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Ecosystem services in environmental discourse – Application of ecosystem services concept in Poland

Usługi ekosystemowe w dyskursie środowiskowym. Studium wdrożenia koncepcji usług ekosystemowych w Polsce

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Main abbreviations and acronyms

CA	Content analysis
CEE	Central and Eastern European countries
CICES	Common International Classification of Ecosystem Services
ES	Ecosystem services
EU	European Union
IDI	Individual in-depth interviews
IPBES	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
NGO	Non-Governmental Organization

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Summary

The main motivation behind this work is the conviction that the study of social and environmental areas intersection is nowadays an important activity. It can be observed that the quality of the surrounding nature is deteriorating. The effects of this entail serious threats, e.g. weather anomalies, scarcity of drinking water, or significant decreases in yields. Environmental problems are rapidly becoming an important sort of social problems. Poor quality of atmospheric air contributes to the development of a number of so-called civilization diseases: allergies, asthma and even cancer. In order to face these threats and contribute to the improvement of the quality of the natural environment, measures are being taken to respond to problems such as the depletion of natural resources or deforestation. Over the years, comprehensive concepts have been conceived aiming at minimizing the risks associated with exploitative development e. g. sustainability.

A relatively new proposal of such a concept is the concept of ecosystem services - the various benefits that humans freely gain from the natural environment e. g. a forest provides mushrooms. Ecosystem services are an important factor in shaping the quality of life, social mobility, investments of economic capital, etc. It has been included in the national statistics. Satisfaction with life is a result of the possibility of finding a job, educational and entertainment services, but also the presence of a park, clean air, or a view of the river. These services are valuable, and people are willing to pay for them, for example, when buying flats. In the context of environmental policies, analyses of ecosystem services are among the priorities for social sciences. However, little is known about the extent to which the concept of ecosystem services is utilized in decision making in areas with strong environmental links e.g. environment conservation, energy, environmental education, etc.

Poland is an interesting case for the analysis of environmental policies and stakeholder deliberation at the national level in the context of ecosystem services concept. Similarly to other Central and Eastern European countries, a legacy of centralized planning with rigid top-down policy-making, and marginalized stakeholder participation has been posing a challenge to crafting environmental policies. After the collapse of Communism in 1989, and in the context of EU accession, the Polish system of nature conservation underwent crucial changes.

Following the motivation, the general aim of this dissertation is to critically examine a significant but yet unexplored research problem: How does the concept of ecosystem services be present in the environmental discourse in Poland? The specific objectives and questions of this dissertation are addressed across the four original research chapters included in this

dissertation and focus on: the application of the ecosystem services concept in environmental policies at the national level in Poland; the presence of the ecosystem services concept in stakeholder deliberation on resource management topics in Poland; the sources of conflicts, which were present in stakeholder deliberation on ecosystem services management in protected areas (i. e. Natura 2000) in Poland. The study undertaken in this thesis falls within the scope of environmental sociology. From the theoretical and methodological point of view, it belongs to the research on discourse, in this case – environmental discourse. The work assumes that today's world is to a large extent culturally "constructed". It is shaped by a multitude of interpretive frameworks derived from the world of science, marketing and media, which on the one hand concern reality (describe and explain it), and on the other hand become a part of it.

Results from the research indicate that the ecosystem services concept is reflected in the national environmental policies and in stakeholder deliberation in Poland. However, it is mainly depicted in an indirect, latent form. Moreover, the study enabled to identify two general groups of barriers to the ecosystem services concept implementation in environmental policy: a) a limited understanding and acknowledgment of the concept among individuals involved in policy making; and b) sectoral divisions within environmental governance that hinder the spread of the concept. It was also found that in stakeholder deliberation conflicts originating from the relationship between actors and the structural context of relations were dominant ones, while sources of conflicts related to values and data were less significant. The results also indicated that there is a strong link between sources of conflicts and an ecosystem services type. Certain ecosystem services types appeared more likely to be a conflict-generating and certain sources of conflict (data, interests, relationship, structure, values) were more significant than others. The dominant source of conflicts regarding relationship is mostly connected with cultural ecosystem services (e.g. tourism, entertainment) while the other sources are mostly related to provisioning ecosystem services (provision of wood, crops, etc.).

By investigating the ecosystem services application in Poland, this dissertation contributes both to the body of scientific knowledge and it offers policymakers recommendations of how to utilize ecosystem services in practice. The implications that emerge from this research are particularly relevant for protected areas, such as those found in Poland, which are the arena of social conflicts and seeking communication tools to facilitate public participation, environmental sustainability, and equitable policy outcomes. The analysis of the Polish nation-wide consultation process with broad stakeholder involvement

showed that, for Poland's case, a country reforming and consolidating its environment protection system, the ecosystem services concept is a handy tool by offering a reference for conflict management and for policy implementation and management of protected areas. It enables stakeholders from opposing stakeholders groups (e.g., foresters, NGOs, the private sector) to deliberate about the future of Natura 2000 areas. Moreover, it could help to deliberate on the trade-offs and synergies between biodiversity conservation and human welfare.

Streszczenie rozprawy w języku polskim

1. Motywacja i cele rozprawy

1.1. Motywacja

Główną motywacją leżącą u podstaw niniejszej pracy jest przekonanie, że badanie punktów stycznych środowiska społecznego i środowiska przyrodniczego jest dziś zajęciem niezwykle ważnym. Widać bowiem, że jakość otaczającej nas przyrody ulega pogorszeniu, a skutki tego widoczne są w postaci realnych zagrożeń np. anomaliach pogodowych, niedoborach wody pitnej czy znaczących spadkach plonów. Problemy środowiskowe w bardzo szybkim tempie stają się dziś ważnymi problemami społecznymi. Zła jakość powietrza atmosferycznego przyczynia się do rozwoju szeregu tzw. chorób cywilizacyjnych: alergii, astmy a nawet nowotworów. Z kolei ginięcie kolejnych gatunków roślin i zwierząt, czyli spadek bioróżnorodności (Mace et al., 2012), zmniejsza wydajność i pogarsza możliwości adaptacyjne środowiska. Przykładem, który jest szeroko badany i stosunkowo często dyskutowany są pszczoły. Pszczoły oraz inne owady zapylające wykonują olbrzymią pracę, od której uzależniona jest w dużej mierze wielkość plonów. Są one przy tym organizmami bardzo wrażliwymi, a ich liczebność maleje (nauka nie ma potrafi podać jednoznacznych powodów tego zjawiska). Zmniejszenie się ich populacji powoduje spadek plonów wielu roślin, co może prowadzić do perturbacji na rynku żywności. Jak pokazują wyliczenia dla jednego tylko obszaru w Republice Południowej Afryki, który jest znaczącym producentem owoców roślin zapylanych przez owady, zastąpienie pracy pszczół wiązałoby się z wydatkami liczonymi w setkach milionów dolarów (Allsopp et al., 2008).

Społeczna refleksja nad tego typu problemami stała się szczególnie istotna w obliczu eksploatacji środowiska przyrodniczego przez człowieka (Frysztacki, 2006; Matczak, 2000). Aby stawić czoła tym zagrożeniom i przyczynić się do poprawy jakości środowiska naturalnego, podejmowane są działania mające stanowić odpowiedź na problemy związane np. z wyczerpywaniem zasobów naturalnych lub wycinką lasów. Na przestrzeni lat przyjmują one postać całościowych koncepcji, których celem jest minimalizacja zagrożeń związanych ze zbyt ekspansywnym rozwojem społecznym, a tym samym poprawa relacji społeczeństwa ze środowiskiem naturalnym (Ostrom, 2009). Można wśród nich wymienić chociażby koncepcję zrównoważonego rozwoju, która zakłada połączenie rosnącej troski o kwestie środowiskowe z kwestiami społeczno-ekonomicznymi (Hopwood et al., 2005) lub koncepcję Gai, opartą na hipotezie, że Ziemia to super-organizm, czujący tak samo jak każde inne żywe stworzenie

(Lovelock, 2003). Jednak, mimo podejmowanych wysiłków, poziom bioróżnorodności ciągle spada (gatunków jest coraz mniej), stan środowiska naturalnego się pogarsza, a nieskutecznym działaniom towarzyszy powstawanie wokół nich aury ideologicznej, czy wręcz utopijnej (Sztumski, 2009). Stosunkowo nową propozycją w omawianym obszarze jest koncepcja usług ekosystemowych (*ecosystem services* - ES), w której upatruje się szansy na przezwyciężenie słabości poprzednich podejść.

Została ona zaproponowana w artykule Roberta Costanzy i współpracowników pt.: "The value of the world's ecosystem services and natural capital" opublikowanym w *Nature* (Costanza et al., 1997) a następnie w „Millennium Ecosystem Assessment", dokumencie zainicjowanym w 2000 r. przez Kofiego Annana, Sekretarza Generalnego Organizacji Narodów Zjednoczonych, w celu oceny wpływu ludzkości na środowisko naturalne na całym świecie (MEA, 2005). ES to różne korzyści, które ludzie mogą swobodnie czerpać ze środowiska naturalnego. Koncepcja ta opiera się na podejściu rynkowym, w którym różne ekosystemy są dostawcami usług przyczyniających się do dobrobytu społeczeństwa. Na przykład, las dostarcza drewna, grzybów i jagód, woda umożliwia hodowlę ryb, owady zapylają rośliny itp. Usługi te mają określoną wartość. Środowisko przyrodnicze i środowisko społeczne tworzą więc, tym samym, skomplikowany system naczyń połączonych. Stan środowiska przyrodniczego w naszym otoczeniu, jest istotnym czynnikiem kształtującym jakość życia, ruchliwość społeczną, lokowanie kapitału ekonomicznego itd. Został on włączony do statystyk krajowych. Na przykład Główny Urząd Statystyczny do podstawowych wskaźników jakości życia zalicza m.in. „zadowolenie z terenów rekreacyjnych i terenów zielonych" czy „narażenie na zanieczyszczenie lub inne problemy środowiskowe w okolicy" (Bendowska et al., 2014). Satysfakcja z życia jest wypadkową możliwości znalezienia pracy, bazy edukacyjnej i rozrywkowej, ale także obecności parku, czystego powietrza, czy widoku na rzekę, za co również płacimy, kupując mieszkania.

Wysoki poziom niepewności związany ze zmianami środowiska i klimatu sprawia, że czynniki środowiskowe są traktowane, podobnie jak relacje władzy czy nierówności społeczne, jako mające znaczący wpływ na ruchliwość społeczną i trwałe zmiany w strukturze społecznej. Nie sposób pominąć też faktu, że w debatach naukowych dyskutowany jest problem tzw. „uchodźców środowiskowych" oraz „uchodźców klimatycznych" – osób zmuszonych do migracji ze względu na czynniki środowiskowe lub zmiany klimatu. Retoryka ta, choć krytykowana za zbyt alarmistyczny ton, dotyka istotnego problemu masowych migracji, spowodowanych czynnikami środowiskowymi, z którymi być może społeczeństwa będą musiały się zmierzyć (Piguet, 2013).

Usługi świadczone przez środowisko w postaci sprzyjających warunków klimatycznych lub dostępności zasobów naturalnych są z kolei czynnikami sprzyjającymi rozwojowi przedsiębiorczości, inwestycji itp. Niski poziom zanieczyszczenia jest często warunkiem koniecznym do funkcjonowania na danym terenie przemysłu wytwarzającego zaawansowane technologicznie sprzęty, których proces produkcyjny jest pod względem środowiska przyrodniczego niezwykle wymagający.

Oprócz tego, że w nauce koncepcja usług ekosystemowych funkcjonuje od ponad 20 lat, jest ona także stosowana przy tworzeniu polityk publicznych w zakresie zarządzania środowiskiem. W przygotowanym przez UNESCO The World Social Science Report 2013 (UNESCO, 2013) czytamy, że zadaniem rządów i międzynarodowych organizacji jest ustanowienie programów badawczych w celu oceny ważnych elementów kapitału naturalnego - wszelkich ożywionych i nieożywionych komponentów ekosystemu, innych niż ludzie oraz wytwory ich pracy, mających wkład w wytwarzanie dóbr i usług wartościowych dla ludzi (Guerry et al., 2015) - a w szczególności usług ekosystemowych. Realizacja tego postulatu od kilku lat jest silnie widoczna np. w polityce Unii Europejskiej (np. Strategia ochrony różnorodności biologicznej do 2020 r.).

Polska jest interesującym przykładem do analizy polityk środowiskowych na poziomie krajowym. Podobnie jak w innych krajach Europy Środkowej i Wschodniej, spuścizna centralnego planowania ze sztywnym, odgórnym kształtowaniem polityki i marginalizowanym udziałem interesariuszy, stanowi wyzwanie dla tworzenia polityki ochrony środowiska. Po upadku komunizmu w 1989 roku i w kontekście akcesji do Unii Europejskiej polski system ochrony przyrody uległ zasadniczym zmianom (Kluvánková-Oravská et al., 2009). Przykładowo, ustawa z dnia 16 października 1991 r. o ochronie przyrody (Dz.U. z 1991 r., poz. 65, z późniejszymi zmianami), opierała się na wymogu ustanowienia kanałów współpracy pomiędzy administracją a organizacjami pozarządowymi. Zmienił się sposób tworzenia polityki ochrony środowiska (Grodzinska-Jurczak and Cent, 2011), np. poprzez zwiększenie udziału społeczeństwa. Pojawiły się również nowe koncepcje, w tym koncepcja ES. Niemniej jednak zmiany te zachodziły stosunkowo powoli, ponieważ centralne władze administracyjne nadal utrzymywały dominującą pozycję w procesie decyzyjnym, a wśród decydentów politycznych i osób zawodowo zajmujących się ochroną przyrody dominowało myślenie hierarchiczne.

W kontekście zmian, które zachodzą w środowisku, analizy dotyczące usług ekosystemowych są zaliczane do priorytetowych kwestii podejmowanych w naukach społecznych (UNESCO, 2013). Ciągle jednak niewiele wiadomo na temat tego, w jakim

zakresie koncepcja usług ekosystemowych jest wykorzystywana w podejmowaniu decyzji w obszarach silnie powiązanych ze środowiskiem naturalnym (np. ochrona środowiska, energetyka, edukacja ekologiczna itp.). Dotychczas ani skala stosowania koncepcji usług ekosystemowych, ani sposób wdrożenia, ani też społeczne szanse i zagrożenia wynikające z ujmowania środowiska w jej duchu, nie zostały poddane systematycznym analizom, tak na poziomie krajowym jak i międzynarodowym. Nie wiadomo także, czy w tworzeniu i realizacji polityk, koncepcja ta faktycznie proponuje nowe rozwiązania, czy też stanowi przejściową modę terminologiczną.

1.2. Cele i pytania badawcze

Zgodnie z wyżej opisaną motywacją, ogólnym celem tej pracy doktorskiej jest krytyczne podjęcie istotnego, lecz jeszcze niezbadanego problemu badawczego: W jaki sposób koncepcja usług ekosystemowych przejawia się w dyskursie środowiskowym w Polsce? Szczegółowe cele badawcze i pytania zawarte w niniejszej pracy doktorskiej, są omówione w czterech oryginalnych rozdziałach poświęconych badaniom zrealizowanych w ramach pracy doktorskiej. Rozdziały 2-5 podejmują następujące cele i pytania cząstkowe:

Rozdziały 2 i 3: Wkład w międzynarodową debatę na temat zastosowania koncepcji ES w polityce ochrony środowiska na poziomie krajowym poprzez udzielenie odpowiedzi na następujące pytania:

1. W jakim stopniu koncepcja ES i jakie kategorie ES są stosowane w polskich politykach środowiskowych?
2. Jakie są bariery i możliwości zastosowania koncepcji ES w Polsce?

Rozdział 4: Zrozumienie, w jaki sposób koncepcja ES była obecna podczas dyskusji interesariuszy na tematy związane z zarządzaniem zasobami w Polsce, poprzez udzielenie odpowiedzi na następujące pytania:

3. W jakim stopniu różne kategorie ES pojawiły się w dyskursie na temat planów zadań ochronnych w Polsce?
4. Czy ES była przydatna do reprezentowania zarówno opisowych, jak i normatywnych aspektów ochrony różnorodności biologicznej?
5. W jaki sposób różne grupy interesariuszy interpretowały ramy ES w obszarach o różnym pokryciu terenu?

Rozdział 5: Zrozumienie źródeł konfliktów, które były obecne trakcie dyskusji interesariuszy na temat zarządzania ES na obszarach Natura 2000 w Polsce, poprzez udzielenie odpowiedzi na następujące pytania:

6. Jakie są źródła konfliktów w partycypacyjnym zarządzaniu ochroną bioróżnorodności w sieci Natura 2000 w Polsce?
7. W jaki sposób źródła konfliktów odnoszą się do koncepcji ES?
8. Jaki jest poziom standaryzacji procesu partycypacyjnego, mającego na celu przygotowanie planów zarządzania siecią Natura 2000?

2. Ramy koncepcyjne i metodologiczne

Zarysowana w niniejszej pracy problematyka - relacji człowieka ze środowiskiem przyrodniczym – była dostrzegana od początku powstania socjologii. Zdaniem niektórych badaczy, odgrywała ona początkowo rolę marginalną (Redclift and Benton, 1994), podczas gdy inni twierdzą z kolei, że była ona znacząca, lecz została zmarginalizowana przez kulturowo zorientowanych tłumaczy i interpretatorów np. myśli Marksa, Webera czy Durkheima (Hannigan, 2014). Faktem jednak jest, że stawianie pytań i szukanie odpowiedzi o miejsce człowieka w świecie przyrody, miało i ma nie tylko ważny wymiar duchowo-filozoficzny, ale także, dotyczy realnych konsekwencji sposobu korzystania z zasobów przyrodniczych czy możliwości radzenia sobie z zagrożeniami naturalnymi, co w efekcie przekłada się na możliwości rozwojowe danego społeczeństwa. Dziś społeczna refleksja nad środowiskiem stanowi jeden z ważnych nurtów socjologii, rozwijany w ramach jej subdyscypliny – socjologii środowiska. Obecną postać zaczęła osiągać jednak dopiero w latach 70-tych XX wieku. W Europie, badania socjologiczne w tym obszarze były reakcją na brak socjologicznego warsztatu analizy, dynamicznej aktywności środowiskowych ruchów społecznych (Zieloni stali się nawet znaczącą siłą polityczną). W Stanach Zjednoczonych, była to natomiast instytucjonalizacja socjologii środowiska na bazie dokonań badawczych w ramach socjologii wsi (stworzono sekcje socjologii środowiska, a także poświęcono jej, specjalne numery czasopism socjologicznych) (Hannigan, 2014).

Dotychczasowe badania (Dunlap, 1998, 1991; Rokicka and Starosta, 2004) pokazały, że czynniki takie jak: postawy wobec środowiska; świadomość ekologiczna oraz ramy interpretacyjne (wzory, przy pomocy których ujmujemy, interpretujemy, czy też kategoryzujemy np. środowisko) powinny być uwzględniane w działaniach zmierzających do poprawy relacji społeczeństwa i środowiska. Samo doskonalenie technologii oraz

reformowanie istniejących systemów ekonomicznych nie wystarczy, ponieważ wszelkie zmiany w relacjach społeczeństwa ze środowiskiem wymagają także przekształceń w istniejących systemach wartości i stylach życia.

Badanie podjęte w niniejszej pracy mieści się w zakresie socjologii środowiska. Z teoretyczno-metodologicznego punktu widzenia zalicza się zaś do nurtu badań nad dyskursem, w tym przypadku - środowiskowym. W pracy przyjęte zostało założenie, że dzisiejszy świat jest w dużym stopniu „skonstruowany" kulturowo (Berger and Luckmannn, 1983; Macnaghten and Urry, 1998). Jest on kształtowany przez wielość ram interpretacyjnych wywodzących się ze świata nauki, marketingu czy mediów, które z jednej strony dotyczą rzeczywistości (opisują ją i wyjaśniają), a z drugiej stają się jej częścią (są kształtowane pod wpływem kontekstu, w którym funkcjonują) (Czyżewski, 2013; Hannigan, 2014; Pettenger, 2016). Koncepcja usług ekosystemowych może być potraktowana, jako jedna z takich ram interpretacyjnych, która proponuje określony sposób ujmowania środowiska (w tym problemów związanych ze stanem środowiska), kształtuje kontekst (rzeczywistość) i jednocześnie ulega ciągłym transformacjom – jest kształtowana pod wpływem kontekstu (rzeczywistości).

2.1.1. Definicje kluczowych terminów stosowanych w pracy

Perspektywa analityczna tej pracy doktorskiej odnosi się do kilku kluczowych pojęć. Pojęciami, które należy w tym miejscu zdefiniować są: dyskurs, dyskurs ekologiczny, ramy interpretacyjne i konflikt. Każde z nich ma szereg różnych znaczeń, praca ta ma jednak przede wszystkim charakter empiryczny i teoretyczna dyskusja na temat wykorzystanych w niej pojęć jest ograniczona do niezbędnego minimum. Dokonane wybory wynikają zaś z konkretnego obszaru badań i postawionych w pracy celów.

Pojęcie dyskursu, pomimo że jest powszechnie stosowane w socjologii, psychologii i kulturoznawstwie, jest niejednoznaczne. Powoduje to problemy w jego praktycznym użyciu, ale zostawia też wiele możliwości interpretacyjnych. Podstawą dla przedstawionych tu badań jest analityczne wykorzystanie obszaru wspólnego wszystkich definicji dyskursu tzn. koncentracji na kontekście (Fairclough and Fairclough, 2013; Wodak and Krzyzanowski, 2008). Van Dijk (2001) metaforycznie określa dyskurs jako „tekst w kontekście". Z kolei Hajer w swoich pracach nad dyskursem środowiskowym definiuje go jako „specyficzny zespół idei, koncepcji i kategoryzacji, które są produkowane, reprodukowane i przekształcane w określony zbiór praktyk i poprzez które nadaje się znaczenie rzeczywistościom fizycznym

i społecznym" (Hajer, 1995), które tworzą opisy i interpretacje zewnętrznego świata doświadczanego przez ludzi (Hajer and Versteeg, 2005). Ponadto dyskurs środowiskowy jest szczególnie "specyficzny czasowo i przestrzennie i jest regulowany przez specyficzne modelowanie natury, które odzwierciedla nasze wcześniejsze doświadczenia i obecne zainteresowania" (Hajer, 1995). Interpretacje stanu środowiska naturalnego (lub faktycznie społecznego), które są częścią dyskursu środowiskowego, opierają się na reprezentacjach i zawsze implikują zestaw założeń oraz ukrytych wyborów społecznych, które są zapośredniczone przez zespół konkretnych praktyk dyskursywnych (Hajer, 1995).

Kolejnym pojęciem, silnie związanym z dyskursem, które również nie ma uzgodnionej definicji, są ramy. Ramy odnoszą się do komunikacji i skupiają się na „słowach, obrazach, zwrotach i stylach prezentacji" (Borah, 2011; Druckman, 2001) oraz „ideach, koncepcjach i kategoryzacjach" (Hajer, 1995). Dlatego też ramy zostały potraktowane w badaniu jako część dyskursu. Goffman (1974) twierdził, że są to schematy interpretacji zdarzeń. Ramy są więc „trwałymi wzorcami poznania, interpretacji i prezentacji, selekcji, akcentowania i wykluczania" (Gitlin, 1980). Ramowanie jest więc wyborem części rzeczywistości, aby uczynić ją bardziej "istotną w komunikacji" (Entman, 1993).

Zastosowanie w tej pracy doktorskiej pojęć dyskursu oraz ram wymaga jednak dodatkowego komentarza. W pracy zakłada się, że koncepcja ES jest jednym z elementów dyskursu środowiskowego i skupia się wyłącznie na wykrywaniu jego obecności i charakteryzowaniu kontekstu, w którym funkcjonuje. Wyjaśnienia te są konieczne, ponieważ za pomocą analizy dyskursu można również badać, na przykład dyskurs środowiskowy w odniesieniu do innych dyskursów, aby zidentyfikować różne elementy dyskursu środowiskowego (koncepcje, idee, kategorie) lub badać ich wzajemne relacje, np. dominację, zgodnie z założeniami krytycznej analizy dyskursu. Niniejsza praca jednak nie podejmuje tych tematów. Przedmiotem niniejszego opracowania jest szczegółowa i systematyczna analiza ograniczonej części dyskursu środowiskowego w formie jednolitych ram interpretacyjnych - koncepcji ES.

Kolejnym kluczowym pojęciem wymagającym zdefiniowania jest konflikt. Konflikt jest uznawany za podstawowy proces w życiu społecznym i jeden z wiodących tematów w naukach społecznych. Generalnie, jest on rozumiany jako pewna niezgodność interesów, wartości itp. pomiędzy zaangażowanymi stronami: jednostkami, grupami społecznymi, organizacjami. W socjologii szczególnie dużo badań dotyczyło konfliktu klasowego oraz innych konfliktów społecznych, zwłaszcza jeśli prowadziły do przemocy. Dokładna definicja konfliktu nie jest jednak powszechnie uzgodniona i zależy od pozycji teoretycznej i zakresu

zainteresowań np. określonym typem ryzyka (Dietz et al., 1989). Można wyróżnić wiele obszarów konfliktowych, takich jak np. rasa (Stone, 1985), klasa (Dahrendorf, 1959), polityka (Gurr, 1980), religia (Kaplan, 2009), ideologia (Brandt et al., 2014), czy środowisko (Diehl, 2018). Ponadto istnieją również różne podejścia analityczne do konfliktu. W makroskali, strukturalny konflikt jest pochodną struktury społecznej (Bernard, 1951). W mikroskali, konflikt behawioralny to działania podejmowane przez aktorów społecznych (Kriesberg, 1973), zaś konflikt psychologiczny, to stan wrogości psychicznej wobec np. innej osoby czy grupy (Fink, 1968). Konfliktom są też analitycznie przypisywane funkcje (Coser, 1964): niszczycielskie, budujące konsensus, generujące innowacje itp. Podejście do konfliktu, przyjęte w tej pracy doktorskiej koncentruje się na środowisku przyrodniczym, jako dostawcy dóbr lub korzyści - ES oraz na działaniach związanych ze środowiskiem, podejmowanych przez poszczególne grupy interesariuszy, a więc konflikt ma charakter głównie behawioralny i psychologiczny. Takie, analityczne podejście do konfliktu zakłada istnienie różnego rodzaju negatywnych reakcji interesariuszy, które mogą w przyszłości wystąpić, jako ograniczenie działań innych interesearіuszy, stan wrogości wobec nich itp. Przykładem takiego konfliktu może być syndrom *Not In My Backyard* (Litmanen, 1996).

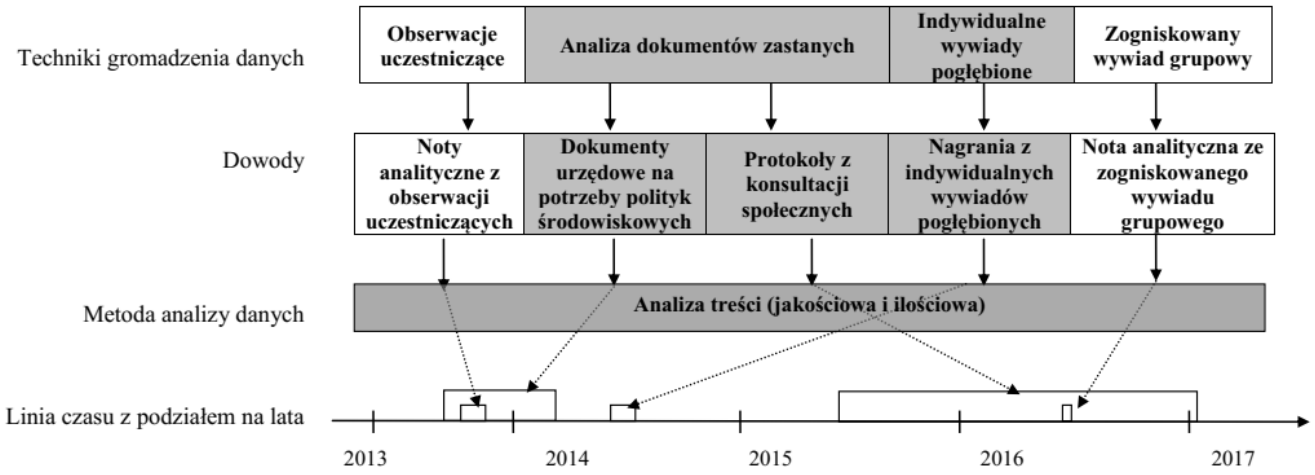
Podstawą przyjętego podejścia są typy konfliktów związanych z ochroną bioróżnorodności: De Meo i współpracowników (2016) oraz Moore'a (2003). W badaniu przeprowadzonym przez De Meo i współpracowników (2016) zidentyfikowano trzy rodzaje konfliktów związanych z obszarami *Natura 2000*, które wynikają z a) restrykcyjnych środków nałożonych na działalność człowieka; b) biurokratycznego, sztywnego zarządzania; c) braku kompleksowych informacji i komunikacji na temat wdrażania sieci *Natura 2000* i zarządzania nią. Typologia konfliktów De Meo (2016) jest zgodna z typologią konfliktów Moore'a (2003), ale ta ostatnia obejmuje więcej źródeł konfliktów, które wydają się jeszcze pełniej oddawać problemy związane z funkcjonowaniem programu *Natura 2000,* zidentyfikowane w literaturze przedmiotu. Są to następujące źródła: a) dane - brak informacji, różne poglądy na temat tego, jakie informacje są istotne, różne interpretacje danych, b) interesy - postrzegane lub faktycznie konkurencyjne, interesy proceduralne, psychologiczne, c) struktura - nierówna kontrola, własność lub dystrybucja zasobów, nierówna władza i autorytet, czynniki geograficzne, fizyczne lub środowiskowe, które utrudniają współpracę, ograniczenia czasowe, d) wartości - różne kryteria oceny pomysłów lub zachowań, wyłączne, z natury wartościowe cele, różne światopoglądy, sposoby życia, ideologia i religia, e) relacje - silne emocje; niewłaściwe interpretacje lub stereotypy; słaba komunikacja; powtarzające się negatywne zachowania.

Teoria dyskursu, w kontekście zdefiniowanych kluczowych pojęć, traktowana jest jako teoria ramowania rzeczywistości, czyli przekazywania w trakcie komunikacji określonych informacji o środowisku naturalnym, ujawniających istniejące lub potencjalne konflikty. W obliczu podjętych w pracy celów badawczych oraz biorąc pod uwagę wspomniane wcześniej zawiłości definicji, teoria dyskursu okazuje się być realną perspektywą. Pozwala ona traktować koncepcję ES jako ramy i określać: a) w jakim stopniu pojęcie to jest obecne w dyskursie dotyczącym środowiska naturalnego; b) w jakim stopniu proponuje ono nowe rozwiązania problemu degradacji środowiska naturalnego; c) w jakim stopniu jest to jedynie koncepcja retoryczna i przejaw europeizacji języka, tj. przenikanie elementów dyskursu z poziomu Unii Europejskiej do dyskursu krajowego oraz d) jakie społeczne szanse i zagrożenia wynikają z danego środowiska, przy użyciu ramy interpretacyjnej w postaci koncepcji ES. Ponadto, choć inne perspektywy analityczne również pozwalają na badanie obszernego materiału tekstowego, nie koncentrują się na kontekście, w którym funkcjonuje tekst, ale na innych aspektach: perswazyjnym – analiza retoryczna, strukturalnym – analiza lingwistyczna (Bauer and Gaskell, 2000), znaczeniowym – analiza semiotyczna (Nöth, 1995). Te podejścia nie są stosowane w niniejszej pracy.

2.1.2. Źródła dowodów i metody

Analizy empiryczne prowadzone w ramach socjologii środowiska koncentrują się głównie na badaniu postaw lub świadomości ekologicznej, które w dużej mierze opierają się na badaniach opinii publicznej (Dunlap, 1998, 1991; Rokicka and Starosta, 2004). Badania dyskursu na gruncie socjologii środowiskowa, dotyczące m.in. środowiskowych ruchów społecznych (Brulle, 1996), często wymagają analizy materiału źródłowego wykraczającego poza deklaracje respondentów, uwzględniającego różne aspekty rzeczywistości społecznej i wykorzystanie różnych jednostek analizy. Tak jest również w przypadku tej rozprawy doktorskiej, w której przedmiotem badań jest obecność koncepcji ES w dyskursie środowiskowym. Ta część pracy doktorskiej opisuje techniki gromadzenia danych, dowody (źródła danych) i metody analizy (Yin, 2008). Wszystkie te trzy fazy pokazano na Rysunku 1.

Rysunek 1. Schemat technik gromadzenia danych, dowodów i metod analizy. Kolor szary oznacza



techniki gromadzenia/dowody/metody główne, a biały pomocnicze.
Źródło: opracowanie własne w oparciu o Yin, 2008.

2.1.3. Gromadzenie danych

W pracy zostały wykorzystane cztery techniki gromadzenia danych: dwie główne (analiza dokumentów zastanych i indywidualny wywiad pogłębiony) oraz dwie pomocnicze (obserwacja uczestnicząca i zogniskowany wywiad grupowy).

Główne techniki gromadzenia danych:

1. Przegląd dokumentów zastanych jest pierwszą z wykorzystanych technik gromadzenia danych. Po pierwsze, przy jej pomocy zgromadzono najważniejsze dokumenty dotyczące polityki w dziedzinie ochrony środowiska w Polsce, a następnie, na drodze doboru metodą kuli śnieżnej z wykorzystaniem Internetu, dodane zostały inne dokumenty, wymieniane w tych zidentyfikowanych już wcześniej. Po drugie, służyła ona do zbierania protokołów ze spotkań konsultacyjnych dotyczących przygotowania planów zadań ochronnych na obszarach Natura 2000 w Polsce. Protokoły uzyskano na wniosek skierowany do Regionalnych Dyrekcji Ochrony Środowiska, które były odpowiedzialne za organizację spotkań. Technika ta została wykorzystana do uzyskania wyników badań opisanych w rozdziałach 2, 4 i 5.

