THE FORTH REPLACEMENT CROSSING SCHEME (WHICH INCLUDES THE QUEENSFERRY CROSSING) EDINBURGH SCOTLAND

TRANSPORT SCOTLAND / JACOBS ARUP

BIG Biodiversity Challenge Award Category: Medium – Large

Project overview

The Queensferry Crossing forms the centrepiece of the upgrade to the cross-Forth transport corridor investment of over £1.3 billion. At 2.7km it is the longest three-tower, cable-stayed bridge in the world. The Forth Replacement Crossing scheme (including the Queensferry Crossing) is 22km long, with major motorway connections to the bridge.

What were the biodiversity conditions on site, prior to the enhancement?

The project area included: protected species, European and Ramsar sites and Sites of Special Scientific Interest (SSSI). St Margaret's Marsh SSSI, directly impacted by the project, consists of 24 ha of dredgings deposited in the mid-20th century on the north shore of the Forth contained by a sea wall. The SSSI is notified for: transition saltmarsh (reedbed) and saltmarsh. Both habitats are uncommon in Scotland and historically it had supported breeding water rail. Part of the SSSI had already been de-designated because of the poor state of designated features and the remaining designated features were in unfavorable condition and declining.

What were the reasons behind this project ?

The project was part of Scotland's NPF and had accelerated progress due to the existing Forth Road Bridge having serious structural issues which could have compromised the central belt's major highway infrastructure. As part of the hybrid bill consent process a Mitigation Framework was developed with stakeholders to fulfil Scottish minister's policy commitments to protecting biodiversity and the environment. It identified aspirations and objectives for protecting the environment and provided a structure for designing mitigation to avoid, reduce or offset environmental impacts in the project design. This approach enabled the novel restoration mitigation for St Margret's Marsh to be adopted.

The Queensferry Crossing

St Margaret's Marsh SSSI

What were the biodiversity measures taken?

This project stands out from other nationally significant infrastructure projects by getting agreement with stakeholders that restoring the SSSI was the preferred mitigation for long-term biodiversity benefits rather than creating replacement habitat.

As the designed lifespan for the bridge was 120 years the mitigation commitment had to be over a similar timeframe. The SSSI was purchased by Transport Scotland and to ensure management perpetuity the road network managing agent is contracted post-construction to deliver the site management.

The first challenge was to understand the decline and unfavourable condition of the site. Research identified key issues which were suppressing the quality of the marsh and potential solutions (Table 1).

A mitigation strategy was implemented which included four key aspects:

1. A live management plan for the site. The objectives to improve the SSSI condition to favourable, improve biodiversity on the site and improve access.
2. Identification of a management team with responsibility for owning the management of the site with input from a Steering Group comprising local community groups and nature conservation organisations.
3. Mechanisms for ensuring the long-term mitigation delivery.
4. Long term monitoring to inform site management

Issue	Effects	Solution	Monitoring
Lack of salt water inundation	Salt marsh community and diversity simplifying	Hard engineering to increase salt water inundation	Water levels and inundation frequency and extent Fixed quadrats and transect vegetation monitoring
Invasive species	Displacement of natural vegetation and safety issues for site workers and visitors	Eradication strategy	Aerial remote sensing and survey
Eutrophication	Reedbed structure and diversity reduced	Increased salt water inundation and reed bed management	Reed productivity/structure and diversity
Access	No safe access to parts of the site other than the sea wall	Scrub clearance and path creation and improvement	Access available

Table 1 Issues and solutions:

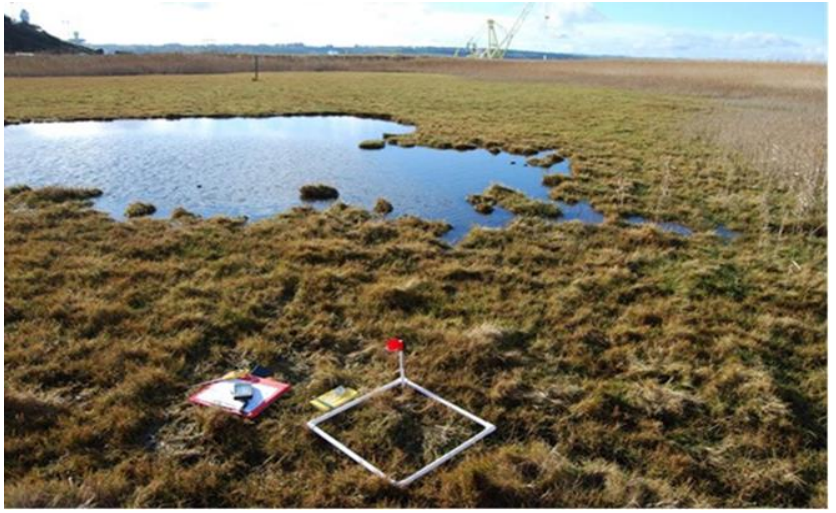
St Margaret Marsh reed bed monitoring and management.:

Further information

To ensure the site's restoration success, management interventions and mechanisms for directing resource have to be based on good data from site monitoring. Fixed quadrats, transects, Common Standards Monitoring Guidance for Saltmarsh Habitats and reed productivity are being monitored to detect vegetation changes. The effectiveness of the monitoring of the site and ability for the hard engineering and management plan to adapt to the changing conditions are essential for the continued direction and success of the restoration.

The control of the saltwater inundation and reedbed management have led to a decline in the dominance of the reed over some of the site which is facilitating a diversification of the plant community. Increasing open water and salt marsh areas have led to increased bird interest and habitat, providing additional features for the wider estuary and Firth of Forth SPA. There is still work to do and the vegetation is not at good conservation status yet but it is well on its way. By changing the traditional approach to mitigation and committing to, and resourcing, long-term adaptive management the site has a bright future and biodiversity benefit is assured. Taking part in the Big Biodiversity challenge will hopefully demonstrate to others that this novel approach has wider applications. It is essential to ensure mitigation is captured in contractual obligations with delivery and resourcing mechanisms identified. Lessons from engaging with committed stakeholders to implement adaptive management will help other projects wanting to replicate our success and deliver long term biodiversity benefits.

Hard engineering to manage the water budget of the marsh :



Permanent quadrat monitoring of the salt marsh

Project Team

- Client / funders: Transport Scotland
- Employer's delivery team: Peter Gilchrist, Liz Morrison, John Fowbert, Maggie Paterson
- Scottish Natural Heritage: Nial Corbett

What was the motivation for carrying out the enhancement?

Our team's motivation was not to see St Margaret's Marsh SSSI site continue to decline with the risk of being wholly de-designated and regionally scare habit becoming even rarer. We weighed the option of replacing the lost habitat from the project to mitigate the impact, but from our perspective this would not remove the risk to the site. Without securing the long-term biological conservation commitment for the SSSI this biodiversity benefit would be short lived.

Saltmarsh area being inundated at the site.