

# LAYMAN REPORT LIFE+ ESTUARIES OF THE BASQUE COUNTRY PROJECT



LIFE08NAT/E/0055



**EUSKO JAURLARITZA**  
**GOBIERNO VASCO**

INGURUMEN ETA LURRALDE  
POLITIKA SAILA  
DEPARTAMENTO DE MEDIO AMBIENTE  
Y POLÍTICA TERRITORIAL



# THREATS IN COASTAL ECOSYSTEMS

Invasive exotic species are a major threat to the conservation of estuarine habitats in the Basque Country. These ecosystems are fragile and increasingly scarce, and suffer pressures such as urbanisation, pollution and agricultural/farming uses. However, they are an important biodiversity reservoir and they provide us with essential resources and environmental services, such as water regulation, which contribute to flood prevention and alleviation.

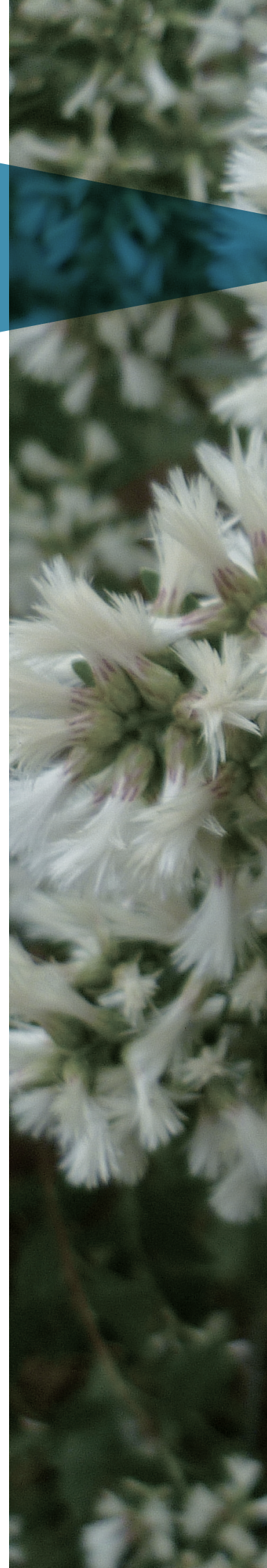
One of the most dangerous species among those of invasive plants in estuarine habitats is *Baccharis halimifolia*, a North America native species that was introduced as an ornamental plant on the coast of France in the 19th century. Today, it is present throughout the whole European Atlantic coast, especially from Brittany in France to Asturias in Spain. On the Cantabrian coast, it has an invasion front of about 300 kilometres and can be found across all the estuaries in the Basque Country. Its main impacts occur on marsh, dune and cliff habitats. It forms dense masses that completely displace the native vegetation, modifying the structure of these essential habitats for the conservation of endangered species of birds and flora.

The Basque Government started a fight against this invasive species in the early 2000s, with the study of the distribution and impacts on the Biosphere Reserve of Urdaibai, and the first pilot projects to eliminate the species were carried out. However, since the launch in 2010 of the **LIFE+ Restoration of habitats of Community interest in the Basque Country's estuaries project**, it has been possible to act globally in the main centres affected by this invasive species.

## ***Baccharis halimifolia*, the estuarine invader**

This species has some strategies that make it a very successful invader:

- Rapid expansion and growth, up to 40 cm per year.
- Each adult female specimen can generate annually up to 1.5 million seeds.
- High rate of seed germination that remain viable in the soil for two years.
- Resistance to stress factors such as salinity, flood, drought, frost, etc.
- High capacity for regrowth after being cut or burnt, even after the use of herbicides.
- It transforms the environment where it establishes itself, favouring sedimentation in estuaries.



# LIFE+ ESTUARIES OF THE BASQUE COUNTRY PROJECT

The LIFE + ESTUARIES OF THE BASQUE COUNTRY project's main objective is the restoration of habitats affected by the invasion of *Baccharis halimifolia* in three estuaries of the Natura 2000 Network in the Basque Country, and has the following specific objectives:

- To improve environmentally the habitats for several species of migratory birds, favouring conditions for nesting and resting.
- To develop a global action in those estuaries with greater recovery potential in the Basque Country.
- To apply the best practices ascertained in pilot projects and disseminate them to a higher level to address the problems in the Natura 2000 spaces of the European Atlantic coast, from Asturias to Brittany, coordinating and promoting activities.
- To educate specialists, management institutions and the general public about the threat posed by introducing invasive exotic species.

