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# Interregional workshop on territories' vulnerability to invasive alien species

Organized by Zemgale Planning Region on ZOOM platform on 20<sup>th</sup> May 2021.

This interregional workshop had 46 participants, representing INVALIDIS project partners, stakeholders, and other interested persons.

## OPENING OF THE WORKSHOP

**Mr. Orfeas Roussos, INVALIDIS project manager from Natural Environment and Climate Change Agency (NECCA) in Greece**, opens the meeting with welcoming the participants and providing information about INVALIDIS project. He started with basic information, such as data: start date, duration, budget, and the specific objective: Improving natural and cultural heritage policies. He also listed countries that are implementing the INVALIDIS project: Greece, Italy, Spain, France, Romania, Latvia, and Portugal. Then he explained that invasive alien species are the key threat to biodiversity because IAS act as vectors for new diseases, cause native species extinction, change ecosystem processes, reduce the value of land and water for human activities.

There are common territorial challenges regarding IAS: lack of awareness about IAS impact on biodiversity & ecosystem services. There is a low level of cooperation between public authorities and local stakeholders for the implementation of operational programmes. There are knowledge gaps in ecosystems vulnerability to biological invasions and species distribution, as well as conflicts of environmental and socioeconomic interests. Therefore, the project goal is to transfer the lessons learnt into regional policies and action plans.

Mr. Orfeas Roussos also explained the main objectives of the INVALIDIS project:

- Increase public administrations' capacity on biodiversity / IAS policies.
- Share methods/tools to evaluate the vulnerability of ecosystems.
- Identify the main pathways of biological invasions and design actions to increase ecosystems' resilience.

- Unlock investments for IAS control and eradication.
- Promote cooperation between authorities and stakeholders and address conflict of interests.
- Raise public awareness and strengthen local communities' commitment.

After Mr. Orfeas Roussos presentation about the INVALIDIS project, the participants watched a video with welcome words from **Aivars Okmanis - The head of Zemgale Planning Region Development Council**. He shared that in Zemgale, where he lives, he has noticed changes in nature, caused by the introduction and spread of invasive species. Canadian goldenrod, Himalayan balsam, Sosnowsky's hogweed and other invasive plant species can be seen in the Zemgale landscape. He said that these changes threaten our local biodiversity, which is extremely important to preserve, especially today, when climate change leads to a much easier entry and adaptation for invasive species. Then he thanked all the project partners for their important work in protecting Europe's biodiversity.

## LEGISLATIVE FRAMEWORK

**Ms. Māra Melnbārde from Species and Habitats Protection Division and Expert at Ministry of Environmental Protection and Regional Development (Latvia)** explained the current legislative framework of invasive alien species in Latvia. She explained how the EU regulation on invasive alien species of Union concern (No 1143/2014) has been updated throughout of the years. In 2019 - second update of list of IAS, when 13 plant and 5 animal species were added to this list. Currently new risk assessments submitted in 2021 are reviewed and expected approval could be in the beginning of 2022.

Invasive alien species of Union concern in Latvia (in wild and captive): In total, there are 66 species of Union concern – 36 plant species and 30 animal species. In Latvia from this list, there are 7 plant species, 11 animal species and several “doorknocker” species.

As part of current legislative framework, there is a Plant Protection Law, which is monitoring the spread of invasive alien plant species specified by the Cabinet on land utilized for agriculture. The law also should restrict the species of spreading and doing surveying as well as data compilation.

Ms. Māra Melnbārde also introduced the participants with issued Regulations of Cabinet of Ministers of Latvia. These Regulations have been issued pursuant to Plant Protection Law:

- Regulations Regarding Restriction of the Distribution of Invasive Alien Plant Species No. 467;
- Regulation Regarding Restricting the Spread of the Invasive Alien Plant Species - *Heracleum sosnowskyi* Manden No. 559;
- List of Invasive Alien Plant Species No. 468 - Hogweed *Heracleum sosnowskyi* Manden.

