



Biodiversity Offset Strategy, Morava Corridor Motorway Project, Serbia

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C. Ng, G. Walsh, S.R. Livingstone and E. Tatum-Hume

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1 Executive summary

The Morava Motorway Project (the Project) has committed to a suite of mitigation actions to avoid, minimise and rehabilitate Project impacts to identified priority biodiversity (2U1K 2020). The Project is following international good practice Performance Standard 6 (IFC 2012) for biodiversity in order to adhere to Project lender requirements. Through this process it was identified that there will be some remaining residual impacts on Critical and Natural Habitat and associated species (TBC 2020a). Therefore, biodiversity offsets are necessary to compensate for the residual impacts to achieve net gain for Critical Habitat-qualifying biodiversity and no net loss for Natural Habitats (TBC 2020b).

This Biodiversity Offset Strategy sets out how the Project will develop, implement and monitor a set of offset actions. Offset actions are needed for two types of terrestrial habitat: 1. Thermophilous woodland and 2. Permanent mesotrophic pastures and aftermath-grazed meadows (referred to as meadow) (with one associated Critical Habitat-qualifying species – the Domogled Meadow Bush Cricket (*Broughtonia domogledi*)), and three aquatic habitats: 1. The Zapadna Morava River (with two freshwater species of stakeholder concern), 2. Riparian and gallery woodland, and 3. Naturalised ponds (TBC 2020b).

Offset actions have been proposed for each habitat type developed through a screening approach and a focused workshop with a group of key Serbian stakeholders and are presented in this Strategy. An overview of the proposed actions is summarized in Figure A. Preliminary forecasts of biodiversity gains based on rehabilitation of areas impacted by the Project plus the proposed offset actions indicate that the Project can achieve an overall net gain.

Type	Terrestrial		Freshwater	
Target biodiversity	CH: meadows (proxy for <i>Broughtonia domogledi</i>)	NH: thermophilous woodland	NH: Zapadna Morava River and associated riparian woodland	NH: naturalised ponds
Offset approach	Site based conservation management	Site based conservation management	Supporting activities identified by the Serbia Water Management Plan	Site based conservation management
Location	Motorway protected area and/or protected agricultural areas working with farmers	Existing or proposed protected areas (4 potential sites)	Throughout Zapadna Morava River basin (main stem river and tributaries)	Project borrow pits and cut off river meanders
Net gain mechanism	Conservation management activities to create and maintain meadow habitat	Conservation management activities to avert loss of woodland habitat and restore degraded habitat	Conservation management focused on water quality and restoring degraded habitat	Rehabilitation and management to create and maintain nature-friendly pond habitat

Figure A. Overview of the Morava Project Offset Strategy

There are some risks identified with whether the proposed actions adhere to the key principles of biodiversity offsets (Section 2.3), for example, issues around additionality where proposed actions are potentially the same as actions being developed in national plans (e.g. the Serbia Water Management Plan). However, there is a need to understand these risks in more depth, and there is also opportunity where the Project could contribute meaningfully to National

initiatives and Serbia's overarching Biodiversity Strategy (Ministry of Environment and Spatial Planning 2011).

The Project has completed the screening phase of developing the offsets program. The next phase is the planning phase which includes assessing the feasibility and potential risks of the proposed actions at a deeper technical level, requiring biodiversity expertise and practical planning, as well as at a political level, involving further focused stakeholder engagement, particularly with key offset partners. This will determine the final set of offset actions and activities, with clear roles and responsibilities outlined in an Offset Management Plan.

The required enabling mechanisms to support and ensure success for the offset program will also be developed in the planning phase, and include a governance-management structure, long-term financing, and the management of consistent and transparent stakeholder engagement. A monitoring plan and no net loss/net gain tracker will also be developed to monitor and track the offset activities progress towards achieving no net loss/net gain of Project impacted biodiversity.

The next steps to further develop and assess feasibility of each of the proposed offset sites and activities are mapped out in [Sections 4](#) and [5](#), and high level next steps for the planning phase are set out in [Section 9](#).

2 Introduction

This Biodiversity Offset Strategy (Offset Strategy) is undertaken for the Morava Corridor Motorway Project (the Project) in the Republic of Serbia (Serbia). The Project is required by international lenders to align with International Finance Corporation (IFC) Performance Standards, including Performance Standard 6 (PS6) on Biodiversity Conservation and Sustainable Management of Living Natural Resources (IFC 2012).

Based on a Critical Habitat Assessment (CHA) (TBC 2020a), a Residual Impact Assessment (RIA) and subsequent rapid field work (TBC 2020b), one species of bush-cricket (*Domogled Meadow Bush Cricket Broughtonia domogledi*) was found to qualify the Project as being in Critical Habitat; the meadow habitat that supports the bush-cricket is Critical Habitat. Terrestrial and aquatic Natural Habitat is also present in the Project area and the updated Biodiversity Impact Assessment (BIA) and RIA (TBC 2020b) have defined the offset requirements to compensate for residual impacts. To align with IFC PS6, the Project will aim to achieve a net gain for Critical Habitat and no net loss for Natural Habitat, where feasible.

2.1 Purpose and scope

This Offset Strategy presents an outline of the Project's framework for offset design and implementation, including broad actions that will be undertaken to achieve the required biodiversity gains. The Offset Strategy serves the following purposes:

- To serve as a framework to guide the planning and implementation of the Project's biodiversity offset commitments to align with IFC PS6;
- To set out the Project's principles, objectives and commitments in relation to biodiversity offsets;
- To provide an outline of the approach to developing and implementing a biodiversity offsets program that will adequately compensate for significant residual impacts and achieve no net loss (NNL) for Natural Habitat and a net gain (NG) for Critical Habitat.

2.2 Description of the Project

The Project is a 112 km motorway to be developed approximately 200 km south of Belgrade city, in the West Morava River Valley. The motorway will run from the Pojate village to Preljina near Čačak city, along a 900 metre (m) right of way.

The Project will include construction of the following permanent structures: (i) above ground structures such as bridges, and overpasses; and (ii) hydrotechnical structures, including cutting off meanders and creating straightened and channelised sections of river, revetments and embankments to prevent flooding and erosion of the Zapadna Morava River. Minor upgrades/movement to some existing high voltage power lines will be undertaken, with no new infrastructure or re-alignment required.

Temporary site facilities such as quarries and borrow areas, camp sites and storage areas, crushers, concrete batching plants and asphalt plants, and access roads will also be installed for the construction phase of the Project.

The Project owners are the Ministry of Construction, Transport and Infrastructure, Corridors of Serbia and Roads of Serbia. The Project is being supported by Bechtel and ENKA (BEJV) throughout the construction phase. The Project is jointly designed and built by BEJV with river regulation designed by the Jaroslav Ceri Institute (JCWI), and the motorway by Institute of Transportation CIP, Highways institute. Implementing the biodiversity offsets program is the responsibility of the Project owners and will likely extend through the life of the Project.

2.3 Offset principles

The Project intends to follow the industry best practice guidance on biodiversity offsets to ensure its design is appropriate. To ensure alignment with international best practice as per the Project lenders requirements for financing, the Project will apply the following key principles based on those developed by the Business and Biodiversity Offsets Programme (BBOP 2012):

1. **Adherence to the mitigation hierarchy:** All appropriate avoidance, minimization and on-site rehabilitation measures will be implemented or explored, and reasonably ruled out before applying biodiversity offsets (as per the Project's Biodiversity Management Plan).
2. **Equivalence:** Biodiversity gains from offsets will be of similar or higher conservation priority biodiversity, i.e., 'like for like or better', to demonstrate that gains are comparable in type, location, and time.
3. **Additionality:** Biodiversity gains will be clearly attributable to the Project's actions and go beyond what would have occurred, in the absence of the offset.
4. **Landscape context:** Offsets will be designed at the landscape-level, to account for connectivity across the landscape, avoiding fragmentation, and maintaining flows of ecosystem services, and will align with Serbian national and regional biodiversity conservation priorities.
5. **Long-term outcomes:** Biodiversity offsets will use an adaptive management approach, incorporating monitoring and evaluation, to secure outcomes that last at least as long as project impacts.
6. **Stakeholder participation:** Offsets will be based upon appropriate and transparent stakeholder consultation. The Project will engage stakeholders in offset design to ensure offsets are the technically valid, politically appropriate, while meeting the local context and needs of the community.
7. **Transparency:** Disclosure of the offset design, implementation and outcomes to the public will be undertaken in an open, transparent and timely manner.

2.4 Offset targets

Offset targets were developed based on the residual impact assessment undertaken as part of the BIA (TBC 2020b). Habitat was considered an appropriate proxy¹ for assessing impacts to Critical Habitat-qualifying species.² A quality and area metric, (quality hectares (QH) for terrestrial habitat and quality kilometers (Qkm) for riverine habitat), was used to measure Project impacts to Natural and Critical Habitat. In this Offset Strategy, these targets are weighed against potential gains made through planned on-site rehabilitation and the proposed offset activities presented in this document to present the potential for the Project to achieve NNL/NG outcomes.

Biodiversity offsets will be necessary to compensate for residual impacts and achieve a net gain for Critical Habitat (permanent mesotrophic pastures and aftermath-grazed meadows), and no net loss for Natural Habitat (Zapadna Morava River and riparian and gallery woodland, thermophilous deciduous woodland, and naturalised ponds³).

A summary of the residual impacts and offset targets for terrestrial habitat and riverine habitat is presented in Table 1.

Table 1. Biodiversity offset targets for the Project (Source: BIA TBC 2020)

Habitat types	Offset target (QH/Qkm)
Terrestrial habitats	
Permanent mesotrophic pastures and aftermath-grazed meadows (meadows)	Greater than 16 QH
Thermophilous deciduous woodland (thermophilous woodland)	Equal or greater than 234 QH
Aquatic habitats	
Highly artificial non-saline standing waters (referred to as naturalised ponds throughout this document)	Equal or greater than 6 QH
Riparian and gallery woodland	Equal or greater than 338 QH
River (Sections 1, 2 and 3)	Equal or greater than 26 Qkm

¹ A proxy is an alternative measure used as a surrogate or stand in for a variable that is difficult to measure

² Permanent mesotrophic pastures and aftermath-grazed meadows was used as a proxy for the Domogled Meadow Bush Cricket (*Broughtonia domogledi*), and river habitat as a proxy for two species of stakeholder concern. Refer to the Updated BIA for further information (TBC 2020b).

³ Naturalised ponds are previously artificial waterbodies that are saturated for most of the year. In the vicinity of the Project, small artificial waterbodies support a variety of native plant and bird species that are nationally protected. While considered as highly artificial areas, the retained ecological functionality of these areas, plus the presence of species of largely native origin within these naturalized waterbodies meets the definition of Natural Habitat under IFC PS6.

2.5 Generation of biodiversity gains

There are two main approaches to generating biodiversity gains via an offset: averted loss offsets and restoration offsets.

Averted loss offsets prevent biodiversity loss from occurring in a situation where there is an ongoing loss or a threat of imminent projected loss, because of factors unrelated to the Project. These offsets typically involve enhancing the management of an area or developing specific actions to reduce a threat to a species or habitat. Offset gains are estimated by calculating the difference between: (i) the predicted biodiversity loss without the offset, and (ii) the predicted reduction in loss as a result of the Project's offset activities.

Restoration offsets repair past damage to biodiversity that was not caused by the Project. Offset gains are estimated by calculating the difference between: (i) the baseline habitat quality in restoration area, and (ii) the habitat quality in the same area at the end of restoration activities.