2. Drugą techniką był indywidualny wywiad pogłębiony (IDI) z polskimi ekspertami w dziedzinie ochrony środowiska. Eksperci zostali wybrani na drodze przeglądu literatury naukowej, dokumentów prawnych i sprawozdań organizacji pozarządowych. Eksperci reprezentowali najważniejsze środowiska specjalistów w dziedzinie ochrony środowiska i kształtowania polityki ochrony przyrody: administrację publiczną (Ministerstwo Środowiska, Państwowe Gospodarstwo Leśne i Narodowy Fundusz Ochrony Środowiska i Gospodarki Wodnej), naukowców (kierownik ośrodka badawczego i profesor uniwersytecki), organizacje pozarządowe (stowarzyszenie ochrony przyrody) oraz polityka krajowa (członek senatu pracujący w komisji ochrony środowiska). Dyspozycje do wywiadów obejmowały pięć grup pytań dotyczących: 1) zrozumienia terminu i koncepcji ES, 2) zastosowania koncepcji ES w polskiej polityce ochrony środowiska, 3) komentarza na temat wyników CA, 4) barier i możliwości zastosowania koncepcji ES oraz 5) porównania Polski i innych krajów. Technika IDI z udziałem ekspertów została wybrana jako najbardziej adekwatna do zbadania potencjału i ograniczeń związanych ze stosowaniem ES w polskich politykach, dotyczących ochrony środowiska oraz do zapewnienia kontekstu dla interpretacji wyników CA. Pozwoliło to na pozyskanie specjalistycznej wiedzy od ekspertów, czego nie można byłoby zrobić poprzez przeprowadzenie badań ankietowych. IDI stymulowały również ekspertów do kompleksowego wyrażenia ich punktu widzenia, co byłoby znacznie utrudnione podczas realizacji wywiadów grupowych. IDI zostały przeprowadzone od maja 2014 r. do lipca 2014 r. z dziewięcioma ekspertami, a każdy wywiad trwał od 30 do 40 minut i został zarejestrowany po uzyskaniu zgody respondenta. Technika ta została zastosowana do uzyskania wyników badań opisanych w rozdziałach 2 i 3.

Pomocnicze techniki gromadzenia danych

3. Trzecią techniką gromadzenia danych wykorzystywaną w pracy jest obserwacja uczestnicząca. Obserwacje prowadzone były na podstawie arkusza obserwacji skupiającego się na aspekcie technicznym spotkania (liczba uczestników, sala, struktura spotkania) oraz na aspekcie merytorycznym (program, aktywność uczestników i sposoby ich wyrażania). Noty analityczne z każdego spotkania zostały wykorzystane do dalszej analizy. Obserwacje uczestniczące były przeprowadzone podczas trzech spotkań konsultacyjnych w październiku i

listopadzie 2013 roku. Technika ta została zastosowana do uzyskania wyników badań opisanych w rozdziale 5.

4. Czwartą techniką zbierania danych był zogniskowany wywiad grupowy, który miał na celu uzupełnienie interpretacji wyników uzyskanych na podstawie analizy dokumentów zastanych (protokołów z konsultacji społecznych). Został on przeprowadzony z ekspertami z Generalnej Dyrekcji Ochrony Środowiska (podmiotu odpowiedzialnego za konsultacje na poziomie krajowym) w czerwcu 2016 roku. Instytucja ta została wybrana jako centralny organ koordynujący pracę wszystkich szesnastu Regionalnych Dyrekcji Ochrony Środowiska odpowiedzialnych za organizację konsultacji społecznych na obszarów Natura 2000 i przygotowanie protokołów z poszczególnych spotkań konsultacyjnych. Eksperci biorący udział w badaniu zostali wskazani przez Generalną Dyrekcję Ochrony Środowiska. Z wywiadu została sporządzona nota analityczna wykorzystana do dalszej analizy. Wywiad nie był rejestrowany. Technika wywiadu grupowego została zastosowana do uzyskania wyników badań opisanych w rozdziale 5.

2.1.4. Rodzaje dowodów

W pracy doktorskiej zostało wykorzystanych pięć rodzajów dowodów (Yin, 2008): trzy mające charakter głównych (dokumenty urzędowe, protokoły ze spotkań konsultacyjnych w obszarach Natura 2000, nagrania z indywidualnych wywiadów pogłębionych) oraz dwa mające charakter pomocniczych (noty analityczne z obserwacji uczestniczących, nota analityczna ze zogniskowanego wywiadu grupowego). Dowody główne zostały wykorzystane do odpowiedzi na wszystkie pytania badawcze, zaś pomocnicze stanowiły podstawę do opracowania narzędzi badawczych oraz dostarczały dodatkowych ścieżek interpretacyjnych. Ponadto wykorzystane w pracy dowody miały charakter zastany lub wywołany – Tabela 1.

Tabela 1. Rodzaje dowodów użytych w pracy doktorskiej.

Rodzaje dowodów	Dowody główne	Dowody pomocnicze
Dowody zastane	• Protokoły z konsultacji społecznych • Dokumenty urzędowe na potrzeby polityk środowiskowych	Nie dotyczy
Dowody wywołane	• Nagrania z indywidualnych wywiadów pogłębionych	• Noty analityczne z obserwacji uczestniczących • Nota analityczna ze zogniskowanego wywiadu grupowego

Źródło: opracowanie własne.

Główne źródła dowodów

1. Dokumenty urzędowe dotyczące polskich polityk środowiskowych obejmowały: 1) akty prawne (ustawy wydawane przez Sejm, określające ogólne założenia i zasady np. ochrony środowiska); 2) strategie na poziomie krajowym (długoterminowe plany wydawane np. przez ministerstwo określające kierunek polityki dla sektorów, takich jak leśnictwo czy gospodarka przestrzenna); oraz 3) rozporządzenia (dokumenty prawne wydawany przez władzę wykonawczą, np. Prezesa Rady Ministrów). Łącznie zidentyfikowano 46 dokumentów istotnych z punktu widzenia polityki środowiskowej w Polsce: 25 rozporządzeń, 11 strategii i 10 ustaw.
2. Nagrania z dziewięciu wywiadów pogłębionych, które zostały przeprowadzone z ekspertami w dziedzinie ochrony środowiska i ochrony przyrody w Polsce.
3. Protokoły ze spotkań konsultacyjnych dotyczących przygotowania planów zadań ochronnych w obszarach Natura 2000 w Polsce. Spotkania były organizowane przez Regionalne Dyrekcje Ochrony Środowiska oraz dokumentowane za pomocą protokołów odzwierciedlających przebieg spotkania. Spotkania te odbywały się w takich miejscach jak: lokalne ośrodki kultury, siedziby lokalnych wydziałów Lasów Państwowych, parki narodowe lub krajobrazowe. W sumie zebrano 1 077 protokołów sporządzonych w latach w latach 2010-2015 z 15 z 16 województw w Polsce. Mimo ponawianych prób uzyskania danych, województwo mazowieckie odmówiło dostępu do swoich danych.

Pomocnicze źródła dowodów

1. Noty analityczne z obserwacji uczestniczących podczas trzech spotkań konsultacyjnych dotyczących przygotowania zarządzania obszarami Natura 2000 w Polsce, które odbyły się w październiku i listopadzie 2013 roku.
2. Nota analityczna ze zogniskowanego wywiadu grupowego z ekspertami z Generalnej Dyrekcji Ochrony Środowiska.

2.1.5. Ograniczenia wynikające z zastosowanych źródeł dowodów i metod

Różnorodność materiałów badawczych pozwoliła na osiągnięcie wszystkich celów określonych w pracy doktorskiej w sposób kompleksowy, umożliwiając spojrzenie na nie przez pryzmat dokumentów urzędowych, wiedzy eksperckiej i z perspektywy praktyków

zarządzania środowiskiem. Jednak wykorzystanie takiego materiału źródłowego (głównie dokumentów zastanych), ze wszystkimi jego zaletami, nie jest wolne od słabości (Sułek, 1990) (Sułek, 1990). Najlepiej byłoby, gdyby badania nad konsultacjami społecznymi opierały się na pełnych nagraniach audio (lub wideo) ze wszystkich spotkań konsultacyjnych. Gromadzenie takich danych było jednak niemożliwe z co najmniej dwóch powodów. Po pierwsze, niski poziom uczestnictwa w konsultacjach społecznych i brak zaufania do instytucji konsultacyjnych przemawiały za jak najmniejszą ingerencją w proces konsultacji (rejestracja i uzyskanie zgody na udział w badaniach) oraz oparciem się na dostępnych materiałach (protokołach). Po drugie, spotkania konsultacyjne często odbywały się równolegle i w odległych od siebie punktach. Udział w nich przekraczał możliwości finansowe i operacyjne prowadzonych w ramach niniejszej pracy doktorskiej badań.

2.1.6. Metody analizy

Badania zostały przeprowadzone z wykorzystaniem analizy treści (CA) dla wszystkich źródeł danych (Frankfort-Nachmias and Nachmias, 2008; Hsieh and Shannon, 2005; Mayring, 2000). Do analizy dokumentów prawnych i protokołów z konsultacji społecznych wybrana została analiza treści, ponieważ umożliwia ona systematyczną analizę dużych partii materiałów tekstowych, zarówno pod względem treści „jawnej" (wyrażenia pojawiające się bezpośrednio w tekście, np. "usługi ekosystemowe"), jak i treści „ukrytej" (rozumienie środowiska pod względem ES, zawarte w tekście, ale bez używania nazwy). CA umożliwiła sprawdzenie obecności koncepcji ES w dokumentach prawnych, tj. w polskich politykach ochrony środowiska oraz w protokołach, które informowały o przebiegu dyskusji podczas spotkań konsultacyjnych dotyczących przygotowania planów zadań ochronnych dla obszarów Natura 2000.

Przeprowadzona CA miała zarówno charakter ilościowy jak i jakościowy. Zakres możliwości wyboru technik badawczych był stosunkowo wąski. Jedną z metod dającą możliwości badania treści, jest analiza konwersacyjna. Służy ona do analiz nagrań np. debat (rozmów), skupiając się jednak na formie wypowiedzi (pauzy, akcenty itp.). Jest to metoda zbliżona do CA, ale nie można jej wykorzystać do analizy zwartych dokumentów urzędowych. Dlatego też analiza konwersacyjna nie mogła być wykorzystana do osiągnięcia celów przyjętych w niniejszej pracy. Analizę dokumentów polskiej polityki ochrony środowiska prowadzono od września 2013 r. do lutego 2014 r., a analizę protokołów z konsultacji społecznych przeprowadzono od maja 2015 r. do stycznia 2017 r. Do

przeprowadzenia procesu CA dla obu źródeł dowodów służyło oprogramowanie NVivo 10. CA została zastosowana w badaniach opisanych w rozdziałach 2, 4 i 5.

CA wywiadów pogłębionych z udziałem ekspertów została wybrana w celu jakościowego zbadania potencjału i ograniczeń związanych ze stosowaniem ES w polskich ramach prawnych oraz zapewnienia kontekstu dla interpretacji wyników CA polskiej polityki ochrony środowiska. Nagrania zostały przeanalizowane przy użyciu kodowania audio w programie NVivo 10. Metoda ta została zastosowana w badaniach opisanych w rozdziałach 2 i 3.

CA not analitycznych z obserwacji uczestniczących w spotkaniach konsultacyjnych została przeprowadzona w celu jakościowego zbadania i scharakteryzowania spotkań konsultacyjnych dotyczących opracowania planów zadań ochronnych na obszarach Natura 2000. Wyniki obserwacji uczestniczących zostały wykorzystane do opracowania narzędzia badawczego analizy treści protokołów z konsultacji społecznych. Metoda ta została zastosowana w badaniach opisanych w rozdziale 5.

CA noty analitycznej z wywiadu grupowego z ekspertami z Generalnej Dyrekcji Ochrony Środowiska umożliwiła jakościowe zbadanie kwestii standaryzacji procedury konsultacji społecznych dotyczących opracowania planów zadań ochronnych na obszarach Natura 2000 w Polsce oraz dostarczenie głębszego wyjaśnienia ilościowych wyników analizy protokołów z konsultacji społecznych. Metoda ta została zastosowana w badaniach opisanych w rozdziale 5.

3. Struktura rozprawy

Niniejsza rozprawa doktorska składa się z czterech oryginalnych artykułów, poprzedzonych wstępem ogólnym i zakończonych rozdziałem zawierającym ogólną dyskusję i główne wnioski. Pomimo niezależności każdego z czterech artykułów, praca jest spójnym tematycznie zbiorem[1] ponieważ:

1. Dotyczy jednego głównego problemu badawczego: obecności koncepcji ES w polskim dyskursie środowiskowym (por.sekcja 1.2).
2. Metody stosowane w pracy doktorskiej mają charakter socjologiczny i wzajemnie się uzupełniają (por. sekcja 2.2).

[1] Zgodnie z par. 13 pkt. 2 Ustawy z dnia 14 marca 2003 r. o stopniach naukowych i tytule naukowym oraz o stopniach i tytule w zakresie sztuki (Dz. U. z 2003 r., poz. 65, z późn. zm.).

3. Poszczególne rozdziały empiryczne (artykuły) są ze sobą powiązane, a kolejne rozdziały opierają się na wynikach opisanych w poprzednich rozdziałach (por. Rozdziały 2-5).

W momencie składania rozprawy doktorskiej, opublikowane zostały trzy artykuły (rozdziały 2, 3 i 4), a czwarty znajduje się w procesie recenzji od 17 lutego 2019 r. (rozdział 5). Ponieważ artykuły naukowe są samodzielnymi publikacjami, w przypadku niektórych fragmentów, takich jak ramy teoretyczne lub metody, nie można było uniknąć częściowych powtórzeń. Postanowiłem jednak zachować każdy rozdział w oryginalnym formacie artykułu, aby zachować ich wewnętrzną spójność. Wszystkie artykuły zostały opracowane pod moim kierownictwem (tj. jestem ich pierwszym autorem) z udziałem innych współautorów, jak wskazano na pierwszej stronie każdego z rozdziałów. Zainicjowałem, zaprojektowałem i przeprowadziłem centralną pracę badawczą opisaną w każdym artykule, przeanalizowałem dane i napisałem pierwszy szkic każdego z artykułów oraz kolejne poprawione jego wersje, zapewniając integralność każdej pracy przed przekazaniem do czasopisma naukowego. Promotorzy i współautorzy wnieśli największy wkład we wprowadzenie i dyskusje lub poprzez udział w gromadzeniu danych. Mój wkład procentowy w przygotowanie każdego z artykułów to (w zależności od artykułu) 60%-70%, zaś wszystkich pozostałych współautorów łącznie 30%-40%[2]. W kolejnych paragrafach, każdy z poniższych rozdziałów jest krótko przedstawiony. Przegląd głównych cech (celów badawczych, technik gromadzenia danych, dowodów, metod analizy danych oraz statusu publikacyjnego) każdego z czterech rozdziałów empirycznych znajduje się w Tabeli 2.

[2] Szczegółowy opis wkładu pracy poszczególnych autorów znajduje się każdorazowo na pierwszych stronach rozdziałów 2-5

Tabela 2. Charakterystyka czterech rozdziałów empirycznych zawartych w pracy doktorskiej. Szare pola oznaczają rozdziały, w których dane elementy pracy się pojawiają np. cele badawcze.

		Rozdziały			
		2	3	4	5
Cele badawcze	Wniesienie wkładu w międzynarodową debatę na temat stosowania koncepcji ES w polityce ochrony środowiska na poziomie krajowym.	■	■		
	Zrozumienie, w jaki sposób koncepcja ES była obecna w rozważaniach interesariuszy na tematy związane z zarządzaniem zasobami w Polsce.			■	
	Zrozumienie źródeł konfliktów, które były obecne w rozważaniach interesariuszy na temat zarządzania ES na obszarach Natura 2000 w Polsce				■
Techniki gromadzenia danych	Obserwacja uczestnicząca				■
	Analiza dokumentów zastanych	■		■	■
	Indywidualne wywiady pogłębione	■	■		
	Zogniskowany wywiad grupowy				■
Dowody	Dokumenty urzędowe na potrzeby polityk środowiskowych	■			
	Nagrania z indywidualnych wywiadów pogłębionych	■	■		
	Protokoły z konsultacji społecznych			■	■
	Noty analityczne z obserwacji uczestniczących				■
	Nota analityczna ze zogniskowanego wywiadu grupowego				■
Metody analizy danych	Analiza treści	■	■	■	■
Status publikacyjny	W trakcie recenzji				■
	Opublikowany	■	■	■	

Źródło: opracowanie własne.

W rozdziale 2 zbadano występowanie koncepcji ES w politykach publicznych w Polsce, przedstawiając systematyczny CA krajowych polityk środowiskowych. Analiza ustaw, strategii krajowych i rozporządzeń została przeprowadzona z wykorzystaniem kodów wskazanych w *Common International Classification of Ecosystem Services*, która obejmuje pełen zakres ES. Wyniki CA zostały przeanalizowane w oparciu o wywiady pogłębione z polskimi ekspertami w dziedzinie ochrony środowiska i ochrony przyrody. Ten rozdział jest tożsamy z artykułem: Maczka, K., Matczak, P., Pietrzyk-Kaszyńska, A., Rechciński, M., Olszańska, A., Cent, J., & Grodzińska-Jurczak, M. (2016). "Application of the ecosystem services concept in environmental policy—A systematic empirical analysis of national-level policy documents in Poland." Ecological Economics, 128, 169-176.

W rozdziale 3 przedstawiono analizę przyczyn ograniczonej obecności koncepcji ES w polskich politykach środowiskowych, w oparciu o IDI z ekspertami w dziedzinie ochrony przyrody. Ta część pracy doktorskiej opisuje potencjał koncepcji ES i jej użyteczność dla różnych sektorów gospodarki, jak również pozytywne i negatywne konsekwencje stosowania

ES w praktyce. Ten rozdział jest tożsamy z artykułem: Maczka, K., & Matczak, P. (2014). “Is the ecosystem services concept useful in Polish policy making? Qualitative analysis of experts perception.” Ekonomia i Środowisko, (4 [51]).

W rozdziale 4 przeanalizowano, w jaki sposób koncepcja ES była obecna podczas konsultacji społecznych dotyczących opracowania planów zadań ochronnych w obszarach Natura 2000 w Polsce. Ta część rozprawy doktorskiej odnosi się do analizy dyskursu protokołów ze spotkań konsultacyjnych powstałych w okresie pięciu lat. Ten rozdział jest tożsamy z artykułem: Maczka, K., Chmielewski, P., Jeran, A., Matczak, P., & van Riper, C. J. (2019). "The ecosystem services concept as a tool for public participation in the management of Poland's Natura 2000” network. Ecosystem Services, 35, 173-183.

Rozdział 5 analizuje źródła konfliktów, które były obecne podczas konsultacjach społecznych dotyczących planów zadań ochronnych w obszarach Natura 2000 w Polsce i ich powiązania z ES. Wykorzystując teorię konfliktów i analizę dyskursu, w tym rozdziale przebadano protokoły z konsultacji społecznych. Ten rozdział jest tożsamy z artykułem: Maczka, K., Matczak, P., Jeran, A., Chmielewski, P., Baker, S. “Conflicts in biodiversity conservation management: Analysis of management plans in Natura 2000 in Poland” złożonym do czasopisma „Land Use Policy” w lutym 2019 r. W momencie składania pracy doktorskiej artykuł był w trakcie recenzji.

Rozdział 6 przedstawia ogólną dyskusję i główne wnioski z badań przeprowadzonych w ramach pracy doktorskiej. W tym rozdziale, syntetycznie zaprezentowany został wkład pracy doktorskiej do debaty naukowej na temat ES w dyskursie środowiskowym. Ponadto nakreślono w nim kluczowe rekomendacje dla planowania, zarządzania i podejmowania decyzji.

Pracę doktorską kończy sekcja zawierająca informacje uzupełniające: tabelę *Common International Classification of Ecosystem Services* oraz zrzuty ekranu z baz danych.

4. Podsumowanie i wnioski

Koncepcja ES była w ciągu ostatnich dwóch dziesięcioleci przedmiotem wielu dyskusji naukowych (Costanza et al., 1997; Daily, 1997; de Groot, 1992; Groot et al., 2002) Jak zauważył Norgaard (2010), koncepcja ES swe początki bierze ze skromnej metafory, która mogła pomóc nam myśleć o relacji między ludźmi i naturą, ale ostatecznie stała się integralną częścią tego, co myśleliśmy o przyszłości ludzkości i ewolucji biologicznej. Podejście to

zakłada, że ludzie czerpią korzyści z ekosystemów i klasyfikuje ES do kategorii *zaopatrzenia* (np. żywność), *regulacji i utrzymania* (np. regulacja klimatu) oraz *usług kulturalnych* (np. doświadczenia rekreacyjne).

Koncepcja ES została szybko wykorzystana w różnych obszarach badawczych, takich jak ochrona bioróżnorodności (Nelson et al., 2009; Wendland et al., 2010), planowanie krajobrazu i przestrzeni (Syrbe and Walz, 2012; Vihervaara et al., 2010) oraz zarządzanie środowiskiem (Ervin et al., 2012; Ingram et al., 2014; Primmer et al., 2015). Jej zastosowanie uznano jednak za arbitralne i wysoce zróżnicowane pod względem metodologicznym (Seppelt et al., 2011). Sama koncepcja jest trudna do wykorzystania w sposób systematyczny i spójny. Ponadto istnieją kontrowersje dotyczące koncepcji ES, takie jak ryzyko monetaryzacji przyrody.

Pomimo wspomnianych słabości, koncepcja ES umożliwia integrację wiedzy osób o różnych pozycjach społecznych i doświadczeniu zawodowym (Abson et al., 2014; Schröter et al., 2017; Steger et al., 2018). Zapewnia wspólny język dla wprowadzenia teorii w życie w pracach interdyscyplinarnych zespołów (Baggio et al., 2015). Akcentuje też ważną rolę dochodów i zatrudnienia społeczności lokalnych. Dla przykładu turystyka może pochodzić z działań na rzecz ochrony różnorodności biologicznej (Bastian et al., 2010; Pettenella et al., 2016). Badania przeprowadzone przez Niedziałkowskiego i współpracowników (2014) pokazują, że obawa mieszkańców przed utratą dostępu do najważniejszych dla nich ES, takich jak drewno, owoce leśne i możliwość rekreacji, może skutecznie osłabić państwowe działania na rzecz ochrony środowiska. Obawy te mogą być jednak uwzględniane poprzez zastosowanie koncepcji ES, ponieważ odnosi się ona do konfliktów związanych z ochroną przyrody, dostarczając danych dotyczących perspektyw i potrzeb społeczności lokalnych, które mają zasadnicze znaczenie dla bardziej efektywnego kształtowania polityki ochrony przyrody.

Koncepcja ES w Polsce stała się przedmiotem dyskusji naukowych stosunkowo niedawno, głównie po 2000 r. (Kronenberg, 2014; Mizgajski, 2010; Rosin et al., 2011; Żylicz, 2010). Podczas gdy debata naukowa koncentruje się na potencjalnym wkładzie koncepcji ES w ochronę przyrody, niewiele wiadomo o jej rzeczywistym wpływie na procesy kształtowania polityki środowiskowej. Wiąże się to z wieloma pytaniami dotyczącymi polityk publicznych w zakresie ochrony środowiska, udziału interesariuszy i konfliktu społecznego dotyczącego środowiska naturalnego w Polsce. Jaki jest potencjał praktycznego wykorzystania koncepcji ES? Jak jest on wykorzystywany w dokumentach dotyczących polityki? Jaka jest obecność i przydatność ES w konsultacjach społecznych na tematy związane z zarządzaniem zasobami

naturalnymi? W jaki sposób jest to związane z różnymi źródłami konfliktu? Pytania te dotyczą nie tylko praktycznego znaczenia koncepcji ES, ale również stanowią wyzwanie w momencie, w którym wysiłki na rzecz włączenia innowacji do głównego nurtu polityki podejmowane przez naukowców i decydentów nakładają się na siebie. W związku z tym w ramach badań podjętych w niniejszej pracy określono zastosowanie koncepcji usług ekosystemów w Polsce poprzez analizę polskiej polityki ochrony środowiska oraz zebranie danych na temat udziału społeczeństwa w zarządzaniu siecią Natura 2000.

Każdy z celów został omówiony w jednym z recenzowanych artykułów składających się na tę rozprawę (rozdziały 2-5). Niniejsze streszczenie zawiera przegląd najważniejszych wniosków płynących z badań. W punkcie 4.1 przedstawiono zastosowanie koncepcji ES w polityce ochrony środowiska na poziomie krajowym w Polsce (cel 1, pytania 1 i 2). W sekcji 4.2 pogłębiono kwestię możliwości praktycznego wykorzystania koncepcji ES (cel 1, pytanie 2). W rozdziale 4.3 przedstawiono obecność koncepcji ES w dyskusjach interesariuszy na tematy związane z zarządzaniem zasobami w Polsce (cel 2, pytania 3-5). W rozdziale 4.4 zbadano źródła konfliktów, które były obecne w dyskusjach interesariuszy na temat zarządzania ES na obszarach Natura 2000 w Polsce (cel 3, pytania 6-8). Natomiast, sekcja 4.5 podsumowuje co wartościowego przeprowadzone badania wnoszą do debaty naukowej i praktycznego zarządzania środowiskiem z wykorzystaniem koncepcji ES i udziałem interesariuszy.

4.1. Zastosowanie koncepcji usług ekosystemowych w polityce ochrony środowiska na poziomie krajowym w Polsce

W rozdziale 2 dokonano analizy zastosowania koncepcji ES w polityce ochrony środowiska na poziomie krajowym w Polsce (**Cel 1)**. W ramach tej analizy zbadano, w jakim stopniu koncepcja ES jest obecna w polskich politykach środowiskowych oraz jakie kategorie ES są stosowane w tych politykach, a także jakie są bariery i możliwości praktycznego zastosowania koncepcji ES w Polsce (pytania 1 i 2).

Przeprowadzone badania pokazały, że koncepcja ES znajduje odzwierciedlenie w krajowych politykach ochrony środowiska w Polsce. Jest ona jednak przedstawiana głównie w postaci pośredniej, ukrytej (tj. bez użycia terminu „usługi ekosystemowe"). Ponadto analiza występowania koncepcji ES w politykach wraz z pogłębionymi wywiadami z ekspertami pozwoliły zidentyfikować dwie ogólne grupy barier we wdrażaniu koncepcji ES a) ograniczone rozumienie i uznanie użyteczności koncepcji wśród osób zaangażowanych w tworzenie polityki; oraz b) podziały sektorowe w ramach zarządzania środowiskiem, które

utrudniają rozpowszechnianie koncepcji. Przeprowadzone badania pokazują, że koncepcja ES była już wykorzystywana w formie ukrytej w polskiej polityce ochrony środowiska jeszcze zanim uzyskała swoją obecną nazwę i przed wdrożeniem unijnej polityki dotyczącej bioróżnorodności.

4.2. Możliwości zastosowania koncepcji ES w praktyce

W rozdziale 3 dokonano analizy możliwości praktycznego wykorzystania koncepcji ES, uwzględniając zakres jej implementacji w dokumentach legislacyjnych i politycznych w Polsce **(Cel 1)**. W ramach tej analizy zbadano ograniczoną obecność koncepcji ES w polskich politykach publicznych, rozszerzając wyniki rozdziału 2 (pytanie 2).

Przeprowadzone badania pokazały, że koncepcja ES ma duży potencjał, aby stać się narzędziem kształtowania polityki i podejmowania decyzji. Badania potwierdzają również, że niektóre przeszkody nie zostały jeszcze pokonane, zwłaszcza te związane z bieżącą polityką i zarządzaniem. Dwuznaczność i niespójność pojęcia stwarza ograniczenia w jego stosowaniu. Ze względu na rozdrobnioną wiedzę zainteresowanych stron koncepcja ta jest stosowana w ramach regulacyjnych głównie jako przewodnia, ogólna idea, a nie jako zorientowana na praktykę idea, stosowana operacyjnie w procesie decyzyjnym. Koncepcja ES choć jest inspirująca i intelektualnie atrakcyjna, pociąga za sobą trudności w stosowaniu jej w polityce. Przeprowadzone analizy pokazują, że koncepcja ES jest ona bardziej przydatna w argumentacji i komunikacji niż w dokonywaniu pomiarów. Ponadto przyczyny ograniczonych postępów w stosowaniu podejścia ES są związane głównie z czynnikiem ludzkim: specyficzne wykształcenie administratorów i decydentów, niechęć do stosowania nowych koncepcji, a także ograniczona i fragmentaryczna wiedza. Koncepcja ta może być postrzegana jako ambiwalentna, ponieważ podejście oparte na ES może być zarówno pomocne w ochronie przyrody, jak i niebezpieczne dla tej ochrony. Może ona być pomocna w procesie decyzyjnym, ale może też pociągać za sobą ryzyko, ponieważ promuje postrzeganie otoczenia głównie przez pryzmat wartości pieniężnych, co w efekcie prowadzi do swego rodzaju „fetyszyzmu utowarowienia" (Kosoy and Corbera, 2010). Koncepcja ES posiada potencjał w kształtowaniu polityki, ale aby mogła być stosowana, wymaga bardziej przejrzystych definicji dostosowanych do kształtowania polityki.

4.3. Obecność koncepcji ES w dyskusjach interesariuszy na tematy związane z zarządzaniem zasobami naturalnymi w Polsce.

W Rozdziale 4 dokonano analizy obecności koncepcji ES w dyskusjach interesariuszy na tematy związane z zarządzaniem zasobami w Polsce **(Cel 2)**. W ramach tej analizy zbadano, w jakim stopniu różne kategorie ES pojawiły się w dyskursie na temat planów zadań ochronnych w Polsce, czy koncepcja ES jest przydatna do reprezentowania zarówno opisowych, jak i normatywnych aspektów ochrony bioróżnorodności oraz w jaki sposób różne grupy interesariuszy interpretowały ES w różnych w obszarach o odmiennym pokryciu terenu (pytania 3-5).

Przeprowadzone badania pokazały, że w czasie wielu spotkań konsultacyjnych dyskusje toczyły się w odniesieniu do koncepcji ES i dotyczyły zarządzania w obszarach o różnym pokryciu terenu. Jednakże koncepcja ES była obecna jedynie pośrednio (bez odwoływania się do terminu „usługi ekosystemowe"), podobnie jak w polskich dokumentach prawnych (patrz Rozdział 3). Wyniki pokazały również, że większość dyskusji miała charakter opisowy i neutralny, z naciskiem na utrzymanie przepływu usług w zakresie świadczenia zaopatrzenia w dobra naturalne i regulacji środowiska na rzecz społeczności lokalnych. Tony normatywne, w szczególności pojawiały się w obszarze usług kulturowych, pomimo że dyskutowano o nich zdecydowanie mniej. Z jednej strony, wyniki naszej analizy wykazały, że eksperci w dziedzinie ochrony środowiska z większym prawdopodobieństwem skupiali się na kwestiach takich jak ochrona różnorodności biologicznej i odnieśli się do usług regulacyjnych. Z drugiej strony, użytkownicy gruntów, tacy jak rolnicy, przedsiębiorcy itp. mieli zazwyczaj różne cele skoncentrowane na równowadze gospodarczej oraz przyjmowali język, który był zgodny z założeniami antropogenicznymi koncepcji ES. W przeprowadzonym badaniu zidentyfikowano również kategorie pokrycia terenu, które współwystępowały z różnymi korzyściami omawianymi przez zainteresowane strony i stwierdzono, że tereny leśne są najbardziej rozpowszechnione spośród ośmiu kategorii pokrycia terenu jeśli chodzi o świadczenie usług.

4.4. Źródła konfliktów w rozważaniach interesariuszy na temat zarządzania usługami ekosystemowymi na obszarach Natura 2000 w Polsce

W rozdziale 5 dokonano analizy źródeł konfliktów, które zostały zidentyfikowane w dyskusjach interesariuszy na temat zarządzania ES na obszarach Natura 2000 w Polsce **(Cel 3)**. Analiza ta jest kontynuacją badań podjętych w rozdziale 4 i określa, jakie są źródła konfliktów w partycypacyjnym zarządzaniu ochroną bioróżnorodności w sieci Natura 2000 w

Polsce, w jaki sposób źródła konfliktów odnoszą się do koncepcji ES, jaki jest poziom standaryzacji procesu partycypacyjnego mającego na celu przygotowanie planów zadań ochronnych dla sieci Natura 2000 (pytania 6-8).

Przeprowadzone badania pokazały, że konflikty wynikające ze stosunków między aktorami i strukturalnego kontekstu relacji były dominujące, natomiast przyczyny konfliktów związanych z wartościami i danymi były mniej istotne. Wyniki wskazują również, że istnieje silny związek między źródłami konfliktów a typem ES. Niektóre rodzaje ES wydawały się bardziej sprzyjające powstawaniu konfliktów, a niektóre źródła konfliktów (dane, interesy, relacje, struktura, wartości) były bardziej znaczące niż inne. Dominującym źródłem konfliktów dotyczących relacji są przede wszystkim konflikty związane z kulturowymi ES, podczas gdy inne źródła związane są głównie z usługami zaopatrującymi w dobra naturalne. Wyniki pokazały również, że brakuje ujednoliconej procedury raportowania ogólnokrajowego procesu konsultacji społecznych. Może to mieć negatywny wpływ na pamięć instytucjonalną i ograniczyć możliwości uczenia się na podstawie wcześniejszych niedociągnięć.

