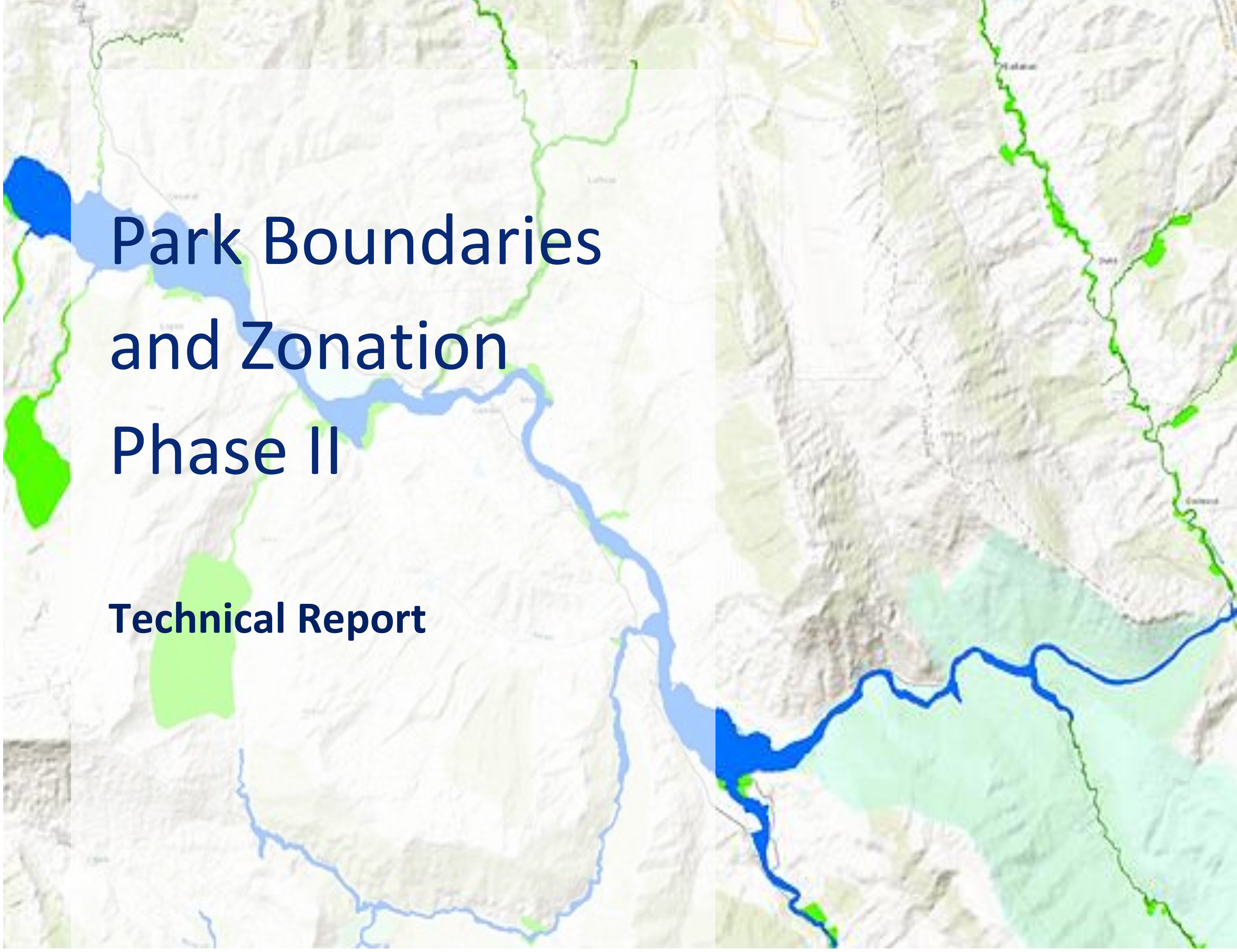

Park Boundaries and Zonation Phase II

Technical Report

Submitted to the Project Coordinators

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This document has been produced by

Dr. Ulrich Schwarz, FLUVIUS,
Floodplain Ecology and River Basin Management,
Vienna, Austria
Ulrich.Schwarz@fluvius.com

Ronny Dobbelsteijn
Tirana, Albania
ronnydobbelsteijn@yahoo.com

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1. Introduction

Following the establishment of the Vjosa Wild River National Park (VWRNP) by the end of 2022, this project aims to provide assistance in the ongoing management planning. This includes additional zonation and landscape feature maps or the identification of restoration areas within the existing boundaries, as well as the creation of various thematic maps required for implementation. Furthermore, it supports the establishment of the VWRNP by mapping and delineating crucial natural features in the catchment area, such as tributaries and karst phenomena, which are essential for maintaining the park's natural processes.

This document has been developed through close collaboration with the park management group (Integrated Management Plan, IMP) and will serve the current and future NAPA purposes.

2. Approach

2.1 Zonation

In addition to the implementation of the already defined two zones of firstly the “Central Sub-zone Level A” and secondly the “Traditional use and Sustainable development Sub-zone” particular entry and exit points for rafting were defined.

2.2 Additional mapping of areas sustaining the VWRNP

In order to achieve the ambitious goal of establishing the first "Wild River National Park" in Europe, it is necessary to establish the park boundaries and subsequent zoning based on the most reliable information available regarding the Vjosa river, its tributaries, and the surrounding area (Sovinc 2021). To ensure the needed hydro- and morphodynamic processes that will shape a diverse range of valley formations, river types, and features such as banks and bars that support riparian habitats and species, it is crucial to safeguard the entire active channels and low-lying active floodplains (Schiemer et al 2018). Furthermore, to maintain the unique hydromorphological integrity of the Vjosa catchment, the boundaries will encompass areas of sediment origin, adjacent steep erodible slopes, intact adjacent forests on mountain slopes, as well as the valley connections to other significant landscapes within the catchment. This delineation follows the approach used in the initial phase, now including all tributaries and landowners.

For the basic understanding of river morphology and to delineate active channels and floodplains it is important to understand:

- Considering the behavior of catchments to calculate discharges in tributaries and the Vjosa, as well as sediment transport (origins, movement, deposition).
- Comprehending the scaling units such as "catchment", "landscape unit", "valley segment", and "river reach" as outlined in CEN Standard 14614:2021 regarding the evaluation of hydromorphological characteristics in rivers.

- Understand occurring valley forms (confined, partially unconfined, unconfined) including terraces and resulting river types.
- Understand river channel and bar forming processes and the development of river banks.
- Understand the development of active and morphological floodplains.

In the first step the following tasks were conducted now for all larger tributaries with focus on lower and middle river courses:

- Delineation of the active channel (AC) comprising the shifting channels and gravel and sand bars frequently flooded (each year), compare figure 1.
- Delineation of the active floodplain (AF) including first the regularly flooded riparian habitats (all 1-5 years) and secondly all other areas within the temporary flooded area of up to app. some 30 years, compare figure 1).
- Delineation of the morphological floodplain MF (defined as the maximum extent of the potentially flooded area, today mostly cultivated land, partially separated from the active floodplain by flood dykes).
- Identification of erodible slopes (fluvial-morphological space demand). In particular, during major floods, the rivers erode laterally not only banks in the active and morphological floodplain or along (former) river terraces but also steep slopes in confined valleys.

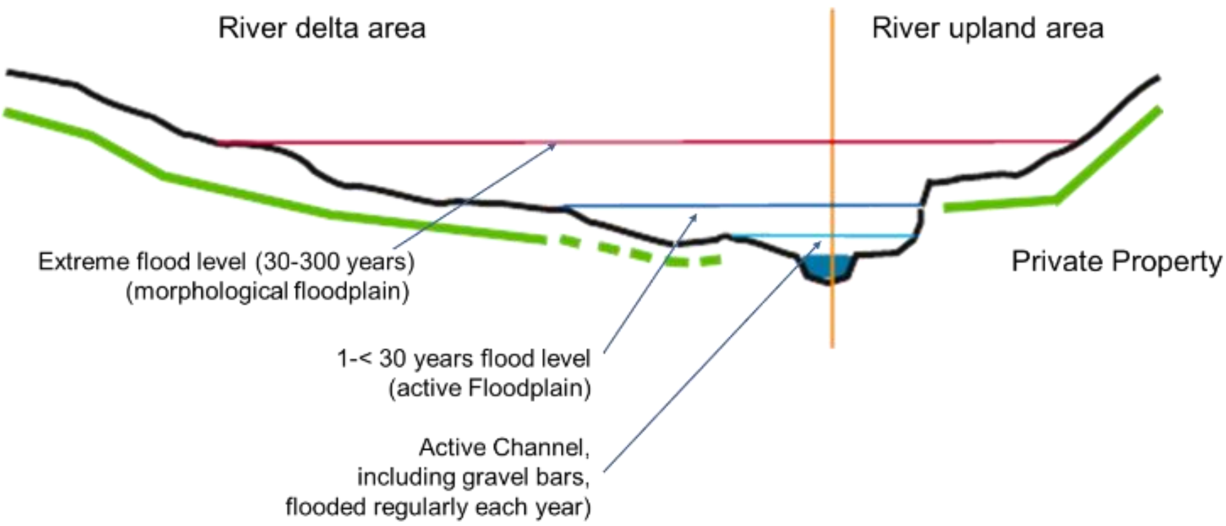

Figure 1: River cross section explaining the main river valley compartments and properties: The annually flooded active channel includes the river branches and open gravel and sand bars, and the active floodplain including the frequently flooded and low-lying areas of the HQ 1-5 hosting typical riparian habitats and the temporary flooded active floodplain up to the 30 years flood frequency.

Figure 2: Example for the braiding middle river course of the Vjosa (downstream of Kalivac) illustrating the large active channel (river branches and vegetation free gravel) and active floodplain, regularly flooded. While the left image shows the situation end of 1960ties (USGS 2018), the two left images indicate the short term changes between 2012 and 2016 (Google Earth 2023).

In the second step, further extension of the area for the VWRNP and/or other forms of protection or consideration in spatial planning were selected by:

- Identification of core areas of sediment origin and delivery (mostly headwaters and tributary confluences, includes also man-made induced erosion, but only directly on tributary slopes). Recent research delivered the first insights into the sediment balance (Hauer 2019, Bizzi et al. 2021) and river morphology (Schiemer et al. 2020, Hauer et al. 2021).
- Identification of stretches with the most valuable, pristine adjacent land (forest slopes), primarily for lower and middle courses of the major rivers (not for headwaters which are usually origin in near-natural mountainous environment).
- Connection with other important landscapes predominantly by valleys of smaller tributaries (if those rivers are permanently disconnected by reservoir dams the connection is omitted, in rivers with hydropower usage (without major dams) at least the connectivity for bedload can be assumed)

In a third step the delineated landscape features have to be overlaid by administrative boundaries and cadaster data.