3 Offset strategy approach

3.1 Offset site and activity selection and planning process

The selection of offset sites and activities is based on a filtering approach to choose the most technically, politically and socially feasible options that will achieve the offset targets. The process involves the following two-phase approach:

1. **Screening** - Develop a set of potential offset sites and activity options for each priority biodiversity feature based on offset feasibility criteria (Table 2), and consultation with a small number of selected experts and relevant stakeholders.
2. **Planning** - Carry out an assessment on the proposed set of offset sites and activities from the screening phase to ensure that they will work in practice (from a management and financial perspective), and technically – i.e. provide the biodiversity gains needed to offset the Project impacts. This planning phase will include the development of the Offset Management Plan and will include significant stakeholder engagement.

The Project has recently completed the **screening phase**, therefore this strategy presents the set of potential offset options developed through that process. The **planning phase** will follow on from the screening phase, involving more in-depth assessment of how the offset activities will achieve the conservation gains and stakeholder input, and will be completed with the final set of offset activities set out in a management plan, with clear roles and responsibilities ready for implementation.

3.1.1 Screening phase approach

A two-pronged approach was undertaken to identify potential offsets sites and activities; a desk-based screening of offset options was followed by a workshop with national stakeholders

to further assess the feasibility of the options and gather additional ideas. The selected set of offset options for the identified priority biodiversity are presented in [Sections 3 and 4](#).

1. Desk-based screening: Identified an initial list of potential offset sites and actions that can theoretically meet Project offset targets. Application of the offset selection criteria of each offset option was undertaken based on key principles for offsets (Table 2). (More details on the feasibility criteria used can be found in Appendix 1: Offset feasibility criteria).

Table 2. High-level feasibility criteria applied to offset options

Feasibility question	Description
How will the offset generate gains, are they likely to be enough to meet the required target?	Will the activities generate averted loss or rehabilitation gains and to what order of magnitude gain might be expected?
Are offsets comparable (or is trade acceptable)?	Will the offset achieve equivalent gains or will an exchange take place (i.e. will it be “like for like”, or “like for better”). If an exchange may occur, will that likely be acceptable to stakeholders.
Are gains additional?	Assessment of whether the gains would be new and therefore can be attributed to the Project
Are gains lasting?	Likelihood of whether the offset can be made permanent to ensure it provides gains beyond the lifetime of the Project.
Does it align with national priorities?	Whether the offset is guided by and contributes to national conservation priorities.

2. Initial stakeholder engagement: Engagement with various government, academic and NGO stakeholders was undertaken via a virtual workshop on 30 November and 1 December 2020. The workshop was held by BEJV and the Corridors of Serbia, and facilitated by The Biodiversity Consultancy (TBC), and aimed to:

- Develop a shared understanding of how the Project landscape is currently being used and managed;
- Assess the feasibility of potential offset options and identify additional options to offset impacts on biodiversity;
- Identify any key risks and enabling conditions that would influence offset success; and
- Generate understanding and support for the Offset Strategy amongst stakeholders.

Full minutes of meetings are presented in [Section 12 Appendix 2](#), along with stakeholder concerns and inputs from the workshop integrated within [Sections 4 and 4.2.2](#). The workshop

was the first of a series of stakeholder engagement activities that will be required as part of the overall offset design. Further information on stakeholders and engagement process is provided in Section 6.

3.2 Enabling mechanisms to support offset actions

All offset programs require a number of enabling mechanisms to ensure that they are appropriately supported to succeed. Such mechanisms include an appropriate governance and management structure to have oversight and guide the program and to ensure smooth implementation and every day running, a financial model to guarantee the required funds, and transparent and sustained stakeholder engagement. These elements of the program will be developed throughout the Planning phase. There is more detail on these aspects of the program in Sections 5, 6 and 7.

4 Terrestrial offset

4.1 Potential offsets for meadow habitat

Meadow areas exist as small patches (under 6 ha) and are scattered over a large area with little connectivity between patches within the Project's Area of Influence (Aol). The meadow areas are generally part of farms that are owned and managed by individuals. It would likely be challenging and costly for the Project to buy-up sufficient areas to create a single offset area large enough to meet the meadow offset target. Two alternative approaches were identified that could theoretically meet the Project's offset targets:

1. Create meadow habitat within the motorway protection zone.
2. Work with farmers to set-aside and manage areas of farmland for meadow conservation.

Both options would require a grazing and/or cutting regime to prevent succession to scrub and woodland, while ensuring the regime is not overly intensive and damaging to species richness.

Creation of meadow habitat in the motorway protection zone: The Project has already allocated fixed protection zones along the motorway: (i) immediate protection zone - 40 m on each side; (ii) wide protection zone - 40 m on each side; and (iii) large protection zone - 235 m on each side. It is not clear if these protection zones are only part of the construction phase or if they will be maintained throughout the operational lifetime of the Project. Within the protection zones there are different habitat types including meadow habitat, but the majority of the zone is comprised of Modified Habitat. Depending on the ownership and future management of the protection zone there is scope for the Project to restore areas of Modified Habitat into meadow habitat.

Management of farmland for meadow conservation: Setting aside farmland for biodiversity conservation is generally considered an effective approach for enhancing biodiversity within

farmland in European landscapes (Dicks *et al.* 2019). Set asides can involve all or part of existing meadow areas in agricultural fields to be withdrawn from intensive production activities and subjected to low/no fertilizer or chemical inputs, with a proper grazing, tillage or mowing regime. Voluntary contract agreements with farmers can be made to set-aside a portion of their land containing existing meadow to be maintained for the period of which the agreement is made for, in return for payment.

4.1.1 Forecast of gains for meadow habitat

Create meadows within the motorway protection zone

Gains are forecast by assuming that areas of Modified Habitat in the protection zone can be rehabilitated into meadow habitat resulting in a gain in habitat quality from a baseline of '0' to a 50% quality score. Monitoring of meadow rehabilitation projects has shown that rehabilitation can be effective but may take up to 10 years to attain a good condition (Dicks *et al.* 2019). Within the protection zone it is estimated that there is over 5,000 ha of Modified Habitat. Of this, 33 ha would be required to be converted to meadow habitat and managed to generate the greater than 16 QH gain required (Table 3).

Table 3: Forecast of terrestrial habitat offset gains for creating meadows within the motorway protection zone

Habitat	Offset target (QH)	Baseline Q	Offset area required	Potential gain (0.5 Q per ha)
Meadow	16	0	33 ha	16.5 QH

Set-aside and manage farmland for meadow conservation purposes

Meadow areas in the wider Aol were precautionarily estimated to have a benchmark quality of 60% in line with the BIA (TBC 2020b). Gains are forecast by assuming that a better meadow management regime can improve habitat quality by 15% (Table 4).

Table 4: Forecast of meadow gains from a managed farmland offset

Habitat	Offset target (QH)	Baseline Q	Offset area required	Potential gain (0.15 Q per ha)
Meadow	16	0.6	110 ha	16.5 QH

4.1.2 High level feasibility assessment and next steps

- A high-level feasibility assessment was undertaken for both options (Table 5) and shows that both are theoretically possible but further investigation is required. Setting-aside farmland for meadow protection and conservation may require long term funding to maintain the offset gains and further understanding of existing agri-environment measures is required to understand if the action would be additional and whether the Project could use existing management mechanisms to deliver the gains. Creating

meadow areas within the protection zone of the motorway appears to be viable, however further understanding of who owns the protection zone, who has responsibility for its management and what is the planned end use of the area is required. Therefore, further investigation of both options is recommended, and the next steps for the planning phase are outlined in Table 6.

Table 5. High-level feasibility assessment of offsets for meadows

Feasibility of offset to meet key design requirements	Set-aside areas of farmland with meadow habitat		Create meadows within the motorway protection zone	
	Finding	Comments	Finding	Comments
Are offsets going to provide gains?	Possible	There is potential for some level of gain to be generated through averting the conversion of meadow areas into farmed land and/or improving the quality of existing meadow habitat. Gains per hectare are unlikely to be very large.	Likely	Based on successful meadow creation examples across Europe, restoration can take between 5 to more than 10 years to show a positive outcome (Dicks <i>et al.</i> 2019). It is therefore likely that gains can be generated over the time scale of the Project.
Are offsets comparable (like for like or better)?	Likely	Meadow areas within the Aol are used for animal grazing, comprising species such as <i>Cichorium intybus</i> , <i>Artemisia vulgaris</i> , <i>Lepidium darba</i> , <i>Amorpha fruticosa</i> , <i>Medicago Lupulina</i> , <i>Medicago sativa</i> , <i>trifolium pretense</i> , <i>Trifolium repens</i> , <i>Vicia Cracca</i> and <i>Poa annua</i> (2U1K 2020). Identifying farmland areas with a similar land use history to serve as set-asides, will likely have a similar species composition and habitat structure to the meadow areas that will be impacted.	Likely	Creation of meadow habitat would aim to replicate the composition and abundance of natural meadow species to ensure a like-for-like meadow habitat.
Are gains additional?	Possible	Further investigation with the relevant stakeholders is required to understand the extent to which existing agri-environment measures have been implemented under the Rural Development Grant Scheme of the Ministry of Agriculture, Forestry and Water Management (MAFWM) within the Aol, whether the grant scheme is ongoing or has ended and therefore whether Project payments could be additional. If the scheme was implemented in the Aol or adjacent catchment but is limited by funding it may be possible for the Project to	Possible	Further investigation with the relevant stakeholders is required to understand to what extent the Project is responsible for managing the protection zones and whether there is scope for meadow habitat to be created. The Project has prepared preliminary landscape designs for the motorway based on planting specifications for Serbian road design standards; there may be scope to create meadows as part of these plans. If Modified Habitat is converted into meadow habitat it is likely that

Feasibility of offset to meet key design requirements	Set-aside areas of farmland with meadow habitat		Create meadows within the motorway protection zone	
	Finding	Comments	Finding	Comments
		contribute to the expansion of existing agri-environment mechanisms.		this gain would be additional as there appear to be no plans or requirements to create meadow habitat.
Are gains lasting?	Unlikely	Per Serbia's Biodiversity Strategy (Ministry of Environment and Spatial Planning 2011), there is no legislation regulating the conservation of farmland such as 'natural fields (meadows and pastures). Hence, this offset would likely only last for as long as the Project compensates farmers suitably for loss of viable land for farming purposes unless payments were established in perpetuity.	Possible	To provide lasting gains, the motorway protection zone would need to be leased in perpetuity or protected by government legislation.
Does it align with national priorities?	Possible	Serbia's Biodiversity Strategy (Ministry of Environment and Spatial Planning 2011), states that the main focus of conserving agri-ecosystems is the protection of genetic resources of specific cultivated and wild plant species in natural habitats. It is therefore possible that this offset would align with the Strategy.	Possible	Per Serbia's Biodiversity Strategy (Ministry of Environment and Spatial Planning 2011), this offset could potentially be recognized as an ecological network under the Law on Nature Protection as a habitat for the EU regionally listed Critically Endangered species.