## PROJECT FACT SHEET

**Name:** LIFE 08NAT/E/0055 "Restoration of habitats of community interest in the Basque Country's estuaries"

**Acronym:** LIFE+ Estuaries

**Coordinating beneficiary:** Department for the Environment and Territorial Policy. Basque Government

**Associate beneficiary:** Ihobe – Public Environmental Management Company

**Budget:** EUR 1,852,825

**Financing:** 50 % European Union, 50 % Basque Government

**Website:** [www.euskadi.net/life\\_estuarios](http://www.euskadi.net/life_estuarios)

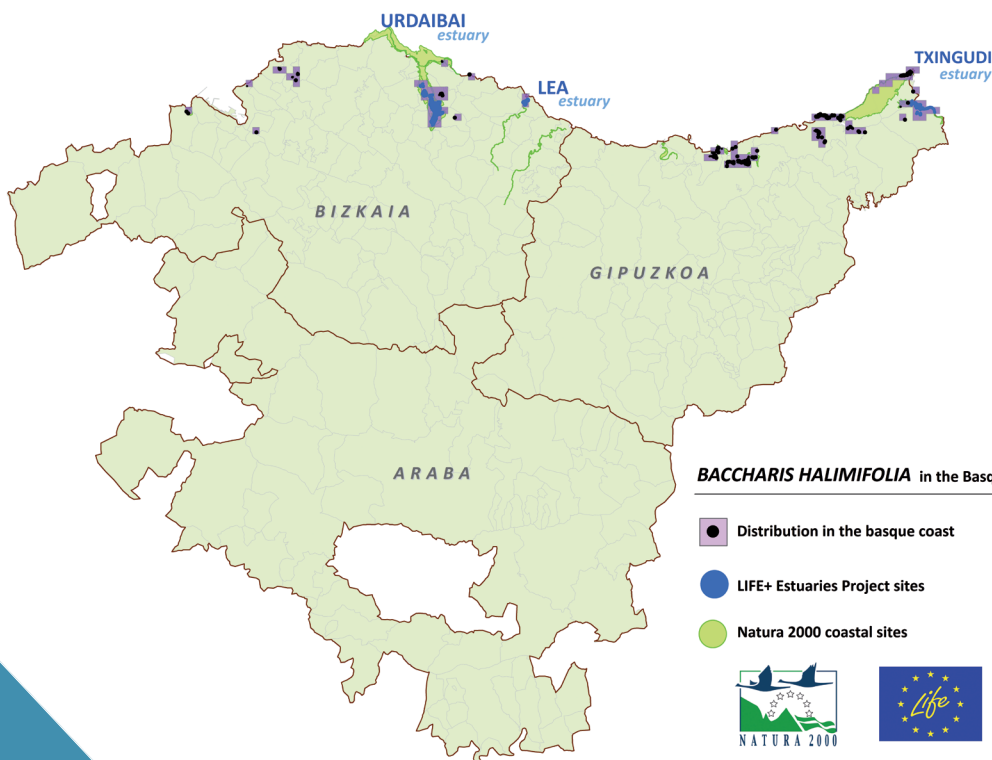
### Did you know that...?

The LIFE programme is the European Commission's financial instrument to support environmental and nature conservation projects throughout the European Union. Since 1992, it has funded more than 3,954 projects with a contribution of 3.1 billion Euro.

# THE PROJECT AREAS

## Did you know that...?

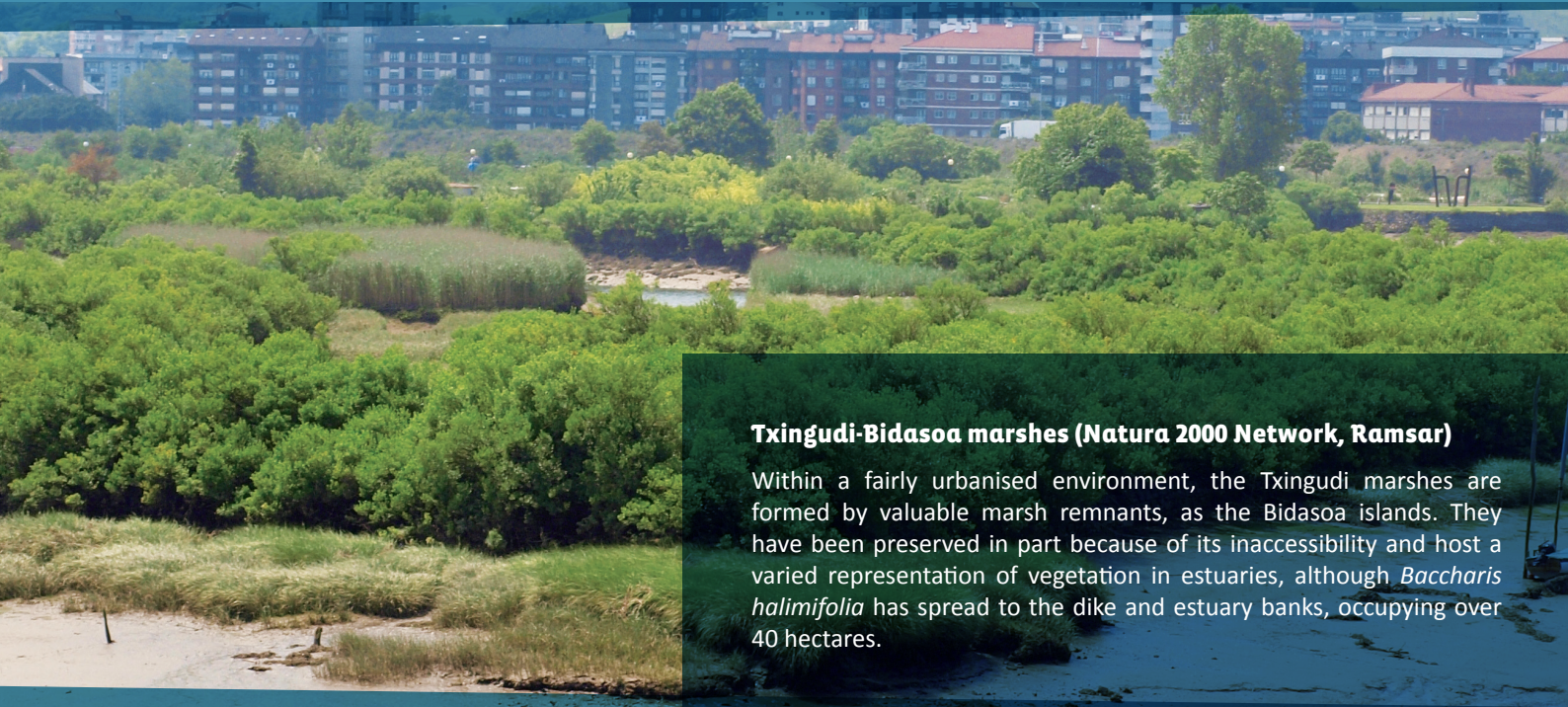
The **Natura 2000 Network** is a network of protected spaces at European level under the Habitats and Birds Directive. In the European Union, it covers more than 18 % of the territory, while in the Basque Country it covers 20 %, spread over 58 locations.





