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LIFE Project Number
LIFE15 GIE/SI/000770

Final Report
Covering the project activities from 07/07/2016¹ to 31/10/2020

Reporting Date²
30/11/2020

LIFE PROJECT NAME or Acronym
LIFE ARTEMIS

Data Project

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Data Beneficiary

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¹ Project start date

² Include the reporting date as foreseen in part C2 of Annex II of the Grant Agreement

This table comprises an essential part of the report and should be filled in before submission

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Obligatory elements	✓ or N/A
Technical report	
The correct latest template for the type of project (e.g. traditional) has been followed and all sections have been filled in, in English <i>In electronic version only</i>	✓
Index of deliverables with short description annexed, in English <i>In electronic version only</i>	✓
<u>Mid-term report</u> : Deliverables due in the reporting period (from project start) annexed <u>Final report</u> : Deliverables not already submitted with the MTR annexed including the Layman's report and after-LIFE plan Deliverables in language(s) other than English include a summary in English <i>In electronic version only</i>	✓
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The reporting period in the financial report (consolidated financial statement and financial statement of each Individual Beneficiary) is the same as in the technical report with the exception of any terminated beneficiary for which the end period should be the date of the termination.	✓
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Amounts, names and other data (e.g. bank account) are correct and consistent with the Grant Agreement / across the different forms (e.g. figures from the individual statements are the same as those reported in the consolidated statement)	✓
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2 List of key-words and abbreviations

IAS – Invasive Alien Species

SFI – Slovenian Forestry Institute

IRSNC – Institute of Republic Slovenia for Nature Conservation

IS / ZS – Institute Symbiosis / Zavod Symbiosis

SFS – Slovenia Forest Service

PMT – Project Management Team

PSG – Project Steering Group

LP TRŠh – Landscape park Rožnik (alias Tivoli, Rožnik and Šišenski hrib)

EWRR – early warning and rapid response system

RRP(s) – Rapid Response Plan(s)

MOP – Ministry of the Environment and Spatial planning

MOL – The City of Ljubljana

EP – *Eutypella parasitica*

3 Executive Summary

Forest ecosystems are often very biodiverse, have many ecosystem services and are occurring almost on all continents. However, in many parts of the world forests are under threat because of human activities like habitat destruction and pollution. Additionally, one of the main identified threat to forests are also invasive alien species. Invasive alien species are a threat for biodiversity, economy, and health. In the last decades, an exponential growth of alien species has been observed and a saturation does not seem to occur, because the main driver, trade, is also continuing to grow. Biological invasions of alien species exist out of several stages: introduction, establishment, spread and invasion. However, one of the most effective way against alien invasive species are prevention or early warning and rapid response.

In the project LIFE ARTEMIS (Awareness, training and measures on invasive alien species in forests) (LIFE15 GIE/SI/000770) were the following aims. The goal of the project LIFE ARTEMIS was to contribute to the reduction of the harmful impacts of invasive alien species on biodiversity by increasing public awareness and by setting up an effective early warning and rapid response framework for invasive alien species in forests. Project objectives to be achieved by the project are: 1) Increase awareness of the general public, in particular of private forest owners, of threats caused by invasive alien species to forests. 2) Establish an efficient national institutional framework for early detection and rapid response for alien species in forests. 3) Improve the national capacity for early detection of alien species in forests by mobilizing and training professionals and volunteers.

The project was divided into 3 preparatory actions in which in A1. a communication plan was developed, and a public attitude survey was planned, in A.2 an early warning and rapid response (EWRR) institutional framework was developed and in A.3 EWRR training programme was developed. Then there were 5 core actions: B.1) National awareness raising campaign on IAS, B.2) EWRR training of professionals and volunteers, B.3) Engaging foresters and citizens scientists in collecting IAS data, B.4) Involving volunteers in the management of invasive alien plants in urban forests and B.5) Canker of maple awareness campaign. Furthermore, there were also 3 dissemination actions: D.1) Dissemination of project results to the general public, D.2) International conference on EWRR and D.3) The transferability and replicability plan.

During the project, many people were reached in regard of the early warning and rapid response system against invasive alien species in forests. The main output in the preparatory action was the preparation of the early warning and rapid response system institutional framework, five rapid response plans of different species and educational materials like a field guide for the recognition of invasive alien species. In the core action B.1, there was an awareness campaign including different components, like a traveling exhibition at different locations, many popular articles and brochures, guided city walks, educational movie screenings, presentations, and train poster campaign. With these activities many people were reached, exceeding the targeted values in the project proposal. In B.2, in total 33 trainings were organized for different groups of stakeholders. In total, 1059 people were participating on these trainings. In B.3, the information system "Invazivke" was developed combining different databases and for the purpose to get more data. Both a website and a mobile app were developed. The information system was promoted for the documentation of invasive alien species in forests in species specific action and school-oriented promotion actions. In total, there were 75.049 observations from 428 providers and different databases. The activity B.4, volunteers helped with the inventory and eradication of different alien plant species from the Landscape park Tivoli, Rožnik and Šiška hill in Ljubljana. In total 10 species were targeted, and actions took place of more than 20 ha. Furthermore, an action plan was developed for the landscape park. Additionally, there was a database/platform developed with good practice examples. B.5 focused on the mitigation of the canker of maple (*Eutypella parasitica*) with

volunteers. We reached at least 100.000 inhabitants with the *Eutypella* awareness campaign. In total 452 cankers were found and more than 50% of the trees with canker were removed.

Project results were disseminated through different means, like social media, scientific and popular articles, conferences, website, and networking meetings. In total 104 people from all over the world attended the EWRR conference organized within the project. In the end, there was also a replicability and transferability workshop with two-member state organizations, and a replicability and transferability plan was made.

The project LIFE ARTEMIS spanned from 2016 till 2020 and had many successful activities that impacted many people in Slovenia in the fight against invasive alien species in forests. The public got equipped with the knowledge to actively contribute to the reduction of the negative impacts of invasive alien species on nature. Cadres for the involvement in the early warning and rapid response were established and trained. With all activities, we have also strengthened the national capacity for the early detection of alien species in forests. There were many transferability and replicability potentials of the deliverables. The public surveys showed that there was an increase in awareness of the problems of invasive alien species in forests during the project period.

4 Introduction

IAS are an increasing threat and have become a major driver of biodiversity loss. Due to the increased trade in goods and the movement of people, there is a significant increase in unintentional introductions. These can only be addressed through preventive mechanisms – awareness-raising, pathway management, and early warning and rapid response.

Compared to other ecosystems the number of invasive alien species in European forests is still relatively low, but it is steadily increasing. Already in 2008, a preliminary assessment of European forest biodiversity, noted increasing threats of alien species to European forests. Due to a lack of systematic research and monitoring of IAS in Slovenia, only some partial data can be used to evaluate trends. However, all evidence shows that alien species are also a serious threat to forests. In 2009 DAISIE database 134 alien forest insects were listed for Slovenia. By 2012, this number increased to 173 (Jurc, 2011). Of these 63% (109 species) can be found on trees or shrubs. From the Neobiota Sloveniae, a catalogue of alien species of Slovenia (Jogan et al. 2012), we estimate that at least 50 alien plants occur in natural forests, of which at least 75% are already invasive and negatively affect forest habitats.

Pressures from alien species in forest should also be seen in the light of the conservation importance of forests in Slovenia. Forests cover almost 60% of the national territory and 25% of forested areas in Slovenia is included into the Natura 2000 network. These forest ecosystems are now exposed to a serious threat of IAS invasion. In February 2014, a severe ice storm hit Slovenia, in which many (in some areas up to 50%) of trees were damaged or broken. In 2015 and in the following years vitality of trees was further compromised by the (native) bark beetle. This makes trees increasingly exposed to pests and diseases. Secondly, sanitary felling after the ice storm led to a significant increase in forest harvesting operations and transport of forestry machinery and timber. Many alien species arrive in Europe with trade in timber and ornamental plants. Two large Pan-European Transport Corridors are passing through Slovenia, resulting in heavy road and railroad transport. Due to a lack of surveillance in Slovenia, we cannot estimate the scale of threat from IAS due to transport. However, from the foreign studies we can conclude that it must be significant and increasing.

The accelerating rates of the establishment of alien species lead to the adoption of the new EU Regulation on IAS. The new regulatory framework is laying down the basis for a coordinated approach of all Member States. The implementation of the regulation will for a large part depend on capacity of individual States to ensure efficient early warning and response mechanisms and to build on regional cooperation. The project LIFE ARTEMIS contributed to the improvement of the capacity of Slovenia to implement the regulation and build on model approaches that will be applicable elsewhere.

In Action A.1 we developed the Project Communication Plan. In the project activities we emphasized the following communication messages:

- (i) Forests are our natural wealth. They are a source of drinking water, they regulate the climate, they offer us opportunities for relaxation, protect against avalanches, give us wood and forest fruits, but at the same time they are an important living space for plants and animals.
- ii) Invasive alien species are alien animals, plants and fungi that spread and cause environmental damage. In forests, invasive alien species may affect indigenous species, change the functioning of the forest, reduce the economic value of wood or affect human health.
- (iii) We can all contribute, through responsible behaviour, to reducing the effects of alien species: we do not plant invasive alien species and we are careful in moving the soil, building material and wood.
- (iv) Pay attention to the occurrence of alien species in forests and record observations as soon as possible to Invazivke Information System.
- (v) The LIFE ARTEMIS project is a communication project whose main objectives are to strengthen awareness of the population of Slovenia on the effects of IAS on forests and to establish a comprehensive holistic system of response to new alien species. Early warning and rapid response

system for alien species in forests will enable detection of new alien species in the early stages and allow effective action to mitigate their negative impacts on forests.

In the project many different stakeholders were addressed - Public sector stakeholders: Ministry of the Environment and Spatial Planning, Ministry of Agriculture, Forestry and Food, Administration of the Republic of Slovenia for Food Safety, Veterinary Sector and Plant Protection, University of Ljubljana and National Institute for Biology, Park rangers, Forestry Inspection, the City of Ljubljana, Management authority of the LP TRŠh, Zoological Garden Ljubljana, Forestry institutions in four neighbouring countries, cooperating in exchange data for alert list species. Civil society stakeholders: Private forest owners, Users of the area in LP TRŠh, participating in the preparation of IAS Action Plan, National nature study NGOs and nature science students, participating in the EWRR training and engaging in early detection, participating in activities in LP TRŠh, Local nature study NGOs, participating in the EWRR training and engaging in early detection. Private sector stakeholders: Tree nurseries, Logging companies, Public green managers.

LIFE ARTEMIS had two dedicated actions to monitor project impact – C.1 and C.2. In the first, we monitored and evaluated the visibility of the project and the outreach of its activities. Measuring the effectiveness of the awareness-raising actions was important so the adjustments of the PR strategies during the project could be implemented instantly and we were able to evaluate the impact of the project on the target audiences. During the project three studies of public attitudes towards IAS were conducted which were used for planning awareness activities on IAS. In C.2 we evaluated the EWRR institutional framework, the effectiveness of EWRR Training Workshops and IAS Information System “Invazivke”. Furthermore, we prepared a cost-benefit analysis of a selected tree pest species, to explore whether the economic damage of the alien species invading Slovenian forests would be greater than the costs of preventive measures and the EWRR for this species would be economically justified, and evaluation of potential income from IAS control measures on a selected invasive tree species.

In the socio-economic context, forests provide multiple ecosystem services (e.g. moderating temperatures, countering climate change, preventing soil erosion, wildlife habitat, providing wood, numerous social benefits). However, increasing international trade in wood and wooden products, increases chances of unintentional introduction of alien tree pests. Loss of trees and decrease of regeneration due to alien species can irreparably affect the ecosystem services they provide. Furthermore, wood is often used as fuel and raw material by many Slovenes. When IAS affect economically important tree species, this can lead to large economic losses and even job losses. In Slovenia, a large amount of wood is exported and extensive damage to forests can lead to decreased revenues from export. Non-timber products like mushrooms and forest fruits are collected over whole Slovenia and are an important supplementary food product for Slovene people. The introduction of IAS already has impact on the non-timber products. This is already shown with the introduction of the spotted-wing drosophila, *Drosophila suzukii*, because of which in some areas blueberries are not any more useful for consumption. An important side effect of collecting non-timber products is an increase in human wellbeing. These non-timber products give people a reason to go into the forests, which reduces stress and increases fitness. The decrease of the non-timber products in the forest decreases its value for humans.

Important stakeholders in the issue of forest IAS are the private forest landowners. They depend for their livelihood on timber and non-timber forest products. An increase of IAS threatens these products and the livelihood of forest landowners. By paying special attention to forest owners in the awareness campaign (action B.1 and B.2), forest owners became aware that tackling IAS is also in their economic interest; therefore, they are now more likely have the interest to become engaged in the EWRR. Slovenia depends on tourism, especially in the national and regional parks, but also in other parts of the country. Tourists are coming here especially for the scenic value of the landscape, of which forests are an important component. IAS can have large impacts on the forests

(e.g. many dying trees) which could become less attractive for tourists. The potential decrease in revenues from tourism in Slovenia could have significant effects on the economy. With setting up the early warning and rapid response system in forests (actions B.2, B.3, B.5) Slovenia is now better prepared to prevent or limit the spread of new invasive alien species. This has major economic benefits as prevention is less costly than eradication or control actions of widespread IAS. In the LP TRŠh eradication and control of IAS commenced during the project (action B.4). As this is one of the most important green and recreational areas in Ljubljana, by reducing the pressure of IAS we have contributed to the maintenance of its ecosystem values.

Expected longer-term results of the projects include increased awareness of the general public on IAS. The public is now better equipped to change behaviour and to act appropriately. Proposal of an institutional framework for EWRR on IAS in forests was prepared and can now be implemented. Professionals and volunteers were trained and gained the knowledge to actively participate in the EWRR by detecting and reporting IAS in forests. A national information system for collecting data on forest IAS *Invazivke* was established. We have actively involved volunteers in site-based action to mitigate IAS impacts in an urban protected forest area. Stakeholders actively engaged in the participatory process of developing a long-term IAS Action Plan for the urban protected area. Forest owners participated in campaign events dedicated to canker on maple trees. More than 50% of the maples infected with canker were felled by forest owners as a result of a species-based campaign. Project results were nationally disseminated at national fairs and over media. Long-term cooperation and exchange of data were established with four forestry institutions in neighbouring countries. Results of the project and lessons learned were shared with the international community on many occasions. The final EWRR International Conference brought together experts from the whole Europe and broader. We have strongly supported the implementation of the EU Regulation on invasive alien species, in particular by proposing an efficient EWRR system, developing regional cooperation and collecting and providing reliable data on IAS to the European EWRR databases.

5 Administrative part

In the beginning of the project the Project Management Team (PMT) and the Project Steering Group (PSG) have been established to assure good management and steering of the project. On the 7th July 2016, the SFI administration had a meeting and the Kick-off meeting was held on the 11th July 2016.

Till the end of the project 39 PMT meetings and 17 PSG meetings have been held. The team had many ad-hoc meetings whenever necessary. The working method is explained in the following charts.

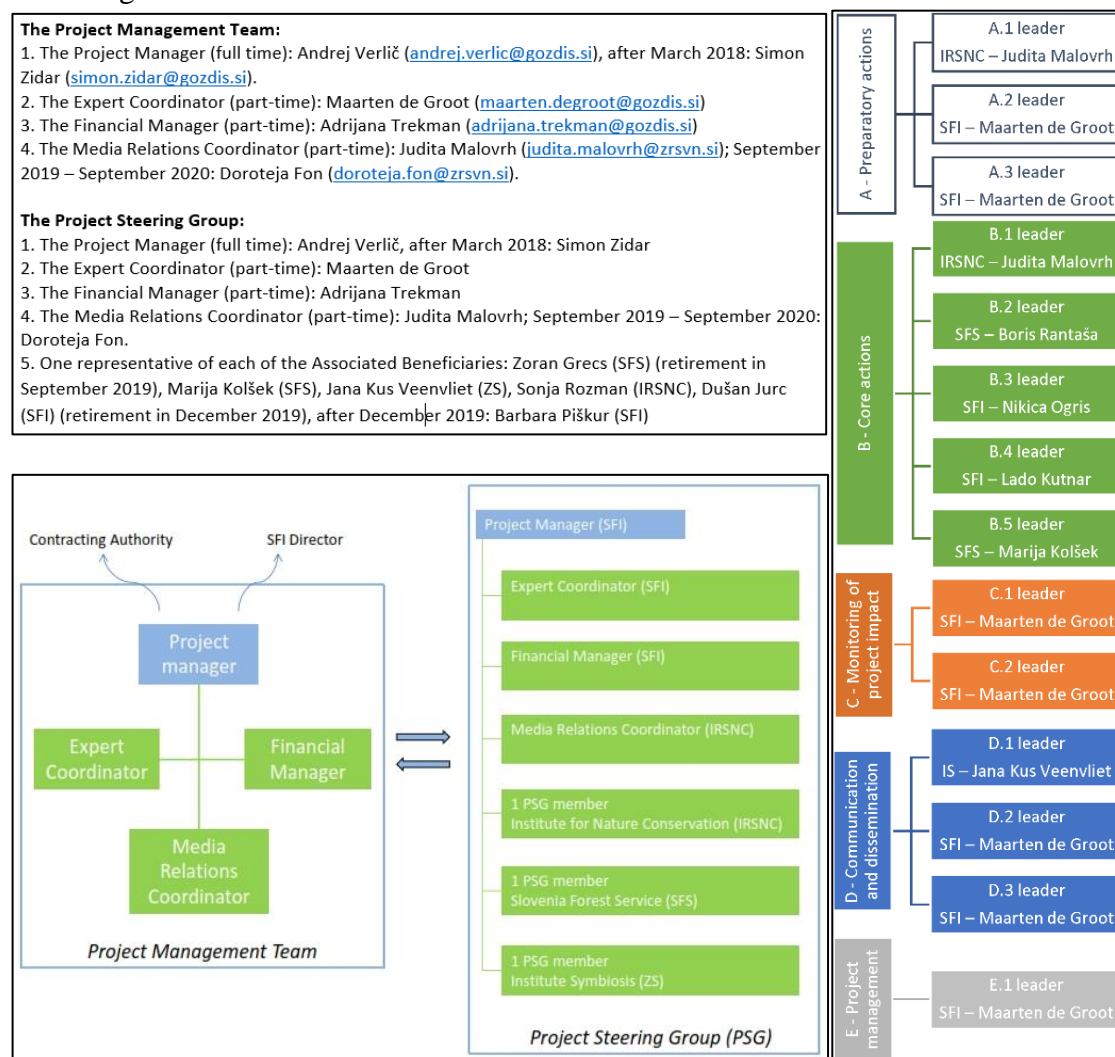


Figure 1: The working method for the management of LIFE ARTEMIS and organigram where all actions have dedicated leaders.