There also is issued pursuant to Hunting Law: Hunting regulations No.421, includes unrestricted wild game on non-native or invasive species.

The Future legislative framework will concentrate on the Law on the Conservation of Species and Biotopes. This law must include all the invasive species. Institutions working to implement this law would be those institutions that oversee IAS and functions, e.g., Nature Conservation Agency, State Plant Protection Service, Latvian Institute of Aquatic Ecology, Food and Veterinary Service, Custom, State Forest Service, Latvian Environment Geology and Meteorology Center. This law would define EU list, National list and restrictions, and general principles of IAS management. It would also define administrative offences and penalties, administrative offence proceedings – involving State police, Municipal police, and Municipal environmental control. It should be mentioned that amendments in Law have been submitted to the Cabinet of Ministers.

When the Regulations of Cabinet of Ministers will be issued pursuant to new amendments, they will define:

- prevention and management of the introduction and spread of all IAS, including:
  - incorporation the part from existing regulations Restriction of the distribution of invasive alien plant species No. 467;
  - more detailed functions for involved parties.
- management measures for specific species;
- the National list of IAS.

The representative of Ministry of Environmental Protection and Regional Development Māra Melnbārde concluded her presentation by showing some of the Invasive alien species of Union concern that can be found in Latvia. Himalayan balsam, Chinese mitten crab, red-eared slider, signal crayfish, Canadian goldenrod, garden lupine, and Spanish slug are some of the species that can be found in Latvia.

## **ASSESSMENT METHODOLOGIES AND RISK ASSESSMENT OF IAS (PATHWAYS OF INTRODUCTION)**

**Mr. Stelios Katsanevakis a representative of Department of Marine Sciences at University of the Aegean (Greece)** did a presentation on project ALAS: Assessing the impacts of invasive alien species on the marine ecosystems of the Aegean Sea using the CIMPAL index.

ALAS “Aliens in the Aegean – A Sea Under Siege” is a three-year long research project being conducted in Greece by the Marine Biodiversity and Ecosystems Management Lab of the Department of Marine Sciences at the University of the Aegean. It is funded by the Hellenic Foundation for Research and Innovation under the “First Call for H.F.R.I. Research Projects to support Faculty members and Researchers and the procurement of high-cost research equipment grant” and its’ aim is to fill knowledge gaps in the life cycle, distribution patterns and ecological

impacts of invasive species in the Aegean Sea. The main objective is assessment and mapping of cumulative impacts of alien species to marine habitats. The CIMPAL index is **Cumulative IMPacts of invasive ALien species**, which can be found through field experiments and surveys, habitat mapping, impact assessment for each species-habitat combination, species distribution modelling of IAS. CIMPAL formula:

**CIMPAL**

cell  $I_c = \sum_{i=1}^n \sum_{j=1}^m A_i H_j w_{i,j}$

- $A_i$ : population status of IAS  $i$
- $H_j$ : status (% coverage) of habitat  $j$
- $w_{i,j}$ : impact weights of species  $i$  to habitat  $j$
- $n$ : number of IAS
- $m$ : number of habitats

} [0, 1]

The researchers are detecting population status of IAS  $i$  by doing extensive surveys at the main habitats (with SCUBA diving). They aim to estimate, for example, the population density of fish with using photo quadrants. By doing this, they are collecting data from species field observations and environmental GIS maps which then is transformed into statistical models that later can be used to predict species distributions.

Then the researchers are detecting status or the percentage of coverage of the habitat  $j$  by mapping marine habitats – updating MARISCA, which stands for “MARIne Spatial Conservation planning in the Aegean Sea”. A project aims to contribute towards the protection and conservation of biodiversity in the context of an integrated Marine Spatial Plan (MSP) in the Aegean Sea. Moreover, one of the ways to reach the aim is by mapping ecological features, such as spatial distribution of shallow habitats or records of Marine caves. Researchers now aim to update the information of the project, where main marine habitats were mapped. Having this information allows the researchers to estimate the percentage of coverage of the habitat  $j$ .