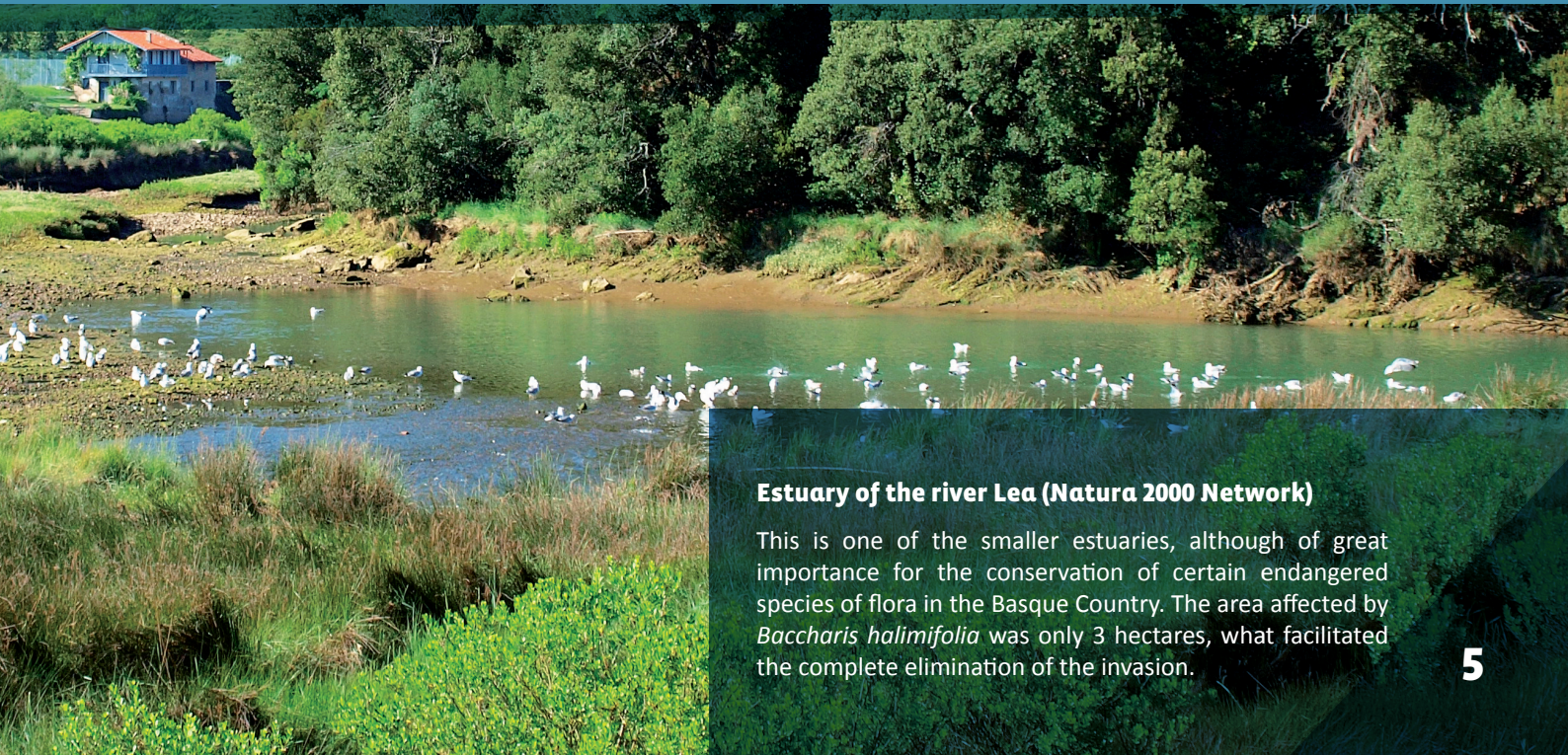
### **Biosphere Reserve of Urdaibai (Natura 2000 Network, Ramsar)**