The partnership was selected based on the reference of individual partner organizations and their experts and experience in similar projects. SFI is a leading national forestry research institute with vast experience also in coordinating and participating in different programs, also LIFE(+). SFI also has experts for alien plant, fungi and insect species in forests. IRSNC is a leading national nature conservation institute, also with vast experience in LIFE projects. Institute Symbiosis (ZS) has specialized in invasive species topics, from management to awareness-raising, communication, etc. Slovenia Forest Service is a public forest service with the most comprehensive network of foresters working in the field and has dedicated departments that deal with pests and diseases. They also have vast experience with LIFE projects.

Most of the actions were conducted according to the proposed workplan, with minor deviation in timing, however reaching the goals of the project. Already at the beginning of the project, the partnership agreed on some allocations in responsibility for certain activities and therefore the budget needed allocations that were beforehand communicated to the external monitor of the project and presented at our first meeting. They are explained in the financial part of this report.

Regarding the communication with the EASME and Monitoring team, two PMT members attended EASME Kick-off meeting in October 2016. The communication with the external monitor, Mr. Nikolaj Pečenko was excellent during the project. Project Manager and Expert Coordinator were regularly communicating with the monitor via e-mails or phone calls to communicate any proposals or potential drawbacks in advance. Moreover, short regular reports on the projects progress were send to the monitor. Each year we had 1 monitoring visit (24.11.2016, 14.11.2017, 28.9.2018, 27.11.2019, 19.1.2020) with positive reports. Furthermore, EASME team visited the project LIFE ARTEMIS on 27th November 2019. Projects progress and results was presented to Mrs. Eva Paparatti, Project Adviser, and additionally some explanations were given regarding the project activities. We received a very satisfyingrespond.

The Grant Agreement has only one amendment (LETTER AMENDMENT NO 1: Modification of the definition of conditions for natural persons, submission of VAT certificate and threshold for submission of the certificate on the financial statements; in *Annex_Amendment 1*).

6 Technical part

6.1 Technical progress, per Action

Action A.1 – Development of the Project Communication Plan

Foreseen start date: 7. 7. 2016

Actual start date: 1. 8. 2016

Foreseen end date: 28. 2. 2017

Actual end date: 31. 3. 2017

Sub-action A.1.1. – A national survey poll on the attitude of Slovenians towards the issues of IAS

Activities undertaken and outputs achieved: To obtain a better understanding of knowledge of the general public on IAS issues we have conducted a national survey poll. A survey polling company was subcontracted (Valicon), which assisted with the development of the questionnaire, administered the survey and provided the database of responses. The survey was conducted in January 2017 based on two types of online questionnaires (basic type was administered on a sample size of 953 respondents, second type – extended version with additional questions on willingness-to-pay assignment – was administered on a sample size of 276 respondents). Respondents sample was designed as quota-balanced by age, gender and regional distribution. Project team members made an analysis of the results and prepared the report in Slovenian with an extended summary in English (*Annex AI_I_001*). It is available also on the project webpage.

Results of the survey allowed us to develop more focused messages in the Project Communication Plan, which was a basis for effective communication throughout the project. Communication and dissemination activities were based on the results of the survey. Further, the results also presented a baseline on which data from the second and third survey were compared to (Action C.1, years 2018 and 2020). The results of the second part of the survey (support for measures of control and eradication) were used for the estimation of willingness-to-pay for different control and eradication actions, which were helpful with the assessment of the socio-economic impact of the project (Action C.2.2.).

Comparison with planned output: Activities were implemented as planned in the Project proposal.

Continuation of the action after the end of the project: Results of the survey can be used by various stakeholders in Slovenia and abroad and can be used as zero status data with future research on this topic.

Sub-action A.1.2 – Project Communication Plan

Activities undertaken and outputs achieved: Based on the outcomes of the national survey poll (Action A.1.1) a Project Communication Plan was developed. In the preparation of the Project Communication Plan a PR expert was subcontracted (Špela Polak, sole trader), who also helped with the national campaign on IAS (Action B.1). PR expert also assisted with a 1-day Communication Plan Workshop which was organised in February 2017. At the workshop, all project staff was included with their experience in the discussion on draft Communication Plan, they were trained on how to communicate the issues of IAS, how to deal with different target audiences and stakeholders and how to present project activities. They practised communication skills on specific cases. Based on the outputs from the survey (A.1.1) and the workshop a project team has finalized the Project Communication Plan (see *Deliverable 7*). The document is also available online on the project webpage.

Project Communication Plan served as a basis for successful communication throughout the project and helped us with achieving specific goals, addressing the right target audiences and stakeholders, and choosing the most effective communication tools and messages. The topic of IAS is specific

thus communication had to be adapted. Target audiences and stakeholders are numerous and require different communication approaches and activities. They are all defined in the Plan.

At the end of the Communication Plan Workshop, we have also conducted a survey among participants where they have evaluated the quality of the event. Results have shown that participants were above-average satisfied with the workshop in general, with the knowledge they have gained, with the group work on specific practical cases and with the realization of the workshop (*Annex_AI_2_001*).

Comparison with planned output: Activities were implemented as planned in the Project proposal; however, the final version of the Project Communication Plan was finalized at the end of March 2017 (should be in February as defined in Project Proposal) due to final coordination activities and finalisation of the document. The delay did not have any impact on other actions.

Modifications: For the development of Project Communication Plan budget for external assistance was available for subcontracted PR expert assisting in the development of the Plan. The actual costs for external PR expert, who has helped with the development of the Plan, were lower as planned. We proposed reallocation of remaining budget (3.475,20 €) within the same cost category but different action (External assistance costs, Action C.1, Media monitoring service – clipping of reports on projects/project issues), since media attention was much higher as we have expected in the Project Proposal, therefore there are more reports on project issues in the media and thus by the end of the project we exceeded the costs allocated for media monitoring service.

Action A.2 – Establishment of the EWRR institutional framework

Foreseen start date: 7. 7. 2016
Foreseen end date: 30. 4. 2017

Actual start date: 7. 7. 2016
Actual end date: 15. 10. 2020

Sub-action A.2.1 – Capacity assessment of professionals and volunteers

Activities undertaken and outputs achieved: A capacity assessment of professionals and volunteers was prepared by carrying out interviews and conducting a self-capacity assessment with the professions and national institutions that could be included in the EWRR system. A report was prepared (*Annex_A2_I_001*), and the findings of the assessment were included as a background analysis of the sub-action A.2.2. The study was used as background information for the sub-action A.2.1 and for developing more focused training programme (Action A.3).

Comparison with planned output: The output was reached as planned.

Continuation of the action after the end of the project: The results can be used as a baseline study regarding the progress of the knowledge of different institutes regarding IAS in forests. However, the knowledge already improved due to the trainings which were given by the LIFE ARTEMIS team. But also, the directors or leaders were already replaced and therefore their opinion is not valid anymore.

Sub-action A.2.2 – Determining the EWRR institutional framework for forest IAS

Activities undertaken and outputs achieved: Based on the capacity assessment analysis, a proposed framework for early warning and rapid response system for IAS was prepared by project members (ZS and SFI) (see *Deliverable 4*). The proposal was several times discussed and presented to the Ministry of the Environment and Spatial Planning (MOP), Ministry of Agriculture, Forestry and Food and other relevant organisations. We were all the time also closely collaborating with the MOP in preparations of amendments to Nature Conservation Act and the Ministry of agriculture, forestry and food for the preparation of the EWRR. The project team was trying to secure amendments to the Nature Conservation Act needed for implementation of EWRR by having a regular conversation with responsible persons at MOP (telephone and *ad-hoc* meetings). In the study, we propose that the coordinating governmental body should be Slovenian Environment Agency (ARSO). In the report, we also present the pros and cons of different institutions. Roles of different institutions in all steps of the EWRR system are also determined. On the request of MOP financial estimation of the operating costs of the EWRR system from the Environmental Regulation point was added.

Comparison with planned output: The document was finished with a delay; therefore, the action was extended to the end of the project. Only a proposal of the EWRR institutional framework was given.

Continuation of the action after the end of the project: The document and the proposed EWRR framework can be used by MOP to secure solid legal basis for the EWRR system for alien species and ensure devolving tasks to the appropriate institutions.

Sub-action A.2.3 – Development of example rapid response plans

Activities undertaken and outputs achieved: For the rapid response plans (RRP), five species were selected (2 plants, 2 mammals and 1 insect): kudzu (*Pueraria montana* var. *lobata*), giant hogweed (*Heracleum mantegazzianum*), racoon dog (*Nyctereutes procyonoides*), grey squirrel (*Sciurus carolinensis*), Asian hornet (*Vespa velutina*).

In cooperation with the representative of the Ministry of the Environment and Spatial Planning and other involved institutions we formulated plans for rapid response for five species (*Deliverables 6a, 6b, 6c, 6d, 6e*). In the reports, we identified the competent authorities for each step of the rapid

response, the rapid response process, and the tasks for each body, as well as possible sources of financing. Rapid response plans were prepared on the basis of the action A.2.2 output.

Comparison with planned output: There was a delay in preparation of RRP, because the EWRR system was not yet completed. Once it was completed, the RRPS were adapted and prepared.

Continuation of the action after the end of the project: The RRP will be used for the eradication actions upon arrival of IAS. Furthermore, they will be used as an example for the preparation of other RRP in Slovenia.

Action A.3 – Development of the EWRR Training Programme

Foreseen start date: 1. 10. 2016
Foreseen end date: 28. 2. 2017

Actual start date: 1. 10. 2016
Actual end date: 22. 3. 2018

Sub-action A.3.1 – Alert list on IAS and priority pathways in forests

Activities undertaken and outputs achieved: Under this action an alert list of alien species in forests and an analysis of the priority pathways were prepared. For this, several study visits were made to different forestry-related institutes which are dealing with invasive forest species and 4 memoranda of cooperation have been signed with the neighbouring countries (see *Deliverable 8*).

After these meetings and a thorough literature study, 12 fungi species, 51 plant species, 13 insect species and seven mammal species were put on the list. For each species the pathway was determined, and a general analysis of pathways was made. The Alert list was published in on-line professional journal “Forest health news” – “*Novice iz varstva gozdov*” (see *Deliverable 3a*) and with written translation in English (*Deliverable 3b*). In addition to that in 2019, the alert list was updated and presented in the second edition of the Field guide for the recognition of alien species in forests (see action A.3.2).

Comparison with planned output: The first alert list was prepared with a minor delay.

Continuation of the action after the end of the project: The alert list will be regularly updated when necessary.

Sub-action A.3.2 – Development of the EWRR Training Programme

In this action, the program was prepared for the Action B.2. Based on the outcomes of A.2.1. and A.3.1, we developed the program. This existed out of a EWRR training manual for early warning and rapid response in Slovene forests (see *Deliverable 5a*) and additionally of a Field guide for the recognition of alien species in forests (*Deliverable 5b*). The training manual for the EWRR system exists out of: Introduction to invasive species, EWRR institutional framework, Invasive species survey methods, reporting invasive species using the on-line information system and mobile application, RRP, Management of IAS, Communicating alien species. Furthermore, a PowerPoint presentation was prepared for the trainings.

As the interest among the target public for the Field guide for the recognition of alien species in forests was very high, we consulted with the monitor and decided to reprint and update it. The field guide was therefore reprinted and updated three times as high interest among users appeared and almost all copies were already distributed among the interested target groups to promote the engagement in the IAS observations as the first step of the EWRR system. After initial 700 copies, additional 3,100 copies were printed. The field guide was very positively received among volunteer and professional users.

Comparison with planned output: The deliverables deviate in such a way that besides the EWRR training manual also a field guide was prepared. We made this decision because we could address in this way more IAS. The separate field guide is also a good output, which would increase recognition of the species. And can be more easily taken into the field. The very positive response to the Field guide justifies the extended duration of the process and additional workload. The participants of the trainings have also received the field guide. The response is so positive that we already needed a reprint of it. It is also getting praise from users and experts within and outside of Slovenia. The second edition of the Field guide was covered by the finances not spent under B.5 for the popular brochure on *Eutypella* (within the same cost category).

Continuation of the action after the end of the project: For now, there is no plan to continue this action after the end of the project. Any important updates of the materials regarding the EWRR system or alert list will be sent to the participants of the EWRR courses.

Complementary action outside LIFE: Within the COST Action Alien CSI the field guide was translated into English and updated to the European level (*Annex_A3_2_001*). The field guide is widely used in other EU countries (at Universities, etc.) Only positive reviews were received including the requests to translate it to other European languages.

Action B.1 – National awareness raising campaign on IAS

Foreseen start date: 1. 4. 2017
Foreseen end date: 30. 6. 2020

Actual start date: 1. 8. 2016
Actual end date: 15. 10. 2020

1. Train poster campaign

Activities undertaken and outputs achieved: Each year 150 posters were hung in passenger trains all over Slovenia for 4 weeks (plus additional 2-4 weeks for setting up and removing the posters). An external designer (DrogArt) has been subcontracted to develop poster design and communication messages, based on the Project Communication Plan (Action A.1). In 2017 the campaign message focused on raising awareness on what IAS are, their threats to the environment and how to recognise them. Besides, project popular brochures and project information sheets were available to passengers at ticket offices at the Ljubljana central train station for additional awareness rising. In 2018 the main message of the campaign focused on encouraging passengers to use our information system Invazivke and report findings of new IAS into the mobile or desktop application. In 2019 focus was on informing passengers about the fact, that IAS do not belong in forests and thus people should not dispose of plant remains from their gardens into the forest. In 2020, which was also an International year of plant health, the main message was that plant health is our concern and we should shop responsibly, especially if plants are imported from foreign countries. On all four posters project webpage was listed, where passengers were able to get more information on IAS and the project. Posters with technical details on time of the campaign are in *Annex_B1_I_001*. Based on the information given to us by Slovenian Railways, we estimate that our campaign has reached in total 2.640.000 passengers (detailed information is in *Annex_B1_I_002*).

Comparison with planned output: In Project Proposal, we planned to interview passengers on whether they have noticed the posters and can recall them into their memory. However, the Slovenian Railways did not allow such activities on trains or at the stations to external businesses. That is why we agreed they would provide us with the number of passengers on trains where our campaign took place, and that could notice the posters.

As planned, in 2017 and 2019 campaign took place in September and October, however, the campaign in 2018 had to be divided into two parts due to lack of available space on trains in the spring period. Thus, 100 posters were hanging in May and June, and 50 in September and October. In 2020 it was planned to have the campaign in June but due to COVID-19 pandemics, it was postponed to September and October. These changes did not have any negative impact on the project results.

Continuation of the action after the end of the project: Not applicable.

2. Popular brochure

Activities undertaken and outputs achieved: In May 2017, we issued a brochure on IAS in forests. On 32 pages, we present IAS, their pathways of introduction, negative effects on biodiversity, economy and human health, as well as ways to prevent their spread. An early warning and rapid response system and central IAS information system “Invazivke” are described. The LIFE ARTEMIS project is presented and the project activities in which readers can be included are also listed.

The brochure was printed in 40.000 copies, of which 22.500 were sent as an insert to the subscribers of the Kmečki glas (Farmer’s voice) magazine, in the beginning of June 2017. The brochure was regularly distributed at project events to further support awareness raising (at travelling exhibition, lectures for local communities, fairs, training events, guided city walks, eradication actions, Invasive Species Survey week etc.). We have also sent it to all landowners at Tivoli, Rožnik and Šiška hill Landscape Park, where we have organised IAS eradication actions. The popular brochure

is also available online on the project webpage. Remaining brochures will also be distributed in the After-LIFE activities. The popular brochure is in *Deliverable 12*.

Comparison with planned output: No deviation from the plan.

Continuation of the action after the end of the project: Remaining brochures will be distributed at the After-LIFE activities and project partners' outside LIFE dissemination activities on IAS.

3. Educational movie

Activities undertaken and outputs achieved:

To raise awareness of the general public, we prepared a 20-minute-long educational movie in which we present the importance of Slovenian forests, the problem of IAS and how to act to prevent damage. A subcontracted movie production company (Kawka production, Gregor Šubic, sole trader) was selected in the public procurement procedure. The movie was screened at lectures accompanying the travelling exhibition and distributed to primary and secondary schools (participating in action B.3). It is also available to visitors of project web-page and YouTube channel. Additionally, it was screened at the International Fair of Agriculture and Food in August 2018, Nature-Health Fair in October 2019 and Eco-week event organized outside our project activities in June 2019. We also organised a premiere of the movie which took place at the premises of coordinating beneficiary and all people that are working on the project were invited. Besides the Slovenian version, another with English subtitles is available for foreign viewers. It was distributed to the participants of the project's International conference (action D.2) organized in September 2019. The educational movie is in *Deliverable 11*.

Before the 20-minute-long educational movie was finished, a shorter, 5-minute-long, presentation movie was made in May 2017 which was broadcasted at the openings of the travelling exhibition and B.2 trainings for EWRR. Additionally, it was screened on International Biodiversity Day in May 2018 at the event organised by LIFE project NaturaViva (LIFE16 GIE/SI/000711) at the Goričko Landscape Park. The movie is available on-line on the project website and YouTube channel. See *Annex_B1_3_001*.

Complementary, 1-minute-long video was made for the promotion of the EWRR system and the application for collecting data on IAS (Invazivke app), and 4 short clips (approx. 30 seconds) on how to install and use desktop and mobile version of the app. They are available on our YouTube channel, project web-page and Facebook page. See *Annex_B1_3_002*, *Annex_B1_3_003*, *Annex_B1_3_004*, *Annex_B1_3_005*, *Annex_B1_3_006*.

By the end of the project, at least 142.400 people saw the educational movie (short or long version) on screenings at fairs, events, lectures and on YouTube channel. List of movie screenings is in *Annex_B1_3_007*.

Additionally, the national television independently recorded 25-min documentary movie "Biotopi" about alien species in forests, where the project team participated, and project activities were also presented. Among other species, Maple of Canker was pointed out (see also Action B.5.3). The movie was streamed on the national television in 2019 and 2020 and is now available online (see *Annex_B5_3_001*, at least 1.884 on-line views).

Comparison with planned output: In Project Proposal we planned to make just one 25-minutes long movie, however, we further prepared short clips for the promotion of the EWRR system and how to install and use desktop and mobile application for collecting IAS data. Short clips are very effective tool for promotion via social media which allowed us to reach wider audience and attract more users to collecting IAS data. No further costs occurred for the preparation of these clips. The educational movie was finished with a small delay, however additional short movies were previously made and presented regularly to the public, thus there were no negative effects on project actions and results. An additional documentary was recorded by Slovenian National television.

