Why protect biodiversity? Perspectives of conservation professionals in Poland

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There are numerous strategies to reverse biodiversity decline, ranging from economic, through ecological, to ethical ones. Which arguments are used in the conservation may have bearing on the actual implementation of biodiversity policies. To understand conservation professionals’ perceptions of biodiversity is particularly important in the countries in transition, where the new environmental policies are being implemented, the approaches to governance are changing and new biodiversity discourses are emerging. This study investigates what the biodiversity conservation professionals in Poland believe the rationale behind conservation is. We reveal two main perspectives – one focused on intrinsic value of biodiversity and one underlining its utilitarian value. Even if the intrinsic value perspective prevails, the economic framing of biodiversity value is emerging. This framing is important in the face of the ongoing changes in Poland with focus on economic development and relatively little attention paid to biodiversity. The utilitarian approach to conservation, reinforced by the concept of ecosystem services, can be used to supplement the emerging biodiversity discourse strengthening the conservation case. The richness of perspectives among the conservation professionals can facilitate deliberate construction of the new conservation discourse in Poland combining the notion of intrinsic value of nature with the utilitarian approach.

Keywords: biodiversity professionals; ecosystem services; intrinsic value; perceptions; utilitarian value

1. Introduction

Biodiversity loss has been on international policy agenda for several decades now, yet the accelerating decline (MA 2005) has not been stopped and we still face many challenges regarding biodiversity conservation (Pimm et al. 1995; Stokstad 2010). There are numerous strategies to reverse the biodiversity decline, ranging from economic, through ecological, to ethical (Rands et al. 2010). Both the rationale for biodiversity conservation action and its success vary greatly, depending on the paradigms represented by various professionals in charge of conservation, as well as social-cultural and political context (Wilshusen et al. 2002; Waylen et al. 2010). The value of biodiversity has been also framed in different terms, ranging from purely intrinsic to different kinds of assigned values, including use and non-use instrumental values (Ehrlich & Ehrlich 1992; Raffaelli et al. 2009). Likewise, the arguments for biodiversity conservation have varied depending on the underlying reasons for maintaining biodiversity in general. Some authors argue that demonstrating the economic values of biodiversity is the only way to go, as people need concrete incentives to engage in action reversing biodiversity loss (e.g. Pearce 2001). Others argue that market-based conservation leads to selling out on nature and advocate return to focusing on the intrinsic values (e.g. McCauley 2006; Soulé 2013).

Which arguments are used and how they are incorporated in the general conservation discourse may have bearing on the actual implementation of biodiversity policies. Presence of perspectives that are in strict conflict with each other may lead to problems in policies’ and management guideline’s implementation due to tensions between fundamental values and beliefs (Emtage & Herbohn 2012; Wolfe 2012). Similarly, professionals working with biodiversity in different sectors may assign different priority to different issues, like, for example, in the case of conflict between conservation and agricultural activities (Henle et al. 2008).

As the successful realization of conservation goals to great extent depends on conservation professionals, i.e. people at different governance levels who work with implementing biodiversity policies in practice (representatives of authorities and NGOs as well as scientists), it is important to know how they perceive biodiversity and the reasons behind its conservation. There have been relatively many studies scrutinizing the perceptions of biodiversity and its values among people not professionally involved in nature conservation. In particular, representations, images and visions of nature (Van Den Born et al. 2001; Buijs et al. 2008, 2012), landscape-type preferences (De Groot & Vanden Born 2003), preferences for biodiversity-related values (Qiu et al. 2013) and people’s mental constructs of biodiversity (Fischer & Young 2007) have been investigated. However, the studies concerning the way in which professionals working with conservation perceive biodiversity and its values are rather sporadic. In a rare study of such values, Sandbrook et al. (2011) investigated plurality of values among international...
conservation professionals and concluded that they did not share any core values, but instead held a complex set of ideas and opinions about biodiversity. Fisher and Brown (2014) looked into how professionals working with conservation use and interpret the notion of ecosystem services, revealing concerns over the utilitarian thinking that permeates this concept and the instrumental approach in adopting it. However, they also conclude that ecosystem services concept may provide a common language to integrate conservation with other sectors.

While there are few studies on the conservation professionals’ perceptions of biodiversity of the old European Union (EU) countries, the new EU member states seem to be even less investigated with regard to this issue. In the light of the ongoing changes that these countries face, both in terms of economic development and implementation of EU policies, knowledge on the existing perspectives on biodiversity conservation may help shed light on the reasons behind conservation and assist shaping the new discourse on biodiversity, facilitating efficient implementation of new domestic policies. In this paper, we reveal the perspectives on biodiversity conservation present among professionals that work with biodiversity in Poland by using a Q-methodology (Webler et al. 2009). The Q-methodology was originally developed by William Stephenson (Stephenson 1935) as a tool to assess individuals’ attitudes and perspectives. The method enables the researcher to reveal patterns in underlying value systems of individuals and groups (Gruber 2011). The aim is not to reveal ‘the facts’ but to study subjective opinions on a topic of interest (Brown 1993). The strength of the Q-methodology is that it combines both statistical analysis and qualitative interpretation that leads to increased reliability and validity of the results (Bumbudsanpharoke et al. 2010).

Poland is the largest post-communist country (both in terms of area and human population) that entered the EU after 2000 and has since then been subject to European biodiversity legislation. Presently, over decade after the accession, Poland still faces numerous development challenges. Because of the focus on economic development of the country, biodiversity conservation is still not at the centre of public attention (Blicharska et al. 2011; Niedzialkowski et al. 2013), even if all relevant policies are officially implemented. At the same time, the level of acceptance of new policies in Poland, likewise in the other new EU member states, is still relatively low (Grodzińska-Jurgczak & Cent 2011) and thus the implementation of biodiversity policies often leads to conflicts, like it was, for example, in the case of the Natura 2000 network implementation (Kluvánková-Oravská et al. 2009; Paavola et al. 2009; Grodzińska-Jurgczak & Cent 2011).