4.5. Uwagi końcowe i wnioski

Przedstawione w pracy badania zastosowania ES w Polsce, pokazały że koncepcja ta jest obecna zarówno w oficjalnych dokumentach tworzonych na potrzeby polityk publicznych, jak i funkcjonowała podczas dyskusji interesariuszy w trakcie konsultacji społecznych dotyczących opracowania planów zadań ochronnych w obszarach Natura 2000 w Polsce. Mimo, że jest to obecność głównie pośrednia (bez odwoływania się do terminu „usługi ekosystemowe), to pokazuje jak rozumienie środowiska przez pryzmat dóbr, które dostarcza Człowiekowi, jest zakorzenione w społecznej świadomości. Analizy pokazały też, że koncepcja może być traktowana jako narzędzie do prowadzenia konsultacji społecznych w obszarze środowiska, ze względu na swoją zrozumiałość i zaobserwowany związek z różnymi źródłami konfliktu, co może się przyczynić do ich efektywniejszego przewidywania i rozwiązywania. Choć koncepcja ES posiada szereg wad takich jak nieścisłości definicyjne czy akcentowanie głównie wymiaru ekonomicznego środowiska, to jest użyteczna jako elastyczna rama porządkująca dyskusję na temat zarządzania środowiskiem.

Rozprawa ta przyczynia się zarówno do rozwoju wiedzy naukowej, jak i oferuje decydentom rekomendacje dotyczące praktycznego wykorzystania koncepcji ES. Po pierwsze kształtowanie polityk publicznych w oparciu o koncepcję ES wymaga jaśniejszego jej zdefiniowania i odniesienia do konkretnych sposobów wyceny, zarządzania czy wprowadzenia płatności za ES, tak aby była ona użyteczna na poziomie operacyjnym. Po

drugie stosowanie jej jako narzędzia komunikacyjnego w trakcie konsultacji społecznych wymaga zachowania elastyczności interpretacyjnej, czyli dopasowania do lokalnej specyfiki danego obszaru (pokrycia terenu, charakterystyki interesariuszy itp.), co pozwoli na uwzględnienie punktów widzenia różnych grup interesariuszy, charakteryzujących się konkurencyjnymi interesami. Po trzecie zaś żeby wykorzystać koncepcję ES jako narzędzie ułatwiające przewidywanie potencjalnych konfliktów między różnymi grupami interesariuszy, konieczne jest opracowanie wystandaryzowanej procedury organizacji i raportowania procesów partycypacyjnych. Pomoże to w stworzeniu interesariuszom w różnych obszarach równych warunków do uczestnictwa i pozwoli uczyć się organizatorom procesów partycypacyjnych na popełnianych wcześniej błędach.

Wnioski płynące z tych badań są szczególnie istotne dla zarządzania obszarami chronionymi takimi jak np. obszary Natura 2000 w Polsce, przez np. władze publiczne. Obszary te są bowiem areną konfliktów społecznych i wymagają narzędzi komunikacji ułatwiających udział społeczeństwa, zrównoważony rozwój, sprawiedliwe zarządzanie z wykorzystaniem polityk publicznych.

Kwestia obecności koncepcji ES w dokumentach dotyczących polityki ochrony środowiska może być postrzegana jako przykład złożonych wyzwań w zakresie integralności tej polityki. Wieloaspektowy (odnoszący się do skali geograficznej, ekologicznej, instytucjonalnej, prawnej, zarządczej i czasowej) i wielopoziomowy (obecny na różnych poziomach każdej skali) charakter polityki środowiskowej (Cash et al., 2006) stanowi wyzwanie dla rozwoju kompleksowej i zintegrowanej operacjonalizacji koncepcji ES, która mogłaby być wdrażana w ramach różnych polityk publicznych w sposób synergiczny. Wymagałoby to jednak zapewnienia prostych odniesień i definicji na poziomie wykonawczym i operacyjnym oraz w odpowiednich dokumentach prawnych dotyczących ES, ich wyceny, zarządzania i potencjalnego wdrożenia płatności na rzecz ekosystemów.

Badania pokazały, że koncepcja ES posiada potencjał do zintegrowania polityki ochrony środowiska z różnych sektorów. Jednak szansa ta nie została jeszcze wykorzystana. Koncepcja ES jest dobrze osadzona, w różnych sektorach polityki ochrony środowiska w Polsce. Jednak bez wyraźnych wytycznych prawdopodobnie nie dojdzie do takiej integracji. Według ekspertów, biorących udział w wywiadach pogłębionych, wytyczne te mogą się pojawić na podstawie co najmniej dwóch procesów: 1) wdrażanie zaleceń i polityk UE, które w coraz większym stopniu odnoszą się do przyrody i wzmacniają myślenie o przyrodzie poprzez pryzmat ES; oraz 2) dialog zainteresowanych stron na temat ochrony przyrody i jej znaczenia dla rozwoju społecznego i dobrobytu.

Analiza ogólnopolskiego procesu konsultacji z szerokim zaangażowaniem zainteresowanych stron wykazała, że w przypadku Polski, kraju podlegającego licznym reformom w okresie po upadku komunizmu i konsolidującego system ochrony środowiska, koncepcja ES jest przydatnym narzędziem. Nawet jako koncepcja ukryta stanowi ona punkt odniesienia dla zarządzania konfliktami oraz wdrażania polityki i zarządzania obszarami chronionymi. Umożliwia różnym, często opozycyjnym względem siebie, grupom interesariuszy (np. leśnikom, organizacjom pozarządowym, przedsiębiorcom) wspólną dyskusję na temat przyszłości obszarów Natura 2000. Ponadto koncepcja ES może pomóc w dyskusjach na temat kompromisów i synergii między ochroną różnorodności biologicznej a dobrobytem społecznym, a także ich skuteczniejszemu osiągnięciu. Ze względu na rozpowszechnienie w dyskusjach pomiędzy interesariuszami, polityk na poziomie europejskim, których celem jest przyjęcie oddolnego podejścia do podejmowania decyzji i uwzględnienie doświadczeń zainteresowanych stron, kompromisy i synergia mogą zostać rozwinięte z perspektywy ES. Koncepcja ES może być nie tylko wykorzystywana jako narzędzie do opisowego przeglądu wyzwań związanych z zarządzaniem środowiskiem, ale również do tworzenia przestrzeni do debaty i minimalizowania konfliktów dotyczących przyszłości chronionych obszarów.

Należy jednak mieć świadomość, że pomimo oczekiwań zarówno naukowców jak i decydentów, związanych z udziałem społeczeństwa w ochronie bioróżnorodności z wykorzystaniem koncepcji ES, zaangażowanie interesariuszy jest problematyczne np. dlatego, ze wiąże się z konfliktami w wielu krajach (Alphandery and Fortier, 2001; De Meo et al., 2016; Hiedanpää, 2005). Konflikty okazują się nieuniknioną częścią tego procesu. Można je jednak zrozumieć i wskazać pewne prawidłowości. Istnieje silna potrzeba dokładniejszego przygotowania, prowadzenia i wyciągania wniosków z procesów partycypacyjnych w celu przewidywania konfliktów i ich rozwiązywania. Partycypacja jest podejściem, które wspiera przejrzystość, ułatwia zaangażowanie różnych grup zainteresowanych stron o różnym pochodzeniu, postrzeganiu i doświadczeniach. Badania pokazują, że potrzebne jest staranne opracowanie i standaryzacja procedur partycypacji.

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Picture 1. Marine in Powidz an example of cultural ecosystem services, Gnieźnieńskie Lakeland, Poland. **Photo:** Krzysztof Mączka.

Zdjęcie 1. *Przystań w Powidzu, przykład kulturowych usług ekosystemowych, Pojezierze Gnieźnieńskie, Polska.* ***Fot.*** *Krzysztof Mączka*

Chapter 1: Introduction and research objectives

1. Background and motivation

The main motivation behind this work is the conviction that the study of social and environmental areas intersection is an important activity nowadays. It can be observed that the quality of the surrounding nature is deteriorating. The effects of this process entail serious threats, e.g. weather anomalies, scarcity of drinking water, or significant decreases in agriculture yields. Environmental problems are rapidly becoming important sort of social problems. Poor quality of atmospheric air contributes to the development of a number of so-called civilization diseases: allergies, asthma and even cancer. The extinction of plants and animals species, i.e. the decline in biodiversity (Mace et al., 2012), reduces productivity and worsens the adaptability of the environment. For instance, the case of the decrease in the number of bees is widely researched and discussed. Bees and other pollinating insects do significantly contribute to the yield in agriculture. At the same time, they are fragile organisms. A decrease in their population causes a deteriorated agriculture productivity, which causes perturbations on the food market. As calculations show for only one area in South Africa, which is a significant producer of fruit from insect-pollinated plants, the replacement of bees labor would be associated with expenditure amounting to hundreds of millions of dollars (Allsopp et al., 2008).

Reflection on human exploitation of the natural environment has become growingly relevant for societal life (Frysztacki, 2006; Matczak, 2000). In order to face these threats and contribute to the improvement of the quality of the natural environment, measures are being taken to respond to problems such as depletion of natural resources or deforestation. Over the years, comprehensive concepts have been conceived aiming at minimizing the risks associated with exploitative development. These ideas are to improve the relations between society and the natural environment and to manage social conflicts that arouse around within area (Ostrom, 2009). These include, for example, the concept of sustainable development that combines growing concern for environmental issues with socio-economic issues (Hopwood et al., 2005) or the concept of Gaia, based on the hypothesis that the Earth is a super-organism that feels just like any other living creature (Lovelock, 2003). However, despite the efforts made, the level of biodiversity is still decreasing (there are fewer and fewer species), and the state of the natural environment is getting worse, and ineffective actions are accompanied by the emergence of an ideological or even utopian aura around them (Sztumski, 2009).

A relatively new proposal in the area in question is the concept of ecosystem services (ES), which is seen as a chance to overcome the weaknesses of previous approaches. It was proposed by Costanza et al. in article: “The value of the world’s ecosystem services and natural capital”, published in *Nature* (Costanza et al., 1997) and further in Millennium Ecosystem Assessment, a document called by the United Nations Secretary-General Kofi Annan in 2000 to assess human impact on the environment globally (MEA, 2005). ES are the various benefits that humans freely gain from the natural environment. The concept is based on a market-based approach in which different ecosystems are providers of services that contribute to society's well-being. For example, a forest provides mushrooms, and berries, water enables fish farming, insects pollinate plants, etc. These services can also be given a monetary value. The natural and social environment thus create a complex system of interconnected vessels. The condition of the natural environment is an important factor shaping the quality of life, social mobility, investments of economic capital, etc. It has been included to the national statistics. For instance, The Central Statistical Office includes "satisfaction with recreational areas and green areas" or "exposure to pollution or other environmental problems in the area" among the basic indicators of quality of life (Bendowska et al., 2014). Satisfaction with life is a result of the possibility of finding a job, educational and entertainment services, but also the presence of a park, clean air, or a view of the river. These environmental conditions are valuable, and people are willing to pay for them, for example, when buying flats.

The high level of uncertainty associated with environmental processes and climate change means that environmental factors, like power relations or social inequalities, are also treated as having a significant impact on social life and involve permanent changes in the social structure. Within scientific debates new issues are discussed, such as the problem of so-called "environmental refugees" and "climate refugees", where people are forced to migrate because of environmental factors or climate change. This touches upon the significant problem of mass migration caused by environmental factors that may have to be faced by societies (Piguet, 2013).

Services provided by the environment in the form of favorable climate conditions or the availability of natural resources are in turn factors conducive to the development of entrepreneurship, investments etc. A low level of pollution is often a prerequisite for the operation of a technologically advanced equipment manufacturing industry in a particular area, the production process which is demanding in terms of the natural environment.

In addition to the fact that the concept of ES has been used in science for more than 20 years, it is also used in the development of public policies in the field of environmental management. The UNESCO World Social Science Report 2013 (UNESCO, 2013) states that it is the task of governments and international organizations to establish research programmes to assess important elements of natural capital - all living and non-living components of the ecosystem other than humans and the products of their work that contribute to the production of goods and services of value to people (Guerry et al., 2015). The implementation of this demand has been strongly noticeable for several years, in many countries and in European Union policies (e.g. the EU Biodiversity Strategy to 2020).

Poland is an interesting case for the analysis of environmental policies at the national level. Similarly to other Central and Eastern European countries (CEE), a legacy of centralized planning with rigid top-down policy-making, and marginalized stakeholder participation, has been posing a challenge to crafting environmental policies. After the collapse of Communism in 1989, and in the context of EU accession, the Polish system of nature conservation underwent crucial changes (Kluvánková-Oravská et al., 2009). For instance, the Act of 16 October 1991 on Nature Conservation (Journal of Laws of 1991, Item 65, as amended), was underpinned by the requirement to establish channels of cooperation between the administration and non-governmental organizations. Nevertheless, the central administrative authorities continued to maintain a dominant position in decision-making, and hierarchical thinking prevailed among policymakers and nature conservation professionals. Nevertheless, environmental policies' making was changing (Grodzinska-Jurczak and Cent, 2011), including wider stakeholder participation. Also, new concepts appeared, with the concept of ES among them.

In the context of environmental policies, analyses of ES are among the priorities for social sciences (UNESCO, 2013). However, little is known about the extent to which the concept of ES is utilized in decision making in areas with strong environmental links (e.g. environment conservation, energy, environmental education, etc.). So far, neither the scale of application of the concept of ES, nor the way in which it is implemented, nor the social opportunities and risks arising from the integration of the environment in its terms, have been systematically analyzed, both at the national and the international level. It is also unclear whether, in the formulation and implementation of policies, this concept actually proposes new solutions or whether it is a temporary terminological fashion.

2. Research objectives and questions

Following the motivation described above, the general aim of this dissertation is to critically examine a significant but yet unexplored research problem, which is the following: How does the concept of ES is present in the environmental discourse in Poland? The specific objectives and questions of this dissertation are addressed across the four original research chapters included in this dissertation. Chapters 2-5 have the following aims and subquestions.

Chapter 2 and Chapter 3: To contribute to the international debate on the application of the ES concept in environmental policies at the national level by providing answers to the following questions:

1. To what extent is the ES concept, and what categories of ES are applied in the Polish policy documents?
2. What are the barriers to, and the potential for, the application of the ES concept in Poland?

Chapter 4: To understand how the ES concept was present in stakeholder deliberation on resource management topics in Poland by providing answers to the following questions:

3. To what extent different ES categories appeared in discourse about management plans in Poland?
4. Were ES useful to represent both descriptive and normative aspects of biodiversity conservation?
5. How different stakeholder groups interpreted ES frames across land cover categories?

Chapter 5: To understand the sources of conflicts, which were present in stakeholder deliberation on ES management in Natura 2000 areas in Poland by providing answers to the following questions:

6. What are the sources of conflicts in participatory biodiversity conservation management in the Natura 2000 network in Poland?
7. How the sources of conflicts refers to the ES concept?
8. What is the level of standardization of the participatory process designed to prepare Natura 2000 management plans?

3. Conceptual and methodological Framework

The issue of societal relations with the natural environment has been recognized since the beginning of sociology. According to some researchers, those relations initially played a marginal role (Redclift and Benton, 1994), while others claim that they were significant but marginalized by culturally oriented translators and interpreters such as Marx, Weber or Durkheim (Hannigan, 2014). However, asking questions and seeking answers about the position of man in the world of nature has not only an important spiritual and philosophical dimension. It also concerns the material consequences of the way of using natural resources and capabilities of coping with natural threats which in effect translates into the developmental opportunities of a particular society. Currently, social reflection on the environment is one of the important trends in sociology, developed as part of its sub-discipline - environmental sociology. However, it was not until the 70s of the 20th century that it began to reach its present form. In Europe, sociological research in this area was a reaction to the emergence of environmental social movements (the Greens even became a significant political force) with their dynamic activity. In the United States, the institutionalization of environmental sociology based on research achievements in rural sociology (Hannigan, 2014).

Previous studies (Dunlap, 1998, 1991; Rokicka and Starosta, 2004) have shown that factors such as attitudes towards the environment; ecological awareness and the interpretive framework (formulas by which we embrace, interpret, or categorize the environment) should be taken into account in activities aimed at improving relations between society and the environment. Improving technology and reforming existing economic systems is not sufficient, because any changes in society's relationship with the environment refer to transformations in behavior, existing value systems, and lifestyles.

The study undertaken in this thesis falls within the scope of environmental sociology. From the theoretical and methodological point of view, it belongs to the research on discourse, in this case – environmental discourse. The work assumes that today's world is to a large extent culturally "constructed" (Berger and Luckmannn, 1983; Macnaghten and Urry, 1998). It is shaped by a multitude of interpretive frameworks derived from the world of science, marketing and media, which on the one hand concern reality (describe and explain it), and on the other hand become a part of it. They are shaped under the influence of the context in which they function. (cf. Czyżewski 2013; Pettenger 2013; Hannigan 1995). The concept of ES can be treated as one of the interpretive frameworks that proposes a specific

way of capturing the environment (including problems related to the state of the environment), shapes the context (reality) and, at the same time, undergoes constant transformations - it is shaped under the influence of the context (reality).

3.1. Definition of key terms applied in the dissertation

The analytical perspective of this work refers to several concepts. The main terms that need to be defined are discourse, environmental discourse, interpretive framework, and conflict. All of them involve various meanings and connotations. It should be noted that this work is primarily of an empirical nature and a theoretical discussion about these terms is not claimed. The choices concerning the conceptual framework are driven by the specific areas of the investigation and the research objectives.

The concept of discourse, despite its popularity in sociology, psychology and cultural studies, is ambiguous, which causes problems in its application, but also offers a number of interpretive possibilities. The perspective of this work focuses on the analytical use of the common area of all discourse definitions, i.e. concentration on context (Fairclough and Fairclough, 2013; Wodak and Krzyzanowski, 2008). Van Dijk (2001) metaphorically describes discourse as "text in context". Hajer, in his works on environmental discourse, defines it as "a specific ensemble of ideas, concepts, and categorizations that are produced, reproduced, and transformed in a particular set of practices and through which meaning is given to physical and social realities" (Hajer, 1995), which form descriptions and interpretations of external world experienced by people (Hajer and Versteeg 2005). Moreover the environmental discourse particularly "is time- and space-specific and is governed by specific modeling of nature, which reflects our past experience and present preoccupations"(Hajer, 1995). The interpretations of the state of the natural (or indeed the social) environment which are parts of environmental discourse are based on representations, and always implies a set of assumptions and implicit social choices that are mediated through an ensemble of specific discursive practices (Hajer, 1995).

Another term, strongly linked to discourse which also does not have an agreed definition is the term of frames. Frames refer to communication and focus on “words, images, phrases, and presentation styles” (Borah, 2011; Druckman, 2001) and “ideas, concepts, and categorizations” (Hajer, 1995). Therefore, frames were treated in the study as a part of the discourse. In the functional sense, Goffman (1974), claimed that they are schemata of events interpretation. Thus, frames were “persistent patterns of cognition, interpretation, and

presentation, of selection, emphasis, and exclusion" (Gitlin, 1980). Framing is a selection of a part of reality in order to make it more "salient in communication" (Entman, 1993).

The use of discourse and frames in the thesis requires an additional commentary. The work assumes that ES concept is one of the components of the environmental discourse, and focuses solely on detecting its presence and characterizing the context in which it functions. These clarifications are necessary because by using discourse analysis it is also possible to study, for example, an environmental discourse in relation to other discourses, to identify different components of environmental discourse (concepts, ideas, categorizations) or to study their mutual relations, e.g. domination, in accordance with the assumptions of critical discourse analysis. Yet, which this dissertation does not take up these themes. The subject of this work is a detailed and systematic analysis of a limited part of the environmental discourse in the form of a single interpretive framework - the concept of ES.

The next core term in this dissertation is conflict. Conflict is assumed as a basic process in social life, and one of the leading topics in social sciences. Generally, it is understood as a certain incompatibility or clash of interest, values etc. between the parties involved: individuals, social groups, organizations. However, the definition of conflict is not agreed among researchers and it depends on a theoretical position and the field of interest related e.g. to various type of risk (Dietz et al., 1989). The precise definition of conflict is a challenging task. One can distinguish plenty of conflict source, such as e.g. race (Stone, 1985), class (Dahrendorf, 1959), politics (Gurr, 1980), religion (Kaplan, 2009), ideology (Brandt et al., 2014), or environment (Diehl, 2018). Moreover, there are also various analytical approaches towards conflict, with the basic distinction between: a) macroscale and structural, when conflict is a part of the social structure (Bernard, 1951); b) microscale and behavioral, when conflict is actions taken by social actors (Kriesberg, 1973); c) psychological, when conflict is a state of mental hostility towards another group (Fink, 1968). Conflicts are analytically attributed to functions (Coser, 1964): destructive, consensus building, generating innovations etc. The approach to conflict in this dissertation is focused on the environment as a provider of goods or benefits – ES. Unequal distribution of ES and unequal distribution of information and power involve actions related to environment taken by particular groups of stakeholders. Thus, the conflict is mostly behavioral and psychological. This analytical approach of conflict is related to different kinds of public reactions against e.g. protected areas or as in Not In My Backyard syndrome or other groups of stakehiolders (Litmanen, 1996).

The basis for this approach are De Meo's et al. (2016) and Moore's (2003) typologies of conflict related to biodiversity conservation. The study by De Meo et al. (2016) identified

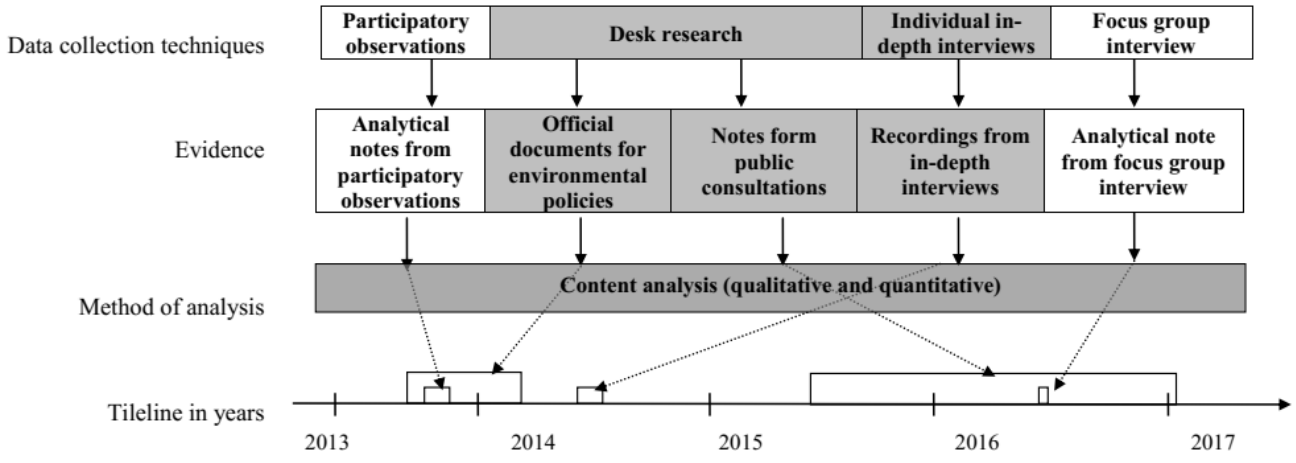
three types of conflicts related to *Natura 2000* areas, that are due to a) the restrictive measures imposed on human activities; b) the bureaucratic, rigid management; c) the absence of comprehensive information and communication about *Natura 2000* network implementation and management. The De Meo's typology of conflicts (De Meo's 2016) is consistent with Moore's (2003), but the latter covers more challenges of *Natura 2000* implementation identified in the literature. These challenges are the following: a) data - lack of information, different views on what information is relevant, different interpretations of data, b) interests - perceived or actual competitive, substantive content, procedural, psychological interests, c) structure - unequal control, ownership or distribution of resources, unequal power and authority, geographic, physical, or environmental factors that hinder cooperation, time constraints, d) values - different criteria for evaluating ideas or behaviour, exclusive intrinsically valuable goals, different worldviews, ways of life, ideology, and religion, e) relationship - strong emotions; misinterpretations or stereotypes; poor communication; repetitive negative behavior.

The theory of discourse in the context of key terms defined above is treated as a theory of framing reality, i.e. the transmission of specific information on the natural environment in the course of communication, which reveals existing or potential conflicts. In the face of the research issues taken up in the work and taking into account the previously mentioned definition complexities, the discourse theory turns out to be a feasible perspective. It enables to treat the concept of ES as a frame and to determine: a) to what extent the concept is present in environmental discourse; b) to what extent it proposes new solutions to the problem of environmental degradation; c) to what extent it is mere a rhetorical concept and a manifestation of Europeanisation of language, i.e. the penetration of elements of discourse features from the level of the European Union to the national discourse (Radaelli 2000) and d) what social opportunities and threats arise from the environment in question, using the interpretive framework, which is the concept of ES. Moreover, although other analytical perspectives also allow for the study of extensive textual material, they do not focus on the context in which the text functions, but on other aspects: persuasive - rhetorical analysis, structural - linguistic analysis (Atkinson et al. 2000), meaningful - semiotic analysis (Bauer and Gaskell, 2000; Nöth, 1995). These approaches are not used here.

3.2. Sources of evidence and methods

Empirical analyses carried out within the environmental sociology focus mainly on the studying of attitudes or ecological awareness, which are based to a large extent on opinion polls (Dunlap, 1998, 1991; Rokicka and Starosta, 2004). Environmental sociology studies on discourse, concerning, among others, environmental social movements (Brulle, 1996), often require an analysis of the source material going beyond the declarations of respondents, taking into account various aspects of social reality and the use of different units of analysis. This is also the case of this dissertation, in which the subject of research is the presence of the concept of ES in the environmental discourse. This part of the dissertation describes data collection techniques, sources of evidence and method of analysis (Yin, 2008). This all three phases are showed on Figure 1.

Figure 1. Scheme of data collection techniques, sources of evidence and method of analysis. Grey color – main techniques/evidence/methods, white – auxiliary.



Source: own work.

3.2.1. Data collection

The data collection techniques used in this dissertation were divided into two groups: major and auxiliary, presented below.

Major data collection techniques

Two major data collection techniques were used in this study. These are the following:

1. Desk research is the first technique of data collection. Firstly it was used for collecting major policy documents in the environmental domain in Poland followed the snowball sampling procedure using Internet, adding other documents referred to in those already identified. Secondly it was used for collecting notes from public consultation meetings concerning preparation of management plans in Natura 2000 areas in Poland. The notes were obtained by request addressed to Regional Directorates for Environmental Protection which were responsible for organization of the meetings. This technique was applied to the research described in Chapters 2, 4 and 5.
2. The second technique was IDI with high profile Polish experts in the field of environmental protection and nature conservation. The experts were chosen by reviewing scientific papers, legal documents, and NGO reports. The experts represented the most important stakeholders and professionals in the area of environmental protection and nature conservation policy making: public administration (the Ministry of the Environment, the State Forest Holding, and the National Fund for Environmental Protection and Water Management), researchers (a leader of a research centre and university professors), NGOs (an association for nature conservation), and a politician (a member of the Senate working in the environmental protection commission). The interview guidelines included five groups of questions concerning: comprehension of the ES term and concept, application of the ES concept in Polish environmental policies, a comment on the CA results, barriers to and potential for the application of the ES concept, and a comparison between Poland and other countries. The technique of IDI with experts turned out to be the most appropriate research technique to explore the potential and the constraints of ES application in the Polish legal framework and to provide the context for the interpretation of the CA results of Polish environmental policies. It allowed to elicit the specialist knowledge of the respondents. This could not be done by conducting questionnaire surveys. Also it stimulated the experts to express their point of view comprehensively, which would otherwise be significantly hindered during the implementation of focused group interviews. The interviews were conducted from May 2014 to July 2014 with nine experts and each interview lasted 30 to 40 minutes. Each interview was recorded following the consent of the respondent. This technique was applied to the research described in Chapters 2 and 3.

Auxiliary data collection techniques:

Two auxiliary data collection techniques were used in the study. They were the following:

1. The third data collection technique used in the work is the participatory observation. The observations were conducted on the basis of an observation sheet focusing on the technical aspect of the meeting (number of participants, room, meeting structure) as well as the substantive aspect (programme, participants' activity and ways of expressing them). The notes from each meeting was used for further analysis. Participatory observations of three consultations meetings in October and November 2013 were conducted. This technique was applied to the research described in Chapter 5.
2. The fourth data collection technique – focused group interview was used to supplement the interpretation of the data gathered through the desk research of notes from public consultations. It was conducted with experts from General Directorate for Environmental Protection (the entity responsible for the consultation on the national level) in June 2016. The entity was chosen as it is the coordinating office for the 16 directorates responsible for organization of public consultations of Natura 200 areas, the notes of which have been analysed using content analysis. The experts were proposed by the entity. The focus group interview was not recorded and note from it was used for further analysis. This technique was applied to the research described in Chapters 5.

3.2.2. Types of evidence

There were five types of evidence used in doctoral dissertation: three main (official documents, minutes from consultation meetings in Natura 2000 areas, recordings from individual in-depth interviews) and two auxiliary (analytical notes from participatory observations, analytical note from focused group interview). The main evidence was used to answer all research questions, while the supporting evidence provided the basis for the development of research tools and additional interpretation paths. Moreover the evidence was existing or elicited – Table 1.

Table 1. Types of evidence used in the doctoral dissertation.

Types of evidence	Main evidence	Auxiliary evidence
Existing evidence	• Notes form public consultations • Official documents for environmental policies	Not applicable
Elicited evidence	• Recordings from in-depth interviews	• Analytical notes from participatory observations • Analytical note from focus group interview

Source: own work.

Main evidence sources

Three major data sources were used in this study. These are the following:

1. Official documents for Polish environmental policies comprising: 1) legal acts (legal documents issued by the parliament, which sets out broad outlines and principles in, for example, environmental protection); 2) national strategies (a long term plan issued by, for example, a ministry which sets out the direction of a policy for a sector such as forestry or spatial management); and 3) decrees (a legal document issued by the executive, in Poland this can be the Prime Minister, or – ministers which specify regulations for implementing acts). In total, 46 documents relevant to the environmental policies in Poland were identified: 25 degrees, 11 strategies, and 10 legal acts.
2. Recordings from nine in-depth semi-structured interviews which were conducted with high profile Polish experts in the field of environmental protection and nature conservation.
3. Notes from public consultation meetings concerning preparation of management in Natura 2000 areas in Poland. Meetings were organized by the Directorate and notes reflecting the course of the meeting were taken. These meetings were held in venues such as local cultural centers, headquarters of local departments of National Forest Holding, and National or Landscape parks. In total 1,077 notes were collected from 15 out of 16 provinces of Poland created from 2010 to 2015. The Mazowieckie province denied access to their data.

Auxiliary evidence sources

Two auxiliary data sources were used in the study. They were the following:

1. Notes from participatory observations of three consultations meetings concerning preparation of management in Natura 2000 areas in Poland in October and November 2013 were conducted.
2. Notes from a focused group interview with experts from General Directorate for Environmental Protection (the entity responsible for the consultation on the national level).

3.2.3. Limitations of used evidence sources and methods

The diversity of research material allowed to achieve all the objectives set out in the paper in a comprehensive way, enabling to look at them through the prism of official documents, expert knowledge and the practitioners of environmental management, during public consultations. However, the use of such source material, with all its advantages, is not free from weaknesses (Sułek, 1990). Ideally, research on public consultations could be based on full audio (or video) recordings of all consultation meetings. However, it was impossible to collect such data for at least two reasons. Firstly, the low level of participation in public consultations and the lack of trust in the consultation institutions argued in favor of least interference (recording and obtaining consent to participate in research) in the consultation process and of relying on available material (reports). Secondly, consultation meetings were often carried out in parallel and at distant points, so that participation in each meeting would exceed the operational capacity of this research.

3.2.4. Methods of analysis

The research has been carried out with the use of Content Analysis (CA) for all five data sources (Frankfort-Nachmias and Nachmias, 2008; Hsieh and Shannon, 2005; Mayring, 2000):

1. **CA of legal documents and notes from public consultations:** The CA was chosen because it enables systematic analysis of large batches of text materials, both in terms of explicit content (phrases appearing directly in the text, e.g. "ecosystem services") and latent content (the understanding of the environment in terms of ES, included in the text but without using the name). The CA enabled to check the presence of the ES concept in legal documents, i.e. Polish environmental policies and in notes, that reported the course of discussions during

consultation meetings concerning the preparation of management plans for Natura 2000 areas.

The conducted CA was both quantitative and qualitative. The range of possibilities to chose other research techniques was relatively narrow. The method which is similar to CA is conversational analysis, which is used to study the recording of e.g. debates (conversations) focusing on the form of statements (pauses, accenting, etc.) but not for analyzing compact official documents. Therefore conversational analysis could not be used in any way to achieve the objectives adopted in this paper. Moreover, conversational analysis was a technique infeasible for the purpose of the study. The analysis of Polish environmental policies was conducted from September 2013 to February 2014 and the analysis of notes from public consultations was held from May 2015 to January 2017. To support the process of CA to both data sources was NVivo 10 software. This method was applied in to research described in Chapters 2, 4 and 5.

