



Protection and Monitoring of Inanimate Nature in the Actions of Landscape Parks — the Example of Poland (EU)

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Received: 17 December 2021 / Accepted: 31 October 2022 / Published online: 10 November 2022
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Abstract

The paper presents the legal protection status in the areas of landscape parks in Poland, whose current number is 126. The structure and effectiveness of provisions pertaining to the protection plans for landscape parks have been presented, mainly in the context of inanimate nature elements. It has been concluded that currently fewer than half of the landscape parks have valid protection plans and that their provisions and the level of detail vary greatly from park to park. After analysing the existing protection plans, it has been noticed that the provisions concerning the protection of inanimate nature elements constitute a definite minority in relation to the provisions concerning animate nature, cultural and historical, or landscape values. The consequences of the lack of regulations and actual actions in the sphere of permanent, organised monitoring of inanimate nature elements have been indicated. The paper also points out how the necessity for the park protection plans to obtain the status of a local legal act, at least in the part concerning broadly understood spatial planning, would be important and beneficial for the management of active nature conservation in the area of the entire landscape park. Furthermore, the paper underlines the importance of obtaining an appropriate amount of data from inventory and scientific research, as well as constant monitoring of animate and inanimate nature resources located in each of the parks.

Keywords Landscape parks · Protection plans · Environmental research · Anthropogenic impact

Introduction

In many countries nature conservation is based on various legal, administrative, or social regulations, which serve as the basis for the establishment of various forms of nature protection, including national parks, landscape parks, forms of individual and species protection, or those trying to protect entire ecosystems (Dowling 2011; Miccadei et al. 2011; Portal and Kerguillec 2018). Their operation requires proper planning of various types of monitoring

and protective measures, whose aim is to preserve the current state of the environment or, if possible, to improve it (Brilha 2002; Clarke et al. 2001; Telbisz et al. 2020). Such actions should be supported by adequate provisions in the protection plans (Božić and Tomić 2015; Gordon et al. 2018; Gregorič 2021; Szepesi et al. 2020). However, it seems that the current state of their implementation in Poland and the translation of individual provisions into actual actions in Polish landscape parks is still incomplete and thus insufficient.

The aim of this paper is to assess the status of legal protection in the areas of 126 landscape parks currently operating in Poland. In particular, the authors have decided to analyse the structure and effectiveness of the protection plan provisions for landscape parks, mainly in the context of inanimate nature elements. A more detailed analysis has been based on the provisions of six protection plans. Based on this analysis, conclusions and postulates have been formulated with regard to the structure of these acts and the need for necessary changes, as well as related actions.

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Landscape Parks: Their Number and Purpose

The landscape park (LP) is one of the forms of area protection in Poland. In accordance with Article 16.1 of the Nature Conservation Act of 16 April 2004 (Journal of Laws of 2021, item 1098), it is a protected area due to its natural, historical, cultural, and landscape values. The purpose of its establishment is to preserve and popularise the above-mentioned values within the framework of sustainable development. Such a legal provision means that these areas are protected by law, but at the same time they remain in limited economic use. Therefore, the development of settlements, environmentally friendly industry, agriculture and forestry, and various types of tourism is possible here. However, all this should be done sustainably, with a priority given to actions aimed at the protection of natural, landscape, and cultural values (Kuś 2014; www.parkikrajobrazowe.pl).

The distribution of landscape parks depends on the natural and landscape values of a particular country. There are 126 landscape parks in Poland (as of the end of 2021; www.stat.gov.pl), and their total area is 26,141.68 km², which constitutes 8.36% of the total area of the country (crfop.gdos.gov.pl). The largest number of parks is located in the central-eastern part (in the Lubelskie Region (LU) area; Table 1), whilst the smallest is in the north-eastern part of Poland (in Podlaskie Region (PD); Table 1). In the eastern part, there is also the largest area covered by landscape parks, whilst the smallest area is located in the western part of the country (in Lubuskie Region (LB); Table 1). The percentage share of landscape park areas in the total areas of individual region

ranges between 4.29% (PD; Table 1) and 18.63% (Śląskie Region (SL); Table 1) (Fig. 1).

