

Saving a critically endangered species

Pearl Mussel Project

The Challenge

- Collect data in the field
- Monitor environmental changes
- Minimise costs to enable project to scale up
- Share information with project participants
- Promote awareness of freshwater pearl mussels

The Benefits

- Fast, accurate data collection
- Evidence to facilitate a results-based approach
- Low project administration costs
- Effective collaboration with farmers and farm advisors
- Increased awareness of freshwater pearl mussels

An urgent and innovative project is underway in Ireland to try to save the freshwater pearl mussel, a type of shellfish species that is on the verge of extinction. ArcGIS is being used online, on mobile devices and on the desktop to collect and share data efficiently and remunerate farmers based on the positive changes that they affect to freshwater habitats in their localities.

The Challenge

Pearl mussels are critically endangered animals. While they can live to be 120 years old, they need very clean freshwater to survive, and their natural habitats in rivers and streams are in constant threat from pressures arising from various land-uses, including agriculture. A ground-breaking agri-environmental project has now been set up in Ireland to incentivise farmers to improve water quality on their farms and thereby protect some of the last remaining populations of pearl mussels in Europe.

A European Innovation Partnership (EIP), funded by the Department of Agriculture, Food and the Marine, the Pearl Mussel Project is a six-year initiative, in which more than 450 farmers will be remunerated based on the environmental results that they achieve. The project team therefore needs to be able to collect, analyse and share a vast amount of data, in an efficient and highly consistent way, so that this environmental information can be used to not only gauge the success of the project but also inform the rewards due to farmers.

The Solution

The ecologists leading the Pearl Mussel Project used Esri's ArcGIS platform to develop a suite of mobile and web-based solutions to underpin the delivery of the agri-environmental scheme. Without any third party support, they used Survey123 for ArcGIS to create a mobile solution to enable independent farm advisors to complete annual habitat surveys in the field, access images to verify plant names and get additional information to help complete the survey. Although incredibly simple and visual for non-technical agriculturalists to use, the solution is highly sophisticated and automatically calculates each farmer's scores.

The project team also created a second mobile solution using Collector for ArcGIS to enable team members to survey 30,000 hectares of farmland, draw the locations of drains and water courses on digital maps and upload the data directly from mobile devices to ArcGIS Online. The ecologists use this solution to accurately record signs of animal crossings and see, at a glance, where they are in relation to sensitive areas of the rivers where the freshwater pearl mussels are located.

In the office, ecologists use ArcGIS Desktop to generate reports for farmers and their advisors, with accompanying maps and advice about where they can make improvements on their farms to increase their payments the following year. The project team also uses ArcGIS Online to create web maps and story maps to increase awareness of the plight of the pearl mussel and the significance of the conservation project.

The project team is currently developing a Survey123 app for farmers so they can self-

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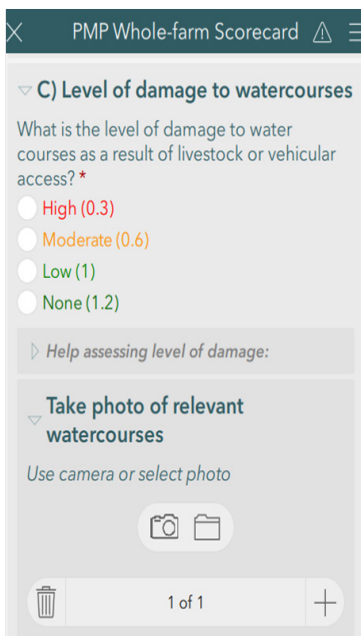
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report any completed environmental measures on their farms. For example, if they erect any fencing to prevent livestock from trampling riverbeds, they will be able to use their smartphones to take a picture and submit a location-verified report, without having to pay an advisor to independently verify that the job has been completed.

“ArcGIS is helping us to demonstrate that the results-based approach can be a successful way to engage landowners in environmental projects and bring about positive change for threatened species.”

Patrick Crushell, Project Manager for the Pearl Mussel Project.



Farm advisors use a Survey123 form on their mobile devices to submit environmental information and images in the field

The Benefits

Fast, accurate data collection

ArcGIS mobile apps enable the project team and farm advisors to collect accurate data about the condition of rivers, streams and the surrounding farmland, very efficiently. In the first year of the project, advisors used a paper-based survey method which was more time-consuming and the data had to be manually checked. “I estimate that advisors work around 25% more efficiently using Survey123,” says Patrick Crushell, Project Manager of the Pearl Mussel Project.

Effective collaboration with farmers

The project team can collaborate effectively with farmers and their advisors by making web apps available showing them where known pearl mussel populations are in relation to their farm boundaries. In addition, farmers receive reports and action plans for environmental measures on their farms with maps generated with ArcGIS Desktop. “The maps make it far easier for farmers to see straight away where they are getting lower scores and where they have opportunities to increase their earnings from the scheme by delivering measureable and verifiable environmental benefits,” Crushell says.

Evidence to facilitate a results-based approach

ArcGIS enables the project team to collect data before and after interventions have taken place and therefore gather the necessary evidence to ensure that the incentive scheme for farmers is fairly and consistently implemented. “The EU is very interested in results-based agri-environmental schemes,” Crushell says. “ArcGIS is helping us to demonstrate that the results-based approach can be a successful way to engage landowners in environmental projects and bring about positive change for threatened habitats and species.”

Low project administration costs

The Survey123 app for advisors and the planned new app for farmers help to minimise the project’s administration costs and will, without doubt, enable the project team to scale up the scheme cost effectively in the future. “We hope eventually to open up this project to many more farmers nationwide,” Crushell explains. “ArcGIS will come into play more and more over time, enabling us to run the scheme on a far larger scale without a significant increase in our administration overheads.”

Increased awareness of freshwater pearl mussels

The development of story maps and web maps helps people to understand where endangered populations of pearl mussels live and why they need to be protected. As Crushell explains, “Eight of the most important river catchments for freshwater pearl mussels in Europe are in Ireland, so it is really important that we raise awareness of this fascinating species and encourage as many people as possible to engage in initiatives like the Pearl Mussel Project to try to restore their habitats.”

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