2. **CA of IDI with experts:** The CA was chosen to qualitatively explore the potential and the constraints of ES application in the Polish legal framework and to provide the context for the interpretation of the CA results of Polish environmental policies. The recordings were analyzed using audio coding in NVivo 10. The analysis of the interviews focused on the application potential of the ES concept and on the existing obstacles, barriers, and opportunities for its application that have been indicated by research conducted thus far. This method was applied into research described in Chapters 2 and 3.
3. **CA of analytical notes from participatory observations of consultation meetings:** The CA has been applied to qualitatively investigate and characterize the public consultation meetings on environmental management in Natura 2000 areas. The results of participatory observations were used to design the CA research tool of notes from public consultations meetings. This method was applied into research described in Chapters 5.
4. **CA of analytical notes from focus group interview with experts from General Directorate for Environmental Protection:** The purpose of the CA of note from focus group interview enabled to qualitatively explore the issue of standardization of the participatory process and to provide a deeper explanation of the quantitative results of the analysis of notes from public consultations. This method was applied into research described in Chapters 5.

4. Structure of the dissertation

This Ph.D. dissertation is a compilation of four original research papers preceded by the above general introduction and followed by a final chapter including a general discussion and main conclusions. It was enabled by art. 13 par. 2 Act of 14 March 2003 on Academic Degrees and Academic Title and on Degrees and Title in the Field of Art (Journal of Laws of 2003, Item 65, as amended).This compilation, despite the independence of its individual parts, is a thematically coherent set of texts as:

1. The dissertation addresses one major research problem: the presence of ES concept in the Polish environmental discourse (c. f. sub-section 1.2)
2. The methods used in the dissertation are of sociological character and are complementary to each other (c. f. subsection 1.3.2)
3. The particular empirical chapters are interrelated and the subsequent chapters are based on the results described in the previous chapters (c. f. Chapters 2-5)

At the time of submission, three research articles were already published (Chapters 2, 3 and 4), and the fourth one was submitted for publication (Chapter 5). As the scientific articles are stand-alone publications, some overlaps between chapters were unavoidable for some sections such as theoretical framework or methods. However, I have decided to preserve each chapter in its original paper format in order to ensure their respective internal consistency. All the scientific articles have been developed under my personal lead (i.e., I am the first author in all of them) with contributions by other co-authors as indicated in each Chapter's first page. I initiated, designed and conducted the central research work described in each article, I analyzed the data and I wrote the first draft of the manuscripts and subsequent revised versions, ensuring the integrity of the work itself before submission to the scientific journal. Supervisors and co-authors contributed mostly to the introduction and discussion sections or by participation in data collection. My percentage contribution to the preparation of each article is (depending on the article) 60%-70% while all other co-authors 30%-40% in total. In the next paragraphs, each of the following chapters is briefly presented. An overview of the main characteristics (aims, data collection, evidence, method of analysis and publication status) of the four empirical chapters is provided in Table 2.

Table 2. Main characteristics of the four empirical chapters included in the dissertation. Grey fields mean chapters in which particular elements of the work appear, e. g. research aims.

		Chapters			
		2	3	4	5
Main research aims	To contribute to the international debate on the application of the ES concept in environmental policies at the national level	■	■		
	To understand how the ES concept was present in stakeholder deliberation on resource management topics in Poland			■	
	To understand the sources of conflicts, which were present in stakeholder deliberation on ES management in Natura 2000 areas in Poland				■
Data collection techniques	Participatory observations				■
	Desk research	■		■	■
	In-depth interviews	■	■		
	Focus group interview				■
Evidence	Official documents for environment al policies	■			
	Recordings from in-depth interviews	■	■		
	Notes from public consultations			■	■
	Analytical notes from participatory observations				■
	Analytical notes from a focus group interview				■
Method of analysis	Content analysis	■	■	■	■
Publication status	Under review				■
	Published	■	■	■	

Source: own work.

Chapter 2 explores the occurrence of the ES concept in public policies in Poland by providing a systematic CA of national environmental policies. The analysis of the legal acts, national strategies, and decrees was conducted using Common International Classification of Ecosystem Services codes, which embraces a full range of ES. The results of CA were explored with in-depth interviews of high profile Polish experts in the field of environmental protection and nature conservation. This chapter was published as: Maczka, K., Matczak, P., Pietrzyk-Kaszyńska, A., Rechciński, M., Olszańska, A., Cent, J., & Grodzińska-Jurczak, M. (2016). "Application of the ecosystem services concept in environmental policy—A systematic empirical analysis of national-level policy documents in Poland." Ecological Economics, 128, 169-176.

Chapter 3 presents the exploration of reasons for a limited presence of the ES concept in Polish public policies basing on IDI with high-profile experts in nature conservation. This part of the dissertation describes the potential of the concept and its utility for different sectors of the economy as well as positive and negative consequences of the ES use in practice. This

chapter was published as: Maczka, K., & Matczak, P. (2014). “Is the ecosystem services concept useful in Polish policy making? Qualitative analysis of experts perception.” Ekonomia i Środowisko, (4 [51]).

Chapter 4 examines how the ES concept was employed as a tool for stakeholders from different social and professional worlds, to deliberate about the management of Natura 2000 areas in Poland. This part of dissertation applies Framing Theory and discourse analysis to the analysis of public documents generated over a five-year period and is focused on. This chapter was published as: Maczka, K., Chmielewski, P., Jeran, A., Matczak, P., & van Riper, C. J. (2019). "The ecosystem services concept as a tool for public participation in the management of Poland's Natura 2000” network. Ecosystem Services, 35, 173-183.

Chapter 5 examines the sources of conflicts, which were present in stakeholder deliberation on ES management in *Natura 2000* areas in Poland. Drawing from conflict theory and discourse analysis, public documents generated over a five-year period of *Natura 2000* areas management consultations were analyzed. This chapter was submitted as: Maczka, K., Matczak, P., Jeran, A., Chmielewski, P., Baker, S. “Conflicts in biodiversity conservation management: Analysis of management plans in Natura 2000 in Poland” submitted to the journal *Land Use Policy* in February 2019. At the time of Ph.D. dissertation submission, the article was still under first review status.

Chapter 6 presents the general discussion and the main conclusions of this research. In this final chapter, the main contributions of the dissertation to ES debate in environmental discourse are synthesized. This chapter also outlines the key implications for planning, management, and decision-making.

Finally, the dissertation includes the supporting information of the research chapters.

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Picture 2. Maintaining habitats an example of regulation and maintenance ecosystem services, Będlewo, Poland. **Photo:** Daria Paniotova.

Zdjęcie 2. *Utrzymanie siedlisk, przykład regulacyjnych usług ekosystemowych, Będlewo, Polska.* ***Fot.*** *Daria Paniotova.*

Chapter 2: Application of the ecosystem services concept in environmental policy—A systematic empirical analysis of national level policy documents in Poland

Article:

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Contribution to the article

Author	Contribution in %	Description of contribution
Krzysztof Mączka	60%	literature review, research concept, methodology, data collection, data analysis, coordination of the work, preparation of final version of the article
Piotr Matczak	10%	gathering data, commenting particular versions of the article, mentoring and guiding the research idea.
Agata Pietrzyk-Kaszyńska	10%	gathering data, commenting subsequent drafts of the article, input to the results and discussion parts.
Marcin Rechciński	5%	gathering data, commenting particular versions of the article, input in the discussion part
Agnieszka Olszańska	5%	gathering data, commenting particular versions of the article, input in the results part
Joanna Cent	5%	gathering data, commenting particular versions of the article, input in the methods part
Małgorzata Grodzińska-Jurczak	5%	guiding research idea, commenting particular versions of the article

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Analysis

Application of the ecosystem services concept in environmental policy—A systematic empirical analysis of national level policy documents in Poland

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ABSTRACT

We explore the occurrence of the ecosystem services (ES) concept in public policies in Poland by providing a systematic content analysis of national environmental policies. A detailed analysis of the legal acts, national strategies, and decrees using the Common International Classification of Ecosystem Services codes, which embraces a full range of ES, shows that the ES concept is reflected in the investigated documents. However, it is mainly depicted in an indirect, latent form. We further explore the ES concept occurrence in the Polish legislation with in-depth interviews of experts. From the interviews we identify two general groups of barriers to the ES concept implementation in environmental policy: (a) a limited understanding and acknowledgement of the concept among individuals involved in policy making; and (b) sectoral divisions within environmental governance that hinder the spread of the concept. Analysis reveals that the concept of services for society provided by nature had already been perceived in Polish national environmental policies before the emergence of the ES concept and the implementation of the EU biodiversity policy. However, the concept is referred to mostly in a latent form, before and after its emergence.

1. Introduction

The ecosystem services (ES) concept has received increased attention and has been widely discussed over the last two decades (Costanza et al., 1997; Daily, 1997; de Groot, 1992; de Groot et al., 2010). It has been quickly utilized in various research areas, such as biodiversity conservation (Nelson et al., 2009; Wendland et al., 2010), landscape and spatial planning (Syrbe and Walz, 2012; Vihervaara et al., 2010), environmental governance (Primmer et al., 2015) and environmental management (Ervin et al., 2012; Ingram et al., 2014). However, its application is considered arbitrary and highly diversified in terms of methodology (Seppelt et al., 2011). The concept itself is hard to operationalize in a systematic and consistent way. Thus, it is hard to develop one classification of ES that would be universal for different application contexts (Fisher et al., 2009). Considerable effort has been devoted by academia to the classification of ES. The most widely used, and the most influential results, of these efforts are the following initiatives: the Millennium Ecosystem Assessment (MEA, 2005), the Economics of Ecosystems and Biodiversity (TEEB, 2010), and the Common International Classification of Ecosystem Services (Haines-Young and Potschin, 2013). While there is a growing body of practical and scientific applications of these classifications (Haines-Young and Potschin, 2013), their application in ecosystem assessments usually requires additional efforts at the stage of their operationalization. Despite these challenges, the concept is considered useful as a support for policies aiming at sustainable development (Balvanera et al., 2012), e.g., in the process of Mapping and Assessment of Ecosystems and their Services in the European Union (Maes et al., 2016), and widely applied in international environmental policy recommendations, e.g., within the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) and the goals of the Convention of Biological Diversity for the year 2020 (García-Nieto et al., 2013).

According to the current approach to conservation in 'people and nature' framing (Mace, 2014), public policy, expressed in policy

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documents records, is an influential factor creating a feedback loop between ecosystems and human welfare (Díaz et al., 2015). Therefore, it is believed that official institutions, operating through policy documents such as strategic plans or national legislation (Mace, 2014) affect not only the environment but also the flow of ES that citizens benefit from.

Within European Union (EU) policies, the ES approach has been incorporated into several strategic documents. It is becoming one of the guiding and crucial design concepts, e.g., water efficiency measures in A Blueprint to Safeguard Europe's Water Resources. The ES concept is also present in other EU policy areas: biodiversity—Our life insurance, our natural capital: an EU biodiversity strategy to 2020; agriculture—Common Agricultural Policy towards 2020; marine management—Marine Strategy Framework Directive; forests—the new EU forest strategy; invasive alien species—EU Regulation 1143/2014 on Invasive Alien Species. Regardless of the coordination framework of the EU, the implementation of these policies is strongly dependent on the individual approach of EU member states (ARCADIS, 2011). Therefore, there are significant differences between member states in the implementation of the ES concept in their national policies, the development of national strategic frameworks for ecosystem restoration, and funding schemes (e.g., in forestry and agriculture) (Prager et al., 2012; Reed et al., 2014).

Piwowarczyk et al. (2013) analysed 63 strategic documents for the 10 largest Polish seaside cities to test how marine ES are perceived in urban planning and long-term management. The authors argue that although marine ES are acknowledged, their recognition in the strategic documents is partial and limited to the services which are already captured by the market mechanisms. The study of documents on urban green space planning in Berlin (Kabisch, 2015) showed that only the very recently developed informal strategies (e.g., Urban Development Concept 2030) explicitly relate to the ES framework. However, the stakeholders are aware of the ES term. Therefore, although policies including the ES concept have already been introduced at the European level, little is known about how the concept can be implemented in national environmental policies. In this study, we further explore the occurrence of the ES concept in policy documents (i.e., national strategies, legal acts, and decrees) using Poland as an example. We explore public policy in the form of principles, guidelines, and procedures developed by governmental bodies and officials following the approach, among others, of Anderson (1975), through the analysis of policy documents. Documents were treated as an initial component of public policy as they illustrate intentions and indicate purposive courses of action within the environmental governance domain (Hill and Hupe, 2014).

Poland constitutes an interesting example for analysing the adjustment of environmental policies because of the rapid socioeconomic transition in the last 25 years. As with other Central and Eastern European countries, Poland's environmental policies have undergone substantial changes (Cent et al., 2014; Kluvánková-Oravská et al., 2009; Niedziałkowski et al., 2015, 2013; Sasse et al., 2006). Poland's adjustment of its legal and administrative framework after the fall of Communism in 1989 and the EU accession in 2004 resulted in a transposition and implementation of the EU regulations. This has had an impact on the current shape of Polish environmental policy and governance (Grodzinska-Jurczak and Cent, 2011; Guttenbrunner, 2009). The concept of ES has entered scientific discussions in Poland relatively recently, mainly after 2000 (Kronenberg, 2014; Mizgajski, 2010; Rosin et al., 2011; Żylicz, 2010). However, the extent to which the ES concept has been applied in Polish policy documents has not been studied. While scientific debate is focused on the potential contribution of the ES concept to nature conservation, little is known about its actual influence on the policy making processes. This concerns not only the practical significance of the ES concept, but also poses a challenge at the point where science and policy overlap in their efforts to mainstream innovation and theoretical development. The aim of this paper is to contribute to the international debate on the application of the ES concept in environmental policies at the national level by providing answers to the following questions:

1. To what extent is the ES concept implemented in the Polish policy documents and what categories of ES are applied?
2. What are the barriers to, and the potential for, the application of the ES concept in Poland?

2. Material and Methods

Our research comprises two parts: content analysis and in-depth interviews of experts. The quantitative content analysis (Graneheim and Lundman, 2004; Hsieh and Shannon, 2005; Krippendorff, 2004) was used for the analysis of Polish environmental policies. This research technique was implemented in a few previous studies on ES (Kabisch, 2015; Piwowarczyk et al., 2013), where it proved useful in providing detailed information on the concept analysed. However, the interpretation of these results required broader knowledge on the specific context of the studied cases. In order to provide a deeper explanation of the results and to complement the quantitative results of content analysis we conducted in-depth interviews with experts engaged in the development and implementation of the analysed policies.

2.1. Content Analysis of Polish Environmental Policy Documents

The subject of the analysis was Polish environmental policies comprising: (1) legal acts (a legal document issued by the legislature—in Poland by the parliament—which sets out broad outlines and principles in, for example, environmental protection); (2) national strategies (a long term plan issued by, for example, a ministry which sets out the direction of a policy for a sector such as forestry or spatial management); and (3) decrees (a legal document issued by the executive—in Poland this could be the Prime Minister—which specifies regulations for implementing acts). We selected major policy documents in the environmental domain and followed the snowball sampling procedure, adding other documents referred to in those already identified. In total, 46 documents relevant to the environmental policies in Poland were identified: 25 decrees, 11 strategies, and 10 legal acts.

The content analysis of the documents was conducted using deductive (Elo and Kyngäs, 2008) and interpretative (Ahuvia, 2001) approaches in quantitative data analysis. For developing coding categories, we used the categorization of ES provided by the Common International Classification of Ecosystem Services (CICES). It is the most detailed categorization available, defining 80 ES at five levels of generality, from the broadest one (sections: provisioning, regulating and maintenance and cultural ES) through divisions, and groups and classes within each section. Both the manifest (exact appearance of the ES term) and the latent references (parts of the text expressing the ES concept—conveying the understanding of environment using the concept of ES without using the exact term 'ecosystem services') to ES were coded. The smallest meaningful parts of texts, where basic meaning could be understood without reading a larger part of the text, were chosen to be the coding units. NVivo software was used for coding and retrieval of the coded text to support the analysis (Cong et al., 2014). A list of 30 keywords relevant to the ES concept was built in order to identify both manifest and latent references to the ES concept. In the first stage of the coding process, all 46 documents were analysed in NVivo for the occurrence of the keywords in order to localize all parts of the content that were relevant to the ES concept. As a result of the first content verification, all the irrelevant parts (i.e., specific names such as titles of documents or meta-language parts such as citations or descriptions of other documents) were removed from further analysis. The remaining phrases were coded, with the use of a five-level, CICES-based list of codes. The most detailed level possible was used to code each phrase. One unit of text could be coded with more than one coding category.

Table 1
Number of references to ES in the analysed documents: legal acts (dark grey), policy strategies and programmes (light grey), and decrees (white). The name of the document, the number of both latent and explicit references to ES (column 'Ref.'), the number of pages of the document, and the year of the document amendment are provided.

No.	Document name, abbreviated where necessary	Ref.	Number of pages	Year (as amended)
1	Act on the protection of nature	264	106	2004 (2013)
2	Water Act	171	94	2001
3	National Programme for Increasing Forest Cover	154	55	2003
4	National Forest Policy	115	29	1997
5	National Strategy for Conservation and Sustainable Use of Biodiversity	115	136	2007
6	National Spatial Development Policy	112	240	2011
7	Strategy for Energy Security and the Environment	48	85	2012
8	Announcement on the publication of the consolidated text of the Law on Forests	46	34	1991 (2011)
9	Water-Environmental Programme	36	98	2010
10	Environmental Protection Act	31	165	2001
11	Decree on the preparation of the protection plan for national parks, nature reserves,and landscape parks	23	11	2005
12	State Environmental Monitoring Programme	23	115	2012
13	Act on the protection of agricultural and forest land	22	9	1995
14	The Operational Programme Infrastructure and Environment	22	247	2013
15	National Environmental Policy	19	56	2008
16	Climate Policy of Poland	17	44	2003
17	Act on preventing damage to the environment and its repair	14	21	2007
18	Spatial Planning and Land Development Act	12	39	2003
19	Strategic plan for the adaptation of sectors and areas vulnerable to climate change	11	60	2013
20	Regulation on criteria for evaluation of occurrence of damage in the environment	10	2	2008
21	Decree on activities which may have significant influence on environment	8	11	2010
22	Regulation on the natural habitats and species of the habitat of species of Community interest, and criteria for selection of areas eligible for recognition or designation as Natura 2000 sites	8	45	2010
23	Regulation on the protection of animal species	7	18	2011
24	National Strategy for Environmental Education	6	30	2001
25	Decree on preparation of the protection plan proposal for Nature 2000 area (b)	5	5	2010
26	Act on providing information on the environment and its protection	4	100	2008
27	Decree on types of restoration activities and conditions and methods of their realization	4	2	2008
28	Decree on preparation of protection plan proposal for Nature 2000 area (a)	3	5	2010
29	Decree on plant protection activity	2	27	2012
30	Decree on the list of invasive plant and animal species	2	3	2011
31	Decree on special protection areas for birds	1	13	2011
32	Act on organic agriculture	0	21	2009
33	Act on the spatial information infrastructure	0	16	2010
34	Announcement on payment rates for trees and bushes removal and fine rates for greenery devastation	0	2	2012
35	Decree on animal species dangerous for people's life and health	0	22	2011
36	Decree on bird ringing	0	16	2006
37	Decree on detailed methods and forms of submitting information about natural compensation	0	1	2010
38	Decree on detailed information on conducted assessments of impact of a venture on the environment and strategic environmental impact assessment	0	3	2012
39	Decree on environmental and conservational information available to the public	0	2	2010
40	Decree on functioning of the National and Regional Environmental Impact Assessment Commission	0	3	2010
41	Decree on the procedure of imposing administrative fines for removing trees or bushes without the required permission	0	2	2004
42	Decree on kinds, types, and subtypes of nature reserves	0	4	2005
43	Decree on the method and frequency of environmental information updating	0	3	2010
44	Decree on the payment rates for different types and species of trees	0	2	2004
45	Decree on the payment for providing environmental information	0	1	2010
46	Decree on the protected species of wild mushrooms	0	6	2004
	Total	1315	2009	

An intersubjective interpretation (Lombard et al., 2002) was applied to identified examples of latent content. The material was initially coded by two members of the research team with a social sciences background. Then, a four-member group with an environmental sciences background verified the coding process. All the ambiguous cases were discussed and clarified.

2.2. Individual, In-Depth Interviews with Experts on Environmental Protection and Nature Conservation

To explore the potential and the constraints of ES application in the Polish legal and administrative framework, and to provide the context for the interpretation of the content analysis results, nine in-depth semi-structured interviews were conducted with high profile Polish experts in the field of environmental protection and nature conservation. The experts were chosen by reviewing scientific papers, legal documents, and NGO reports. The experts represented the most important stakeholders and professionals in the area of environmental protection and nature conservation policy making: public administration (the Ministry of the Environment, the State Forest Holding, and the National Fund for Environmental Protection and Water Management), researchers (a leader of a research centre and university professors), NGOs (an association for nature conservation), and a politician (a member of the Senate working in the environmental protection commission). The interview guidelines included five groups of questions concerning: comprehension of the ES term and concept within institutional level, application of the ES concept in Polish environmental policies, a comment on the content analysis results, barriers to and potential for the application of the ES concept, and a comparison between Poland and other countries. The interviews were conducted from May 2014 to July 2014 and each interview lasted 30 to 40 min. Each interview was recorded following the consent of the respondent. The recordings were analysed using audio coding in NVivo. The analysis of the interviews focused on the potential application of the ES concept and on the existing obstacles, barriers, and opportunities for its application that have been indicated by research conducted thus far.

3. Results

3.1. To What Extent Is the ES Concept Implemented in Polish Environmental Policies?

Within the 46 analysed documents (2009 pages in total) we coded 1315 parts of text that referred to ES (those parts of the text which contain the exact term 'ecosystem services' or a formulation that uses an understanding of the environment in the ES concept without using the exact term 'ecosystem services'). References to ES were found in 31 documents (12 decrees, 11 strategies, and 8 acts). Both manifest and latent references to the ES concept were not identified in 15 documents, of which 13 were decrees and 2 were acts (Table 1). The coded phrases that were relevant to the ES concept and contained the exact term 'ecosystem services' (manifest content) appeared only 18 times in four documents: the National Spatial Management Policy (7 references), the Strategy for Energy Security and the Environment (7 references), the National Strategy for Conservation and Sustainable Use of Biodiversity (2 references), and the Strategic Plan for the Adaptation of the Sectors and Areas Vulnerable to Climate Change (2 references). The majority of the coded text contained latent references to the ES concept.

Although the ES concept appears in the majority of the documents, its use is particularly visible in specific sectors. The concept appears most frequently in the following sectors: nature protection (documents 1, 5, 10, 11—over 530 references of ES), forestry (documents 3, 4, 8, 13—over 315 references) and water management (documents 2 and 9—over 200 references).

The most represented ES category is 'Regulation and maintenance', followed by 'Provisioning', while 'Cultural' is the least frequent section among the 46 analysed documents (Table 2).

Regarding particular ES concept references (codes) in the documents, the distribution is highly unequal (Fig. 1).

Table 2
Frequency of the ES codes representing cultural, provisioning, and regulation and maintenance services, appearing in the Polish legal documents related to environmental protection.

Section	References in documents (total)	%	Most frequent example within each section
Regulation and maintenance	482	42	lifecycle maintenance, habitat and gene pool protection
Provisioning	428	38	water (as material)
Cultural	226	20	cultural heritage
Total	1136	100	

3.2. What Are the Barriers and the Potential of the ES Concept Application?

Based on the exploration of the appearance of the ES concept in documents, the barriers and the potential of the ES concept application in Poland were further explored by the means of in-depth interviews with the experts. Based on this, two groups of obstacles for the ES concept application in Polish environmental public policy documents were identified (Table 3): (1) comprehension and acknowledgement of the term; and (2) sectoral functioning of administration and allocation of responsibilities.

The first group of obstacles is connected with an ambiguous definition of ES—experts claim that the concept has not been defined clearly in any of the existing definitions. The respondents emphasized the abstract character of the term as a general barrier to the practical application of the ES concept. The term is seen as imprecise and having no specific and defined criteria of measurement. Therefore, there is a flexibility of interpretation, which may lead to contradictory understandings. Lack of clear definitions of ES categories was identified as a reason for the limited use of the concept in executive legal documents. Experts explained that the absence of the ES approach in decrees was because these are detailed and executive documents, whereas the ES concept is more easily applicable in general terms and has no common and well-grounded best practices governing its practical and measurable implementation. Moreover, there are, according to the respondents, deficits in competencies of policy makers that make it difficult to apply the ES concept in daily practice or use it for implementing a more bottom-up, evidence-based policy, where the 'evidence' is defined by identification of ES.

The second identified group of barriers has structural origins. The experts mentioned fragmented, sectoral administrative operations in Poland and referred to generally poor environmental policy integration. There are many institutions which deal with environmental protection but they have a relatively low impact on creating policies in this area. Moreover, since the distribution of responsibilities between numerous institutions is unclear, each of them has relatively low overall impact on policy implementation. Consequently, even if new approaches or concepts are used by a particular institution, they do not easily infiltrate to others.

However, having identified the barriers to the implementation of the ES concept in environmental policy, the experts anticipated that the concept is likely to expand in its application and will gradually increase in appearance in the legal documents. Poland, as the EU member state, will have to fully transpose the European regulations into the national legislation (Table 4).

Considerable effort is being applied to mainstream the ES concept at the European level. Our interviewees therefore expected more detailed and better defined regulations on ES, in particular within the national assessments of ES, in each member state. The experts noted the potential of applying the ES concept in public policies, but most of them highlighted the risk stemming from the shift from communicating the need for sustainable natural resources management to mostly economic and monetary rhetoric. This shift may strengthen the anthropocentric approach, implying that the use of the ES concept leads to protecting only those elements of nature that have an explicit or accountable economic value. Conversely, some of the respondents emphasized the educational and promotional potential of the ES concept. They pointed out that the Polish Ministry of the Environment and some NGOs already use the concept in environmental education and campaigns promoting environmentally-

friendly behaviour. The concept is used as an argument for the need for protecting nature but also as an argument that, for instance, can improve the promotion of local products. According to the respondents, the concept may improve communication and dialogue between stakeholders in nature conservation, potentially contributing to mitigation of conflicts occurring, e.g., during the implementation and management of Natura 2000 sites (Zaharia et al., 2014)or other protected areas. Explicitly, the approach can help in finding a compromise between development and conservation and can help to promote better solutions during decision making processes.

No.	Ecosystem Services category	CICES level					Example quotations from documents analysed in content analysis
		General	Section	Division	Group	Class	
1	Ecosystem services						"functions of environmental elements, understood as usefulness of protected species, habitats, water or surface of the earth to other environmental elements or people" (Act on Preventing and Repairing Environmental Damage)
2	Lifecycle maintenance, habitat and gene pool protection						"ecological (protective) functions providing the following: water cycle stabilization, protection against floods, avalanches, landslides, […] creating conditions for protecting the biological potential of an impressive amount of species, ecosystems and genetic qualities of organisms, providing people with better living conditions, as well as health and agricultural protection, which enhances biodiversity and landscape variation" (National Forest Policy)
3	Provisioning						"Owing to it, we gain control over the protection of mineral resources, including those ground waters which are treated as mineral, i.e., curative, thermal waters and salt springs, against non-rational, wasteful and damaging exploitation" (National Environmental Policy)
4	Maintenance of physical, chemical, biological conditions						"A national park is created in order to preserve biological diversity, resources, creations and elements of inanimate nature and landscapes, and to restore the proper state of resources and natural elements, as well as to recreate deformed natural animal and fungi habitats" (Act on Protection of Nature)
5	Regulation and maintenance						"A natural reserve covers the areas preserved in their natural or almost unaltered state, ecosystems, natural refuges and habitats, plant, animal, fungi habitats, as well as creations and elements of inanimate nature, which can be distinguished by their special ecological, scientific, cultural and landscape qualities and values" (Act on Protection of Nature)
6	Water (ecosystem services/provisioning/materials)						"For the purposes of farmland and forest land ground water irrigation" (Environmental Protection Act)
7	Water (ecosystem services/provisioning/nutrition)						"Rational water management for the purpose of water provisioning in inhabited areas and for economic development should provide balance of water consumption and regeneration of resources while providing high quality of waste water treatment" (National Spatial Management Policy)
8	Cultural						"Access to a national park or a natural reserve – an entrance to an area which is under strict or active protection for scientific, educational, tourist and recreational purposes" (Act on Protection of Nature)
9	Wild animals and their outputs						"Capturing, hunting or collecting protected species or their parts and derivative products for economic purposes" (Act on Protection of Nature)
10	Hydrological cycle and water flow maintenance						"Protection against flooding and drought" (Water Act)

Fig. 1. Ten most frequently represented categories of ecosystem services in the Polish policy documents. The code of the ES most general category comes out at the top, followed by lifecycle maintenance and habitat and gene pool protection.

Table 3
Obstacles in the ES concept application in Polish policies on the basis of IDI of experts.

Type of obstacle	Quote example	Expert
Poor comprehension and acknowledgement of the term	"Naturalists cannot agree with economists. The reason is that economics is a scientific discipline concerned with how people make choices. This definition has been applied for at least eighty years. Economics is not a science of the salvation of the world. Conversely, if an economist is talking with a naturalist, a misunderstanding immediately appears because the naturalist says that a natural resource (e.g., oxygen) is priceless. But what does it mean priceless?"	Head of a research centre
	"An obstacle is that it is a vague concept"	Head of a research centre
	"Probably there is a lack of sufficient knowledge on evidence based policy"	Expert of the Ministry of the Environment
Sectoral functioning of administration and responsibility allocations	"We may say that the ES concept is used in <<environmental>> sectors, Undoubtedly, it is connected with a higher level of education among officials at this level of administration (who undergo a very restrictive selection). At the local level, this concept is used rarely or not at all. It results from the fact that this concept is not very common at lower levels of administration and local officials are often not very well-educated."	University professor
	"The decision making power is fragmented. There are too many sectors in administration, and each of them can block the implementation of a new solution."	A member of the Senate

4. Discussion

Our analysis has shown that, in the case of Poland, the concept of ES is reflected in national environmental policy documents. However, the concept is predominantly captured in an indirect, latent form. Nevertheless, a content analysis showed that ecosystems are perceived in the policies as beneficial for human beings. Implementing environmental policies aimed at optimizing the national flow of ES would require incorporation of specialized managerial instruments, e.g., cost–benefit analysis, payments for ES, and biodiversity offsets (Engel et al., 2008; McKenney and Kiesecker, 2010; Muradian and Rival, 2012; Pirard, 2012; Primmer and Furman, 2012). These instruments could not be successfully used without clearly defined terms. The gap between the ES framework and its potential as a policy instrument has also been revealed in our results. We suggest that because of the small number of straightforward references to the ES term in more general policy documents (such as acts and laws) the concept is almost absent in more detailed, executive decrees. This pattern is reinforced by the frequently occurring interdependence between policy and executive documents.

Furthermore, differences in how various sectors referred to the ES concept in documents were proven both in quantitative terms and in the representation of the ES categories used in the texts. This proves that administrative barriers reported by the interviewed experts do exist. This supports the view of Cash et al. (2006) who stress the incorrectness of perceiving the national level of jurisdictional scale as unitary in the discussion on multilevel governance and is another example of the environmental policy integration challenge (Biermann et al., 2009; Lafferty and Hovden, 2003). The ES concept's irregular and incoherent application in documents illustrates one of the important reasons for the lack of internal integration within the environmental policy domain at the national level.

On the one hand, in domains such as forestry and tourism, natural capital is intuitively and automatically perceived as a provider of goods and services. The ES concept in these domains, and hence policy sectors, is not a novel idea. On the other hand, the knowledge of one domain or policy sector about the benefits derived from products provided by ecosystems cannot be easily transferred to another sector. Nevertheless, the use of the ES concept in sectoral documents does provide some guidance in this respect. For instance, forestry policy documents are those where the majority of references to ES concern regulating services, regardless of the widely perceived exploitative (i.e., concentrated on provisioning services) approach of this sector's operation (Blicharska and Angelstam, 2010; Niedziałkowski et al., 2014). This focus on regulative services is reflected both in international discussions on payments for goods and services provided by forests (Chhatre and Agrawal, 2009; Meijaard et al., 2014; Ventrubová and Dvořák, 2012) and in the reflections on the ES tradeoffs, which treat the sustainable flow of environmental products as a condition for the quality of regulating services in forests (Castro et al., 2015; Fisher et al., 2009).

The idea of including benefits and services derived from the environment into policy making has a long history (Kronenberg, 2014). However, a formal (legislative and institutional) and structured implementation of the ES concept is driven by requirements of international agreements or high-level policy goals, such as the EU Biodiversity Strategy to 2020. In contrast, the empirical data presented in this paper emphasize that many of the services society derives from nature had already been perceived and protected in Polish national environmental policy documents before the emergence of the ES concept and the implementation of the EU biodiversity policy. The Polish National Forest Policy is an example of a document, which is treated as a foundation for policy change at the international level (Díaz et al., 2015). Although the Forest Policy ensures a more precise and well-defined implementation of the ES concept than many others, it does not contain a single explicit use of the ES term. This suggests that perspectives from the further implementation of the EU ES policies e.g., the EU Biodiversity Strategy to 2020 are needed, as identified by the experts. However, in certain cases implementation could possibly be limited to assuring common ES terminology in the EU policies.

We argue that the study of the ES concept's presence in policy documents can provide a more comprehensive view of the use of one of the most widely acknowledged paradigms of biodiversity conservation—the socioecological approach—than the current EU recommendations. This addresses the experts' anxieties, parallel to those already identified (Fisher and Brown, 2014), of putting too much focus on financial issues when applying the ES concept in policy-making. Our results have revealed a frequent incorporation of the services that do not function according to financial markets (i.e., lifecycle maintenance, habitat, and gene pool protection), whereas the EU efforts are still directed at quantifying and marketing various services as in e.g., The Economics of Ecosystems and Biodiversity (TEEB, 2010).