- Final administrative overlay and legal delineation.
- Overlay with administrative parcels layer to identify all public and private parcels but only for active channels and active floodplains on larger tributaries.

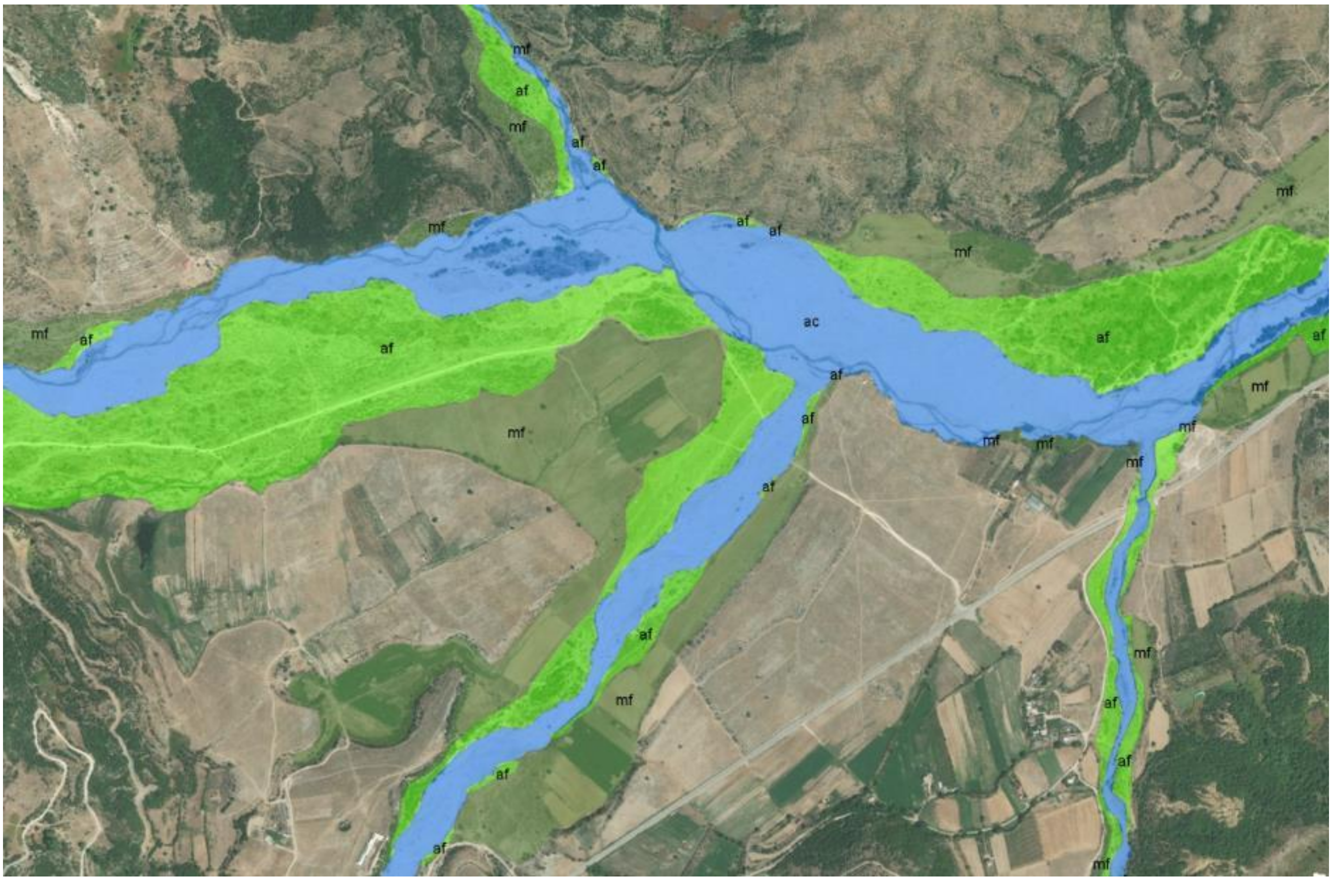

Figure 3: Mapping example for Kardhiqi showing the delineation of active channels (blue), active and morphological floodplain (green and beige respectively) (Google Earth 2023).

Figures 4: Sediment origin in headwaters (left) and steep erosion slopes (right) ((Google Earth 2023).

The table 1 list and explain all mapped features and gives suggestions for the further zonation and planning. Further the colour schema underlines the grouping of types for the current park boundaries (dark blue; in light blue other features of the active floodplain), important features for even expanding the VWRNP (dark green) and additional features (light green). Finally grey colour stands for impacted hydropower rivers and light brown indicate valley types outside of the contemporary flood regime. The suffix "_bz" indicate "buffer areas(zones)" which are important for the middle and long-term shift and development of the core zone.

Table 1: Overview of mapped features (the order is feature oriented and not alphabetic).

Attribute	Explanation	Zonation/Planning
AC	Active channel	Central Sub-zone Level A! AC on tributaries serve to maintain VWRNP, potential expansion in the future
AC_hpp (for HPP rivers so)	Active Channel hydropower (tributaries only)	No zone, long-term planning background
AFr	Active floodplain riparian <HQ5	Central Sub-zone Level A! AFr on tributaries serve to maintain VWRNP, potential expansion in the future
AFrDelta	Active floodplain riparian <HQ5 in the delta	Proposal to include as part of the delta in the VWRNP (existing PA)
AFr_hpp (for HPP rivers)	Active floodplain riparian <HQ5 hydropower (tributaries only)	No zone, long-term planning background
AFoth	Active floodplain others (>HQ5-30, mostly agriculture)	In minor parts "erosion buffer"
AFoth_bz	Active floodplain others ("buffer zone")	Traditional use and Sustainable development Sub-zone. Areas inside or adjacent to the AFr.
CY	Canyon banks (narrow, steep banks along upper Vjosa and Bene and Shushica)	Central Sub-zone Level A!
BBS	Bank buffer strip (buffer adjacent to AC, indifferent habitats)	Central Sub-zone Level A!
BBSn	Natural bank buffer strip (buffer adjacent to AC)	Central Sub-zone Level A!
ES	Erosion slopes	Central Sub-zone Level A!
EB	Erosion buffer part of AF	Not currently part of the VWRNP but should serve as strategic pool for erosion buffers
EB_bz	Erosion buffer part of AFoth	Traditional use and Sustainable development Sub-zone. Important as erosion buffer.
MF	Morphological floodplain (>HQ30-300) entirely used	No zone, long-term planning background "valley"

Attribute	Explanation	Zonation/Planning
MF_bz	Morphological floodplain (>HQ30-300) erosion buffer	Not currently part of the VWRNP but should serve as strategic pool for erosion buffers
TR	Terrace	No zone, long-term planning background “valley”
TR_bz	Terrace, erosion buffer	Not currently part of the VWRNP but should serve as strategic pool for erosion buffers
DE	Deltaic habitats	No zone, long-term planning background (existing PA)
LA	Lagoon	No zone, long-term planning background (existing PA)
SA	Salina	No zone, long-term planning background (special management/restoration)
CS	Coastal swamp (mostly meliorated)	No zone, long-term planning background, restoration needed!
NAadj	Natural area adjacent to the rivers	Only for main rivers in the lower and middle river courses with interruption by intensive landuse
Con	Connection to existing PA, tributaries or other natural areas	No zone, long-term planning background in particular for wider catchment, not considered for areas upstream of reservoirs (permanently disconnected)
Sed	Areas of sediment origin	No zone, long-term planning background, not considered for areas upstream of reservoirs (permanently disconnected)
Rest	Potential restoration areas (mining deposits, gravel and agricultural areas)	Central Sub-zone Level A! (one exception on upper Shushica, 2.6 ha previously used for road construction, just adjacent opposite are currently used for water pipeline construction, partially in side of park)
Kar	Karst features (springs, caves (only points collected, no meaningful approach to include in the VWRNP), karst fields)	Proposed to be at least associated to the VWRNP

The following descriptions further explain the most important riverscape types mapped for the project:

1. Active channel [AC]

The primary focus of nature conservation lies within the active channels of Vjosa, its main tributaries, and the sub-tributaries. This encompasses the entirety of the river bed, along with all the gravel and sand bars. In the braided and ana-branching sections, the active channel represents the "bankfull flow" of the average annual flood. Bars with dispersed pioneer vegetation connect to the active floodplain, although a single annual flood has the potential to completely alter the channel and bars.

Figure 5: The active channel comprises the river water bodies and the gravel bed (Kardhiqi, a Drinos tributary, all pictures by Ulrich Schwarz).

2. Active floodplain [AFr] and [AFoth]

The active floodplain generally refers to areas that experience regular and frequent flooding, typically occurring every 1-5 years. The frequency, intensity, and duration of high water levels, as well as the morphodynamic processes, play a crucial role in shaping the riparian vegetation in these areas. In cases where bars with pioneer vegetation are not eroded within the following year and the conditions are suitable (such as the presence of fine silt material and adequate moisture), young softwood stands, primarily consisting of willows, poplars, and plane trees (platanus) in upper courses, can establish themselves. If these low-lying softwood shrubs survive subsequent floods, they can even form islands within the river. To better define riparian habitats with characteristic pioneer and floodplain vegetation, it is important to differentiate the active floodplain in low-lying areas, which are subject to floods up to a 5-year frequency. Areas experiencing floods with a recurrence interval of more than 5-30 years are predominantly used for agriculture, including some grazing meadows, with only a few remnants of floodplain forests remaining (as most of them were previously cleared).

Figure 6: Pioneer and softwood development on gravel bars on middle Vjosa, in the background higher floodplain stands with eroding bank.

3. Morphological floodplain [MF]

The morphological floodplain, which is situated at a higher elevation and has the potential to be flooded (HQ 30-300), was not the main focus of the current mapping. However, it was essentially completed using elevation models, which indicated that it is approximately 6-8 meters above the active channel. Additionally, areas of the active floodplain that are separated by flood dykes would also fall into this category. This particular class is of interest because it allows for the identification of floodplain remnants and provides a general delineation of the valley floor, which was formed by the accumulation of rivers over the past several thousand years.

4. Canyon banks [CY]

The canyon banks, which rise up to approximately 20 meters in height, encompass the lower portion of the canyon slopes. The mapping did not provide a detailed representation of the entire canyon slopes; instead, it acts as a buffer strip for the extensive upper Vjosa and middle Shushica areas, where the rivers flow through steep, canyon-like incised channels measuring 10-15 meters in depth on former terraces composed mainly of conglomerate material. True canyons are only present along the upper Bence region.

