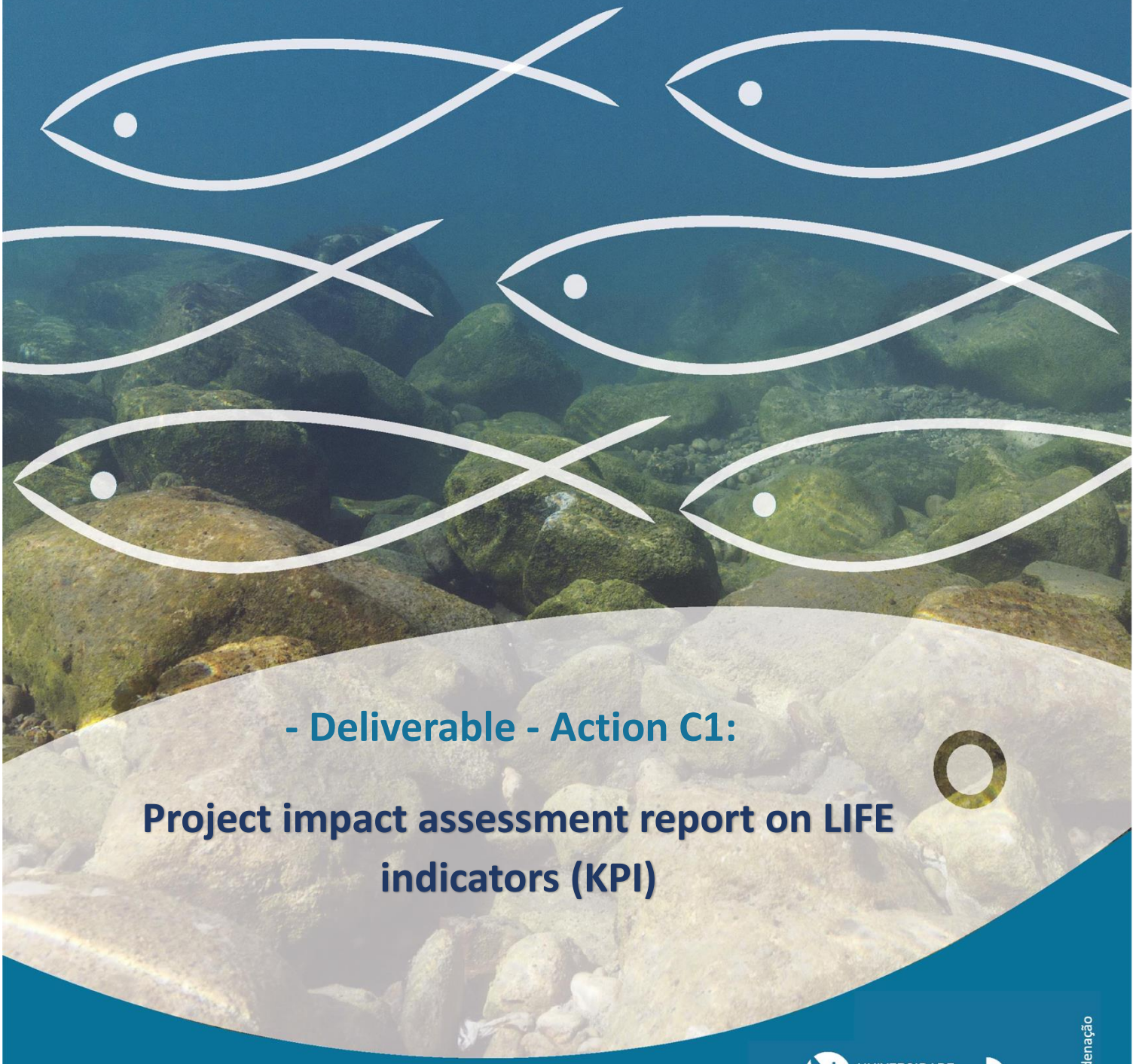
AÇÕES DE CONSERVAÇÃO E GESTÃO PARA PEIXES MIGRADORES NA BACIA HIDROGRÁFICA DO VOUGA

CONSERVATION AND MANAGEMENT ACTIONS FOR MIGRATORY FISH IN THE VOUGA RIVER BASIN

(LIFE16 ENV/PT/000411)



- Deliverable - Action C1:

Project impact assessment report on LIFE indicators (KPI)

Trabalhos realizados no âmbito do projeto LIFE ÁGUEDA (LIFE16 ENV/PT/000411), com o financiamento do Programa para o Ambiente e a Ação Climática (LIFE) e contributos diretos para a conservação de espécies e habitats da Rede Natura 2000. Cofinanciado pela EDP – Gestão da Produção de Energia, S.A.