Continuation of the action after the end of the project: Movie will be available for screening also after the end of the project (at the After-LIFE activities and also project partners' events outside LIFE).

4. Travelling exhibition

Activities undertaken and outputs achieved: Travelling exhibition consists of 12 roll-up displays on which we present IAS, their effects on the environment, economy and human health, possible measures to prevent the damage and activities of the LIFE ARTEMIS project. In addition to roll-ups, we also prepared interactive displays on which visitors actively learn about IAS threats and are encouraged to prevent their introduction and spread. Travelling exhibition is in *Deliverable 38*. Subcontractors were selected in public procurement processes for the graphic design of roll-up and interactive displays (DrogArt), for the production of interactive displays (RSN Media) and for the printing of roll-up displays and advertising posters for local communities (Grafex). Pedestrian people counter for monitoring the number of exhibition visitors was purchased (Eproming d.o.o.) following the public procurement rules.

At the opening of the first exhibition, we organized a press conference, where we presented the project, the ongoing activities, the issues of IAS in forests and the early warning and rapid response system. A few days before the conference we have found a new location of invasive alien plant (*Akebia quinata*), one of the alert list species, which was the second finding in Slovenia. This was also presented at the press conference. After the conference five different media companies reported on the event (the leading commercial television, the Slovenian Press Agency, two national daily newspapers and online media portal).

The travelling exhibition was promoted at each location via different local media (tv, radio, printed and online media), posters, announcements by local municipalities or local tourism organisations, local forest associations, regional units of project partners IRSNC and SFS, project web page and social media.

By the end of the project, travelling exhibition was set up at 29 locations and visited by at least 165.000 people (counted with pedestrian people counter or data given by the venue if the counter was not used). List with locations, dates, number of visitors and pictures is in *Annex B1_4_001*.

Comparison with planned output: The travelling exhibition was a great success since we have greatly exceeded the expected number of exhibition visitors (at least 25.000 visitors). Due to high demand, we have displayed it until, instead of June, the beginning of October 2020. The number of visitors was counted by pedestrian people counter, however at some locations due to potential damage or theft the host advised us not to set it up (usually in schools). At some locations, it also stopped working. In all these cases we report the number of visitors given to us by the host venue. Roll-up displays (in particular frames) got very worn-out during the use and since travelling exhibition is one of the After-LIFE activities we decided to repair it (but only to replace the frames/stands of roll-ups and keep the canvases, since they are still in satisfactory condition). Funds for the repair were not foreseen in the project proposal.

Continuation of the action after the end of the project: Exhibition will be further available to host at different locations after the end of the project.

5. Lectures for local communities

Activities undertaken and outputs achieved: At the locations of the travelling exhibition, we have organised a lecture for local communities and private forest owners. Participants were invited via different local media (tv, radio, web and printed media) local tourism organisations or municipalities, local forest associations, regional units of project partners IRSNC and SFS, project web page and social media. Posters were printed and hanged to promote the lecture and the exhibition.

At the lectures, we presented IAS and their impacts, possible measures to prevent negative effects, the project and its activities in which people could participate. We motivated visitors to take part in

the early warning and rapid response system, to use the Invazivke application and report findings of new IAS. At each lecture, educational movie was screened. Visitors received project promotional materials (brochures, leaflets, flyers). Power Point presentations of each lecture are in *Deliverable 36*.

Between June 2017 and September 2020 25 lectures were organised with a total of 598 participants. At 2 locations the lecture was also published on the project's Facebook page, which has reached 2148 viewers (views of different lengths). Journalists attended some of the lectures and prepared articles and tv posts in local media.

Additionally to the lectures accompanying the travelling exhibition, we have organised 25 extra lectures all around Slovenia for local communities, natural science societies, biology students, visitors at fairs and other people interested in nature conservation. These additional lectures were visited by 739 participants; all together with lectures accompanying the exhibition 1337 participants. List with locations, dates, number of visitors, pictures and presence lists of lectures are in *Annex B1_5_001*.

Comparison with planned output: Activities were implemented as planned in the Project Proposal. We have greatly exceeded the expected number of visitors (500). Due to COVID-19 pandemics, some lectures were cancelled (in the period from March until June 2020), that is why we organised them also after the foreseen deliverable end date (in August and September). The delay did not have any impact on other actions.

Continuation of the action after the end of the project: Lectures are planned to continue also in the After-LIFE activities.

6. Guided city walks

Activities undertaken and outputs achieved: Every year from 2017 to 2020, we carried out guided city walks where participants learned to recognize IAS in order to be able to participate in the EWRR system. We showed alien species which are specific to that area and presented the use of Invazivke app. Participants also received our promotional materials (brochures, leaflets, flyers). In 2017 we organised two 1-hour walks in 5 biggest cities in Slovenia, as it was planned in the Project proposal; in total 10 walks with 33 participants. Due to poor response, in the next years, we adjusted the strategy to attract more potential citizen scientists. In 2018 we carried out 20 walks at 8 different locations which were visited by 362 participants, in 2019 22 walks at 9 locations with 459 people and in 2020 7 walks at 5 locations with 93 participants. In all 4 years, a total of 947 people participated in guided walks. Participants were various (visitors of nature-related events, primary and secondary school children, nature conservation students, scouts, visitors of fairs, farmers and volunteers participating in inventory and eradication activities of LIFE ARTEMIS project). In 2017 also journalists attended the walks in 3 cities and published articles about the project and issues with IAS in their localities. A list with locations, dates, target groups, number of participants, pictures and presence lists are in *Annex_B1_6_001*.

Comparison with planned output: In 2017, the response to the walks was poor, even though the events were promoted in various local media with a total of 21 published articles. In the next years, we therefore modified the activity and focused on more specific target groups (those more interested in biodiversity, nature protection and IAS) and often included our walks in other events with nature-related topics. We also decided to organise the walks over a longer period of time and not just in September in order to avoid bad weather conditions and other external causes. The change in strategy paid off as we exceeded the expected number of guided city walks' participants (800).

Continuation of the action after the end of the project: Guided city walks are planned to continue also in the After-LIFE activities.

7. Media relations

Activities undertaken and outputs achieved: We regularly informed the media about all important project activities, results and achievements, such as openings of the travelling exhibition, lectures and key project milestones. On international days, which were thematically related to our project,

we sent out press releases. We also informed the public about specific IAS and their issues, new IAS findings and other events. We offered support to journalists with answers to their questions and preparations of popular articles.

The openings of the travelling exhibition, lectures and movie screenings were announced in many local TV, radio, web and printed media with 81 published articles in the period from June 2017 until August 2020 (*Deliverable 37*). From the beginning of the project, we sent out 42 press releases announcing the travelling exhibition, lectures and other project events, about the international days related to the topic of IAS and important project results and achievements. We prepared 14 popular articles for printed media, participated in 10 interviews and on 23 occasions offered support to journalists with statements and answers to their questions. The list is in the *Annex_B1_7_001*.

Comparison with planned output: Activities were implemented as planned in the Project Proposal. Outreach target of 25 short articles in local media announcing the exhibition and lectures has been exceeded. A press release we sent out after the first finding of invasive alien plant kudzu in Slovenia caused someone to report another location of this plant to us based on the press release he heard in the media.

Continuation of the action after the end of the project: Activity is planned to continue also in the After-LIFE activities (preparation of articles, sending out press releases, offering support to journalists).

Action B.2 – EWRR training of professionals and volunteers

Foreseen start date: 1. 5. 2017
Foreseen end date: 31. 12. 2027

Actual start date: 3. 2017
Actual end date: 30. 9. 2018

Activities undertaken and outputs achieved: The action finished in September 2018 and was already reported in the Progress Report. In total, 1059 participants (including project staff) took part in 33 events of the LIFE ARTEMIS Action B.2, exceeding the target reach set in the Project Proposal for the action by over 20%. For full list of events see *Annex_B2_001*. Information on each event (participants lists, reports, photos etc.) is available in *Annex_B2_002*.

The activities within the action B.2. have successfully disseminated the issue of invasive alien species in forests to most experts and professionals in forestry and nature conservation services and businesses in Slovenia and region. Most of the participants have also answered questionnaires, which were evaluated and used to improve status regarding IAS in Slovene forests (see Action C.2).

Sub-action B.2.1. EWRR Training of trainers workshop

Activities undertaken and outputs achieved: The action started in May 2017 with the EWRR training of trainers workshop, in which the high interest for the topic of IAS has been already expressed through unexpectedly high participation of experts (43 participants). Materials are in *Deliverable 13*.

Comparison with planned output: No deviations.

Continuation of the action after the end of the project: Transfer of knowledge on IAS to forestry professionals will continue after the project as SFS regularly organizes trainings for their professional employees.

Sub-action B.2.2 Regional EWRR Workshops for forestry professionals

Activities undertaken and outputs achieved: From May to October 2017, regional EWRR workshops for forestry professionals took place - the workshops were well received with an exceptional response from forestry and nature conservation professionals (521 participants at 14 workshops). Materials are in *Deliverable 14*.

Comparison with planned output: Some workshops were organised with a little delay due to large bark beetle infestations and increased workloads in 2 SFS regional units.

Continuation of the action after the end of the project: The impact of the workshops was so strong that workshops regarding important IAS in forests are now being organised spontaneously in regional and local SFS units outside the framework of the LIFE ARTEMIS project.

Sub-action B.2.3 Regional EWRR Workshops for private forest owners and volunteers

Activities undertaken and outputs achieved: The workshops took place in September and October 2017. In total 311 forest owners, members of nature-related NGOs and others took part in 14 workshops in Slovenia. A draft of the presentation that has been customised and used by SFS regional coordinators (see *Deliverable 18*) has been prepared and disseminated.

Comparison with planned output: The Regional EWRR Workshops for private forest owners and volunteers had fewer participants than targeted in the project proposal – the target was 350 participants, and the realised number of participants was 311. This is probably due to increased workloads for forest owners in 2017 due to bark beetle attacks and extreme weather events. Still, the workshops were well-visited compared to activities with forest owners in other projects.

Continuation of the action after the end of the project: We will continue to inform and educate forest owners about IAS and potential newly arrived IAS in the future.

Sub-action B.2.4 EWRR Workshops for forestry related businesses

Activities undertaken and outputs achieved: With three workshops we reached all target stakeholder groups and altogether 139 people participated. The first workshop was organized together with the yearly meeting of the association, which includes 38 societies connected to agriculture and forestry. The second workshop in Ljubljana was focused on professional staff (forestry inspectors, green public managers, logging companies). With the third workshop in September 2018 tree nurseries and garden centres were addressed. Members of the professional gardening association were invited to this training. PowerPoint presentations are in *Deliverable 19*.

Comparison with planned output: 3 instead of 5 half-day workshops were organised as the strategy to reach the audience from different parts of the country changed. Instead of on the regional scale we focused on different target groups. We have organized workshops aside from yearly meetings, where members from the whole country participated. All target stakeholder groups were reached, and we also exceeded the outreach target.

Sub-action B.2.5. EWRR Transferability Workshop

Activities undertaken and outputs achieved: Workshop for the transfer of good practice was organized within the scientific meeting of the Forest Protection Colloquium in Austria in March 2018. We presented project activities and proposed EWRR system for IAS in forests to forestry professionals and representatives from authorities responsible for IAS management from the Member States and other countries (45 participants from 12 countries). PowerPoint presentations are in *Deliverable 17*.

Comparison with planned output: Workshop was organised with a short delay. To achieve even greater international participation workshop was performed back-to-back with Forest Protection Colloquium in Vienna instead of in Ljubljana.

Action B.3 – Engaging foresters and citizen scientists in collecting IAS data

Foreseen start date: 1. 1. 2017
Foreseen end date: 30. 6. 2020

Actual start date: 1. 8. 2016
Actual end date: 31. 10. 2020

1. Development of a central information system

Activities undertaken and outputs achieved: A central national system for alien species was developed by SFI and is available online (www.invazivke.si) since March 2017 (*Deliverable 10*). The public part of the “Invazivke” (meaning “*Invasives*”) web application provides an overview of verified and confirmed IAS findings in Slovenia. Data can be viewed by each visitor of a site in a public viewer in the form of a spreadsheet or on an online interactive map, as well as several online data services for personal non-commercial use. In the “Invazivke” web application, a visitor can be notified of new IAS finds for all or just selected species. The customer receives an automatically generated notification to his email address once a day. The feature is important as part of the EWRR system for IAS, where responsible organisations can be immediately informed about the new findings. By the end of the project, the website had 577.700 visitors, who made 1.196.000 inquiries (see also *Annex_B3_I_001*).

The Invazivke mobile app for Android is free of charge and is available for download at the Google Play Store (*Deliverable 9*). It is intended for field data collection with a smart device that includes a GPS sensor and a digital camera. This allows us to automatically locate the location (exact X and Y coordinates) and the photo, which greatly facilitates and speeds up the entry of data. Thus, only the manual selection of the species from the drop-down list is left to the user. An application is also provided with IAS descriptions, including photo material for easier identification of the organism found. The first version of the mobile application was published on 19th May 2017 and then regularly updated and upgraded. On October 15, 2020, the latest version of the Invazivke app was updated to version Invazivke v2.4., which is compatible also with the new Android 11 system.

Part of the web and mobile application Invazivke is a list of IASs with their descriptions. The current list includes 165 IASs. A description of a particular type includes photographs of the most characteristic symptoms, the source of the species, the route of entry, the list of neighbouring countries where the species is already occurring, the period of detection and activity of the species, the description of the habitat, status, influence, and list of similar species, together with descriptions of distinctive signs.

The IAS system is designed to connect several existing information systems that are already collecting IAS data in Slovenia. By linking various IAS databases into a central database, we obtain more comprehensive information on the occurrence and prevalence of IAS in Slovenia, and all members of the consortium gain added value by linking their databases. Until 31st October 2020, we imported 9 databases in the information system (see also *Annex_B3_I_001*). Data from Invazivke IAS recording system was also exported into important international bases (e.g., GBIF and EASIN) (see *Annex_B3_I_001*).

Comparison with planned output: No deviations.

Modifications: The action started earlier to assure for the information system and applications to be ready as soon as possible. We communicated this to the external monitor. The action was also prolonged to the end of the project as the application was updated.

Major problems encountered: None.

Continuation of the action after the project: The system will be running after the project. Species lists will be updated with descriptions and updates will be produced.

2. Promotion of the information system among professional users

Activities undertaken and outputs achieved:

We promoted the information system on the following events:

- Lecture at the 8th seminar and workshop on Forest protection, 12. 9. 2017, Pokljuka. Seminar and workshop were attended by 91 participants (target value 60).
- Together with action B.2.2 14 Training Workshops on regional units of the Slovenian Forest Service were organized as planned (*Deliverable 20*).
- Announcements and articles in professional magazines:
 - an article in the series Professional and Scientific Works, Studia Forestalia Slovenica (see *Deliverable 21a*)
 - Nikica OGRIS. 2017. Sporočanje najdb invazivnih tujerodnih vrst v gozdovih v informacijski sistem Invazivke (Eng. Reporting records of invasive alien species in forests into information system Invazivke). *Novice iz varstva gozdov* 10: 22–24. (see *Deliverable 21b*)
 - short oral and poster presentation at “Forest and wood 2018: Science for future” scientific meeting in Ljubljana: Simon ZIDAR, Nikica OGRIS, Lado KUTNAR, Maarten de GROOT. 2018. Vključevanje ljubiteljske znanosti (citizen science) v zbiranje podatkov o invazivnih tujerodnih vrstah v gozdovih v projektu LIFE ARTEMIS (Eng. Involvement of citizen science in collecting data on invasive alien species in forests in the project LIFE ARTEMIS), *Gozd in les 2018: Znanost za prihodnost*, Studia Forestalia Slovenica, 159: 12. (*Annex_B3_2_001*).
- Articles on information system published in forestry magazines:
 - Zidar S. de Groot M. 2018. Invazivne tujerodne vrste ogrožajo naše gozdove – projekt LIFE ARTEMIS (Invasive alien species are threatening our forests – project LIFE ARTEMIS), *Gozdarski vestnik* 76(5-6): 255-256. (*Deliverable 22*)
 - promotion of the information system in articles about alien forest pests and diseases published in forestry journal “Gozdarski vestnik” (*Deliverable 22*)

Comparison with planned output: There were no deviations with the planned output.

Modifications: Sub-action was carried out as planned.

Continuation of the action after the project: We will continue to promote the Invazivke system.

3. Promotion of the information system among citizen science groups

Activities undertaken and outputs achieved:

We promoted the information system on the following events:

- In the **National Forest Week**, 23rd May 2017, we had a lecture at the Forest and Wood Science Meeting. The lecture was titled: Central electronic information system on invasive alien species in Slovenia. We also prepared a poster that was exhibited at the event.
- **Record an Alien Species:** From 2017 till 2020, we organised an annual campaign to encourage target audiences to report an alien species. The species, selected for the campaign were Himalayan Balsam (*Impatiens glandulifera*), Oak Lace Bug (*Corythucha arcuata*), fungi Ash Dieback (*Hymenoscyphus fraxineus*) and Tree of Heaven (*Ailanthus altissima*). We have issued a promotion leaflet each project year (*Deliverable 34*), presenting the species, identification characteristics, and similar species. The importance of reporting observations to the Invazivke app was described. Leaflets were distributed to the target audiences at all project events. Furthermore, species were also promoted with articles in various national and local media (see *Annex_B3_3_001*) and on our Facebook and via project e-Newsletters.
For all species, the knowledge on the distribution has significantly increased. In total at least 259 observers entered their data to the Invazivke app as records of the species of yearly campaigns (see also *Annex_B3_3_002*).
- **Invasive species survey week:** This activity was aimed at promoting observation and recording of IAS among primary and secondary school children and teachers. The action was organised each

September from 2017 till 2020. In 2017 the action took one week; however, teachers reported that it was difficult to complete it within one week, therefore in the subsequent years, the action was running for two consequent weeks. At the end of August, teachers were invited via a special newsletter to register their participation. Printed materials were sent to all registered schools, and some additional digital materials were provided to teachers (a PowerPoint presentation, a leaflet with a selection of the most common alien plants, links to relevant information on our website). Altogether 55 schools participated and submitted 2.158 records of IAS in the Invazivke system (see also *Annex_B3_3_003*).