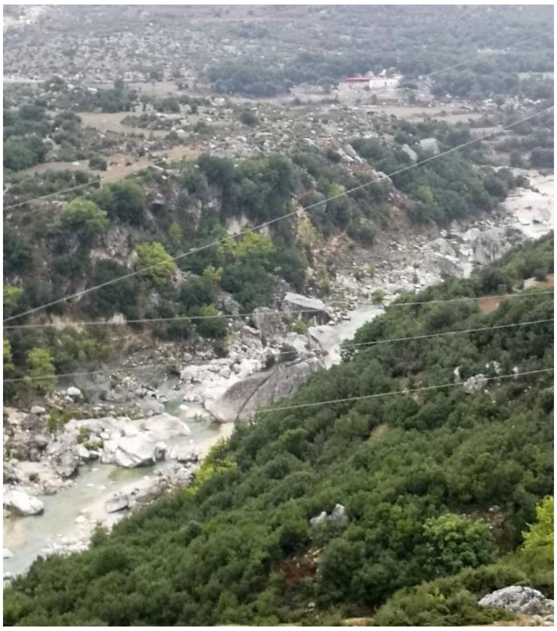

Figure 7: Huge monolithic rocks most probably of the weak settled steep banks of the canyon like breakthrough in the upper Shushica valley, originating maybe from landslides of the steep mountains in the vicinity. The core includes the channel and the steep canyon like bank up to the top.

Figure 8: Left: Upper Vjosa near Permet: Widening on left side and steep bank with canyon-like vegetation on the right side. Right: Inside the Bence headwater canyons.

5. Erosion slopes [ES]

In the partly confined valleys of middle and upper reaches (namely on Vjosa and Shushica) it is necessary to survey and include also steep sloped banks where rivers cut into the hills and mountains. Typical gravel fans are generated and material is supplied for the sediment transport.

Figure 9: The Shushica valley is full of spectacle landscape features, one are the huge eroding slopes, partially as rock but partially as finer material ending up in the river channel.

6. Areas of sediment origin [Sed]

The main objective is to create a comprehensive mapping of the primary sources of sediment, which heavily relies on the hydrology, geology, and morphology of specific headwater areas, including the upper course and smaller tributaries. Due to deforestation in certain parts of the Vjosa catchment, significant soil erosion and gully formation have occurred. Although the overall impact on sediment balance remains unexplored, reforestation efforts should be incorporated into the basin management plan for the affected areas.

Figure 10: One of the most relevant sediment production is the headwater catchment of Shushica, where recently a pass road was established to connect the Shushica with the Plateau over the Bence canyon towards Tepelena in the Vjosa valley. The material for the road was taken from the open gravel fans.

Figure 11: Once the eroded material is transported to broader valleys it serves as sediment deposits before major floods further transport it downstream. The lower Kardhiqi river demonstrate the permanent accumulation and erosion, even terrace building.

7. Natural areas adjacent to the rivers [NAadj]

Natural areas adjacent to the river are identified where forests are directly connected to the river without being separated by roads or agricultural strips. The distance from the river axis is limited to a few kilometers, regardless of what lies beyond. These areas are not included in any protected area.

The areas are only mapped for the major lower and middle river courses where the adjacent areas are frequently interrupted by other landuse. The headwaters within mostly near-natural adjacent land are not included.

Figure 12: Not only in the upper course but also in the Kalivac gorge forests spread towards the river banks and serve as valuable buffer areas around the VWRNP.

Figure 13: This majestic and pristine mountain area can be found on upper Vjosa, and in addition serving as sediment origin area should be closely associated to the VWRNP. Further, the area link to other PA on the mountain ridges and the Zagorje valley behind the mountains. On the other hand, the picture taken from the road highlights the mobility of finer material and erosion slopes in the foreground as well.

8. Connection to other important landscapes [Con]

To maintain the main rivers and tributaries and its discharge and sediment load and therefore the entire VWRNP it is necessary to delineate all smaller tributaries at least by a connection buffer (most of this smaller tributaries have not permanent water). Only in case of entire interruption by a reservoir dam, draping the sediments the connection buffers were not considered.

9. Bank buffer strip [BBS]

Where only small strips with indifferent usages or habitats can be found adjacent to the active channel such as road slops this category tries to close gaps with a thin buffer strip. Additionally, it is important to know that the active channel doesn't include the bank as such. Usually, the bank is the margin of the active floodplain. It includes also subcategory "n" which are buffer strips of "7. NAadj" (see above).

10. Erosion buffer [EB]

This category is introduced where the river is eroding agricultural land, usually in the "active floodplain". There are several places where the river is attacking higher level floodplain areas (AFoth, MF) but the erosion rates strongly depend on the material and specific hydraulic conditions. Not all of the erosion sites proceed fast and in the same manner, While the middle Vjosa has the strongest erosion rates of up to 24 m per year, the lower Vjosa near Shushica comes to maximum 15 m and in even the latest delta bend (free moving) indicate an erosion rate of up to 9 m per year (lower Drinos reaches 18 m and lower Shushica 12 m of maximum erosion rates per year).

In particular on lower Vjose the meander bends are reinforced by groynes since about the year 2000 (renewed and extended about 2010) , preventing any further shift in this section. Further excessive dredging forces channel incision instead of widening.

The loss of fertile agricultural land on the one side is compensated by accumulation on the other side of the river providing excellent stands for floodplain forests including a high value for water purification and groundwater infiltration, nutrient and carbon fixation and fishing/spawning habitats e.t.c. This should be always in mind if the lateral shift is possible, it includes the erosion of land but also the accumulation and provision of ecosystem services.

The erosion buffer areas evaluate the overall erosion rates based on the average of the previous 15 years and anticipates the land that could potentially erode within the next few decades. It is likely that smaller strips will be adequate for the upcoming years to avoid the need for river engineering interventions such as groynes or rip-rap.

11. Karst features [Kar]

In general, three different karst features were considered and initially mapped. Those are karst springs, karst caves and one special case of a larger karst field (polje). As spring and cave locations are usually represent as points (or with buffers as circles) being in most cases not directly connected to the valley or river corridor the prepared map layer should stand for the first time separated. The hydrogeological situation and important underground streams should be studied. They should be seen as an inherent, natural component of the Vjosa river system. One example for a transboundary catchment karst feature is the sink of Drinos water towards the huge Blue Eye karst spring which discharge towards the coast near Seranda.

12. Restoration [Rest]

So far, the proposal of restoration areas is limited to the current park boundaries. Namely river bank deposits of the bitumen mining on lower Vjose and the numerous commercial gravel extraction sites with facilities/machinery should be on focus, but also a larger, recently converted floodplain area (plantation). The restoration of devasted floodplain forest areas in detail is a separate issue for the future (proposal exist).

13. Terraces [TR]

Finally, to show the entire valleys, the terraces of different age and height were added. Those areas > 10-15 m above the current river channel are intensively used for settlements, infrastructure and agriculture. However, in light of planned infrastructure (major road, railway) the valley and Vjosa should be considered from the beginning.

14.Deltaic habitats [DE) (excluded from VWRNP)

The Vjosa delta consists of the riparian part and the marine-deltaic part. The delta must be included sooner or later into the VWRNP as it is one of the best preserved deltas in the Mediterranean (recent Euronatur MedDelta study will be published soon).

Figure 14: Coastal swamps in the south of the Vjosa delta.

15.Coastal swamp [CS] (excluded from VWRNP)

North of the lagoon a former coastal brackish water swamp can be find between the river floodplain and the lagoon. Shallow freshwater groundwater of the river is mixed with salt water intrusion form coast and originally build large swampy areas along the Albanian coast, predestined for wetland restoration.

16.Lagoon [LG] (excluded from VWRNP)

As the lagoon is an integral part of the river delta, built by river sand dune barrier deposited by coastal wave activities, it should be included in the wider management of the national park. The lagoon is split into two parts, the protected site and the salina.

17.Salina [SA] (excluded from VWRNP)

This area includes the commercially used part of salt production as a part of the former Lagoon.

2.3 Web boundary mapping and further maps for the IMP

Supplementary maps were created to enhance the management plan and for use in various expert groups of park development, such as web presentations. These requests were made by different sectors of the park development team and official organisations to supplement the official documents like the Integrated Management Plan.

3 Results

3.1 Zonation

The Zonation had been established during the initial project phase by the end of 2022, and was complemented in 2023 by entry and exit points for rafting, as sustainable touristic activity.