The researchers are also following the impact weights of species  $i$  to habitat  $j$  by measuring the strength of evidence and the magnitude of the impact. These weights depend not only on the reported magnitude of the impact, but also the strength of evidence. When talking about magnitude of impact, they have this approach: if the index is zero, there is no or negligible impact, it has its maximum value at eight where there is massive impact and it is irreversible at community level. It means that even if the invasive species are removed, the local population will not come back to its initial state. There are also minor moderate and major impact, where accordingly they affect individual, at population level or community level reversible. Regarding the strength of evidence - they have high strength of evidence, when the information assessment is based on experiments, medium strength of evidence is if this assessment is made on modelling observations correlations

and low strength of evidence is when the information assessment is made on expert judgement. Researchers are also doing literature review at Mediterranean scale and they have involved experts regarding around 100 species. Moreover, not to only rely on theory, they are also doing practical work - conducting field experiments and surveys to cover knowledge gaps.

The idea of ALAS project is summarized in the figure, where Mr. Stelios Katsanevakis explains that by using surveys and existing data the researchers are going to model the distribution of alien species. Then based on large-scale habitat mapping, they have information on distribution of habitats and knowing the impact on its species and its habitat, they are going to apply this index to a large-scale cumulative impact assessment. Therefore, this CIMPAL index measures the magnitude of the cumulative impacts of all the invasive species in the study area on marine ecosystems. The project is still going and they are going to receive these estimates after around year or year and a half from now. The index has been applied on a Mediterranean scale in 2016 by large-scale mapping on 13 habitats. He showed reefs, Posidonia meadows. They have also assessed 60 IAS, and this assessment was based on literature review, inventories of all reported invasive species in Europe. They have done bibliographic search using specific keywords, receiving 329 articles that reported impacts of marine invasive species on the marine habitats. They have also used Mediterranean distributions of invasive alien species, based on EASIN (European Alien Species Information Network), which included information from many other sources. After doing all this work, the researchers managed to estimate this CIMPAL index for Mediterranean Sea. The CIMPAL index also allows the researchers to rank the species based by their impact. Researchers have also applied the CIMPAL index to Natura 2000 sites, where the impact of invasive species in Greece is clearly visible. Furthermore in the framework of the ALAS project they wish to improve the application of the CIMPAL index, by adding more terms into the formula. They also are going to have better habitat maps, and improved impact assessments.

After the presentation, there was a discussion about how many times the researchers must dive to get satisfactory results.

About the future opportunities in the fight against IAS was telling **Francisco A. Hueso Fernandez, Technical-Biologist from Regional Government of Extremadura, Spain.**

In Spain, legislation began in 2011, with the approval of Royal Decree 1628/2011, which gave a list of species considered exotically invasive, which were found to be harmful to native fauna and a list of potential invasive species. The second list made it possible to control these species and to carry out eradication or control actions, based on the potential they could present in certain situations (soil, climate, habitat, etc.). In 2013, the previous Royal Decree was amended, approving the definitive one (which is currently being held), the Royal Decree 630/2013, which, unlike the previous one, only has the Spanish Catalogue of invasive alien species. Although it leaves the door open, through scientific reports to be able to introduce new species (Vietnamese pig, royal python), it does not address what to do with those species that enter the country “legally”.

The Law 33/2015 poses the responsibility of public administrations in the conservation of wild biodiversity, and it guarantees that the importation of non-native species is carried out with sufficient guarantees so as not to negatively affect the preservation of native wild species. In addition, this aspect is covered by the FAO as part of its preventive biosafety measures. The Spanish legislation has so called spirit of the norm, which is a tool that allows controlling the legal introduction of non-native species, by means of a scientific method and not adjusted for commercial and economic reasons. This is based on the mandatory legislation in Spain and, in addition, the Constitution gives the State the customs powers. The fact that this new standard exists does not exempt the other rules in force for the whole issue of import live animals, plants, propagules, etc. (veterinary certificates, possible quarantines, plant passport, etc.) from complying.