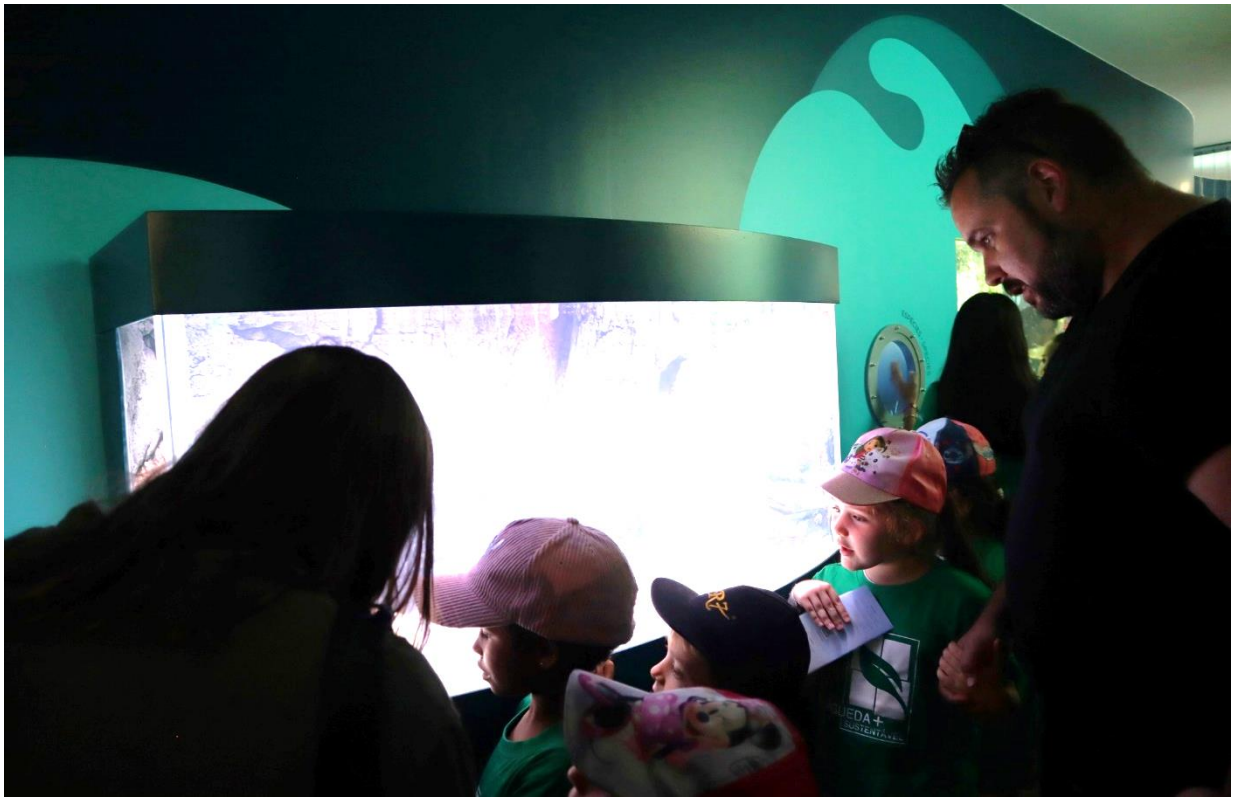
Coordenação

Parceiros

Apoios

- Entregável - Ação C1 -

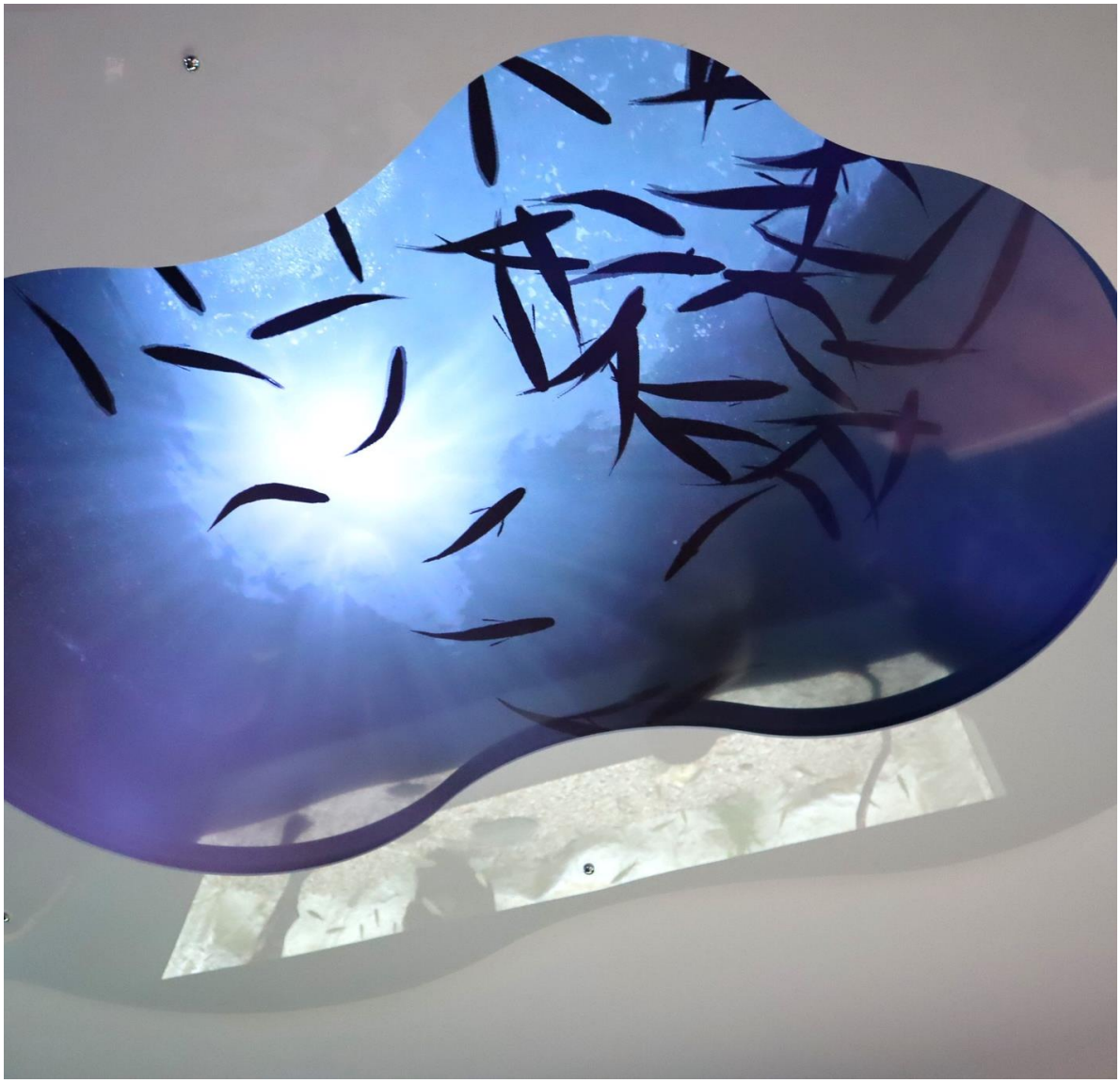
Relatório de avaliação de impactos de projeto em indicadores LIFE (KPI)



Financiado pelo Programa LIFE para o Ambiente e Ação Climática

Ações de conservação e gestão para peixes migradores na bacia hidrográfica do Vouga

LIFE16 ENV/PT/000411



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RESUMO

O projeto LIFE ÁGUEDA foi implementado para dar resposta a pressões hidromorfológicas, à fragmentação fluvial, à degradação dos habitats ribeirinhos, às espécies vegetais exóticas invasoras e à necessidade de melhorar a conservação e a gestão dos peixes migratórios na bacia hidrográfica do rio Vouga. O projeto incluiu obras de continuidade fluvial, recuperação ribeirinha, instrumentos de governação das pescas, monitorização ecológica, avaliações socioeconómicas, comunicação e educação ambiental, bem como ações de replicação.

A avaliação final dos indicadores do projeto LIFE mostra que a maioria dos principais objetivos físicos, técnicos, de comunicação e de replicação do projeto foram alcançados. Os resultados mais significativos dizem respeito ao restauro ou melhoria da continuidade fluvial, à redução das pressões hidromorfológicas, ao restauro de habitats ribeirinhos, ao controlo de espécies exóticas invasoras, ao envolvimento das partes interessadas, à sensibilização do público e à produção de ferramentas de transferência.

No final do projeto, este tinha abrangido 51 km de troços fluviais. Este valor inclui 34 km de continuidade fluvial restabelecida ou melhorada nos rios Águeda e Alfusqueiro através das Ações B1 e B2, bem como 17 km associados ao sistema de captura e translocação de enguias na barragem da Grela. Este sistema criou uma base operacional para medidas futuras de mitigação no rio Vouga.

No entanto, os 17 km devem ser interpretados como uma base operacional pós-LIFE e não como um resultado final da translocação dos juvenis de enguia Europeia, uma vez que essa translocação não pode ser concretizada antes de 31 de julho de 2025.