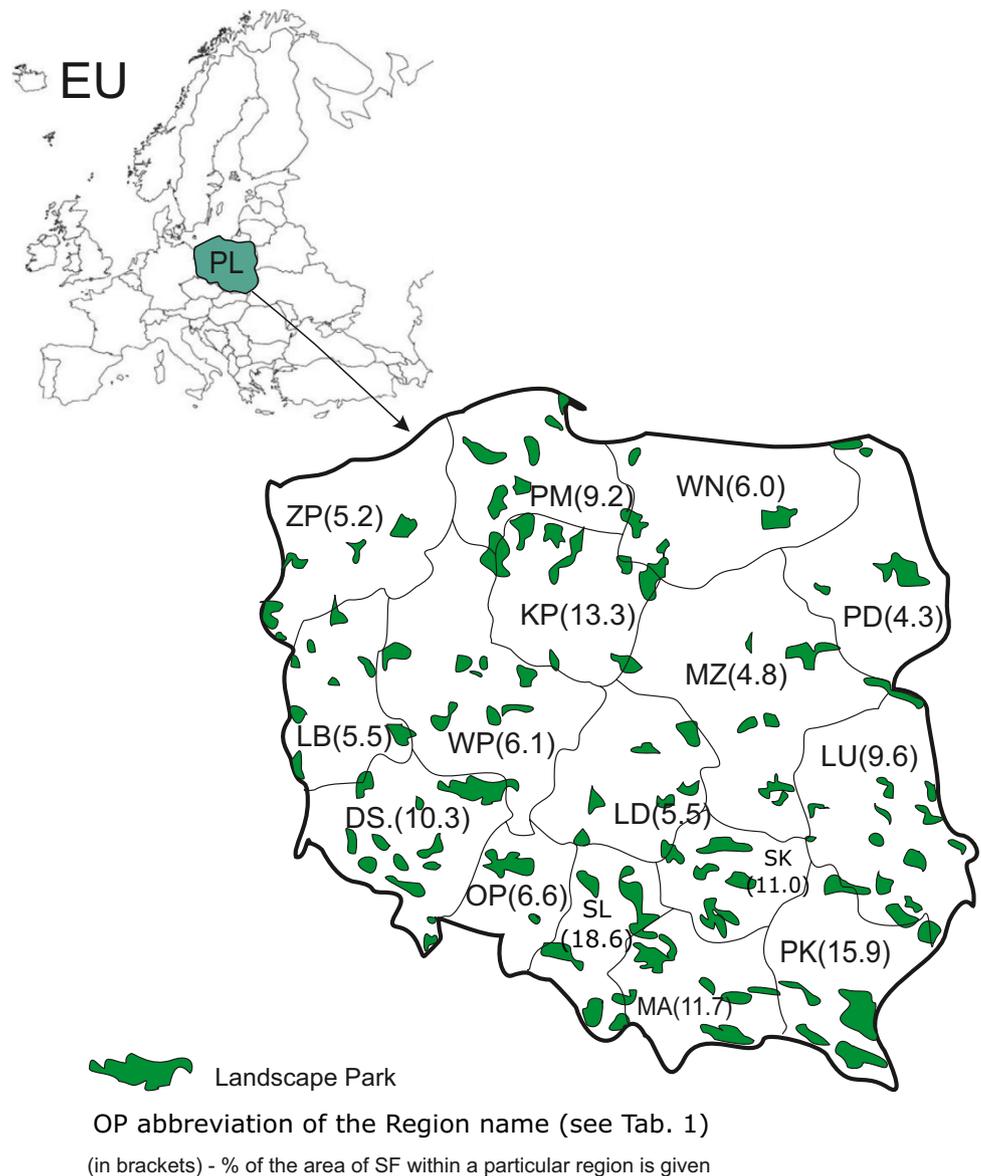
Currently, LP services are included in the structure of self-government administration and are subordinate to regional authority (Marshal's Offices). The LP management structure differs in individual regions. In the case of 12 regions (DS, LU, LB, LD, MA, MZ, OP, PM, SL, SK, WP, and ZP; Table 1), there is a single landscape park directorate managing all of landscape parks covering all parks in a given region. There are two complexes of landscape parks in PD and one complex of parks and seven independent landscape parks in KP region. There is one complex of parks in WM region and four landscape parks which operate independently. On the other hand, there are three independent landscape parks in PD region. The lack of a uniform park management structure seems to be a disadvantage from the perspective of the effectiveness of the actions taken.