The royal decree 570/2020 is structured in two chapters: Chapter 1 - General questions, objectives of the standard, scope of application and reasons for a species to be on the list of alien species with invasive potential; Chapter 2 - Regulates the import authorization process, by using the documents of the annexes. It also has five Additional provisions and two Annexes - Model application for authorization prior to the import of a species included in the listing; Minimum content of risk analysis. They have created a list of non-native species, the inclusion criteria is showing invasive characteristics, vectors of harmful organisms for autochthonous biodiversity, dangerous organisms for causing adverse effects on human health and actions for research, management and conservation of biodiversity. There is a continuous update on the list of non-native species.

Then Francisco A. Hueso Fernandez explained how the royal decree 570/2020 works. The importer, which requests import a species within the "list of non-native species", must initiate the procedure with the presentation of the application (Documents of Annex I and Annex II). As in any administrative proceedings, if there is an error, there is a period of 10 days to correct it. If it is not corrected within the time limit, the file is closed, and the application is rejected. If corrected, the process continues, with an Instruction and interim evaluation of risk analysis, where and under article 83 of Law 39/2015. There must be a minimum period of public exposure of 20 days, where any citizen, association, etc. can argue about this process (always with a scientific vision), in addition to the reports requested from public administrations and universities (included in some of the scientific committees of the Ministry or the State Commission on natural heritage and biodiversity). Similarly, if something needs to be corrected in this step (some information, erroneous data, etc.), they are requested in the same way as in the previous case. If you pass this filter, the applicant is given a hearing, in case you want to declare something in relation to the process. The final evaluation of the risk analysis is then carried out with the reports received through the various channels and is available to the executing body that will issue a decision.

Francisco Fernandez also demonstrated the application form and emphasized that this request must be accompanied by a risk analysis of the species that are intended to introduce. The risk assessment has to have description of the species, invasive behaviour and ecological requirements, Probability of entry, establishment and spread in the natural environment, potential distribution, extent and magnitude of its possible impact, control, containment and management measures of the species,

as well as other pertinent information. Then by public participation and administration, this request and risk assessment is evaluated, and the resolution is given. Within three months, there could be denied authorization of import or authorized import.

In the case that this is Favourable, this implies that this taxon, is taken from the "List" and from this moment, no more is needed to request the import of this species, since it has been taken from the "List". However, this rule is in effect, so if a scientific report or study appeared that would call into question the decision taken on the acceptance of importation of the species. Showing that if it really presents problems for the maintenance of the native biodiversity, this resolution would be revoked (informing, by means of publication in the official bulletin of the state - BOE-) of its inclusion on the "List". If the resolution is negative, and the importation of the species is prevented, this species is taken from the "List" and included in the Spanish Catalogue of Invasive Alien Species, with all the conditions that imply to a species included in the catalogue (prohibited sale, transport, etc.). As in the previous case, the rule is in effect and by the same consideration if a scientific report or study appears, which demonstrates otherwise so that it is included in the IAS Catalogue, it can be removed and reversed. However, everything must be supported from the scientific point of view.

This is a norm to apply to third countries outside from the European Union, but at the same time, any species on the List that circulates freely through territory of the EU can enter Spain.

After this presentation Ms. Māra Melnbārde asked a question how in Spain's legislation is solved the problem with water invasive species, who is responsible, who needs to eradicate them in inland and marine waters. She received an answer that it depends on the national ministry that controls the rivers and the waters. This ministry has applied a national rule - in the case of the Franciscos department they fight with all the invasive species in the rivers. Precisely they have a problem with plant species that has been imported from Mexico. It is creating a problem, because it covers all the surface of the water, so for local species it is hard to live in that area. They have to take this plant out of the river with different mechanical assistance, which is a high cost procedure. The application of the national rule is on the regional governments, they have to allocate funds to fight against invasive species. Therefore, invasive species are the responsibility of local governments. For example, ministry of environment apply the national rule and tell about new species that they discover to incorporate these species into national list, but the fighting is on the regional government. Municipalities only collaborate, but they do not have the resources.