Table 6: Next steps to understand the feasibility of both options to create gains for meadow habitat during the offset planning phase

Meadow offset option	Next steps
Creation of meadows within the motorway protection zone	<p>Work with Corridors of Serbia and the Government to:</p> <ul style="list-style-type: none"> • Understand the purpose of the protection zone and who will own and manage it after the motorway is constructed. • Understand what areas are included in the landscape management plans and whether there is scope to rehabilitate areas as meadow habitat (and if so what size of area is possible and who will manage and monitor the area). • Assess the potential for some sections of the protection zone to be managed as meadow habitat, the actions required to identify appropriate sections and establish a rehabilitation and meadow management regime <p>Based on the above, calculate the gains that could be generated through a protection zone offset</p>
Set aside farmland areas	<p>Investigate the possibility of working with the Ministry of Agriculture, Forestry and Water Management to:</p> <ul style="list-style-type: none"> • Understand if the existing scheme is operational in the Aol, if there is any scope to expand the scheme (creating additional areas as offset gains for the Project). • The cost of funding an expansion. • Understand how the scheme is currently managed and monitored (and therefore what involvement from the Project would be required) <p>Based on the above, calculate the gains that could be generated through a set aside offset</p>
The offset planning phase for meadow habitat	<p>From the above assessments, it will be decided which option is the most viable as a meadow offset and the next step during the planning phase would be to develop the required management plans and funding mechanism with relevant stakeholders. A monitoring and evaluation program will also be developed to track progress and enable adaptive management. Monitoring will need to determine the baseline prior to offsets and the success of rehabilitation efforts e.g. the extent of meadow establishment, % ground cover vs % exposed ground, species diversity, grass to herb ratio, and indicator species presence and track these over time to demonstrate that a net gain has been achieved.</p>

4.2 Potential offsets for thermophilous woodland habitat

Thermophilous woodland areas exist as small patches (<c.210 ha) and are scattered over a large area with little connectivity between patches within the Aol. Land ownership is also complex with different state and private land ownership and management rights. Therefore, the most pragmatic way forward was to identify existing and proposed large, protected areas to consider as offset options that can theoretically meet the Project's offset targets. Two alternative approaches were identified:

1. Support the **management of an existing protected area**; this would likely involve increasing the conservation activities in one (or more) protected areas containing thermophilous woodland or a different habitat type considered to be of higher conservation value (i.e., a "trade up")
2. Support the **establishment and management of a new protected area** containing thermophilous woodland (or higher conservation priority habitat)

Using global and national databases on protected areas (such as the Serbian Conservation Institution's [protected area database](#)), within the Aol there are two existing and two proposed large (>200 ha) protected areas ([Figure 1](#) and [Table 7](#)) that could be further investigated to support an offset for thermophilous woodland.

Support to an existing protected area

Two existing protected areas that have been identified as potential offset areas are Ovcarsko-Kablarska kilisura and Goc-Govozdac. Existing protected areas likely lack the total resources required to meet conservation management needs. According to Serbia's Biodiversity Strategy there is a 50% funding shortfall in basic protected area management and a 75% shortfall in optimal management (Ministry of Environment and Spatial Planning 2011). Due to limited government funding, natural resource exploitation such as timber harvesting has been necessary to help finance natural resource conservation and management activities within existing protected areas. Activities to support existing protected areas could include measures to restore habitat that has been logged (legally or illegally) as well as improve the management of these areas based on identified gaps in management effectiveness.

Protected areas are required to have management plans, as stipulated by the Law of Nature Protection, that are implemented by a designated Protected Area Manager. Management plans include the management actions for conservation and development considering the needs of the local population.

Support the establishment and management of a new protected area

Supporting the designation and management of a new protected areas such as Celije or Planina Stolov could provide an alternative option ([Figure 1](#) and [Table 7](#)). These areas are identified by the [Institute for Nature Conservation](#) as having natural resources of importance for protection but currently have no protected area status. From preliminary desktop data (based on CORINE land use spatial information), both areas contain forest and woodland habitat, but the exact extent of areas covered by forest/woodland and the habitat type are unknown.

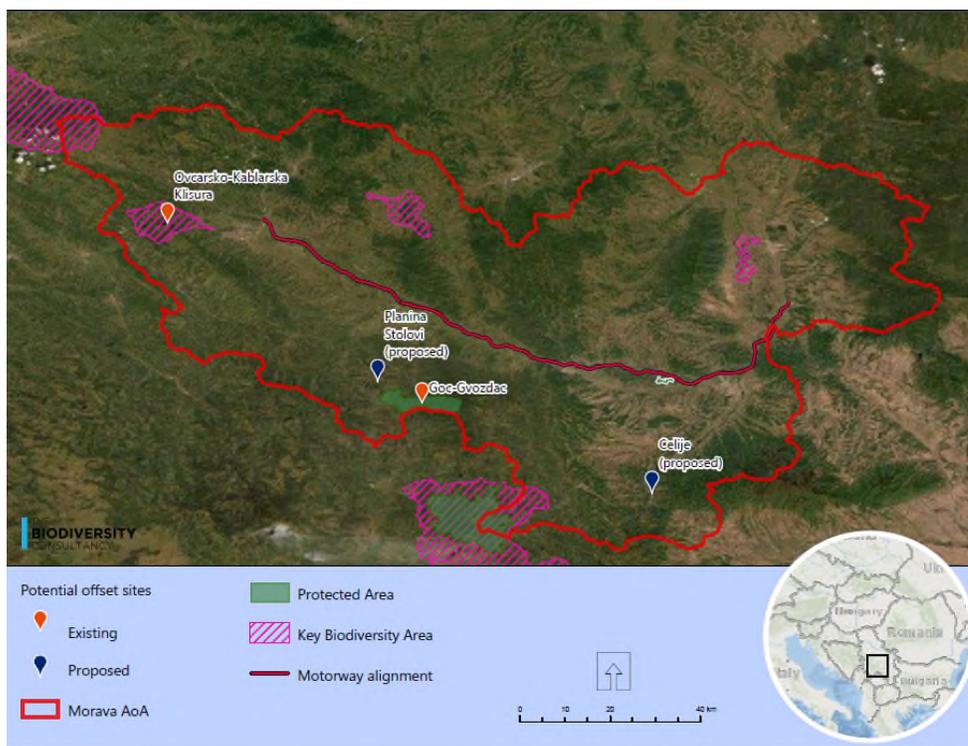


Figure 1. Existing and proposed protected areas identified in the wider landscape

Table 7. Details of the protected areas identified in the wider landscape

Name	Location	Size (ha)	Managing entity	Type	Category
Existing protected areas					
Goc-Gvozdac	43.548723, 20.712747	3957.2	Forest management "Srbijašume"	Special Nature Reserve	Protection category I – protected area of international, national, that is, of exceptional importance
Ovcarsko-Kablarska Klisura (Ovčar – Kablar gorge)	43.907961, 20.204629	2250	Tourist Organisation of Čačak	Landscape of outstanding features Key Biodiversity Area	Protection category I – protected area of international, national, that is, of exceptional importance.
Proposed protected areas					
Celije	43.389950, 21.172028	3966	-	Registered natural resources	Registered natural resources are areas importance for protection, for which no

Name	Location	Size (ha)	Managing entity	Type	Category
					protection procedure has been initiated or implemented. Proposed for designation as a protected area.
Planina Stolovi	43.613081, 20.624084	9932	-	Registered natural resources	Classified as an area of outstanding natural landscape. Submitted for protected status. Proposed for designation as a protected area.

4.2.1 Forecast of gains for thermophilous woodland habitat

Gains could likely be generated via both averted loss and restoration offsets. Averted loss gains would be created as forest within protected areas is currently being logged to generate revenue for conservation activities. Therefore, providing finance to protect these areas would prevent further logging. Restoration gains would be created by restoring logged areas and/or other degraded areas through either active or passive restoration. As no detailed assessment has been undertaken of the type of forest/woodland habitat, the extent of each habitat type or its condition, various assumptions are made for the purpose of the gains forecast based on the size of each protected area:

- 10%⁴ of existing and proposed protected area have been logged to either finance the protection of the area (in the case of existing protected areas) or as they have no protection status and people are using the area (in the case of proposed protected areas).
- Without the offset, a further 10% of the protected area/proposed area would be lost.
- The baseline quality of protected areas where logging has not occurred is 60% (of a pristine habitat) (i.e. the quality proposed for Natural Habitats in the AoI in the BIA, TBC 2020).
- The habitat quality in logged areas is 10% and restoration can return the area to below baseline conditions (50%) over a 15-20 year period.

From the preliminary forecast, the Goc-Gvozdac protected area has the greatest potential to create sufficient offset gains or either of the two proposed protected areas.

⁴ There is no published information on the extent to which protected areas have been logged to generate finance for their protection. 10% is applied based on Jovanović & Milanović (2017), a paper on deforestation in Southern Serbia.

Table 8: Forecast of terrestrial habitat offset gains for thermophilus woodland by supporting the establishment or management of protected areas

Name of protected area	Offset Target (QH)	Total area of the protected area (or proposed protected area) (ha)	Area assumed to be logged (ha)	Potential gains		Total gain (QH)
				Averted loss gain (QH) (10% of total area x 0.5Q)	Restoration gain (QH) (restored area QH) – (logged area QH))	
Existing protected areas						
Goc-Gvozdac	234	3,957	396	198	158	356
Ovčar – Kablar gorge	234	2,250	225	113	90	203
Proposed protected areas						
Celije	234	3,966	397	199	159	358
Planina Stolovi	234	9,932	993	497	398	895

4.2.2 High level feasibility assessment and next steps

The high-level feasibility assessment revealed that either averting future habitat loss through the establishment of a new protected area or increasing protection of one or more protected areas are potentially feasible for the Project (Table 9). Nevertheless, further investigation will need to confirm or rule out which of these options will deliver gains. The next steps for the planning phase for thermophilous woodland offsets are outlined in Table 10.

Table 9. High-level feasibility assessment of averted loss offsets for thermophilous woodland

Feasibility of offset to meet key design requirements	Support to an existing protected area		Support the establishment of a new protected area	
	Finding	Comments	Finding	Comments
Are offsets going to provide gains?	Possible	Gains can possibly be generated to meet offset targets in the Goc-Gvozdac protected area (based on the assumptions made in Section 4.2.1), its less likely that Ovčar – Kablar gorge could generate enough gains.	Possible	Gains can possibly be generated to meet offset targets in both proposed protected areas (based on the assumptions made in Section 4.2.1).
Are offsets comparable (like for like or better)?	Likely	Ovčar – Kablar gorge and Goc-Gvozdac both comprise mostly forested areas, likely including thermophilous woodland along low-lying and hilly areas outside the flooding area.	Likely	Celije and Planina Stolovi both comprise mostly forested areas/transitional woodland/shrub, likely including thermophilous woodland along low-lying and hilly areas outside the flooding area.
Are gains additional?	Likely	Current funding is likely inadequate to meet conservation management needs at both Ovčar – Kablar gorge and Goc-Gvozdac where it is recognized that public enterprises have to exploit natural resources in order to finance the conservation of natural resources within these areas. Furthermore, it is recognized that there is a 75% shortfall in financing to maintain optimal functioning of Serbia’s protected areas (Ministry of Environment and Spatial Planning 2011).	Possible	The offset will support the protection of an area that would potentially otherwise be developed for agriculture, infrastructure, commercial/residential spaces, and/or logging. As the government does not have the resources to protect its currently designated protected areas it is unlikely that it could fund the creation and protection of new areas without external support.
Are gains lasting?	Likely	Protected areas will be retained under existing national legislation although management effectiveness could remain an issue and so long-term funding would be required to maintain the gains generated.	Likely	Protected areas, once established, will be retained under existing national legislation although management effectiveness could remain an issue and so long-term funding would be required to maintain the gains generated.