Landscape parks operate primarily on the basis of resolutions issued by the regional councils (or older regulations adopted by voivodes). These documents define the borders of the parks and their buffer zones, protection goals, and prohibitions concerning, e.g. the implementation of certain especially industrial operations that have a negative impact on the environment, transformation of land surface, changes in hydrographic conditions, or felling of in-field, waterside, and roadside trees. Other important documents for the functioning of LPs are protection plans. Based on detailed inventories, these plans indicate threats, monitoring issues, and conservation, tourist, and scientific needs. Both of the above-mentioned document types have their legal basis in

Table 1 Landscape parks in individual regions of Poland (as of 01/08/2021)

Region (abbreviation)	Number of landscape parks	Number of parks together with another region	Area of landscape parks (km ²)	Percentage of the area of a given region (%)
Dolnośląskie Region (DS)	12	1	2,063.21	10.34
Kujawsko-Pomorskie Region (KP)	10	4	2387.58	13.28
Lubelskie Region (LU)	17	4	2403.25	9.57
Lubuskie Region (LB)	8	3	773.28	5.53
Łódzkie Region (LD)	7	3	1001.36	5.50
Małopolskie Region (MA)	11	3	1783.08	11.74
Mazowieckie Region (MZ)	9	3	1717.47	4.83
Opolskie Region (OP)	4	1	625.90	6.65
Podkarpackie Region (PK)	10	4	2837.47	15.90
Podlaskie Region (PD)	3	-	865.66	4.29
Pomorskie Region (PM)	9	2	1678.55	9.16
Śląskie Region (SL)	8	3	2297.11	18.63
Świętokrzyskie Region (SK)	9	1	1263.53	10.79
Warmińsko-Mazurskie Region (WN)	8	3	1449.76	6.00
Wielkopolskie Region (WP)	14	1	1807.17	6.06
Zachodniopomorskie Region (ZP)	7	1	1187.87	5.19

Fig. 1 Distribution of landscape parks in Poland



the Nature Conservation Act (Journal of Laws of 2021, item 1098).

The tasks resulting from the above-listed legal acts are performed by LP administration. Currently, its competences consist in applying active protection measures, conducting inventories, issuing opinions, cooperating with local self-governments and institutions, providing information about regulations, reporting law violations to relevant institutions, and offering nature education and promoting values of the parks. These are the so-called soft competences, the use of which may only slightly affect the current and future state of the park environment. Such legal status as well as other problems, including financial and staffing ones, often result in ineffective protection of landscape park areas. These issues have been addressed in several analyses (Łakomicz and Zimmiewicz 2008; Kistowski and Kowalczyk 2011;

Kistowski 2012; Jakiel 2014). The legal status described above and the resulting protection-related problems were also described in the 2012 report by the Supreme Audit Office (NIK), which is a document of the highest rank in the country (NIK Report 2012). Apart from various other issues, the report indicated problems related to the lack of

- Adequate financing,
- Sufficient number of qualified staff,
- Protection plans in some of the parks,
- Effective protection stemming from the lack of appropriate competences,
- Precision of statutory provisions.

The last 10 years have witnessed an improvement in issues related to personnel and financial matters (but only

in several regions), although certainly not to a satisfactory level, especially from a national perspective. Still, legal issues and the possibilities of implementing effective monitoring and protective measures in landscape parks in most cases require corrections and changes.

Landscape Park Protection Plans — Legal Problems

One of the basic legal acts concerning LPs is the protection plan. Currently, it is created on the basis of the provisions set out in the Nature Conservation Act and the Regulation of the Minister of the Environment on the preparation of a draft protection plan for a national park, nature reserve, and landscape park, amending the plan and protection of resources, features, and components of nature (Journal of Laws of 2005, No. 94, item 794). Based on comprehensive inventories and assessment of the state of nature, it primarily defines the objectives of nature protection, internal and external threats, as well as indicates the ways and areas of implementation of protective measures related to nature protection and landscaping. Moreover, it indicates areas available for scientific, educational, tourist, and recreational purposes. Most importantly, however, it also defines specific rules for, e.g. studies of the conditions and directions of spatial development, local spatial development plans, and spatial development plans for regions.