• **Special card for the promotion of IAS Information System** was also prepared and printed in 6.000 copies and distributed at different project events (lectures, exhibitions, eradication actions, fairs etc.). Promotional card is in *Annex_B3_3_004*.

Comparison with planned output: The action was conducted as planned in the proposal. We have reached the targeted outreach of 500 volunteers submitting 2.500 IAS occurrences.

Major problems encountered: No major problems.

Continuation of the action after the project: To promote the use of Invazivke system, different activities will take place also in the following years.

Action B.4 - Inclusion of volunteers in IAS management in urban forests

Foreseen start date: 1. 4. 2017
Foreseen end date: 30. 6. 2020

Actual start date: 5. 4. 2017
Actual end date: 10. 9. 2020

1. Mobilisation of volunteers

Activities undertaken and outputs achieved: As presented in the Mid-term report we delivered lectures on alien species in the quaternary communities of the City of Ljubljana (MOL) and one lecture to the students at the Biology Students' Research camp in Predoslje. The objective of these was to invite citizens to join the field survey of alien plants in 2017 and eradication actions in the years 2018-2020. Additionally, articles in printed and online media were published to call for volunteer participation (*Annex_B4_1_001*). Mobilisation of volunteers for the eradication actions was carried out every time before each of the IAS eradication action in 2018 - 2020.

Comparison with planned output: There was no deviation from the planned output.

Continuation of the action after the end of the project: Not applicable.

2. Alien Plants Inventory and selection of priority sites

Activities undertaken and outputs achieved: The purpose of this activity was the inventory of alien plant species from the alert list and observation list, created within the LIFE ARTEMIS project. The inventory in the Landscape park Tivoli, Rožnik and Šiška hill (LP TRŠh) was already prepared and reported in the Mid-term report (see Inventory manual in *Deliverable 15*). Volunteers carried out the inventory of IAS plants in autumn 2017. The work was carried out by 16 out of 24 trained volunteers and 10 additional people (LIFE ARTEMIS project team and professionals working in LP TRŠh). We prepared a report of the survey and selected 10 species for eradication (report in *Annex_B4_2_001*).

Comparison with planned output: There is no deviation from the planned output. Despite a lower number of actively participating volunteers, we successfully surveyed the whole area of the LP TRŠh as planned.

Continuation of the action after the end of the project: The inventory of the IAS in the Landscape park will take over the manager of the protected area as proposed in action B.4.4.

3. Eradication of alien plants in the selected priority sites

Activities undertaken and outputs achieved: Each year of the project (2018-2020) two eradication actions of selected alien plant species in LP TRŠh were organized. In addition to the project team, participants were park managers, biology students, nature conservation enthusiasts and pupils with teachers from biotechnical high schools. Additionally, one additional eradication action was organised in collaboration with the Landscape park managers. In total 224 volunteers participated in 7 eradication actions (see *Annex_B4_3_001* and *Annex_B4_3_002*). We assess that we were eradicating at least 18 IAPS on 20 ha of the protected urban forest area (list of locations in *Annex_B4_3_003*). Due to time consumable, complex and difficult removal of the *Lonicera mackii* (large bushes), small mechanization was hired to help effectively dig out the bushes, that were then taken over by the volunteers for cutting and transport. After each action all removed plants were collected in bags or closed containers and taken over by company dealing with plant waste (JP Voka Snaga d.o.o.; Tisa, do.o.) and sent to destruction (incineration). Participating volunteers received project T-shirt, catering with sandwich and responsibility insurance were also provided for the volunteers. In September 2020, a lecture for volunteers, forest owners and other stakeholders was prepared, to present the results of the action (*Annex_B4_3_004*).

Comparison with planned output: We have reached the planned output. The number of participating volunteers was almost 2,5 times higher than anticipated.

Additional eradication action at a different location in Slovenia at Nadiža River was organised. At the end of 2019, a local forester reported several observations of Butterfly Bush (*Buddleja davidii*) on the gravel beds of Nadiža river in North West Slovenia. This species is known to be invasive, especially in open rocky or stony areas. Nadiža river is part of Natura 2000 site (SI3000167) and a protected area. After an extensive survey by ZS, it was estimated that around 400 bushes are present on the gravel beds. ZS arranged the permits for the eradication, and at the end of February 2020, we performed an eradication action. Besides three members of the LIFE ARTEMIS project team and a subcontracted company which helped with sawing larger bushes, the action was carried out by IRSNC staff which used this day as their team-building event. In one day action, around 400 bushes were removed. Part of the material was taken to the wood chipping company and safely disposed, and part was burnt on the site. The action was also promoted as an example of good practice for rapid response and removal of the observed IAS.

Modifications: To secure needed participation of a higher number of volunteers to effectively remove IAS at some of the selected locations bus transportation was additionally provided for participated high school students at two eradication actions. The cost was not planned in the projects proposal and was discussed with the monitor.

Major problems encountered: No major problems encountered.

Complementary action outside LIFE: The Landscape park manager also organised some eradication action within the Landscape park. As a result of a strong promotion, eradication actions with volunteers were organised by SFS in other parts of Slovenia.

Continuation of the action after the end of the project: According to the IAS Action Plan (action B4.4) the Landscape park management authority will continue with the eradication actions in the park.

4. Development of the IAS Action Plan

Activities undertaken and outputs achieved: In October 2019, IRSNC together with SFI organized Consultation meeting in form of two workshops to encourage active stakeholder participation and to present and discuss action plan for invasive alien plant species in the LP TRŠh. For the first workshop all forest owners in the park were invited. The LIFE ARTEMIS project was presented, followed by a presentation of the draft version of action plan. The interactive activities in which owners shared their opinion on IAS, their presence on their land and willingness to cooperate in implementing the action plan took place. The workshop was attended by a small number of owners, but the ideas and exchange of experiences were very positive, and the owners were largely willing to participate.

The second workshop was meant for other stakeholders and users of the area. It was attended by 13 representatives of the City of Ljubljana, the Ministry of the Environment and Spatial Planning, the Slovenian Forest Service, the LP management company JP VOKA SNAGA, SFI, the Biotechnical Faculty (Department of Biology and Forestry) and a representative of ZOO Ljubljana. On the workshop representatives of various institutions shared their experiences with activities related to the removal of IAS in the park area and how they could be included in the future. In the continuation of the workshop, we wanted to hear examples of good practice regarding the possibility of disposal, removal and processing of waste green cuttings and IAS biomass. The Consultation Meeting outlined guidelines for further work and active participation in the implementation of the action plan. Supporting materials (invitations, participants list, outputs, photos) are in *Annex_B4_4_001*. Based on the Plant Inventory (action B.4.2) and the outcomes of the Consultation Meeting, the IAS Action Plan was prepared by IRSNC by the end of the project (*Deliverable 27*). During its preparation, the project team cooperated with the management authorities of the LP Rožnik. Since numerous stakeholders were actively involved in the preparation, the preparation of the action plan itself makes an important contribution to raising the awareness of key stakeholders in the area.

Comparison with planned output: The Action Plan was prepared with a delay. However, this has not affected other project activities. Also, the target outreach of 50 participants of the Consultation

Meeting was not reached. However, we assess all important stakeholders participated. All forest owners in the area were informed personally via mail, and we could not influence their participation. Continuation of the action after the end of the project: The action plan is intended primarily for the park's management authority, JP VOKA SNAGA, and the founder of the protected area, the City of Ljubljana, who will plan and implement activities and provide the necessary financial resources on its basis. The action plan will be an annex to the Management Plan of the Tivoli, Rožnik and Šišenski hrib Landscape Park. The action plan also presents a concrete medium-term plan for the management of invasive alien species in the case of a protected area, which will be a model example for the preparation of similar action plans for other protected areas or similar urban forests in Slovenia and Europe.

5. Platform for IAS management initiatives

Activities undertaken and outputs achieved:

We set up a platform for the exchange of information on the management of IAS. The platform, called Alien Oracle (in Slovenian “Tujerodni vedež”) is integrated on the project website <https://www.tujerodne-vrste.info/tujerodnivedez/> (*Deliverable 24*). It works on the principle of user-submitted posts, where external users can submit their information on experience with the management of IAS through a form. The form is then approved by the administrator (tasks carried out by Zavod Symbiosis) and made publicly visible. Until the end of the project, 30 posts on the management of alien species were collected within Alien Oracle. Information was submitted from various organisations, carrying out IAS management activities (besides the partners of the LIFE ARTEMIS project, also societies and managers of protected areas).

Comparison with planned output: The activity was finished with a small delay, but the targeted outreach of 30 management initiatives entered was achieved.

Continuation of the action after the end of the project: The platform will be maintained and further promoted by ZS also after the end of the project. Users who already submitted their information, can log in to the website and on their own update the information.

Action B.5 - Canker of maple awareness campaign

Foreseen start date: 1. 4. 2018
Foreseen end date: 30. 6. 2020

Actual start date: 16. 2. 2018
Actual end date: 31. 10. 2020

The action started with the opening meeting in February 2018, where a refined action plan was drafted and later accepted via e-mail.

B.5.1 Newspaper articles

Newspaper articles had been published in a professional journal (“Gozdarski vestnik”), farmer’s journal (“Kmečki glas”, “Zelena dežela”) and local/regional publications. 18 articles out of expected 15 articles were published (see *Annex_B5_1_001, Deliverable 31*). Target audience (forest owners, adults interested in environmental issues) and outreach target were achieved. These magazines and newspapers have a broad readership, high circulation and are very popular with rural people and focus mainly on older people that do not necessarily use the internet (estimated number of printed copies of used media: over 300.000).

B.5.2 Popular brochure on *Eutypella*

The first output of the action was the Popular brochure on *Eutypella* titled: »Skupaj ustavimo javorov rak!« (Eng. “Let’s Stop Maple Canker Together!”) (*Deliverable 23*), which was published in August 2018 in 25.000 copies. The brochure was distributed with the Slovenian farmer’s newspaper (21.500 copies), within project’s partner institutions, at various events and trade fairs and at lectures and excursions for private forest owners in sub-actions B.5.4 and B.5.5. Additionally, to supplement the brochure, a poster has been additionally prepared (*Annex_B5_2_001*) to display at fairs.

B.5.3 TV broadcasts

TV coverage of the campaign content was assured in 2018 and 2020 during Control of *Eutypella* sub-action (B.5.6.). Altogether 3 TV broadcasts were streamed as planned. In 2018 the documentary broadcast of the National Television was filmed, where a large section was dedicated to the Canker of Maple and clear instructions were given how to cut the infested trees. On November 22, 2020, the broadcast “People and the Earth”, one of the most watched broadcasts of the National Television, included a presentation of Maple Canker. The broadcast was recorded in October 2020. The canker of maple was presented in the broadcast “Slovenska kronika” as the TV report from the first press conference (Action D.1) in November 2016. The presentation of the disease was planned also for the second press conference. However, we did not get any response from the journalists as the COVID-19 pandemic was at that point in the focus of all media.

The *Eutypella* awareness campaign was also featured at a national-scale radio station. Target audience of the action were forest owners and farmers and outreach target (at least 100.000 inhabitants) was achieved. List of TV and radio broadcasts is in *Annex_B5_3_001*. Additionally, the goal to reach forest owners and farmers was addressed with the promotion of the campaign within the SFS’s promotional activities at fairs (see also *Annex_B5_3_001*).

B.5.4 and B.5.5 Lectures for private forest owners and Excursions for private forest owners

The lectures for private forest owners and excursions for private forest owners were held in October and November 2018. In total, 12 events were carried out in 6 Regional Units (RU) of the Slovenia Forest Service (SFS) (*Annex_B5_4-5_001*). The first half of the events included lectures by experts of the SFI and field excursion, while the other half were field excursions conducted by the SFS. Lectures and excursions were promoted in the newspaper “Kmečki glas”, on the SFS and LIFE ARTEMIS websites and in local media. A total of 262 participants attended lectures and field trips

(Annex_B5_4-5_002, Annex_B5_4-5_003). Results exceeded the projects target of 225 participants in total for both campaigns. Control method of sanitary felling was presented. We successfully mobilized forest owners and other interested citizens to pay attention to occurrence of *Eutypella* and report it through the IAS Information System.

B.5.6 Control of *Eutypella*

The action of cutting down infected trees with fungus that cause the Canker of Maple was planned for 2019 and 2020. During project data on recorded infected maples were collected from various sources. Until the end of the project, there were 452 records of Maple Canker sites in the IAS Invazivke information system. SFS was implementing action of cutting infected maples to lower potential of pathogen spreading. By the end of October 2020 SFS had issued 158 administrative decisions to forest owners, to cut 469 maples with a Maple Canker (according to the provisions of the Forest Act). The decision specifies the method of suppression of the fungus and the deadline for implementation, which was usually given by the end of 2019 or by the first half of 2020. Altogether 239 affected trees were cut until November 2020 (Annex_B5_6_001).

SFI monitored the impact of the felled infected trees with *Eutypella parasitica* (EP) by setting up Burkhart spore collecting traps in areas with a higher number of diseased trees. The Burkhart spore traps have been ordered and delivered (with delay). In 2018, Burkhart spore traps have been tested and in 2019, three woodland locations with detected Maple cankers were chosen for research and traps were placed there in the field. Despite our continuous attempts to detect the numerous spores of this fungus, monitoring with the Burkhart spore traps was not successful, as *EP* ascospores were detected in only one single sample in 2019. Method is otherwise proven to be used for the *EP* detection. The detection of *EP* spores was also tested with a different type of spore traps and has not given satisfactory results, as also with this method, *EP* spores were not caught. Based on this research, professional article was prepared and will be published in forestry magazine (Annex_B5_6_002). Possible reasons why we failed to catch *EP* ascospores are also discussed there. However, the success of sub-action is assessed to be achieved, as more than 50% of the detected infected trees were felled in the campaign.

Comparison with planned output: We have reached the planned outreach as proposed.

Modifications: In addition to TV broadcasts, the disease was presented also on radio and at fairs to reach the target audience. Trainings and excursions were conducted simultaneously. The number of events is therefore lower than planned (12 events), but the number of participants is still higher than the target participation (262 participants). Popular brochure was published with a small delay as predicted and communicated with monitor. To supplement the brochure, a poster has been additionally prepared to display at fairs.

Major problems encountered: The spore traps were delivered with a delay. However, this has not affected the planned spore trapping before the cutting of the infested trees since it was planned for the end of 2019 and in 2020. We had problems to affectively detect the air-born spores with the spore samplers as discussed above and we have tested additional methods to address this problem.

Continuation of the action after the project: SFS has a tradition of organizing field excursions for private forest owners, with an aim to improve management of forests. The education about the disease in the form of lectures, excursions will continue after the project. SFS will continue issuing administrative decisions to cut maples with a maple canker. The Burkhard spore traps will continue to be used by SFI for identification of fungi within EWRR system.

Action C.1 – Monitoring of project visibility and trends in public attitudes towards IAS

Foreseen start date: 1. 4. 2017
Foreseen end date: 30. 9. 2020

Actual start date: 1. 8. 2016
Actual end date: 31. 10. 2020

The visibility of the project in media has been monitored from the beginning by the means of SFI and IRSNC general clipping, website visits, Facebook likes. Clipping was subcontracted by IRSNC in November 2016. Two reports monitoring the professionals and volunteers involvement were prepared (*Deliverable 25, Deliverable 33*).

Indicator 12.1.1 Website

1. Web site: 73.624 unique visitors and 98.886 sessions on Google Analytics (www.tujerodne-vrste.info); 577.767 unique visitors (www.invazivke.si).
2. Social media: Facebook (1023 followers) and Twitter followers (118).
3. On-line IAS Information System: 75.049 observations and 428 providers
4. Android application: 1904 downloads.

Indicator 12.1.2 Other tools for reaching/raising awareness of the general public

1. Travelling exhibition: the number of visitors. Monitoring is made with a visitors counter which is automatically tracking the number of visitors. 29 locations – 165.031 visitors
2. Training events: B.2 Slovenian Workshops: 1014, B.3 Information System Workshop: 521, B.4 Survey Training Events: 24.
3. Eradication actions: 224 participants in 7 eradication actions and 1 additional action (13 participants)
4. Popular lectures: Number of people participating at lectures for general public in actions B.1 (exhibition openings): 1337, B.4 (National Forest Week): 68 participants and B.5 (*Eutypella* campaign): 163.
5. Field excursions for the general public: Number of people participating at events B.1 (guided walks): 947 participants, B.4: 6 participants and B.5 (*Eutypella* excursions for forest owners): 262 participants.
6. Policy-makers events, consultation meetings: B2 (EWRR Transferability Workshop): 45, B4 (Consultation meeting IAS Action Plan): 18, D1 (Consultation meeting for policy-makers): 28.
7. Number of printed manuals, brochures: A.3 (Training Manual (700), field guide (3900)), B.1 (Popular brochure: 40000, DVDs: 300), B.4 (Inventory Manual (60)), B.5 (*Eutypella* popular brochure: 25000)
8. Dissemination at fairs: 137,000 visitors.

Indicator 12.1.3 Surveys carried out regarding awareness of the environmental/climate problem addressed. After first survey (Action A.1; 952 respondents) two national surveys were conducted (Action C.1), with different numbers of respondents: 515 (second survey; 503 the same as in the first survey), 522 (third survey). Two reports summarising these results were prepared (*Annex_C1_3_001, Annex_C1_3_002*).

13.1. Networking and other professional training or education

- (1) EWRR Conference: 104.
- (2) Study visits: in total 4 visits one to Italy, Croatia, Austria and Hungary. Twice we visited LIFE Observatree in the UK; once LIFE CSMON in Italy.

14. Jobs Full-time equivalents (FTE): No. of FTE/per year: 2,1

Media monitoring – press clipping: LIFE ARTEMIS: 497 - Web media (236), Radio and TV (75), Printed media (186)

Comparison with planned output: There is no deviation from the planned output. Media attention was much higher as we have expected in the project proposal, thus costs for media monitoring service exceeded the foreseen budget.

Continuation of the action after the end of the project: The survey on the public opinion can be used as a baseline for further studies.

Action C.2 – Evaluating the effectiveness of EWRR system

Foreseen start date: 1. 4. 2017
Foreseen end date: 30. 6. 2020

Actual start date: 5. 4. 2017
Actual end date: 31. 10. 2020

Sub-action C.2.1 – Evaluation of the established EWRR system

Activities undertaken and outputs achieved:

1. An evaluation of the EWRR institutional framework

To verify the functionality of the proposed EWRR system the planned simulation exercise took place in Strunjan in cooperation with all relevant organisations. Although the EWRR system for IASs in forests has not yet been completely established at that time, we had the opportunity to evaluate the functioning of the proposed system by responding to a real case scenario of finding a new IAS (kudzu) in Slovenia. The prepared Rapid Response Plan for Kudzu was used and evaluated in this scenario.