This is the best preserved estuary on the Basque coast, covering an area of over 1,000 hectares, of which about 300 hectares were invaded by *Baccharis halimifolia*, mainly in the central zone of the estuary. It is a refuge for thousands of birds on their migratory journeys. They have benefited from the improvement of the conservation state of this natural area.



### **Txingudi-Bidasoa marshes (Natura 2000 Network, Ramsar)**

Within a fairly urbanised environment, the Txingudi marshes are formed by valuable marsh remnants, as the Bidasoa islands. They have been preserved in part because of its inaccessibility and host a varied representation of vegetation in estuaries, although *Baccharis halimifolia* has spread to the dike and estuary banks, occupying over 40 hectares.



### **Estuary of the river Lea (Natura 2000 Network)**

This is one of the smaller estuaries, although of great importance for the conservation of certain endangered species of flora in the Basque Country. The area affected by *Baccharis halimifolia* was only 3 hectares, what facilitated the complete elimination of the invasion.

# CONSERVATION OF ESTUARINE BIRDS AND HABITATS

The actions carried out under the **LIFE+ ESTUARIES OF THE BASQUE COUNTRY** Project aimed at improving the environment of the affected habitats. Most are Habitats of Community Interest (Directive 92/43/EEC), although others are habitats which are necessary for the preservation of various species of fauna and flora.

- *Juncus maritimus* marsh rushes.
- Atlantic saline scrubland.
- Coastal lagoons.
- Dune formations.
- Riverside forests.
- *Phragmites Australis* saline or dry reedbeds.

The recovery of these habitats and, in general, the improvement of the ecological state of estuaries, contributes to the preservation of bird species that are included in the Birds Directive (Directive 79/409/EEC), to provide areas of rest, food and nesting:

- Aquatic warbler (*Acrocephalus paludicola*).
- Reed warbler (*Acrocephalus arundinaceus*).
- Purple heron (*Ardea purpurea*)
- Great bittern (*Botaurus stellaris*).
- Little bittern (*Ixobrychus minutus*).
- Little egret (*Egretta garzetta*).
- Bluethroat (*Luscinia svecica*).
- Common spoonbill (*Platalea leucorodia*).
- Osprey (*Pandion haliaetus*).



*Glaux maritima*



Aquatic warbler (*Acrocephalus paludicola*).



*Matricaria marítima*

**Did you know that...?**

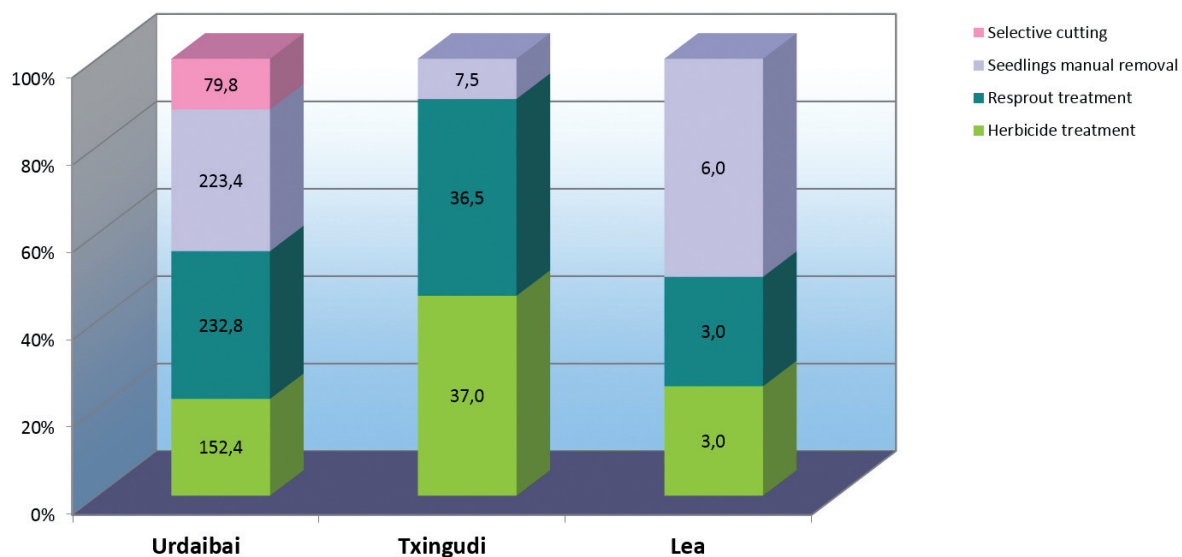
A recent study in the **Urdaibai Bird Center** shows that the invasion of *Baccharis halimifolia* affects bird communities of reedbeds due to the change in the vegetation structure. Besides favouring generalist forest species, it also affects the rest and feeding patterns of the migratory birds, many of them protected by the Birds Directive.