Feasibility of offset to meet key design requirements	Support to an existing protected area		Support the establishment of a new protected area	
	Finding	Comments	Finding	Comments
Does it align with national priorities?	Likely	A key objective of Serbia's biodiversity strategy is the comprehensive and adequate management of existing protected areas.	Likely	A key objective of Serbia's biodiversity strategy is the expansion of the protected area system to adequately represent the country's biodiversity. Serbia's strategic priorities also lists the protection of 10% of its territory by 2020 but only 7.7% of the country is currently protected.

Table 10: Next steps to understand the feasibility of both options for gains of thermophilous woodland during the offset planning phase

Thermophilous woodland offset option	Next steps
Improved management of an existing protected area or creation and management of a new protected area	<p>Investigate working with the appropriate managing entities (Srbijasume - the public company for forest management and the Tourist Organisation of Čačak) and the Institute of Nature Conservation to:</p> <ul style="list-style-type: none"> • Understand the current status of the two identified potential proposed and two⁵ existing protected areas including: what is the extent and quality of forest habitat type present, what are the existing threats and what is the extent of logging (illegal or legal) in each site? • Understand if there are any plans in place to make the proposed sites official protected areas, and whether there is a preferred site for protection. Understand the process to gazette a new protected area. • Find out what the priority forest types for conservation are in Serbia (and understand if ‘trading up’ is a potential option if there is not enough thermophilous forest within the proposed sites. • Understand where key gaps may exist in management needs of the existing protected areas to reduce the identified threats. • Ensure that supporting conservation within the identified potential sites would be additional to what is already being done, and that any suggested offset activities are in line with national priorities. • Based on the above, calculate the gains that could be generated through additional Project support to each proposed site, and assess which site(s) are most feasible to be used as an offset.
The offset planning phase for thermophilous woodland	<p>From the above assessments, it will be decided which site, or combination of sites, is the most viable as a thermophilous woodland offset and the next step during the planning phase would be to develop the conservation activities required to achieve biodiversity gains within existing or newly developed management plans, with a funding mechanism, working with relevant stakeholders. A monitoring and evaluation program will also be developed to track progress and enable adaptive management. Monitoring will need to determine the baseline prior to offsets and the success of rehabilitation efforts e.g. the extent and quality of</p>

⁵ Although the desk-top screening shows that the Ovčar – Kablar gorge may not be able to generate sufficient gains to meet the offset target, this is based on multiple assumptions that should be investigated further in the screening phase.

	forest/woodland establishment, and track these over time to demonstrate that no net loss has been achieved.
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5 Freshwater offset

5.1 Potential offsets for the Zapadna Morava River and associated riparian and gallery woodland

The Project’s freshwater offset target includes the generation of biodiversity gains for the Zapadna Morava River (Natural Habitat), associated riparian habitat (Natural Habitat). The quality of freshwater habitats in a catchment and the suitability of freshwater habitat for freshwater species is largely dependent on the land use activities occurring around the rivers and tributaries. Activities in riparian and instream areas which remove vegetation and disturb the instream environment (such as agricultural and urban encroachment, vegetation removal and gravel and sand mining) result in erosion, sedimentation and nutrient enrichment which decreases freshwater habitat quality for freshwater species.

Results from an ecological status assessment of the Zapadna Morava concluded that the River is impacted by moderate organic pollution as well as various types of hydrological and geomorphological pressures from land use activities such as agriculture, industry and sand mining and therefore the overall status of the river was assessed as *moderate* (Novaković 2013). A freshwater habitat verification of the Zapadna Morava River (Djikanovic *et al.* 2020) noted that intensified agricultural activities, urban settlements, landfills and instream gravel and sand mining in the Aol are the largest threats to freshwater ecology, contributing to an overall decrease in the quality of the freshwater habitats ranging between 24-34%.

The condition of the Zapadna Morava River catchment in the Aol provides an opportunity to achieve biodiversity gains by rehabilitating and improving the instream and riparian environment in the broader Aol which would lead to an increase in the condition of the Zapadna Morava River and riparian woodland condition with the possibility of creating offset gains for the Project.

Two approaches were investigated that together could generate the required gains for the Project. The first describes Project-led rehabilitation of the new sections of river as part of the final step of the mitigation hierarchy. The gains from this activity are accounted for here as they were not included in the residual impact assessment (TBC 2020b) due to insufficient information being available at the time of writing. A combination of both options will be required to achieve no net loss/ net gain for impacted biodiversity:

1. Rehabilitation and reinstatement of the new sections (straightened sections) of the Zapadna Morava River⁶. Measures outlined in the BMP include reshaping and re-vegetation of the straightened riverbanks, establishment of riparian woodland in the straightened sections of the Zapadna Morava River and rehabilitation and improvement of river substrate.
2. Improvement of instream and riparian habitat in sections of the River not impacted by the Project and in the wider Aol. Various activities have been identified that could support the improvement of instream and riparian habitat in sections of the River not impacted by the Project and in the wider Aol. These include:
 - Bank stabilization, bank re-vegetation, erosion control and riverbed enhancement of degraded river in the Aol (roughly 390 km of river network occurs in the Aol which is estimated to currently maintain 69% habitat integrity).
 - Rehabilitation and monitoring of gravel and sand beds which have been illegally mined in the Zapadna Morava River;
 - Improve water quality (e.g. potentially sewage and outflow management within major towns in the basin and/or within the river tributaries identified as being highly polluted (research carried out by JCWI, Prvoslav Marjanovic pers. comm. 2020)
 - Invasive species management and eradication programs for various freshwater invasive species present in the Zapadna Morava River.

The Republic of Serbia is in the process of developing a Water Management Plan (WMP 2021-2027 - (MoAFM 2019) which presents a strategic framework for integrated water management within the country. The WMP has been prepared by public water utilities "Srbijavode" and "Vode" Vojvodina " with co-ordination from the Ministry of Agriculture, Forestry and Water Management: Directorate of Water. The WMP will prescribe environmental goals for all freshwater systems that need to be achieved while implementing water resources protection and improvement measures. The WMP includes an assessment of the pressures and impacts of human activities on the quantity and quality of water, data on monitoring the quality of surface and groundwater, economic analysis and an overview of measures for achieving increase resources status through protection and improvement. The plan is enacted with an expiration period of 6 years, after which it will be audited and amended in terms of assessing progress in achieving the environmental goals and the effects of the measures taken. It is likely that there will be catchment-level plans developed, although this needs to be confirmed with the relevant parties compiling the overarching WMP.

It is envisaged that the proposed offset actions for the Project could be carried out in conjunction with the WMP catchment-level plan for the Zapadna Morava River catchment, therefore supporting the objectives of the plan. This would enable the use of existing

⁶ In the Project's residual impact assessment, biodiversity gains from terrestrial and aquatic rehabilitation actions were not estimated.

governance structures for offset implementation. Should it be feasible to dovetail the offset measures with the WMP, the Project would need to show that the offset actions would create additionality over and above the activities and outcomes of the planned WMP measures. This could be demonstrated by increasing the activities or areas the activities are implemented above what is stipulated in the WMP.

5.1.1 Forecast of gains for river and riparian woodland

Forecasts of biodiversity gains are from: 1. Rehabilitation of straightened sections of the river (Project-led mitigation) and 2. Rehabilitation of instream and riparian habitat in the wider AoA (through contributing to elements of the new National Water Management Plan that will be implemented in 2021). The Project could additionally assist with rehabilitation and monitoring of gravel and sand beds which have been illegally mined in the Zapadna Morava River. This would contribute to a restoration/rehabilitation gain for freshwater habitat and associated freshwater species (including *Unio crassus* and *Astacus astacus*).

For river habitat (i.e. instream freshwater habitat) rehabilitation and restoration of impacted sections of the Zapadna Morava River from measures detailed in the Biodiversity Management Plan (BMP) are anticipated to provide quality gains of approximately 10% along the 76.5 km impacted section of river, which would equate to 7.65 Qkm. After restoration and rehabilitation efforts for Project impacted river sections, 18 Qkm of gains are still required to meet offset targets which are achievable through improvement of river quality in unimpacted sections of rivers in the greater AoA. Gains in the wider AoA are forecast by assuming that freshwater habitat quality could be improved by 10 - 20%. Gains for the Zapadna Morava River are theoretically feasible based on the available length of river network within the Zapadna Morava basin, and the opportunity for improvement of stretches of river and tributaries that are not impacted by the Project through rehabilitation (Table 11).

Table 11: Forecast of freshwater habitat offset gains for rivers

Habitat type	Offset target (Qkm)	Residual impacts remaining after rehabilitation of straightened sections (Qkm)	Potential gains from improving habitat in the Aol (Qkm) ⁷	Overall NG position
River habitat (instream freshwater habitat)	25.9	18	31- 63	+ 13 – 45 QKM

⁷Potential gains consider the total network of the Zapadna Morava River and major tributaries in the Aol (approximately 390 km) excluding those sections of the Zapadna Morava impacted by the Project (76.5 km), totaling 313.5 km available for potential improvement.

For riparian habitat rehabilitation and restoration of impacted sections of riparian woodland measures include the establishment of 17m of riparian and gallery woodland in the sections of Zapadna Morava that will be straightened. Establishment of a 17m wide riparian woodland corridor in the straightened sections of river (c.45 km) with a 50% habitat condition is anticipated to provide gains of approximately 76.5 QH⁸. A significant percent of the sediment and surface water pollutants in surface runoff may be removed by the implementation of 30 m riparian buffer zones (Schoonover et al., 2006), therefore increasing the riparian woodland area to a width of 30 m and a condition of 60% would provide a significant increase in gains from Project rehabilitation (162 QH); the option to increase the size of the riparian restoration area should therefore be assessed as part of the next steps (Table 14:). After restoration and rehabilitation efforts for Project impacted riparian and gallery woodland sections, 261 QH of gains are still required to meet offset targets. Rehabilitation and restoration of unimpacted sections of riparian and gallery woodland in the wider AoA were considered to meet offset targets. A 15-20% improvement in the quality of riparian woodland in the wider Aol could result in additional gains of 322-430 QH that would surpass the Project offset targets (Table 12). Focusing restoration efforts on smaller patches of riparian habitat which are more heavily degraded and therefore could achieve greater gains should be investigated as a next step.

Table 12: Forecast of freshwater habitat offset gains for riparian gallery woodland

Habitat type	Offset target (QH)	Residual impacts remaining after rehabilitation (QH)	Potential gains from improving habitat in the Aol (QH) ⁹	Overall NG position (QH)
Riparian and gallery woodland	337.5	261	322-430	+ 61-169

5.1.2 High level feasibility assessment and next steps

The high-level feasibility assessment shows that implementation of rehabilitation in the straightened river sections and a combination of habitat improvement measures in the wider Aol has the potential to achieve the offset targets for river and riparian habitat (Table 13). The

⁸ Based on there being a 153 ha within the 45 km by 17 m restored area of riparian habitat on each side of the river and that achieving a 50% QH score over a 10+ year period

⁹ Potential gains consider the total area of riparian and gallery woodland in the Aol (approximately 2,710 ha) excluding those sections of riparian woodland impacted by the Project (562.5 ha), totaling of 2,148 ha available for potential improvement.

next steps recommended for the screening phase of offset development are outlined in Table 14.