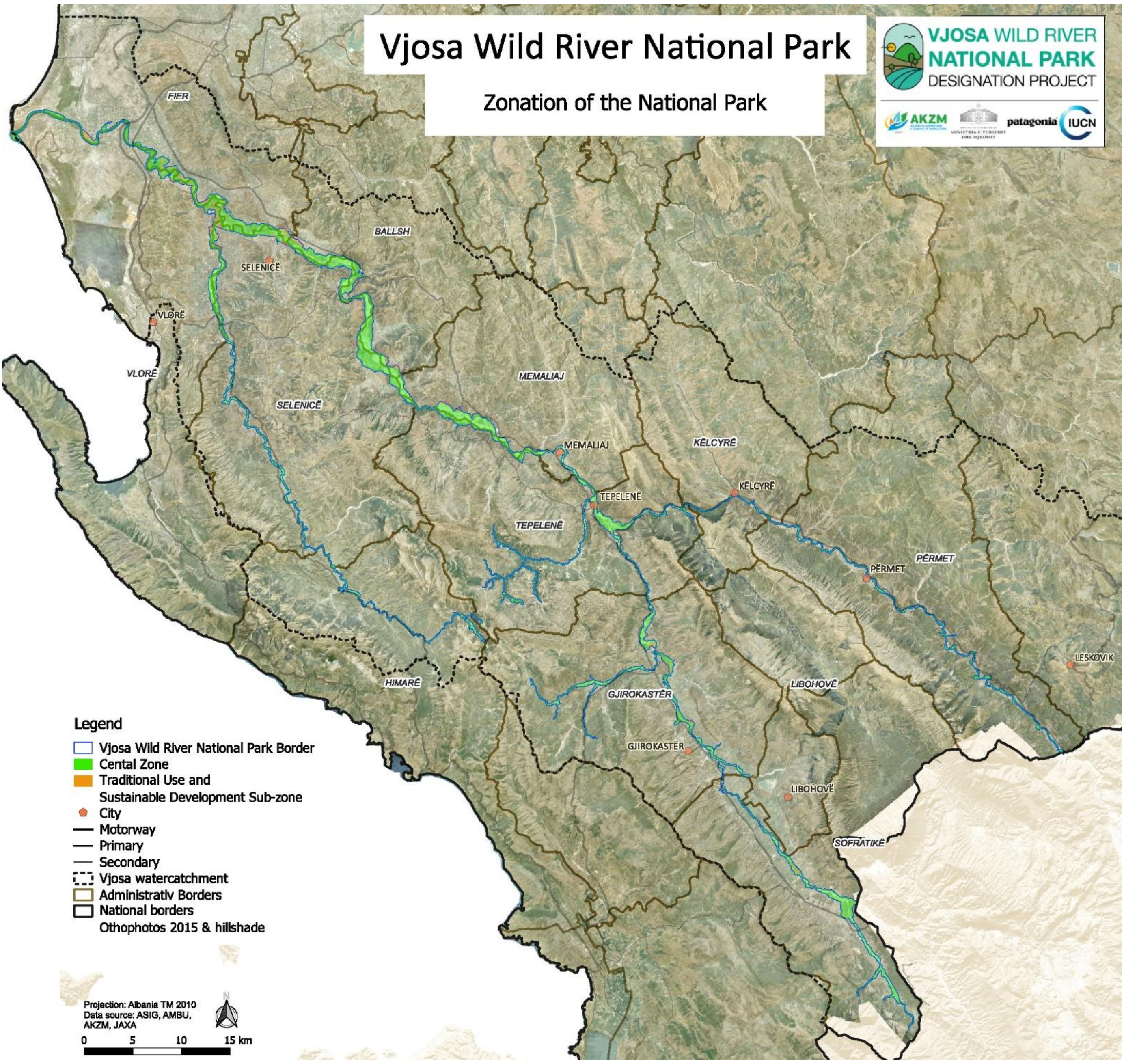

Figure 15: Overview map and zonation.

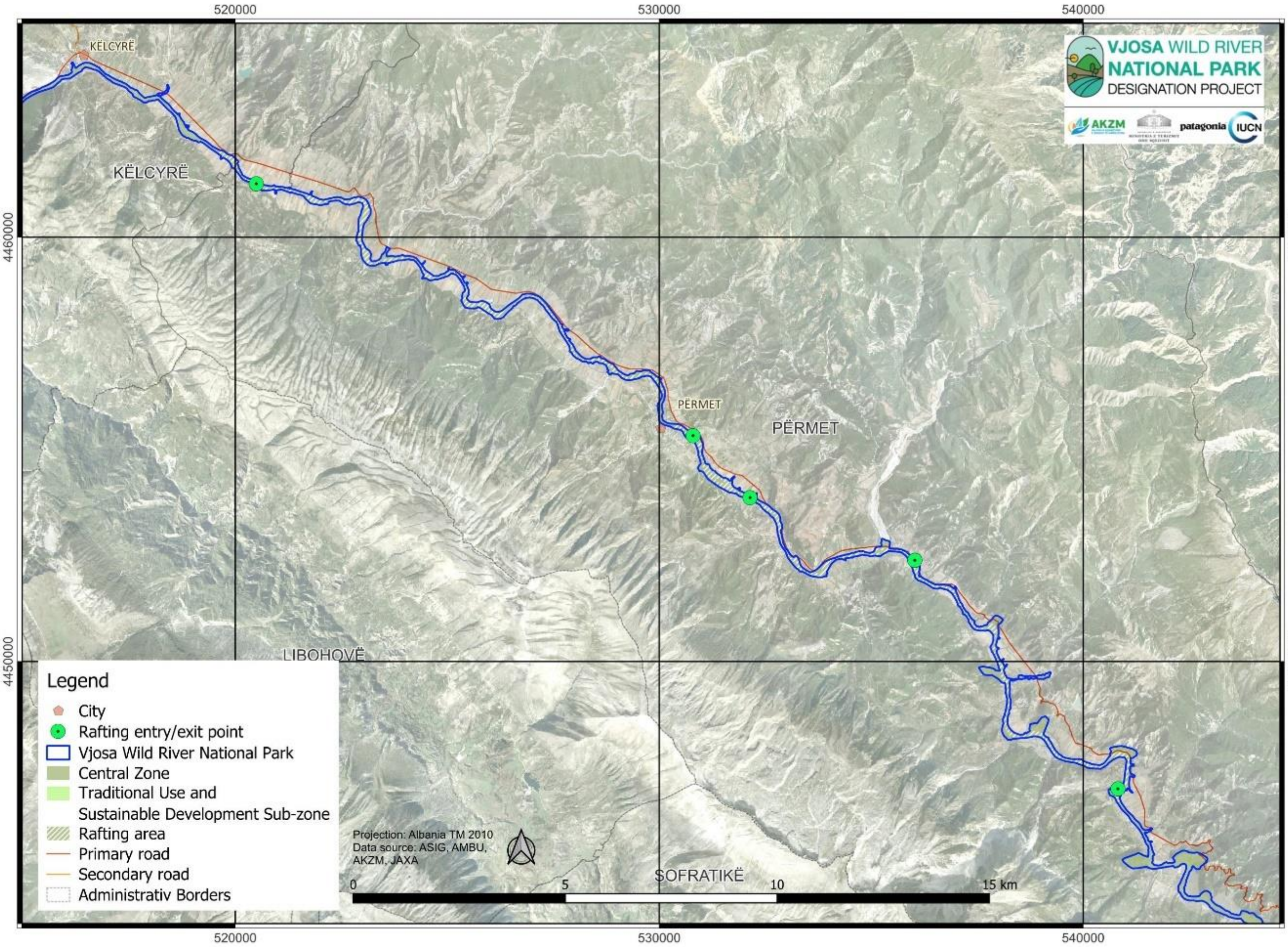

Figure 16: Rafting stretch on upper Vjosa around Permet with entry and exit points.

3.2 Riparian landscape features of the VWRNP

Unlike the missing systematic habitat mapping for the entire park it is possible to show the major riparian landscape features in four summarised groups (compare Annex 2):

1. The active channel comprises the entire river water bodies and gravel and sand bars/islands (6,033 ha).
2. The active floodplain includes all regularly flooded natural or near natural areas attached to the active channel (4,596 ha).
3. Natural bank strips, erosion slopes and canyons summarize natural and near-natural areas around the first two core feature groups (918 ha).
4. Other areas finally consist of small patches and erosion buffers in the active floodplain currently used for agriculture (1,188 ha).

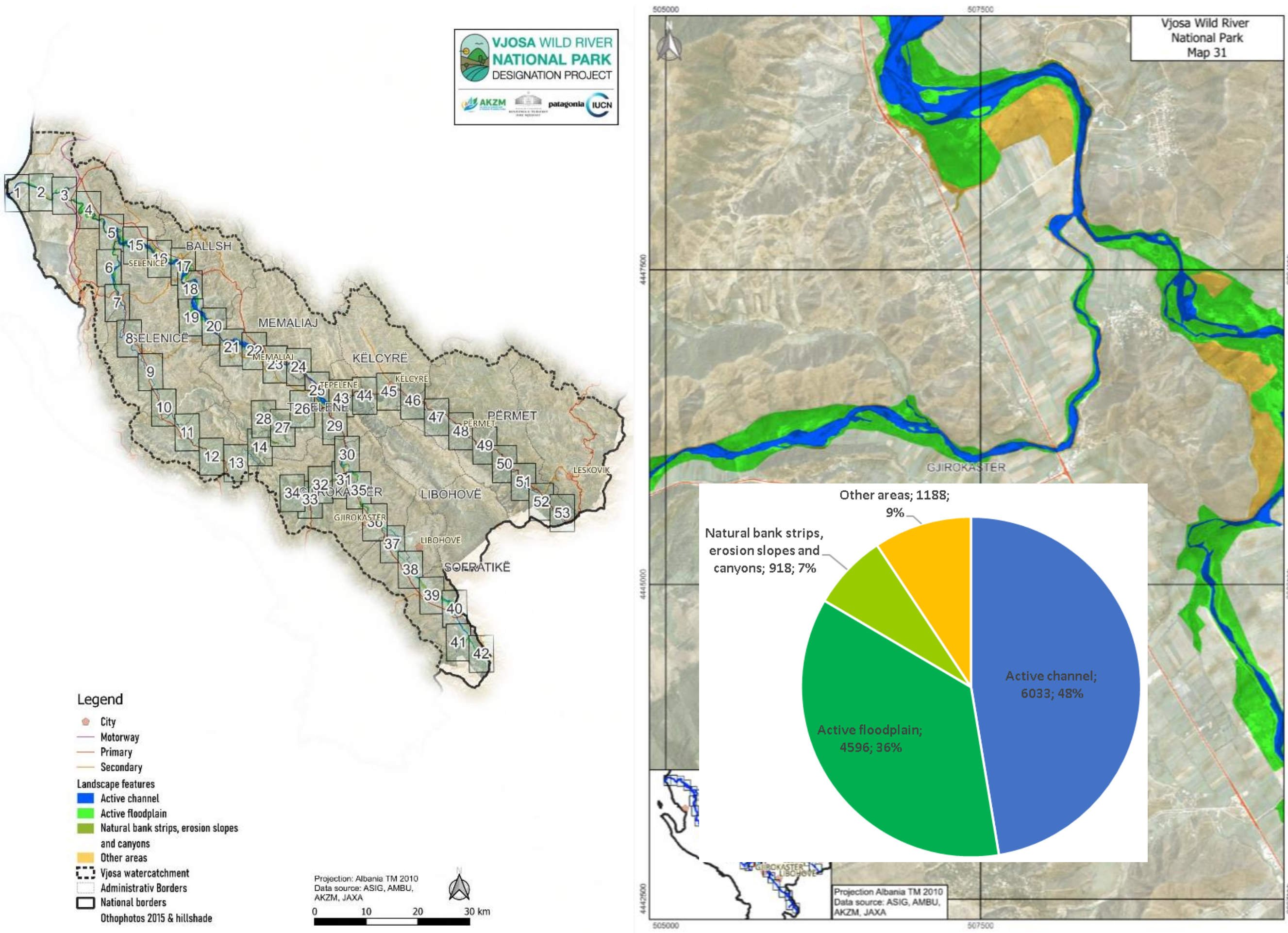

Figure 17: Overview of riparian landscape feature groups, example atlas sheet (compare Annex 2) and overall distribution.

3.3 Additional areas sustaining the VWRNP

3.3.1 Distribution of additional areas sustaining the VWRNP

In addition to the 400 km of Vjosa, Shushica, Bence and Drinos with Kardhiqi the extended analysis comprises the tributaries with an additional total length of 280 km (including 70 km of strongly impacted rivers by hydropower). The totally mapped area increase from 53,448 ha to 88.365 ha.