The first statutory provisions on protection plan for LPs were introduced to the Polish legislation as part of the Nature Conservation Act of 1991. Together with the Act on spatial planning, in force at that time, they constituted functional area plans and their provisions were binding for spatial planning. Interestingly, the plans concerned not only the landscape parks themselves, but also their buffer zones (Radecki 2008). They lost this function in 1994, when the new law on spatial development entered into force. However, they were treated as having priority over local spatial development plans in the subsequent years (Radecki 2008). The amendment to the Nature Conservation Act of 2000 expanded the concept of landscape park protection plans, indicating amongst other things that their provisions were binding for local spatial development plans, and obligated municipalities to amend their provisions, taking into account the protection plans. However, this act also meant that the majority of protection plans became invalid (Radecki 2008). The current Nature Conservation Act of 2004 provided new foundations, scope, and methods for establishing protection plans. It also referred to the above-mentioned Regulation (Journal of Laws 2005, No. 94, item 794), indicating the exact scope of such plans. Furthermore, it stated that the timeframe of such plans should be 10 years for newly created parks and 5 years for the existing parks (Zawartka 2012). As

for the latter, this timeframe was changed in 2008 (Journal of Laws of 2008, No. 201, item 1237), extending it by another 10 years, i.e. until 2018. Further changes, which indirectly influenced the functioning of protection plans, took place in 2008, when the services of landscape parks were transferred from the central government to the regional authority level, and most of the “hard” coordination competences were lost by landscape parks to the regional directors of environmental protection (Kistowski and Kowalczyk 2011; Kistowski 2012). This reduced the rank of landscape parks to some extent.

Another significant change concerning conservation plans took place in 2015 with the entry into force of the Act of 24 April 2015 amending certain acts in relation to strengthening landscape protection instruments (Journal of Laws of 2015, item 774), commonly known as the “Landscape Act.” This law provides for landscape audits for each region, which are to determine the extent of the so-called priority landscapes and borders of landscape protection zones, and for the latter to establish prohibitions on the construction of new buildings. These provisions, once established, should be transferred to the protection plans for landscape parks and constitute an act of local law. Unfortunately, landscape audits have still not been prepared (as of 2021), and no provisions regarding landscape protection have been introduced into protection plans. As a result, LP Services did not obtain appropriate tools for landscape protection, and thus indirectly also for the protection of other elements of nature, including geoheritage sites (geosites). At the same time, a certain legal ambiguity was created, consisting in the adoption of protection plans without provisions resulting from audits. Still, numerous protection plans were developed after the year 2015.

Currently, LP protection plans are created for a period of 20 years (article 20.1 of the Nature Conservation Act of 16 April 2004 (Journal of Laws of 2021, item 1098)). Their adoption requires public consultations, an opinion by the provincial historical-culture monument conservator and agreement with the regional director of environmental protection. The plan itself is established in the form of a resolution of the regional council. It should also be noted that the vast majority of this document does not constitute an act of local law in the present-day legislation, which translates into the manner of its implementation, as well as the effectiveness of individual provisions. Consequently, some local authorities feel that they are not directly obliged to incorporate the provisions of the protection plans into various planning documents and acts created for the area managed.

The development of protection plans provides LP Services with tools that enable them, to some extent, to supervise landscape parks and protect them effectively (Mastalska-Cetera and Krajewski 2014). However, despite the legal obligation to draw up protection plans and certain

improvements in environmental protection resulting from their provisions, not all the LPs have yet established such plans. This is due to numerous factors. These are predominantly financial considerations (high cost of preparation), unfavourable attitudes of local authorities towards establishing this type of legislation (Jakiel 2014), long duration of their preparation, dependence on other institutions (e.g. the need to include protective task plans or protection plans for Natura 2000 sites), and the prevailing belief that these documents are insufficiently effective.

As of the end of 2021, there are only 59 binding protection plans for landscape parks or their parts in Poland. Another 27 are in the phase of creation or establishment (Table 2). The number of adopted plans varied from year to year (Fig. 2). The highest number of them entered into force in 2006 (7), whereas in 2015 not a single one was established. The pace and schedule of the plan adoption were certainly influenced by financial issues, statutory changes (2004), and organisational changes (2008–2009). The fastest increase in the number of applicable protection plans took place in Małopolskie Region, where nine protection plans were adopted between 2017 and 2020, and another two are having their documentation prepared.