Regarding policy making at various governance levels, the national level is the key linking level, ensuring implementation of top-down, international agreements, which can be adapted to the conditions of a particular country (Maes et al., 2012). Based on the results of our study, we suggest that while environmental policies are not ES-driven (Matzdorf and Meyer, 2014), the overall idea and logic behind ES has been inherently included in policy documents. We have shown it is possible to match references to different ES that appear in policy documents with concrete ES categories. This provides a foundation for identifying gaps and, thus, for improving and structuralizing the process of planning and managing natural resources at the national level. Since our study is focused on the Polish case, we postulate that other similar analyses of national environmental policy documents would make it possible to obtain a comprehensive and comparative image of the

Table 4
Barriers and opportunities for expanded application of the ES concept.

No.	Barriers and opportunities for expansion of ES	Quote example	Author
1.	Transposition of EU regulations	"It [many references to lifecycle maintenance, habitat and gene pool protection] might result directly from the fact that Natura 2000 was implemented in Poland or from the Convention of Biodiversity Protection, which also deals with gene pool protection and has been transposed to our law."	Executive of the State Forest Holding
2.	Risk from ES application	"There is a risk of protecting only those things that we are able to count, […] it is not possible to count everything. I think this concept might be as useful tool as many others, but it needs to be applied consciously and moderately."	Leader of an association for nature conservation
3.	Potential of ES application	"This concept is very useful at the level of social communication. It allows to explain many things, e.g., why we should protect biodiversity."	Executive of the Ministry of the Environment

current extent of ES inclusion in national level policies in other countries. This would also address methodological concerns faced during the course of this study, namely a lack of clear and unequivocal reference points to assess the scope of the presence of the ES concept in policy documents.

5. Conclusions and Recommendations

The issue of the presence of the ES concept in environmental policy documents can be seen as the exemplification of complex scale challenges in environmental policy integration. The multi-scale (relating to geographical, ecological, institutional, jurisdictional, managerial, and temporal scales) and multi-level (present across different levels of each scale) character of environmental policy (Cash et al., 2006) challenges the development of a comprehensive and integrated operationalization of ES that could be implemented within various public policies in a synergic way. This would, however, require providing straightforward references and definitions at the executive and operational levels, and in respective legal policy documents for ES, their valuation, management, and potential implementation of payments for ES systems.

Our study has shown that the ES concept could be used for integrating environmental policies from various sectors. However, this opportunity has not yet been used. The ES concept is well embedded, latently, in various environmental policy sectors in Poland. However, without explicit guidance, the ES concept is unlikely to provide a basis for such integration. This guidance could emerge from at least two processes according to the experts interviewed in our study: (1) the implementation of EU recommendations and policies that increasingly refer to and strengthen thinking about nature through the lens of ES; and (2) the stakeholder dialogue on nature conservation and its importance for human development and wellbeing.

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Picture 3. Cultivated crops an example of provisioning ecosystem services, Będlewo-Bieczyny Natura 2000 area, Poland. **Photo:** Daria Paniotova.

Zdjęcie 3. *Uprawa zbóż, przykład zaopatrujących usług ekosystemowych, obszar Natura 2000 Będlewo-Bieczyny, Polska.* ***Fot.*** *Daria Paniotova.*

Chapter 3: Is the ecosystem m services concept useful in Polish policy making? Qualitative analysis of experts perception

Article:

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Contribution to the article

Author	Contribution in %	Description of contribution
Krzysztof Mączka	70%	literature review, research concept, methodology, data collection, data analysis, coordination of the work, preparation of final version of the article
Piotr Matczak	30%	commenting subsequent versions of the article, mentoring and guiding the research idea, data collection, contribution to the introduction and discussion parts

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IS THE ECOSYSTEM SERVICES CONCEPT USEFUL IN POLISH POLICY MAKING? QUALITATIVE ANALYSIS OF EXPERTS PERCEPTION

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CZY USŁUGI EKOSYSTEMOWE SĄ UŻYTECZNE W TWORZENIU POLSKICH POLITYK PUBLICZNYCH? JAKOŚCIOWA ANALIZA PERCEPCJI EKSPERTÓW

STRESZCZENIE: Koncepcja usług ekosystemowych jest coraz szerzej stosowana zarówno w badaniach naukowych, jak i konstruowaniu polityk publicznych, także w Polsce. W niniejszym artykule przedstawiono wyniki indywidualnych pogłębionych wywiadów eksperckich ze specjalistami z zakresu ochrony przyrody. Na podstawie wywiadów zidentyfikowano przyczyny ograniczonej obecności koncepcji usług ekosystemowych w polskich politykach publicznych, został oceniony potencjał tej koncepcji w stosunku do różnych sektorów gospodarki, a także wskazano pozytywne i negatywne konsekwencje mogące wynikać z jej praktycznego stosowania.

SŁOWA KLUCZOWE: usługi ekosystemowe, polityki publiczne, eksperci, wywiady

Introduction

The concept of ecosystem services has been increasingly applied in biodiversity research and policies all over the world[1]. As Norgaard[2] pointed out, the concept of ecosystem services started as a humble metaphor which could help us to think about the relation between people and nature, but eventually it became integral to what we thought about the future of humanity and biological evolution. It enables us to describe and to analyse the relations between people and the environment[3] and involves some novel, incentive-based conservation strategies[4]. The approach presumes that nature provides services which are beneficial for human societies, allows for economic valuation of particular ecosystem services and contributes to the new conservation debate[5]. Within the debate, the traditional nature conservation approach, which disregards the losses to human societies, is challenged. The ecosystem services approach is treated in this debate as a framework offering possibilities for negotiating costs and benefits of conservation[6]. It may offer guidelines for improving conservation and human welfare via win-win solutions[7]. Nevertheless, it is also criticized as it could be misleading in conservation efforts because of its narrow economic orientation towards nature as a stock, which may lead to commodity fetishism[8].

[1] R. Costanza et al., *The value of the world's ecosystem services and natural capital*, "Nature" 1997 no. 387, p. 253-260; *The millenium ecosystem assesement, ecosystems and human well-being: a framework for assessment,* www.cices.eu [12-09-2014]; see also: TEEB, *The economics of ecosystems and biodiversity for local and regional policy makers,* www.teebweb.org [12-09-2014]; R. Haines-Young, M. Potschin, Common international classification of ecosystem services (CICES): Consultation on version 4, August-December 2012, www.cices.eu [12-09-2014]; P. Lamarque, F. Quetier, p. Lavorel, *The diversity of the ecosystem services concept and its implications for their assessment and management*, "Comptes Rendus Biologies" 2011 no. 334, p. 441-449.

[2] R. B. Norgaard, *Ecosystem services: From eye-opening metaphor to complexity blinder,* "Ecological Economics" 2010 no. 6(69), p. 1219-1227.

[3] R. S. de Groot, M. A. Wilson, R. M. J. Boumans, *A typology for the classification, description and valuation of ecosystem functions, goods and services*, "Ecological Economics" 2002 no. 41(3), p. 393-408; E. Gómez-Baggethun; D. N. Barton, *Classifying and valuing ecosystem services for urban planning*, "Ecological Economics" 2013 no. 86, p. 235-245.

[4] J. Paavola, K. Hubacek, *Ecosystem services, governance, and stakeholder participation: an introduction*, "Ecology and Society" 2013 no. 18.

[5] B. A. Minteer, T. R. Miller, *The New Conservation Debate: ethical foundations, strategic trade-offs, and policy opportunities*, "Biological Conservation" 2011 no. 144, p. 945-947.

[6] T. O. McShane et al., *Hard choices. Making trade-offs between biodiversity conservation and human well-being*, "Biological Conservation" 2011 no. 144, p. 966-972.

[7] S. C. Farber, R. Costanza, M. A. Wilson, *Economic and ecological concepts for valuing ecosystem services*, "Ecological Economics" 2002 no. 3 (41), p. 375-392.

[8] N. Kosoy, E. Corbera, *Payments for ecosystem services as commodity fetishism,* "Ecological Economics" 2010 no. 6(69), p. 1228-1236.

Although significant progress has been made in the assessment frameworks of ecosystem services, there is still work to be done[9], e.g. development of frameworks that would allow the transition of a scientific concept into a rationale of policy making[10]. De Groot et al.[11] found five groups of challenges and obstacles that need to be addressed in order to fully utilize the concept: (a) Understanding and quantifying how ecosystems provide services; (b) Valuing ecosystem services; (c) Using ecosystem services in a trade-off analysis and decision; (d) Using ecosystem services in planning and management; (e) Financing sustainable use of ecosystem services. The concept is more often perceived as help rather than hindrance as it addresses some current problems of the environmental assessment practice[12]. Yet, some very basic issues, such as a clear and consistent definition to avoid misrepresentations, which could undermine the credibility of the ecosystem services concept, have not been solved. Nevertheless, the implementation of the concept needs to be context specific, used on a case-by-case basis, and take into account both benefits and limitations. It is necessary to put more emphasis on the analysis of ecosystem functionality, structural and functional linkages within ecosystem services and determinants of human well-being, and to integrate ecosystem services into conventional development policies and priorities from their conception to their execution[13].

In Poland, the concept began to be used in scientific research in the 2000s[14]. Yet, in legal and legislative documents, the concept has been barely presented so

[9] G. Yapp, J. Walker, R. Thackway, *Linking vegetation type and condition to ecosystem goods and services,* "Ecological Complexity" 2010 no. 3(7), p. 292-301.

[10] K. Helming, K. Diehl, D. Geneletti, H. Wiggering, *Mainstreaming ecosystem services in european policy impact assessment,* "Environmental Impact Assessment Review" 2013 no. 40, p. 82-87.

[11] R. S. de Groot et al., *Challenges in integrating the concept of ecosystem services and values in landscape planning, management and decision making,* "Ecological Complexity" 2010 no. 3(7), p. 260-272.

[12] P. Lamarque et al., op. cit.; A. Nahlik, M. E. Kentula, M Siobhan Fennessy, *Where is the consensus? A proposed foundation for moving ecosystem service concepts into practice,* "Ecological Economics" 2012 no. 77, p. 27-35.

[13] G. C. Daily, P. A. Matson, *Ecosystem services: From theory to implementation,* "Proceedings of the National Academy of Sciences" 2008 no. 28(105), p. 9455-9456; see also: D. Ervin, et al., *Growing cities depend on ecosystem services*, "Solutions" 2012 no. 6, p. 74-86; J. Baker, W. R. Sheate, *Ecosystem services in environmental assessment. Help or hindrance?*, "Environmental Impact Assessment Review" 2013 no. 40, p. 3-13; M. Kandziora, B. Burkhard; F. Müller, *Interactions of ecosystem properties, ecosystem integrity and ecosystem service indicators. A theoretical matrix exercise,* "Ecological Indicators" 2013 no. 28, p. 54-78; P. Kumar, S. E. Esen, M. Yashiro, *Linking ecosystem services to strategic environmental assessment in development policies,* "Environmental Impact Assessment Review" 2013 no. 40, p. 75-81.

[14] A. Mizgajski, *Ecosystem services as an emerging field of research and application,* "Ekonomia i Środowisko" 2010 no. 1(37), p. 10-19; T. Żylicz, *Valuation of ecosystem services. An overview of world research*, "Ekonomia i Środowisko" 2010 no. 1(37), p. 31-45; see also: Z. Rosin et al., *Ecosystem services as an efficient tool of nature conservation: a view from the Polish farmland,* "Chrońmy Przyrodę Ojczystą" 2011 no. 1(67), p. 3-20; J. Kronenberg, et al., *The importance of White Stork Ciconia ciconia for society: an analysis from the perspective of ecosystem services*, „Chrońmy Przyrodę Ojczystą" 2013 no. 3(69), p. 179-203.

far[15]. Our previous study[16] showed that the scope of ecosystem services implementation in the Polish legislation and policy documents is limited. However, the reason for this weak implementation of the concept is still unidentified.

Aim of the research

The study aims to explore the potential for a practical use of the ecosystem services concept, taking into account the scope of its implementation in the legislative and policy documents in Poland. Although the ecosystem services concept is becoming increasingly common in the area of scientific research, it has yet to be widely implemented in practice. Exploring the reasons for this phenomenon contributes to the debate on the utility of the ecosystem services concept because the concept might be useful in nature conservation policies, but at the same time, it might also entail some risks.

The quantitative assessment of the presence of the ES concept in the Polish legal and policy documents[17] aimed at recognizing to what extent the ecosystem services concept is present in Polish legal and policy documents concerning environment protection. The analysis of the documents revealed that the use of the concept is limited. The concept is applied as a certain underlying approach. In particular, ESs are used in a rather descriptive sense (and mostly latently). Within 46 documents that we coded, there were 1315 parts which were relevant to the ecosystem services concept. Moreover, 264 of those parts were found in the Nature Conservation Act (the document with most frequent coding) while the ES concept did not appear in 15 documents at all. Since most of them were decrees (12), we can argue that the ecosystem services concept is hardly present in the lower rank documents. Taking into account the most general level of ES, i.e. the sections concerning provisioning, regulation and maintenance, and cultural services, the most represented category is "Regulation and maintenance" (42% appearances), followed by "Provisioning" (38%), while "Cultural" is the least frequent section. The difference between the two most frequent categories is small (only 4%). A much bigger gap may be observed between both these sections and the "Cultural" section (20% of all appearances), which suggests that the cultural aspect of ecosystems is applied relatively rarely in the legislation in Poland. Moreover, we also found out that the second most frequent ecosystem service is "lifecycle maintenance, habitat and gene pool protection" (142 appearances), while the first most frequent level is the most general one – ecosystem services.

[15] Z. Rosin et al., op cit.
[16] P. Matczak et al., *Catalogue of ecosystem services targeted in protected areas management and spatial planning in Norway and Poland*, Poznań 2014.
[17] Ibidem.

Methodology

In order to investigate the issue of the limited and specific presence of ES in the Polish legislation, we designed and conducted a series of in-depth interviews with experts in the area of environment protection. The guidelines for interviews were prepared on the basis of content analysis to explore broader context of the concept utility in institutions of nature conservation at different level of public management and background (academia, NGOs etc.) as well as particular results of ecosystem services presence in documents. An expert, individual and in-depth interview is a method that has an exploratory value. We used it for analysing the potential of the ES concept in Polish policies. Nine in-depth interviews were conducted with high-level experts in the field of environment protection. Six of them were "face to face" in the offices of experts, two of them were phone interviews and in one case we got answers via e-mail. The interviews were realized from May of 2014 until July of 2014 and lasted between 20 and 40 min. The selection of experts was made on the basis of snowball sampling supported with a literature review and a media reconnaissance. Four categories of experts were interviewed: 1) Representatives of the administration: a specialist from the Department of Environment Protection in the Ministry of the Environment; a director in the National Forest Holding; a director at the National Fund for Environmental Protection and Water Management; an expert from the Ministry of the Environment working on ecological education; a former Vice-Minister of the Environment; 2) Researchers: a leader of a research center; a professor at a university of life sciences specialising in nature conservation; a scientist working at a university and for a nature protection foundation specialising in ecosystem services; 3) NGOs: a president of one of the leading associations for nature protection; 4) Politicians: a member of the Senate working on the environment protection. The analysis of nine interviews helped to identify the diversity of opinions of ecosystem services utility, limitations and potential among experts with various background.

Results

The analysis is divided into three sections: 1) The scope and potential of the ecosystem services concept implementation; 2) Positive consequences of ecosystem services implementation; 3) Negative consequences of ecosystem services implementation.

The scope and potential of the ecosystem services concept implementation

Supporting the results of the earlier quantitative analysis, the experts claim that the ecosystem services concept is not commonly present in the Polish public administration, which is responsible for the environment protection. Moreover,

they argue that even if the concept is used, its application is usually inappropriate – not corresponding to the scientific knowledge on ecosystem services. Apart from the uses in scientific research that has some relevance when the development of policies is concerned, the concept is applied by NGOs as a tool for promoting biodiversity protection.

According to the experts, the ecosystem services concept is hardly implemented in the regulations because the term is unclear and imprecise. It is a barrier in day-to-day decision making. Moreover, the concept can rather be used on the highest level of public administration (by central governmental administration) than on the lower ones. There are two reasons for that. Firstly, among the highest level of government officials there is more knowledge of "trendy" new ideas. Secondly, the concept is applied in acts and in national strategies at a high degree of generality, as a mere notion. The application on the level of decrees or the local level of day-to-day decision making processes would possibly require translation into more concrete parameters, concerning specific actions and money flow. However, the concept is lacking such parameters.

It was also identified that, on the one hand, the EU regulations on ecosystem services are still not very precise, but on the other hand, the use of ecosystem services concept is likely to expand in the future due to the new European legislation. According to experts, there is a tendency to focus on ecosystem services in the EU environmental laws and strategies. Poland as a member state has to transpose European regulations (e.g. assessments of ecosystem services in national accounts[18]) into the national law.

Although some experts did not have an opinion on the ecosystem services concept utility in particular economy sectors (they only knew the facts connected to their institutions), the others noticed that various sectors differ a lot in terms of the implementation potential of the ecosystem services concept.

According to them, the ecosystem services concept is useful in such sectors as tourism and forestry because these yield direct profits from nature. Some experts pointed out that although agriculture is also a sector which reaps direct profits from nature, the concept is not used in this sector because agricultural ecosystems are very intensively exploited, with a much smaller emphasis on their protection.

Regarding the significant disproportion between particular ecosystem services applications in the Polish legislation, experts pointed out that cultural ecosystem services were less represented than provisioning and regulating services for at least two reasons. Firstly, this could be connected with the general regularities which were described in the Maslow's hierarchy of needs – cultural services were on a higher level of this hierarchy and first required the fulfilment of more basic needs, like provisioning, regulating and maintenance services. Secondly, this could be attributed to the educational background of the governmental officials who are engaged in the environmental policies construction process.

[18] The Europe Union 2020 Biodiversity Strategy.

According to the experts, such officials are mainly naturalists, and they focus on habitats and biological processes and are less interested in cultural services.

Furthermore, even if some experts were not sure why there was a relatively large presence of lifecycle maintenance, habitat and gene pool protection ecosystem services, they agreed that this might be caused by a traditional understanding of environment protection as a protection of species and a protection of valuable areas. Moreover, they argue that many analysed documents were written by biologists who are aware of such environmental processes as lifecycle maintenance or gene pool protection.

Another reason could be the Europeanization of the Polish national law – the transposition of the EU directives into the national legislation. For instance, there are some significant uses of ecosystem services concept in the documents on water management as a consequence of the Water Framework Directive[19] or in the implementation of Natura 2000: "The aim of the network is to assure a long-term survival of Europe's most valuable and threatened species and habitats"[20].

Positive consequences and negative of ecosystem services implementation

Experts emphasize that the concept is very useful as a social communication tool in discussing environmental issues. It can minimize conflicts concerning e.g. implementation and management of Natura 2000 by helping to compromise or to work out better solutions during the decision-making process and it can educate people on environmental protection in a more intuitive way (explaining what people get from ecosystems and how much it may cost). Moreover, a wider use of the concept creates the need for more research and more expertise in the area of ecological economics. Thus, it builds a market for environmental experts.

According to some experts, the concept as a neutral idea and the method does not have negatives aspects. However, for most experts, there is a risk stemming from the fact that the concept frames the environment not in terms of its intrinsic values, but in terms of its monetary value. It presumes that we can protect only those elements which we can calculate. Thus, the ES concept entails a danger of commodification of nature, which is fundamentally wrong and poses a threat for the environment in the long run.

[19] Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy.

[20] *MEMO on Commission strategy to protect Europe's most important wildlife areas – frequently asked questions about NATURA 2000,* www.ec.europa.eu [20-09-2014].

Conclusions

The ecosystem services concept is seldom applied in the Polish legal and policy documents. The interviewed experts confirm the hypothesis that is based on the experiences from other countries[21] (however the identification of precise distribution of opinions requires further research).

The hypothesis states that the idea has a high potential and that it is a promising tool for policy and decision making. The research also confirms that some of de Groot's groups of obstacles[22] have not been overcome yet, especially those connected with day-to-day policy and management. Previous studies emphasized the necessity to integrate ecosystem services into conventional development policies in every phase of their development and execution[23]. Yet, the ambiguity and inconsistency of the concept pose constraints into the concept application. Moreover, due to a fragmented knowledge of the interested parties, the concept is used in the regulatory framework mainly as a general, guiding idea, not as a practically oriented method used operationally in the decision-making process. The concept is intellectually attractive but entails difficulties in its application in policies. Actually, it seems to be more useful in argumentation and communication than in measurement. Furthermore, experts attribute reasons for the limited progress of the application of the ES approach mainly to human factors: specific education of the administrators and decisions makers, reluctance to apply new concepts, and also limited and fragmented knowledge.

The concept might be perceived as ambivalent because the ecosystem services approach can be framed both as helpful in nature conservation and as dangerous to nature conservation. It may be helpful in the decision making process, but it may also entail risks as it promotes perceiving the environment mainly through the prism of monetary values, which may lead to commodity fetishism[24] in Poland and in other countries. To summarise, the ecosystem services concept has a policy potential, but in order to be applied, it requires more clarified definitions adjusted to policy making. Perhaps, application in some policy areas, such as forestry or water management, would be a step forward offering some experience useful in other domains.

This paper is a result of research conducted within the project LINKAGE (LINKing systems, perspectives and disciplines for Active biodiversity GovernancE, POL-NOR/2/196105/2013).

[21] E.g. T. O. McSheane et al., op. cit.; P. Lamarque et al., op. cit.; A. Nahlik et al., op. cit.
[22] R. S. de Groot et al., op. cit.
[23] P. Kumar et al., op. cit.
[24] N. Kosoy, E. Corbera, op. cit.

Picture 4. Obrzycko Oak Forest – one of the Natura 2000 areas in Poland. **Photo:** Krzysztof Mączka.

Zdjęcie 4. *Dąbrowy Obrzyckie – jeden z obszarów Natura 2000 w Polsce.* ***Fot.*** *Krzysztof Mączka.*

Chapter 4: The ecosystem services concept as a tool for public participation in management of Poland's Natura 2000 network

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Contribution to the article

Author	Contribution in %	Description of contribution
Krzysztof Mączka	60%	literature review, research concept, methodology, data collection, data analysis, coordination of the work, preparation of final version of the article
Piotr Chmielewski	10%	data collection and analysis, input to the section concerning Natura 2000 as a biodiversity conservation policy
Agnieszka Jeran	10%	commenting subsequent versions of the article, mentoring and guiding the research idea, contribution to the methods part
Piotr Matczak	10%	commenting subsequent versions of the article, mentoring and guiding the research idea, contribution to the introduction and discussion parts
Carena J. van Riper	10%	commenting subsequent versions of the article, input to the discussion part, proofreading

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The ecosystem services concept as a tool for public participation in management of Poland's Natura 2000 network

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ABSTRACT

This paper examined how the ecosystem services (ES) concept was employed as a tool for stakeholders from different social and professional worlds to deliberate about the management of Natura 2000 areas in Poland. Drawing from Framing Theory and discourse analysis, we analyzed public documents that were generated over a five-year period. We observed that many public debates were couched within the ES framework and related to management of a range of land cover categories. Our results also indicated the majority of public discussions were descriptive and neutral, with a focus on maintaining the flow of *Provisioning*, and *Regulation and Maintenance* services to local communities. Normative tones were adopted, particularly surrounding *Cultural* ES, despite the limited amount of time that stakeholders dedicated to exploring these topics. Our results reinforce the importance of considering the ES concept as a boundary object that maintains interpretive flexibility and focuses stakeholder attention on points of potential social conflict. The implications that emerge from this research are particularly relevant for protected areas, such as those found in Poland, which are reforming environmental protection plans and seeking communication tools to facilitate public participation, environmental sustainability, and more equitable policy outcomes.

1. Introduction

The ecosystem services (ES) framework has gained attraction over the last two decades given its potential to provide a common basis for valuing the environment (Costanza et al., 2017, 1997; de Groot et al., 2012; Hein et al., 2006; McDonough et al., 2017; Oikonomou et al., 2011; Richards et al., 2017). Although academics and practitioners have directed their attention to incorporating multiple values into decision-making (Fisher and Brown, 2014), there remain inconsistencies in how these values are interpreted and applied (Brown, 2013; van Oort et al., 2015). In particular, instrumental, intrinsic and relational views of nature rest on divergent premises that are increasingly recognized and necessarily maintained by decision-makers (Kenter, 2016; Chan et al., 2016). The ES concept offers one unifying platform for acknowledging and incorporating these different views of human-nature relationships into environmental policies (Chan et al., 2016; van Riper et al., 2017b). A host of frameworks have been developed to aid in this process (Muhar et al., 2017), including the Millennium Ecosystem Assessment (MEA, 2005), The Economics of Ecosystems and Biodiversity (TEEB, 2010), Common International Classification of Ecosystem Services (Haines-Young and Potschin, 2013), and Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (Díaz et al., 2015). Although the tenets of these frameworks differ, they converge on the assumption that people obtain benefits from ecosystems and classify ES into the categories of *Provisioning* (e.g., food), *Regulation and Maintenance* (e.g., climate regulation), and *Cultural* services (e.g., recreational experiences).

Previous research has argued that the ES framework can be considered a "boundary object" that enables people to integrate knowledge across social and professional worlds (Abson et al., 2014; Schröter et al., 2017; Steger et al., 2018). Running in parallel to this conceptualization is the idea of a "bridging concept" (Braat and de Groot, 2012; Davoudi et al., 2012; Paehlke, 2005) that links different disciplines (Deppisch and Hasibovic, 2013) and provides a common language for bringing theory into practice within interdisciplinary teams (Baggio et al., 2015). This body of work suggests ES can become a tool for standardization that is flexible enough to adapt to local needs and constraints, and sufficiently robust to maintain a common identity across diverse

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stakeholder groups (Star and Griesemer, 1989). Interpretive flexibility is an important precondition for ES to continue functioning as boundary objects and/or bridging concepts, because implementation is often guided by diverse organizational and communication needs in society (Primmer and Furman, 2012). That is, collaborators must ensure their priorities and conceptualizations remain sufficiently vague but operational and specific in local contexts (Star, 2010). This research approach is particularly useful for trade-off situations when there is need to balance the costs and benefits of diverse human uses of ecosystems (Deng et al., 2016; Howe et al., 2014).

Poland constitutes an interesting case for analyzing the ES concept given the extent of scientific discussions that have focused on this topic since 2000 (Maczka et al., 2016; Maczka and Matczak, 2014; Mizgajski et al., 2014; Piwowarczyk et al., 2013; Stępniewska et al., 2017). Despite the concept's presence in European Union (EU) policies, it rarely appeared in Polish legal documents prior to the XXI century (Maczka et al., 2016). Because of rapid socio-economic transitions (e.g., moving from central planning to a market-based economy, increased numbers of NGOs and democratization of decision-making) in Poland over the past 25 years, environmental policies have undergone substantial changes (Cent et al., 2014; Kluvánková-Oravská et al., 2009; Niedziałkowski et al., 2015; Sasse et al., 2006). Those changes included the implementation of the Nature Conservation Act in 1991 and its reformation in 2004 that defined the goals and forms of nature-based settings (e.g., national parks), as well as created channels of cooperation with non-governmental organizations. Similar to other Central and Eastern European countries, Poland has been criticized for weak institutional capacity (Jänicke, 2002) and, consequently, its public participation has slowly developed (Grodzinska-Jurczak and Cent, 2011). The adjustment of Poland's legal and administrative framework after the fall of Communism in 1989 and the EU accession in 2004 resulted in transposition and implementation of EU regulations, which impacted the current shape of Polish environmental policy and governance (Grodzinska-Jurczak and Cent, 2011; Guttenbrunner, 2009). A prime example of these changes is the EU-wide Natura 2000 network that was implemented in Poland to advance biodiversity conservation.

Our study explored how the ES framework was employed by stakeholders to advance economic, environmental and land use policies and practices during deliberation of the Natura 2000 network, which is the world's largest network of protected areas. Specifically, we examined how the ES concept was used by stakeholders engaged in the processing of this public policy in Poland (García-Nieto et al., 2015; Sarkki and Karjalainen, 2015). Building on previous research about the implementation and mainstreaming of ES (de Groot et al., 2010; Sarkki and Karjalainen, 2015), we applied discourse analysis of secondary data (Hajer, 1995) and drew on Framing Theory (Borah, 2011) to analyze multi-stakeholder communication about management of Natura 2000 areas. We explored how the ES framework functioned as a participatory tool by relating the ES categories to discussions and negotiations about management of protected areas (i.e., Natura 200 sites) in Poland. Our assessment of stakeholders' interests unveiled points of potential social conflict, and provided insight on the process of weighing tradeoffs across different land cover categories across Poland. This is the first investigation of how ES frames are employed in environmental policy discourse at a nation-wide planning and management scale in Poland. Therefore, the primary purpose of this study was to understand how the ES concept was implicitly present in stakeholder deliberation on resource management topics in Poland. The following three objectives guided this investigation:

1. Determine the extent to which different ES categories appeared in discourse about management plans in Poland;
2. Assess whether ES were useful to represent both descriptive and normative aspects of biodiversity conservation;
3. Examine how different stakeholder groups interpreted ES frames across land cover categories.

2. Review of previous research

2.1. Policy context for the application of ecosystem services

The ES concept has been applied in a variety of contexts and is widely recognized as integral to assessments of natural capital from local to global scales (Guerry et al., 2015; UNESCO, 2013). At an international scale, EU policies have directly engaged with the ES framework (Bouwma et al., 2017) to solve problems tied to: 1) water efficiency (e.g., Blueprint to Safeguard Europe's Water Resources); 2) biodiversity (e.g., an EU biodiversity strategy to 2020); 3) agriculture (e.g., Common Agricultural Policy towards 2020); 4) marine management (e.g., Marine Strategy Framework Directive); 5) forests (e.g., the new EU forest strategy); and 6) invasive alien species (e.g., EU Regulation 1143/2014 on Invasive Alien Species). The ES concept has also been incorporated into environmental policies at national scales (Hansen et al., 2015; Maczka et al., 2016; Molnar and Kubiszewski, 2012; Nordin et al., 2017; Pittock et al., 2012; Sitas et al., 2014) and local levels (Hansen et al., 2015). Particularly in Poland, although the ES framework is rarely at the forefront of national policy documents (Maczka et al., 2016; Mizgajski et al., 2014), it has been indirectly applied at the local level in contexts such as coastal cities (Piwowarczyk et al., 2013).

Public involvement in the formation of environmental policies requires decision-makers to recognize the diverse array of stakeholder values and positions that are expressed through descriptive (i.e., neutral) and prescriptive (i.e., positive and negative) messages (Schmidt, 2008). Although the vast majority of discourse is descriptive, public policies can become contested over time (Bouwma et al., 2017), especially when they are based on prescriptive communications across sectors and competing interest groups (de Groot et al., 2010). Given that public consultation can be steeped in misunderstandings and distortion of concepts (Kraft and Furlong, 2012) alongside social conflict (Maestre Andrés et al., 2012; Sarkki and Karjalainen, 2015), the co-production of knowledge through participatory and deliberative processes becomes paramount for sustaining a dialogue (Wüstenhagen et al., 2007). This requires that agencies use accessible language (Albrecht and Ratamäki, 2016) and include stakeholders throughout all phases of the decision-making process (Setten and Brown, 2018), particularly during discussions about controversial topics such as risk communication (Atman et al., 1994; Renn, 2008; Slovic, 2016), climate variability (Jamieson, 2014; Markowitz and Shariff, 2012; Myers et al., 2012; Nisbet, 2009), and land management concerns in protected areas (van Riper et al., 2017b).

There is value in implementing and mainstreaming the ES framework in public policies (Cowling et al., 2008; Maczka et al., 2016; Pittock et al., 2012); however, previous research has indicated this is a challenging process (Bouwma et al., 2017). Particularly in terms of EU policies (Kabisch, 2015) the extant literature has showed that informal strategies focused on planning for urban green space in Berlin (e.g., Urban Development Concept 2030) referred to the ES concept in 2015 yet stakeholders remained unaware of the ES term. The study of climate protection laws in Germany also showed both biotic and abiotic ES were a significant part of the landscape planning domain. In Poland, legal acts concerning the protection of ecosystems (Stępniewska et al., 2017) showed that ES were incorporated into regulations in 2015, albeit indirectly and not in harmony with executive regulations. These challenges suggest that policies are increasingly widening the scope of protection from preservation to the protection of ecosystem functions. Yet, even using the ES concept *de facto* does not require high public awareness of the concept.

2.2. Natura 2000 as a biodiversity conservation policy

Natura 2000 is a form of nature conservation in the EU focused on species and habitats. Based on EU directives, the main aim of Natura

2000 is to ensure the long-term survival of Europe's most valuable and threatened organism and places. The EU Member States are responsible for employing conservation authorities to manage these spaces. Cooperation is required for authorities, voluntary bodies, local or national charities and private landowners, with the purpose of providing effective resource protection (Alphandery and Fortier, 2001; Bryan, 2012; Hiedanpää, 2005; O'Donnell and Stokowski, 2016). Management plans are the preferred option for most EU Member States to facilitate decisions about particular Natura 2000 areas (Cernecky, 2011). The two models of Natura 2000 legal frameworks include national legislation in countries such as the Netherlands that require provinces to set up management plans for each Natura 2000 area, and management approaches in countries such as Germany that do not have legal mandates but instead rely on legislation from the Special Areas of Conservation and Special Protection Areas. Although Natura 2000 was established within the conservation paradigm but not in response to the ES framework, the framing of benefits provided by ecosystems to human communities is increasingly applied in Natura 2000 governance.