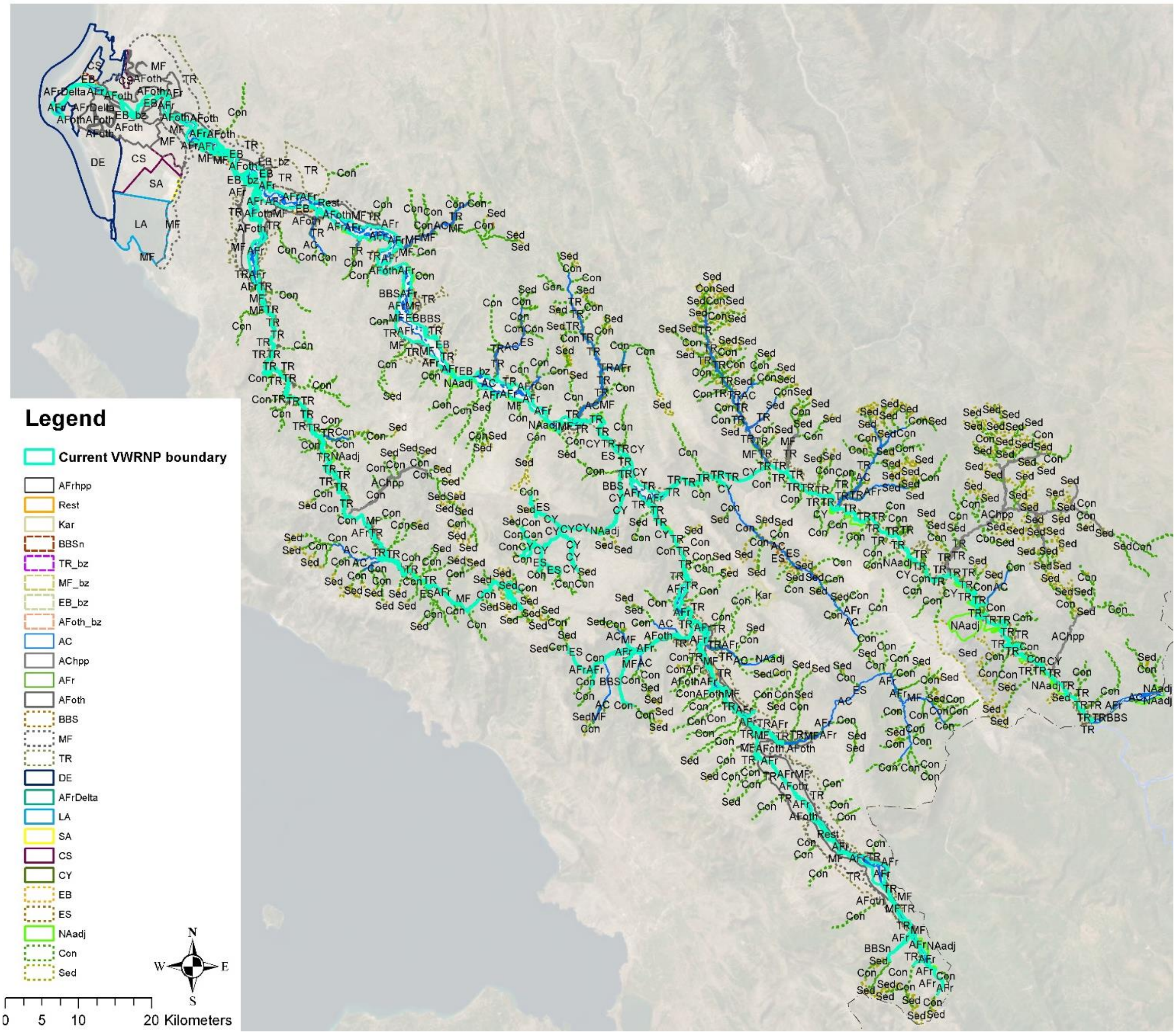

Figure 18: Overview map of all mapped landscape features in comparison to the existing park boundary (in cyan; for legend explanation compare table 1).

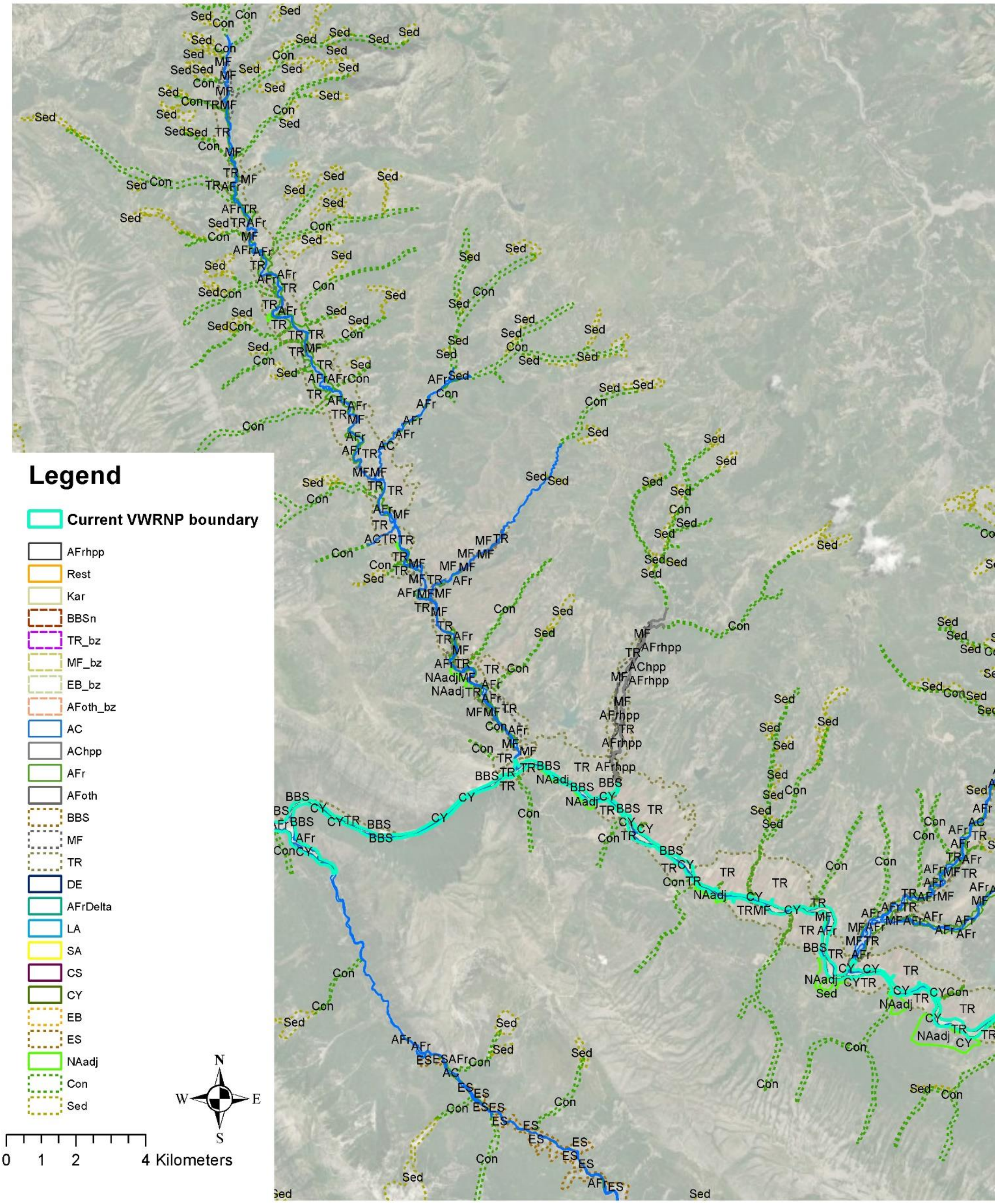

Figure 19: Example of the full thematical resolution of delineated area types (for legend explanation compare table 1).

The figure 20 below summarizes the additionally mapped features. Most important are the 723 ha mapped additional tributaries [AC] and their active floodplains [AFr] with 620 ha. Delta habitats are by far the largest to be considered in the future [AFrDelta, DE, LA] and the connectivity areas through smaller tributaries inside the catchment and the sediment origin areas increased significantly [Con, Sed].