Table 13: High-level feasibility assessment of offsets for riparian and gallery woodland

Feasibility of offset to meet key design requirements	Restoration offset – rehabilitate areas of riparian woodland in the new areas of river and in degraded areas within the Aol, and reduce pollution in the River	
	Finding	Comments
Are offsets going to provide gains?	Likely	Gains can likely be delivered through rehabilitation of degraded riparian and gallery woodland in the greater Aol. Enough degraded riparian habitat is available to provide gains with an improvement of approximately 15-20% of habitat condition and functionality across the Aol or the equivalent focused in larger stretches of identified forest. The offset will take time to establish and accrue biodiversity gains.
Are offsets comparable (like for like or better)?	Likely	Rehabilitating riparian woodland based on the local plant species community structure of existing riparian woodland within the Project Aol would ensure that offsets are like for like.
Are gains additional?	Likely	The offset will support the rehabilitation of riparian woodland that would otherwise remain in a degraded state or further decrease in in condition over time. However, further investigation is still needed to understand whether the Republic of Serbia Water Management Plan (WMP 2021- 2027) includes rehabilitation of riparian sections of the Morava Valley basin and how the Project can create additionality for this aspect.
Are gains lasting?	Possible	Rehabilitated sections of riparian woodland would require monitoring and potential maintenance once established, but it is not clear who would be responsible for this and thus maintenance effectiveness could remain an issue.
Does it align with national priorities?	Possible	Although the WMP (2021-2027) is still not officially public, it is likely that this would align with tenets of the Plan in terms of water resources protection and improvement implementation. As per Serbia’s Biodiversity Strategy (Ministry of Environment and Spatial Planning 2011), the offset

Feasibility of offset to meet key design requirements	Restoration offset – rehabilitate areas of riparian woodland in the new areas of river and in degraded areas within the Aol, and reduce pollution in the River	
	Finding	Comments
		could potentially be recognized as an ecological network under the Law on Nature Protection.

Table 14: Next steps to assess the feasibility of rehabilitation in rivers and tributaries and riparian woodland in the wider Aol during the offset planning phase

Rivers and tributaries and riparian woodland offset options	Next steps
River and riparian woodland	<ul style="list-style-type: none"> • Find out what rehabilitation and water quality improvement actions are already included in the Serbia Water Management Plan (WMP) (2021-2027) and how Project offset outcomes align with existing national plans. • Investigate how the Project can achieve additionality over and above planned actions within the WMP. • Understand if there will be a specific Zapadna Morava basin action sub-plan. • Check the finalised river regulation and habitat restoration design to verify the gains estimated for rehabilitation of straightened river sections. • Understand the specific actions required to improve the water quality of the most impacted tributaries and river sections and identify the relevant stakeholders to engage with that the municipality level. • Understand any existing actions for rehabilitation of previously gravel mined areas within the Aol. • Assess whether it is feasible for the Project to widen the area of riparian habitat rehabilitation in the straightened sections on the River from 17 m to 30 m to reduce the overall riparian offset requirement (through increased rehabilitated area within Project control). • Assess where within the wider Aol there are heavily degraded areas of riparian habitat where offset rehabilitation measures can be focused and achieve the level of gains required for a>NNL outcome.
The offset planning phase for river and	From the above assessments, it will be decided if the proposed options are viable as a river and riparian woodland offset and the next steps during the planning phase would be to develop the required management plans

riparian woodland habitat	and funding mechanism with relevant stakeholders. A monitoring and evaluation program will also be developed to track progress and enable adaptive management. Monitoring will need to determine the baseline prior to offsets and the success of rehabilitation efforts e.g. the extent and composition of riparian woodland along the new straightened river areas, and in identified degraded areas, and improvements in the water quality of the river. Monitoring of the presence of the two freshwater stakeholder species will also be needed (potentially using eDNA survey techniques at the correct time of year).
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5.2 Potential offsets for naturalised ponds

Although the residual impact to naturalized pond habitat is relatively small (6 QH), restoration of the naturalised ponds directly impacted by the Project alone will not create sufficient gains (Table 15).

The Project will result in multiple river meanders being cut off from the river (in total 98 ha), therefore it's proposed that these cut-offs and potentially quarries and borrow pits can be rehabilitated to create gains for naturalised pond habitat. Note: gains from rehabilitating quarries and borrow pits are not estimated as part of the gains forecast at this stage, only the gains from the creation of pond habitat from cut-off meanders.

The restoration and offset actions that could support the Project to meet the target are:

- Rehabilitate and reinstate naturalised ponds that are under temporary Project infrastructure.
- Rehabilitate borrow pits (and potentially quarries) to naturalized pond habitat.
- Rehabilitate meander cut-offs of the Zapadna Morava to create pond like habitat using measures such as sluice gates to control hydrological capacity (whilst retaining connectivity with the river channel at the downstream end during high flows, to maximise value as backwater refuge / nursery habitat for some river channel aquatic species) and the rehabilitation of bank habitats by revegetation and stabilization where necessary.
- Establishment of populations of the Noble Crayfish (*Astacus astacus*) in naturalised ponds and rehabilitated cut off meander areas of the Zapadna Morava River.

5.2.1 Forecast of gains for naturalised ponds

Forecasts of biodiversity gains for naturalised ponds assume that the Project will undertake rehabilitation of pond habitat under the temporary footprint of the Project and create new pond habitat in the meander cut-off sections. This will result in a restoration/rehabilitation gain for naturalised pond habitat and potentially create suitable habitat for *A. astacus*. A preliminary feasibility assessment suggests that there are enough meander cut-off areas to provide rehabilitation opportunities to theoretically meet the Project's pond offset target (Table 15). Establishment of pond habitat in the meander cut-offs from measures outlined in the BMP is feasible, as lentic (standing water) communities establish relatively easily once habitat is

created and contribute significantly to biodiversity across the landscape (Deacon *et al.* 2018). Gains are forecast by assuming that (almost) all meander cut offs within the Project footprint could be rehabilitated to form pond habitat with a 30-40% habitat condition.

Table 15: Forecast of freshwater habitat offset gains for naturalised ponds

Habitat type	Offset Target (QH)	Residual impacts remaining after rehabilitation (QH) ¹⁰	Potential gains from restoring cut-off meanders (QH) ¹¹	Overall NG position
Naturalised ponds	5.7	5.4-5.6	29.5-38	+ 24-33 QH

5.2.2 High level feasibility assessment and next steps

A high-level feasibility assessment of potential biodiversity gains from rehabilitation of impacted naturalised ponds, and the meanders of the Zapadna Morava River that will be cut off for flood control purposes shows that offset targets and conditions can theoretically be achieved (Table 16). The next steps recommended for the planning phase of offset development for naturalised ponds are outlined in Table 17.

Table 16: High-level feasibility assessment of offsets for naturalised ponds

Feasibility of offset to meet key design requirements	Restoration offset – rehabilitate portions of naturalised ponds under temporary infrastructure and create habitat in meander cut-offs	
	Finding	Comments
Are offsets going to provide gains?	Likely	Gains can likely be delivered through rehabilitation of temporary impacts to naturalised ponds and rehabilitation of the meander cut-offs.
Are offsets comparable (like for like or better)?	Possible	Possibly, the rehabilitation is proposed in the meanders affected by the Project and could represents a like for like approach but would require verification through monitoring of pond communities.

¹⁰ Based on a rehabilitation of ~2.44 ha of pond habitat temporarily impacted by the Project achieving 10-20% quality.

¹¹ Based on rehabilitation of 98 ha of cut-off meanders to achieve 30-40% quality.

Feasibility of offset to meet key design requirements	Restoration offset – rehabilitate portions of naturalised ponds under temporary infrastructure and create habitat in meander cut-offs	
	Finding	Comments
Are gains additional?	Possible	The offset will support the rehabilitation of meander cut offs that would otherwise be completely lost. However, further investigation is still needed to understand whether the Republic of Serbia Water Management Plan (WMP 2021- 2027) includes rehabilitation of floodplain sections of the Morava Valley basin and how the Project can create additionality for this aspect.
Are gains lasting?	Likely	Rehabilitated meanders would require operation of sluice gates, monitoring and potential maintenance once established (due to the natural tendency of oxbows to infill over time). Naturalised ponds are generally robust habitats that are reasonably stable and once reinstated are likely to be lasting, as is the case of existing naturalised ponds in the Aol. It is not currently clear which entity will be responsible for managing and monitoring the pond areas after restoration.
Does it align with national priorities?	Likely	Although the WMP (2021-2027) is still not officially public, it is likely that this would align with tenets of the Plan in terms of water resources protection and improvement implementation.

Table 17: Next steps to assess the feasibility of pond restoration during the offset planning phase

Naturalised ponds offset options	Next steps
	<ul style="list-style-type: none"> • Find out what actions for floodplain sections of the Morava Valley basin are already included in the Serbia Water Management Plan (WMP) (2021-2027) (if any). • Understand what further gains for pond habitat could be achieved from borrow pit rehabilitation once plans are completed. • Find out who will be responsible for undertaking restoration and managing the cut-off meander areas in the long term and assess if there potential for them to be developed of protected areas, or tourism areas to ensure long term gains for biodiversity. • Assess the technical requirements to keep a minimum level of water within the cut-off meanders to maintain biodiversity e.g. the management of sluice gates, periodic dredging etc.

<p>The offset planning phase for naturalized ponds</p>	<p>From the above assessments, it will be decided if the proposed option is viable as pond offset and the next step during the planning phase is to develop the required management planning with relevant stakeholders. A restoration plan will be needed for the identified meander cuts offs, along with a monitoring and evaluation program to track progress for both the construction and operations phases of the Project and enable adaptive management to demonstrate that a no net loss has been achieved within the newly created naturalised ponds. Monitoring of the pond communities will be required to verify like for like or better. The potential for long-term management of these areas, and by whom is an important question to answer.</p>
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6 Stakeholder engagement

Pro-active and transparent stakeholder engagement and consultation is a key component of any biodiversity offset program. This extends to direct partners e.g., Public Enterprise Roads of Serbia (Roads of Serbia), to institutions that need to be engaged to support the development and implementation of offset activities e.g. [Srbijavode](#) (the public company for water management), [Srbijasume](#) (the public company for forest management), Institute of Nature Conservation), supporting stakeholders e.g., regional, and local government council, and direct recipients of biodiversity benefits e.g., the fishing community. The involvement of stakeholders who have knowledge, experience, skills and rights to help determine what may be appropriate and effective offset activities and how they may be delivered is fundamental to the success of the offset program.

Government

Engaging with the relevant Serbian government institutions is of primary importance when developing the offset program. Offset success is largely a political and social challenge, and therefore existing national and regional plans need to be considered carefully and integrated at an early stage. This includes engagement at all levels, from state authorities to local self-governance units such as district councils at the municipality level.

Government agencies that have been identified as potential offset governance and management partners are Roads of Serbia who will be the operators of the Morava Corridor Motorway Project, the Institute for Nature Protection, and the Environmental Protection Agency (under the Ministry of Environmental Protection). The Republic Water Directorate (under the Ministry of Agriculture, Forestry and Water Management), are also an important stakeholder as they manage the government work under the EU Water Framework Directive, including the development of the [Serbia Water Management Plan](#). The Public Water Management Companies [Srbijavode](#) and [Vode Vojvodine](#) are tasked with the development of the Water Management Plan for the period of 2021-2027. The Plan is due to be released in early 2021. The Institute for Nature Conservation are also an important stakeholder and potential management partner as they manage Serbia's protected areas (existing and potential). It is important that the Project

engage with these potential partners to understand whether they are willing to take part/support the offset program.