Protection of Inanimate Nature in Protection Plans

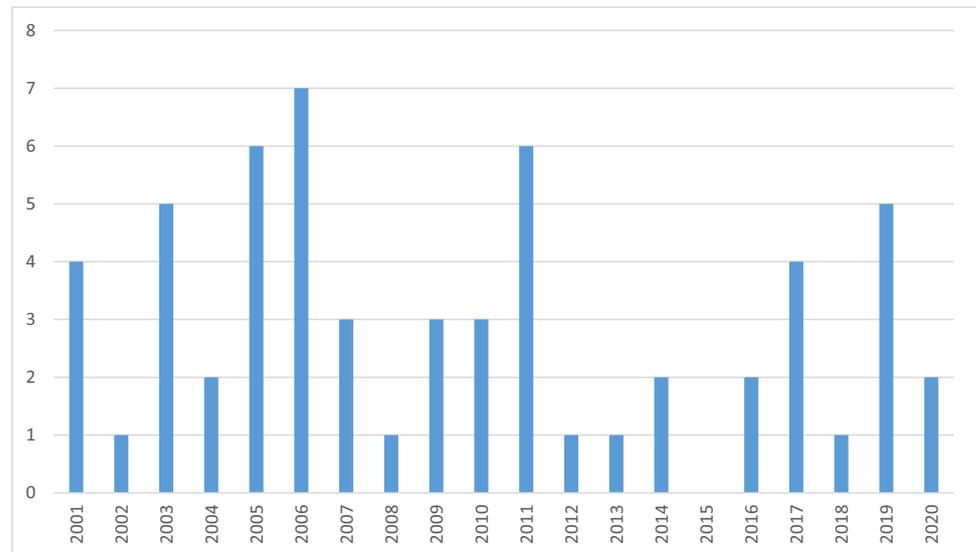
Protection plans comprise provisions pertaining to all the environmental components that are located in a particular landscape park. They include elements of both animate and inanimate nature, as well as cultural and historical, landscape, and social elements. All these components are inextricably linked with one another, and their basis are elements of inanimate nature. These are mainly flowing water (W_F) and standing water (W_S), soil (S), air (A), geological objects (GO) with geomorphology (aspect, slope steepness, microscale relief), and other characteristic units exposed on the soil surface or located underground. Their monitoring and protection are one of the tasks of LP Services. These tasks should be performed mainly on the basis of analyses and provisions contained in protection plans, as well as on an ad hoc basis as a result of the so-called ongoing monitoring.

In order to compare individual protection plan provisions concerning elements of inanimate nature, 6 selected landscape parks located in Poland were analysed. These were Sudety Wałbrzyskie LP, Tenczyński LP, Mazowiecki LP, Jałowski LP, Suwalski LP, and Wzgórze Dylewskie LP.

Table 2 Protection plans in landscape parks (as of 01/08/2021)

Region	Number of landscape parks in the region	Number of managed landscape parks or their parts	Number of protection plans in force	Number of protection plans under development	No conservation plans and no work on them
Dolnośląskie Region (DS)	12	12	8	-	4
Kujawsko-Pomorskie Region (KP)	10	10	4	-	6
Lubelskie Region (LU)	17	17	2	3	12
Lubuskie Region (LB)	8	7	1	-	6
Łódzkie Region (LD)	7	7	5	-	2
Małopolskie Region (MA)	11	11	9	2	-
Mazowieckie Region (MZ)	9	5	5	-	-
Opolskie Region (OP)	4	3	3	-	-
Podkarpackie Region (PK)	10	10	5	5	-
Podlaskie Region (PD)	3	3	3	-	-
Pomorskie Region (PM)	9	7	2	5	-
Śląskie Region (SL)	8	8	1	1	6
Świętokrzyskie Region (SK)	9	8	1	3	4
Warmińsko-Mazurskie Region (WN)	8	8	6	-	2
Wielkopolskie Region (WP)	14	14	2	8	4
Zachodniopomorskie Region (ZP)	7	6	2	1	4

Fig. 2 Number of protection plans for landscape parks adopted in every year during the last 20 years (data as of December 31, 2020)



The parks differ in terms of their natural characteristics, location, and the plan adoption date. What was compared was the occurrence of provisions concerning threats and monitoring for individual components of inanimate nature (W, S, A, GO; Table 3), as well as provisions concerning

the method of protection of the above-mentioned natural elements and indications regarding the necessity to provide legal protection for inanimate nature objects (Table 4).