**Ms. Linda Gerra-Inohosa, researcher at Latvian State Forest Research Institute "Silava", Latvia,** introduced the study: "Invasive alien species of Union concern in Latvia and their pathways of introduction". The aim of the study was to develop a methodology for identifying pathways of introduction for invasive alien species of the EU concern in Latvia and to asses and prioritize these pathways. This study presents example of the first steps in prioritizing the pathways of invasive alien species of EU concern in Latvia.

During the research, the species were divided into two groups:

- Species occurring frequently in the wild in Latvia and/or forming populations in the wild;
- Species not occurring in the wild in Latvia and/or occurring only as records of individual escaped specimens.

Today, there are approximately 797 alien species recorded in the territory of Latvia and from the list of invasive species of the EU List, which includes 66 invasive alien species, 11 (2 plant and 9 animal) species have been found in the wild in Latvia. Part of the animal species that are not found in the wild in Latvia are being kept in zoos, private collections, used in aquacultures, part of these are being kept in aquariums or as pets. Part of the plant species (nine plant species) of EU List are offered for sale in different nurseries and some aquatic plant species are also provided through aquarium clubs. Then Ms. Linda Gerra-Inohosa proceeded to introduce the history of the nine invasive animal and two invasive plant species that are found in Latvia.

The plant species *Heracleum sosnowsky* is native to the north of Caucasus and was introduced in Latvia in 1948. It was cultivated as a perspective forage plant species. Later it was also grown for ornamental purposes and beekeeping. Since then it has spread in almost all territory of the country and nowadays is one of the most dangerous invasive alien species in Latvia. Interesting that currently *Heracleum sosnowsky* is the only plant species in the official list of invasive species, and no other plant or animal species have been included. The second plant species *Impatiens glandulifera* originates from the western part of the Himalayas. First record of this species in Latvia is dated with 1898, but a massive naturalization of this species started in the middle of 20th century. It was introduced as decorative plant species in the Baltic countries.

The nine invasive animals found in wild in Latvia are raccoon dog (*Nyctereutes procyonoides*), muskrat (*Ondatra zibethicus*), nutrias (*Myocastor coypus*), Chinese mitten crab (*Eriocheir sinensis*), two crayfish species (*Orconectes limosus*, *Pacifastacus leniusculus*), Amur sleeper (*Perccottus glenii*). Two new invasive species have been identified during the last ten years – since 2006 observations of *Trachemys scripta* are being reported and in 2015 some specimens of *Alopothen aegyptiacus* were observed for the first time.

In the study “Invasive alien species of Union concern in Latvia and their pathways of introduction” researchers used already developed methodological approach. For each species was determined the environmental impact assessment (Dispersion potential or invasiveness; Colonisation of high conservation value habitats of EU; Adverse impacts on native species; Alteration of ecosystem functions), species’ establishment or potential for establishment in Latvia, modes of entry, pathways of introduction and vectors, prioritization of pathways of introduction and vectors.

After explaining the methodology of the research, Ms. Linda Gerra-Inohosa informed about the results. Both invasive alien plant species of EU list - *Heracleum sosnowskyi* and *Impatiens glandulifera* - have been naturalized and are evaluated as high-risk invasive alien plant species of EU list in Latvia. They both occur in the wild have been introduced intentionally and later have spread unintentionally, using all modes of entry (Release, Escape, Contaminant, Stowaway, Corridor, Unaided).