Serbia's National Biodiversity Strategy (2011-2018) (Ministry of Environment and Spatial Planning 2011) identifies the conservation objectives and outputs for Serbia. The Project plans to align with the National Biodiversity Strategy and can contribute towards the country's intended conservation outputs in multiple ways, from providing support towards the protection of proposed nationally important areas for forest protection, to supporting ecological restoration for river systems and improving water quality of polluted water catchments. To support the selection of offset sites and activities that align with national conservation strategies (as well as technical and social criteria), discussions with the appropriate stakeholders are recommended early in the offset planning phase to discuss the feasibility of the proposed sites and actions in this strategy. Initial engagement with some key stakeholders by BEJV and Corridors of Serbia has already started (see [Section 2.1.1](#)) and will continue through the detailed planning of the offset Program. As each offset action is defined the governance and management structure will also need to be identified that defines clear roles and responsibilities for national and local government partners and stakeholders.

Other interested parties

The Project's offset program is likely to be of interest to a range of other stakeholders as it relates to sustainable development, forestry, fishing, habitat conservation, and local livelihoods. Local communities will be a key stakeholder to consider in terms of their current and future use the priority biodiversity features, e.g., natural habitats such as thermophilous woodland and the Zapadna Morava river. The scientific research community such as the Faculty of Biology, University of Belgrade and Natural Science Faculty, University of Kragujevac are likely to be interested and helpful stakeholders, along with water and forest focused environmental NGOs. These parties will be identified and integrated into a stakeholder engagement plan which will outline how the Project will manage regular and transparent proactive engagement (supported by the Project offset management team).

7 Governance and management

The overall approach to implementing the offset Program is the development of a participatory approach to natural resource management and biodiversity conservation that is adapted to the context of Serbia and, more specifically, to the context of the proposed offset actions. The governance structure and management of the Program is the driving force and is responsible for ensuring the smooth implementation and operation of the offset actions.

Important design principles for establishing this type of management system approach are:

- Use existing governance structures wherever feasible;
- Ensure any new structures that are created are appropriate to the scale and stakeholders involved;
- Develop downward as well as upward accountability (implementation and financial) for all management structures;

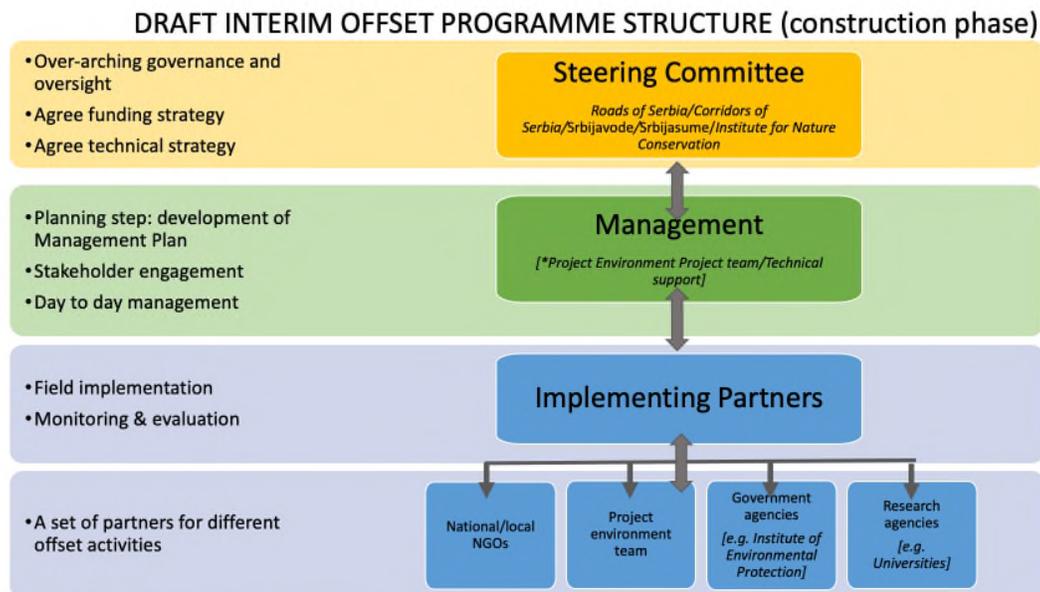
- Ensure there is sufficient capacity and technical assistance within the governance and management structures to function efficiently.

Public Enterprise Roads of Serbia will be the Project operator post -construction. They are therefore ultimately responsible for the delivery of biodiversity gains to achieve net gain/no net loss through the offset Program in the long term. Corridors of Serbia and BEJV are partners of the Project in managing the construction of the Project and will be involved in planning and early implementation of the offset Program. However, Roads of Serbia will be overseeing later implementation and ongoing activities and monitoring to ensure net gain/no net loss targets are met.

7.1 Governance management structure

In order to guide the offsets program, a governance management structure will be developed. The structure can be relatively simple, with clear roles set out for all parties. The structure will include governing oversight of offset planning, implementation, and ongoing longer-term activities such as monitoring, as well as the on-the-ground implementing parties and technical support. It is likely that the governance management structure will be adapted for different phases of the program.

An initial interim structure for during Project construction will be important to develop early on in the planning phase. A draft example interim offset governance and management structure is presented in Figure 2. This structure will likely evolve over time as required, and as it becomes clearer who the key partners, roles and responsibilities of the offset program will be.



*Project resourcing for the Interim Offset Programme could include 1 x Conservation Coordinator and 1 x Conservation Officer.

Figure 2. Example interim offset program governance and management structure (this is an example of what the structure could look like, however internal discussions and further engagement with stakeholders is required to develop this further)

8 Financing

The Project understands that long term funding is required for offset success. A detailed assessment of finance requirements will be carried out during the planning phase when there will be more clarity on costs as feasibility of the suggested offset actions is better understood. Budgeting will include costs for:

- Each of the finalised offset actions
- The development of the Offset Management Plan and Monitoring Plan
- In-house staffing and external technical support (if deemed necessary)
- Stakeholder engagement with key stakeholders
- Ongoing management and monitoring and evaluation for offset activities for approximately 22 years, in order to achieve no net loss/net gain of priority biodiversity
- Independent (from the Project partners) review of offset progress
- A contingency fund in the event of offset under-performance
- Administration and overhead costs

Ideally, there would be continued investment in perpetuity after the initial c. 25-year investment, to be discussed with relevant offset management and Government partners prior to the end of the Project operational period.

Costs for the Project's offset program over the 25 years have been estimated as requiring an approximate budget of c. 13,661,500 Euros (approximately 546,500 Euros per year, with likely larger costs up front during the planning phase and initial implementation of actions). The breakdown of this budget is shown in [Appendix 3](#). It is challenging to include any detail in a budget at this early stage in the development of an offset program, therefore it has been developed with the following caveats:

- It is not yet known what the final set of offset actions will be and have based costs on proposed actions for each priority biodiversity in this strategy
- Existing budgets developed for national plans have not yet been shared or consulted
- This is a precautionary order of magnitude estimate based on (TBC) experience from other international offset programs
- Project may have already included some river restoration costs into their financial models, if so, this may reduce the cost of the aquatic offset option.

It is essential for the Project to estimate what the potential costs of the offset program will be to ensure that sufficient funds are raised/set aside to cover funding the program in the long term. This estimate has been developed in order for the Project to be able to plan ahead and understand what these costs might be.

8.1 Financing options

The funding approach and options for the offset program is still under consideration by the Project and requires further internal discussions to fully understand different financing options. Potential options that have been used by other development projects to fund offset programs in the long term are presented below:

- **Contributing up-front capital to an endowment.** Once the endowment is in place, the endowment then generates annual financing needs, either in perpetuity or on a draw-down basis should replacement funding be planned by government at some time in the future. Typically, endowments are managed in a major international financial centre, and annual funds transferred in country subject to approval of activity reports and plans by a governance committee. Typically, such costs can be included in overall project capex finance sought from financial institutions – particularly multilateral or development finance institutions, which have a remit that includes environmental safeguards within projects.
- **Finance from on-going revenues.** An alternative to up-front capitalisation of an endowment is to contribute ongoing finance to offsets from annual Project revenue or profit e.g. from toll stations along the Motorway. This would have to be carefully structured and monitored to ensure Project risks such as changing prices, changes in terms/conditions/regulations associated with changes in government, flaws in models predicting revenue rates are appropriately mitigated.

As the Project is government-owned, it is hopeful that Public Enterprise Roads of Serbia will work closely with other government departments to deliver biodiversity gains through existing national plans and programs (ensuring actions are additional to what is already planned and fully funded). This will be investigated through engagement with the relevant departments as part of the planning phase of the Project. Currently, environmental financing sources in Serbia involve funds from the national budget which are allocated through ministries, institutions, and funds as well as local government budgets and funds sources from bilateral and multilateral treaties (e.g. significant funds come from EU pre-accession funds) (Ministry of Environmental and Spatial Planning 2011).

An Environmental Protection Fund (EPF) was established in 2004 by the Ministry of Environment and Spatial Planning (Ministry of Environmental and Spatial Planning 2011) (“Official Gazette of the Republic of Serbia”, Issue 72/09), and provides funds for environmental development. The fund financially manages environmental projects and performs financial mediation in the area of conservation, sustainable use, protection and development of the environment in compliance with existing national strategic plans and programs. This information was sourced from the Serbian Biodiversity Strategy written in 2011, and therefore up-to-date information on the EPF is needed to understand the current status of the Fund. There may be opportunity to use the Environmental Protection Fund to manage finances for the Project’s offset program, but this will need to be further investigated through engagement with the relevant government departments.

9 High-level next steps

This Offset Strategy provides the framework under which the offsets program will be developed in order to compensate for residual impacts and achieve a no net loss for Natural Habitat and net gain for Critical Habitat. The Project is still at an early stage in the process having completed the screening phase (Section 3.1). The planning phase now takes forward the proposed offset sites and actions presented in this strategy, to better understand feasibility and to develop the Offset Management Plan.

This section presents the high-level steps the Project will take to develop the full offset program, including the enabling mechanisms (Section 3.2). These high-level actions are also set out in the Biodiversity Management Plan (BMP). A set of specific more detailed immediate next steps are presented for each priority biodiversity feature in Sections 4 and 5. It is the responsibility of the Project partners to set up the human and financial resources needed to carry out these next steps (internal management, and external support if needed).

Initial planning phase steps (in the next 6 months):

1. **Assess the social and political feasibility of offset options and activities** developed in this Offset Strategy in collaboration with specialists, key stakeholders, and relevant government organizations to support the decision on the final selection of offset actions.
2. **Assess the technical feasibility of offset options and activities.** Carry out any required fieldwork with relevant stakeholder and fill data gaps to fully understand feasibility of generating biodiversity gains on the ground (See detailed next steps for each priority biodiversity feature in Sections 3 and 4) to support the selection of the final offset actions.
3. **Confirm the no net loss/net gain potential of the offset activities** to ensure sufficient gains can be achieved to meet the offset targets (loss/gain accounting update)
 - As required, update the Residual Impact Assessment based on a) results of eDNA study for presence of snail species (results due in February 2021), b) final river regulation design including details of rehabilitation plan, c) detailed review of Project infrastructure siting e.g. avoidance of Critical and minimization of Natural Habitat where possible including updated quarry/borrow pit/waste dumps alternatives analysis, d) final borrow pits restoration plan.
 - Compare the offset targets to the predicted gains (step 2) to assess the overall NNL/NG position.
4. **Check and verify the estimated costs of implementing the final suite of offset actions;** at this stage the costs will still be estimates as detailed planning will not have been undertaken.

5. **Hold workshops with key stakeholders** to agree the final suite of actions, the types of management activities required to implement the actions, and agree the Governance structure:
 - o Hold a second more detailed workshop with identified key stakeholders and finalise the offset sites and activities to generate biodiversity gains, management structure and financing options.

