

Coastal Model for the Tees estuary and Tees Bay

INTRODUCTION

The Tees area (Fig 1) has long been a highly industrialised area with many industries located on or near the banks of the estuary. Discharges into the tidal waters once caused serious pollution, however improvements over the last 40 years have resulted in enormous improvements in water quality and the return of Salmon to the estuary and river.

Regular discharges to the estuary must be controlled and potential spills must be anticipated and guarded against. To help with this process we have developed a new 3-dimensional model* for the estuary and adjacent coastal waters.



APPLICATIONS

The model is set-up to address regulatory questions arising from a range of issues such as listed below:

- COMAH regulations
- IPPC assessments
- Outfall and mixing zone dilutions
- DTA risk assessment
- New outfall assessment
- Cooling water dispersion

EXAMPLES

Two example outputs from the model are shown below. The first shown in Figure 1 results from a hypothetical spill in the upper reaches of the estuary; a series of these plots would show the timescale for the estuary to be fully flushed or for all concentrations to fall below a safe level for the wildlife in the estuary.

Figure 1. Discharge in the upper estuary

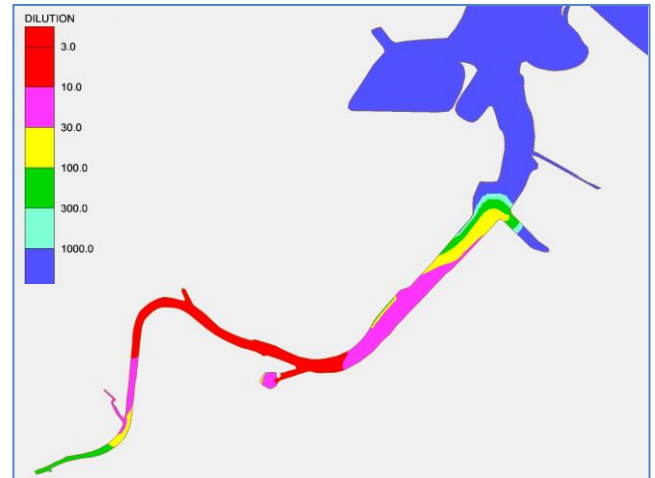
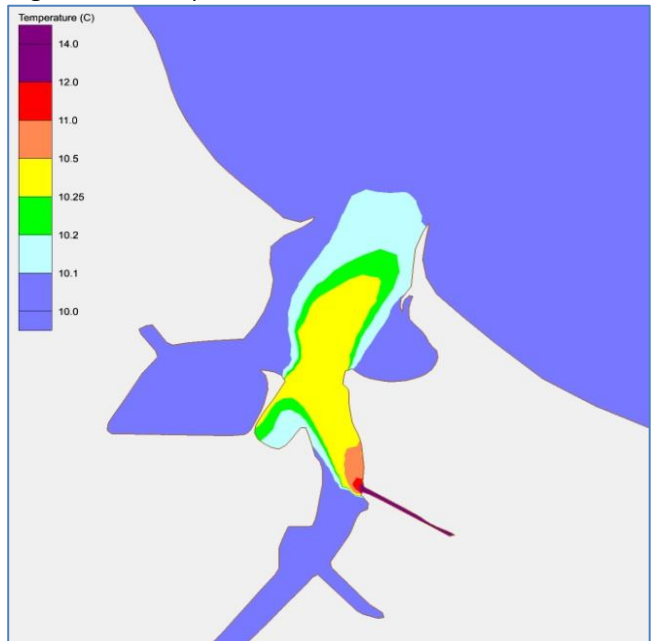


Figure 2 shows a prediction of the temperature of the plume emerging from Dabholm Gut on the ebb tide in the 1990's.

Figure 2. Warm plume from Dabholm Gut



MODEL FEATURES

- Fully 3-dimensional
- Includes salinity and temperature calculations
- Incorporates Dabholm Gut and Billingham Beck
- Includes the barrage and Slalom operation
- Resolution of 12 m in the upper estuary
- Grid refinement option for increased detail in a local area
- Validated against 1995 joint industry and Environment Agency survey data

* based on the FVCOM 3D model code from University of Massachusetts-Dartmouth