O projeto restaurou ou melhorou habitats ribeirinhos ao longo de mais de 50 km de margens nos rios Águeda e Alfusqueiro, através do controlo de espécies exóticas invasoras e da plantação de mais de 17 000 plantas autóctones. Estas ações reforçaram as bases para a recuperação a longo prazo das galerias ripárias e melhoraram as condições do habitat, reforçando os indicadores LIFE relacionados com habitats, condição do ecossistema, serviços ecossistémicos e espécies exóticas invasoras.

Os indicadores socioeconómicos e de comunicação também demonstraram um desempenho robusto, com benefícios em termos de emprego direto e indireto, atividade económica local, capacitação e sensibilização do público. O relatório de comunicação confirma 278 notícias em diversos tipos de meios de comunicação, uma comunidade final no Facebook com 803 seguidores e a utilização contínua do sítio web do projeto como ponto central de disseminação da informação do projeto. As atividades de educação e sensibilização ambiental alcançaram mais de 5 000 participantes, e os produtos finais, permanentes, do projeto relativos à interpretação e alcance do público, nomeadamente o Centro de Interpretação do Rio, C-Rio e a exposição no Fluviário de Mora, proporcionam uma capacidade de divulgação contínua após o término do projeto.

Não obstante, o impacto das ações do projeto em determinados indicadores não pôde ser plenamente avaliado durante o período de vigência do projeto, sendo necessário um acompanhamento a longo prazo no âmbito do Plano Pós-LIFE. Tal inclui os efeitos nas comunidades de peixes e nas populações de espécies, o impacto do programa de translocação da enguia europeia e a eficácia da passagem para peixes.

EXECUTIVE SUMMARY

The LIFE ÁGUEDA project was implemented to address hydromorphological pressures, river fragmentation, degraded riparian habitats, invasive alien plant species, and the need to improve the conservation and management of migratory fish in the Vouga River basin. The project incorporated river continuity works, riparian restoration, fisheries governance tools, ecological monitoring, socio-economic assessments, communication and environmental education, as well as replication actions.

The final assessment of the LIFE project indicators shows that most of the project's core physical, technical, communication and replication targets were achieved. The most significant results relate to the restoration or improvement of river continuity, the reduction of hydromorphological pressures, the restoration of riparian habitats, the control of invasive alien species, stakeholder involvement, public awareness, and the production of transfer tools.

By the end of the project, it had affected 51 km of river stretches. This figure comprises 34 km of restored or improved river continuity in the Águeda and Alfusqueiro rivers through Actions B1 and B2, as well as 17 km associated with the eel capture and translocation programme at the Grela weir. This system created an operational basis for future mitigation in the Vouga River. However, the 17 km should be interpreted as a Post-LIFE operational basis rather than a completed biological translocation result because the translocation of juvenile eels was not implemented before 31 July 2025.

The project restored or improved riparian habitats along more than 50 km of riverbanks, and supported the control of invasive alien species and the planting of over 17,000 native plants. These actions strengthened the basis for the long-term recovery of riparian galleries and improved habitat conditions, supporting the LIFE indicators relating to habitats, ecosystem condition, ecosystem services and invasive alien species.

The socio-economic and communication indicators also demonstrate robust performance. The C2 assessment reports on direct and indirect employment, local economic activity, capacity building, and public awareness benefits. The communication

report confirms 278 media items across multiple types of media, a final Facebook community of 803 followers, and the ongoing use of the project website as a central information hub. Environmental education and awareness activities reached over 5,000 participants, and the permanent interpretation outputs, the River Interpretation Centre, C-Rio, and the exhibition at the Fluviário de Mora, provide ongoing outreach capacity after the project has ended.

Nonetheless, the impact of the project's actions on certain indicators could not be fully realised within the project duration and requires longer-term monitoring under the Post-LIFE Plan. This includes the effects on fish communities and species populations, the impact of the European eel translocation programme and the efficiency of the fish pass.

CONTENTS

TABLES

1. INTRODUCTION

The LIFE ÁGUEDA project was designed to eliminate or substantially mitigate hydromorphological pressures in the Vouga River basin and to support the conservation and sustainable management of migratory fish and associated riverine habitats. The project addressed pressures that affect the achievement of good ecological status under the Water Framework Directive, including river discontinuity, physical alteration of river stretches, degraded riparian galleries and invasive alien plant species.

The project was implemented through an integrated approach. Physical restoration actions were combined with ecological monitoring, fisheries-management tools, socio-economic assessment, communication, education, replication and Post-LIFE planning. This report assesses the project impact through the LIFE Project Indicators and explains the assumptions used for the 31/07/2025 update.

2. PURPOSE AND SCOPE OF THE ASSESSMENT

The purpose of this report is to provide an interpretative assessment of the LIFE ÁGUEDA impacts against the LIFE Project Indicators and to support the final KPI/LPI update table.

The report covers:

- environmental and ecological indicators, including river continuity, hydromorphological pressures, riparian habitat restoration, invasive alien species and species-related indicators;
- socio-economic and governance indicators, including employment, local economic effects, capacity-building, fisheries tools and stakeholder involvement;
- communication and awareness indicators, including media visibility, website use, social media, education and public engagement;
- replication, transfer and Post-LIFE indicators, including B7 outputs, long-term maintenance needs and beyond-five-years values;
- traceability elements supporting the final submission.

The assessment distinguishes between achieved physical outputs and biological outcomes that require longer-term monitoring. This is particularly relevant for fish-pass efficiency, target-species population trends and juvenile European eel translocation.

3. Evidence base and method

The assessment was prepared using the updated deliverables list and the project documents submitted with the Final Report. The method included comparison of the original KPI objectives and estimates with the final LPI/KPI snapshot values, and verification of the information included in the Final Report and relevant deliverables.

4. Assessment of project impacts by indicator area

4.1. Environmental and ecological indicators

The main end-of-project environmental impact is the restoration or improvement of river continuity in the Águeda and Alfusqueiro rivers. Actions B1 and B2 restored or improved river continuity along 34 km through five fish-passage solutions, eight removals or structural adaptations and management solutions for remaining relevant structures. The eel capture and translocation system created the operational basis for future mitigation over an additional 17 km in the Vouga river.

The final project area or length affected by implementation actions should therefore be reported as 51 km. This corrects the previously identified inconsistency where the sum of 34 km and 17 km had been reported as 52 km. The 51 km value should be used consistently in the report and the KPI table.

The project also improved riverbed and hydromorphological conditions. The 68 ha value for improved riverbed conditions is derived from the 34 km river length and an average river section of 20 m. The indicator should be interpreted as mitigation of targeted hydromorphological pressure in the intervention stretches, not as full removal of all basin-scale hydrological pressures.

4.2. Riparian habitats, invasive alien species and ecosystem services

Riparian restoration and invasive alien species control were implemented on more than 50 km of riverbanks along the Águeda and Alfusqueiro rivers. The Report on Action B4 documents the planting of more than 17,000 native plants and the removal or control of invasive species such as acacias, false acacias and giant canes, using physical, mechanical and nature-based techniques.