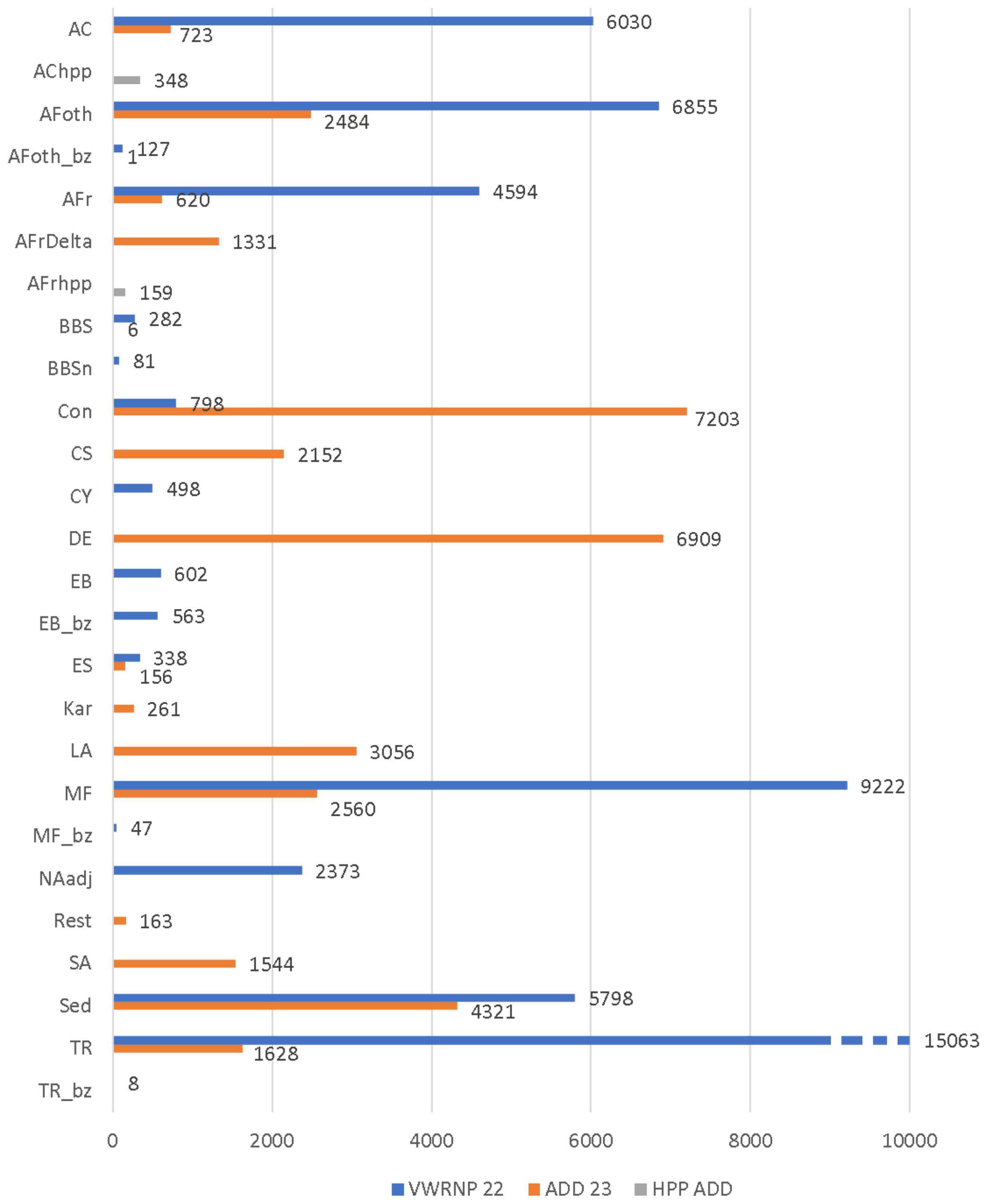

Figure 20: Distribution of additionally mapped area classes (orange and grey) in ha. In blue the current VWRNP (the overlapping potential restoration areas from the forest project are not included, all in one the total merged size for potential restoration areas is 379 ha, see chapter 3.4.4).

3.3.2 Cadastral overlay

Coverage of Active Channel and Active Floodplain

It is important to note that the existing cadastral data have significant shortcomings and restrictions in terms of coverage, spatial accuracy (with some municipalities not accurately geocoded), and thematic resolution (ownership). As a result, the overlay analysis should be considered merely a starting point, with subsequent planning required on a municipality-by-municipality basis.

The differences between Phase I and Phase II of the Vjosa project focus on the most relevant "Active Channel" and "Active Floodplain" whereby the parcels are categorized as private, public or mixed:

- Private are all those plots where houses and private land are clearly visible. Private land is recognized by active use of agricultural land (crops or ploughing signs).
- Public are rivers, streams, canals, roads, tracks and land without clear agricultural activities.
- Mixed are plots where part is private and part looks public, also when overlapping with rivers. All plots that have mixed or unclear ownership.

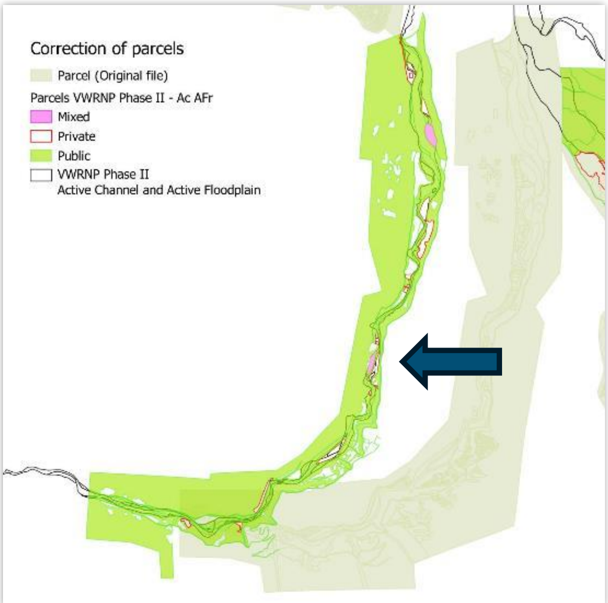

Figure 21: Location correction for parcels on Lower Bence.

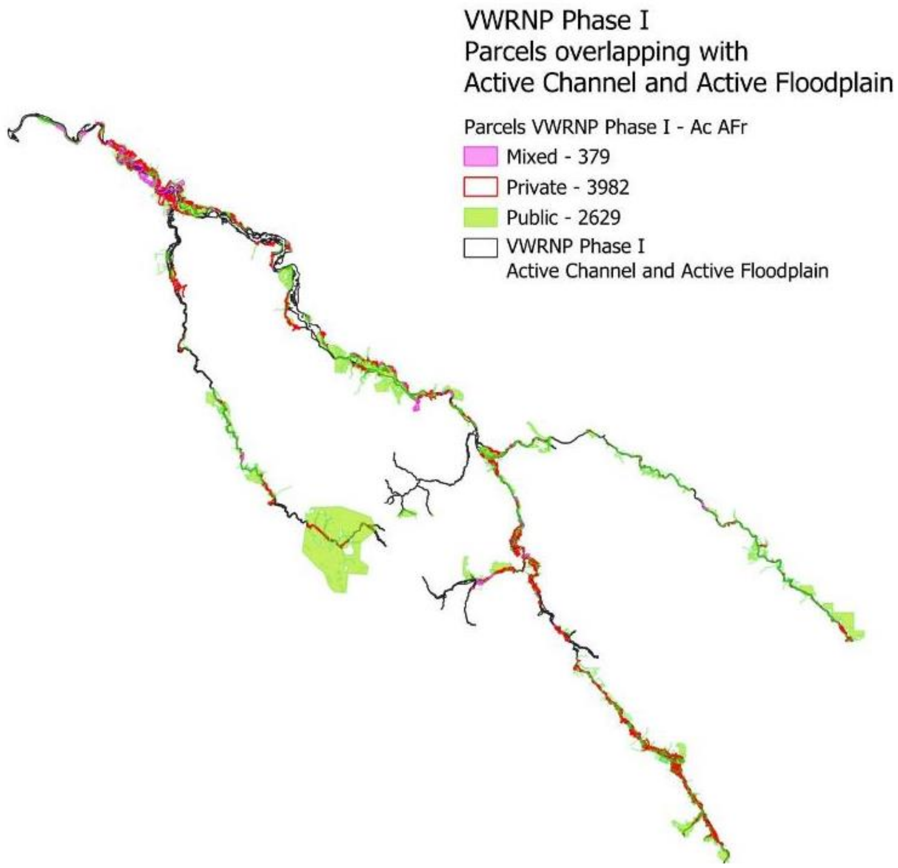

Figure 22: VWRNP Phase I cadastral overlay on active channel and active floodplain.

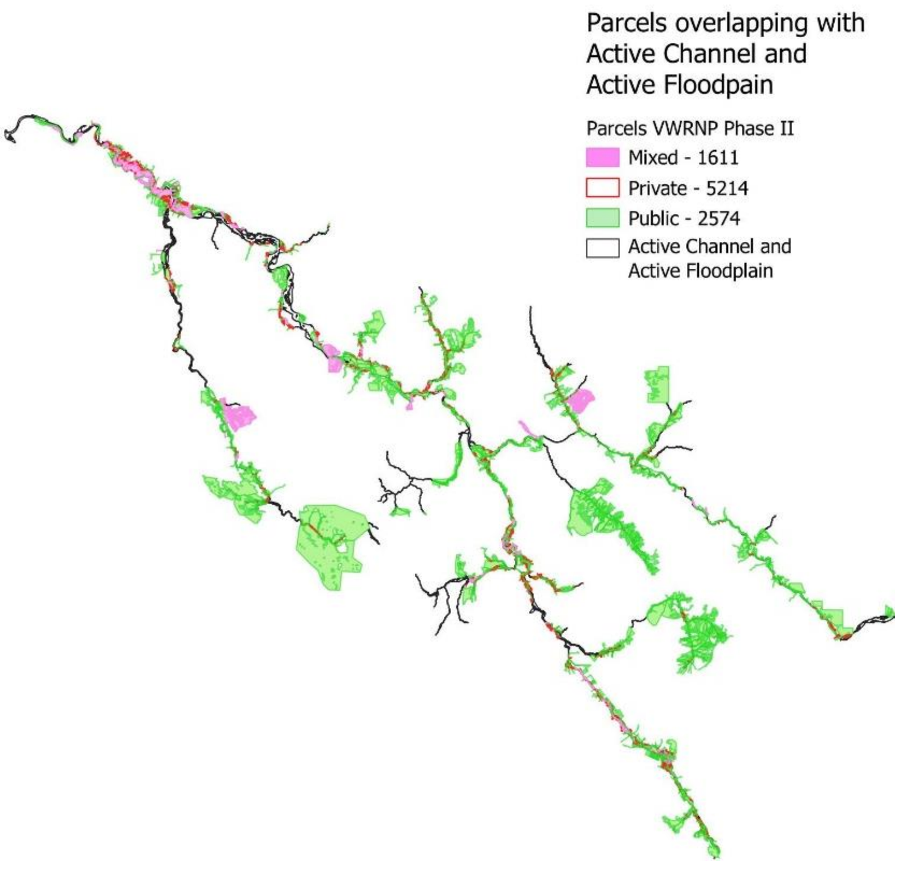

Figure 23: Phase II overlap of cadastre on active channel and active floodplain.

According to the findings, the sections currently outside the boundaries of Vjosa Wild River National Park, which consist of active channels and floodplains, will lead to the creation of numerous new cadastral parcels that overlap. Discrepancies from the previous cadastral mapping not only involve expanded areas but also adjusted parcels in the lower Bence region. The redistribution of public parcels towards mixed or potentially private ownership is observed based on expert assessment during image analysis.

Table 2: Distribution of parcels in the initial project phase and with the additional areas.

Parcels	Phase I	Phase II
Mixed	379	1611
Private	3982	5214
Public	2629	2574

The total mapped riparian landscape features (with exception of the numerous “connection areas and sediment origin areas) of the Vjosa catchment was also recorded and checked for overlap with cadastre. This resulted in a total of 89.903 parcels overlapping.

