UNIVERSITY OF Southampton

Preserving the World Heritage site of Venice for future generations

Visitors to the beautiful city of Venice in February 2013 found themselves negotiating flooded streets. The waters of the Grand Canal rose to 1m 43cm (56ins) and poured into streets, hotels, restaurants as well as famous churches. Italian journalists reported up to 60 per cent of Venice was flooded as it was hit by its 15th highest tide since records began.

Researchers at the University of Southampton's National Oceanography Centre have joined engineers in tackling the flooding that has caused problems since the 10th century. Now, with 22 million tourists visiting the city every year and the prospect of sea levels rising with climate change, the problem is more acute than ever.

With colleagues in Italy and beyond, they have developed innovative new computer software that models eco systems in the lagoon to protect it from environmental damage and preserve habitats so visitors can continue to discover and appreciate this unique coastal region. Sedtrans (a computer software package) has been used by the Venetians to predict the impact of increasing levels of sediment and dredging operations both in city canals and the lagoon. Controlling sea bed levels in the lagoon also ensures the survival of the local fishing industry and preserves jobs for thousands of local people.

Professor Carl Amos' work started in 1999 with the European Union's Feedbacks of Estuarine Circulation and Transport of Sediments (F-ECTS) project to examine seabed stability in the lagoon. This work has continued, through further research grants.

A key part of the ongoing research is an examination of the impact of sediment build-up on the €8bn Venetian Storm Gate scheme, MOSE, which began in 2004 and is scheduled for completion in 2016. It aims to construct a series of giant, submerged gates that can be raised to prevent the sea entering Venice Lagoon and flooding the city. Effects of future plans to extend dredging to allow larger cruise ships to visit Venice are also being considered. These vessels could bring an extra 15,000 people a day to the World Heritage site.

Professor Amos and his team also believe temperature changes in the lagoon, especially in winter, may be influenced by the urban impact of many millions of tourists each year. His work on heat islands resulting from this "thermal pollution" are now informing studies on the potential for the fishing industry in the lagoon when the storm gates are closed.