The KPI values on sustainable forest management, natural and semi-natural habitats and invasive alien species should be linked to the 13.5 ha habitat restoration/regeneration area, the 30 ha area

targeted for restoration and IAS control, repeated follow-up control and maintenance of planted native vegetation. The explanation should not rely only on the number of plants.

Severe drought affected some planted specimens and required maintenance and replacement measures. For this reason, the report should present habitat restoration as a substantial and durable intervention, while acknowledging that the full ecological consolidation of riparian habitats depends on continued maintenance under the Post-LIFE Plan.

4.3. Species indicators and biological response

The project was expected to benefit several migratory and native fish species, including *Anguilla anguilla*, *Alosa alosa*, *Alosa fallax*, *Petromyzon marinus*, *Salmo trutta* and *Lampetra alavariensis*. The physical actions improved access to habitat, reduced fragmentation and created better conditions for spawning, refuge, growth and dispersal.

Species indicators must be interpreted cautiously because measurable biological response depends on life-cycle duration, interannual variability, hydrological conditions and the timing of implementation. For some species, especially shads and sea lamprey, available monitoring data do not support robust direct attribution of population recovery within the project period.

Fish pass efficiency cannot yet be reported as finally quantified by PIT antenna monitoring. The physical fish passage solutions were installed, but final biological performance remains dependent on Post-LIFE monitoring. Similarly, the European eel capture station was installed, but no juvenile eels were translocated by 31/07/2025. The target of translocating juveniles should therefore be presented as a Post-LIFE operational objective.

4.4. Socio-economic and governance indicators

The socio-economic indicators show relevant effects on employment, local economic activity, capacity-building and stakeholder engagement. The C2 assessment reports 5 directly created FTE jobs, 25 directly maintained FTE jobs, 1,143 qualified staff workdays and 1,362 operational staff workdays associated with suppliers and subcontracted entities.

The Mobile Registration Station and the “Peixe do Vouga” origin label created a functional pilot model for fisheries traceability and market differentiation. However, direct market effects should be interpreted carefully, because they are influenced by fish availability, fishing effort, weather conditions, market demand and scarcity of target species.

The project also strengthened governance capacity through stakeholder meetings, technical guidance, fisheries-management guidelines, maintenance manuals and replication tools. These

outputs support the long-term transfer of knowledge to authorities, infrastructure managers, fisheries stakeholders and other river-basin contexts.

4.5. COMMUNICATION, AWARENESS AND PUBLIC ENGAGEMENT INDICATORS

Communication activities were broad and sustained throughout the project. The D2 Final Report on Communication Actions reports 278 media items across online platforms, printed press, radio, television, institutional websites and other channels. It also records the continued role of the project website as a central information hub.

Facebook supported direct communication with the public. The project reached approximately 61,000 views during the initial years and closed with 803 followers. The website and Facebook page will continue to be maintained for at least five years after project closure.

Environmental education and awareness activities reached more than 5,000 participants. Permanent outputs such as C-RIO, the Fluviário de Mora exhibition, adapted trails and visitor-support materials provide continued outreach capacity beyond the LIFE funding period.

4.6. REPLICATION, TRANSFER AND POST-LIFE INDICATORS

The B7 deliverables strengthen the project legacy and support transfer of project outputs. Replicable elements include river continuity restoration methods, fish-passage and barrier-removal solutions, riparian restoration and invasive-species control methods, fisheries-management guidance, the smartphone-based monitoring approach, the Mobile Registration Station, the Seal of Origin system and communication tools.

The Post-LIFE Plan defines continued responsibilities for monitoring, maintenance, eel translocation, operation of education and interpretation facilities, website maintenance, dissemination and replication. These commitments support the beyond five years values included in the KPI/LPI table, but they should be clearly distinguished from values already achieved by 31/07/2025.

5. KPI UPDATE TABLE: SUMMARY OF FINAL INTERPRETATION

The full final KPI update table is provided at the end of this document. **Table 1** summarises the principal final interpretations.

Table 1 - Summary of the main KPI values and comments on interpretation

INDICATOR AREA	FINAL VALUE	COMMENT
Project area/length	51 km	34 km restored or improved through Actions B1 and B2, plus 17 km linked to the eel capture and translocation programme. The 17 km is an operational basis for Post-LIFE mitigation.
River continuity	34 km restored or improved	5 fish passage solutions, 8 removals or structural adaptations; management solutions for 2 downstream seasonal obstacles.
Hydromorphological pressures	15 obstacles addressed	The final intervention exceeded the initial target on the proposal, of 11 obstacles.
Riverbed conditions	68 ha improved	Calculated from 34 km of improved river stretches and an average width of 20 m.
Flood resilience	35 ha improved;	45 ha remaining at project end; 39 ha expected beyond 5 years (estimated additional 6 ha of improved resistance to flooding in alluvial margins adjacent to the end of project 35 ha).
Riparian habitats and IAS	Over 50 km of improved riverbanks; 13.5 ha habitat restoration; 30 ha IAS control	Action B4 implementation had more than 17,000 specimens of native vegetation planted; First intervention for IAS control was repeated with several control passages to monitor IAS presence and/or resurgence.
European eel	Eel capture station installed; translocation programme not achieved by 31/07/2025	Severe weather conditions and other constraints impacted on the translocation programme execution. European eel juveniles' translocation transferred to the Post-LIFE phase.
Fish-pass efficiency	Physical solutions installed; final efficiency not quantified	PIT-antenna for passive monitoring assessment needed maintenance intervention; restoration measures / fish pass efficiency assessment to occur during the Post-LIFE monitoring activities.
Socio-economic impact	5 FTE created; 25 FTE maintained; 1,143 qualified and 1,362 operational workdays	Socio-economic assessment in the project's intervention area (Action C2). Impact assessment for local/regional subcontractors and suppliers for the project actions.
Communication	278 media items; 803 Facebook followers; website maintained up to date after closure	KPI reflecting a broader media coverage than LPI snapshot values resulting from narrower press/online news category to be included in the LPIs. High media coverage during project execution, particularly in online media. The project team will continue to update actions results on LIFE Agueda's website during the Post-LIFE period, as well as the News and Agenda pages.
Replication and transfer	5 documents foreseen in B7 actions completed.	Support of replication and transfer of the project outputs with 1 plan for replication and Transfer, 3 good-practices guides (on fish passages, riparian galleries restoration and sustainable fishing measures, and 1 MRS financial viability plan.

6. CONCLUSIONS

The LIFE ÁGUEDA indicator assessment shows a strong overall performance in relation to physical implementation, habitat restoration, pressure reduction, communication, capacity-building and replication. The project addressed hydromorphological pressures, restoring or improving river continuity, restoring riparian habitats and controlling invasive alien species, and established tools for sustainable fisheries management, traceability and awareness for anadromous species with high socio-economic impact in the region (allis shad and sea lamprey).

The main reporting priority is to ensure that achieved outputs and expected longer-term impacts are duly conveyed. Biological indicators resulting from the project's actions are of particular importance in the final report but also in the Post-LIFE period, as fish population responses, fish pass efficiency and juvenile eel translocation require continued monitoring and operation after the project end.