The following impact indicators have been considered to assess the EWRR system:

- Number of alien species addressed with communication (till the end of the project: 60 species, 5 years after the project: additional 10 species): at least 85 species were addressed with communication.
- Number of alien species addressed with training (till the end of the project: 80 species, 5 years after the project: additional 10 species): 115 species were addressed during the training.
- Number of IAS controlled during the actions on LP TRŠh (B.4) and whole Slovenia (B.5) (till the end of the project: 11 species): 17 species (B.4) + 1 additional species (B.4, extra location Nadiža); 1 species (B.5).
- Number of intercepted alien species by the EWRR new to Slovenia. 1 species were found new to Slovenia. However, there was the second record of naturalised *Akebia aquinata* for Slovenia and the first record of sub spontaneous spread of *Koeleuteria panniculata*. In total 39 species of the alert list were found.
- Surface for control (till the end of the project: 20 ha, 5 years after the project: 30 ha). 20 ha.
- Percentage of population decrease of *Eutypella* canker of Maple (till the end of the project: 125 trees, 5 years after the project: 250 trees). 51 % of infected trees eradicated (469 trees found and marked to cut, 239 trees already felled).

2. Effectiveness of EWRR Training Workshops

The effectiveness of the EWRR Training Workshops will be evaluated by evaluating all training events and by analysing the rate of correctly identified species submitted through the IAS information system.

(1) For each EWRR Workshop type an evaluation form was prepared. All participants were asked to fill in a few questions before and after the workshop. In average, participants thought they greatly increased their knowledge about the EWRR system. The report is in the *Deliverable 28*.

(2) Expert administrators assigned to verifications of observations submitted through the information system had a task to record the number of verified observations. In total 96,8 % of the observations were correctly identified.

3. IAS Information System Evaluation

The developed information system was regularly assessed by the team members. New adaptations and versions of the Invazivke app were prepared also considering user's experience. An on-line survey about the satisfaction with the use of the information system was made. Most of the respondents were very satisfied with the app and the service it provides. Additional suggestions for improvement were also given and then considered.

Comparison with planned output: We had an opportunity to evaluate of the EWRR system on the real case scenario instead of the planned simulation exercise. The goal of the activity was reached.

Continuation of the action after the end of the project: Not applicable.

Sub-action C.2.2 – An assessment of the socio-economic impact of the project actions

Activities undertaken and outputs achieved:

1. Cost-benefit analysis of a selected tree pest species

The cost-benefit analysis was prepared on a single species example to explore whether the economic damage of the IAS in Slovenian forest would be greater than the cost of the preventive measures with EWRR system. For this study, we used the emerald ash borer (*Agrilus planipennis*) as a model species. Our research aims to assess the economic and treatment costs in Slovenia. The second scenario was based on all the information of Slovenia's major and minor hosts, the emerald ash borer economic damages, and the eradication actions' costs. The report is in the *Annex_C2_2_001*.

2. Evaluation of the potential income from IAS control measures

In this study, the potential for invasive species to be used as raw material for pellets production was made. The research was presented at the EWRR international conference (D.2) and on the 30th International Conference on Wood Science and Technology. See *Annex_C2_2_001* and *Annex_C2_2_002*.

Comparison with planned output: There is no deviation from the planned output.

Continuation of the action after the end of the project: Not applicable.

Action D.1 - Dissemination of project results to the general public

Foreseen start date: 1. 8. 2016
Foreseen end date: 30.10.2020

Actual start date: 1. 8. 2016
Actual end date: 31. 10. 2020

Sub-action D.1.1 – Obligatory dissemination actions

1. Project website: At the beginning of the project, we have redesigned the website www.tujerodne-vrste.info, which is already since 2008, the main web source on alien species in Slovenian language. The structure of the page was adapted in such a way that it can serve as the LIFE ARTEMIS project website and repository of project outputs and at the same time provide all relevant information on alien species.

The page is administered by ZS, who's staff is taking care of regular updates and technical maintenance of the page. Project partners were regularly submitting news messages. The website is also including a platform Alien Oracle for the exchange of the experience on control and eradication of IAS (more under B.4), where also external users can submit posts.

Visits to the page increase after media messages on the project's topics on IAS, which shows that the page is well serving to provide additional information to the interested public. During the second part of the project, we have in particularly expanded the part of the website which is dedicated to the IAS identification. Descriptions from the Field Guide (see action A.3) were integrated on the website. Furthermore, species descriptions were also added to the English part of the website. This has substantially increased interest in the page from foreign countries. About 24.000 visitors of the website are visiting the English version of the website.

Statistics on visiting of the page is shown in *Annex D1_1_001*. Part of the statistic applies to the page visitation prior to the redesign, and after the redesign of the page in November 2016, when the statistics was followed with new analytics tracking code. During the project LIFE ARTEMIS, the page was visited by over 81.000 visitors. After the redesign, the page was on average visited by over 1.500 visitors, which is well above the outreach target of 700 visitors/month. The percentage of English-speaking visitors has increased and about one third of visitors have visited the English version of the website after its redesign. Exports of Google Analytics are provided in the *Annex D1_1_001*.

2. Notice boards: Two project notice boards were planned in the project. A general notice board, describing the goals and actions of the project, is placed outside of the premises of the Coordinating Beneficiary since October 2016. The second notice board on invasive alien species in protected areas was set up along a frequented trail in the Tivoli, Rožnik and Šiška hill Landscape park in November 2017 (*Deliverable 1*). Both notice boards were prepared and designed by Institute Symbiosis and SFI took care of setting them up. In 2020 the plate on one of the notice boards was replaced as it was damaged by a fallen tree. In this way, also the continuation of the notice board was assured. Smaller information plates were placed at offices of all beneficiaries in October 2016.

3. Layman's report: At the end of the project, partners have prepared Layman's report, summarizing the achievements of the project. The report was prepared bilingually in Slovenian and English. It was made available in a printed version and also as a digital publication (*Deliverable 32*), which can be accessed on the project website: <https://www.tujerodne-vrste.info/wp-content/uploads/2020/12/Poljudno-porocilo-Laymans-report-LIFE-ARTEMIS-WWW.pdf>

Sub-action D.1.2 – Additional dissemination actions for wider audiences

1. Social media: The project Facebook account was set up in November 2016, and since then, the project team was regularly publishing messages and announcing project events. By the end of the project, the Facebook site had 1023 followers (see *Annex D1_2_001*). This is less than the anticipated 2000 followers. However, during the project, Facebook substantially changed algorithm, which is often making non-private messages which are not paid through Facebook adds much less visible to the audience.

We have set up a Twitter account, which we have mainly used for informing the international public and networking with similar projects. By the end of the project, we had 118 followers on the Twitter account (see *Annex DI_2_002*). In Slovenia, Twitter is not a very popular media and would likely not reach our target group.

In the second phase of the project, we have also set up a YouTube channel, where we enabled viewing of all movies and short clips, prepared within the project. Altogether almost 2,600 viewers have watched some of the contents (see *Annex DI_2_003*).

2. Facebook group: instead of a closed Facebook group we decided to keep informing interested public through an electronic newsletter. The reason for this is that the messages sent to the Facebook group would have been largely the same as on the current Facebook page. E-newsletter enables us to link short messages to the longer information to our homepage. By May 2018 we have collected over 300 e-mail addresses, however following the GDPR rules we had to re-establish the mailing list in May 2018. By the end of the project, we had 507 subscribers to the mailing list. By the end of the project, we have sent out 11 E-newsletters and three special e-newsletters for the teachers (informing them of the specific actions where schools can join) (see *Annex DI_2_004*, *Annex DI_2_005*).

3. Presenting the project at national fairs: Each year (2017 – 2020) we attended a fair where we presented IAS and the project. Promotional materials (popular brochure, project information sheet, “record an alien” flyers, information system promotion card, brochure on *Eutypella*) were distributed to the visitors. Those who took part in the activities on the stand also received a promotional gift. We also prepared a questionnaire where visitors were able to test their knowledge and learn new facts about IAS; the results helped us understand the general public’s awareness on IAS. We drew random participants who received a project’s t-shirt or the Field guide. The educational movie was screened on the stand. Besides the project presentation on the stand we also prepared a lecture (in 2017 and 2018) and a guided walk (in 2018) about IAS (both Action B.1). We equipped the stand with fresh material of invasive plant species which attracted visitors very much. See *Annex DI_2_006*.

In October 2017 we attended the Nature-Health Fair in Ljubljana and, according to the organizers, more than 20.000 people visited the fair. In August 2018 we presented the project at the Fair for agricultural products and food AGRA in Gornja Radgona which has been visited by 117.000 visitors. In 2019 we again participated at the Nature-Health Fair which was attended by 20.000 people. Due to COVID-19 pandemics in 2020, the Fair for agricultural products and food AGRA in Gornja Radgona was cancelled. As an alternative they prepared an online fair in which we have participated with the presentation of the project and main IAS issues on their web-page. A link to the project’s online page and *Invazivke* app with a presentation movie clip are listed. The fair will last from September 2020 until March 2021. According to the organizers, in the first week fair’s page recorded over 37.000 views.

4. Press conferences: In the project proposal, we have planned two press conference. The one in the beginning of the project was successfully organised as planned. It had a very good outreach since 4 main Slovenian media companies attended it (see *Annex DI_2_007*). After the event, 9 clips were published on TV, radio and in printed media. The second one was planned towards the end of the project in October 2020. This coincided with the beginning of the second wave of COVID-19 pandemics and strict limitations on a gathering of people were introduced just before the press conference. We have issued a press release and sent it to journalists (see *Annex DI_2_008*), but there was little response as their attendance was also limited to only the most important events. The press release was taken up by the national press agency, regional radio, daily newspaper and forestry magazine.

Sub-action D.1.3 – Additional dissemination actions for national and local policy makers

A Consultation Meeting was planned as the main dissemination action towards the national and local policymakers. At the meeting, members of the project team presented the most relevant

outcomes of the LIFE ARTEMIS project regarding early warning and rapid response (see *Annex_D1_3_001*; <https://drzavnisvet.si/post/560330/v-zivo-strokovni-posvet-invazivne-tujerodne-vrste-v-gozdovih-medsektorski-izzivi-in-priloznosti-pri-njihovem-upravljanju>).

Representatives of the Municipality of Ljubljana and the Administration for Food Safety, Veterinary Sector and Plant Protection (overseeing the management of quarantine pests) presented their views to the future development of the EWRR. In the final part of the meeting, the participants were invited to a discussion on the open issues of EWRR. The summary of the meeting and the main conclusions are described in *Deliverable 30*. The event was planned at the National Council, which is at the second place in the system of bodies of the national authority, after the National Assembly. The consultation was initially planned in April 2020 but had to be moved to September due to the COVID-19 pandemics. In the end of September, the second wave of the epidemic started again; however, we have decided to implement the meeting as a hybrid event. All the lecturers were present at the National Council, while the participants were able to listen to the lecture and enter the discussion via TV Chanel (S-TV Skledar) of the National Assembly and ZOOM Broadcasting. The meeting was attended by 28 participants from various sectors (*Annex_D1_3_001*). This is lower than the target outreach (50). The most possible cause is the uncertain situation with the second wave of COVID-19 pandemics. The decision to change the meeting in the hybrid form was also made only a few days before the meeting as the situation with COVID-19 was drastically changing day to day.

Sub-action D.1.4 – Networking with other LIFE projects

Following the original plan, the LIFE ARTEMIS team visited two related LIFE projects. In 2016 we visited the team of the project CSMON-LIFE (LIFE13 ENV/IT/842), which is working towards involving citizens in the study, management and conservation of biodiversity. In January 2017, we visited the project LIFE ObservaTREE (LIFE12 ENV/UK/000731), which had a goal to mobilise public in the early warning system for tree health. Later, in September 2017, the LIFE ARTEMIS team was invited to the final conference of the LIFE ObservaTREE project, where we presented first results from our project and exchanged further experience regarding training and volunteer management.

The international conference (Action D.2) offered good networking experience with other LIFE projects: LIFE SAMFIX (LIFE17 NAT/IT/000609), LIFE ASAP (LIFE15 GIE/IT/001039), Scirious LIFE (LIFE14 NAT/UK/000467), Invasive LIFE (LIFE17 NAT/FI/000528), LIFE ObservaTREE (LIFE12 ENV/UK/000731). Some of the training and events in Slovenia were organised in the synergy or together with the LIFEGENMON (LIFE13 ENV/SI/000148), LIFE CB SI (LIFE14 CAP/SI/000012) and LIFE AMPHICON (LIFE18 NAT/SI/000711) projects. We also had a meeting with LIFE NET PRO NET project (LIFE15 GIE/IT/000897) regarding the involvement of citizen science.

In addition to networking with LIFE projects, we have presented LIFE ARTEMIS project, its activities and results to different target audiences on at least 13 different national and international conferences and meetings. The list of presentations is in *Annex_D1_4_001*.

Modifications: Extension of the deadline for milestone of Networking visits to February 2017 was communicated to external monitor.

Action D.2 – International conference on EWRR

Foreseen start date: 1. 10. 2018
Foreseen end date: 30. 9. 2019

Actual start date: 6. 9. 2018
Actual end date: 31. 10. 2020

Activities undertaken and outputs achieved: Preparations for organising an international conference on EWRR started already in September 2018 with an internal staff meeting. At the meeting, members of the scientific and technical boards from all partner organisations were selected, and tasks were divided over different project team members. Roadmap for the organisation was produced. The first announcement of the conference went out in December 2018, with the second one following in March 2019 including call for abstract (*Annex_D2_001*), which was open until 15th May 2019. The special webpage was set up to promote and present all the relevant information regarding the international conference, also allowing an on-line registration (see *Annex_D2_002*). The conference “Detection and control of forest invasive alien species in a dynamic world”. was organised in Ljubljana (venue M hotel) between 25 and 28 September 2019. The conference was organised back-to-back with the COST action Alien Citizen Science annual meeting. This enabled increase participation of some of the leading researchers in this field and reduced the costs and the amount of travel. At least 104 people attended the conference, arriving from 17 different countries (EU and non-EU) (see *Annex_D2_003*). During 3-day programme of the conference altogether 57 oral and poster presentations were presented on different topics: early detection, rapid response, alert lists of IAS, the ecology of IAS, information systems as part of early warning, raising awareness about IAS issues and mobilisation of public participation, mitigation and control of IAS, etc. The presentations are also available on the project webpage: https://www.tujerodne-vrste.info/projekt-life-artemis/projektne-aktivnosti/mednarodna_konferenca/. The book of abstracts was published (*Deliverable 26*) and is also available on the webpage. Additional to the book of abstract, all participants also received a DVD with projects educational movie, printed cotton bag and small promotional material: pen and notebook. In addition to poster and oral presentations, 4 workshops were held at the conference, results of which were combined into joint research articles published in the proceedings of the conference. On the last day, the field excursion was organized in the SW part of Slovenia. Unfortunately, due to national airline bankruptcy and changes in return flights schedules, only a lower number of participants attended the excursion. Subsequently, only one bus for the excursion was needed. In the short questionnaire after the conference, we got very satisfactory responses from all participants of the conference for being well organized and interestingly combining different aspects of the IAS management and EWRR system. To reach wide scientific community, the Proceedings of the conference were published in an open access international scientific journal *Management of Biological Invasions* (*Deliverable 29*; <https://www.reabic.net/journals/mbi/2020/Issue4.aspx>). Special issue “*Detection and control of alien forest species in a changing world*” was published in the end of October 2020. It includes editorial and 8 peer-reviewed scientific articles from presentations and workshops at the conference.

Comparison with planned output: We have finished all outputs as proposed. The conference itself was finished by the end of September 2019, however the publishing of the Proceedings finished later – in the end of October 2020. This change was communicated with the monitor. A slightly lower number of presentations was also presented as expected (57 instead of planned 70).

Modifications: Because of projects national co-financing with public money (MOP), the conference was required by law to be organised also in Slovene. Therefore, simultaneous translation was provided during the conference and the abstract book was translated into Slovene to provide a bilingual implementation. From this change, additional costs were incurred, which were communicated with the monitor and are within the project’s budget. The conference was not organized in collaboration with the unit “Alien invasive species and international trade” of the IUFRO as planned in the proposal as the period was not suitable and many other activities in the same field of IAS in forests were already set in the proposed timeframe. However, the conference

was successfully combined with the COST Action. The additional costs incurred with publishing the Proceedings of the conference. We believe that publishing in an open-access peer-reviewed scientific journal strongly contributed to wider dissemination of the projects and conferences results and reach even better our target audience. The publishing also seemed more sustainable as it is an online journal and with open access, also meaning many policy-makers can reach it.

Major problems encountered: No major problems or deviations were encountered.

Complementary action outside LIFE: The conference was organised back-to-back with COST Alien CSI action, where complementary topics on IAS and citizen science were presented and discussed.

Continuation of the action after the project: The book of abstracts, proceedings and presentations will stay available on the project website and the proceedings will be available on the journal website.

Action D.3 – Replicability and transferability plan

Foreseen start date: 1. 1. 2020
Foreseen end date: 30. 9. 2020

Actual start date: 12. 8. 2020
Actual end date: 31. 10. 2020

Activities undertaken and outputs achieved:

Many activities within other actions aimed at facilitation of transferability and replicability of the project results. In the D.3 action, the main planned activity was one-day Transferability Meeting. Due to travel restrictions connected to the COVID-19 pandemics in the springtime the meeting was postponed to possibly more suitable time in autumn 2020. However, because of the second pandemics wave the meeting was at the end organised on-line on the 9th September 2020 (*Annex_D3_001*). On one-day Zoom meeting, representatives of two EU IAS management authorities participated (altogether 10 participants). Representatives from Croatia and Belgium presented their situation regarding the development of the EWRR system in their countries and the LIFE ARTEMIS team (SFI, ZS) presented the main projects results in Slovenia with the potential for transferability. Presentations are available on the project's webpage. In the discussion, special emphasis was given to the transferability potential of the following results: EWRR institutional framework, rapid response plans for IAS, alert lists, and priority pathways, EWRR training program and EWRR training workshops, IAS information system, mobilisation of volunteers in eradication actions, alien plants inventory methodology and manual, a platform for IAS management initiatives and eradication of *Eutypella* canker. Based on the meeting, a Replicability and Transferability Report was prepared (*Deliverable 35*).

Comparison with planned output: Due to COVID-19 pandemics, the activity started late and finished by the end of the project.

Modifications: The Transferability Meeting was organised on-line due to the COVID-19 pandemics.