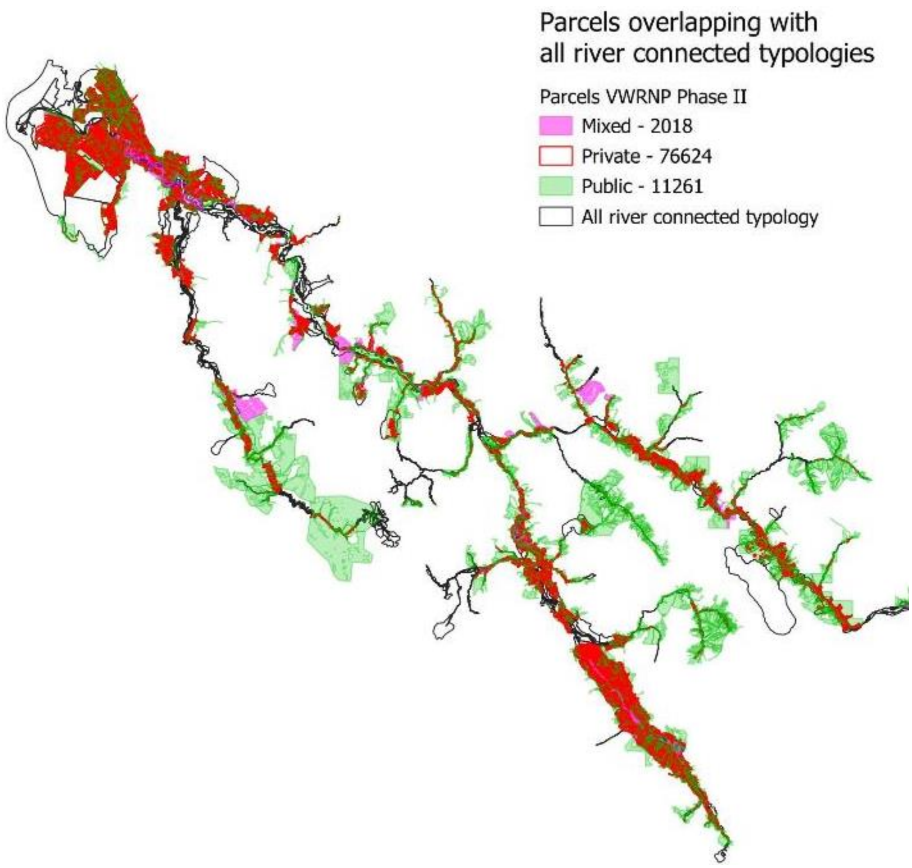

Figure 24: Phase II overlap with cadastre on all river landscape features.

As based on phase I the total amount of parcels that were identified intersecting with the current boundary of VWRNP was 9,441. Parcels which can be obviously addressed as "public" cover 75% of all analysed parcels, which is at least a good indicator and base for the preparation and designation of VWRNP.

Table 3: Size of parcels inside the important riverine area polygon.

	Number of parcels	Full parcels size in Ha	Parcel area inside riverine polygon		% of parcel inside riverine polygon
Public	3171	19.008,9	5.173,8	75%	27,22%
Private	5884	2.444,4	923,6	13%	37,79%
Parcels with issues	386	1.240,1	810,1	12%	65,32%
Total	**9441**	**22.693,4**	**6.907,5**	**100%**	**30,44%**

The atlas and detailed data on parcels per municipalities can be found as Annex 3.

3.4 Additional maps requested by team groups and official bodies

3.4.1 Boundary web map and administrative boundaries

The stakeholder meetings emphasized the importance of having a comprehensive understanding of the park boundaries, and it is crucial to find a suitable solution for this matter. In essence, the government system (ASIG Geoportal) provides access to the park boundaries, utilizing high-resolution imagery from 2018 as a standard reference. However, this system has certain limitations when it comes to verifying locations on-site. To address this issue, various alternatives have been examined and tested, yielding different outcomes. On the new VWRNP website a 'zoomable' map will be shown with the boundary

- A download of the KML data will be provided for the use in Google Earth and GIS.
- Two links to Google maps (North – South) which works on computer and mobile in the field. The extent of the VWRNP is: North West point: 40.667332 North by 19.312587 East (in Albania 2010: 4503832 by 441856), South East point: 39.8142108 North by 20.5908324 East (in Albania 2010: 4408977 by 550400).

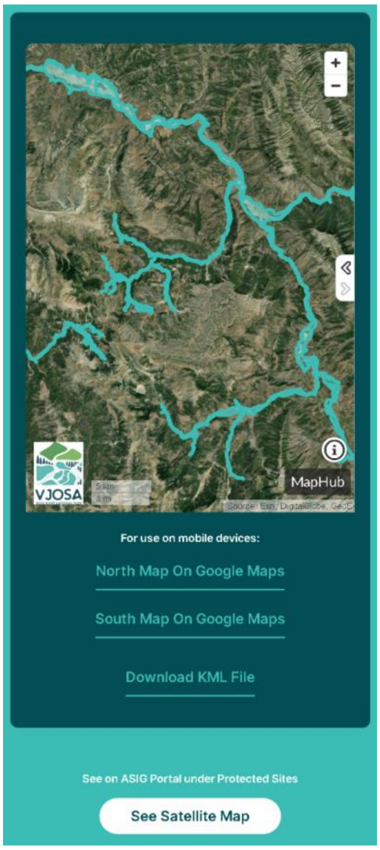

Figure 25: Web map also available on mobile devices for fast checking the boundaries for everybody.

Figure 26: Overview of Municipalities and cities within and along the VWRNP.

3.4.2 Map for protected areas natural and cultural monuments

At present, besides Vjosa WRNP there are 7 other parks in the catchment area of the Vjosa in Albania. One National Park, one protected landscape and 5 (managed) nature reserves. The VWRNP now overlaps or connects to all 7 of them (Syri i kalter (Blue eye) via the underground stream). There are 71 areas of natural monuments, of which 12 are directly connected to VWRNP, 6 others are within 100 meters of the boundary. Of the 60 natural monuments point features, only one existing interactions within 100 meters of the VWRNP. Of the 288 cultural monuments, 10 are within the VWRNP and another 5 within 100 meters.

There are 71 areas of natural monuments, of which 12 are directly connected to VWRNP and another 6 within 100 meters

OBJECTID	Monumenti	Qarku
2	Rrepet e Vurgut të Çorrushit	Fier

3	Rrepet e Festes&Rrepet e Poçemit	Fier
14	Viroi (mëma e ujit) i Gjirokastrës	Gjirokaster
33	Bredhi i Petranit	Gjirokaster
35	Guri i Petranit	Gjirokaster
36	Ujëvara e Progonatit	Gjirokaster
43	Guri i Atos	Gjirokaster
47	Kanionet e Nivicës	Gjirokaster
50	Rrepet e Grykës së Këlcyrës	Gjirokaster
51	Uji i Zi Këlcyrë	Gjirokaster
54	Mogilat e Vasjarit	Gjirokaster
65	Rrepet e Drashovices	Vlore

Name	Category	Area_Ha
Bredhi i Hotoves-Dangelli	PARK KOMBËTAR	36003
Bredhi i Kardhiqit dhe Rrezome	REZERVAT NATYROR I MENAXHUAR	4304
Bredhi i Sotires	REZERVAT NATYROR	4928
Bredhi Zhulatit	REZERVAT NATYROR I MENAXHUAR	936
Syri i Kalter	REZERVAT NATYROR	293
Zagori	REZERVAT NATYROR	24607
Pishe Poro-Narte	PEIZAZH I MBROJTUR	16431

Of the 288 cultural monuments, 10 are within the VWRNP, and another 5 within 100 meters.

OBJECTID	OID_	Name	POINT_X	POINT_Y
11	98	URA E BRATAJT	19,671944047	40,266961887
13	100	KEMBET E URES ANTIKE NEN KALANE E CERJES	19,694229591	40,263915589
14	101	UJESJELLESI I VRANISHTIT	19,719639742	40,226596213
22	125	TERMAT ANTIKE NE REXHEPAJ GORISHTAJ	19,742472222	40,495805556
53	347	URA E KOLLORCES	20,172874722	40,060180556
56	350	URA NE SUBASH	20,090857453	40,209201079
143	438	UJESJELLESI I BENCES	20,006465828	40,264516667
144	439	RRENOJAT E URES ANTIKO MESJETARE	20,024297265	40,29771099
151	446	URA METALIKE E LEKLIT	20,055628434	40,259171905
152	447	URA METALIKE E DRAGOTIT	20,079255354	40,292370141

- All 7 parks have links to VWRNP
- Of 71 Natural monuments 12 overlap
- Of 288 Cultural monuments 10 overlap

Figure 27: Protected areas as well as natural monuments.

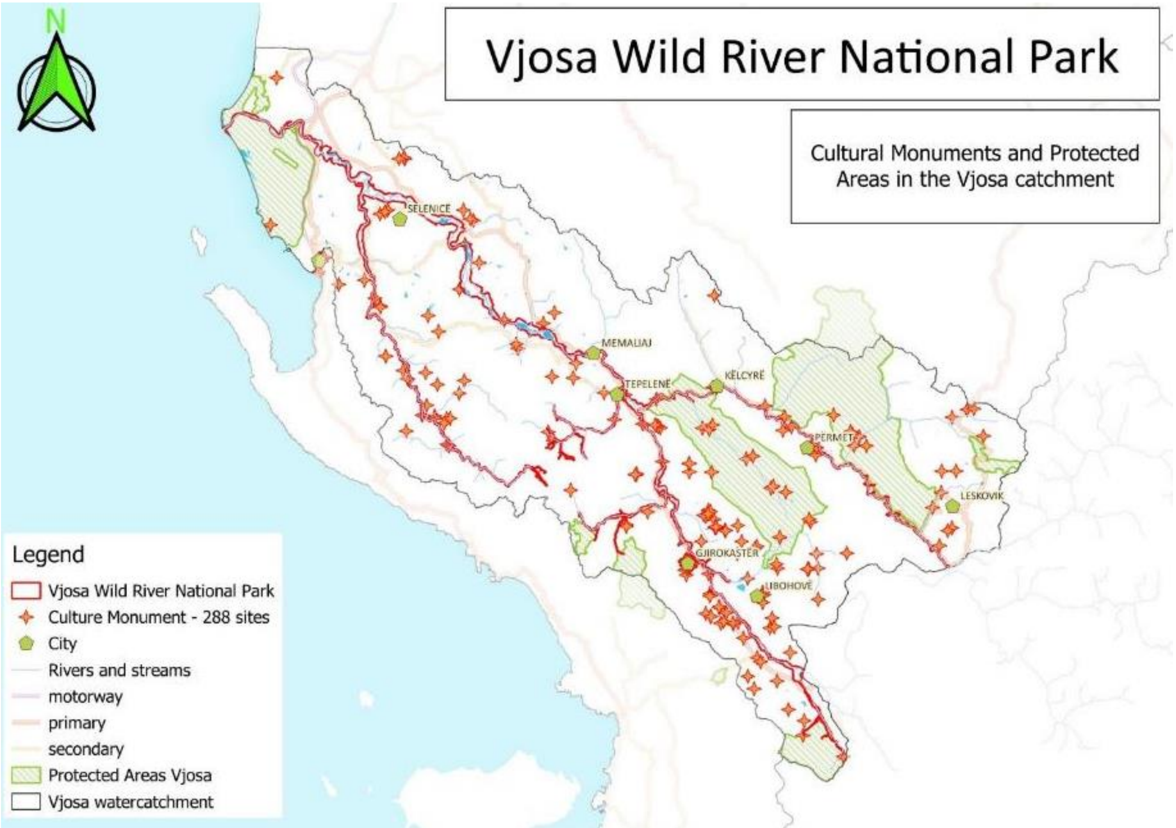

Figure 28: Protected areas as well as natural and cultural monuments.