The complete final update on the KPI table is provided as an Annex to this report.

ANNEX - KPI Update

OBJECTIVE	INDICATORS		ESTIMATED IMPACT (ABSOLUTE VALUES)	ESTIMATED IMPACT (IN %) *	31/07/2025 (4TH UPDATE)	COMMENT*
Improved Environmental and Climate Performance (including resilience to climate change)	Water	Improved resilience to flooding (FD)	35 ha of alluvial plains	30-40% change	Increased resilience of 35 ha of floodplains to floods and inundation	45 ha remaining at project end; 39 ha expected beyond 5 years (estimated additional 6 ha of improved resistance to flooding in alluvial margins adjacent to the end of project 35 ha).
			9000 m of improved riparian woods	5-10 % change	13.5 ha (approx.) of improved riparian woods - reinforcement of native vegetation cover and riverbanks stabilization	More than 17,000 native plants (trees and shrubs) were planted throughout the project area, increasing resilience in flood-prone areas
		Improved Structure of Riparian Galleries (WFD)	30 ha (restoration and control of invasive species)	5-10 % change	30 ha renaturalisation of riparian woods and IAS control	Renaturalisation of riparian woods and control of invasive species reduced the area affected by IAS. Drought-related mortality was addressed through maintenance and replacement or reinforcement planting where possible.
			51 kms (improved conditions)	60 % change	Approx. 51 km of improved conditions of riparian structure	Renaturalisation of riparian woods and control of invasive species reduced the area affected by IAS in 25 km of river stretches in both margins.
		Reduction of Hydromorphologic Pressures in Rivers Águeda and Alfusqueiro (WFD)	removal of 8 obstacles in rivers Alfusqueiro and Águeda	75% change	8 obsolete barriers removed in the Águeda and the Alfusqueiro rivers	Objective fully achieved through the elimination of eight obstacles in the Águeda and Alfusqueiro rivers. This included six complete removals and two structural alterations, effectively removing their barrier effect.
		Improved structure and substrate of River Bed (WFD)	68 ha of river bed (improved conditions)	100% change	68 ha of improved riverbed conditions (renaturalisation)	The value is calculated from 34 km of Águeda and Alfusqueiro river stretches and an average river section of 20 m, corresponding to 68 ha of improved riverbed conditions.
		Reduction of Siltage in River Bed (WFD)	restoring lotic conditions in eight river stretches	2-5% change	lotic conditions restored in eight river stretches (elimination of the lentic conditions upstream the eight obstacles removed or structurally altered)	The removal or structural adaptation of obsolete weirs restored lotic conditions in the affected stretches and reduced siltation associated with upstream lentic areas.
		River Continuity Reestablishment	34km of rivers	100% change	34 km of river continuity restored or improved through five fish-pass solutions, eight removals or structural adaptations and management solutions for two remaining structures.	The result concerns the Águeda and Alfusqueiro rivers and corresponds to the completed restoration or improvement of river continuity over 34 km.
		Performance of fish pass solutions	% of individuals belonging to the target species that	30-75% change	Five fish-pass solutions installed. No final automatic PIT-based efficiency value available by 31/07/2025.	Five fish-pass solutions were installed, instead of the three initially foreseen. PIT antennas removed for maintenance shortly after

Objective	Indicators		Estimated Impact (absolute values)	Estimated Impact (in %) *	31/07/2025 (4th update)	Comment*
			successfully negotiate the fish pass; and the number of target species that use the fish facility			placement; passive monitoring of fish pass efficiency not available by 31/07/2025. Assessment depends on continued monitoring in the Post-LIFE period.
		Obstacles to River Continuity Removed/Mitigated	11 weirs	100% change	15 weirs addressed: five fish passes, eight removals or structural adaptations, and management solutions for two seasonal or managed structures.	Estimated values exceeded. Two additional fish passes installed and management plans for two downstream seasonal obstacles.
		Naturalized Fish Passes Installed	construction of 3 nature-like fish passes	100% change	Three nature-like fish passes installed, complemented by two technical/removable fish passes at temporary weirs.	The project installed three nature-like fish passes, complemented by two pilot technical/removable pool-and-weir passes at seasonal leisure weirs in two river parks.
		Number of water bodies in bad ecological status addressed by the project (WFD)	2	100% change	Benefits achieved in river Águeda and river Alfusqueiro (reestablishment of river connectivity) and in river Vouga (mitigation of unsurmountable Grela weir through installation of an eel capture station (Translocation of juvenile eels).	The project benefited the Águeda and Alfusqueiro rivers by restoring connectivity, improving riverbed conditions, and supporting habitat recovery for migratory and native fish. European eel juveniles will also be translocated from the Vouga to the restored areas.
Sustainable land use, agriculture and forestry	**Forestry**	Reforested areas; increase in area under sustainable forest management	13.5ha	20% change	13.5 ha of reforested/restored riparian areas and IAS control in 30 ha, contributing to increased sustainable forest management.	Sustainable forest management improved the ecological status of 51 km of river sections, covering about 30 ha of riparian galleries and forests. This included planting around 17,000 native trees and shrubs, using species typical of local ecosystems to help preserve the local gene pool.
	Fisheries	Sustainable fisheries management	50 km	100% change	Official (legal) recommendation to tag anadromous fish with the Seal of Origin; Amendments to the closed season for fisheries targeting diadromous species; regulation of commercial fishing in the non-maritime inland waters of the Aveiro estuary (Regulatory Orders No 44/DG/2022 and No 47/DG/2023; Order No 51/2022)	The Mobile Registration Station and the "Peixe do Vouga" seal of origin supported traceability, registration and valorisation of professional catches of diadromous fish.
		European eel juveniles benefitted with translocation	500,000 individuals/yr	25-50% change	Eel capture station installed at Grela weir, but no juvenile eels translocated by 31/07/2025.	The eel capture station was installed at the Grela weir. No juvenile eels were translocated by 31/07/2025, and the 500,000 juveniles/year target remains linked to operation after project end.