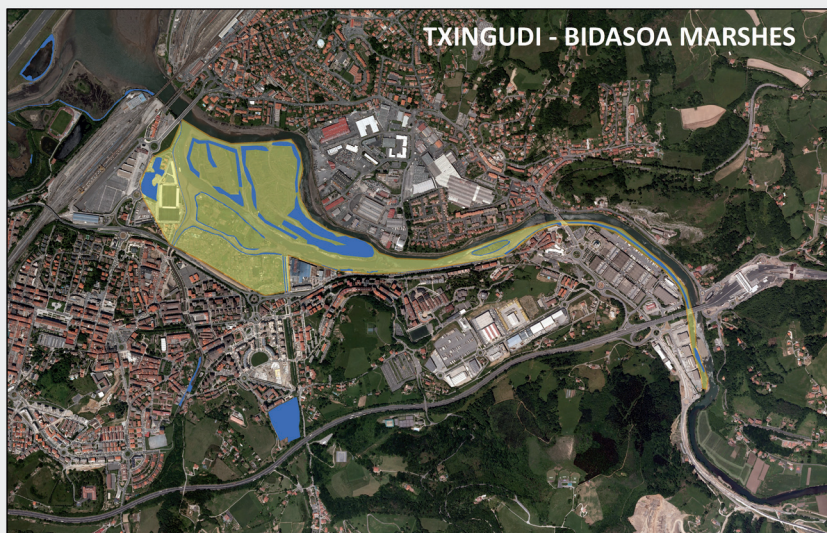
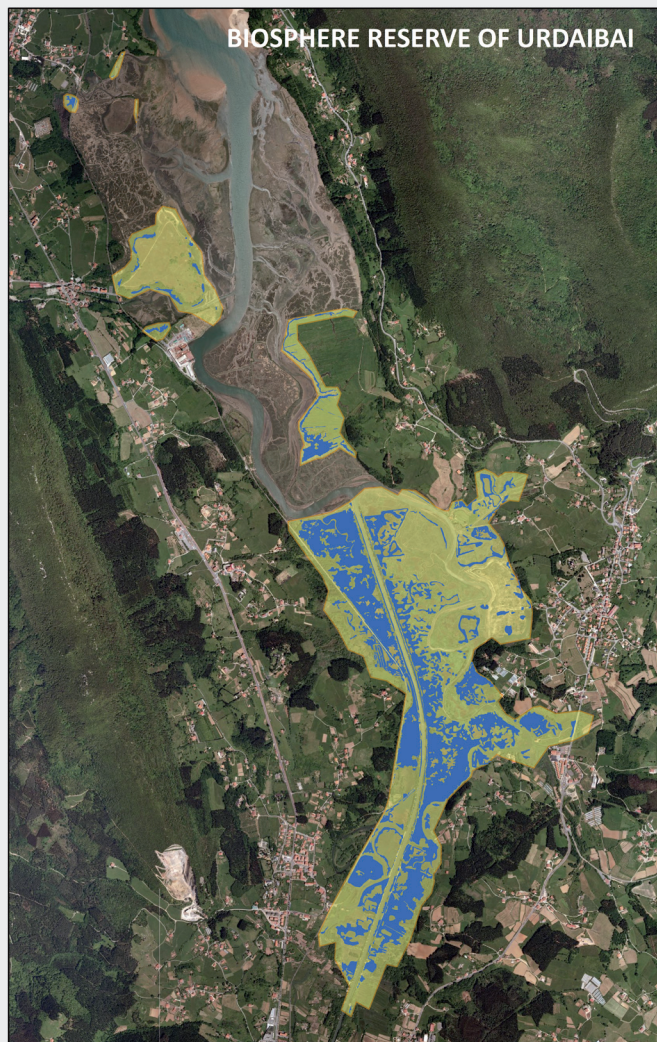
# THE PRIORITY: TO ELIMINATE INVASIVE VEGETATION AND RESTORE THE ECOSYSTEM

## One problem, different solutions



By combining physical and chemical methods, treatments have been carried out in an area of 300 hectares that were invaded by *Baccharis halimifolia*. In total, including the first treatment and subsequent reiterations, over 780 hectares have been covered. Different methodologies have been applied depending on the characteristics of the plants and the environment:

- Manual pulling up for vegetation less than 75 cm tall. This methodology was used in 237 hectares.
- Cut and herbicide application by brush on the stump, for vegetation that could not be pulled up and vegetation that had regrown. In total, 192 hectares of new specimens and 272 hectares of regrowth were treated.
- Selective removal of female specimens before the flowering season to prevent seed dispersal from one year to another. This methodology was used in 80 hectares in Urdaibai.