Poland’s biodiversity is relatively rich compared to other EU countries (Oleksyn & Reich 1994; Plit 2000), and therefore the need for the effective strategies that combine economic development with conservation goals to protect the remaining biodiversity is of particular importance. In our study, we reveal how professionals in Poland think about what rationale behind biodiversity conservation is. We discuss the potential role of their perspectives in constructing new conservation discourse in a young EU member state.

2. Methods

The Q-methodology was initially developed as a tool for psychological research. However, it has been used in many different fields, including environmental studies, for example, to investigate perspectives on forest management (Steelman & Maguire 1999), tiger conservation (Rastogi et al. 2013), global environmental change (Niemeyer et al. 2005), environmentally adapted management practices in agriculture (Bumbudsanpharoke et al. 2010), conservation discourses (Cairns et al. 2014) or good participation process (Webler et al. 2001).

In the Q-methodology, each participant is given a set of statements that he/she orders (sorts) on a Q-chart (Figure 1), from the statements he/she agrees most with to the statements he/she agrees least with (sorting of the statements by a participant is called a ‘Q-sort’). Quantitative analysis of the Q-sorts aids to find patterns in opinions across participants. This is complemented with qualitative interviews conducted during Q-sorts to create narratives representing different opinions/perspectives. The methodological details of the Q-method have been described by several authors (e.g. Brown 1993; Webler et al. 2009). In the following, we focus mainly on the details specific to our study. First, we selected a set of statements that made up a concourse, based on the body of literature on the arguments for biodiversity conservation emerging from a comprehensive literature review on different arguments for conservation that was conducted within the BESAFE project (Biodiversity and Ecosystem Services: Arguments for our Future Environment; http://www.besafe-project.net/) and will be published elsewhere (Howard et al., unpublished data). Different rationales for biodiversity conservation that emerged from the literature review were represented by 180 initial statements that could be roughly divided into seven categories: economic arguments, biophilia (i.e. based on the premise that there is an instinctive bond between human beings and other living systems) arguments, utilitarian (non-economic) arguments, aesthetic arguments, intrinsic value arguments, ecosystem integrity/function arguments and ecosystem service arguments. The initial 180 statements were reviewed and reduced to a final set of 42 final statements (Table 1). When selecting the final 42 statements, attention was paid to retain statement representing each of the argument categories, to have statements that would be easily understandable and meaningful for the participants and that would allow for slightly different interpretations by different people. The statements were also selected to represent topics that all participants were likely to have opinions about. The statements taken from the literature were edited to be understandable even if read out of context. Finally, to
get acceptance and to ensure that the statements were understood all were translated into Polish.

In the Q-methodology, it is recommended to have fewer participants than statements used. Usually a ratio 3:1 is recommended (Webler et al. 2009). For our 42 statements, we selected 16 participants. The participants were professionals working with biodiversity conservation (see supplemental data), including authorities’ representatives, NGO representatives and scientists (representing both natural and social sciences). All participants were selected through judgement sampling (Marshall 1996) and contacted by email and/or telephone. In case of authorities, a head of particular unit was contacted, while in case of researchers or NGOs, particular person of interest was contacted. Main selection criterion was that all participants should work professionally with biodiversity conservation and thus be well acquainted with this topic. Compared to other quantitative methodologies, Q-methodology requires relatively small sample of respondents because the aim in a Q-study is to focus on what are the particular perspectives and not how many people express these perspectives (Brown 1996). In the Q-methodology, the respondents are ‘dependent variables’ (in quantitative method’s terminology), and the Q-statements are ‘independent variables’, representing a wide spectrum of ideas (Kamal et al. 2014). Thus, a Q-study does not describe a population of people expressing particular views, but instead it describes a population of viewpoints or perspectives (Van Exel & De Gnaaf 2005). Because of this inherent structure, there is a need for assuring that a set of statements is representative, i.e. includes all important claims in the relevant topic. This was done by including in the concourse statements from each argument category (see above) and statements that were both positively and negatively framed (Kamal et al. 2014). All the statements are provided in Table 1, together with their z-scores and ranks for each factor. Z-scores represent measures of how far a statement lies from the middle of a distribution of statements typical for a particular factor and thus can be used to show which particular statements are most important for describing particular factor (Webler et al. 2009).

The participants were asked to sort the statements written on small cards into the Q-chart (Figure 1) according to their personal thoughts and views having the question ‘Why to invest in biodiversity conservation?’ in mind. The participants sorted the statements on a scale from ‘most like I think’ (+4) to ‘least like I think’ (−4). At the same time, the participants were encouraged to think aloud and discuss their choices with the interviewer. The interviews were audio-recorded and the participants were assured of the anonymity of both the sorts and the recordings. Each interview/sort took from ca. 40 minutes to 1.5 hour. The interviews were conducted in April to June 2013. The quotes from the interviews were used to cross-check the results of the quantitative analysis. Particular fragments of the interviews are also quoted to support the findings presented in the results section.

The quantitative analysis was conducted using free software PQMETHOD program written by Peter Schmolck (http://schmolck.userweb.mwn.de/qmethod/index.htm#PQMethod). First, a factor analysis was conducted using principal component analysis (PCA) algorithm in order to identify which Q-sorts (particular sortings by individual participants) clustered together. As a result, eight different factors, representing different

| Why invest in biodiversity conservation? |
|-----------------------------------------|
| **My personal thoughts and beliefs** about the value of biodiversity conservation |
| 42                                      |
| 25                                      |
| 30                                      |
| 19                                      |
| 15                                      |
| 7                                       |
| 6                                       |
| 34                                      |
| 36                                      |
| 35                                      |
| 29                                      |
| 32                                      |
| 38                                      |
| 23                                      |
| 13                                      |
| 9                                       |
| 39                                      |
| 5                                        |
| 41                                      |
| 18                                      |
| 27                                      |
| 20                                      |
| 24                                      |
| 31                                      |
| 37                                      |
| 2                                        |
| 10                                      |
| 11                                      |
| 8                                        |
| 12                                      |
| 26                                      |
| 1                                        |
| 22                                      |
| 17                                      |
| 40                                      |
| 16                                      |
| 14                                      |
| 28                                      |
| 33                                      |
| 4                                        |
| 21                                      |
| 3                                        |
| **Least like I think**               |
| **Most like I think**               |

