduction. *Conservation Biology*, *7*(3), 569-580.

Reckase, M.D. (1979). Unifactor latent trait models applied to multifactor tests: Results and implications. *Journal of Educational Statistics*, *4*(3), 207-230.

Robitaille, J.F., & Laurence, S. (2002). Otter, Lutra lutra, occurrence in Europe and in France in relation to landscape characteristics. *Animal Conservation*, *5*, 337-344.

Røskaft, E., Bjerke, T., Kaltenborn, B.P., Linnell, J.D.C., & Andersen, R. (2003). Patterns of self-reported fear towards large carnivores among the Norwegian public. *Evolution and Human Behavior*, *24*, 184-198.

Taylor, N., & Signal, T.D. (2005). Empathy and attitudes to animals. *Anthrozoös*, *18*, 18-27.

Torkar, G., Praprotnik, L., & Bajd, B. (2007). Odnos študentov, bodočih učiteljev, do živali. *Didacta Slovenica*, *22*(1–2), 136–149.

Verčkovnik, T., Zupan, A., & Novak, B. (2000). Učni *načrt: program osnovnošolskega izobraževanja. Biologija.* Ljubljana: Ministrstvo za šolstvo, znanost in šport : Zavod Republike Slovenije za šolstvo.

Vilhar, B., Zupančič, G., Vičar, M., Sojar, A., & Devetak, B. (2008). *Učni načrt. Biologija: gimnazija: splošna gimnazija : obvezni predmet (210 ur), izbirni predmet (35, 70, 105 ur), matura (105 + 35 ur)*. Ljubljana : Ministrstvo za šolstvo in šport: Zavod RS za šolstvo.

Zimmerman, L.K. (1996). The development of an environmental values short form. *Journal of Environmental Education*, *28*, 32-37.

Yamaguchi, N., Gazzard, D., Scholey, G., & Macdonald, D.W. (2003). Concentrations and hazard assessment of PCBs, organochlorine pesticides and mercury in fish species from the Upper Thames: River pollution and its potential effects on top predators. *Chemosphere*, *50*, 265-273.

Authors

Gregor Torkar is an Assistant Professor of biological education working at University of Nova Gorica, School of Environmental Sciences and EGEA, Institution for Nature, Slovenia. His main interests of research are biological and environmental education, and studies of human dimensions in nature conservation. **Correspondence:** University of Nova Gorica, School of Environmental Sciences, Vipavska 13, 5000 Nova Gorica, Slovenia. E-mail: gregor.torkar@guest.arnes.si

Petra Mohar is a biologist working in LUTRA, Institute for Conservation of Natural Heritage. Her main research interests are ornithology and freshwater ecology. E-mail: petra@lutra.si

Tatjana Gregorc is a biologist working in LUTRA, Institute for Conservation of Natural Heritage. Her main research interest is mammal ecology, especially beaver and Eurasian otter, and environmental impact assessment. E-mail: tatjana@lutra.si

Igor Nekrep is a biologist working in LUTRA, Institute for Conservation of Natural Heritage. His main research interest is entomology and environmental impact assessment. E-mail: igor@lutra.si

Marjana Hönigsfeld Adamič is a biologist working in LUTRA, Institute for Conservation of Natural Heritage. Her main research interest is conservation of Eurasian otter Lutra lutra. E-mail: marjana@lutra.si

Slovenya'daki öğrencilerin Avrasya Su Samuruna yönelik bilgileri ve tutumları

Bu çalışma Slovenya'daki insan-su samuru etkileşimleri üzerine odaklanmıştır. Çalışmanın amacı lise öğrencilerinin Avrasya su samuruna yönelik bilgi ve tutumları ile ilgili veriyi elde etmekti. Anket 273 öğrenci ile 2008-2009 yılında sürdürülmüştür. Öğrencilerin ortalama yaşı 15.57 idi. Katılımcılara 18 tutum ve 8 bilgi sorusunu içeren bir anket uygulanmıştır. Sonuçlar öğrencilerin su samuruna yönelik tutumlarının olumlu olduğunu göstermektedir. Öğrencilerin olumlu tutumları onların zayıf bilgilerine rağmen bulunmuştur. Çalışma iyi gerçek bilginin pozitif tutumlarla ilişkili olduğunu açığa çıkarmıştır. Sonuçlar ayni zamanda bayan öğrencilerin koruma ile ilgili karsı çıkan maddelere erkek öğrencilerden daha fazla karşı çıktıklarını göstermektedirler.

Anahtar keliemeler: tutumlar, bilgi, Avrasya Su Samuru, doga koruma, ogrenciler