**LIFE+ Estuaries PROJECT  
WORK AREAS**

-  *Baccharis halimifolia*
-  Work areas



## Keys to managing *Baccharis halimifolia* in estuaries

- To anticipate flowering, in order to prevent adult plants from producing and dispersing seeds.
- To plan actions based on the life cycles of birds and other species.
- To take into account the difficulties of working in these environments: tidal dynamics, accessibility, weather, etc.
- To anticipate recolonisation of seeds along the bank and regrowth of treated specimens.
- To manage waste properly, both pruning and contaminant remains.
- To involve all authorities taking part, as well as experts and local population.

### Did you know that...?

During the three years of the LIFE project, it is estimated that more than 570,000 adult specimens of *Baccharis halimifolia* have been treated, and over 5 million seedlings in the three areas for action have been pulled out, thus significantly reducing their capacity for expansion along the Basque coast.



# MONITORING AND FIRST RESULTS

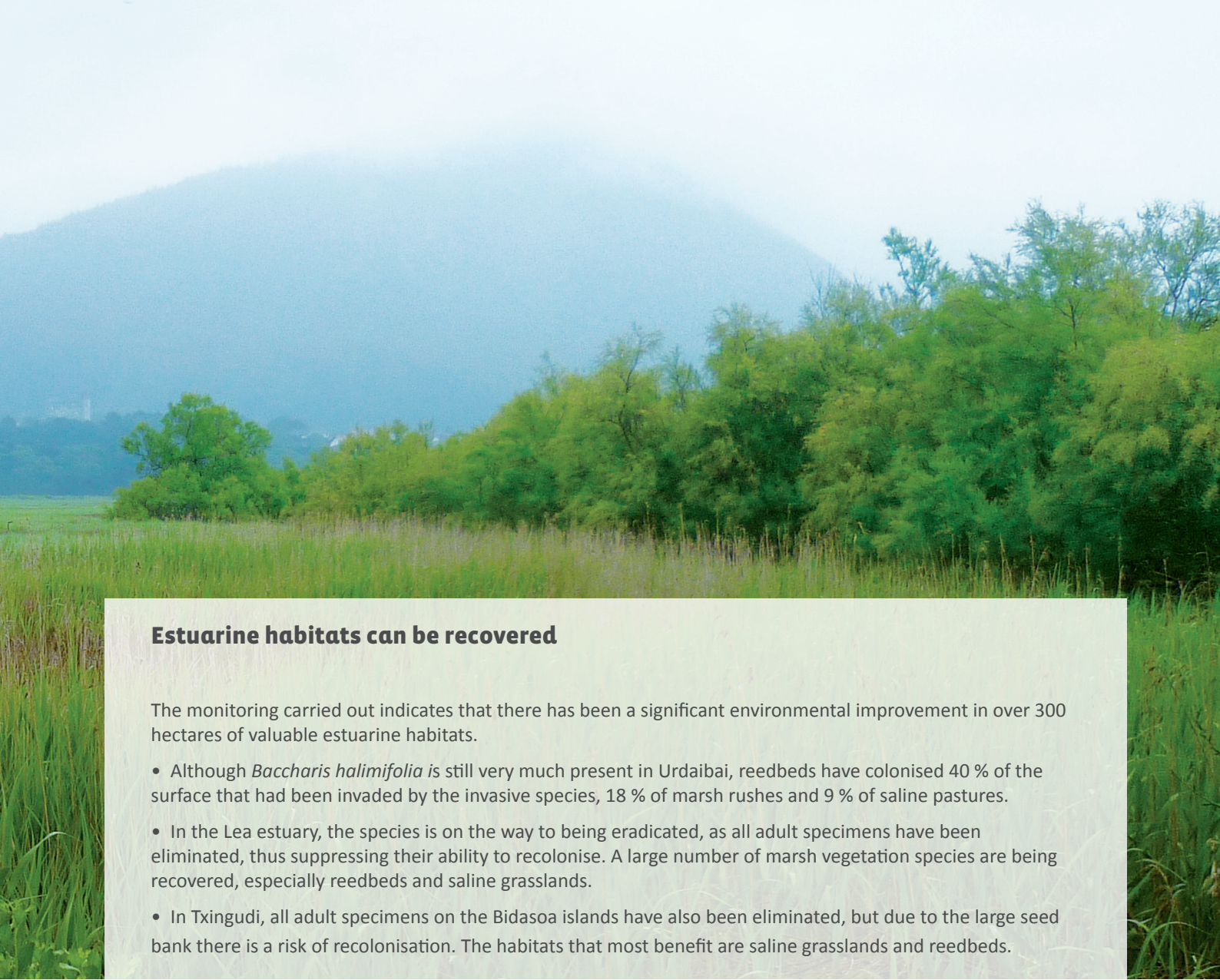
## The LIFE+ ESTUARIES OF THE BASQUE COUNTRY PROJECT monitoring plan

To quantify the results of the elimination methodologies and assess the habitat recovery degree, a Monitoring Plan was launched in the three areas for action. For four years, 45 permanent plots and 164 variable transects in total have been established, where the effectiveness of work to remove the invasive plant, its capacity for recolonisation, and evolution of the natural vegetation in estuaries have been monitored. Upon completion of the project, a map of the final state of the treated areas as well as of the distribution of *Baccharis halimifolia* in other estuaries of the Basque coast has been created.