Figure 1. Q-chart with an example of a Q-sort from perspective 1 (sort 10), where all the statements (numbered from 1 to 42) are sorted on the scale from ‘most like I think’ to ‘least like I think’.
Table 1. The Q-statements used in the study, their z-scores and scores for particular statements for each factor (Q-SV).

| No. | Statement                                                                 | Factors |
|-----|---------------------------------------------------------------------------|---------|
|     |                                                                           | 1       | 2       | 3       | 4       |
|     |                                                                           | Z-score | Q-SV    | Z-score | Q-SV    | Z-score | Q-SV    | Z-score | Q-SV    |
| 1   | We do not know how ecosystems will be affected by the loss of species,     | 0.783   | 1       | 0.754   | 1       | −0.701  | −2      | 0.000   | 0       |
|     | therefore we better preserve them.                                        |         |         |         |         |         |         |         |         |
| 2   | Protecting ecosystem service providers is important because they are a     | −0.414  | −1      | 1.616   | 4       | 0.210   | 0       | 0.006   | 0       |
|     | source of economic value.                                                 |         |         |         |         |         |         |         |         |
| 3   | The ecosystem service approach has potential to improve species            | −0.224  | −1      | 1.193   | 2       | 1.074   | 2       | 0.272   | 1       |
|     | conservation in Europe.                                                   |         |         |         |         |         |         |         |         |
| 4   | Biodiversity conservation is not a moral matter.                          | −0.341  | −1      | −0.848  | −1      | −1.002  | −2      | −0.272  | 1       |
|     |                                                                           |         |         |         |         |         |         |         |         |
| 5   | Some species are important symbols of human values, such as freedom.      | −0.003  | 0       | −0.280  | 0       | 0.000   | 0       | 0.556   | 1       |
|     |                                                                           |         |         |         |         |         |         |         |         |
| 6   | Species are priceless.                                                     | 0.496   | 1       | −0.271  | 0       | −0.792  | −2      | −1.887  | −4      |
|     |                                                                           |         |         |         |         |         |         |         |         |
| 7   | The reason biodiversity matters is because it confers on us an           | 0.451   | 1       | −0.894  | −1      | 0.164   | 0       | −1.349  | −3      |
|     | imprecise, immeasurable well-being that is located in the spirit rather |         |         |         |         |         |         |         |         |
|     | than in the wallet.                                                       |         |         |         |         |         |         |         |         |
| 8   | The extinction of a species is like the destruction of a great work of    | 0.122   | 1       | −1.119  | −2      | 0.000   | 0       | −1.881  | −4      |
|     | art.                                                                      |         |         |         |         |         |         |         |         |
| 9   | It is not clear why all species that environmentalists campaign to save   | −1.504  | −3      | −0.497  | −1      | −0.655  | −2      | 0.266   | 0       |
|     | ought to be saved.                                                        |         |         |         |         |         |         |         |         |
| 10  | Protecting biodiversity and ecosystem services is particularly important  | −0.659  | −2      | 0.854   | 2       | 0.910   | 2       | −0.272  | −1      |
|     | for poverty alleviation in developing countries.                          |         |         |         |         |         |         |         |         |
| 11  | Conserving genetic diversity is important to feed future human            | −0.455  | −2      | 1.410   | 3       | 1.329   | 3       | −0.272  | −1      |
|     | populations.                                                              |         |         |         |         |         |         |         |         |
| 12  | Countries can benefit from their conservation efforts through tourism.    | −0.195  | 0       | 1.307   | 3       | 0.210   | 0       | −0.810  | −2      |
|     |                                                                           |         |         |         |         |         |         |         |         |
| 13  | Nature provides us with many valuable experiences.                        | −0.432  | −1      | 0.444   | 1       | 1.657   | 4       | 2.153   | 4       |
|     | We hunt, fish, hike, mountain climb, and engage in numerous               |         |         |         |         |         |         |         |         |
|     | activities in which we interact with nature.                              |         |         |         |         |         |         |         |         |
| 14  | Losing its biological richness and diversity, the world loses its magic.  | −0.087  | 0       | −0.904  | −2      | 0.373   | 1       | −0.012  | 0       |
|     |                                                                           |         |         |         |         |         |         |         |         |
| 15  | It is important to conserve the genetic reservoir in a region, in case    | −0.005  | 0       | 1.641   | 4       | 0.537   | 1       | 1.071   | 2       |
|     | we need to breed disease-resistant plants or produce food adapted to local|         |         |         |         |         |         |         |         |
|     | conditions.                                                               |         |         |         |         |         |         |         |         |
| 16  | We want to experience areas where humans are merely visitors and not      | −0.773  | −2      | −1.399  | −4      | 0.373   | 1       | 0.278   | 1       |
|     | inhabitants.                                                              |         |         |         |         |         |         |         |         |
| 17  | Most species are superfluous.                                             | −2.337  | −4      | −2.198  | −4      | −2.148  | −4      | −2.153  | −4      |
|     |                                                                           |         |         |         |         |         |         |         |         |
| 18  | We value some species for their beauty, but this is only relevant for     | 0.948   | 2       | 0.738   | 1       | −0.419  | −1      | 0.804   | 2       |
|     | a very small number of species. Therefore, beauty is not a particularly   |         |         |         |         |         |         |         |         |
|     | important basis for conservation.                                         |         |         |         |         |         |         |         |         |
| 19  | We do not need to recognize other beings as our moral equals              | 1.028   | 2       | 0.262   | 0       | −1.611  | −3      | −0.260  | 0       |
|     | to realize that we should not kill that which is not a threat.            |         |         |         |         |         |         |         |         |
| 20  | All species have a right to exist, regardless of their ability to benefit | 1.763   | 4       | 0.068   | 0       | 1.028   | 2       | −0.006  | 0       |
|     | humans.                                                                   |         |         |         |         |         |         |         |         |
Nature is a laboratory for the pursuit of science through which society gains knowledge, and understanding of the world. The diversity of life is something like the rivets on an airplane, with each species playing a small but significant role in the working of the whole. The loss of each rivet weakens the plane by a small but noticeable amount – until it loses airworthiness and crashes.