All animal IAS occurring in the wild in Latvia are low or medium risk species. Medium risk species are *Nyctereutes procyonoides* and *Trachemys scripta*. The rest are low risk species. The environmental impact assessment for the species occurring in the wild in Latvia is based on the evaluation of actual situation. Low or medium risk for a species in Latvia is determined by its frequent occurrence in the whole territory of Latvia. The fact that it has occupied its ecological niche and does not display invasiveness (*Nyctereutes procyonoides*, *Ondatra zibethicus*); that it occurs rarely, does not survive and/or propagate in the wild (*Alopochen aegyptiacus*, *Eriocheir sinensis*, *Myocastor coypus*, *Trachemys scripta*); that its distribution is local and its invasiveness is not pronounced (*Orconectes limosus*, *Pacifastacus leniusculus*, *Perccottus glenii*). All animal IAS, except *Trachemys scripta*, correspond to the unintentional type of introduction. More than half of the species introduced unintentionally correspond also to the intentional type of introduction. This means that initially the species may be introduced intentionally, and after acclimatization and naturalization in the new environment, the animals may spread to new areas unintentionally. The IAS of animals occurring in Latvia have been introduced and continue to spread via four modes of entry: Escape, Release, Unaided, Stowaway and Not known.

The researcher then concluded that in the future special attention should be paid to possible introduction of following plant species - *Elodea nuttallii*, *Heracleum mantegazzianum*, *Asclepias syriaca*, *Heracleum persicum*, because these species have been recorded in the neighbouring countries, and the climate conditions in Latvia are similar to countries where these species already occur. Current prioritization of pathways of introduction and vectors, as well as the spread of invasive alien species of EU list allowed identifying the most important pathways of introduction relevant for Latvia only for those species, which are found in the wild in Latvia. Although the main pathways in the EU are similar, it has been mentioned that they may vary among regions or countries. Therefore, in the future possible pathways of introduction and vectors for all invasive alien species of EU list relevant to Latvia should be analyzed.

As the last presenter in the Assessment methodologies and risk assessment of IAS (pathways of introduction) section was **Dr. Ernesto Azzuro, researcher at “Istituto per le Risorse Biologiche e le Biotecnologie Marine” in Italy**. He talked about Participatory approaches to monitor marine bio-invasions in the Mediterranean Area. They have created animation, which shows invasive species and their invasion sequence in the Mediterranean Sea- how these species have moved through Suez Canal.

The first participation part is detection: when detector, usually a fisher, reports a new specimen, never captured or seen before, to professional researchers. The angler are getting more and more involved with the researchers as new fish species detectors. The next part is the sending the information to wider public and professional researchers. In Italy there are made various facebook.com groups, such as “Mediterranean Marine Life”, “iSea”, “AlienFish” and others. Various social groups, such as fishers, scuba drivers, researchers etc, use these facebook.com groups. This is a wonderful way to get information about new and entering species and their spread.

The detectors can use not only social networks as mentioned before, but also participatory websites like seawatchers.net. It is also important to raise general public awareness and knowledge, such as Local Ecological Knowledge (LEK), which is information that local people have about local ecosystems, which is gradually rising through years. This methodological approach is getting more and more attention in sciences. This approach can be employed to track, monitor and reconstruct the distribution of invasive species.

LEK1-reconstructing historical trends. The researchers identify fishers in the same location and they ask the fishers two questions. First - if they can tell if there have appeared new species that were not present before and then the fisher can start mentioning species that were not seen before in the area. Second question is the frequency of those fish appearing in captures (rating from 0-5) - rating 0 for absent and rating 5 for dominant. Ernesto Azurro showed the LEK protocol and the interviewing process. As a result, the LEK protocols work at the regional scale, the researchers can reconstruct the chronology of the invasion.

The second example of the possible use of Local ecological knowledge is NIS Participatory mapping - it is ensemble of approaches that combines the tools of modern cartography with participatory methods that help recording and representing the spatial knowledge of local communities. For example, the researchers can ask local anglers to draw locations on map for various fish species and after the researchers can model the distribution of various species.

After the various and educational presentations there were discussions about the arrival of invasive crayfish species in Latvia, about the circular economy and allowing invasive species to be used for food - as a benefit from them. There were also discussions whether it is possible to reduce, limit or prevent their further spread, how to act and how to reduce trade. How to talk to the public, how to encourage young people using mobile apps for invasive species detection. For example, google lens species recognition. The participants of the interregional workshop also discussed about climate change, the way it is helping invasive species to spread.