Medium Planning term steps (6-12 months, once the above steps are completed):

6. **Develop the Offset Management Plan** including development of a more detailed and fact-based budget and financing for the offset program, monitoring and evaluation plans to track implementation of activities and outcomes for identified priority biodiversity, finalise the governance management structure, and the development of terms of reference and budgets for implementation partners.
7. Validate final plans with all stakeholders

Implementation and ongoing management:

8. **Implement the Offset Management Plan** - implementation of the Management and Monitoring Plans, with ongoing oversight from the governance/management structure (anticipate a 12-18 month establishment phase to get actions up and running, to test assumptions and make changes where issues are encountered).
9. **Ongoing offset activities and monitoring**, to achieve no net loss/net gain of priority biodiversity.
 - o Periodic evaluation and progress reviews, with adaptive management to ensure biodiversity gain targets will be achieved.

10References

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11 Appendix 1: Offset feasibility criteria

The screening of potential offset sites/activities uses a combination of technical, social, political and operational feasibility criteria to determine the most viable options. The feasibility criteria are described in Table 18.

Table 18: Offset feasibility criteria

No.	Criteria	Description
Technical feasibility		
1.1	Equivalent	The Project impacts and offset gains need to be similar to ensure a fair exchange. Offsets should be comparable in terms of: Type: offsets should be for the same biodiversity as impacted (e.g., a certain species or habitat); Amount: offsets should provide gains equal in scale to, or greater than, residual impacts (quantitative estimation of both Project impacts and offset gains is necessary); and Time: offset gains must be realized within an appropriate timescale for both stakeholders and the biodiversity concerned (e.g., not increasing extinction risk in the short-term).
1.2	Additional	It needs to be demonstrated that relevant biodiversity gains would not have happened in the absence of the offset. For example, protection of unthreatened ecosystems or investments into existing protected areas with adequate funding would not be considered additional.
1.3	Lasting (permanence)	Offset gains should last for at least as long as the Project impacts. In many cases, this will require financing beyond the lifespan of the Project, e.g., through endowment funds.
Social feasibility		
2.1	Alignment with community interests	Biodiversity conservation actions are more likely to be feasible if they support local socioeconomic and cultural values of land/ natural resources and are aligned with community interests. This includes consideration of, for example: 1) the relative intensity of use of natural resources (density of people and type of natural resource use); 2) local dependency (socioeconomic or cultural) on biodiversity-related ecosystem services; 3) the well-being and vulnerability status of resource users; 4) community interests; and 5) the existence of compatible conservation and livelihood options.
2.2	Conflict	Biodiversity conservation actions are more likely to be feasible in contexts without conflict, or clear mechanisms to resolve conflicts. Typical areas of conflict in conservation projects include: 1) land

No.	Criteria	Description
		tenure conflicts; 2) natural resource conflicts; 3) social conflict and cohesion; 4) in-migration to Project area. Conflict also refers to legacy issues related to Protected Areas.
2.3	Governance	Biodiversity conservation actions are more likely to be feasible in contexts with clear institutional arrangements and good governance. This includes consideration of, for example: 1) Institutional arrangements - understanding if there are clear and appropriate institutional arrangements; 2) governance and management responsibility - understanding if there is clear and suitable allocation of governance and management responsibility between actors involved in natural resource management.
Political feasibility		
3.1	Legislation	Biodiversity conservation actions are more likely to be feasible in contexts with clear and appropriate legislation. This includes consideration of, for example: 1) clarity of legislation; 2) appropriateness of legislation for development of lasting biodiversity conservation initiatives; 3) coherence between relevant legislation.
3.2	Political support (alignment)	Biodiversity conservation actions are more likely to be feasible in contexts where there is strong political support for the sites and approaches being proposed. This includes consideration of, for example, alignment of the approach or site with: 1) regional and/or national conservation initiatives; 2) the national biodiversity strategic action plan (NBSAP); 3) regional conservation plans; 4) other political interests.
3.3	Stakeholder support	Biodiversity conservation actions are more likely to be feasible in contexts where there is strong stakeholder support for the sites and approaches being proposed. These stakeholders are broader than just local communities, including for example local government, non-governmental organizations (NGOs), and private sector such as tourism outfits or natural resource trading companies. This includes consideration of, for example, 1) stakeholder attitude towards conservation; and 2) likelihood of generating local stakeholder support for the initiative.
Operational-financial feasibility		
4.1	Capacity	Biodiversity conservation actions are more likely to be feasible in contexts where there are good levels of capacity or where there are limited barriers to developing the required capacity. This includes capacity within institutions, organizations, projects or initiatives, for example government, community natural resource management

No.	Criteria	Description
		institutions, and NGOs. Consideration of capacity includes: 1) technical; 2) human; 3) financial capacity.
4.2	Partnerships	Biodiversity conservation actions are more likely to be feasible in contexts where there are opportunities for partnerships. This can include partnerships with communities, government, and NGOs. This includes consideration of: 1) existing stakeholders important to conservation program development; 2) their experience with partnering; 3) their interest in partnering.
4.3	Affordability (costs)	Biodiversity conservation actions are more likely to be feasible, and good value for money, in contexts where there are no significant operational challenges. This can include consideration of, for example: 1) site accessibility; 2) site services and infrastructure; and 3) site-specific challenges such as extreme weather events, disease, or other operational issues.

12 Appendix 2 Biodiversity offsets workshop, meeting minutes

Held 30th November - 1st December 2020

Attendees

No.	Organization type	Name of organization	Participant name
1.	Non-profit	Ambassadors of Sustainable Development	Aleksandra Mladenovic
2.	Project contractor	BEJV	Sinem Aksit
3.	Project contractor	BEJV	Josie Dujmovic,
4.	Project contractor	BEJV	Vincent Nougarede
5.	Project owner	Corridors of Serbia	Nina Valcic
6.	Project owner	Corridors of Serbia	Jelena Vasilijevic
7.	Project owner	Corridors of Serbia	Nevena Tufegdzcic
8.	Project owner	Corridors of Serbia	Igor Radovic
9.	Project owner	Corridors of Serbia	Nikola Milutinovic
10.	Project contractor	ENKA	Sevket Imamoglu
11.	Government agency	Environmental Protection Agency	Slaviša Popović
12.	Project contractor	HIDROPROJEKAT SAOBRAĆAJ	Strahinja Nikolic
13.	Project contractor	Highways Institute	Nada Dragovic
14.	River Regulation Designer	Jaroslav Černi, Water Institute	Marina Babic-Mladenovic
15.	River Regulation Designer	Jaroslav Černi, Water Institute	Prvoslav Marjanovic
16.	Project owner	Roads of Serbia	Djordge Mitrovic
17.	Government agency	Serbia Water	Nenad Marić
18.	Project contractor	The Biodiversity Consultancy	Suzanne Livingstone
19.	Project contractor	The Biodiversity Consultancy	Nikki Phair
20.	Project contractor	The Biodiversity Consultancy	Gina Walsh
21.	Project contractor	The Biodiversity Consultancy	Cheryl Ng
22.	Project contractor	The Biodiversity Consultancy	Charlotte Lambert
23.	Academia	University of Belgrade	Katarina Zorić
24.	Academia	University of Belgrade	Vesna Djikanovic

Invited but were not able attend meeting:

No.	Organization type	Name of organization	Participant name
1.	Project owner	Corridors of Serbia	Leonid Vukovic
2.	Project owner	Corridors of Serbia	A Naumovic
3.	Government agency	Institute for Nature Conservation of Serbia	Vladan Bjedov
4.	Government agency	Ministry of Agriculture, Forestry and Water Management	Goran Kamčev
5.	Government agency	Ministry of Construction, Transport and Infrastructure	Uros Stanimirovic
6.	Government agency	Ministry of Environmental Protection	Sabina Ivanovic
7.	Government agency	Ministry of Environmental Protection	Jelena Ducic
8.	Government agency	Ministry of Environmental Protection	Snezana Prokic
9.	Government agency	Ministry of Mining and Energy	Jovanka Atanackovic
10.	Government agency	Serbia Water	Miodrag Marinković
11.	Government agency	Serbia Water	Miloš Radovanović

Day 1 of workshop – 30th Nov 2020

Session	Who	Key comments/questions/takeaways
Welcome to the workshop and participants Brief round of introductions	Corridors of Serbia	
Introduction to the Morava Corridor Motorway Project	BEJV	Key takeaway: To develop an understanding of the Project
Introduction to the Project's biodiversity International lender requirements	TBC	Key takeaway: To develop an understanding of the priority biodiversity for the Project P. Marjanovic: Did the Project consider the positive benefits of the project to biodiversity. e.g., the creation of oxbow lakes? <i>Discussion: Project have plans for rehabilitation of the new sections of river that are being recreated, and the meanders that are being cut off for flood protection will also provide habitat for biodiversity (although will be a loss of main stem river habitat). Rehabilitation, restoration and new habitat creation will be accounted for in the residual impact assessment when the plans are finalized, and it is fully understood. This will be taken into account when considering the impacts of the Project.</i>
The Mitigation Hierarchy Project's approach to applying the Mitigation Hierarchy	TBC	Key takeaway: To develop a common understanding of the Mitigation Hierarchy, biodiversity offsets and the approach the Project will apply. Comments/questions: P. Marjanovic: As the Project is located in a heavily modified landscape, can we expect no residual impacts after restoration/rehabilitation is completed? Are we assuming that there is always a residual impact? <i>Discussion: It is hard for a project to get back to its original state from rehabilitation/restoration activities alone – all large infrastructure projects have an</i>

Session	Who	Key comments/questions/takeaways
		<p><i>impact on the landscape. Based on the assessment undertaken, there will be a residual impact to the priority biodiversity even after restoration and rehabilitation. The residual impact assessment is underway and will be publicly disclosed once complete. It was based on the best available information at the time, but it could be updated again, for example once river regulation design plans are finalized.</i></p> <p>S.Popovic: Did the Project consider the effects of habitat fragmentation to mammals populations? <i>Discussion: Yes, this is covered in the ESIA prepared by 2U1K</i></p> <p>P. Marjanovic: Regarding like-for-like offsets, does the conservation action have to compensate for the same type of biodiversity only? For e.g., river for river only? How about oxbow lake for river? <i>Discussion: We can replace the river for something that is better for biodiversity but "trading up" will require adherence to specific criteria to show that it is technically, politically, and socially feasible. The river is important for a number of threatened species and one Critical Habitat-Qualifying species (Striped Nerite snail). (NB – as of 20th Feb 2021, the Striped Nerite is deemed not to be present in the Zapadna Morava River based on a combination of field data, eDNA analysis and expert opinion). This makes things more complex when the species cannot live in the traded habitat e.g. this snail can only live in river habitat and not in slow moving oxbow lakes.</i></p> <p>P.Marjanovic: Can the 2D hydrological modelling that is currently being undertaken help with assessment? It is not clear how this would be considered to understand impacts to the biodiversity. <i>Discussion: It was challenging to assess what the downstream impacts are, hence the need for 2D hydrological modelling. We recognise that the modelling work is still ongoing (due to be completed in March 2021). In the meantime, we had to rely on expert opinion. Once the modelling results are available, we can check that what we have undertaken thus far is appropriate particularly for the downstream areas of the river.</i></p>