3.4.3 Map for impacting activities

Data and locations of Karst springs and Caves as part of the hydorlogical system of the Vjosa are illustrated in . However “watersources” includes all usages from trinking water abstraction, abstraction for agriculture and hydropower as well as extraction for water bottle industry.

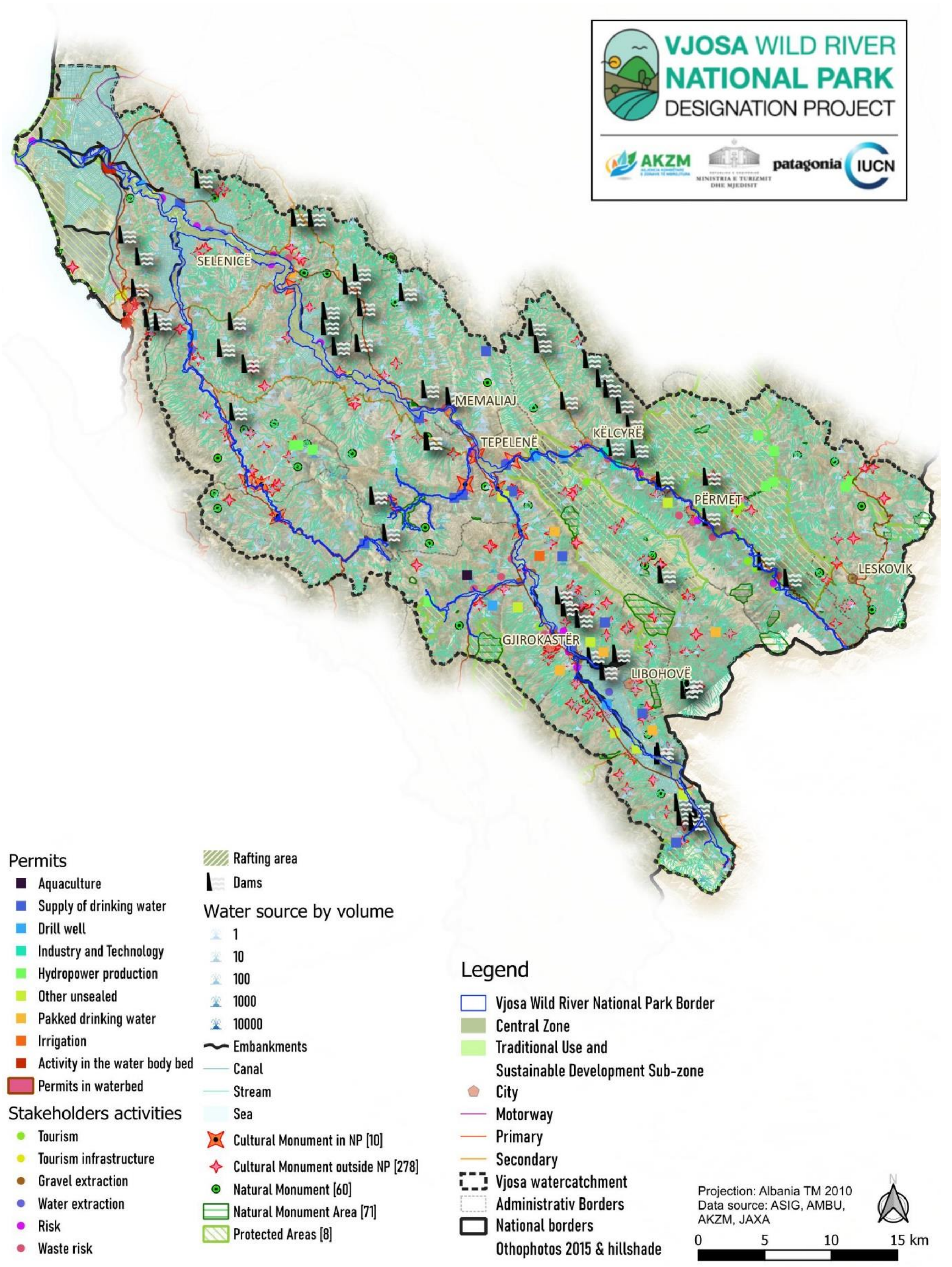

Figure 29: Initial map of activities and pressures as prepared for the management plan.

3.4.4 Map of potential restoration areas

Potential restoration areas comprise areas obviously mapped and separated within the landscape feature mapping as potential restoration areas (163 ha) and areas delineated in a forest restoration project (see IMP). The total merged area of all restoration sites is 379 ha (several forest restoration sites also overlap the already proposed areas).

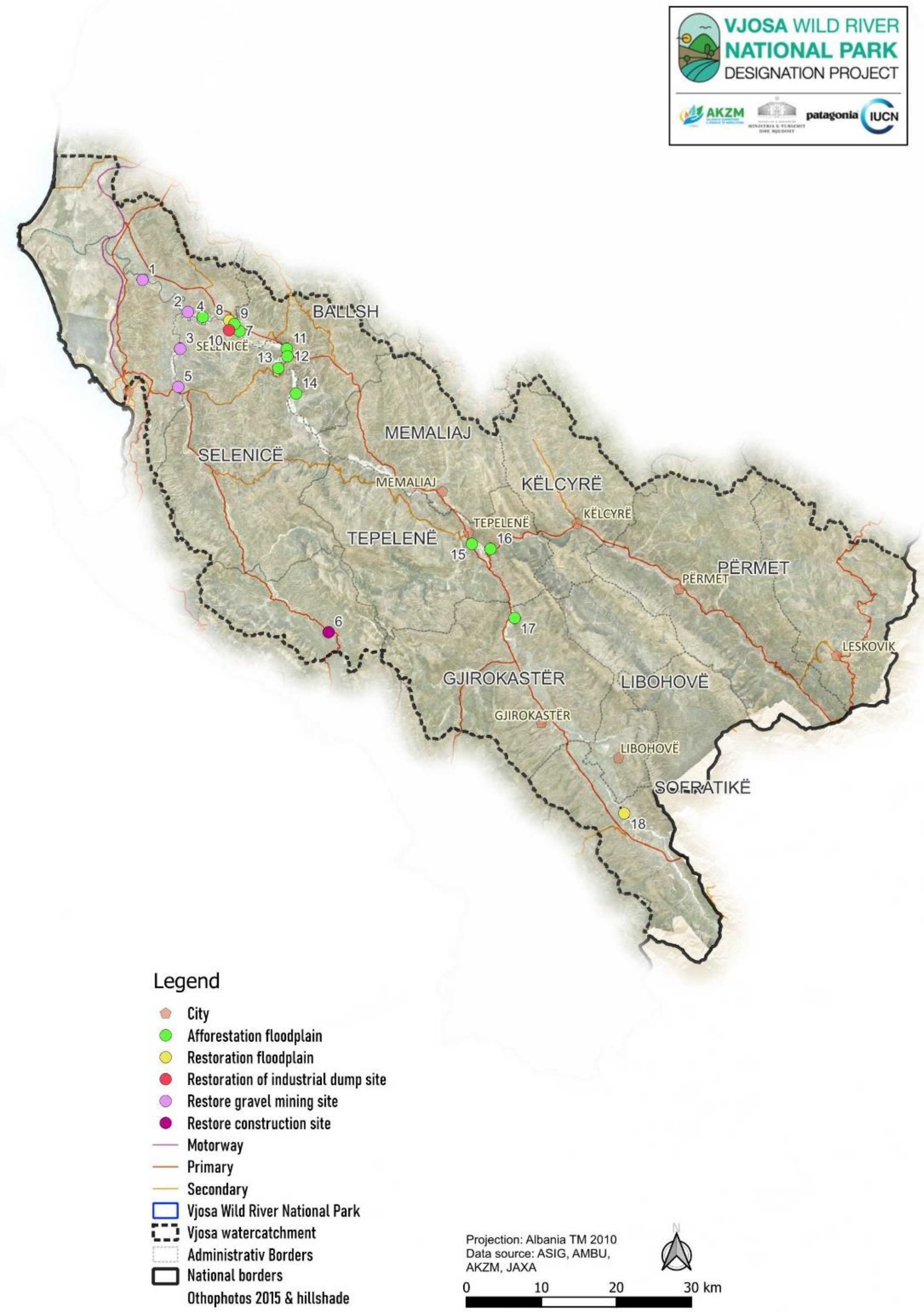

Figure 30: Potential restoration areas within the VWRNP.

4 Conclusions and Recommendations

The following conclusions and recommendations can be draw for the main outputs:

- The delineation of the park remains as defined in Phase I with two zones ""Central Sub-zone Level A" and secondly the "Traditional use and Sustainable development Sub-zone" supplemented by entry and exit sites for rafting (as sustainable tourism activity).
- The mapping of additional areas maintaining the natural processes of the VWRNP, in particular on tributaries, is a major step to complete the coverage of potentially valuable areas in respect to the further management and the long-term spatial planning in the Vjosa basin. There is a proposal how to consider the additional areas. First time a short list with potential restoration areas inside the VWRNP was added.
- Various additional maps were provided to the park implementation groups and NAPA, namely for the IMP.
- This project phase close the gaps regarding the most important tributaries and areas sustaining the VWRNP in the Vjosa basin and supported the development of the first management plan.
- Based on the experiences the planning and implementation of a regular GIS and data management unit for the VWRNP is strongly recommended.

5 References

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6 Annex

The following material can be found in the separate final data package attached to this report:

“VWRNP_PhaseII_FinalPackage290324”

1. Annex 1 A3 VWRNP Zonation.pdf
2. Annex 2 A4 Atlas 25k VWRNP Landscape Features.pdf
3. Annex 3 A4 Atlas 25k VWRNP parcels.pdf
4. Annex 4 Parcel Municipal Cadastre.xlsx
5. Annex 5 A3 Impact Activities.pdf
6. Annex 6 A4 Atlas 25k VWRNP Impact Activities.pdf
7. Annex 7 GISdata Additional Landscape Features Sustaining VWRNP.zip
8. Annex 8 GISdata Potential Restoration Areas.zip