In addition, the effect of the methodologies applied to the environment has been monitored through soil sampling and monitoring of impact on non-target species. Also, alternative methodologies to improve performance and reduce impact have been tried.

### Did you know that...?

To work in sensitive and protected environments such as estuaries, it is necessary to implement preventive measures to avoid affecting the flora and fauna. Under the framework of the **LIFE+ ESTUARIES OF THE BASQUE COUNTRY** project, different environmental and specific safety plans have been applied, and a study of product toxicity used on aquatic organisms has been carried out in collaboration with the University of the Basque Country.



## Estuarine habitats can be recovered

The monitoring carried out indicates that there has been a significant environmental improvement in over 300 hectares of valuable estuarine habitats.

- Although *Baccharis halimifolia* is still very much present in Urdaibai, reedbeds have colonised 40 % of the surface that had been invaded by the invasive species, 18 % of marsh rushes and 9 % of saline pastures.
- In the Lea estuary, the species is on the way to being eradicated, as all adult specimens have been eliminated, thus suppressing their ability to recolonise. A large number of marsh vegetation species are being recovered, especially reedbeds and saline grasslands.
- In Txingudi, all adult specimens on the Bidasoa islands have also been eliminated, but due to the large seed bank there is a risk of recolonisation. The habitats that most benefit are saline grasslands and reedbeds.

*Baccharis halimifolia* has great resistance and an ability to recolonise from the seed bank. Performing active surveillance in treated areas will facilitate monitoring of emerging populations and prevent the invasion spreading again.

In general, a good colonisation of native species from these habitats can be seen, such as *Atriplex prostrata*, *Juncus maritimus*, *Phragmites australis*, *Elytrigia atherica*, *Festuca pruinosa*, etc. The evolution of vegetation communities will run its course, so that subsequent monitoring will be needed to determine the final habitat that will recover in the areas for action.

## Revegetation on the Bidasoa islands

In order to facilitate the recovery of native vegetation and increase competition, 9,543 trees and shrubs have been planted on the Bidasoa island dikes, where the recovery of native vegetation has been weaker. The main species was *Tamarix gallica*, because it grows in the same habitat as *Baccharis halimifolia* and develops saline scrubland that can compete with this species.



# “RESTORING THE ESTUARINE HABITATS” DISSEMINATION CAMPAIGN

Dissemination is an important part of project management of invasive species. The public must know the threat posed by invasive ornamental species and the impacts on coastal ecosystems that they have, as well as the preventive measures they can carry out. With these objectives, the **LIFE+ Estuaries of the Basque Country** project launched a dissemination campaign that included with the following actions:

- Information panels in the areas for action in Urdaibai, Txingudi and Lea.
- Information leaflets about the project and the impact of invasive species in coastal ecosystems.
- “Estuaries: threats and conservation” photographic competition, with the participation of 23 people and a travelling exhibition of the selected photographs through the project area municipalities.
- Educational exhibition “*Baccharis halimifolia*: the history of an invasion”, with over 70,000 visitors.
- Educational unit and guided tour programme aimed at primary and secondary school students and educational programme students.
- Media presence through newspaper articles, radio interviews and television programmes.

Also, other awareness actions aimed at more specialised and technical audiences have been carried out:

- Technical symposium “Invasive species in the Natura 2000 Network”, with over 80 attendees.
- Participation in international conferences, such as NEOBIOTA 2012, and national conferences, such as the 4th National Congress of Invasive Exotic Species, and the two editions of conferences on Invasive Exotic Species in Rivers and Wetlands.
- Publication of technical and technical-dissemination articles in national magazines, such as Quercus or Foresta, and other regional magazines, such as Sustrai and newsletters from the Department of Environment and Regional Policy of the Basque Government.