Major problems encountered: None.

Continuation of the action after the project: The project team will stay available for advice and possible further cooperation with the respective Member States. The Replicability and Transferability Report will stay available on the webpage.

Action E.1 – Coordination and administration of the project

Foreseen start date: 7. 7. 2016
Foreseen end date: 31. 10. 2020

Actual start date: 7. 7. 2016
Actual end date: 31. 10. 2020

Sub-action E.1.1 – Project management by SFI

Activities undertaken and outputs achieved: In the beginning of the project, PMT and PSG have been established to ensure good management and steering of the project. Until the end of the project, 39 PMT meetings and 17 PSG meetings have been held. The team had many *ad-hoc* meetings whenever necessary. Right at the start of the project, on the 7th July 2016 the SFI administration had a meeting and Kick-off meeting was on the 11th July 2016. Project Manager and Project financial manager also attended LIFE15 Kick Off Meeting on the 10th of October 2016 in Brussels.

Contracts with co-financers were signed 24. 3. 2017 (MOP) and 7. 3. 2017 (MOL). Partnership agreements were signed by November 2016.

Comparison with planned output: In accordance with the changes in the reporting instructions, LIFE ARTEMIS was not obliged to perform an external financial audit.

Modifications: Instead of just the logo, we ordered several elements for the visual identity of the project, such as logo, colours, typography, designs of leaflet, newsletter, roll-up, graphic design of website and project identity. The subcontracting was thus combined from E.1 (logo) and D.1 (website) budget.

For the sake of more effective implementation of certain activities, after prior consultation with an external monitor, the transfer of the budget foreseen within the cost categories, within the actions, between the partners, has been carried out. To the greatest extent, this was a transfer from the partner IRSNC to SFI, for both External and Other costs categories and part with those items of the linked salary budget (Personnel). The budget for illustrations has been transferred from the category of external services to the category of Personnel costs because they will be made with a newly employed person within the partner ZS.

Sub-action E.1.2 – After-LIFE plan

Activities undertaken and outputs achieved:

The After-LIFE plan of the LIFE ARTEMIS project was prepared by all the project partners at the end of the project (*Deliverable 39*).

Comparison with planned output: The After-LIFE plan was not completely finished by the end of the project as propose, however was finished within the reporting, ensuring project requirements.

6.2 Main deviations, problems and corrective actions implemented

Most of the actions were conducted according to the proposed work plan, with only minor deviation in timing, however execution was of the highest standard and thus the achievement of the project outcomes was assured. Some of the activities encountered minor problems, which were addressed during the project and did not affect the overall project objectives.

During the project the COVID-19 pandemics affected our everyday lives and due to this also some of the project activities needed to be adapted. The Consultation meeting (D.1) in the National Council was to be organised in the uncertain situation with COVID-19 pandemics as the situation drastically changed on a day-to-day basis. Therefore, the event was only few days prior to implementation changed to hybrid form, allowing participants to join on-line. Despite wide dissemination of the invitation and information less people than expected attended the event. Sporetraps for monitoring the success of the control activities on *Eutypella* canker of maple were delivered with a significant delay. However, this did not affect the implementation of the monitoring and we continued with activities in 2018 when they were delivered. While waiting we additionally tested different and simpler type of the sporetraps and tried to detect the spores of this alien fungi. Upon arrival Burkhard sporetraps were used and tested in the field, but we encountered another problem. Despite our attempts, we were not able to detect and catch spores in the traps. We continued to use this method and different approaches also in the following two years, but the results were not satisfactory. Based on this research, professional article was prepared and will be published in forestry magazine. Possible reasons why we failed to catch *EP* ascospores are also discussed there. However, the success of sub-action is assessed to be achieved, as more than 50% of the detected infected trees were felled in the campaign.

The action A.2 was prolonged and the proposed EWRR system was prepared after many discussions and presentation to Ministry of the Environment and Spatial Planning (MOP), Ministry of Agriculture, Forestry and Food and other relevant organisations. When the EWRR was finished also Rapid Response Plans for 5 high risk species was finished as planned but with a delay.

After first year of the project Guided walks (B.1) organised in cities across Slovenia did not bring the satisfactory results therefore the strategy of the organization changed. We were joining our activities to other nature connected public activities and more targeted group of people we wanted to address. The change of strategy was successful, and we reached the target outreach. Since media attention was much higher as we have expected in the Project Proposal, there were more reports on project activities in the media and thus by the end of the project we exceeded the costs allocated for media monitoring service (press-clipping).

To enhance the outreach of the project few activities not planned in the project proposal were conducted. Additional activity of eradication of *Buddleja davidii* in Natura 2000 site was organized and conducted within the project (see B4). Field guides (A.3) were reprinted as the interest among public was high and we wanted to promote their involvement in the EWRR system. Also, at the international conference additional costs occurred when providing bilingual implementation demanded by Slovenian co-financers (simultaneous translation and translation of abstracts). With Proceedings of the conference, we wished to assure wide dissemination among target scientific community and therefore the proceedings were published in open access international scientific journal, from which the additional costs, not planned in the proposal, arose.

6.3 Evaluation of Project Implementation

Methodology applied: In general, we assess the appropriate methods were used to reach the objectives of the project as target outreach of the project was achieved.

The proposal for EWRR system for IAS was prepared (A.2.2). However, we believe that this activity should be included in core actions instead of preparatory, as the work for its preparation was greatly underestimated. Therefore, the activity also finished with a delay.

The national campaign (B1) and dissemination activities (D1) were very successful and different communication approaches gave very satisfactory results with strong media coverage (500 publications in different media) and numerous attendances, often exceeding the targeted values. The strategy to prepare lectures at exhibition opening brought nice results and were therefore more cost-efficient. Also, the adapted strategy for guided walks was well accepted. The costs of promotional and dissemination activities are justified by the targeted and even exceeded outreach. However, based on the evolvement of the Twitter community in Slovenia, this may not be an effective way to reach the mass public, but more for communicating results to the international public. Furthermore, despite regular posting relevant in interesting information on Facebook, we have not reached the targeted number of followers until the end of the projects. However, we believe the objective was reached as many posts reached thousands of FB users. To address enhancing and boosting Facebook posts additional costs would need to be anticipated.

EWRR training of professionals and volunteers (B.2) was organised with “train the trainers” approach and specifically addressing the targeted groups, which proved successful. We have built the cadres for the involvement in the EWRR system by involvement of professionals, forest owners and citizen scientists. In total, 1059 participants took part in 33 training events exceeding the target reach set in the project proposal for the action by over 20%.

Setting up the centralised IAS Information System (B.3) was important output of the project. We have developed the Invazivke app for Android system, which was greatly used. Valuable lesson learned in the action was that majority of our users used mobile app. In comparison to web app. This information could be valuable also for similar projects in other countries. Engaging foresters and citizens scientists in collecting IAS data (B.3) by promoting the information system was addressed successfully. In the invazivke system more than 18.000 IAS records were submitted via web and mobile app. As promotion of the information system among citizen science groups is important for the first step of the EWRR system, the promotion should be continuous and enhanced. A lot of data was submitted by the schools in Invasive Survey Week action, but also a lot of time and effort was needed for the communication with the teachers and many of the submitted data was incorrect or even fake. Promotion of the selected IAS in Record an Alien Species was interesting approach; however, it could be strengthened and more cost-effective by emphasizing also other type of media e.g., television. In the information system Invazivke altogether more than 75.000 data on IAS was collected, which implies the success of the actions and importance of the developed centralised information system. We believe all activities in this action were therefore cost-efficient.

Successful methods were used for the mobilization of the volunteers who participated in the eradication actions of alien plants in the selected priority sites (B.4). The involvement of more formally organised groups of volunteers such as environmental NGOs, biotechnical high schools, biology students’ associations proved to be successful approach. The decision to set a Platform for IAS management initiatives on the project website seems suitable. In the action we have been removing IAS from 20 ha of the protected area with the help of volunteers and have prepared the IAS Action Plan which will be included in area’s mid-term management plan as proposed in the Project Proposal.

Approaches used in the Canker of maple awareness campaign (B.5) were successful. As a result of the action many infected trees were detected and will be cut down to prevent the spread of

the disease. By the end of the project already half of the infested trees in Slovenia were properly felled. Methods to promote the action in the different type of media was suitable and targeted outreach was achieved. The excursions and lectures were conducted simultaneously, and such approach should be used also in the future also in the cost-efficiency point of view. The monitoring of the action's impact with spore traps was less suitable, as with purchased Burkhardt spore traps, we were not able to detect spores of this alien fungi species. This method has been previously already used in similar studies abroad. This monitoring would provide supporting proof that the activity was conducted successfully and would provide additional value with a research. However, the actions objective to reduce the number of infected trees in Slovenia by half was reached.

Important and very useful insight in changes in the public perception of IAS presented surveys carried out within A.1 and C.1 actions. Results of the surveys together with media monitoring via press-clipping allowed us to adjust the PR strategies during the project when necessary. Monitoring of the project impact with many different activities was successful and we were able to identify weaknesses and adapt accordingly. Evaluation of the effectiveness of EWRR system via different approaches was important and good indicators if the goals of the project activities were reached. In the cost-assessment sense we believe the costs were justified and funds used sustainably. Deriving from greater media coverage and many publications in different media also the costs of press-clipping as a monitoring activity (C.1) greatly exceeded the planned costs of this activity. However, greater media coverage of project relating topics is only beneficial and means that greater number of target public was reached.

The international EWRR conference (D.2) was organised according to plan and the methods applied here were good. The dissemination of the projects results was assured and enabled a lot of networking with similar projects. Book of abstracts and Proceedings were produced in a more sustainable way to enable wide and future dissemination of the results. Costs for the conference organization seem to justify the importance it was given to the conference in the international context as it was well accepted among all participants.

Replicability and Transferability of the project was assured on many activities during the project. Transferability meeting with the output Replicability and Transferability Report was appropriate approach to strengthen the replicability potential. Funds were used cost-efficiently.

Action	Foreseen in the revised proposal	Achieved	Evaluation
A.1.1 – A national survey poll on the attitude of Slovenians towards the issues of IAS	<p>Objectives: get information on how much people know about IAS, their attitude towards IAS and how supportive they are of management actions.</p> <p>Expected results: Baseline data at the beginning of the project obtained with the initial survey. At least 900 respondents and 250 respondents in subsample.</p>	National survey poll conducted as planned and report prepared.	Results of the survey allowed us to develop focused messages and increase the effectiveness of communication. Respondents N=953 and in subsample for the willingness-to-pay N=276. The design and method allowed monitoring of awareness of the general public on IAS with the follow-up surveys.

	Report on survey.		
A.1.2 - Project Communication Plan	<p>Objectives: To determine detailed implementation of the communication and dissemination.</p> <p>Expected results: Communication Plan, Communication Plan Workshop</p>	Project Communication Plan made	Communication plan workshop attended by 40 participants (as planned) from partnering institution. Communication plan was created and put on the project website. Effective external communication of the project team was defined.
A.2.1 - Capacity assessment of professionals and volunteers	<p>Objectives: which existing national institutions could be involved in the EWRR system, what is current staff capacity of each institution, which skills and knowledge of staff have to be further developed so that they will be able to take over their roles and responsibilities in the EWRR system</p> <p>Expected results: Capacity assessment of organisations and civil society groups</p>	The capacity assessments conducted. Findings of the assessment presented in the report and were included as a background analysis into the report of the sub-action A.2.2.	210 respondents in web-based survey among members and supporters of environmental NGOs and forest owners. The assessment of the capacity of professionals was made for the following organizations: Ministry of Agriculture, Forestry and Food, Ministry of the Environment and Spatial Planning, Environmental Agency of the Republic of Slovenia, Institute of the Republic of Slovenia for Nature Conservation, Slovenia Forest Service, Slovenian Forestry Institute, Food Safety Administration, Veterinary and Plant Protection Administration, National Institute of Biology, University of Ljubljana, Forestry Inspection, Protected Areas, phytosanitary inspection and the Agricultural Institute of Slovenia. In total, 348 employees at different responsibility levels answered the interviews/questionnaires and assessed their knowledge of ITV recognition and management issues.
A.2.2 - Determining the EWRR institutional	Objectives: an EWRR institutional framework for forest	Proposal for the EWRR made and prepared in form of the report: A proposed	We had many meetings with the Ministry for the environment and spatial planning about the proposed

<p>framework for forest IAS</p>	<p>IAS will be determined</p> <p>Expected results: a document, written in Slovenian language with an summary in English Report on EWRR institutional framework (with findings of the capacity assessment)</p>	<p>framework for early warning and rapid response system for invasive alien species in forests</p>	<p>EWRR system. Meeting with other involved institutions in the EWRR were also held. Proposal of the institutional framework of EWRR for IAS in Slovenia was prepared as planned. We propose that the overall coordination of EWRR system is devolved to the Environmental Agency and various other institutions are appropriately involved in performing specific expert tasks. The EWRR system should be formalised with appropriate legal framework, and additional financial and human resources should be ensured for carrying out new tasks.</p>
<p>A.2.3 - Development of example rapid response plans</p>	<p>Objectives: Development of example rapid response plans</p> <p>Expected results: Example rapid response plans for five high risk species</p>	<p>For the rapid response plans, five species of Union concern were selected (2 plants, 2 mammals and 1 insect): <i>Pueraria montana</i> var. <i>lobata</i>, <i>Heracleum mantegazzianum</i>, <i>Procyon lotor</i>, <i>Sciurus carolinensis</i>, <i>Vespa velutina</i>. Rapid response plans based on the proposed framework of the EWRR System were prepared.</p>	<p>For the rapid response plans, five species were selected (2 plants, 2 mammals and 1 insect). The reports were prepared with a delay, because the EWRR system was not yet set. The plans can be used as a template for other IAS.</p>
<p>A.3.1 - Alert list on IAS and priority pathways in forests</p>	<p>Objectives: Make list of alien species, which are not yet present in a country or are present only locally, but which have already proven to be invasive elsewhere and therefore pose a high risk of invasion.</p> <p>Expected results: list of expected new alien species in forests and the most</p>	<p>Alert list on IAS and priority pathways in forests determined.</p> <p>4 collaboration memorandum agreement with neighbouring countries have been signed to assure exchange of relevant information about new IAS.</p>	<p>Meetings at institutions in neighbouring countries and literature analysis led to selection of 12 fungi species, 51 plant species, 13 insect species and 7 mammal species to put on the list. For every species the pathway was determined, and a general analysis was made. For fungi, the most problematic pathways are transport with goods, for insects these are the hitch hikers, for plants and mammals the most common pathway was the escape from gardens and confinements.</p>

	likely pathways of their introduction		Four memoranda of cooperation signed as planned.
A.3.2 - Development of the EWRR Training Programme	Objectives: To develop EWRR training programme Expected results: EWRR Training Manual	TWO manuals: 1) EWRR training manual and additional field guide for the recognition of alien species in Slovene forests (with two updates – second and third edition). EWRR Training Programme has been developed and prepared.	The deliverables deviate in such a way that beside the EWRR training manual (700 copies) also a field guide was prepared. We made this decision because we could address in this way more invasive alien species. The separate field guide is also a good output, which strongly increased recognition of the species. The process was communicated to the external monitor and the team has prepared an exemplar guide that is getting praise from experts and users. The fieldguide was also reprinted three times as high interest among users appeared (700 + 700 + 2000 + 1500 copies).
B.1.1 – Train poster campaign	Objectives: To increase visibility of IAS threats among target audiences Expected results: 10 % ad recall from the train passengers.	Train poster campaign in 4 years with 4 different posters designs communicating different messages about IAS was conducted. The posters were hanging on passenger trains for at least one month per year.	Train poster campaign was conducted. On the basis of information given to us by Slovenian Railways, we estimate that our campaign has reached in total 2.640.000 passengers. The Slovenian Railways did not allow measuring the recall from the passengers on trains or at the stations to external businesses. That is why we agreed they provided us the number of passengers on trains where our campaign took place and that could notice the posters. We believe the outreach was achieved.
B.1.2 – Popular brochure	Objectives: To improve knowledge on IAS, especially among forest owners and other target audience participating in project activities Expected results: 22.000 distributed brochures to readers	22.500 popular brochures distributed to readers of magazine “Farmer’s voice” in June 2017; other copies were regularly distributed at project events (lectures, exhibitions, guided walks, training events, fairs etc.).	Going by the plan, brochure is very well received and was widely distributed among general public and forest owners.

	of magazine “Farmer’s voice”, 17.000 distributed brochures at other project events		
B.1.3 – Educational movie	Objectives: To raise awareness of the IAS threats by demonstrating environmental damage and calling the target audience to take action Expected results: 500 viewers at exhibition opening events/lectures for local communities, 14.000 visitors of fairs, DVDs sent to at least 250 schools	By the end of the project at least 142.400 people saw the educational movie. The majority of 300 DVDs with movie distributed (schools, conference participants, lectures etc.)	In addition to 20 min educational movie, two shorter (1- minute and 5- minute long) presentation movies has been produced. The movie was prepared also with English subtitles. We have exceeded the target outreach.
B.1.4 – Travelling exhibition	Objectives: To increase awareness of the target audiences on the importance of ecosystem services of forests and the threats posed by IAS Expected results: At least 1000 visitors at each exhibition venue	The travelling exhibition was prepared on roll-ups and with two interactive elements. Exhibition was set up at 29 locations and visited by at least 165.000 people (counted with pedestrian people counter or data given by the venue if the counter was not used).	We have largely exceeded the expected outreach. Because of the interest among the venues the travelling exhibition was set up more than planned 25- times. With the exhibition the general public was addressed and awareness was increased as general and informative presentations on IAS were prepared.
B.1.5 – Lectures for local communities	Objectives: To get a message of the IAS threats to the local communities and motivate them to take action Expected results: 500 people attending the lectures	25 lectures were organised with a total of 598 participants. In addition to the lectures accompanying the travelling exhibition, we have organised 24 extra lectures all around Slovenia for local communities, natural science societies, biology students, visitors at fairs and other people interested in nature conservation. These	Expected 25 lectures were conducted in different local communities across Slovenia. Additional 24 lectures were also prepared to present project and problems with IAS. We have reached the target outreach and even exceeded it.