Nature provides a place to take calculated risks, to learn the luck of the weather, to lose and find one’s way, to reflect on success and failure. Even if only a few species are needed for our world to be productive we have to conserve more species as a back-up. Otherwise a pest or climate change could wipe out the few species we have saved, and we would have nothing in reserve.

Pristine nature is valuable in itself. Ecosystems have co-evolved with humans creating landscapes of important cultural value. Any effort to conserve biodiversity must be limited by considerations of other values such as freedom, equality, health and justice.

Destroying nature is like burning unread books. Valuing species in economic terms implies a justification for the destruction of the biosphere. Nature produces works of grace which please the eye. Species extinction reduces possibilities for future generations. The knowledge of the mere existence of species is valuable, even if it is certain that I will never experience them in situ.

Genetic diversity is good because each particular species represents the success of generations of evolutionary trial and error. Biodiversity is an unqualified good, i.e. biodiversity is good no matter what. Humans are morally permitted to extinguish any species harmful to human survival. We can’t aim to conserve biodiversity in all its aspects. Instead, we have to make choices about increasing, maintaining, or even diminishing biodiversity in particular circumstances.

As nature is always changing there is no point in conserving a fixed ecosystem state. Species extinctions are not necessarily bad. Nature and its diversity make our lives meaningful. The earth’s biodiversity should be conserved because genetic diversity may be valuable in the development of new drugs against disease.
perspectives, were created. The factors were then rotated using Varimax algorithm, to find the simplest structure in the data while aiming to explain as much of the variance as possible. We selected the optimal number of factors by, first considering the eigenvalues (choosing factors with eigenvalues above 1; Webley et al. 2009), and then checking if the resulting perspective made sense in terms of clearness and interpretability of results (Kamal et al. 2014). It became apparent that four of the eight factors (perspectives) worked best to interpret the range of perspectives. As the rotation resulted in one perspective (perspective 3) of bipolar character (i.e. where participants placed Q-statements representing some particular perspectives on opposite sides of the Q-chart, thus representing directly opposing views), one Q-sort (3) was removed from the final analysis, to avoid interpretational problems. However, some insights from this particular sort are included when perspective 3 is presented to illustrate the bipolar character of this perspective. Additionally, one Q-sort (14) represented truly hybrid views (was not significantly associated with any of the particular factors/perspectives) and was thus not included in the final analysis. To sum up, 14 individual Q-sums were used in the final analysis.

3. Results

The factor analysis reduced and summarized the complex and high-dimensional results of the interviews down to four dimensions, or factors, each, representing the main perspectives on biodiversity conservation rationale that emerged from the Q-analysis. The PCA factors will hereafter be referred to as perspectives. Together the four perspectives explained 67% of the total variance among 14 out of 16 of the Q-sums (two sorts were not included in the factor analysis). Perspective 1 was defined by six Q-sums, perspective 2 by four, while perspectives 3 and 4 by two sorts each. The correlations between perspective 1 and 3 (0.2834), P1 and P4 (0.1148), as well as P3 and P4 (0.2901), were relatively low, while correlations between perspectives 1 and 2 (0.4044), P2 and P3 (0.3613) and P2 and P4 (0.3843), were higher. The composite reliabilities for the perspectives were relatively high (0.960 for P1; 0.941 for P2; 0.889 for P3; 0.889 for P4), which indicates that if the study would be repeated similar perspectives would emerge.

In the following section, we describe the particular perspectives, based on the quantitative Q-analysis and supported by the interview material. Number in [] indicates the number of a statement. For each quote from an interview, a number of the participant is indicated (for a list of participants, see supplementary material).

3.1. Perspective 1: biodiversity as an unqualified good; nature as an ecological system

Participants representing this perspective focused on an intrinsic value of biodiversity and defined biodiversity as an unqualified good. They believed that all species had right to exist, even if they have no clear benefit for mankind [20]. The participants explained: ‘The human being is not the most important being on the Earth and has no moral right to decide about the life of other beings… (...) in an ideal world all species should exist’ (participant 6); ‘this is exactly what biodiversity is about, that not necessarily everything need to give us some benefits’ (participant 11). One of the participants also underlined the time perspective, claiming that ‘all species have right to exist, regardless their ability to benefit, meaning provide benefits “now”; if they do not provide now, it does not mean that they will not provide in the future’ (participant 8).

The representatives of this perspective did not think that humans were morally permitted to extinguish any species harmful to human survival [37], and called this a ‘utilitarian point of view’ (participant 8) or ‘very subjective and utilitarian [approach]’ (participant 8). One participant added ‘I associate that with religions that show that humans are above all other species and have a right to decide what may live and what may not, this does not really reflects my morality’ (participant 6).

Additionally, biodiversity was seen as a whole, where each small piece was important for the whole system [22], where species survival ultimately depended on large numbers of other species [31] and where there was a need to keep more species than seemed to be enough for productivity just now, as a backup in the face of future changes [24]. This reflected long-time perspective thinking, as ‘we would have nothing in reserve to replace the species that we would lose due to some decision regarding present benefits’ (participant 8). Additionally, nature was also perceived as a laboratory for the pursuit of science and understanding [21], as something that can give us ‘values (...) that can bring us some development, we can learn something from them, from nature, or get some ideas from it’ (participant 10).

What significantly distinguished perspective 1 from other perspectives (Table 2) was that the participants valued biodiversity as an unqualified good, i.e. as something that was good no matter what [36], ‘independent of our understanding of its current utility, and all that we think about it now’ (participant 8), also reflecting the intrinsic value of biodiversity. This was also the only perspective in which species were to some extent considered priceless (z-score 0.496). According to this perspective, extinctions of species were definitely something bad [40] and reduced possibilities for future generations [33], however not necessarily economic possibilities, but also other utility values: ‘for example if Great Snipes get extinct, then the next generation will never be able to learn about their biology and beauty and what is special for this species, what they contribute with’ (participant 11).