First of all, it should be pointed out that all the protection plans analysed include provisions concerning

Table 3 Records on threats and monitoring for inanimate nature in protection plans for selected landscape parks

Region	Landscape Park	Year of creation	Threats (selected)	Monitoring
DS	Sudety Wałbrzyskie	2016	- Anthropogenic transformation of river beds - Soil erosion on tourist routes - Exploitation of rock raw materials - Illegal waste disposal - Surface water pollution	S, W, GO
MA	Tenczyński	2017	- Pollution of surface and ground waters - Soil degradation - Air pollution - Emission of traffic pollutants - Illegal waste disposal - Degradation of rock formations and rock exposures - Degradation of springs	S, W, A, GO
MZ	Mazowiecki	2004	- Exploitation of peat - Drainage of swamps - Discharge of sewage - Illegal waste disposal - Emission of traffic pollutants	None
PD	Jaśliski	2003	- Water pollution with household sewage - Exploitation of gravel and rock raw materials - Chemicals in agriculture - Illegal garbage dumps	None
PL	Suwalski	2003	- Exploitation of mineral deposits - Surface erosion - Pollution of surface and ground waters	GO
WM	Wzgórz Dylewskich	2007	- Improper waste management - Improper sewage management - The flow of phosphorus and nitrogen to the soil - Air pollution	None

S – soil, W – water, A – air, GO – geological object

Table 4 Records concerning the protection of inanimate nature in the protection plans of selected landscape parks

Region	Landscape park	Year of creation	Protection records (selected)	Proposed new forms of inanimate nature protection
DS	Sudety Wałbrzyskie	2016	- Maintaining the natural course of river channels - Striving to improve water quality - Stopping large-scale interference with the terrain - Unveiling of rock formations	Nature monuments (9)* Documentary sites (10)
MA	Tenczyński	2017	- Water quality monitoring - Liquidation of wild dumps - Rational use of fertilizers - Unveiling of rock formations - Air quality monitoring	Nature monuments (3) Documentary sites (2)
MZ	Mazowiecki	2004	- Recultivation of illegal excavations - Liquidation and rehabilitation of illegal landfills	No
PD	Jaśliski	2003	- Prevention of water pollution and contamination - Elimination of threats resulting from the chemicalisation of agriculture - Introducing a partial ban on the exploitation of mineral resources with particular limitation of the use of gravel	Nature monuments (4) Documentary sites (2)
PL	Suwalski	2003	- Reclamation of illegal points of extraction of mineral resources - Organising water and sewage management - Creating buffer zones around water courses and reservoirs	Nature reserve (1)
WM	Wzgórz Dylewskich	2007	- Liquidation of wild dumps - Organising water and sewage management	No

*Number

individual components of inanimate nature. However, their scope, form, and, above all, level of detail vary considerably. Very often, they use quite general terms (e.g. surface water pollution) and apply to the entire park area. Our analysis showed that the most common threat listed pertains to surface water quality issues and the related risk resulting from improper waste and sewage management. Soil degradation (soil erosion along tourist trails, waste disposal, exploitation of rock resources, traffic emissions, the use of agrochemicals in agriculture) is also frequently mentioned, sometimes indirectly. What is also often addressed is the threat to air quality, but rather as a risk to the entire LP, without indicating areas. Occasionally, there are provisions regarding specific objects of geoheritage sites. It is particularly visible in the plan for the Tenczyński LP, which lists threats to rock formations (destruction, quarrying), geological exposures (covering with trees), and water sources (water contamination). However, it seems that these rather vague provisions stem from the high geodiversity of the area.

As regards monitoring, it was only referred to in the provisions of three protection plans analysed (Table 3), with only one plan describing comprehensive monitoring for all elements of inanimate nature (*W*, *S*, *A*, and *GO*), namely that for Tenczyński LP. On the other hand, the monitoring of elements of animate nature is indicated very often in the plans analysed.

The conservation measures listed correspond quite well with the above-mentioned threats, but do so mostly in a fairly general way, without indicating specific actions (Table 4). Some plans also indicate entities that should carry out particular conservation measures, and very often these are not LP Services. Four of the protection plans analysed also indicated inanimate nature objects that should be subject to an additional form of protection, usually in the form of an inanimate nature monument or a documentary site which are legal categories established by local authority. The largest number of such indications, as many as 18, appeared in the protection plan for Sudety Wałbrzyskie LP.

One of the most interesting provisions and, as it seems, a very desirable one is the provision indicating the necessity of providing “institutional support for further scientific research in the Park, oriented towards increasing the knowledge about the abiotic environment,” which can be found in the plan for Sudety Wałbrzyskie LP. However, its authors did not specify what particular actions they had in mind.