		additional lectures were visited by 727 participants.	
B.1.6 – Guided city walks	<p>Objectives: To train inhabitants of urban areas to detect and recognise IAS to be able to participate in EWRR as citizen scientists</p> <p>Expected results: 800 participants</p>	In year 2017 – 2020 guided walks were organised. In all 4 years total of 947 people participated in guided walks. The target outreach was achieved.	Despite high media attention the walks were not as visited as we have anticipated in the first year. We have then adjusted the strategy to attract more potential citizen scientists and focus on specific target group or guided walks included in other nature related events.
B.1.7 – Media relations	<p>Objectives: To get the message to the media and ensure that information is correct and conveys the campaign messages</p> <p>Expected results: 25 short articles about exhibition, lectures, movie screenings; 5 press releases per year on international days related to the topic; responding and offering support to journalists regarding project activities as well as any events regarding IAS that may occur during the implementation of the project</p>	42 press releases were sent out. We prepared 14 popular articles for printed media, participated in 10 interviews and on 23 occasions offered support to journalists with statements and answers to their questions. Activities were implemented as planned in the Project Proposal. Outreach target of 25 short articles has been achieved and exceeded.	Conducted according to the proposed plan. Press releases were sent to media not only on international days related to the topic but also at important project achievements. A press release we sent out after the first finding of invasive alien plant kudzu in Slovenia caused someone to report another location of this plant to us based on the press release, he heard in the media. The media coverage of the campaign was good and above the expected.
B.2.1 - EWRR Training of Trainers Workshop	<p>Objective: Establish a pool of qualified trainers of the EWRR Training Programme.</p> <p>Expected results: 14 SFS Regional Coordinators trained.</p>	1 Workshop conducted and 14 SFS Regional Coordinators trained.	The original outreach target, 14 SFS Regional Coordinators trained, has been exceeded. 43 participants (including presenters) have been trained in total, including 14 SFS Regional Coordinators. The results show that the average self-estimate of competence for organising LIFE ARTEMIS trainings increased from 4,3

			(unsatisfactory) to 6 (satisfactory) on the scale of 1 – 10.
B.2.2 - Regional EWRR Workshops for forestry professionals	<p>Objective: Forestry professionals will develop sufficient knowledge and skills to be able to perform their tasks in the EWRR system.</p> <p>Expected results: 25 participants are expected to attend each of the regional workshops (350 in total).</p>	<p>14 Workshops conducted with 521 participants. The target outreach exceeded.</p>	<p>The before/after questionnaire analysis (N=385) shows that the workshops were well-received and perceived to be necessary by the participants. An unexpected increase in number of participants compared to the plan at workshops also confirms this. After the workshops, 92 % of respondents knew how to react to IAS in forests, compared to 48 % before workshops. All of the key competences (IAS determination, EWRR system reporting and knowledge) increased from 0,6 to 1,3 (averages) on the scale of 1-4.</p>
B.2.3 - Regional EWRR Workshops for private forest owners and volunteers	<p>Objective: Forest owners and volunteers develop the capacity and knowledge to participate in EWRR system.</p> <p>Expected results: 25 participants are expected to attend each of the regional workshops (350 in total).</p>	<p>14 Workshops conducted, 311 participants.</p>	<p>The Workshops were conducted as planned. A slightly lower number of participants attended the workshops as it was planned. However, the objective to develop the capacity and knowledge for volunteers to participate in the EWRR system was addressed successfully.</p>
B.2.4 - EWRR Workshops for forestry related businesses	<p>Objective: To improve awareness and knowledge of people employed in forest related businesses on the forest IAS and mobilise them to participate in the EWRR system.</p> <p>Expected results: 20 participants are expected to attend each workshop (100 in total).</p>	<p>3 workshops for forest related businesses organised for members of agricultural and forestry associations, professional staff in nature conservation, forestry inspectors, public green managers and for tree nurseries and garden centres.</p> <p>139 participants.</p>	<p>Trainings for forestry related businesses were conducted and reached the target outreach of participants. Instead of 5 only 3 events were organised as the strategy to inform forestry related businesses adapted. To ensure the participation two workshops were organised together with yearly meeting of associations connected to agriculture and forestry, garden centres and tree nurseries.</p>

B.2.5 - EWRR Transferability Workshop	Objective: To transfer the model approach for the development of EWRR system to forestry professionals from the other Member States. Expected results: 20 participants are expected.	Transferability Workshop organised, and 45 people participated from many different EU counties. The target outreach was achieved.	The workshop was organised during Forest Protection Colloquium in Austria and not in Slovenia as planned. This offered the opportunity that higher number of forestry professionals participated (coming from 12 countries). All were informed about the project and the proposed EWRR system.
B.3.1 - Development of a central IAS Information System	Objectives: To develop a public electronic information system for the collection of data on invasive alien species (IAS), which will include desktop, web and mobile applications, and will link several existing information systems that already collect information about IAS. Expected results: electronic information system for desktop, web and mobile applications	All applications were prepared in time. The web application published on March 5, 2017. The mobile application was published on May 19, 2017.	Information system and applications were developed and are running and collecting data. All were regularly updated according to the user feedback.
B.3.2 - Promotion of the information system among professional users	Objectives: to promote the use of the invasive information system among forestry experts. Expected results: 2 professional articles 2 presentations 14 workshops for the use of the information systems. 340 professional users expected to attend events.	Results have been achieved. The promotion took place at the trainings in collaboration with actions in B.2. Articles about the information system were published as planned. At least 612 professional users attended the promotional events.	The system is known to the forest owners and professionals according to the proposal. The target outreach was successfully achieved.

<p>B.3.3 - Promotion of the information system among citizen science groups</p>	<p>Objectives: Promotion of the use of the invasive information system among volunteers.</p> <p>Expected results: Announcements in professional magazines, campaign “search for alien species” (flyer and 5 popular articles), Invasive Species Survey Week – outreach: 500 volunteers expected to participate, and 2.500 IAS submitted</p>	<p>Activities conducted according to the proposed plan. In 2017 lecture and field walk at the Forest and Wood Science Meeting during the National Forest Week was organised. Invasive Species Survey Week and Record an Alien Species actions conducted each year from 2017. Flyers and articles published each year for different selected species. Altogether 1147 pupils participated and submitted 2.158 records of IAS in Invazivke system. 14.310 data are believed to be submitted as the result of the Record an Alien actions.</p>	<p>Target outreach is achieved. The promotional actions were nicely accepted among the volunteers and especially for schools each year more school participated in submitting the data.</p>
<p>B.4.1 - Mobilisation of volunteers</p>	<p>Objectives: to promote the project activity in LP TRŠh and encourage volunteers to participate.</p> <p>Expected results: 4 lectures in Ljubljana</p>	<p>Achieved. Lectures in the quaternary communities of the City of Ljubljana and for biology students delivered. Additionally, 16 articles were published to call for volunteer participation.</p>	<p>Lectures in quarterly communities were slightly less visited as expected. However, the mobilisation of the volunteers assured sufficient numbers of volunteers for IAS surveys (24) and eradication actions.</p>
<p>B.4.2 - Alien Plants Inventory and selection of priority sites</p>	<p>Objectives: the inventory of alien plant species from the Alert and Observation Lists, created within the LIFE ARTEMIS project</p> <p>Expected results: census protocol, census of alien plant species in LP TRŠh</p>	<p>The Alien Plants Inventory Manual prepared The inventory finished.</p>	<p>Less volunteers as expected joined our Survey Training Events for volunteers, where 24 people participated (expected target outreach was 40). The planned area of the Landscape park was surveyed according to the prepared manual.</p>

<p>B.4.3 - Eradication of alien plants in the selected priority sites</p>	<p>Objectives: (1) To demonstrate IAS management by use of volunteers (2) To reduce pressures to biodiversity by removing invasive alien plants on the selected priority sites.</p> <p>Expected results: at least 30 volunteers per year participate in eradication actions, alien plants removed on at least 20 ha</p>	<p>The target outreach was achieved. 7 eradication actions were organised, and 237 volunteers joined our activities. We have removed the selected IAS in the priority sites from at least 20 ha area as planned. The pressure to biodiversity was reduced in selected sites.</p>	<p>The eradication actions were successful, and a lot of volunteers joined our activities. The management with the help of volunteers were demonstrated and will be likely used in the following eradication activities in the same protected area according to the IAS Action Plan.</p>
<p>B.4.4 - Development of the IAS Action Plan</p>	<p>Objective: By IAS Action Plan ensure long-term management of IAS in LP TRŠh.</p> <p>Expected results: The action plan</p>	<p>The IAS Action Plan was prepared. The IAS Action Plan Consultation meeting in form of two workshops for forest owners and other stakeholders was organized.</p>	<p>The action was successful. However, a lower number participant joined the IAS Action Plan Consultation meeting, especially the number of participating forest owners was low, but the ideas and exchange of experiences were very positive, and the owners were largely willing to participate. Altogether 18 people instead of planned 50 participated.</p>
<p>B.4.5 - Platform for IAS management initiatives</p>	<p>Objective: To improve cooperation and exchange of knowledge among IAS management initiatives.</p> <p>Expected results: at least 30 management initiatives entered by the end of the project</p>	<p>Platform “Alien Oracle” (Tujerodni vedež) was set on the project website.</p> <p>30 management initiatives were entered by project team and other institutions and NGOs.</p>	<p>The platform provides exchange of experience in IAS management. The experiences are ordered by species. Additionally, instructions for the organisation of the eradication were added. The platform presents the only publicly available database on IAS management eradication actions in Slovenia.</p>
<p>B.5.1 – Newspaper articles</p>	<p>Objective: to present a species-based awareness campaign; to present disease and its effects to forest owners and adults interested in environmental issues</p>	<p>Achieved. 18 newspaper articles published, at least 319,100 inhabitants reached (copies of magazines).</p>	<p>The outreach target was achieved.</p>

	Expected results: 15 articles in newspapers and magazines, 300,000 inhabitants of Slovenia reached		
B.5.2 – Popular brochure on Eutypella	Objective: to mobilize forest owners and other interested citizens to pay attention to occurrence of Eutypella and report it through IAS Information System Expected results: Popular brochure on Eutypella, delivered with magazine “Farmer’s voice” (22,000 copies)	Popular brochure on Eutypella was published (25.000 copies) and 21.500 copies distributed with the magazine as planned.	The target outreach is believed to be achieved. The brochure was additionally distributed on all project’s events, especially to forest owners (action B.5.4 and B.5.5).
B.5.3 – TV broadcasts	Objective: to mobilize forest owners and other interested citizens to pay attention to occurrence of Eutypella and report it through IAS Information System Expected results: 3 TV broadcasts, 100.000 inhabitants reached	3 TV broadcasts were streamed as planned. In addition to that radio broadcast were also prepared and the campaign was presented at different fairs to achieve even broader target audience.	The outreach was successfully achieved. In addition to TV and radio coverage of the campaign some presentation on fairs were also prepared to reach the target outreach of forest owners.
B.5.4 – Lectures for private forest owners	Objective: to mobilize forest owners and other interested citizens to pay attention to occurrence of Eutypella and report it through IAS Information System Expected results: lectures in SFS regional units with Eutypella canker, 135 participants	Lectures were organised as planned. 163 participants attended the events	The target outreach was achieved. Lectures were combined with excursions to assure the target audience.
B.5.5 Excursions for private forest owners	Objective: : to mobilize forest owners and other interested citizens to	Forest excursions were organised as planned. 262 participants	The target outreach was achieved. Excursions were combined with lectures to assure the target audience.

	<p>pay attention to occurrence of Eutypella and report it through IAS Information System</p> <p>Expected results: 12 excursions for private forest owners organised, 90 participants</p>	<p>attended the excursions.</p>	
B.5.6 Control of Eutypella	<p>Objective: forest owners of tress affected by Eutypella encouraged to remove them</p> <p>Expected results: at least 50 % of diseased trees in Slovenia felled, reduction of spores detected</p>	<p>158 administrative decisions issued to forest owners, to cut 469 maples with a Maple Canker. Altogether 239 affected trees were already cut (51 %).</p> <p>The reduction of spores was monitored but not detected as the sporetraps were not catching successfully the spores of this fungi species.</p>	<p>The target outreach was achieved as more than 50% of the infected trees were felled and a lot of data about the occurrence of the species was submitted in the Invazivke system.</p> <p>We failed to detect the spore concentration reduction.</p>
C.1 - Monitoring of project visibility and trends in public attitudes towards IAS	<p>Objectives: The visibility of the project in media</p> <p>Expected results: indicators</p>	<p>The indicators shows the target outreach was achieved in the vast majority of activities (see also Deliverable 33). Only three indicators were only not reached as planned: Social media, Dissemination at fairs and Policy makers events, consultation meeting.</p>	<p>The visibility of the project media indicates the actions outreach was reached. However, the social media did not reach the targeted followers (1141 instead of 2.500), but some of the posts and information on the FB has reached thousands of people. During the project, FB substantially changed algorithm, which is often making non-private messages which are not paid through Facebook adds much less visible to the audience. In Slovenia, Twitter is not a very popular media and was therefore used to reach international public. The consultation meetings were not attended as planned (91 instead of 120), which is mostly due to COVID-19 pandemics. This was also the reason the last fair was cancelled and therefore less people were reached.</p>

C.2.1 - Evaluation of the established EWRR system	<p>Objectives: Evaluation of the established EWRR system</p> <p>Expected results: indicators</p>	<p>Indicators connected to the functionality of the proposed EWRR institutional framework evaluated and reached. See under C.2 action. Simulation exercise was organised.</p>	<p>Evaluation of the EWRR system was evaluated as planned. Post-training knowledge transfer assessment prepared, which showed that trainings really contributed to the IAS knowledge of participants and majority of them found the training very useful and important. The need to continue with such activities was expressed.</p>
C.2.2 – An assessment of the socio-economic impact of the project actions	<p>Objectives: Evaluation of the EWRR Training Workshops</p> <p>Expected results: assessment of the socio-economic impact: 1) Cost-benefit analysis of a selected tree pest species and 2) Evaluation of the potential income from IAS control measures.</p>	<p>The outreach was reached via conducting two assessments. Reports on both assessments prepared.</p>	<p>The actions objective was achieved.</p>
D.1.1 - Obligatory dissemination actions	<p>Objectives: To inform public about the project results.</p> <p>Expected results: Project website 700 visitors/month, 2 notice boards, layman’s report</p>	<p>Website was publicly available, both notice boards finished, layman’s report prepared and published.</p>	<p>Website was very well visited and was regularly updated. General notice board placed at the premises of the Coordinating Beneficiary; second one was placed in the landscape park. Layman’s report was printed in 500 copies.</p>
D.1.2 - Additional dissemination actions for wider audiences	<p>Objectives: To inform interested public about the project results.</p> <p>Expected results: Communication through social media, e-newsletter, presenting the project at 4 national fair, 2 press conferences</p>	<p>Facebook page and Twitter account created; 13 e-newsletters published instead of a closed Facebook group. 2 press conferences organised; we have attended 3 national fairs (4th was cancelled due to COVID-19). We have prepared a project information sheet and printed it (20,000 copies).</p>	<p>The target outreach was achieved. However, for the Social media we have not reached the target value. The fair in 2020 got cancelled, but instead presentation of the project and IAS topic was prepared for the on-line fair’s website, which according to the organizers in the first week recorded over 37.000 views. After first press conference</p>

			<p>very good outreach was achieved as 9 clips were published on TV, radio and in printed media after the event. The second one coincided with the beginning of the second wave of COVID-19 pandemics and strict limitations on a gathering of people were introduced just before the press conference. We have issued a press release and send it to journalists.</p>
<p>D.1.3 - Additional dissemination actions for national and local policy makers</p>	<p>Objectives: Inform policy makers about the project results</p> <p>Expected results: 1 workshop with minimum 50 participants, Conclusion of the consultation meeting prepared</p>	<p>The Consultation meeting organised in the National Council, 28 participants attended the hybrid form of event. Possible reason for this is COVID-19 pandemics and changes of the event form only few days before the meeting. Conclusion of the consultation meeting were prepared.</p>	<p>The meeting was organised as planned but with a delay due to the first wave of COVID-19. We assess all the relevant ministries attended the meeting as planned. The video of the meeting is still available on-line and can be additionally viewed by interested state and locally policy makers representatives. Conclusions of the Consultation meeting will stay online.</p>
<p>D.1.4 - Networking with other LIFE projects</p>	<p>Objectives: Uptake of best practice from related LIFE projects</p> <p>Expected results: 2 study visits</p>	<p>Completed. Visiting the project CSMON-LIFE in Italy and LIFE ObservaTree in the UK.</p>	<p>CSMON-LIFE project team presented their best practice regarding biodiversity databases management and mobilization of volunteers. LIFE ObservaTREE project presented us their experience of working with volunteers and their training. Many other networking and dissemination events took place, especially with LIFE projects in which LIFE ARTEMIS beneficiaries also participate (LIFE Kočevsko, LIFEGENMON, Life to Grasslands, LIFE Capacity building Slovenia, LIFE International networking conference, BioBlitz etc). The networking possibility was given also at the EWRR LIFE ARTEMIS international conference, where 5 other LIFE projects were presented.</p>

<p>D.2 - International conference on EWRR</p>	<p>Objectives: The main aim of this action is to organise an international conference on early warning and rapid response for IAS.</p> <p>Expected results: approximately 70 oral presentations and posters will be presented during the conference. 100 participants from at least 5 countries are expected to attend the conference</p>	<p>The conference was organized in September 2019 in Ljubljana, 104 participants attended on at least one day of the conference, they were coming from 17 countries (EU and outside EU); altogether 56 poster and oral presentations were given.</p>	<p>The target outreach was achieved as planned.</p>
<p>D.3 - Replicability and transferability plan</p>	<p>Objectives: to facilitate replicability and transferability of project results</p> <p>Expected results: one-day Transferability Meeting with at least three representatives from two member states attending; and Replicability and Transferability Report</p>	<p>The Transferability Meeting was organised but postponed due to the COVID-19 pandemics. The meeting was organized in on-line form. Priorities and measures for the results transferability have been discussed.</p> <p>Replicability and Transferability report was prepared.</p>	<p>Achieved according to the plan.</p>
<p>E.1.1 - Project management by SFI</p>	<p>Objectives: Coordination among the project partners, reporting to and communicating with Associated Beneficiaries, the European Commission and the co-financers of the project, budget management, financial reports, procurements, tenders, communication, and coordination of the public awareness activities.</p>	<p>PMT and PSG established, regular communication between the project team on PMT and MSG meetings, Reports for co-financers MOP and MOL regularly prepared. Logo and other visuals of the project made in October 2016.</p>	<p>39 PMT meetings and 17 PSG meetings have been held. The team had many ad-hoc meetings whenever necessary. Kick-off meeting was on the 11th July. LIFE15 Kick Off Meeting on the 10th of October 2016 in Brussels. Project financial manager attended LIFE15 Kick Off Meeting on the 10th of October 2016 in Brussels. Contracts with co-financers signed 24. 3. 2017 (Ministry for Environment and Spatial planning) and 7. 3. 2017. Partnership agreements signed by November 2016.</p>

	<p>Expected results:</p> <ul style="list-style-type: none"> - Project Management Team (PMT) - Project Steering Group (PSG) - reports for financers - logo of the project 		
E.1.2 - After-LIFE plan	<p>Objectives: Define the work after the end of the project.</p> <p>Expected results: The After-LIFE plan</p>	The After-LIFE plan was prepared and is available also on the project website.	Expected result delivered.