The participants also did not think that biodiversity conservation should be constrained by considerations of other, human-related, values like freedom, equality, health and justice [27], even if one of the participants said: ‘maybe it must be, but this is such an empty argument...
Table 2. Statements distinguishing factors 1 to 4 ($P < 0.05$).

| No. | Statements                                                                 | Factor 1                  | Factor 2                  | Factor 3                  | Factor 4                  |
|-----|----------------------------------------------------------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
|     |                                                                            | Z-score       | Q-SV       | Z-score       | Q-SV       | Z-score       | Q-SV       | Z-score       | Q-SV       |
| 31  | Species survival ultimately depends on large numbers of other species.     | 1.777*        | 4          | 0.929        | 2          | 0.865        | 2          | −0.816        | −2         |
| 32  | Species extinction reduces possibilities for future generations.           | 1.200*        | 3          | 0.346        | 1          | −0.537       | −1         | −0.810        | −2         |
| 33  | We do not need to recognize other beings as our moral equals to realize that| 1.028         | 2          | 0.262        | 0          | −1.611       | −3         | −0.260        | 0          |
| 34  | Species are priceless.                                                     | 0.496         | 1          | −0.271       | 0          | −0.792       | −2         | −1.887        | −4         |
| 35  | As nature is always changing there is no point in conserving a fixed ecosystem state. | −1.180*       | 0          | −1.177       | −3         | −1.611       | −4         | 1.609         | 4          |
| 36  | Nature provides us with many valuable experiences. We hunt, fish, hike, mountain climb, and engage in numerous activities in which we interact with nature. | −0.432*       | −1         | 0.619        | 1          | 0.583        | 1          | 1.343         | 3          |
| 37  | Nature provides us with many valuable experiences. We hunt, fish, hike, mountain climb, and engage in numerous activities in which we interact with nature. | −1.150        | −3         | 0.861        | 1          | −0.733       | −1         | 0.278         | 1          |
| 38  | Species extinction reduces possibilities for future generations.           | −0.773        | −2         | −1.399       | −4         | 0.373        | 1          | 0.550         | 1          |
| 39  | As nature is always changing there is no point in conserving a fixed ecosystem state. | −1.504        | −3         | −0.497       | −1         | −0.655       | −2         | 0.266         | 0          |
| 40  | Species extinction are not necessarily bad.                               | −1.634*       | −4         | −0.515       | −1         | −0.491       | −1         | 0.816         | 2          |
| 41  | The earth’s biodiversity should be conserved because genetic diversity may be valuable in the development of new drugs against disease. | 0.478         | 1          | 1.690*       | 4          | −0.210       | 0          | 0.266         | 0          |
| 42  | Protecting ecosystem service providers is important because they are a source of economic value. | −0.414        | −1         | 1.616*       | 4          | 0.210        | 0          | 0.006         | 0          |
| 43  | Countries can benefit from their conservation efforts through tourism.    | −0.195        | 0          | 1.307*       | 3          | 0.210        | 0          | −0.810        | −2         |
| 44  | Nature provides us with many valuable experiences. We hunt, fish, hike, mountain climb, and engage in numerous activities in which we interact with nature. | −0.432        | −1         | 0.444*       | 1          | 1.657        | 4          | 2.153         | 4          |
| 45  | Species extinction reduces possibilities for future generations.           | 1.200         | 3          | 0.346        | 1          | −0.537       | −1         | −0.810        | −2         |
| 46  | Losing its biological richness and diversity, the world loses its magic.  | −0.087        | 0          | −0.904       | −2         | 0.373        | 1          | −0.012        | 0          |
| 47  | We want to experience areas where humans are merely visitors and not inhabitants. | −0.773        | −2         | −1.399       | −4         | 0.373        | 1          | 0.278         | 1          |
| 48  | Nature and its diversity make our lives meaningful.                       | −0.154        | 0          | −0.830       | −1         | 1.611*       | 4          | −0.804        | −1         |
| 49  | Valuing species in economic terms implies a justification for the destruction of the biosphere. | −1.371        | −3         | −1.460       | −4         | 0.583*       | 1          | −0.798        | −1         |
| 50  | We value some species for their beauty, but this is only relevant for a very small number of species. Therefore, beauty is not a particularly important basis for conservation. | 0.948         | 2          | 0.738        | 1          | −0.419*      | −1         | 0.804         | 2          |
| 51  | Even if only a few species are needed for our world to be productive we have to conserve more as a back-up. Otherwise a pest or climate change could wipe out the few species we have saved, and we would have nothing in reserve. | 0.973         | 2          | 0.279        | 0          | −0.537       | −1         | 0.538         | 1          |
| 52  | Knowledge of the mere existence of species is valuable, even if it is certain that I will never experience them in situ. | 0.848         | 2          | 0.428        | 1          | −1.074*      | −3         | 1.621         | 4          |
| 53  | We can’t aim to conserve biodiversity in all its aspects. Instead, we have to make choices about increasing, maintaining, or even diminishing biodiversity in particular circumstances. | −0.380        | −1         | 0.042        | 0          | −1.238       | −3         | 0.266         | 0          |

(Continued)
| No. | Statements                                                                                                                                                                                                 | Factor 1 | Factor 2 | Factor 3 | Factor 4 |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|----------|----------|----------|
| 19  | We do not need to recognize other beings as our moral equals to realize that we should not kill that which is not a threat.                                                                                  | 1.028    | 0.262    | −1.611   | −0.260   |
| 34  | Knowledge of the mere existence of species is valuable, even if it is certain that I will never experience them in situ.                                                                                  | 0.848    | 0.428    | −1.074   | 1.621    |
| 39  | As nature is always changing there is no point in conserving a fixed ecosystem state.                                                                                                                     | −0.180   | −1.177   | −1.611   | −1.609*   |
| 40  | Species extinctions are not necessarily bad.                                                                                                                                                             | −1.634   | −0.515   | −0.491   | 0.816*    |
| 31  | Species survival ultimately depends on large numbers of other species.                                                                                                                                   | 1.777    | 0.929    | 0.865    | −0.816*   |
| 6   | Species are priceless.                                                                                                                                                                                   | 0.496    | −0.271   | −0.792   | −1.887   |

*Distinguishing statements for factor 4*

Note: * indicates significance at $P < 0.01$; Q-SV, score for particular statement for each factor, from −4 to +4.
What does it mean “freedom, equality, health, and justice”, probably it is a very subjective concept, defined culturally” (participant 15).