Photography selected in the contest  
“Estuaries: threats and conservation”.  
Autor: Eladio Aires Pacheco



# COORDINATION, A FUNDAMENTAL ASPECT IN MANAGING INVASIVE SPECIES

*Baccharis halimifolia* extends over several regions of the European Atlantic coast, primarily invading estuarine areas where different organisations managing the territory meet. With the aim of sharing the problem and finding the necessary solutions, the “**International Commission for monitoring and exchange of experiences on *Baccharis halimifolia***” has been created. The commission brings together representatives of public institutions, researchers and specialists from the regions affected by this invasive plant. The main actions carried out by this group with more than 25 representatives from 6 regions were:

- Develop a common assessment of the severity and impacts from *Baccharis halimifolia* in estuaries of the European Atlantic coast.
- Exchange and analyse information on management and restoration experiences carried out.
- Identify the needs for the study and management of *Baccharis halimifolia*, as well as good and bad practices.
- Preparation of “*Baccharis halimifolia* Management Manual” for planning prevention, removal, restoration and monitoring actions in estuaries and along coastal cliffs.
- Transference of all the information and conclusions gathered to national and international bodies, such as the Ministry of Environment of the Spanish Government or the European Plant Protection Organization (EPPO) for support in the development of specific regulations and risk analysis in the European territory.

## Global action on the Basque coast

One of the main outcomes of the International Commission has been the launch of a coordinated action in the Txingudi-Bidasoa estuary, which has allowed joint management between the Gipuzkoa Provincial Council, the Provincial Coastal Service of Gipuzkoa, the Irun and Hondarribia municipalities and the Basque Government. This is intended to ensure complete removal of *Baccharis halimifolia* in this estuary.

This example has served as motivation for other organisations to do similar work in other estuaries, such as the case of the SAC Barbadun, where the Bizkaia Provincial Council has removed the few specimens that had appeared, thus creating a barrier to expansion in the western extreme of the Basque Country.

Also, in the research field, important collaborations have emerged throughout the project. Several lines of research related to the impact of *Baccharis halimifolia* in estuarine habitats as well as removal treatments have been reinforced, especially involving researchers from the University of the Basque Country.

## Did you know that...?

*Baccharis halimifolia* is included in the Spanish Catalogue of invasive exotic species (Royal Decree 630/2013); as a result, its possession, trade, transport and introduction is prohibited throughout the territory. However, it is still sold and used as an ornamental plant in France and other European countries.

# PROJECT BENEFITS

The **LIFE+ Estuaries of the Basque Country Project** has contributed significantly to the conservation of habitats of Community interest in estuaries, mainly *Juncus maritimus* marsh rushes, *Phragmites australis* reedbeds and *Elytrigia atherica* saline pastures in the estuaries of Urdaibai, Txingudi and Lea. It has also led to the environmental improvement of other habitats such as dunes, alders and coastal lagoons by preventing invasion. In short, it has benefited a great mosaic of vegetation communities that comprise estuarine ecosystems, and therefore the bird species inhabiting them. It has also contributed to improving the conservation state of these three areas of the Natura 2000 Network, which were being badly affected by invasive species.

Removal of the largest masses of *Baccharis halimifolia* on the Basque coast also means a major obstacle to the expansion of the species, both to other coastal areas of the unaffected Natura 2000 Network and to other habitats such as coastal cliffs.

The monitoring throughout the entire project has allowed the collection of large amounts of data that have helped improve elimination methodologies and foster a greater understanding of the impacts and behaviour of this species in estuarine habitats. This set of actions have resulted in a valuable lesson included in the "*Baccharis halimifolia* Management Manual", a guide that will serve as a reference for future actions and for other European regions affected.

Thanks to the work carried out by the International Commission for monitoring and exchange of experiences, control actions have spread to other areas of the Natura 2000 Network in the Basque Country, and exemplary coordinated actions have been undertaken. In the future, this collaboration will be valid to manage the problem of invasive species from a global perspective.

The effort made to disseminate and spread awareness has improved the understanding of the problem by the public, as well as increased government awareness of the importance of conserving estuarine habitats and the need to address biological invasions with a global perspective.

# THE FUTURE

**Although the LIFE+ Estuaries of the Basque Country project is completed, the actions undertaken will have an immediate continuity.**

In addition to the maintenance and monitoring work needed in the areas for action, these will extend in collaboration with other organisations to other affected areas on the Basque coast that were identified on the map produced in 2013, such as the estuary of the river Oria and Iñurritza, or the Jaizkibel and Uliia cliffs. The improvement and research of new methodologies to eliminate the species will still be given great attention.

The restoration of estuaries has begun, but it is necessary to maintain the study of the habitat evolution. To do so, the Monitoring Plan will continue, expanding to new areas for action, and it will accommodate other affected ecosystems, such as coastal cliffs.

Disclosure will also be a cornerstone of the work of the Basque Government in the field of invasive species, through interpretation centres and educational activities related to the natural environment. Also, information and communication digital media will be enhanced.

The international working group created under the LIFE project will have an important role in this new period, as it has been created as a reference group for the consultation of issues related to the conservation of estuaries and the threat posed by invasive species.

All this information  
has been made available  
to the public  
on the website

[www.euskadi.net/life\\_estuarios](http://www.euskadi.net/life_estuarios)



**EUSKO JAURLARITZA**  
**GOBIERNO VASCO**

INGURUMEN ETA LURRALDE  
POLITIKA SAILA  
DEPARTAMENTO DE MEDIO AMBIENTE  
Y POLÍTICA TERRITORIAL