OBJECTIVE	INDICATORS		ESTIMATED IMPACT (ABSOLUTE VALUES)	ESTIMATED IMPACT (IN %) *	31/07/2025 (4TH UPDATE)	COMMENT*
		Increased diadromous fisheries income	euro/kg	25% change	Price increases were observed for the relevant species, but they cannot be directly attributed to the Mobile Registration Station or Seal of Origin. Prices varied with market demand and supply conditions. Notably, in the Mondego, price per kg increased despite higher fish supply.	Sales data show strong price variation for allis shad and sea lamprey during the project, with marked increases in price per kg from start to finish. In the Vouga, this trend cannot be directly linked to project actions, as prices rose while fish availability declined. In the Mondego, however, prices increased alongside higher supply, suggesting a positive effect of the project team's close work with fishers on sustainable fisheries management. The Mobile Registration Station and seal of origin also laid the groundwork for future traceability and market differentiation.
Improved Nature, Species and Biodiversity	**Habitats**	Areas progressing towards improvement or restoration or in a favourable conservation status	34 km	100% change	34 km with restored or improved river continuity	Habitats condition improving with the reestablishment of river connectivity: increased habitat diversification, with direct benefits for biodiversity, improved access and increased availability of feeding, spawning and refuge areas for migratory and resident fish.
		Improved Area of Riparian Habitats (HD)	13,5 ha (restoration and re-naturalizing)	20% change	13.5 ha of reforested areas with native plant species and riverbanks stabilization with nature-based techniques.	The project restored and re-naturalised riparian habitats by planting around 17,000 native trees and shrubs typical of local ecosystems, maintenance works and nature-based riverbank stabilisation techniques.
		Improved Conservation Status of Areas from designated Natura 2000 SCI or SPA	2,5 ha	40-60%	Aquatic habitat restoration for diadromous species achieved as planned.	Management actions and aquatic habitat restoration benefited the Natura 2000 context associated with the Ria de Aveiro (PTCON0061) and Vouga (PTCON0026) SCI, particularly through river-continuity and riparian-habitat improvements.
		Number of Natura 2000 Sites targeted by the project	2 Natura 2000 SCI's	1.89%	2 Natura 2000 SCI's	The project targeted two Natura 2000 sites: Ria de Aveiro (PTCON0061) and Vouga (PTCON0026).
	Wildlife Species	Number of threatened species in improved or secured status	Population (specify unit)	% change	Targeted threatened migratory and native species benefited from improved river continuity, restored riparian habitats, and reduced hydromorphological pressures. Improvements in population status expected but not yet evident.	The main species addressed by the project include *Alosa alosa*, *Alosa fallax*, *Petromyzon marinus*, *Anguilla anguilla Salmo trutta* and *Lampetra alavariensis*. Population responses require longer ecological time frames than the physical implementation period.

Objective	Indicators		Estimated Impact (absolute values)	Estimated Impact (in %) *	31/07/2025 (4th update)	Comment*
		Anguilla anguilla	Iberian Population	1-5%	Not yet applicable. Habitat restoration was successfully completed, but the translocation programme will be implemented in the post-project period due to severe weather damage to the eel capture station shortly after its installation.	Target species considering its conservation status in the Portuguese Red Book of Threatened Species (EN) and the IUCN Red List (CR), as well as European Eel Management Plan and ICES recommendations; population recovery is expected to benefit from habitat restoration and specimen translocation.
		Alosa alosa	Iberian Population	10-20%	Fisheries data and visual counts at the Coimbra fish pass show strong interannual fluctuations in *Alosa alosa* numbers. Marked increase in the Mondego from 2020 to 2021, but proportional decrease from 2023 to 2024; numbers remained very low in 2025. The Vouga basin mirrors the Mondego trends for migratory species, at a smaller scale and lower numbers of fish entering the river basin to spawn.	Allis shad is listed as Endangered (EN) in the Portuguese Red Book of Freshwater and Migratory Fishes (2023), with an overall unfavourable conservation status in Portugal, consistent with assessments for Spain and France. Monitoring relies mainly on commercial fishing data and information from professional fishers, complemented in the Mondego by fish counts at the Coimbra weir-bridge fish pass. Although shad entries in the Mondego vary strongly between years, low counts have become more frequent and lower than in the past. Similar reports from other Portuguese basins suggest an unfavourable and declining trend in the Vouga basin, including the project area.
		Alosa fallax	Iberian Population	5-15%	Twaite shad has low commercial interest, but it is reasonable to infer the same trend as for *Alosa alosa* in the Vouga for the species, *i.e.,* unfavourable and declining.	Twaite shad is listed as Vulnerable (VU) in the Portuguese Red Book of Freshwater and Migratory Fishes (2023), and its conservation status in Portugal is assessed as unfavourable/inadequate (U1) at EU biogeographical level. As there is no dedicated monitoring programme and the species has lower commercial interest than allis shad, its local status and population trend remain difficult to assess.
		Salmo trutta	Iberian Population	1-5%	Improved river continuity and habitat conditions increased the potential availability of suitable habitat for sea trout, although no robust species-specific population estimate was available by project end.	The project improved river connectivity and habitat conditions for migratory fish, including sea trout. Although the resident *Salmo trutta* ecotype dominates the project area, the anadromous ecotype is increasing in the Mondego, where river connectivity was restored earlier. A similar positive

Objective	Indicators		Estimated Impact (absolute values)	Estimated Impact (in %) *	31/07/2025 (4th update)	Comment*
						trend is expected in the Vouga basin in the medium to long term.
		Petromyzon marinus	Iberian Population	5-10%	Sea lamprey larvae (ammocoetes) CPUE decreased from 55 ind/h to 43ind/h; the length of inhabited feature (larvae detected in monitoring campaigns) increased from 53 km to 61 km.	Habitat access improved, but population-level response remained influenced by wider basin-scale and interannual factors.
	Habitats Directive Protected Species	Number of endemic species in improved or secured status	Population (specify unit)	% change		
		Alosa alosa	Iberian Population	10-20%	Population size in the project area could not be determined; improved river connectivity expected to favour population status and trend.	The project improved migration and habitat conditions for allis shad in the target river stretches, with better access to spawning areas. The population is expected to respond positively and benefit in the medium to long term in the basin with the contribution of the project works.
		Alosa fallax	Iberian Population	5-15%	Population size in the project area could not be determined; improved river connectivity expected to favour population status and trend.	The project improved migration and habitat conditions for twaite shad in the target river stretches.
		Petromyzon marinus	Iberian Population	5-10%	*Petromyzon marinus* larvae detected in a inhabited or benefited length increased from 53 km to 61 km, while CPUE decreased from 55 to 43.	Improved access to river stretches benefits sea lamprey habitat availability, while population values remain influenced by wider environmental and fisheries factors.
	Endemic Species	Number of endemic species in improved or secured status	Population (specify unit)	% change	CPUE values for *Lampetra alavariensis* larvae decreased approx. 60% between the beginning and the end of the project.	Despite interannual variation, *L. alavariensis* CPUE declined markedly in the monitored area. This is consistent with its Endangered (EN) status in the Portuguese Red Book of Freshwater and Migratory Fish, due to its restricted distribution and ongoing habitat decline. Habitat and river connectivity improvements may favour the population trend in the project implementation area.
		Lampetra alavariensis	World Population	0.9	Average CPUE for *Lampetra alavariensis* larvae decreased from 23.2 ind/h to 9.20 ind/h for the Vouga basin during the project period.	The project improved habitat and connectivity conditions for the species, but the observed CPUE decrease shows that recovery cannot be confirmed within the project period.