Implementation of Inanimate Nature Protection

It is interesting to see the comparison of the above-mentioned provisions concerning protective measures and the actions actually taken during the validity of a given

protection plan (Table 5). As revealed by the analysis of data obtained from the landscape parks examined, the implemented actions meet the assumptions of a given protection plan only to a certain degree. Often, protective measures are carried out not only by LP Services, but also by other institutions, in particular the State Forests, Polish Waters, local authorities, or other local institutions and associations.

The number of actions taken is quite high, but they are not always reflected in the provisions of the protection plans (e.g. monitoring of geoheritage, geo-education).

Conclusions

Based on the analysed legal documents and provisions defining the competences and methods of operation of LP Services in Poland, it has been concluded that

1. No protection plans have been created for approximately half of all the parks. This fact, apart from the legal necessity of implementing such plans, may contribute to the current situation in which both LP Services and other institutions operating in these areas may have incorrect or incomplete knowledge about the state of the environment. This, in turn, reduces the actual possibility to protect these areas through protective measures and due to the lack of full knowledge that could be used when assessing investments in the area of LPs.
2. With regard to the existing protection plans, it should be noted that the provisions concerning elements of inanimate nature constitute a definite minority relative to those concerning animate nature, as well as cultural, historical, or landscape values. A greater number of such provisions can only be found in the protection plans for mountain and upland parks (Sudety Wałbrzyskie LP, Tenczyński LP).
3. The documents analysed differ with regard to the manner, structure, and scope of the provisions. In the older protection plans (formed in the years 2003–2007), these provisions are very general, whilst the newer documents (2016–2017) contain much more detailed guidelines, although they remain insufficiently precise.
4. There is a lack of both regulations and actual actions in the sphere of permanent, organised monitoring of inanimate nature elements.
5. There is a need for protection plans to acquire the status of a local law act, at least in the part concerning broadly defined spatial planning, so that their provisions are binding for various institutions and apply to local planning documents and legal acts.

The presented analysis showed that there is a necessity of specifying many provisions of protection plans. However, this would require a sufficient amount of data obtained from inventory and scientific research, as well as constant monitoring. Hence, there is a need to intensify the cooperation of LP Services with other institutions and the scientific community. Providing mutual information about the needs,

Table 5 Landscape park services concerning inanimate nature in selected landscape parks

Region	Landscape park	Direct and indirect actions of landscape park services
DS	Sudety Wałbrzyskie	- Submission of applications to community authorities for the establishment of geoheritage monuments - Issuing opinions on the regulation of water courses - Monitoring of geoheritage sites
MA	Tenczyński	- Submission of applications to community authorities for the establishment of geoheritage monuments - Monitoring and revealing geoheritage sites - Issuing opinions on the regulation of water courses - Cooperation in the rehabilitation as geosite of the quarries - Organising cleaning actions - Cooperation with universities in the creation of diploma theses
MZ	Mazowiecki	- Carrying out protective or monitoring activities for waters (mainly monitoring the water level in peat bogs and swamps)
PD	Jaśliski	- Monitoring of inanimate nature - Monitoring of littered places and usual waste storage - Organising cleaning actions
PL	Suwalski	- Cooperation with Regional Nature Protection Inspectorate regarding the monitoring of surface waters - Air monitoring using the “Airly” air quality measurement sensor (from 2019) - Removal of certain plants from geosites - Preventing accidental extraction of gravel and sand - Construction of tourist infrastructure to reduce erosion
WM	Wzgórz Dylewskich	- Cooperation in the field of small retention - Cooperation with the Polish Geological Institute in the field of inventorying all objects of inanimate nature

research conducted, and results obtained seems to be particularly important. This will allow for the acquisition of more data suitable for planning specific protective measures. It may also contribute to the improvement of knowledge about the state of the environment in a given LP and the indication of specific areas facing strong anthropogenic impact and the resulting threats to the natural environment of the park.

Author Contribution Conceptualisation, A. K. and P. D.; methodology P. D.; formal analysis, P. D.; data curation, P. D.; writing—original draft preparation, A. K. and P. D.; writing—review and editing, A. K. and P. D.; and visualisation, A. K. and P. D. All authors have read and agreed to the published version of the manuscript. A. K. — 40% and P. D. — 60%.

Funding This research was financially supported by the Polish Ministry of Science and Higher Education (grant no. DWD/3/34/2019) and by AGH-UST (grant no. 16.16.140.315).

Data Availability Original data included in this publication will be made available upon request after a second companion publication is available.

Declarations

Conflict of Interest The authors declare no competing interests.

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