In Poland, management plans have legislative support at the national level. In accordance with the art. 28 par. 1 of Act of 16 April 2004 on Nature Conservation, the Polish Parliament appoints a supervisor of particular Natura 2000 areas (e.g., Regional Director of Environmental Protection, Director of Maritime Office for marine areas). The first draft of the management plan is required within six years of the approval of an area by the European Commission or the appointment of a special protection area. It is approved by an act of local law in the form of an order of the Director of the Regional Directorate for Environmental Protection. Establishing a management plan is mandatory, except for marine areas or the areas that already have a pre-existing protection plan from a national park or a nature reserve (Journal of Laws of the Republic of Poland from 2015, item 1651). Developing a management plan includes identifying risks for a Natura 2000 area and actions that should be carried out by particular entities. The method and scope of management tasks for Natura 2000 were defined in the Ordinance of the Minister of Environment dated 17th February 2010 (Journal of Laws of the Republic of Poland from 2015, item 1651). Management plans included protection tasks such as required descriptions and boundary maps, identified threats to plant and animal species and their habitats, objectives, and protective measures and monitoring.

Given the scale and scope of the Natura 2000 network (it covers ca. 18% of the EU territory), conflicts have emerged throughout its establishment and management. To mitigate these conflicts, facilitated communication and public participation measures have been widely applied (Bouwma et al., 2016). Similar to other countries, difficulties were experienced during the implementation of Natura 2000 areas in Poland. The participation of local communities in the implementation process was limited only to information and education, sometimes after key decisions were made (Bołtromiuk, 2012). This "announce and defend" model (Yosie and Herbst, 1998) raised concerns over social and environmental justice. Consequently, a concerted effort was made to rectify public exclusion from decision-making.

2.3. Application of discourse analysis and framing theory

Discourse analysis is one approach for investigating how stakeholders articulate and engage with the ES frame. Discourse is defined as "a specific ensemble of ideas, concepts, and categorizations that are produced, reproduced, and transformed in a particular set of practices and through which meaning is given to physical and social realities" (Hajer, 1995, pp 44). Frames refer to the context of language and images (Borah, 2011; Druckman, 2001), as well as the broader structures and ideas that can be discerned from communication (Kemp et al., 2017). Frames emerge from "persistent patterns of cognition, interpretation, and presentation, of selection, emphasis, and exclusion" (Gitlin, 1980 pp 7). According to Goffman (1974), frames are embedded within discourse and are schemata for interpreting events. Drawing from the Common International Classification of Ecosystem Services V4.3 (CICES) (Haines-Young and Potschin, 2013) we defined the ES framework as the representation of reality that reflected environmental concerns connected with services from ecosystem affecting human well-being.

Discourse analysis and particularly Framing Theory have been applied in previous research to better understand an array of socio-environmental issues such as shale gas (Clarke et al., 2015; Lis and Stankiewicz, 2016; Vuola and Pyhälä, 2016), natural disasters (Ashlin and Ladle, 2007), and conservation policy (Spash and Aslaksen, 2015). This theoretical lens has also been applied to better understand how parts of reality were made more salient in communication about resilience (McGreavy, 2016) and the role of new technologies to create memes for environmental protests (Davis et al., 2016). In ES-related research, it was applied by Bieling (2014), who conducted a hermeneutical in-depth analysis of stakeholders' short stories and Asah et al. (2014) in an analysis of focus group interviews. However, previous research has yet to draw on Framing Theory to better understand how stakeholders articulate ES in environmental policy discourse at a nation-wide scale.

3. Material and methods

Drawing on the literature reviewed above, we examined the framing of ES concepts at multiple Natura 2000 areas across Poland, and conducted a discourse analysis (Fairclough and Fairclough, 2013; Wodak and Krzyzanowski, 2008) to identify the contexts in which the ES categories appeared. Specifically, we used mixed methods (Graneheim and Lundman, 2004; Hsieh and Shannon, 2005; Krippendorff, 2004) to analyze notes from meetings about management of Natura 2000 areas in Poland. Content analysis was performed using a predefined set of categories that reflected the ES frame, and we focused particular attention on public policy consultations that provided information on the use of ES in a variety of land use contexts (Kabisch, 2015).

3.1. Research material

Individual notes from meetings were examined to determine how the ES frame was used as a launching point for discussion among stakeholders. Management plans typically move through a 21-day public consultation period. However, in response to the historical process for public engagement in decisions about the implementation of Natura 2000 areas in Poland, the General Directorate for Environmental Protection extended the consultation process in 2009 by organizing a series of meetings for stakeholder deliberation. Meetings were organized by the Directorate and notes containing the course of the meeting were taken. These meetings were held in venues such as local cultural centers, headquarters of local departments of National Forest Holding, and National or Landscape parks. Although attendance was not always high, securing participation of stakeholders was one of the primary concerns of organizers (General Directorate for Environmental Protection, 2016).

In total, we collected 1,077 notes (4,475 pages) from 15 out of 16 provinces of Poland created from 2010 to 2015. The Mazowieckie province denied access to their data. These documents varied in length from 1 to 47 pages ($M = 4.16$). The average amount of discussion time was four hours. The details in documents varied, though these documents largely maintained similar structures, including the date, title, list of participants in attendance, and the discussion.

3.2. Research procedure

The analytical procedures adopted in this study spanned four phases that were carried out from May 2015 to January 2017. Phase 1 focused on selecting research material to be included in the analysis given the importance of working with high quality and relevant information. Two

Table 1
Description notes from public consultation meetings concerning preparation of management plans in Natura 2000 areas in Poland.

No.	Province	Number of documents before screening	Number of documents after screening	Number of pages analyzed
1	Dolnośląskie	140	2	12
2	Kujawsko-pomorskie	58	0	-
3	Lubelskie	148	3	10
4	Lubuskie	29	21	80
5	Łódzkie	34	2	7
6	Małopolskie	94	12	31
7	Mazowieckie	-	-	-
8	Opolskie	46	8	38
9	Podkarpackie	93	47	280
10	Podlaskie	63	12	40
11	Pomorskie	107	49	186
12	Śląskie	27	21	109
13	Świętokrzyskie	39	11	42
14	Warmińsko-mazurskie	61	9	57
15	Wielkopolskie	48	3	17
16	Zachodniopomorskie	90	11	60
Total		1077	211	969

criteria were developed to determine the relevance of notes and all documents were evaluated for potential inclusion in the analysis. First, documents needed to report on the discussion that occurred during a meeting to allow for our interpretation and assessment. In several cases, notes were technical documentations of an area or focused on topics outside the scope of this study such as lists of protected species. Of all 1077 documents, 154 were excluded because they did not meet the first criterion. Second, a form of a narration was required so we could connect stakeholders to particular statements. Several documents omitted these details which would have prevented us from identifying the specific stakeholders or groups that were engaged in discussion. A total of 712 documents were excluded due to the second criterion, and ultimately, 211 were selected for analysis across 14 provinces (the Kujawsko-Pomorskie province did not generate any suitable documents), amounting to 969 pages of text (Table 1). Additionally, all documents were unevenly distributed among provinces due to variation in consultation processes and documentation procedures.

Phase 2 focused on developing a coding scheme for analysis of ES and the broader context. The ES coding scheme spanned the following ES types identified by CICES V4.3 (Haines-Young and Potschin, 2013): 1) *Provisioning*: nutritional, material and energetic outputs from the ecosystem; *2) Regulation and Maintenance*: the ways in which ecosystem can mediate or moderate the ambient environment that affects human performance*;* and 3)

Cultural: the non-material and normally non-consumptive outputs of ecosystem that affect the physical and mental states of people. The coding scheme thematically evaluated the content discussed and indicated whether direct or indirect references to ES were made by stakeholders. The former was marked when an exact appearance of the ES term appeared in the text, while the latter was marked when parts of the text expressed the purpose of the ES frame through as discussions about services such as flood prevention, fishing economies, and recreation.

In addition to analyzing meeting notes for direct and indirect engagement with three ES categories, we considered how stakeholder discussions were framed. In line with Beery et al. (2016), we coded all data across three frames: 1) Neutral: a descriptive statement free of negative or positive judgment linking *Provisioning*, *Regulation and Maintenance*, and *Cultural* ES with human activities; 2) Positive: a prescriptive statement about benefits for the environment and/or society related to *Provisioning*, *Regulation and Maintenance*, and *Cultural* ES; and 3) Negative: a prescriptive statement that includes negative judgment linking *Provisioning*, *Regulation and Maintenance*, and *Cultural* ES with human activities. Several examples of negative statements touched on issues such as poaching or stealing wood thieves, less access to resources, and impacts of protected species like beavers which cause flooding and damage to farmlands.

Phase 3 of the analysis focused on coding. In this stage, we deductively coded and quantified stakeholder engagement with services provided by the Natura 2000 network (Elo and Kyngäs, 2008). Interpretive techniques were also applied to understand the broader context of statements (Ahuvia, 2001). These techniques were guided by principles in grounded theory (Glasser and Strauss, 2017) to identify emergent themes and better understand how and why statements were classified into the predetermined ES categories. Following Asah et al. (2014), the passages that were identified as representing *Provisioning*, *Regulation and Maintenance*, and *Cultural* ES types were normally around one paragraph in length. To do this, we engaged in an iterative process whereby discussions of ecosystem's benefits were identified, segregated, grouped, regrouped, and linked to other texts and codes (Saldaña, 2015). We also coded all references to ES in terms of the direct and indirect references made by stakeholders, and adopted these same methods to determine whether descriptive or prescriptive statements were made during public consultation meetings (Table 2). All data were analyzed by two researchers, one social scientist and one natural scientist, for interrater reliability. These two individuals coded independently and later discussed their interpretations and uncertainties (Ahuvia, 2001; Denzin and Lincoln, 2005). NVivo 10 software was used for coding and retrieval of the coded text to explore how the ES frame appeared in discussions during public discussions of management plans in Poland.

Finally, Phase 4 focused on attributing land cover categories to stakeholder discussions. We coded all statemnts according to the type of area where the meeting occurred using biogeographical data from the Natura 2000 sites. Specifically, we applied the land cover categories identified in the Mapping and Assessment of Ecosystems and their Services ("Typology of ecosystems — Biodiversity Information system for Europe", 2018) to each public document to better understand the social-ecological relationships between stakeholder engagement with ES and the biophysical conditions being evaluated. For this procedure, the following categories were applied: 1) urban; 2) cropland; 3) grassland; 4) woodland and forested land; 5) heathland and scrub; 6) sparsely vegetated habitats; 7) mires, bogs and fens (wetlands); 8) lakes and rivers; and 9) mixed. Given that our analysis concerned only terrestrial Natura 2000 areas, we disregarded four land cover categories: 1) marine, 2) coastal, 3) shelf, and 4) open oceans.

4. Results

4.1. Extent of the ecosystem service frame appearance in public consultation

In response to the first research objective, analyses revealed that the ES frame served as a launching point for public discussions of management plans for Natura 2000 sites in Poland, but in an indirect way. Within the 211 analyzed documents, 939 references were made to one of the three ES categories (i.e., *Provisioning*, *Regulation and Maintenance* and *Cultural* ES) across 174 notes. The most represented type was *Provisioning*, followed by *Regulating and Maintenance*, and then *Cultural* (Table 3).

4.2. Ecosystem services in descriptive or prescriptive frames

The distribution of particular ES frames (i.e., the second research objective) was highly uneven across descriptive and prescriptive contexts (Fig. 1). Almost two thirds of manifestations were neutral, in that they reflected states and processes, as illustrated by the following example: "Species can persist because the habitat depends not only on the use, but first of all on the habitat conditions associated with moist soil" [neutral; *Regulation and Maintenance* ES; note 83]. Over one third of

Table 2
Illustrative quotes of neutral, positive, and negative contexts of ecosystem services (ES) discussed during public consultation meetings focused on management of Natura 2000 areas in Poland.

ES frame	Context		
	Neutral	Positive	Negative
Provisioning	"… willingness to cooperate with Polish Angling Association in order to collect information about the fishing economy on the lake." [note 41]	"For cultivation of meadows, grazing would be the best." [note 185]	"… threat posed by poachers to the fauna of the lake." [note 21]
	"… logging for sale within the area did not pose a threat to bats." [note 161]	"… bats' guano is a valuable fertilizer which could be used in many crops." [note 70]	"… despite the great involvement of forestry service it is very difficult to eliminate wood theft within this protected area." [note 56]
Regulating and Maintenance	"… fresh meadows which provide patched of habitats for endangered bats are located only on private lands." [note 71]	"… the idea of creating the Turawa Reservoir was associated with the retention conditions, and the reservoir's leading function was flood protection for the region." [note 41]	"… interference in the forest state may worsen the feeding conditions for bats within their habitat." [note 56]
	"… maintenance of this area is our obligation by law as it provides habitats for endangered species." [note 69]	"… emphasized the role of biodiversity and the function of meadows for the treatment of surface waters." [note 81]	"… regulating the estuary disturbs the natural conditions of the estuary and affects the periodical overdrying of habitats for endangered species within this area." [note 124]
Cultural	"Concerning the recreational use of an oxbow lake, the shape and size of the platform on the oxbow lake should be consulted with the Angling Association, because it knows the best needs of anglers." [note 90]	"… tourism is desirable in this Natura 2000 area." [note 147]	"… angling and water sports should be represented by a category–called scaring birds." [note 41]
	"… establishment of agritourism does not disturb the landscape , but it will be necessary to prepare an appropriate environmental report." [note 134]	"Xerothermic grasslands, which occur in this area, are few in our region, very floristically rich and very nice."[note 94]	"It should be noted that one of the dunes is destroyed by quads."[note 185]

passages were prescriptive, in that they involved judgments on actual states or processes concerning the environment. Specifically, the narrative included 25% negative and 10% positive tones. For example, one stakeholder claimed that "…threats and protective actions to the plans of protective tasks are listed, therefore the hazard category, which is fishing, does not refer to the fishing itself, but actually to the effects of improper practicing of this activity" [negative; *Cultural* ES; note 41] and the another stated that "… bats' guano is a valuable fertilizer which could be used in many crops." [positive; *Provisioning* ES; note 70]

4.3. Ecosystem services frames adopted by groups of stakeholders

The use of ES frames was evaluated across a range of stakeholder groups. A majority (88%, N = 826) of references to ES and their associated frames were directly associated with particular stakeholder groups (Table 4). These frames, especially *Regulation and Maintenance*, were used most frequently by: 1) plan managers (e.g., representatives of the Directorates of Environmental Protection, entities responsible for preparation of management plans); 2) representatives of the National Forest; and 3) scientists who had expertise in areas such as environmental protection. Others stakeholders groups also used the ES framework but focused on different types of services, mostly *Provisioning*.

4.4. Ecosystem services frames used in particular ecosystems

In response to the final research objective, use of the ES frame was analyzed across land cover categories. There were eight types of ecosystems identified: 1) urban; 2) cropland; 3) grassland; 4) woodland and forested land; 5) heathland and scrub; 6) mires, bogs and fens (wetlands); 7) lakes and rivers; and 8) mixed. We observed that the most abundant landscape type discussed by stakeholders was woodland and forested land, appearing in 60 documents, followed by rivers and lakes in 46 documents, urban areas and grassland in 36 documents, wetlands in 20 documents, cropland in seven documents, and heathland, scrub and mixed in three documents each (Table 5). The *Regulation and Maintenance* services were relatively dominant (47–57%) across the following land cover categories, spanning urban, grassland, mires, bogs and fens (wetlands), and mixed landscapes. *Provisioning* services were tied to (47–67%) cropland, woodland and forested land, heathland and scrub and lakes, and rivers land cover categories. *Cultural* services were not dominant in any land cover categories but were relatively significant (17–19%) in urban mires, bogs and fens (wetlands), land cover categories. By and large, statements across all land cover categories were couched in a neutral tone of discussion.

Following our analysis of the relationship between ES narratives and land cover categories, we identified the land management issues around which particular ES appeared during public consultations. We identified 24 types of land management issues and found that the distribution of ES across these categories was highly uneven (Table 6). The key issues discussed were related to management regulations on habitat (23%), setting borders around protected areas (15%), language used by agencies (13%), and limitations on farmland (10%). One example quotation was from a stakeholder who discussed tourism infrastructure that could protect valuable habitat from degradation: "The location of

Table 3
Occurrence of *Provisioning*, *Regulation and Maintenance* and *Cultural* ecosystem services and example quotations from secondary data drawn from public consultation meetings about management plans in Natura 2000 areas in Poland (N = 942).

Ecosystem Services	Example quotation	Number of references in documents	Percent
Provisioning	"One needs to manage the mowed biomass waste from the mowed permanent grasslands" [note 5]	425	45%
Regulation and Maintenance	"The role of biological diversity and the function of pastures in terms of treating surface waters are crucial" [note 81]	410	44%
Cultural	"Will there be any prohibitions introduced concerning e.g. recreation in this area?" [note 38]	104	11%
Total		942	100%

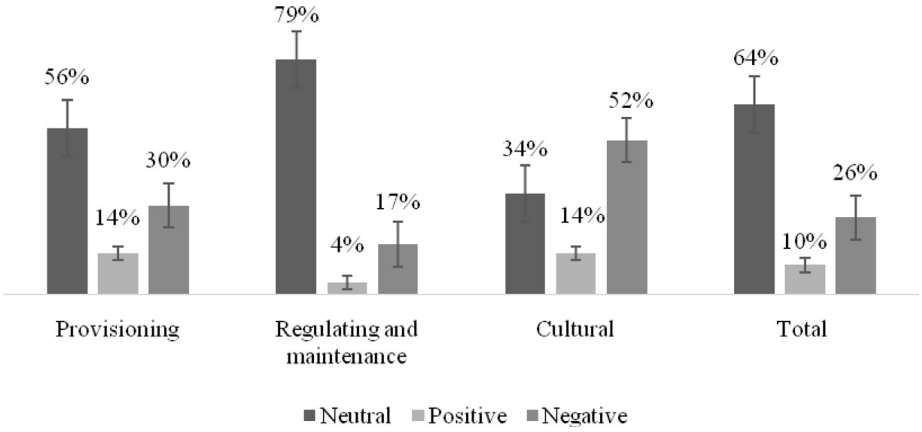

Fig. 1. Frequency of the ecosystem service frames adopted to represent *Provisioning*, *Regulation and Maintenance* and *Cultural* services discussed during meetings about management plans for Natura 2000 areas in Poland in three types of context (neutral, positive and negative).

the agrotourism farm nearby is beneficial for the protection of the reserve because it catalyzes tourist traffic and is a place where one can leave his car" [positive; *Cultural* ES; note 54]. Another participant proclaimed in her description of management that a certain amount of land would need to be set aisde for protection: "the preliminary indicators of forest habitat status assessment would require 20 m^3 per hectare, with coarse woody debris being unevenly distributed [neutral; *Regulation and Maintenance* ES; note 57].

Multiple descriptive contexts were referenced in discussions about ES policies. All neutral land management issues had precise meanings, and referred to facts or technical conditions such as the principles and aims of Natura 2000. For example, one participant explained that, "the Natura 2000 area is not a reserve; there is only one principle here - no deterioration of habitats and species." [neutral; *Regulation and Maintenance* ES; note 176]. All of the positive frames connoted precise meanings tied to valuable species and habitats. For example, one participant emphasized the following: "the management plan records will concern only valuable natural habitats being objects of protection and not the entire Natura 2000 area" [positive; *Regulation and Maintenance* ES; note 117]. All *Provisioning* services that were framed as positive and involved direct utilization of natural resources. Another participant discussed the coexistence between human activities and protected areas, which positively impacted forestry: "thanks to the forest management model in the area, the protection objects of the forest shelters are maintained [positive; *Provisioning* ES; note 15]. Finally, the negative context was also present during public discussions of the Natura 2000 areas, including illegal or damaging use of natural resources such as tillage and developments to accommodate anglers, as illustrated by the following passage: "As a potential threat to riparian habitats, he mentioned the possible creation of new fishing ponds" [negative; *Provisioning* ES; note 130].

5. Discussion

5.1. Use of ecosystem services in public consultation

This study overlaid the ES framework on notes from public discussions about the management of Natura 2000 areas in Poland to better understand how stakeholders framed their perceived relationship with the environment. Drawing on discourse analysis (Hajer, 1995) and Framing Theory (Goffman, 1974), we sought to observe how the ES concept was (indirectly) engaged during these meetings given the prominence of ES in regulatory procedures and utility in practice. *Provisioning* and *Regulation and Maintenance* ES were most pronounced in stakeholder deliberations. The broader context of these benefits was highly variable, though many narratives were situated in descriptive (i.e., neutral) terms that simply depicted natural resource conditions. *Cultural* ES that represented tangible (e.g., recreation and tourism revenue) and intangible qualities of nature (e.g., pride, beauty) were mentioned less often, connected with negative patterns of behavior such as noncompliance with rules and regulations, and were largely framed in prescriptive terms. These findings indicated that *Cultural* ES were most contested but least considered across a range of stakeholder groups. Although *Cultural* ES are sometimes investigated in ways that align with *Regulation and Maintenance* ES (Czúcz et al., 2018), they may be neglected by decision-makers and stakeholders because of their value-laden context (van Riper et al., 2017b; Willcock et al., 2016). In-depth discussions directed toward *Cultural* ES are needed to confront public concerns and foster discourse about benefits for human well-being, in accordance with the aims of biodiversity conservation policies

Table 4
Frequency of ecosystem services (ES) frames and the context of the discussions in particular groups of stakeholders (N = 826).

ES frame and context	Plan managers (n = 404)	National forest (n = 134)	Science (n = 79)	Other administrators (n = 69)	NGOs (n = 34)	Municipality (n = 31)	Business (n = 15)	Village head (n = 13)	Farmers (n = 11)	Other (n = 36)
ES frame										
Provisioning	37%	48%	29%	62%	59%	61%	80%	54%	82%	50%
Regulation and maintenance	55%	44%	57%	29%	15%	23%	20%	31%	9%	28%
Cultural	8%	8%	14%	9%	26%	16%	0%	15%	9%	22%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100	100%
Context										
Descriptive	71%	65%	70%	61%	53%	61%	60%	62%	45%	53%
Positive	8%	10%	11%	9%	15%	13%	20%	0%	27%	8%
Negative	21%	25%	19%	30%	32%	26%	20%	38%	27%	39%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 5
Frequency of ecosystem services (ES) frames and the context of the discussions across land cover categories (N = 939). The highest values are in a bold font style.

ES frame and context	Urban (n = 87)	Cropland (n = 49)	Grassland (n = 226)	Woodland and forested land (n = 247)	Heathland and scrub (n = 15)	Mires, bogs and fens (wetlands) (n = 68)	Lakes and rivers (n = 234)	Mixed(n = 14)
ES frame								
Provisioning	31%	**49%**	42%	**47%**	**67%**	34%	**53%**	43%
Regulation and maintenance	**52%**	39%	**51%**	43%	20%	**47%**	35%	**57%**
Cultural	17%	12%	7%	10%	13%	19%	12%	0%
Total	100%	100%	100%	100%	100%	100%	100%	100%
Context								
Neutral	**60%**	**61%**	**60%**	**66%**	**67%**	**78%**	**62%**	**93%**
Positive	13%	16%	12%	8%	13%	4%	9%	0%
Negative	28%	22%	28%	26%	20%	18%	29%	7%
Total	100%	100%	100%	100%	100%	100%	100%	100%

in Poland and abroad (cf. Maczka et al., 2016).

5.2. Types of ecosystem service frames used by stakeholders

Our findings underlined the importance of distinguishing among categories of ES and identifying the communication tools that enabled deliberation about management of natural resources. The frames analyzed for this research were unequally weighted in conversations and across ES types, in that descriptive and prescriptive (either positive or negative) contexts were observed to differing degrees. *Cultural* ES, in particular, often elicited an emotional valence that will be important to recognize in future research and practice because these services can serve as indicators of social conflict. Moreover, given that *Cultural* ES are at risk of moving out of boundary object status into a more standardized state (Steger et al., 2018), we urge future researchers and practitioners to maintain interpretive flexibility that will accommodate different viewpoints and facilitate dialogue about competing interests (Abson et al., 2014).

Results from our assessment of how ES were approached across sectors provided useful insights into how subgroups of stakeholders viewed their relationship with the environment and strived to accomplish different end goals (Steger et al., 2018). On one hand, environmental experts and scientists were more likely to focus on issues such as biodiversity conservation and refer to *Regulation and Maintenance* ES. This could be due to their competencies concerning the environment (e.g., knowledge of farming regulations) (Maczka et al., 2016) or familiarity with scientific language used in EU Natura 2000 policies that are species- and habitat-oriented (Guttenbrunner, 2009). On the other hand, land users such as farmers, business etc. tended to have different end goals focused on economic sustainability and also adopted language that aligned with the anthropogenic assumptions of the ES framework. These individuals were also more likely to adopt normative stances and reference *Provisioning* ES. Thus, the public consultations analyzed in this study showed dynamic interactions that engaged the ES concept as a boundary object to express different interpretations of ecosystems and human communities.

ES were instrumental in the participatory processes analyzed in this study given that they supported transdisciplinary, action-oriented

Table 6
Land management issues discussed about provisioning, regulating and maintenance, and cultural ecosystem services (ES) frames across neutral, positive and negative context (N = 856).

Context and ES frame	Types of land management issues	Number of times referenced	Percent
Neutral context			
Provisioning	Characteristic of uses (e.g., the kind of farming that exists within the protected area)	64	7%
	Organizational and/or management possibilities (e.g., where to establish protected area border)	126	15%
	Mechanism for coexistence in human activities and protected area (e.g., minimizing impacts of forestry)	48	6%
Regulating and maintenance	"Natura 2000 language" (e.g., its principles and aims)	114	13%
	Organizational/management possibilities in terms of regulation (e.g., how to maintain a habitat)	194	23%
	Circumstances of habitat formation	4	0%
Cultural	Recreation and tourism	19	2%
Positive context			
Provisioning	Organizational and/or management options for tourism (e.g., establishing walking paths)	16	2%
Regulating and maintenance	Valuable species and habitats	7	1%
	Human protection by nature (e.g., meadows protect from floods)	7	1%
Cultural	Pride and beauty	6	1%
	Education and heritage	2	0%
	Tourist infrastructure that protects valuable habitat from degradation	1	0%
	Promotion and development	7	1%
Negative context			
Provisioning	Lack of use (e.g., mowing meadows is beneficial for the habitat but nobody does it)	13	2%
	Illegal forms of human use (e.g., poaching)	13	2%
	Limitations of farmland	89	10%
	Damage caused by protected species (e.g., beavers cause damage to farmlands and flooding)	8	1%
Regulating and maintenance	Damage in habitats caused by anthropogenic pressures or other species (e.g., boars)	58	7%
	Illegal use of regulating and maintenance services (e.g., illegal dumps)	7	1%
Cultural	Collecting valuable species (e.g., butterflies)	3	0%
	Limiting tourist activities (e.g., walking)	38	4%
	Limiting tourist infrastructure (e.g., construction of a playing field)	4	0%
	Illegal tourism (e.g., illegal barbecuing)	8	1%
Total		856	100%

communication about resource management. Although we focused primarily on connecting the indirect discussions of ES to the framework outlined in CICES V4.3 by Haines-Young and Potschin (2013), we provided insight on the types of stakeholder groups engaged in deliberation about land management issues that warrant attention, particularly surrounding regulations (e.g., establishing protected area borders) that would affect local residents. Identifying relevant subgroups of stakeholders is important to facilitate communication about salient topics with particular groups and shape message frames to align with existing belief systems (Kemp et al., 2017). These forms of communication carry potential to provide deeper information on how to advance place-based dialogues about (dis)similar goals for natural resource conservation, promote effective problem solving focused on social-ecological and participatory issues, and create a platform for considering how socio-economic and cultural land management issues vary across a range of land use contexts (Muhar et al., 2017; Pecurul-Botines et al., 2014; Zhang et al., 2016).

Participatory management of Natura 2000 areas is complex not only due to the array of viewpoints held by stakeholder groups but also because of the diverse ecosystems being managed. We identified the land cover categories that supported various benefits discussed by stakeholders, and observed that woodland and forested land were the most common of eight land cover categories. Discussions in these contexts were largely neutral indicating that these spaces would be less likely to generate social conflict than environments that were contested and associated with *Cultural* ES. Our results align with past research that has indicated distinct land cover categories such as evergreen forest (Brown and Brabyn, 2012) and open water (van Riper et al., 2017a) are more likely to embody diverse values. Public land management agencies that rely on the ES framework to manage ecosystems and communities should carefully consider how dialogue and treatment of social-ecological issues may vary across different landscapes, especially in contexts where competing interests are being negotiated among stakeholders.

Although we contend that ES can be treated as boundary objects to help identify and solve problems from different disciplinary perspectives across land cover categories, this framework is not without limitations. It has potential to focus attention on commonalities rather than pre-existing biases that can lead to communication failures (Deliège, 2016; Kenter et al., 2016a). However, simultaneously, it can blind people to policy outcomes spanning social and ecological systems. That is, the simplicity of the ES stock-flow concept can eclipse the complexity of resource management challenges faced by society in an array of settings (Muradian and Rival, 2012; Norgaard, 2010). Given that public discourse varies across countries and cultures (Mensah et al., 2017; Quyen et al., 2017), it is critically important to consider the historical contexts for valuation. In this study, Polish citizens had very little influence on decision making during the communist period (1945–1989). A culture of responsibility and collective decision-making was only recently built so the contested nature of *Cultural* ES may be tied to the historically limited levels of public participation (Maczka et al., 2016).

5.3. Future application of ecosystem service frames

To better understand and manage complex systems that involve human and biological communities, there is a strong need to develop communication tools that enable diverse stakeholders and researchers from different fields of study to work together. In line with previous research indicating that various ES types may be operating differently as instruments for communication (Kenter, 2016; Kenter et al., 2016b; Steger et al., 2018), our findings reinforced the notion that ES were launching points for exploring (dis)similar interests on descriptive or prescriptive pathways. Although the majority of discussions about Natura 2000 areas were descriptive, normative claims were made that warrant careful consideration by decision-makers to minimize communication failures due to differing values and interests that intersected discourse (Deliège, 2016; Schröter et al., 2014). In particular, *Cultural* ES were often framed prescriptively and were most likely to be framed negatively, indicating that they require careful attention in future work.

Our analysis showed that the ES concept functioned as a conduit for stakeholders to discuss both instrumental and non-instrumental, intrinsic values (e.g., pride and beauty of nature) or non-monetary benefits (e.g., regarding education). However, these conversations took place less frequently. Although ES were engaged beyond purely economic and instrumental values to express the broad relationships formed between people and places (Chan et al., 2016), this concept did not act as a binding agent for discussion (Norgaard, 2010). In other words, the ES concept was used to varying degrees, and for many experts that dealt with this concept in a more explicit manner, opened up new possibilities for recognizing complexity across ES categories. Use of this framework also engaged with the priorities set forth in national-level planning frameworks (Scholte et al., 2015) and assisted with tradeoffs in protected area management by simplifying the “bins” or types of services that were being affected and discussed (Schirpke et al., 2017). We argue that this framework will be particularly useful for Natura 2000 areas that aim to move away from more technocratic scientific processes toward inclusive conservation (Ferranti et al., 2014).

6. Conclusion

Results from this research show that for Poland’s case, a country reforming and consolidating its environment protection system, the ES frame can be a useful communication tool that enables stakeholders from opposing stakeholders groups (e.g., foresters, NGOs, the private sector) to deliberate about the future of Natura 2000 areas. In this respect, the ES frame can not only simplify tradeoffs and raise visibility of complexity, but also act as a flexible boundary object that remains open to local circumstances. Due to the prevalence and patterns of this framework in public deliberation about management of the protected area system in Poland, we argue that European-level policies that aim to embrace bottom-up approaches to decision-making and incorporate the experiences of stakeholders can be advanced through engagement with ES. This framework can not only be used as a tool for descriptively reviewing management challenges, it can also be used to create space for making prescriptive claims that warrant attention in public forums and minimize conflicts about the future of protected landscapes.

7. Declarations of interest

None.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ecoser.2018.12.005.

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Picture 5. Coarse woody debris (dead wood) is one of a few conflicting issues during public consultation meeting concerning preparation of management plans for Natura 2000 areas in Poland, Noteć Forest Natura 2000 area, Poland. **Photo:** Krzysztof Mączka.

Zdjęcie 5. *Martwe drewno jest jednym z kilku konfliktujących tematów podczas konsultacji społecznych dotyczących przygotowania planów zadań ochronnych dla obszarów Natura 2000 w Polsce, obszar Natura 2000 Puszcza Notecka, Polska.* ***Fot.*** *Krzysztof Mączka*.

Chapter 5: Conflicts in biodiversity conservation management: Analysis of management plans in Natura 2000 in Poland

Article:

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Contribution to the article

Author	Contribution in %	Description of contribution
Krzysztof Mączka	70%	literature review, research concept, methodology, data collection, data analysis, coordination of the work, preparation of final version of the article
Piotr Matczak	15%	commenting subsequent versions of the article, mentoring and guiding the research idea, contribution to the introduction and discussion parts
Agnieszka Jeran	5%	commenting subsequent versions of the article, mentoring and guiding the research idea, contribution to the methods part
Piotr Chmielewski	5%	data collection and analysis, input to the section concerning Natura 2000 as a biodiversity conservation management policy
Susan Baker	5%	commenting on versions of the article, contributing to the conceptual framework and discussion, editorialist

Conflicts in biodiversity conservation management: Analysis of management plans in *Natura 2000* in Poland.