The participants also expressed a moral stance that other beings should not be killed if they are not a threat, even if they are not our moral equals [19]. However, to some participants this kind of ‘moral approach’ was something new: ‘morally, in some way looking from the entirely human point of view, you can look at nature conservation as well. In some way I have never thought about it like that’ (participant 10).

To sum up, this perspective represented a protection-oriented view that underlined the intrinsic value of biodiversity and its right to exist, no matter the benefits it could provide to people. The participants had a holistic view of the nature and saw it as an integrated ecological system of components and interlinkages that needed to be maintained, where humans only are one component. They also thought that people need biodiversity for the future but not necessarily in terms of economic benefits.

3.2. **Perspective 2: ecosystem services and utility of nature**

The focus in this perspective was to a large extent on the utilitarian value of biodiversity, as one of the participants described it: ‘this approach allows looking at nature conservation in a new way, not as simply an aesthetic question, but [an issue] that has a social-economic importance’ (participant 7). Also: ‘People need to understand why they are doing it [protect/conserve biodiversity], they have to benefit from it. People do not do something just for an idea, but they actually need to understand that nature also is useful for them’ (participant 16). Ecosystem services were seen as a source of economic value, which was [2] ‘important, because this economic factor is simply the best reason that can convince to protect biodiversity’ (participant 2). Participants also believed that countries could benefit from their conservation through tourism [12] and that the ecosystem service approach had potential to improve conservation in Europe [3], even if ‘it is a long way still’ (…) because these arguments are getting accepted slowly’ (participant 2). They also thought that genetic diversity could be valuable in the development of new drugs [42], or disease-resistant plants and the production of food adapted to local conditions [15]. Furthermore they thought that biodiversity would be important for feeding future human populations [11]. As one participant put it:

There were such examples where mass production of food, such industrial [production] with time occurred counter-efficient (…) Some species of rice were widely propagated as more efficient and they were really more productive but with time this productivity decreased and then it occurred that, when there were attempts to come back to the old species, they were then impossible to find (…) Even if we think at this moment that we can, let’s say, mass-produce corn or some other species and (…) feed the humanity (…) It will be so for sure, but in a perspective of 20 or 30 years, but for example not 50. (Participant 7)

Another participant also said that ‘adjusting to local conditions is important’, as

(…) only such local varieties are most valuable, most healthy, and they are also well-adjusted to the local natural conditions; and there are also of course these all genetically modified organisms (GMOs) plus these kinds of varieties that can be grown everywhere because they are simply resistant to everything – but it is also often connected to worse taste, to worse quality. (Participant 9)

Two participants talked about GMOs, underlining that ‘GMOs are still not well studied, recognized, and we still do not really know if they can cause some illnesses, genetic or others’ (participant 9) and that ‘[thinking about genetic diversity for feeding people in the future] is this kind of thinking that protects us against different genetic modifications’ (participant 16).

The participants of this perspective considered the description of biodiversity as a work of art [8], a museum to all [32] or magic [14] as ‘too metaphoric’ (participant 7). One of the participants added that the term ‘museum’ may have very negative associations in the society, as related to the argument that ‘one wants to make an “open-air museum” [from nature]’ (participant 2). Also, on the contrary to perspective 1, representatives of this perspective did not think that biodiversity was an unqualified good [36]. ‘The question of the absolute good… these protected values are different, biodiversity is one of them – but, it is a professional bias – but it is weighed. Because our work is that unfortunately we have to weigh’ (participant 2). They also did not value experiences provided by nature to people as much as perspectives 3 and 4 did, but more than perspective 1 [13].

Particularly distinguishing statements for this perspective are presented in Table 2. Here, the utility of biodiversity was also underlined [42, 2, 12], and species extinction was seen as reducing possibilities for future generations [33], as ‘it simply limits human possibilities and also impoverishes landscape, impoverishes ecosystem’ (participant 9). Another distinguishing statement was about the people’s desire to experience wild areas [16], not supported by the participants of this perspective.

Summing up, perspective 2 was a utility-oriented perspective focusing on concrete benefits that people can get from biodiversity as a basis for conservation.

3.3. **Perspective 3: intrinsic value of nature, aesthetics, non-economic values**

Similarly to perspective 1, participants representing perspective 3 believed that all species had a right to exist [20]. As one of the participants described it: ‘Most of all… it simply is [emphasis] and just because of this fact there is
no discussion on that (…) for me it is beyond the need of discussing if it is important or not. It simply is’ (participant 12). Moreover, the participants valued pristine nature regardless of its utilitarian value [25] and believed that biodiversity could be protected in all its aspects, a view significantly different from all other perspectives. They also considered conservation to be a moral matter [4] and strongly opposed the notion that humans may extinguish any species harmful to their survival [37].

What significantly differentiated this perspective from the other perspectives was the appreciation of beauty as a basis for conservation [18, 30] and the belief that nature’s diversity made our lives meaningful [41] (Table 2). The latter view was considered as very subjective and emotional, as one of the participants said: ‘this is such a soft statement, very subjective, but actually it appeals to me. This is actually funny because here I am myself and here [in relation to the other statements] more professional’ (participant 13).

Moreover, the participants representing this perspective considered values other than economic as important, for example, the experiences that people get when they interact with nature [13], or the value of nature for production of scientific knowledge [21] and to some extent also the notion that economic valuation of species implies a justification for the destruction of the biosphere [29], a belief that distinguishing this group from all other perspectives.

To sum up, perspective 3 to some extent resembled perspective 1 – in its conviction that biodiversity should be protected because of its intrinsic value. However, on the contrary to perspective 1, this perspective did not regard nature as being a large dynamic interconnected system that needs to be maintained as a whole. Instead, it included an ‘emotional’ component, perceiving nature as a source of beauty and important experiences.

The excluded Q-sort of participant 3 also fell under perspective 3 but participant 3 had sorted particular statements in the opposite way to the other participants representing this perspective (making the perspective bipolar). For example, participant 3 believed that humans were morally permitted to extinguish species harmful to human survival [37], did not think that biodiversity is good no matter what [36] nor that all species have right to exist [20], and underlined the need for making choices when protecting biodiversity [38].