Objective	Indicators		Estimated Impact (absolute values)	Estimated Impact (in %) *	31/07/2025 (4th update)	Comment*
	Alien Species	Reduction of invasive alien species	Population/ha Population/m3	% change	IAS area decreased from 33 ha at the beginning of the project to 3 ha at project end, with 0 ha estimated beyond five years.	The main IAS reported were *Acacia dealbata*, *Ailanthus altissima* and *Arundo donax*, with follow-up control contributing to a strong reduction in affected area.
		Reduction of *Acacia dealbata* populations in project intervention areas	1 populations/ha	95 % change	Population value reduced from 1 population/ha to 0 population/ha.	Control actions were implemented across the riparian intervention area, contributing to the reduction of invasive alien species pressure and supporting native habitat recovery.
		Reduction of *Ailanthus altissima* populations in project intervention areas	1 populations/ha	95 % change	Population value reduced from 1 population/ha to 0 population/ha.	Control actions were implemented across the riparian intervention area, contributing to the reduction of invasive alien species pressure and supporting native habitat recovery.
		Reduction of *Arundo donax* populations in project intervention areas	1 populations/ha	95 % change	Population value reduced from 1 population/ha to 0 population/ha.	Control actions were implemented across the riparian intervention area, contributing to the reduction of invasive alien species pressure and supporting native habitat recovery.
Economic Performance, Market Uptake, Replication	Employment	Jobs created	FTE	% change	2.8 FTE at project end	A total of 11 additional staff members were recruited during LIFE ÁGUEDA, corresponding to 39,430 working hours over the project lifetime.
		Direct Jobs Created during project lifetime	6 FTE	not applicable	2.8 FTE at project end	The project generated additional employment through recruitment by DOCAPESCA and the University of Évora. At project end, the quantified employment indicator was 2.8 FTE.
		Direct Jobs maintained after the project end	5 FTE	not applicable	5 FTE expected beyond five years.	After project completion, 2 FTE were maintained at DOCAPESCA and 3 FTE at the University of Évora, years through continued institutional links.
	Replication / Transfer	No. of replication / Transfer		not applicable	Replication, continuation and transfer pathways identified through new entities/projects and new geographic areas.	Replication is expected through uptake of LIFE ÁGUEDA approaches by new projects and entities. Continuation is expected through LIFE ÁGUEDA partners applying project methods and prototypes in additional river continuity actions. Transfer is supported by interest from external entities addressing river fragmentation in their own intervention areas.
		Number of EU countries directly targeted by activities	8	not applicable	4 countries/geographic areas identified: Portugal, Ireland, Spain and France.	The replication and transfer pathways cover Portugal, Spain, France and Ireland, with a focus on

OBJECTIVE	INDICATORS		ESTIMATED IMPACT (ABSOLUTE VALUES)	ESTIMATED IMPACT (IN %) *	31/07/2025 (4TH UPDATE)	COMMENT*
		dealing with replication/transfer goals				river continuity restoration, fisheries management, certification of origin, riparian habitat restoration and participatory management approaches.
		Replication: Continuity/Enlargement Proposed	1	not applicable	Continuation and enlargement pathway identified through post-project deployment of LIFE ÁGUEDA methods and prototypes.	Continuation focuses on applying project methods and prototypes to river continuity restoration beyond the original intervention area, supported by continued use of monitoring, maintenance, eel translocation, communication and stakeholder engagement tools.
		Replication: New Portuguese projects Proposed	1	not applicable	Replication in Portugal identified across several river basins and five Hydrographic Regions.	Replication in Portugal focuses on barrier removal, river continuity re-establishment and fisheries management approaches in river basins within RH1 Minho, RH3 Douro, RH4 Vouga and Mondego, RH5 Tejo and RH7 Guadiana.
		Replication: New EU projects Proposed	1	not applicable	Replication and transfer pathways identified in other European countries, including Ireland, Spain and France.	International transfer focuses on participated fisheries management, river fragmentation mitigation, river continuity restoration, riparian habitat restoration and participatory governance in comparable river-basin contexts.
	Training for Replication	Number of EU participants in replication workshop on technical design of naturalized fish passes	10	not applicable	40 professionals/experts reached by project end and expected to remain the quantified value beyond five years.	Training included 40 enrolled participants in the workshop on nature-like fish passes: design, construction and monitoring.
		Number of EU participants in training/field visits to project intervention areas	3	not applicable	13 technical experts in invasive alien species control workshops/dissemination events.	Field trips and training activities supported replication by transferring technical knowledge to professionals.
	Technical Dissemination for Replication	Number of technical participants in project's conferences/seminars	200	not applicable	60 enrolled participants in two events.	The project disseminated results on river continuity, fish migration, riparian restoration, invasive species control, fisheries management and replication potential in two organized events, the first being a symposium at Fluviário de Mora in 2022, and the second corresponding to the project's Final Seminar in 2025.
		Number of EU contacts in project's seminar in Brussels and Greenweek	200	not applicable	n.a.	Greenweek participation programmed to occur in 2020, with travels cancelled due to the COVID-19 pandemic.

OBJECTIVE	INDICATORS		ESTIMATED IMPACT (ABSOLUTE VALUES)	ESTIMATED IMPACT (IN %) *	31/07/2025 (4TH UPDATE)	COMMENT*
	Market uptake	Average number of customers/users of the "mobile auction" solution	40 to 60	50-75%	Mobile Registration Station operational; 388 fish registered and labelled; approximately 14 fishers, corresponding to about seven fishing boats, participated.	The Mobile Registration Station was tested in real operational conditions and supported traceability and market differentiation. Use varied with fishing activity and species abundance.
	Fishery Sector	River Basin area Benefitting from "sustainable fishing" seal	50 km	100% change	Professional fisheries traceability tested in the Vouga basin through the Mobile Registration Station and the “Peixe do Vouga” seal of origin.	The approach is linked to sustainable management of diadromous fisheries in the Vouga basin and has replication potential in comparable fisheries contexts.
		Number of fisherman using the "mobile auction" for fish sales	30 fishermen	0.5	Approximately 14 fishers, corresponding to about seven fishing boats, used the Mobile Registration Station / “Peixe do Vouga” seal of origin.	Participation demonstrated the feasibility of the traceability model and engagement of professional fishers under real operational conditions.
		Increase of market value of *Alosa alosa* labeled with "sustainable fishing" seal	2.5 euro/kg	25% change	Average sale prices for allis shad increased during the project period, from 3.00€/kg in 2017 to 4.99€/kg in 2024, and 9.20€/kg in 2025, average price at Aveiro sales port. Labelled fish specific price was not separately quantified.	Notwithstanding that the seal of origin and traceability mechanism created a basis for market valorisation, observed price increases in Aveiro sales port are mostly reflecting market conditions, fish scarcity and demand. For the Mondego basin, price increase occurred even with increased market offer, reflecting sustainable fisheries management approach.
		Increase of market value of *Petromyzon marinus* labeled with "sustainable fishing" seal	8.75 euro/kg	25% change	Average sale prices for sea lamprey increased during the project period, from 14.61 €/kg in 2017 to 16.68€/kg in 2022; labelled-fish-specific price premium was not separately quantified. In 2024 and 2025 a severe shortage occurred in sea lamprey supply (no data referring to average price in those years)	Notwithstanding that the seal of origin and traceability mechanism created a basis for market valorisation, observed price increases in Aveiro sales port are mostly reflecting market conditions, fish scarcity and demand. For the Mondego basin, price increase occurred even with increased market offer, reflecting sustainable fisheries management approach.
Communication, dissemination, awareness raising	**Communication and Dissemination**	Layman Report Users/Readers	3000 person	not applicable	Layman Report completed and made available digitally; printed copies will be made available for C-Rio visitors and Águeda visitors in general, at the Tourism office, during the Post-LIFE period.	The Layman Report provides a non-technical synthesis of the project, its objectives, actions and key results for the general public. Available in English and Portuguese versions.