Most of the project results and outputs have been seen and detected during the project itself. However, the raising awareness activities should have also long-term effects with changing people's behaviour and attitudes towards IAS. Also, the results of the eradication activities (B.4 and B.5) and decreased negative effect on the biodiversity will be recognised more substantially over time. Proposal of an institutional framework for EWRR on IAS in forests was prepared and can now be implemented.

As presented in the Replicability and transferability report some of the results has already been replicated or transferred in the scope of similar projects. Based on the IAS information system for Slovenia (Invazivke) the regional information system for forest pests and diseases "DanubeForestHealth" in the international area of the Mura-Drava-Danube Biosphere Reserve was developed in the INTERREG project REFOCUS. Furthermore, the alert list of IAS for Slovenian forests was extended and transferred to the regional level as A Field Guide to Invasive Alien Species in European Forests was produced in the COST Action Alien CSI. To facilitate transferability and replicability of project results all reports have English summary, and the project website is translated into English.

In the project we have strongly supported the implementation of the EU Regulation on invasive alien species (Regulation (EU) No 1143/2014) and Commission implementing regulations (EU) 2016/1141, 2017/1263 and 2019/1262 in particularly by proposing an efficient EWRR system, preparing national alert list for IAS in forests, developing regional cooperation and collecting and providing reliable data on IAS to the European EWRR databases. LIFE ARTEMIS greatly contributed also to the ability of Slovenia to implement provisions of this EU Regulation. With the raising awareness activities (B1, D1), we have empowered and equipped with knowledge general public and target audience to assist in the EWRR system and to make decisions in IAS management. We have contributed to building a framework of a surveillance system for forests for early detection of newly arrived IAS by capacity building and training of forestry professionals and volunteers (B.2, B.4). The centralised national information system was developed (B.3) and connected to the existing databases with IAS data in Slovenia. The data in the Invazivke system was shared also with supranational databases: GBIF (Global Biodiversity Information Facility) and EASIN (European Alien Species Information Network). Regional long-term cooperation was established with the neighbouring forestry institutes by signing memoranda of agreements. With analysing pathways of unintentional introductions of IAS the EWRR efforts could be directed to the likely sources/areas of IAS in Slovenia and EU. In the project first national alert list for IAS in forest was prepared which can contribute to the establishment of a national list of IAS of national concern. We have also strengthened the capacity to react properly to new introductions by taking measures and to warn Member State of new arrival of new IAS. Rapid Response Plans for 5 selected IAS prepared

in the project provide examples for further preparation of rapid response plans also for other IAS and support the implementation of the EU regulation. Based on LIFE ARTEMIS activities new locations of the IAS of Union concern were found and reported to the national authority to inform other Member States. The solutions developed in LIFE ARTEMIS can also be used to support the implementation of the EU plant health policy (Regulation (EU) 2016/2031 of the European Parliament of the Council). Additionally, the project contributed to the protection and effective management of Natura 2000 areas, since 25 % of forests in Slovenia are included into the Natura 2000 network.

6.4 Analysis of benefits

1. Environmental benefits

a. Direct / quantitative environmental benefits:

The main goal of the project is to contribute to the reduction of the harmful impacts of IAS on biodiversity of forests in Slovenia. This was achieved through different activities focusing on specific objectives.

To decrease negative impacts of IAS 18 selected IAS were being removed from 20 ha of protected area in LP TRŠh as planned in the area-based campaign (B.4). Survey of the whole protected area and inventory of IAS were systematically conducted and based on this data also an IAS Action Plan was prepared to ensure long-term management of IAS in this protected area.

With a species-based campaign (B.5) we have prevented and slowed down the spread of the alien fungi and prevented its negative ecological effects. As a result of the campaign 239 trees with maple of canker were cut down, which exceeds the initial projects target outreach (125 trees). By mobilising forest owners, forestry professionals and general public 469 trees infected with alien fungus *Eutypella parasitica*, were discovered and 158 administrative decisions have been issued to forest owners, to cut the trees appropriately.

We have strongly increased the awareness of the general public about IAS and risks they are posing to the environment. In different activities we have reached target public, who got informed about IAS and possible management approaches:

- Website was visited very well (659.406 visitors making at least 372.547 sessions – target values: 100.000 visitors and 132.000 sessions).
- Social media got strong response from followers (1.141 followers; less than target outreach: 2.500) We believe this is due to changed FB algorithms, however some FB posts have reached thousands of FB users. Also, Twitter community is also not so strong in Slovenia and Twitter was therefore mainly used to communicate with international public.
- IAS information system was greatly used (75.049 submitted records of IAS (target value: 30.000) and the Android application was downloaded and installed approx. 6-times more than expected (1.904-times; target was 300)
- 30 initiatives were contributed to the IAS Management Initiatives Platform as planned
- Travelling exhibition has reached 165.031 visitors (as counted with pedestrian people counter) and strongly exceeded the target outreach of 25.000 visitors.
- training events were attended by 1.559 participants (more than target outreach of 1.200 participants).
- 237 volunteers participated at eradication actions (target outreach 90 volunteers was exceeded)
- Popular lectures were also nicely visited with 1.905 participants (expected was 975)
- Field excursions for general public: 1.215 participants (target value 930)
- 91 participants attended the policy makers events and consultation meetings. This is less than anticipated (120), mainly due to COVID-19 pandemics and inactivity of forest owners.
- 71.660 printed manuals, brochures and DVDs were published in the project. This exceeded the target value 67.700 copies.
- 157.000 people were reached at national fairs. We did not reach the target outreach as the 4th fair has been cancelled due to COVID-19 pandemics.
- International EWRR conference was attended by 104 participants (goal: 100).

Surveys carried out regarding awareness of the environmental problem addressed showed that at the end of the project 91% of respondents knew the term “alien species”, which has raised for 15 % from the first survey in the beginning of 2017 (76%). In the last survey in 2020 also 91 % respondents recognised IAS as a threat (83 % in 2017).

b. Qualitative environmental benefits

i. LIFE Environmental Governance & Information:

One of the main objectives of the project was to develop an effective institutional EWRR framework for IAS in Slovenia and therefore the proposal for EWRR was prepared to effectively address the risks newly introduced IAS are posing to biodiversity, environment, economy, and public health. The proposed system still needs to be taken up by the authorities and additional cadres and funds would need to be established. The system can be translated and transferred to another EU Members. Moreover, examples for 5 IAS species on the list of IAS of EU concern were prepared, which can be used in the future, when the species is found for the first time to effectively conduct the rapid response measures. The first national alert list of IAS for forests were carefully designed and many aspects were taken into account when preparing the list. The alert list of IAS in Slovenia can be used on the regional level as the newly introduced species can also come from the neighbouring countries. The exchange of data and up to date alert lists are therefore important. Through the national awareness raising campaign we were targeting audiences and stakeholders, so they will become more aware of the threats posed by IAS and with increased knowledge they will be able to detect and in due time report IAS. This enable us to detect IAS in early stages of invasion and respond rapidly, either by eradicating the species or if this is not feasible taking measures to prevent further spread. Preventing introduction and spread of new alien species will reduce the damage to forests and contribute to maintenance of forest ecosystem services.

In order for EWRR system to work effectively, cadres of professionals and volunteers need to be trained. We have already organised training workshops for forestry professionals, private forest owners and volunteers.

Through the national awareness raising campaign on IAS we have educated general public on how to reduce new introductions and prevent the spread of IAS. Through travelling exhibition, lectures for local communities, poster campaign on trains, movie, guided city walks and regular media coverage we were continually raising awareness of the general public.

2. Economic benefits

With established elements of the EWRR system (actions B.2, B.3, B.5) we are now able to better prevent or limit the spread of newly arrived IAS in Slovenia. This has major economic benefits as prevention is less costly than eradication or control actions of already widespread IAS. We have trained different stakeholders to actively participate in the early warning system. The central information system collects submitted data and enables instant information transfer to the authorities and other interested parties. Thus, enabling rapid response and the start of the eradication activities. The dedicated application and information system developed in the project called "Invazivke" also enables easy verification of easy recognisable IAS via photos thus reducing the costs of the on-site field verification and data collection from experts. With the involvement of the volunteers the costs of surveying larger areas across Slovenia are decreased and efficiency to detect new IAS increased.

In a dedicated sub-action C.2.2 – An assessment of the socio-economic impact of the project actions we have prepared assessment presented in a report (Annex_C2_2_001). Economic impact assessments tend to be very complex. Therefore, it is not realistic to calculate the overall socio-economic impact. We have investigated the costs-benefits of having an early detection system for forests compared to a widespread invasion by chosen model species the emerald ash borer (*Agilus planipennis*) and its associated damage and management costs. The second scenario was based on all the information of Slovenia's major and minor hosts, the emerald ash borer economic damages, and the eradication actions' costs. The cost of eradicating IAS represents the total cost of production processes envisaged in all host trees' felling and processing in the infested and protected area. The calculations of the early detection by professionals were based on the program of surveys organized by the Slovenian national plant protection organization and is co-financed by the European union. The effective eradication measures for this species mean felling the possible host tree species and production of green chips. The estimated value of felled wood on the truck road is 281 million EUR. Considering the costs of felling and harvesting, the actual value of wood is 139 million EUR. In the

case of green chips, the value of these is 154 million EUR. Considering the costs of felling, harvesting, and production of wood chips on the truck road, the loss due to eradication amounts to EUR 49 million. The economic damage could be significantly lower if IAS would be found and controlled in a timely manner in the narrower area. In the case of a simulation carried out as part of another research project in Slovenia, it was found that the attack would be limited locally in case of timely detection, and the loss due to destruction would be only 6000 EUR. This study again shows the importance of early detection of newly arrived IAS to prevent their severe economic losses. For the project 2.1 FTE jobs were created.

3. Social benefits

LIFE ARTEMIS is expected to have immediate and long-reaching social benefits and socio-economic impacts. As forests provide multiple ecosystem services, those could be threatened by the IAS. For example, wood is often used as fuel and raw material by many Slovenes. When IAS affect economically important tree species, this can lead to large economic losses and even job losses. In Slovenia large amount of wood is exported and extensive damage to forests can lead to decreased revenues from export. Non-timber products like mushrooms and forest fruits are collected over whole Slovenia and are an important supplementary food product for Slovene people. Also, as a space for recreation, healthy forests are important for public health. The private forest landowners depend for their livelihood on timber and non-timber forest products. Slovenia depends on tourism, especially in the national and regional parks, but also in other parts of the country. Tourists are coming here especially for the scenic value of landscape, of which forests are an important component. IAS can have large impacts on forests (e.g., many dying trees) which could become less attractive for tourists. The potential decrease of revenues from tourism in Slovenia could have significant effects on economy.

The immediate implications of actions, such as the National awareness raising campaign and trainings of various target groups for involvement in the EWRR, are direct and indirect. Already by following our communication strategy set up in the Project communication plan, we tried not to increase public tension that has been increasing due to refugee crisis in Europe, by carefully choosing words and designing messages that do not resemble those used for refugee topics. Project activities (B.1, D.1) has raised awareness on the topic that our project addresses. This is expected to have an immediate and long-term effect on society due to increased knowledge on IAS presented in a positive manner, that changes public perception of the problematics related to IAS.

Additionally, in the Landscape park Rožnik eradication and control of alien plant species had positive social effects (action B.4). As this is one of the most important green and recreational areas, reducing the pressure of IAS contribute to the maintenance of its ecosystem values. The involvement of the volunteers in action also had positive social effects. Volunteers were properly trained and mentored by the experts and involved in inventory activities and eradication actions. It is known that participating in such activities give people also personal satisfaction and a purpose of belonging due to a group effort for a common cause. This was also shown perfectly in the visited LIFE ObservaTREE project.

4. Replicability, transferability, cooperation

Many of the project results were designed to enable replicability by other countries on EU level. We believe likelihood of project replicability is high as many EU countries still need to establish EWRR systems, alert lists and priority pathways analysis arising from EU IAS regulation, meaning the replicability is policy dependent. The results with potential for national and international replication are presented also in the Replicability and Transferability Report (Deliverable 35). The following outputs have strong replicability potential: EWRR institutional framework, rapid response plans for IAS, alert lists, and priority pathways, EWRR training program and EWRR training workshops, IAS information system, mobilisation of volunteers

in eradication actions, alien plants inventory methodology and manual, platform for IAS management initiatives and eradication of Eutypella canker.

5. Best Practice lessons:

During the project we used several best practice measures.

We have prepared proposal for EWRR system for alien species in forests. This system is already known in the phytosanitary sector for tree pests and diseases in Slovenia and other parts of Europe. We have proposed the framework of EWRR system for IAS affecting biodiversity to be implemented also in Slovenia.

In the project we were using volunteers for the detection of invasive alien species. This is also called “citizen science”. All over Europe there are activities and projects already using citizen scientists for the detection of invasive alien species, such as UK in LIFE Observatree project. In the LIFE ARTEMIS project, we were strengthening the capacity of volunteers by informing and training them, how to search for IAS. Through whole country we were organizing trainings for volunteers and professionals regarding the EWRR system and the recognition of alien species. We find this strategy very successful and we do not have any suggestion to change this best practice.

For use by volunteers as well as professionals a central information system for IAS data was developed, which consists out of a website and an app where people can report the IAS. By the end of the project more than 75.000 records have already been submitted. The user-friendly application was regularly updated involving responses from the professional and volunteer users, and the system works well. Regarding the developed application we did not need any adjustment of this best practice.

We have also prepared an action plan for the Landscape park Tivoli, Rožnik and Šiška hill in Ljubljana for the management of alien species. The inventory of alien plant species in the areas was conducted by the trained volunteers and on basis of this data the action plan and suggested priority management activities were determined. In the preparation of the document different stakeholders were included, including forest owners in this area. We do not have any suggestion for adjustments for the best practice.

To collect and present an overview of all national management practices with eradication of IAS we developed IAS management platform named Alien Oracle. The platform was included on the project’s website, where also external users can submit their experiences. This could be an example of best practice lesson, which proved to be successful and further efforts should be made to expand this approach to other countries.

During the project we also mitigated the canker of maple. The best-known method for this is to cut the trees with the canker and put it on the ground with the canker towards the ground. This slow down the spread of the spores and the spreading of the disease.

6. Innovation and demonstration value:

Three components of the project are having demonstration value: 1) building of the EWRR network, using the capacities of professionals and volunteers, 2) building on the EWRR system with the alert list of alien species in forest, combining the species relevant to the phytosanitary and nature conservation sectors and 3) the information system, which is integrating the most advanced programming solutions, to enable quality user's interaction, simple verification process and high level of reliability of data.

In the beginning of the project thorough analysis of capacities and needs among professionals and volunteers has been performed and served as a basis for designing the EWRR training programme. We have established a large pool of trained observers, which can contribute data on IAS through the information system. The proposal of the EWRR system for IAS was prepared which involves professional and voluntary capacities to participate especially in the early warning part of the

system. Various groups of observers were trained and equipped with knowledge and tools to be actively involved in the system.

The alert list of alien species in forest has been made early in the project to enable to focus EWRR activities to those species, which are most likely to enter or spread in the coming years. In this list we have combined alien species causing economic damage, which are already covered by the phytosanitary regulations and alien species causing damage to nature, some of which are covered by the Regulation EU 1143/2014. This is enabling efficient use of capacities Slovenia is now one of few European countries having an up-to-date science-based alert list and our approach can serve as an example to the other Member states. The web and mobile application “Invazivke”, which was developed during the project, is using the most modern programming technology. It enables quick and simple uploading of data where as many as possible functions are automatized. To ensure high reliability of data, the applications are designed in such a way that the observer is obliged to provide photos. This is an excellent compromise ensuring high quality (reliability) of data and at the same time minimising the efforts observers need to make to submit the data. The use of the Invazivke system was highly promoted among different groups of interested stakeholders, also among other public institutions dealing with invasive alien species.

7. Policy implications

During the project we were closely collaborating with Ministry of the Environment and Spatial Planning (MOP) in preparation of amendments to Nature Conservation Act and the Ministry of Agriculture, Forestry and Food for the preparation of the EWRR system. Also based on the capacity assessment of potential professional institutions included in the EWRR system, we have prepared a proposal for the EWRR for IAS in Slovenia addressing especially IAS affecting biodiversity as the phytosanitary part of EWRR addressing alien pests and diseases is already set up. In the process of the preparation, we were having conversation with responsible representatives at MOP trying to secure amendments needed for implementation of EWRR system in Slovenia. The proposal was prepared, and its further implementation is expected in the future. Furthermore, examples of rapid response plans for 5 selected IAS were prepared and can be used as template for future rapid response plans considering the proposed structure of the EWRR system. With the findings of new invasive alien plant kudzu in Slovenia, we were also able to evaluate the effectiveness and suitability of the proposed framework of EWRR system. We have strongly collaborated with MOP regarding measures of eradicating kudzu, as the species is in the list of IASs that concern the European Union (Regulation (EU) 1143/2014 on invasive alien species). For EWRR system to work effectively, cadres of professionals and volunteers need to be trained. We have already organised training workshops for forestry professionals, private forest owners, volunteers, and forestry related businesses in the project and therefore secured the needed capacities.

7 Key Project-level Indicators

The final actual values of the KPIs for LIFE ARTEMIS project were entered in the online KPI database. The targeted values set at the beginning of the project were achieved. With the project activities we were addressing the whole area of Slovenia. We assess, our awareness-raising, and dissemination activities reached more than 411.000 people in Slovenia. Selected invasive alien plant species (10 species) were eradicated from 20 ha of area in the protected Landscape park Tivoli, Rožnik and Šiška hill. At least three different public bodies as stakeholders were addressed in the project. NGOs were addressed in different activities and at least 5 organisations were included by the end of the project. In the training activities 139 stakeholders in private to profit sector were involved. The project websites (www.tujerodne-vrste.info and www.invazivke.si) were very well visited: altogether 704.000 unique visitors. Many different publications, brochures, leaflets were published as seen under action C.1. In the surveys about public attitudes towards IAS altogether 1657 people were included. In different project activities more than 700 members of interested groups were involved. 2,1 FTE/per year were created in the project.