3.4. Perspective 4: intrinsic and aesthetic values of nature: importance of natural processes

Like perspective 3, the participants representing this perspective underlined that nature was valuable in itself [25] and referred to the beauty of nature as important for humans [30]. They believed that the knowledge of the mere existence of species was valuable [34] – a view that significantly distinguished perspective 4 from all other perspectives (Table 2). On the other hand, they did not think that species were priceless [6] and did not appreciate the idea of spiritual importance of biodiversity [7]. One of the participants said ‘in my opinion biodiversity has value, not related to any spiritual feeling, but biodiversity is important for other reasons, for example for the reason of evolutionary stability’ (participant 4). Another participant commented on the statement 7: ‘these are for me such philosophical questions… feelings can be very [subjective]’ (participant 5).

The main difference between this perspective and perspective 3 was that participants representing this perspective framed nature as something that was dynamic and variable, not a ‘museum’ [32], as it was ‘a more dynamic system’ (participant 5). The perspective underlined that species extinctions were not necessarily bad [40] (this was opinion significantly different from all other perspectives; see Table 2), because ‘this is a natural process, usually’ and it is ‘not dependent on our valuation – good or bad; it is simply a fact’ (participant 5). However, on the contrary to perspective 1, this perspective did not explicitly emphasize the nature as interconnected system of relations [31]. Nevertheless, knowledge about ecological processes seemed to be important, which was indicated by the high importance given to statement number 39 ‘as nature is always changing there is no point in conserving a fixed ecosystem state’, distinguishing this perspective from all other perspectives. One of the participants described it as ‘variability is not dependent on humans, so humans should not insist to influence that’ (participant 4). The participants of this perspective did not think species extinction could be compared to the destruction of a work of art [8], as ‘the destruction of a work of art is caused by our decision; a decision of some madman, but a human decision, while the extinction of species can be independent of humans’ (participant 4) and ‘in general I do not know if a product of nature can be compared at all with a product of human mind’ (participant 5). Generally, statements in this perspective illustrate a vision of nature as something that operates independently of humans, their actions and valuations.

To sum up, participants representing perspective 4 seemed to hold somewhat similar views to the people from perspectives 1 and 3, when it comes to intrinsic value of biodiversity. In addition, they underlined the importance of natural processes independent of humans.

3.5. Consensus statements

Several consensus statements emerged from the analysis (Table 3). For example, the participants representing all four perspectives definitely did not think that most species were superfluous [17] and even called this idea ‘absurd’ (participants 7 and 9), as ‘every species has some own place in nature, in the ecosystem it has some particular function’ (participant 9). As framed by one of the participants:

I think it cannot be superfluous if it was constructed in such a way [that] everything complements each other, like a chain with many links, if only the smallest one
4* Biodiversity conservation is not a moral matter.
5 Some species are important symbols of human values, such as freedom.
17* Most species are superfluous.
21* Nature is a laboratory for the pursuit of science through which society gains knowledge, and understanding of the world.
23* Nature provides a place to take calculated risks, to learn the luck of the weather, to lose and find one’s way, to reflect on success and failure.
32 Nature provides the profoundest historical museum of all.
35 Genetic diversity is good because each particular species represents the success of generations of evolutionary trial and error.

Table 3. Consensus statements.

| No. | Statement                                                                 | Factors |
|-----|---------------------------------------------------------------------------|---------|
|    |                                                                           | 1       |
| 4*  | Biodiversity conservation is not a moral matter.                          | Z-score |
|     |                                                                           | Q-SV    |
| 5   | Some species are important symbols of human values, such as freedom.      |        |
|     |                                                                           | -0.341  |
|     |                                                                           | -1      |
| 17* | Most species are superfluous.                                            |        |
|     |                                                                           | -0.003  |
|     |                                                                           | 0       |
| 21* | Nature is a laboratory for the pursuit of science through which society   |        |
|     |                                                                           | 1.126   |
|     |                                                                           | 3       |
|     |                                                                           | 0.576   |
|     |                                                                           | 1       |
| 23* | Nature provides a place to take calculated risks, to learn the luck of    |        |
|     |                                                                           | -0.085  |
|     |                                                                           | 0       |
|     |                                                                           | -0.086  |
|     |                                                                           | 0       |
| 32  | Nature provides the profoundest historical museum of all.                 |        |
|     |                                                                           | -0.658  |
|     |                                                                           | 0       |
|     |                                                                           | -1.267  |
|     |                                                                           | -1      |
| 35  | Genetic diversity is good because each particular species represents the  |        |
|     |                                                                           | -0.385  |
|     |                                                                           | -1      |
|     |                                                                           | -0.632  |
|     |                                                                           | -1      |
|     |                                                                           | -0.328  |
|     |                                                                           | 0       |
|     |                                                                           | 0.272   |
|     |                                                                           | 1       |

Notes: Q-SV, score for particular statement for each factor, from −4 to +4. All listed statements are not significant at P > 0.01, and those flagged with an * are also not significant at P > 0.05, which means that they do not significantly contribute to the extracted particular factors (perspectives).

The participants also did not think that nature should be called ‘museum’ [32]. They also thought, at least to some extent, that biodiversity conservation was a moral matter [4] and that it was important for people because it could provide knowledge through scientific research [21]. On the other hand, the participants of all four perspectives treated statements relating to symbolic [5] or contemplative values [23] neutrally, which indicates that they were rather indifferent in their relation to such statements.