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Conflicts in biodiversity conservation management: Analysis of management plans in *Natura 2000* in Poland.

Abstract:

This paper examined the sources of conflicts, which were present in stakeholder deliberation on ecosystem services (ES) management in *Natura 2000* areas in Poland. Drawing from conflict theory and discourse analysis, we analyzed public documents that were generated over a five-year period of *Natura 2000* areas management consultations. We observed the dominance of conflicts originating from the relationship between actors and the structural context of relations, while reasons of conflicts related to values and data were less significant. Our results also indicated that there is a strong link between sources of conflicts and ES type. Certain ES types appeared more likely to be a conflict-generating and certain source of conflict (data, interests, relationship, structure, values) were more significant than others. The dominant source of conflicts regarding relationship is mostly connected with cultural ES while the other sources are mostly related to provisioning ES. We also found out that there was lack of standardized procedure for reporting this nation-wide public consultation process. This can negatively affect institutional memory and limit the opportunities for lesson learning from past mistakes. The implications that emerge from this research are particularly relevant for protected areas, such as those found in Poland, which are the arena of social conflict and seeking communication tools to facilitate public participation and equitable policy outcomes.

Keywords: ecosystem services, stakeholder participation, public consultation, protected areas, land use policy.

1. Introduction

Stakeholder participation has a long tradition in biodiversity conservation management (Reed, 2008). It appears at various stages of decision-making processes (Hurlbert and Gupta, 2015) and takes various forms. On the one hand, there are examples of tokenism, where the "announce and defend model" (Yosie and Herbst, 1998) is applied and engagement is limited to information and education after key decisions have already been made. This can move stakeholder participation in manipulation (Arnstein, 1969). On the other hand, stakeholders can be involved from the very beginning of a process and a discussion can be open and inclusive. If citizens have real decision power a process is considered interactive, effective and appropriate (Jones-Walters and Çil, 2011; Kubacka and Macias, 2016). However, the willingness to participate depends on the mobilization ability of particular groups of stakeholders (Reed et al., 2009; Rowley and Moldoveanu, 2003). It also involves the promotion of participation in biodiversity conservation in different groups of stakeholders. Although, the promotion has mostly normative background, including that it enables disclosure of conflicts, itself a prerequisite to resolving them, and that it helps secure efficiency and effectiveness of management (Jones-Walters and Çil, 2011; Selman, 2004; Vicente López-Bao et al., 2017; Webler et al., 2001), the existing literature also offers an ambiguous picture of stakeholders participation operation and effectiveness (Kraft and Furlong, 2012; Maestre Andrés et al., 2012; Sarkki and Karjalainen, 2015). Knowledge on how to advertise and how to do stakeholder participation work on the local level in specific settings can provide insights helping to improve biodiversity conservation policies (Baker and Chapin III, 2018).

Currently, various techniques are used in participatory processes, such as deliberative pooling, citizen juries, consensus conferences, 21st-century town meeting (Gregory et al., 2008). They have increasingly become part of developing and implementing conservation policies,

especially in the implementation of policies in protected areas (Blondet et al., 2017), for landscape management (Fagerholm et al., 2016), and in conservation activities led by local inhabitants (Sakurai et al., 2015). Realized benefits of stakeholder participation are, however, ambiguous, and how best to assess these benefits remains in dispute (Reed, 2008). A prime example of that is the *Natura 2000* network that was implemented in the European Union (EU) to advance biodiversity conservation.

In this context, the issue of procedural standardization of participatory processes is particularly interesting. On the one hand, standardization seems to be an effective approach in reaching consistent outcomes but, on the other hand, the participatory process must be tailored to the community, and the local, contextual situation (Sanoff, 2000). For instance, Blondet et al. (2017) showed that participation in *Natura 2000* areas was mostly organized in an instrumental, non-standardized manner: reactively, in response to already developing local contestation around *Natura 2000*. Finding a balance between standardization and diversification of stakeholder participation (a tailored solution) is an important issue to meet the specificity of local circumstances in different countries and communities.

Protected areas provide various ranges of ecosystem services (ES) (Díaz et al., 2018; Kettuunen et al., 2008; ten Brink et al., 2011). Recent research shown (Maczka et al., 2019) that ES concept provides potential to act as a "boundary object" or "bridging concept", enabling it to be a practical tool for biodiversity conservation management improvement, especially given that many public debates are couched within the ES framework and related to management of a range of land cover categories. It enables people to integrate knowledge with different social positions and professional backgrounds (Abson et al., 2014; Maczka et al., 2016; Schröter et al., 2017; Steger et al., 2018) and provides a common language for bringing theory into practice within interdisciplinary teams (Baggio et al., 2015). Despite controversies concerning the ES concept, such as the risk of nature monetization (Maczka and

Matczak 2014), it appeared useful because it captures the important role of local communities' income and employment, such as through tourism, that can be derived from biodiversity conservation efforts (Bastian et al., 2010; Pettenella et al., 2016). The research by Niedziałkowski et al. (2014) shows that local inhabitants fear of losing access to critical ES, such as wood, forest fruits, and recreation opportunities, can effectively undermine state-led conservation initiatives. However, these fears can be sensitized through the use of the ES concept, as it addresses conservation conflicts by providing data concerning local community perspective and needs, which are instrumental to more effective conservation policy-making.

Poland constitutes a case that can offer insights concerning participatory biodiversity conservation management of *Natura 2000*. Similarly to other Central and Eastern European (CEE) countries, Poland has a legacy of centralized planning and rigid top-down policy-making, which excluded stakeholder participation. After the collapse of Communism in 1989, and in the context of EU membership, the Polish system of nature conservation underwent crucial changes (Kluvánková-Oravská et al., 2009). For instance, the Nature Conservation Act (1991), was underpinned by the requirement to establish channels of cooperation between the administration and non-governmental organizations. Nevertheless, the central administrative authorities continue to maintain a dominant position in decision-making, and hierarchical thinking prevails among policymakers and nature conservation professionals. The establishment of *Natura 2000* after EU accession in 2004 resulted in controversies and conflicts with NGOs and local stakeholders, as found in several other EU member states (Blicharska and Angelstam, 2010; Grodzinska-Jurczak and Cent, 2011). Nevertheless, the stakeholder participation process established to prepare *Natura 2000* management plans in Poland consisted of over 1000 meetings and covered different *Natura 2000* areas across the country.

Our research gave an opportunity to analyse participation in a large scale process of biodiversity conservation management and to compare across different land cover type in Poland, addressing what has been previously identified in literature as a research gap (Blicharska et al., 2016; Díez et al., 2015; Kamphorst et al., 2017). The primary purpose of this study was to understand the sources of conflicts, which were present in stakeholder deliberation on ES management in *Natura 2000* areas in Poland. The following three objectives guided this investigation:

1. Identify sources of conflicts in participatory biodiversity conservation management in the *Natura 2000* network in Poland
2. Systematize sources of conflicts by referring to the ES concept
3. Assess the level of standardization of the participatory process designed to prepare *Natura 2000* management plans.

1.1 *Natura 2000* as a biodiversity conservation management policy

The main aim of *Natura 2000* is to assure the long-term sustainability of Europe's most valuable and threatened species and habitats (Council of the European Union, 2007). The EU Member States are responsible for ensuring that all *Natura 2000* areas are appropriately managed by conservation authorities. Stakeholder participation in *Natura 2000* management has been playing the increasingly prominent role in Europe, as stemming, at least in part, from the Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters from 25 June 1998 (the Aarhus Convention). The main instrument to govern *Natura 2000* areas is the management plan (Bouwma et al., 2018). It is preferred in most EU Member States and mandatory in some of them (Cernecky, 2011).

In Poland, the management plans have legislative support. In accordance with the Nature Conservation Act (2004, art. 28 par. 1), supervisors of particular *Natura 2000* areas types are

appointed (for example, Regional Director of Environmental Protection, Director of Maritime Office for marine areas). The first draft of the management plan needs to be prepared within six years from the date of approval of an area by the European Commission as a *Natura 2000* site. Stakeholder participation in establishing management plans for *Natura 2000* areas in Poland consists of three main steps. Firstly, a proposed management plan goes into a 21-day public consultation period. Secondly, the comments are reviewed and either accepted or refused. Thirdly, a series of open meetings are organized with stakeholders to establish the plans, in particular, *Natura 2000* areas. Since 2009, a new step has been added, with the aim of engaging local stakeholders, who were earlier effectively disregarded (General Directorate for Environmental Protection, 2016). Meetings are organized by the Regional Directorates for Environmental Protection and held in local culture centers, headquarters of the local department of the National Forest Holding, National or Landscape parks, etc. Notes summarising the course of the meeting were taken by organizers.

Given the scale and scope of the *Natura 2000* network, they influence the everyday life of a significant number of citizens. *Natura 2000* covers approximately 18% of the territory of the EU, while in Poland it covers almost 20% of the country. Given both the size of its population (38 million inhabitants approximately; 7,5% of the EU population) and of its territory (312 700 km^2, 7% of EU territory) the Polish case is particularly important, providing an important study site for analyzing the implementation of participatory approaches. The challenges and obstacles are well researched, including as they relate to (Bołtromiuk, 2012; Díez et al., 2015): a) insufficient knowledge about environmental effects of new large-scale investments - e. g. wind power parks, pipelines etc. (Andrulewicz et al., 2010; Floor et al., 2015); b) different and competing interests of stakeholders concerning the use of resources (Alphandery and Fortier, 2001; Bielecka and Różyński, 2014; Blondet et al., 2017; Ecke et al., 2010; Hermoso et al., 2015); c) the struggle over who has power in

decision-making, for example, in terms of the use and allocation of compensatory financial mechanisms (Blicharska et al., 2016; Bołtromiuk, 2012; Brandt et al., 2013; Pecurul-Botines et al., 2014); d) divergent perception of the purpose of protected areas, such as in relation to their use for recreational purposes, on the one hand, and for economic activity, on the other (Alphandery and Fortier, 2001; Blicharska et al., 2016; Dimitrakopoulos et al., 2010; Grodzinska-Jurczak and Cent, 2011; Holmes et al., 2017; Kopnina et al., 2018; McShane et al., 2011; Niedziałkowski et al., 2014); e) problems with involvement of stakeholders in *Natura 2000* management due to lack of awareness of their perspectives, lack of ability to ensure equal participation of various stakeholders groups that risks marginalisation of other important socio-environmental actors, and lack of trust between stakeholders (Díez et al., 2015; Ferranti et al., 2014, 2010, Hiedanpää, 2005, 2002; Laven et al., 2015). The result is often seen in stakeholder conflicts (De Meo et al., 2016; Geitzenauer et al., 2016; Stancioiu et al., 2010). A study in Slovakia shows that participatory process in the implementation of *Natura 2000* network involves conflicts potential (Brescancin et al., 2017). For some stakeholders site designation under *Natura 2000* is perceived as having potential economic benefits, for example, that can be used as a marketing tool to promote eco-tourism, while for others it is an obstacle due to the potential for imposing restrictions on agricultural and forestry activities. A “latent conflict” between nature conservation authorities and environmental NGOs, on the one side, and landowners and their representatives, on the other, has been reported in Italy (De Meo et al 2016). Research showed a strong need to increase social compromise around biodiversity conservation management (Geitzenauer et al.2016). The acceptance of compromise could be supported by wider stakeholder participation in biodiversity conservation management followed by an acknowledgment of the diversity of perspectives, conflicting interests, and social positions and their integration with biodiversity conservation (Paloniemi et al. 2015).

1.2 Application of conflict analysis framework

We based our theoretical framework on De Meo's et al. (2016) and Moore's (2003) typologies of conflict related to biodiversity conservation. The study by De Meo et al. (2016) identified three types of conflicts related to *Natura 2000* areas, that are due to: (a) the restrictive measures imposed on human activities; (b) the bureaucratic, rigid management; (c) the absence of comprehensive information and communication about *Natura 2000* network implementation and management. The De Meo's typology of conflicts (De Meo's 2016) is consistent with the Moore's (2003), but the latter covers more challenges of *Natura 2000* implementation identified in the literature. These challenges are the following: a) data - lack of information, different views on what information is relevant, different interpretations of data, b) interests - perceived or actual competitive, substantive content, procedural, psychological interests, c) structure - unequal control, ownership or distribution of resources, unequal power and authority, geographic, physical, or environmental factors that hinder cooperation, time constraints, d) values - different criteria for evaluating ideas or behavior, exclusive intrinsically valuable goals, different worldviews, ways of life, ideology, and religion, e) relationship - strong emotions; misinterpretations or stereotypes; poor communication; repetitive negative behavior.

2. Methods and data

In order to answer the research questions, an interpretive discursive framework was utilized, an approach, already applied to several socio-environmental studies, such as gas (Clarke et al., 2015; Lis and Stankiewicz, 2016; Vuola and Pyhälä, 2016); conservation policy (Spash and Aslaksen, 2015) as well as environmental conflicts (O'Donnell and Stokowski, 2016). The notion of discourse we adopt see discourse as "a specific ensemble of ideas, concepts, and categorizations that are produced, reproduced, and transformed in a particular

set of practices and through which meaning is given to physical and social realities" (Hajer 1995), which form descriptions and interpretations of external world experienced by people (Hajer and Versteeg 2005).

In our case, we refer to stakeholders' discourses concerning *Natura 2000* site management plans. To analyze this discourse, content analysis (CA) was undertaking, both quantitative and qualitative (Graneheim and Lundman, 2004; Hsieh and Shannon, 2005; Krippendorff, 2004). Our approach was similar to previous research where CA was applied to investigate relevant policy documents concerning participatory processes (Paloniemi et al., 2015).

2.1 Data

The data used for the study comprise notes from participatory meetings concerning the preparation of management plans in *Natura 2000* areas in Poland, collected within the project "Preparing management plans for *Natura 2000* areas in Poland" conducted from 2009 to 2015. The notes were taken by the organizers of consultation meetings, that is, the Regional Directorate for Environmental Protection or by outsourced organizations. These obligatory notes were prepared after each meeting and provided description of the meetings' conduct and discussions. The notes constitute a unique set of material, enabling an analysis of a participatory process on a large scale. In total, we collected 1,077 notes (comprising 4,475 pages) from 15 out of 16 provinces of Poland (the Mazowieckie province denied access), taken in the period from 2010 to 2015. The average length of a note is 4.2 standard pages (A4). The details in documents varied, though most of the discussion records had similar structures, including the date, title, list of participants, and details of the discussion. Furthermore, the analysis of notes was accompanied by participatory observations and later supplemented by a focus group interview as discussed below. The procedure of data collection and analysis is presented below.

2.2 The research procedure

The study was conducted from October 2013 to January 2017 consisting of four procedural steps:

1. For the purpose of designing the CA research tool, participatory observations of three consultations meetings in October and November 2013 were conducted. Observation protocol was used to assess the course of a meeting and the discussed issues.
2. In order to look for the basic information on meetings, a quantitative CA of 1077 notes was conducted. The number of participants per meeting and type of area where consultation meetings took place were both coded. For the latter, the land cover types specified in the Mapping and Assessment of Ecosystems and their Services ("Typology of ecosystems — Biodiversity Information system for Europe," 2018) was used for each note. This was to enable a better understanding of the social-ecological relationships between stakeholder engagement with ES and the biophysical conditions being evaluated. For this procedure the following types were used: 1) urban, 2) cropland, 3) grassland, 4) woodland and forested land, 5) heathland and scrub, 6) sparsely vegetated habitats, 7) mires, bogs and fens (wetlands), 8) lakes and rivers, 9) mixed. The analysis concerned only *Natura 2000* areas situated on land, and therefore four land cover types: 1) marine, 2) coastal, 3) shelf and 4) open ocean were disregarded.
3. The final CA of the notes was conducted using: 1) deductive coding, in which predefined categories were used (Elo and Kyngäs, 2008) and 2) interpretive coding – where researchers go beyond quantifying the most straightforward denotative elements in a text (Ahuvia, 2001). In order to perform the analysis, the research material needs to meet the criteria of quality and relevance. For the collected notes, two criteria were developed and all documents were evaluated for potential inclusion into the analysis. Firstly, a document needed to have a narrative part representing a discussion during a meeting, to allow for interpretation in the first place. Secondly, the narration needed to be attributable to a

particular stakeholder. Concerning the first criterion, in several cases, notes were too technical or were irrelevant to the scope of the study. This refers, for instance, when note does not include a discussion part but was comprised of lists of protected species and technical documentation of the area. Of the 1,077 documents, 154 were excluded as they did not meet the first criterion. Concerning the second criterion, several documents missed narratives that could be attributed to specific stakeholders or groups, resulting in the exclusion of a further 712 documents. Eventually 211 notes were selected for analysis across 14 provinces (the Kujawsko-Pomorskie province did not generate any suitable documents), amounting to 969 pages of text – Tab 1.

Table 1 near here

After identifying the documents for analysis, a coding scheme was developed, applying an approach similar to Asah et al. (2014). For this, five types of sources of conflicts (Moore, 2003) were used. In addition, the Common International Classification of Ecosystem Services V4.3 (CICES V4.3), comprising three categories: 1) provisioning, 2) regulation and maintenance 3) cultural was employed (Haines-Young and Potschin, 2013). Coding scheme included codes of direct and indirect references to ES that were made by stakeholders. The former consist of the use of the ES term in the text, while the latter contained statements related to ecosystems and their services, such as flood prevention, fishing economies, and recreation but without using the ES term.

During coding, the text was searched iteratively for the categories related to sources of conflicts and then these coded passages were searched for references to benefits that conveyed the ES categories outlined in the CICES V4.3. The coding unit was the smallest meaningful parts of a text, where the basic meaning could be understood without reading a

larger part of the text. This process of pattern coding (Saldaña, 2015) involved identifying and segregating, grouping, regrouping, and linking texts and codes to the categories specified in the CICES V4.3 and to those linked to sources of conflict. Through this procedure, how the ES concept and sources of conflicts appeared in discussions during public consultations concerning the preparation of management plans in Poland were identified.

NVivo 10 software was used for coding and retrieval of the coded text to support the analysis. Each appearance of the sources of conflicts and the ES concept was also described by attributing respective stakeholders as authors of the statement. Data were coded cooperatively by two researchers, one with a social sciences background and other from the natural sciences. They coded independently and later discussed their interpretations and uncertainties for interrater reliability (Ahuvia, 2001; Denzin and Lincoln, 2005).

4. To supplement the interpretation of the data gathered through the CA a focused group interview with experts from General Directorate for Environmental Protection (the entity responsible for the consultation on the national level) was held (June 2016). The purpose of the focus group interview was to explore the issue of standardization of the participatory process and to provide a deeper explanation of the quantitative results of the CA.

3. Results

3. 1 Ecosystem type of *Natura 2000* areas influence on stakeholders participation

In 52% of analyzed notes (558 of 1,077) information on the number of participants per meeting was provided. This revealed that the number of participants differs depending on the type of ecosystem within a *Natura 2000* area. For instance, for cropland, 21 stakeholders took

part on average, while for lakes there were 12 stakeholders on average (Fig. 1). The difference is statistically significant (Kruskal-Wallis H test: p=,000<0.05, df=8). The coefficient of variation concerning the average number of participants among *Natura 2000* areas is strong: CV=52%. Moreover, the observations during participatory meetings showed that the ecosystem type of *Natura 2000* area also influences the composition of the stakeholders. In particular, the woodland areas are characterized by the relatively higher number of participants per meeting, as evidenced by the number of foresters attending.

Figure 1 near here

3. 2 Standardization of participatory process

Analyses also revealed why meetings concerning the preparation of management plans were conducted using the same participatory technique: open meeting. According to experts from the General Directorate for Environmental Protection, there are three main reasons for this standardization: (a) uncertainty concerning the number of stakeholders that will attend a meeting; (b) low costs of organizing open meetings; (c) familiarity with open meetings among both participants and organizers.

> *Open meetings were used because we never know how many people will eventually come. Thanks to the use of such a formula, we did not generate additional costs, and such meetings were known to both participants and organizers.* [General Directorate for Environmental Protection representative, focused group interview]

Review of sources of conflicts in participatory meetings

Concerning sources of conflicts which appeared in meetings, analyses revealed that there were 154 references, in 95 (of 211) notes to various sources of conflicts. Out of those,

124 referred to a particular group of stakeholders. Plan managers and scientists were mentioned most often in this regard (Tab 2).

The most represented source of conflicts is relationship type (for example, the behavior of people who are barbecuing in forbidden places in a forest or driving quad bikes up dunes and disturb others), while the least numerous source is the values (e.g. controversies on what is more important in a particular situation: "human well-being" or "nature conservation"). All groups of stakeholders focused mostly on relationships, with the exception of farmers and business people who focused mostly on structure (e.g. the issue of responsibility for particular actions within *Natura 2000* area or of financial incentives for nature conservation). There were also two other sources of conflicts: concerning data (e.g. lack of information on the consequences of the implementation of the management plan) and direct economic interests (e.g. prevention of income loses for local community).

Table 2 near here

3.3 The relation between sources of conflicts and ES

In 88 notes (of 95) where sources of conflicts appeared, the ES category could also be identified (Tab 3). Taking into account three ES categories, conflicts occurred most often in relation to provisioning category of ES (49%), followed by cultural (26%), and regulation and maintenance (25%) ES. The sources of conflicts were unequally distributed between the ES categories.

Most sources of conflicts were of a relationship nature (45% of all appearances), followed by structure (20%) and interests (19%). The sources of conflicts are unequally distributed between the ES categories. For 15 records representing the cross-tabulation of ES categories and types of sources of conflicts, five are distinctly more populated (bolded records in table

4). These are the following: relationship conflict source across all three ES categories; interests conflict source and provisioning ES category; structure conflict source and provisioning ES category. The other 10 records are comparatively less populated.

Table 3 near here

Provisioning ES entail conflicts relatively often, twice as much as the two other ES. Three out of the five relatively frequently represented sources of conflicts perceived by stakeholders concerning provisioning ES were: structure (15%), followed by interests (14%) and relationship (13%). Sample statements from each of these types illustrate the beliefs of stakeholders about the mechanisms responsible for the conflict.

> [...] *the main discussed issue was the implementation of protective tasks on meadow habitats - the problem of collecting hay, its disposal and the sense of conducting this type of work in the absence of adequate financing.* [provisioning ES/structure, note 2]

This statement specifies what type of ES is an "issue" and what could be the reason for "absence of adequate financing". The conflict appears between farmers and representatives of the state, who do not provide compensation mechanisms.

Concerning interests conflict, ES as resources involve competing benefits and losses. This can be illustrated by the following comment:

> *Presenting proposals for protective measures caused much controversy among farmers' representatives. They complained about charging them with the costs of nature protection in the Natura 2000 area.* [provisioning ES/interests, note 195]

In terms of relationship conflict, cognitive and communication aspects are involved. This can be illustrated by the quotation concerning conflict based on the issue of dead wood and the relationship between foresters and the local community:

> *The Forest District believes that if there is dead wood, there will also be social protests because the inhabitants of neighboring towns need firewood. The Forest District does not agree to leave the lumber in the forests as there is a need to change social awareness.* [provisioning ES/relationship, note 211]

Concerning the second type of ES (regulation and maintenance), there was a dominance of relationship conflict, while other sources of conflicts were relatively less represented. This source of conflict is reflected in the following citation:

> *A representative of an NGO, expressed his understanding of the need to conduct flood prevention activities but stressed the scale of the phenomenon which is negative for the environment.* [regulation and maintenance ES/relationship, note 162]

Cultural ES saw clear dominance of relationship conflicts (20%), compared with other sources, with one note clearly revealing the strength of feelings involved:

> *Anglers destroy the fence, clogging the tank. Fishing also threatens eutrophication* [cultural ES/relationship, note 180]

Here it can be assumed that the behavior of anglers exploiting recreational ES may evoke conflict with pond owner/administrator.

To sum up, relationship source of conflicts (referring to strong emotions; misinterpretations or stereotypes; poor communication; repetitive negative behavior) appears clearly the dominant source of conflicts concerning regulation and maintenance and cultural ES. For provisioning ES conflicts are almost equally distributed among structure, interests, and relationship. Altogether, relationship source of conflicts is the most frequent. Data and values are the least important sources of conflicts.

4. Discussion and conclusion

4. 1 Sources of conflicts

It is widely acknowledged that biodiversity conservation programs entail conflicts, which can sometimes undermine expected outcomes. Our study scrutinizes the types of conflicts and whether they arise in the context of specific ES types and whether this also shapes their nature. The empirical focus was on *Natura 2000* areas in Poland.

In relation to types of conflict, the analysis of the notes from consultations concerning management plans has shown the dominance of conflicts originating from relationship and structure, while those related to values and data were less significant. Conflicts concerning relationship were observed in all groups of stakeholders except among farmers and business, for which structure was the main source of conflicts. The dominance of those two sources of conflicts can stem from: a) negative experiences in the past (e. g. lack of transparency and public dialogue) with *Natura 2000* implementation in Poland, similar to other countries, like France or Germany (Alphandery and Fortier, 2001; Stollkleemann and Welp, 2006); and b) the post-communist legacy of centralization combined with weak participatory tradition in Poland (similar to other CEE countries). During the implementation of *Natura 2000* areas in Poland before 2004, a poor incentive mechanism and the 'announce and defend' participatory process did little to enhance stakeholder support of *Natura 2000* plans (Bołtromiuk, 2011). There is still a legacy of distrust between society and the state. The dominance of relationship and structure related conflicts implies problems with misinterpretations or stereotypes; poor communication; repetitive negative behavior that hinder effective management. Our study suggests that in planning future participatory process and to organize discussions these issues require attention as they are potentially more conflicting.

Our research shows that there is a strong link between sources of conflicts and ES type. It shows organizers of the participatory process which ES type are more likely to be conflict-generating and in aspects of what source of conflict (data, interests, relationship,

structure, values). Therefore our research supports the claim that the ES concept has the potential to become a "boundary object" or "bridging concept" (Maczka et al., 2019), which helps to bring different groups of stakeholder (with different interests, expertise, experiences etc.) together to mutually understand problems in biodiversity conservation and management. The utilisation of ES as a framework to lead a discussion on problematic issues could sensitize public consultation organizers to specific conflicts linked to ES. This can help to meet the urgent need of building capacity concerning *Natura 2000* management at the level of stakeholders relations (e.g. communication) and structural mechanism (e. g. distribution of power and authority).

As the dominant source of conflicts – regarding relationship is mostly connected with cultural ES while the other sources are mostly related to provisioning ES, it appears that cultural ES have higher potential to generate relationship conflicts than other ES types. There are multiple values involved in the use of sites for the purposes of cultural ES. Thus conflicts are to a certain extent inevitable. Our study suggests that in managing the trade-offs and conflicts between different values of sites the relationship issues: strong emotions, misinterpretations stereotypes, poor communication is of particular importance, while other sources of conflicts are marginal. This information could help environmental managers to predict which problems are more likely to appear and to prepare proposition of some remedies e. g. designation of an area where behavior which is negative for the particular protected area (e. g. angling) will be allowed.

4.2 Assessment of public consultation

Our analysis shows that the meetings concerning *Natura 2000* management plans significantly vary in terms of the number of participants per meeting, while the composition of stakeholders at the meetings depends on the area's ecosystem type. Some professional

groups, such as foresters of the National Forest Holding, are particularly involved. Their meetings attendance is, however, a part of their work which explains their engagement. In contrast, farmers are less mobilized. The difference in stakeholder presence and composition at the meetings coincides to ecosystem type. It has an influence on the composition of stakeholders in particular protected area (forests – foresters, croplands – farmers etc.). It is important for planning of the participatory meetings, and for choosing discussion methods to take into account the ecosystem type of the area where the meeting takes place by addressing perspectives (interests, values etc.) of groups which are more likely to come (Paloniemi et al., 2015). This study suggests that at meetings some stakeholders can be systematically underrepresented.

Organizers of the meetings customary used the consultation technique of a public meeting irrespective of numbers attending. However, a meeting attended by 12 participants is close to a focus group interview, while for meetings attended by 40 or more participants the public hearing technique is more appropriate. Standardized application of consultation technique can negatively influence the outcome of public consultation and flexibility and diversity of meeting type is recommended.

Although the participatory technique was standardized, there was lack of standardized procedure for preparing notes, including in relation to the structure of note, the presence of photo documentation, page length, or whether information was provided about site trips. Wide but poorly standardized and not well reported participatory process concerning management plans echoes the socialist central planning and top-down policy-making. This can negatively affect institutional memory (Ackerman and Halverson, 1999) and undermine the benefits arising from conducting and reporting on the participatory process. The institutional memory is particularly important for planning future actions and learn from past mistakes. Certain

standardization of reporting can improve the feasibility of feedback from stakeholder participation to public consultation organizers, environmental managers, and decision makers.

We conclude that, despite expectations attributed to participation in biodiversity conservation stakeholders engagement appears problematic and involves conflicts in many countries. Our study on the Polish nation-wide consultation process with broad stakeholder involvement confirms this. Nevertheless, it is an appropriate approach as it supports transparency, facilitates the involvement of different stakeholders groups with various backgrounds, perceptions, and experiences. Conflicts are an inevitable part of the process. They can be, however, understood, and certain regularities can be indicated. There is a strong need to prepare, conduct and learn from the participatory process more carefully in order to anticipate conflicts. The ES concept is a handy tool by offering a reference for conflict management and for policy implementation and management of protected areas. It could help to deliberate on the trade-offs and synergies between biodiversity conservation and human welfare. Participation procedure needs development and standardization of procedure is needed.

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Table 1. Description of the sample of notes from public consultation meetings concerning the preparation of management plans in Natura 2000 areas in Poland

No	Province	Number of notes (N=1077)	Number of notes in the final sample (N=211)	Number of pages in notes in the final sample (N=211)
1	Dolnośląskie	140	2	12
2	Kujawsko-pomorskie	58	0	Not applicable
3	Lubelskie	148	3	10
4	Lubuskie	29	21	80
5	Łódzkie	34	2	7
6	Małopolskie	94	12	31
7	Mazowieckie		Access denied	
8	Opolskie	46	8	38
9	Podkarpackie	93	47	280
10	Podlaskie	63	12	40
11	Pomorskie	107	49	186
12	Śląskie	27	21	109
13	Świętokrzyskie	39	11	42
14	Warmińsko-mazurskie	61	9	57
15	Wielkopolskie	48	3	17
16	Zachodniopomorskie	90	11	60

Figure 1. Average number of participants per meeting in particular ecosystem type, N=558

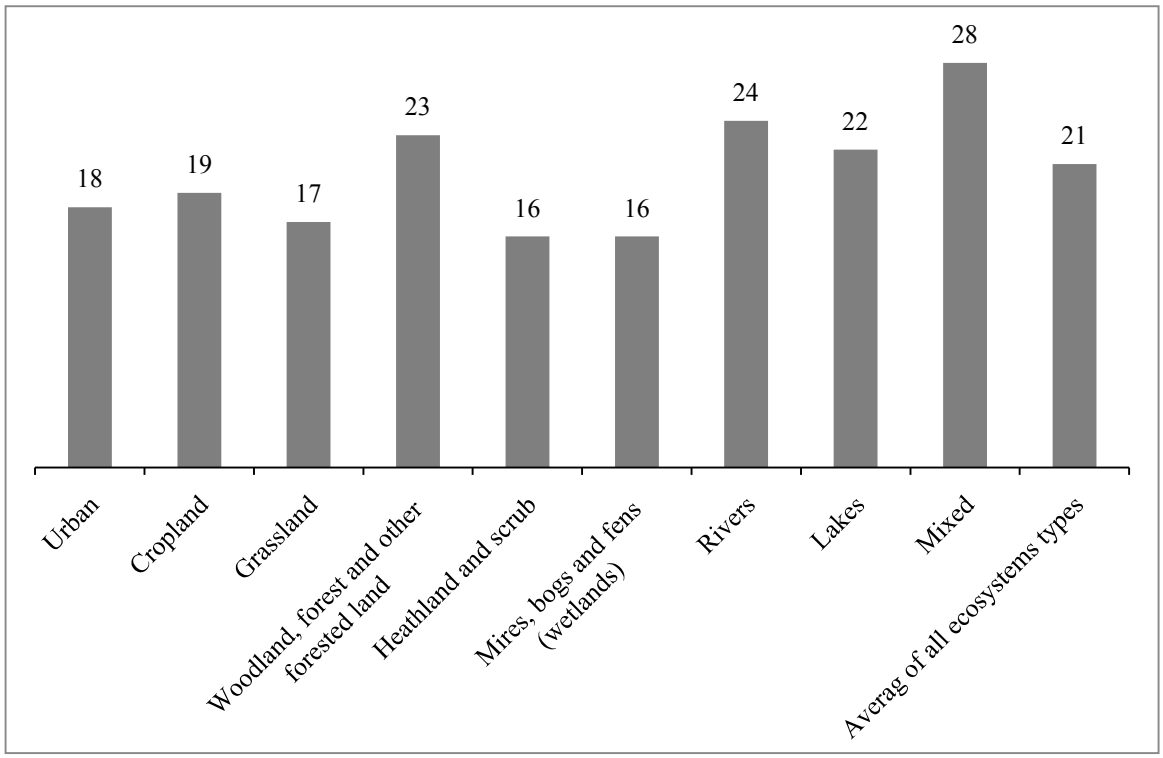

Table 2. Sources of conflicts identified in particular groups of stakeholder, N=95

Sources of conflicts	Plan managers, scientists (N=27)	Municipality officer (N=12)	National foresters (N=16)	Environmental NGOs (N=15)	Farmers and business (N=11)	Village head (N=10)	Other public administration bodies (N=20)	Others (N=13)	Not assigned (N=30)	Total (N=154)
Data	1%	0%	2%	1%	3%	1%	1%	1%	3%	12%
Interests	1%	2%	2%	3%	1%	2%	1%	2%	2%	16%
Relationship	12%	3%	5%	5%	0%	2%	6%	4%	8%	44%
Structure	3%	3%	2%	1%	3%	1%	5%	1%	6%	25%
Values	1%	0%	0%	1%	0%	1%	1%	1%	0%	3%
In total	18%	8%	10%	10%	7%	6%	13%	8%	19%	100%

Table 3. Statements representing conflicts in notes from meetings on management plans: ecosystem services types in particular sources of conflicts, N=88

ES category	Data (N=8)	Interests (N=17)	Relationship (N=40)	Structure (N=18)	Values (N=5)	In total(N=88)
Provisioning	6%	**14%**	**13%**	**15%**	2%	49%
Regulation and maintenance	2%	3%	**13%**	6%	1%	25%
Cultural	1%	2%	**20%**	0%	2%	26%
In total (N=88)	9%	19%	45%	20%	6%	100%

Picture 6. Reared animals and their outputs an example of provisioning ecosystem services, Gnieźnieńskie Lakeland Natura 2000 area, Poland. **Photo:** Krzysztof Mączka.