Session	Who	Key comments/questions/takeaways
		<p>P.Marjanovic: Values and preferences of stakeholders for considering 'trading up' for biodiversity offsets is an important point. It is unclear how comprehensive stakeholders' views regarding biodiversity have been taken into consideration based on the existing documentation reviewed. <i>Discussion: This workshop is the first consultation on biodiversity offsets we are undertaking. We will reach out to more stakeholders once the initial offset strategy is developed. BEJV: Additional studies on ecosystem services (impacts on stakeholders in terms of how their access to ecosystem services is impacted), informed consultation and participation around river regulation work and noise impacts are ongoing which will supplement this topic.</i></p>
<p>Biodiversity offsets and the Project Offset/conservation strategy Conservation targets for priority biodiversity</p>	<p>TBC</p>	<p>Comments/questions: P.Marjanovic: Regarding the offset targets calculated for the river, why was just length of the river rather than area calculated for the river? <i>Discussion: It was a sensible pragmatic way of calculating impact to the river as its width can vary in time and space. We have also used this approach on previous projects and has been accepted by the lenders.</i> P.Marjanovic: TBC has not considered the overall percentage of the river that is impacted over the areas that have not been impacted due to the Project. How significant is the effect in the consideration of this? <i>Discussion: The Critical Habitat criteria does not account for the proportion of area impacted, but is based on a specific set of criteria for species and ecosystems. One aquatic species was assessed to qualify the Project as Critical Habitat.</i> S. Popovic: Has the Project considered Protected Area information in the studies conducted? Discussion: Yes, we have considered information on protected areas. One protected area is located downstream of the Project. This was included in our assessments. Although we don't have the results of the 2D modelling, based on expert opinion, it is unlikely to significantly impact the protected area.</p>

Session	Who	Key comments/questions/takeaways
		<p>P.Marjanovic: Regarding suggested conservation activities TBC has initially proposed, how do we differentiate between conservation actions funded by the Project and those of by other sources. <i>Discussion: One of the key principles of offsets is additionality i.e. conservation actions must be additional to what is already being done by other parties. Water quality improvement is already part of a government activity. We would like to understand what the constraints are in managing it so far? Can the Project justify helping with those issues and attributing it partly to the gains of the Project while allowing the government to meet their own obligations? Again, we would like to emphasize it's a grey area, this often largely comes down to stakeholder agreement.</i></p> <p>Regarding water quality improvement as a conservation action of the Project, this could be complicated to attribute gains to the Project. There are plans in development to manage national water quality issues, including river quality. Under the Water Directorate, there is the National Water Strategy and with various documentation such as river basin management plans. Especially with the country being in the process of succession into the EU, it has obligations to align with the EU directive.</p>
Breakout session: Aquatic habitat and Terrestrial habitat: Feasibility of achieving conservation targets	TBC	Cancelled due to time limitations
Summary and closing remarks	TBC/BEJV	

Day 2 of workshop 1st Dec 2020

Session	Who	Key comments/questions/takeaways
Brief recap from Day 1 Questions and clarifications	TBC	Key comments/questions P.Marjanovic: What base you used for maps? How did you measure habitats sizes you presented in map? <i>TBC: We used the CORINE land use data and ESIA vegetation maps to inform our assessment.</i> (Additional suggestion to use the term vegetation map, rather than habitat as habitat maps usually mean use of the Natura 2000)
Breakout session: Aquatic habitats and Terrestrial habitats Verify existing threats to priority biodiversity, understand what programs and activities currently exist, understand constraints to current conservation activities Identify what additional actions could be undertaken by the project	TBC	Key takeaway: Develop a set of potential conservation actions the Project could undertake to compensate for the impacts Notes from Aquatic group(s): Top three existing threats to the river: Gravel extraction (often illegal), Pollution from industry and agriculture (nutrient and organic), Land use
Regroup and share key findings	TBC	Potential activities to address threats Improve water quality of tributaries to improve overall quality of main river. Current activities National water management plan is in progress (draft available for consultation in 2021?) Draft proposal in place for new monitoring program – does not include biodiversity as it is part of Natura 2000 Constraints/challenges

Session	Who	Key comments/questions/takeaways
		<p>Lack of baseline biodiversity data, specifically for aquatic habitat types, limits identification of potential offset sites</p> <p>Caution will be needed not to contradict/ counteract any of the plans that are already in development (additionality)</p> <p>Additional actions</p> <p>Rehabilitation of polluted tributaries where there is potential habitat for crayfish</p> <p>Could meander cut offs be designed with suitable conditions for crayfish?</p> <p>Rehabilitate areas impacted by gravel extraction (predominantly existing areas)</p> <p>Notes from Terrestrial group:</p> <p>Thermophilous deciduous woodland and other types of forest and woodland in Serbia is an important habitat type and should be protected.</p> <p>Habitat loss, fragmentation and degradation are main threats.</p> <p>Srbijasume - a local unit responsible for some areas.</p> <p>Institute for nature conservation deal with nature protection and biodiversity</p> <p>geosrbija.rs site – tells you parcel I.D., for each parcel of forested land, and then get who the owner is. Lots of different owners. Processing it will take time.</p> <p>Unclear if meadow is a priority habitat in Serbia (A number of moist and wet meadow habitat types do seem to be listed Priority habitat types under Serbian legislation, as per the Rulebook on Habitat Types (No. 35/2010)</p> <p>To engage with the Institute of Nature Conservation to understand land ownership in Serbia.</p> <p>Additional conservation option for meadow areas: Work with farmers to understand if they would be willing to protect some areas of meadow or create new areas of meadow for biodiversity purposes if they were compensated for it?</p>

Session	Who	Key comments/questions/takeaways
Breakout session: Aquatic habitats and Terrestrial habitats Who are the key stakeholders and what role could they play in the conservation activities? Who are the other stakeholders who will be interested in the conservation activities?	TBC	<p><u>Key takeaway:</u> Identify the key stakeholders and their involvement in potential conservation actions</p> <p>Notes from Aquatic group 1:</p> <p>Key stakeholders to be involved in/ undertake conservation activities and their roles Organisation involved in National Water Management plan (Srbijavode (Serbia Water) Institute for nature conservation</p>
Regroup and share key findings Prioritise the potential conservation actions based on potential to generate conservation gains, complexity and cost Next steps for the Project for progressing the offsets program	TBC	<p>Stakeholders with an interest in conservation activities Subsistence and recreational fishers Tourism industry (creation of new lakes from extraction pits and meander cut offs)</p> <p>Notes from Terrestrial group: Suggested stakeholders - Public Company for Forest management ("Srbijasume"), https://srbijasume.rs/ Public Company for Water management ('Srbijavode'), http://www.srbijavode.rs/web/ WWF Serbia Research community on nature conservation Beneficiaries of biodiversity conservation protection – tourism, General suggestion: To have a local NGO ('public enterprise') coordinate with various stakeholders to enable effective implementation of the Project's conservation actions. E.g. Ambassadors of sustainable development could serve as a main NGO and coordinate action with other various local stakeholders.</p>

Session	Who	Key comments/questions/takeaways
		Group stated they will help look into any local NGOs that focus on insect conservation.
Closing remarks	Corridors of Serbia	Thank you everyone for your contributions to this process. This was the first workshop on this topic, but it won't be the last. The Project partners appreciate the information that was gathered these last few days to support the Project to develop an Offset Program to manage their impacts to biodiversity.

13 Appendix 3 – Breakdown of estimated Biodiversity Offset Program budget

This estimated budget is based on the proposed offset actions for the identified priority biodiversity features in this Biodiversity Offsets Strategy and takes into account:

- The development of the Offset Management Plan and Monitoring Plan
- In-house staffing and external technical support (if deemed necessary)
- Stakeholder engagement with key stakeholders
- Ongoing management and monitoring and evaluation for offset activities for approximately 22 years, in order to achieve no net loss/net gain of priority biodiversity
- Independent (from the Project partners) review of offset progress over the lifetime of the Project
- A contingency fund in the event of offset under-performance
- Administration and overhead costs

The budget was developed with the following caveats:

- It isn't yet known what the final set of offset actions will be and therefore have based costs on proposed actions for each priority biodiversity in this strategy – the final set of actions may be different to what is presented here and therefore the budget may alter
- Budgets developed for relevant national plans have not yet been reviewed e.g. the Water Management Plan and budgets for the proposed and existing protected areas (this would be helpful in understanding what costs will be)
- This is a precautionary order of magnitude estimate based on (TBC) experience from other international offset programs
- The Project may have already included some river restoration costs into their financial models, if so this may reduce the cost of the aquatic offset option
- The cost of inflation has not been taken into account in this estimated budget

Item	Breakdown	Estimate of cost (Euros)
Proposed offset actions		
Terrestrial		
1. Meadows		
1.1 Motorway protected areas	Feasibility study (includes feasibility for protected agricultural areas (1.2))	€ 50,000.00
	Studies to establish monitoring baseline (includes feasibility for protected agricultural areas (1.2))	€ 30,000.00
	Establishment of meadow habitat (seed collection/nursery, dispersal)	€ 300,000.00
	Maintenance of meadow habitat (as otherwise likely to convert to woodland) 15,000 x 22 years	€ 330,000.00
1.2 Protection of agricultural areas (Costs for this option are not included in the total estimated budget ¹²)	Payments to farmers for setting aside and maintaining meadow habitat 22,000 x 22 years. (Approximately 200 per hectare (need 110 ha))	€ 484,000.00
2. Thermophilous woodland		

¹² The estimated costs of offset option *1.2 Protection of agricultural areas* is not included in the total estimated budget. This is because the two offset options for meadow habitat area are alternatives: i.e. once feasibility is understood for each option, the preferred option will be taken forward. The higher cost option (1.1) is included in the total estimated budget.

2.1 Proposed protected areas management	Feasibility study	€ 50,000.00
	Studies to establish monitoring baseline	€ 70,000.00
	Annual management costs 150,000 a year x 22 years (staff and activities)	€ 3,300,000.00
Aquatic		
3. Zapadna Morava River and riparian woodland (various restoration activities)	Feasibility study	€ 50,000.00
	Studies to establish monitoring baseline	€ 70,000.00
	Annual management costs 80,000 a year x 22 years (staff and activities)	€ 1,760,000.00
4. Naturalised ponds (management of Project borrow pits and cut off river meanders)	Feasibility study	€ 30,000.00
	Studies to establish monitoring baseline	€ 40,000.00
	Annual management costs 50,000 a year x 5 years/until established (staff and activities), maintenance costs 20,000 a year x 18 years)	€ 610,000.00
	Sub total	€ 6,690,000.00
Planning Phase of Project (x 2 years)		
Development of Offset Management Plan	50,000 x1	€ 50,000.00
Development of the Offset Monitoring and Evaluation Plan	50,000 x1	€ 50,000.00

In house staffing (2 people)	80,000 x2 years	€ 160,000.00
External technical support	75,000 x2 years	€ 150,000.00
Stakeholder engagement (e.g. workshops)	6 workshops over 2 years (5,000 each)	€ 30,000.00
	Sub total	€ 440,000.00
Ongoing management of offset program (Project)		
Ongoing monitoring and evaluation of offset actions	50,000 x 22 years	€ 1,100,000.00
In house staffing (2 people)	80,000 x 22 years	€ 1,760,000.00
External technical support	40,000 x 5 years	€ 200,000.00
Ongoing Stakeholder engagement	5,000 x 10 years	€ 50,000.00
Independent review of offset progress	1 review every 3-5 years (15,000 x 6)	€ 90,000.00
	Sub total	€ 3,200,000.00
	Estimated costs	€ 10,330,000.00
Administration and overhead costs	15 % of estimated total costs (including costs)	€ 11,879,500.00
Contingency	15 % of estimated total costs	€ 1,781,925.00
	TOTAL ESTIMATED BUDGET	€ 13,661,425.00