4. Discussion

It is broadly recognized that different types of values are central to biodiversity conservation (Chan 2008) and that activities relating to conservation are value-laden (Odenbaugh 2003). At the same time, there is a generally held assumption that conservation professional share a core set of values and objectives that guide their work (Sandbrook et al. 2011). However, recent debate on the values and advocacy in conservation biology indicates that there can be many different ‘ideologies’ constituting the base for conservation (Miller et al. 2011; Robinson 2011). Although conservation programmes and policies do not always explicitly consider these different ideologies behind conservation, ‘their implementation will favor different values, and project objectives will be responsive to different ideologies’ (Robinson 2011). Moreover, it is known from studies on policy implementation in other fields that implementation of policies is ‘filtered through the values of those responsible for action’ (Lloyd et al. 2009). Thus, different understandings of biodiversity, as well as different goals for conservation, may lead to conflicting interpretations of the conservation policies and obstruct their effective implementation. Amplified conflicts may hinder communication between people involved in the conservation-related work (Miller et al. 2011) and lead to confusing messages ‘sent’ to the general public by professionals actually having the same overarching goal, i.e. conserving biodiversity (Sandbrook et al. 2011). The multilevel nature of biodiversity governance may amplify these problems (Levin 2000). Because the assumptions behind conservation may impact the way biodiversity discourse is shaped and the policies are implemented, it is critical to recognize what values underlie the conservation work of biodiversity professionals. However, such studies are still rare. Our study aimed at filling this gap by addressing one of the new EU member states, where biodiversity conservation is competing with present economic development (Blicharska et al. 2011).

Our results reveal that the conservation professionals represent a set of different perspectives on fundamental biodiversity issues, which is in line with previous research (Robinson 2011; Sandbrook et al. 2011). Recognizing the different perspectives that exist is an important prerequisite to facilitate communication, find possible synergies, as well as avoid or mitigate conflicts in policy implementation (Durning & Brown 2006). The multiscale and complex issues of high importance (such as biodiversity conservation) are often conflicting in their nature and it may be impossible to build the classical consensus on them. We suggest that instead of always trying to even out the existing differences one may attempt to build the biodiversity discourse on these differences (Gustafsson 2013). Recognizing the existing differences and identifying potential conflicts and synergies may facilitate creation of a discourse that incorporates all relevant, even contradictory, perspectives and makes use of their potential.
In our study of conservation professionals’ rationale for biodiversity conservation, we revealed four different perspectives on the reasons for biodiversity conservation. Three of the perspectives were closely related in their understanding of biodiversity as something with intrinsic value and thus could be called ‘biodiversity-centred’. The remaining perspective underlined the needs of people and the crucial role ecosystems play in delivering different services to humans, and thus was more anthropocentric.

Perspective 3 was bipolar, in the sense that one of the participants representing this perspective sorted particular statements contrary to the other participants. This illustrates both with weakness and the strengths of the Q-methodology. The downside of the method is potential difficulties in interpretation of the polarized responses. The strength is that it reveals the full range of views regarding a particular issue, also marginalized or less common ones. These views are typically the ones that may open up a polarized debate and they are therefore crucial to consider.

However, the general pattern of our findings shows the existence of two main lines of reasoning for biodiversity conservation. These can be interpreted in terms of the two competing biodiversity discourses commonly found in literature: a narrative of nature as an ethical identity and a narrative of nature as a resource for society (Gustafsson 2013). The former describes nature as something representing intrinsic values, often related to emotions and morals, while the latter underlines the utility of nature and its importance for social and economic development of humans (Van Koppen 2000). These two discourses seem to be largely contradictory, however, they may also be considered as two complementary discourses of one common biodiversity storyline that can be used to communicate what biodiversity is about (Gustafsson 2013).

The mix of perspectives existing among the Polish conservation professionals could be used to lift the rank of the biodiversity conservation among other societal issues in Poland. Since the beginning of 1990s, the country has experienced a large economic development that eventually may threaten the biodiversity. For example, there is an ongoing debate on the prospective shale gas extraction that would be both very beneficial for the country’s economy and its energy security, but may also entail large environmental costs (Johnson & Boersma 2013). Similarly, there is a large-scale development of the transport infrastructure (Szymalski and Ryter 2004; Jędrzejewski et al. 2006). Furthermore, during the last two decades Poland has been going through transformation involving broad political, economic and social changes, related to the process of institutional change from the hierarchical government-centred approach to a multilevel, decentralized governance system (Kluvánková-Oravská et al. 2009). Additionally, after entering the EU in 2004, Poland accepted many new policies related to environmental issues and biodiversity in particular. These changes together imply both adoption of new legislation in national policies that oblige the country to protect its biodiversity, and the need to open up for a decision-making that is open and inclusive and takes into account values represented by different stakeholders. However, the biodiversity conservation argumentation is relatively weak and undeveloped (Blicharska et al. 2011; Representative of General Directorate for Environmental Protection, Poland, personal communication, 2013). Moreover, the question of biodiversity conservation is still most commonly taken up to the public debate in controversial cases and mainly by NGOs (Grodzińska-Jurczak & Cent 2011; Niedzialkowska-Jurczak & Cent 2011; Niedziałkowski et al. 2013), while the policymakers focus on other societal issues, particularly economic development. This is illustrated, for example, by the fact that in Poland there has never been any Green Party in the Parliament that would represent an environmental worldview and focus on environmental issues that are important for the whole society.

In a situation where economic development still plays a main role, the anthropocentric vision of conservation that views humans as beneficiaries of nature, through the concept of ecosystem services, can to be particularly useful. Considering the nature as something that actually provides us with concrete benefits can counterweight the current emphasis on the general economic development. The utility-oriented approach to biodiversity has been a dominant view in environmental discourses since the 1980s (Hajer 1995); however, the present notion of ecosystem services underlying this approach is a relatively new concept, and it is increasingly used in biodiversity related decision-making (MA 2005; Braat & De Groot 2012). Also in Poland, the ecosystem services approach to conservation is rather new, as indicated by most of the interviewees, but it carries potential for improved management of natural resources (Rosin et al. 2011). As the ecosystem services approach helps visualizing the value of biodiversity (Harrison et al. 2010), it can be a useful tool for convincing decision-makers and the general society about the need for biodiversity protection (Daily et al. 2009). It can also help balance the more intrinsic value-oriented approach represented usually by the NGOs and increase the chances for partnership-like communication between them, the professionals working in the administration and the actual policymakers.

In the light of the above, the future conservation effort in Poland, and other new EU member states being in a similar situation, should focus not only on the actual creation of protected areas or fulfilling the conservation targets but also on the active and deliberate construction of the new type of conservation discourse. This discourse can build on the already existing perspectives and balance the notion of intrinsic value of nature with its utilitarian value.

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