Zdjęcie 6. *Hodowla zwierząt, przykład zaopatrujących usług ekosystemowych, obszar Natura 2000 Pojezierze Gnieźnieńskie, Polska.* ***Fot.*** *Krzysztof Mączka.*

Chapter 6: Summary and the main conclusion

1. Introduction

The ES concept has received increased attention and has been widely discussed over the last two decades (Costanza et al., 1997; Daily, 1997; de Groot, 1992; de Groot et al., 2010). As Norgaard (2010) pointed out, the ES concept started as a humble metaphor which could help us think about the relation between people and nature, but eventually, it became integral to what we thought about the future of humanity and biological evolution. The approach presumes that people obtain benefits from ecosystems and classifies ES into the categories of *Provisioning* (e.g., food), *Regulation and Maintenance* (e.g., climate regulation), and *Cultural* services (e.g., recreational experiences).

The concept has been utilized in various research areas, such as biodiversity conservation (Nelson et al., 2009; Wendland et al., 2010), landscape and spatial planning (Syrbe and Walz, 2012; Vihervaara et al., 2010), environmental governance (Primmer et al., 2015) and environmental management (Ervin et al., 2012; Ingram et al., 2014). However, its application was considered arbitrary and highly diversified in terms of methodology (Seppelt et al., 2011). The concept itself is hard to operationalize in a systematic and consistent way. Moreover, there are controversies concerning the ES concept, such as the risk of nature monetization.

Despite those weaknesses the ES concept enables people to integrate knowledge with different social positions and professional backgrounds (Abson et al., 2014; 2016; Schröter et al., 2017; Steger et al., 2018) and provides a common language for bringing theory into practice within interdisciplinary teams (Baggio et al., 2015). It captures the important role of local communities' income and employment. For instance, tourism can be derived from biodiversity conservation efforts (Bastian et al., 2010; Pettenella et al., 2016). The research by Niedziałkowski et al. (2014) shows that local inhabitants fear of losing access to critical ES, such as wood, forest fruits, and recreation opportunities. It can effectively undermine state-led conservation initiatives. However, these fears can be sensitized through the use of the ES concept, as it addresses conservation conflicts by providing data concerning local community perspective and needs, which are instrumental to more effective conservation policy-making.
The concept of ES has entered scientific discussions in Poland relatively recently, mainly after 2000 (Kronenberg, 2014; Mizgajski, 2010; Rosin et al., 2011; Żylicz, 2010). While the scientific debate is focused on the potential contribution of the ES concept to nature conservation, little is known about its actual influence on the policy-making processes. It

raises many questions on the environmental public policies, stakeholder participation and social conflict concerning the natural environment in Poland. What is the potential for practical use of the ES concept? How it is utilized in policy documents? What are the presence and its usefulness in stakeholder deliberation on resource management topics? How it is related to the different sources of conflict? It concerns not only the practical significance of the ES concept but also poses a challenge at the point where science and policy overlap in their efforts to mainstream innovation. Therefore, this research explored the application of ecosystem services concept in Poland by analyzing Polish environmental policies and by collecting evidence from the case of public participation in the management of Poland's Natura 2000 network. The main research question investigated was the following:

How is the concept of ES present in the environmental discourse in Poland?

This research question has been addressed in this Ph.D. research by achieving the following specific aims and by answering sub-questions:

Aim 1: To contribute to the international debate on the application of the ES concept in environmental policies at the national level by providing answers to the following questions:

1. To what extent is the ES concept present in the Polish policy documents, and what categories of ES are applied in the documents?
2. What are the barriers to, and the potential for, the application of the ES concept in Poland?

Aim 2: To understand how the ES concept was present in stakeholder deliberation on resource management topics in Poland by providing answers to the following questions:

3. To what extent different ES categories appeared in discourse about management plans in Poland?
4. Were ES useful to represent both descriptive and normative aspects of biodiversity conservation?
5. How different stakeholder groups interpreted ES frames across land cover categories?

Aim 3: To understand the sources of conflicts, which were present in stakeholder deliberation on ES management in Natura 2000 areas in Poland by providing answers to the following questions:

6. What are the sources of conflicts in participatory biodiversity conservation management in the Natura 2000 network in Poland?
7. How the sources of conflicts refers to the ES concept?
8. What is the level of standardization of the participatory process designed to prepare Natura 2000 management plans?

Each of these sub-questions has been addressed in one of the peer-reviewed articles constituting this dissertation (Chapters 2-5). This concluding chapter provides an overview of and reflects on the main findings of these articles. In section 2, the current application of the ES concept in environmental policies at the national level in Poland is presented, in response to sub-question 1 and 2. Section 3 explores the potential for practical use of the ES concept. Section 4 presents ES concept use in stakeholder deliberation on resource management topics in Poland in response to sub-questions 3-5. Section 5 explores the sources of conflicts, which were present in stakeholder deliberation on ES management in Natura 2000 areas in Poland, in response to 6-8 sub-questions. In conclusion, section 6 discusses the added value of the conducted research to the scientific and societal debate concerning environmental management using ES concept and participation of stakeholders.

2. The application of the ES concept in environmental policies at the national level in Poland

In Chapter 2 an analysis was made of the application of the ES concept in environmental policies at the national level in Poland (**Aim 1)**. This analysis investigated to what extent is the ES concept present in the Polish policy documents, and what categories of ES are applied in the documents as well as what are the barriers to, and the potential for, the application of the ES concept in Poland (sub-questions 1 and 2).

It was found that the ES concept is reflected in the investigated national environmental policies in Poland. However, it is mainly depicted in an indirect, latent form. Moreover the exploration of the ES concept occurrence in the Polish legislation with in-depth interviews of experts enabled to identify two general groups of barriers to the ES concept implementation in environmental policy: a) a limited understanding and acknowledgement of the concept among individuals involved in policy making; and b) sectoral divisions within environmental governance that hinder the spread of the concept. The analysis reveals that the concept of services for society provided by nature had already been perceived in Polish national environmental policies before the emergence of the ES concept and the implementation of the EU biodiversity policy. However, the concept was referred to mostly in a latent form.

3. The potential for the application of the ES in practice

In Chapter 3, an analysis was made of the potential for practical use of the ES concept, taking into account the scope of its implementation in the legislative and policy documents in Poland **(Aim 1)**. This analysis investigated the limited presence of the ES concept in Polish public policies extending the results of Chapter 2 (sub-question 2).

It was found that the concept of ES has a high potential to be a tool for policy and decision making. The research also confirms that some of the obstacles have not been overcome yet, especially those connected with day-to-day policy and management. The ambiguity and inconsistency of the concept pose constraints into the concept application. Due to a fragmented knowledge of the interested parties, the concept is used in the regulatory framework mainly as a general, guiding idea, not as a practically oriented method used operationally in the decision-making process. The concept is intellectually attractive but entails difficulties in its application in policies. Essentially, it seems to be more useful in argumentation and communication than in measurement. Furthermore, reasons for the limited progress of the application of the ES approach correspond mainly to human factors: specific education of the administrators and decisions makers, reluctance to apply new concepts, and also limited and fragmented knowledge. The concept could be perceived as ambivalent because the ecosystem services approach can be framed both as helpful in nature conservation and as dangerous to nature conservation. It may be helpful in the decision-making process, but it may also entail risks as it promotes perceiving the environment mainly through the prism of monetary values, which may lead to commodity fetishism. The ecosystem services concept has potential in designing policies, but in order to be applied, it requires more clarified definitions adjusted to policy-making.

4. The ES concept presence in stakeholder deliberation on resource management topics in Poland

In Chapter 4, an analysis was made of the ES concept presence in stakeholder deliberation on resource management topics in Poland **(Aim 2)**. This analysis investigated to what extent different ES categories appeared in discourse about management plans in Poland, whether the ES concept is useful to represent both descriptive and normative aspects of biodiversity conservation and how different stakeholder groups interpreted the ES frames across land cover categories (sub-questions 3-5).

It was found that many public debates were couched within the ES framework and related to management of a range of land cover categories. However, the ES concept was indirectly engaged during these debates similarly to the ES concept presence in Polish legal documents prior to the XXI century (see Chapter 3). The results also indicated that the majority of public discussions were descriptive and neutral, with a focus on maintaining the flow of Provisioning, and Regulation and Maintenance services to local communities. Normative tones were adopted, particularly surrounding Cultural ES, despite the limited amount of time that stakeholders dedicated to exploring these topics. On the one hand, results from our assessment showed that environmental experts and scientists were more likely to focus on issues such as biodiversity conservation and refer to *Regulation and Maintenance* ES. On the other hand, land users such as farmers, business, etc. tended to have different end goals focused on economic sustainability and also adopted language that aligned with the anthropogenic assumptions of the ES framework. The research also identified the land cover categories that supported various benefits discussed by stakeholders and observed that "woodland and forested land" is the most common of eight land cover categories.

5. The sources of conflicts in stakeholder deliberation on ES management in Natura 2000 areas in Poland

In Chapter 5, an analysis was made of the sources of conflicts, which were identified in stakeholder deliberation on ES management in Natura 2000 areas in Poland **(Aim 3)**. This analysis is a continuation of the research undertaken in Chapter 4 by investigating what are the sources of conflicts in participatory biodiversity conservation management in the Natura 2000 network in Poland, how the sources of conflicts refers to the ES concept, what is the level of standardization of the participatory process designed to prepare Natura 2000 management plans (sub-questions 6-8).

It was found that conflicts originating from the relationship between actors and the structural context of relations were dominant ones, while reasons of conflicts related to values and data were less significant. The results also indicated that there is a strong link between sources of conflicts and an ES type. Certain ES types appeared more likely to be a conflict-generating and certain sources of conflict (data, interests, relationship, structure, values) were more significant than others. The dominant source of conflicts regarding relationship is mostly connected with cultural ES while the other sources are mostly related to provisioning ES. We also found out that there was a lack of standardized procedure for reporting this

nation-wide public consultation process. This can negatively affect institutional memory and limit the opportunities for lesson learning from past shortcomings.

6. Final remarks and conclusion

The research on the application of ES in Poland carried out in the study showed that this concept is present both in official documents created for the needs of public policies, as well as during stakeholder discussions during public consultations concerning the development of management plans in Natura 2000 areas in Poland. Although this is an indirect presence (without direct reference to the "ecosystem services" term), it shows how the understanding of the environment by the prism of the goods it provides to the human well-being is rooted in social consciousness. The analyses also showed that the concept can be treated as a tool for conducting public consultations in the area of the environment, due to its comprehensibility and observed relationship with various sources of conflict. This relationship may contribute to the conflicts effective anticipation and resolution. Although the ES concept has a number of drawbacks, such as definition inaccuracies or the emphasis on the economic dimension of the environment, it is useful as a flexible framework for the discussion on environmental management.

By investigating the ES application in Poland, this dissertation contributes both to the body of scientific knowledge and it offers policymakers recommendations on benefits of ES use in practice and on limitation of this concept. Firstly, ES-based public policy-making requires a clearer definition of the concept and a reference to specific ways of valuing, managing and potential payments for ES, to be useful at operational level. Secondly, using it as a communication tool during public consultations requires interpretive flexibility, i.e. adaptation to the local specificity of a particular area (land cover, stakeholder characteristics, etc.), that will accommodate different viewpoints and facilitate dialogue about competing interests. Thirdly, in order to use the ES concept as a tool for anticipating potential conflicts between different stakeholder groups, it is necessary to develop a standardized procedure for the organization and reporting of participatory processes, to create equal conditions for participation for stakeholders in different areas and to be able to learn from past mistakes in the future.

The implications that emerge from this research are particularly relevant for environmental managers and decision makers, such as those in the case of Natura 2000 areas

in Poland. They are the arena of social conflicts and require communication tools to facilitate public participation, environmental sustainability, and equitable policy outcomes.

The issue of the presence of the ES concept in environmental policy documents can be seen as the exemplification of complex scale challenges in environmental policy integration. The multi-scale (relating to geographical, ecological, institutional, jurisdictional, managerial, and temporal scales) and multi-level (present across different levels of each scale) character of environmental policy (Cash et al., 2006) challenges the development of a comprehensive and integrated operationalization of ES that could be implemented within various public policies in a synergic way. This would, require providing straightforward references and definitions at the executive and operational levels, and in respective legal policy documents for ES, their valuation, management, and potential implementation of payments for ES systems.

The research has shown that the ES concept could be used for integrating environmental policies from various sectors. However, this opportunity has not yet been used. The ES concept is well embedded, latently, in various environmental policy sectors in Poland. However, without explicit guidance, the ES concept is unlikely to provide a basis for such integration. This guidance could emerge from at least two processes according to the experts interviewed in our study: 1) the implementation of EU recommendations and policies that increasingly refer to and strengthen thinking about nature through the lens of ES; and 2) the stakeholder dialogue on nature conservation and its importance for human development and wellbeing.

The analysis of the Polish nation-wide consultation process with broad stakeholder involvement showed that, for Poland's case, a country reforming and consolidating its environment protection system, the ES concept is a handy tool by offering a reference for conflict management and for policy implementation and management of protected areas. It enables stakeholders from opposing stakeholders groups (e.g. foresters, NGOs, the private sector) to deliberate about the future of Natura 2000 areas. Moreover, it could help to deliberate on the trade-offs and synergies between biodiversity conservation and human welfare. Due to the prevalence and patterns of the ES frame in public deliberation, the European-level policies that aim to embrace bottom-up approaches to decision-making and incorporate the experiences of stakeholders can be advanced through with the lens of ES. This framework can not only be used as a tool for descriptively reviewing management challenges, but it can also be used to create space for making prescriptive claims that warrant attention in public forums and minimize conflicts about the future of protected landscapes.

We must be aware that despite expectations attributed to participation in biodiversity conservation with the utilization of ES, stakeholders engagement appears problematic and involves conflicts in many countries. Nevertheless, it is an appropriate approach as it supports transparency, facilitates the involvement of stakeholders groups with various backgrounds, perceptions, and experiences. Conflicts are an inevitable part of the process. They can be, however, understood, and certain regularities can be indicated. There is a need to prepare, conduct and learn from the participatory process more carefully in order to anticipate conflicts and resolve them. Participation procedure requires development and standardization is needed, as this study points out.

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Appendices

1. Common International Classification of Ecosystem Services v4.3 (https://cices.eu/).

CICES for ecosystem service mapping and assessment	Note: this section is not complete and for illustrative purposes only. Key components could change by region or ecosystem.				
CICES for ecosystem accounting	Note this section is open in that many class types can potentially be recognised and nested in the higher level classes, depending on the ecosystems being considered.				
Section	Division	Group	Class	Class type	Examples
This column lists the three main categories of ecosystem services	This column divides section categories into main types of output or process.	The group level splits division categories by biological, physical or cultural type or process.	The class level provides a further sub-division of group categories into biological or material outputs and bio-physical and cultural processes that can be linked back to concrete identifiable service sources.	Class types break the class categories into further individual entities and suggest ways of measuring the associated ecosystem service output.	
Provisioning	Nutrition	Biomass	Cultivated crops	Crops by amount, type	Cereals (e.g. wheat, rye, barely), vegetables, fruits etc.
			Reared animals and their outputs	Animals, products by amount, type	Meat, dairy products (milk, cheese, yoghurt), honey etc.
			Wild plants, algae and their outputs	Plants, algae by amount, type	Wild berries, fruits, mushrooms, water cress, salicornia (saltwort or samphire); seaweed (e.g. Palmaria palmata = dulse, dillisk) for food

CICES for ecosystem service mapping and assessment	Note: this section is not complete and for illustrative purposes only. Key components could change by region or ecosystem.				
CICES for ecosystem accounting	Note this section is open in that many class types can potentially be recognised and nested in the higher level classes, depending on the ecosystems being considered.				
Section	Division	Group	Class	Class type	Examples
			Wild animals and their outputs	Animals by amount, type	Game, freshwater fish (trout, eel etc.), marine fish (plaice, sea bass etc.) and shellfish (i.e. crustaceans, molluscs), as well as equinoderms or honey harvested from wild populations; Includes commercial and subsistence fishing and hunting for food
			Plants and algae from in-situ aquaculture	Plants, algae by amount, type	In situ seaweed farming
			Animals from in-situ aquaculture	Animals by amount, type	In-situ farming of freshwater (e.g. trout) and marine fish (e.g. salmon, tuna) also in floating cages; shellfish aquaculture (e.g. oysters or crustaceans) in e.g. poles
		Water	Surface water for drinking	By amount, type	Collected precipitation, abstracted surface water from rivers, lakes and other open water bodies for drinking
			Ground water for drinking		Freshwater abstracted from (non-fossil)

CICES for ecosystem service mapping and assessment	Note: this section is not complete and for illustrative purposes only. Key components could change by region or ecosystem.				
CICES for ecosystem accounting	Note this section is open in that many class types can potentially be recognised and nested in the higher level classes, depending on the ecosystems being considered.				
Section	Division	Group	Class	Class type	Examples
					groundwater layers or via ground water desalination for drinking
	Materials	Biomass	Fibres and other materials from plants, algae and animals for direct use or processing	Material by amount, type, use, media (land, soil, freshwater, marine)	Fibres, wood, timber, flowers, skin, bones, sponges and other products, which are not further processed; material for production e.g. industrial products such as cellulose for paper, cotton for clothes, packaging material; chemicals extracted or synthesised from algae, plants and animals such as turpentine, rubber, flax, oil, wax, resin, soap (from bones), natural remedies and medicines (e.g. chondritin from sharks), dyes and colours, ambergris (from sperm whales used in perfumes); Includes consumptive ornamental uses.
			Materials from plants,		Plant, algae and

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CICES for ecosystem accounting	Note this section is open in that many class types can potentially be recognised and nested in the higher level classes, depending on the ecosystems being considered.				
Section	Division	Group	Class	Class type	Examples
			algae and animals for agricultural use		animal material (e.g. grass) for fodder and fertilizer in agriculture and aquaculture;
			Genetic materials from all biota		Genetic material (DNA) from wild plants, algae and animals for biochemical industrial and pharmaceutical processes e.g. medicines, fermentation, detoxification; bio-prospecting activities e.g. wild species used in breeding programmes etc.
		Water	Surface water for non-drinking purposes	By amount, type and use	Collected precipitation, abstracted surface water from rivers, lakes and other open water bodies for domestic use (washing, cleaning and other non-drinking use), irrigation, livestock consumption, industrial use (consumption and cooling) etc.
			Ground water for		Freshwater abstracted

CICES for ecosystem service mapping and assessment	Note: this section is not complete and for illustrative purposes only. Key components could change by region or ecosystem.				
CICES for ecosystem accounting	Note this section is open in that many class types can potentially be recognised and nested in the higher level classes, depending on the ecosystems being considered.				
Section	Division	Group	Class	Class type	Examples
			non-drinking purposes		from (non-fossil) groundwater layers or via ground water desalination for domestic use (washing, cleaning and other non-drinking use), irrigation, livestock consumption, industrial use (consumption and cooling) etc.
	Energy	Biomass-based energy sources	Plant-based resources	By amount, type, source	Wood fuel, straw, energy plants, crops and algae for burning and energy production
			Animal-based resources		Dung, fat, oils, cadavers from land, water and marine animals for burning and energy production
		Mechanical energy	Animal-based energy	By amount, type, source	Physical labour provided by animals (horses, elephants etc.)
Regulation & Maintenance	Mediation of waste, toxics and other nuisances	Mediation by biota	Bio-remediation by micro-organisms, algae, plants, and animals	By amount, type, use, media (land, soil, freshwater, marine)	Bio-chemical detoxification/decomposition/mineralisation in land/soil, freshwater and marine systems including

CICES for ecosystem service mapping and assessment	Note: this section is not complete and for illustrative purposes only. Key components could change by region or ecosystem.				
CICES for ecosystem accounting	Note this section is open in that many class types can potentially be recognised and nested in the higher level classes, depending on the ecosystems being considered.				
Section	Division	Group	Class	Class type	Examples
					sediments; decomposition/detoxification of waste and toxic materials e.g. waste water cleaning, degrading oil spills by marine bacteria, (phyto)degradation, (rhizo)degradation etc.
			Filtration/sequestration/storage/accumulation by micro-organisms, algae, plants, and animals	By amount, type, use, media (land, soil, freshwater, marine)	Biological filtration/sequestration/storage/accumulation of pollutants in land/soil, freshwater and marine biota, adsorption and binding of heavy metals and organic compounds in biota
		Mediation by ecosystems	Filtration/sequestration/storage/accumulation by ecosystems	By amount, type, use, media (land, soil, freshwater, marine)	Bio-physicochemical filtration/sequestration/storage/accumulation of pollutants in land/soil, freshwater and marine ecosystems, including sediments; adsorption and binding of heavy metals and organic compounds in ecosystems (combination

CICES for ecosystem service mapping and assessment	Note: this section is not complete and for illustrative purposes only. Key components could change by region or ecosystem.				
CICES for ecosystem accounting	Note this section is open in that many class types can potentially be recognised and nested in the higher level classes, depending on the ecosystems being considered.				
Section	Division	Group	Class	Class type	Examples
					of biotic and abiotic factors)
			Dilution by atmosphere, freshwater and marine ecosystems		Bio-physico-chemical dilution of gases, fluids and solid waste, wastewater in atmosphere, lakes, rivers, sea and sediments
			Mediation of smell/noise/visual impacts		Visual screening of transport corridors e.g. by trees; Green infrastructure to reduce noise and smells
	Mediation of flows	Mass flows	Mass stabilisation and control of erosion rates	By reduction in risk, area protected	Erosion / landslide / gravity flow protection; vegetation cover protecting/stabilising terrestrial, coastal and marine ecosystems, coastal wetlands, dunes; vegetation on slopes also preventing avalanches (snow, rock), erosion protection of coasts and sediments by mangroves, sea grass, macroalgae, etc.
			Buffering and attenuation of mass flows		Transport and storage of sediment by rivers,

CICES for ecosystem service mapping and assessment	Note: this section is not complete and for illustrative purposes only. Key components could change by region or ecosystem.				
CICES for ecosystem accounting	Note this section is open in that many class types can potentially be recognised and nested in the higher level classes, depending on the ecosystems being considered.				
Section	Division	Group	Class	Class type	Examples
					lakes, sea
		Liquid flows	Hydrological cycle and water flow maintenance	By depth/volumes	Capacity of maintaining baseline flows for water supply and discharge; e.g. fostering groundwater; recharge by appropriate land coverage that captures effective rainfall; includes drought and water scarcity aspects.
			Flood protection	By reduction in risk, area protected	Flood protection by appropriate land coverage; coastal flood prevention by mangroves, sea grass, macroalgae, etc. (supplementary to coastal protection by wetlands, dunes)
		Gaseous / air flows	Storm protection	By reduction in risk, area protected	Natural or planted vegetation that serves as shelter belts
			Ventilation and transpiration	By change in temperature/humidity	Natural or planted vegetation that enables air ventilation
	Maintenance of physical, chemical, biological conditions	Lifecycle maintenance, habitat and gene pool protection	Pollination and seed dispersal	By amount and source	Pollination by bees and other insects; seed dispersal by insects, birds

CICES for ecosystem service mapping and assessment	Note: this section is not complete and for illustrative purposes only. Key components could change by region or ecosystem.				
CICES for ecosystem accounting	Note this section is open in that many class types can potentially be recognised and nested in the higher level classes, depending on the ecosystems being considered.				
Section	Division	Group	Class	Class type	Examples
					and other animals
			Maintaining nursery populations and habitats	By amount and source	Habitats for plant and animal nursery and reproduction e.g. seagrasses, microstructures of rivers etc.
		Pest and disease control	Pest control	By reduction in incidence, risk, area protected	Pest and disease control including invasive alien species
			Disease control		In cultivated and natural ecosystems and human populations
		Soil formation and composition	Weathering processes	By amount/concentration and source	Maintenance of bio-geochemical conditions of soils including fertility, nutrient storage, or soil structure; includes biological, chemical, physical weathering and pedogenesis
			Decomposition and fixing processes		Maintenance of bio-geochemical conditions of soils by decomposition/mineralisation of dead organic material, nitrification, denitrification etc.), N-

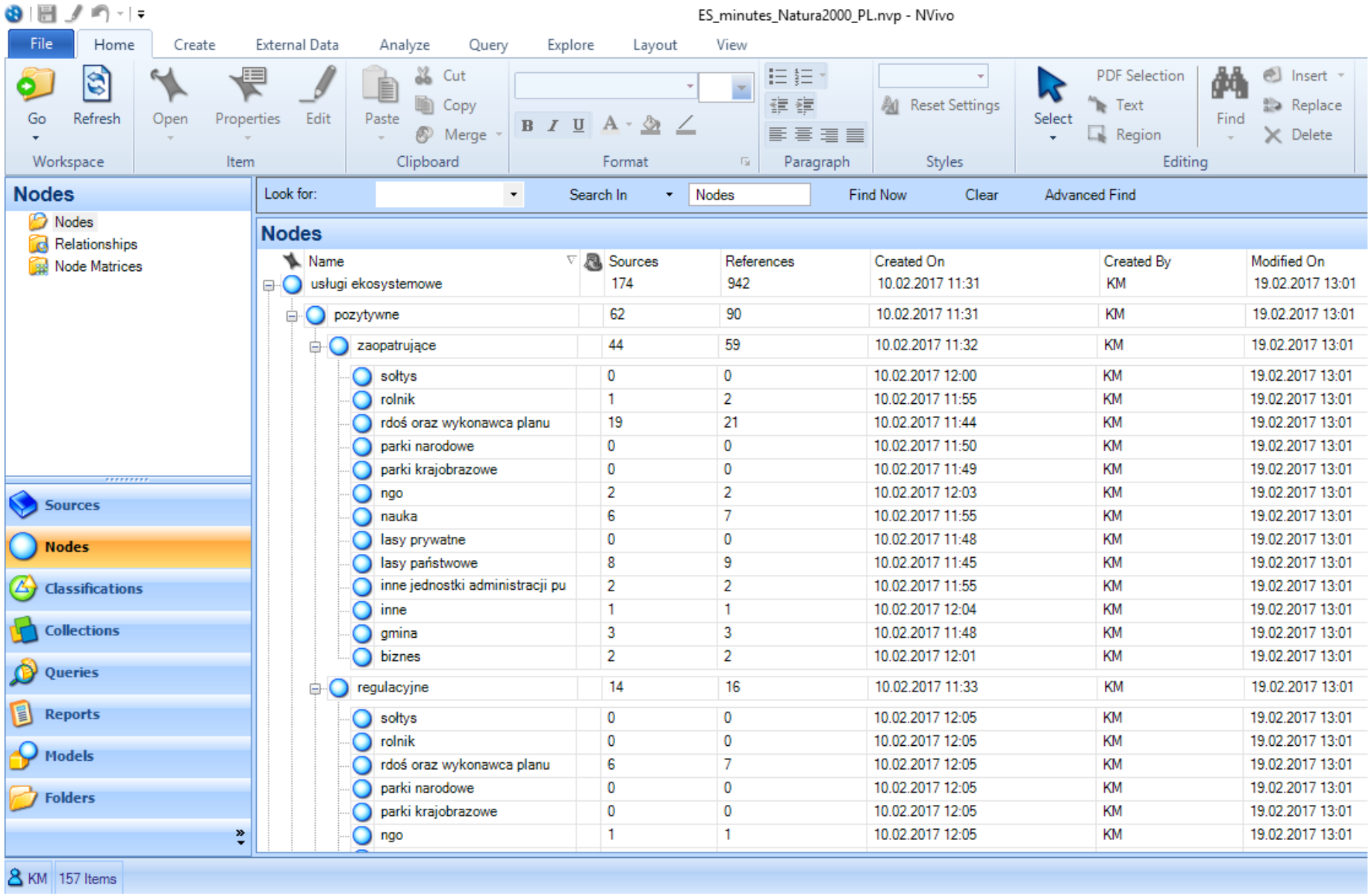
CICES for ecosystem service mapping and assessment	Note: this section is not complete and for illustrative purposes only. Key components could change by region or ecosystem.				
CICES for ecosystem accounting	Note this section is open in that many class types can potentially be recognised and nested in the higher level classes, depending on the ecosystems being considered.				
Section	Division	Group	Class	Class type	Examples
					fixing and other bio-geochemical processes;
		Water conditions	Chemical condition of freshwaters	By amount/concentration and source	Maintenance / buffering of chemical composition of freshwater column and sediment to ensure favourable living conditions for biota e.g. by denitrification, re-mobilisation/re-mineralisation of phosphorous, etc.
			Chemical condition of salt waters		Maintenance / buffering of chemical composition of seawater column and sediment to ensure favourable living conditions for biota e.g. by denitrification, re-mobilisation/re-mineralisation of phosphorous, etc.
		Atmospheric composition and climate regulation	Global climate regulation by reduction of greenhouse gas concentrations	By amount, concentration or climatic parameter	Global climate regulation by greenhouse gas/carbon sequestration by terrestrial ecosystems, water columns and

CICES for ecosystem service mapping and assessment	Note: this section is not complete and for illustrative purposes only. Key components could change by region or ecosystem.				
CICES for ecosystem accounting	Note this section is open in that many class types can potentially be recognised and nested in the higher level classes, depending on the ecosystems being considered.				
Section	Division	Group	Class	Class type	Examples
					sediments and their biota; transport of carbon into oceans (DOCs) etc.
			Micro and regional climate regulation		Modifying temperature, humidity, wind fields; maintenance of rural and urban climate and air quality and regional precipitation/temperature patterns
Cultural	Physical and intellectual interactions with biota, ecosystems, and land-/seascapes [environmental settings]	Physical and experiential interactions	Experiential use of plants, animals and land-/seascapes in different environmental settings	By visits/use data, plants, animals, ecosystem type	In-situ whale and bird watching, snorkelling, diving etc.
			Physical use of land-/seascapes in different environmental settings		Walking, hiking, climbing, boating, leisure fishing (angling) and leisure hunting
		Intellectual and representative interactions	Scientific	By use/citation, plants, animals, ecosystem type	Subject matter for research both on location and via other media
			Educational		Subject matter of education both on location and via other media

CICES for ecosystem service mapping and assessment	Note: this section is not complete and for illustrative purposes only. Key components could change by region or ecosystem.				
CICES for ecosystem accounting	Note this section is open in that many class types can potentially be recognised and nested in the higher level classes, depending on the ecosystems being considered.				
Section	Division	Group	Class	Class type	Examples
			Heritage, cultural		Historic records, cultural heritage e.g. preserved in water bodies and soils
			Entertainment		Ex-situ viewing/experience of natural world through different media
			Aesthetic		Sense of place, artistic representations of nature
	Spiritual, symbolic and other interactions with biota, ecosystems, and land-/seascapes [environmental settings]	Spiritual and/or emblematic	Symbolic	By use, plants, animals, ecosystem type	Emblematic plants and animals e.g. national symbols such as American eagle, British rose, Welsh daffodil
			Sacred and/or religious		Spiritual, ritual identity e.g. 'dream paths' of native Australians, holy places; sacred plants and animals and their parts
		Other cultural outputs	Existence	By plants, animals, feature/ecosystem type or component	Enjoyment provided by wild species, wilderness, ecosystems, land-/seascapes
			Bequest		Willingness to

CICES for ecosystem service mapping and assessment	Note: this section is not complete and for illustrative purposes only. Key components could change by region or ecosystem.				
CICES for ecosystem accounting	Note this section is open in that many class types can potentially be recognised and nested in the higher level classes, depending on the ecosystems being considered.				
Section	Division	Group	Class	Class type	Examples
					preserve plants, animals, ecoystems, land-/seascapes for the experience and use of future generations; moral/ethical perspective or belief

2. An example of databases in NVivo 10 used in this dissertation



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zaopatrujące	44	59	10.02.2017 11:32	KM	19.02.2017 13:01
sołtys	0	0	10.02.2017 12:00	KM	19.02.2017 13:01
rolnik	1	2	10.02.2017 11:55	KM	19.02.2017 13:01
rdoś oraz wykonawca planu	19	21	10.02.2017 11:44	KM	19.02.2017 13:01
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biznes	2	2	10.02.2017 12:01	KM	19.02.2017 13:01
regulacyjne	14	16	10.02.2017 11:33	KM	19.02.2017 13:01
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rolnik	0	0	10.02.2017 12:05	KM	19.02.2017 13:01
rdoś oraz wykonawca planu	6	7	10.02.2017 12:05	KM	19.02.2017 13:01
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parki krajobrazowe	0	0	10.02.2017 12:05	KM	19.02.2017 13:01
ngo	1	1	10.02.2017 12:05	KM	19.02.2017 13:01