Objective	Indicators		Estimated Impact (absolute values)	Estimated Impact (in %) *	31/07/2025 (4th update)	Comment*
		Communication and Dissemination: EU entities directly approached by networking works	20	not applicable	28 professionals/experts involved in networking by project end.	Networking supported transfer of experience on river restoration, fish migration, telemetry, invasive species control, riparian restoration, communication and environmental education.
		Communication and Dissemination: News published in general media	120		167 press and online news items by project end.	The original target of 120 news items was exceeded. The LPI value covers press and online news media and does not include radio, television, podcasts, institutional websites, newsletters, social media posts or project-created dissemination products.
		Communication and Dissemination: Resident population made aware through monthly walks/tours	480	not applicable	1,737 participants involved in environmental awareness activities, including guided walks, volunteer activities and activities with families or local groups.	Awareness activities exceeded the initial conservative estimate and contributed to local engagement with river continuity, riparian habitats and invasive alien species control.
		Communication and Dissemination: Number of tourists and residents made aware through interpretation trails	9.360/yr	not applicable	Permanent adapted trails, information panels, C-Rio and Fluviário de Mora interpretation materials were installed and available to visitors; 1,231 C-Rio visitors and 41,800 Fluviário de Mora guided visitors were recorded by 31/07/2025.	Visitor-support and interpretation infrastructure created a long-term awareness channel beyond the project period. Continued visits to C-Rio and the Fluviário de Mora are expected to contribute to post-project outreach.
	Awareness raising	Resident population made aware through monthly walks/tours	960	not applicable	1,737 participants involved in additional environmental awareness activities, including guided walks, awareness sessions and volunteer activities.	The awareness activities exceeded the initial estimate and supported public understanding of river restoration, native riparian vegetation and invasive alien species control.
		Number of young people from neighbouring municipalities made aware through specific environmental education works	4000	not applicable	More than 6,600 children reached through school and holiday programmes, including 4,544 through Rio vai à Escola/Rio de Todos and 2,122 through LIFE em Férias.	The initial target of 4,000 young people was exceeded through school-based and holiday environmental education activities.
		Number of people reached directly with awareness raising activities	203440 person	not applicable	51,400 persons influenced through dissemination or awareness-raising actions at project end.	The final LPI value aggregates direct awareness, dissemination, visitor, website and communication channels.

Objective	Indicators		Estimated Impact (absolute values)	Estimated Impact (in %) *	31/07/2025 (4th update)	Comment*
		Number of municipalities reached with direct environmental education activities	12 municipalities	not applicable	12 municipalities reached through direct environmental education and awareness actions.	Activities covered the Região de Aveiro intermunicipal context and Mora, supporting territorial dissemination of project messages.
	Stakeholder Involvement	Number of Stakeholders actively involved with the project works	30 persons/ entities	not applicable	Stakeholder involvement included 6 NGOs, 19 public bodies, 3 private-for-profit entities and 2 civil-society organisations	Stakeholder participation covered implementation, monitoring, training, awareness, fisheries and replication-related activities.
	Active Engagement with Project Implementation	Number of young students participating in volunteering holiday camps	80 students	not applicable	2,122 children participated in LIFE em Férias and 4,544 children in Rio vai à Escola/Rio de Todos; higher-education field trips reached 50 students.	The initial 80-student target was exceeded through the combined school, holiday and higher-education activities.
		Number of recreational fisherman using regularly the monitoring application	1000 person	0.1	Pesca em Portugal app reached more than 2,073 registered active users by 31/07/2025.	The app created a functional citizen-science channel for recreational fisheries. Catch reporting remained lower than registration levels.
		Number of National Public Administrations engaged with implementation of project works	4	1	At least 4 national public administration entities were involved: APA, ICNF, DGRM and IPMA, with additional institutional stakeholders involved during implementation.	The target was achieved through involvement of the main national authorities relevant to water, nature conservation, fisheries and related monitoring.
	TV Documentary	General public audience for the TV project´s documentary	1,780,000 person	n/a	Documentary produced and made available online as part of the final communication outputs.	The documentary provides an accessible audiovisual synthesis of LIFE ÁGUEDA works and results, supporting continued dissemination beyond project end. By project end, it was available via YouTube but may become a TV Documentary pending future arrangement/negotiation with the production company.
	Website	Number of visitors	4800/yr	n/a	20,109 unique website visits by 31/07/2025, with 27,124 estimated beyond five years.	The final value exceeds the annual estimate and reflects the website function as the central project information repository. The website will be maintained after project closure.
		Number of EU visitors	240/yr	n/a	International reach recorded through website represented 7.8% of total unique visits (3.2 % from	The project audience was predominantly Portuguese (93.2%), with a smaller but relevant

OBJECTIVE	INDICATORS		ESTIMATED IMPACT (ABSOLUTE VALUES)	ESTIMATED IMPACT (IN %) *	31/07/2025 (4TH UPDATE)	COMMENT*
					Spain, Belgium, Italy and United Kigdom); total unique website visits were 20,109 by 31/07/2025.	international reach through digital communication channels.
	Behavioural change	Number of entities/individuals changing behaviour	Number	% change	124 persons with improved capacity or knowledge and 8,050 individuals involved in project activities at project end.	The project created conditions for behavioural change through training, participation, traceability tools, citizen-science tools, stakeholder involvement and long-term awareness infrastructure.
		Number of professional fishermen changing Behaviour/Practices	30 person	50% change	Approximately 14 fishers, corresponding to about seven fishing boats, participated in the Mobile Registration Station / “Peixe do Vouga” seal of origin pilot; 130 professional fishers were addressed through field contact and meetings.	The pilot demonstrated uptake of traceability-based professional fisheries practices. Participation was influenced by fish availability, weather and fishing effort.
		Number of recreational fishermen changing Behaviour/Practices	1000 person	0.1	Pesca em Portugal app reached more than 2,073 registered active users by 31/07/2025; offline registration functionality was introduced during the project.	The result exceeded the initial user target and supports behavioural change towards voluntary catch-data registration by anglers.

LIFE ÁGUEDA
Ações de conservação e gestão para peixes migradores na bacia hidrográfica do Vouga

LIFE16 ENV/PT/000411

Coordinating Beneficiary

UNIVERSIDADE DE ÉVORA

MARE

Associated Beneficiaries

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MORA MUNICÍPIO

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