Marine assessment using the ERICA Tool

This practical will provide you with hands on experience of using Tiers 1 and 2 of the ERICA Tool. You will need to make, and justify, decisions on:

- Selecting relevant input data
- Choosing an appropriate reference organism to represent species of interest or creating a user-defined organism to represent species of interest
- Selecting appropriate parameters for your selected reference organism

Purpose of the assessment

You have to predict dose rates to wildlife in the vicinity of a nuclear site which discharges directly into the marine environment.

Discharges occur via a pipeline extending 200 m into the sea from the coastline.

For the purposes of this exercise you have the results of a monitoring programme providing activity concentrations in water and sediment (Table 1) at four co-located sampling sites (Figure 1).

Table 1. Water (Bq/l) and sediment (Bq/kg dw) activity concentrations at four sampling sites (see Figure 1).

	Site 1		Site 2		Site 3		Site 4	
	Water	**Sediment**	**Water**	**Sediment**	**Water**	**Sediment**	**Water**	**Sediment**
H-3	5.3E-1	5.3E-1	2.0E+1	2.0E+1	1.6E+0	1.6E-1	4.7E-1	4.7E-2
Co-60	2.7E-4	8.0E+1	9.9E-3	3.0E+3	8.2E-4	2.5E+1	2.4E-4	7.2E+0
Sr-90	1.3E-1	5.0E+1	5.0E+0	4.0E+1	4.1E-1	3.3E-1	1.2E-1	9.6E-2
Tc-99	2.7E-2	2.7E+0	9.9E-1	9.9E+1	8.2E-2	8.2E-1	2.4E-2	2.4E-1
Ru-106	1.3E-1	5.3E+2	5.0E+0	2.0E+4	4.1E-1	1.6E+3	1.2E-1	4.8E+2
Cs-134	1.3E-1	5.3E+2	5.0E+0	2.0E+4	4.1E-1	1.6E+2	1.2E-1	4.8E+1
Cs-137	1.3E+0	5.3E+3	5.0E+1	2.0E+5	4.1E+0	1.6E+3	1.2E+0	4.8E+2
Pu-238	2.7E-4	2.7E-1	9.9E-3	9.9E+0	1.0E-3	5.5E-1	2.4E-4	1.6E-1
Pu-239	1.3E-2	1.3E+1	5.0E-1	5.0E+2	4.1E-2	2.7E+1	2.0E-2	1.0E+1
Am-241	2.7E-3	5.3E+1	9.9E-2	2.0E+3	8.2E-3	1.1E+2	2.4E-3	3.2E+1

Note: the ratios between most radionuclides in this scenario are reflective of real discharges however the data have been modified and additional radionuclides added to help us to demonstrate different aspects of the assessment

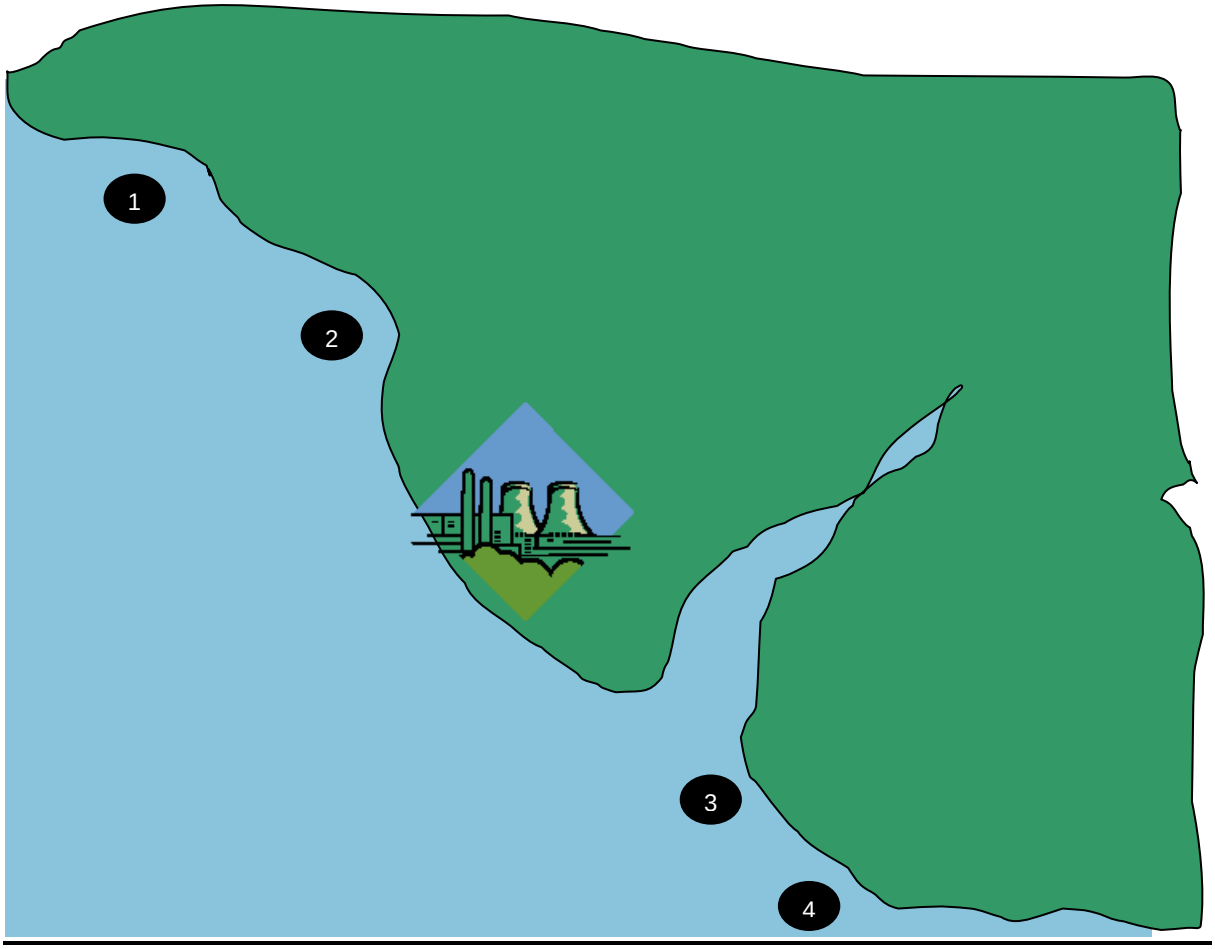

Figure 1 The co-located water and sampling sites

Assessment details

Part 1.

Begin your assessment at Tier 1

Use the notes sheet provided to:

Make a note of your decisions regarding input activity concentrations

The resultant RQ values and limiting reference organisms

Record your decision on the assessment

Part 2.

There is a Natura 2000 site located 10 km distant from the nuclear site (Figure 2) and two of the sampling locations (Sites 3 and 4) are within this site.

If you decide that you need to conduct a Tier 2 assessment then the following additional information should be considered.

Protected species at the site and their relevant characteristics are:

Atlantic salmon
Diet –fish and zooplankton
Size 60x10x8 cm (lengthxheightxwidth)
Mass 1.4 kg
Inhabits water column

Common seal
Diet –fish
Size 150x40x40 cm (lengthxheightxwidth)
Mass 150 kg
Inhabits water column when in sea but 50 % of time on land

You might want to consult the help file to help you decide which reference organism to use to represent these two species by (click Organism Wizard link from main menu). Or you can choose to create your own organism. If you do the latter, we suggest for this exercise that you use the CR values for an appropriate reference organism.

Use the notes sheet to record your decisions and results.

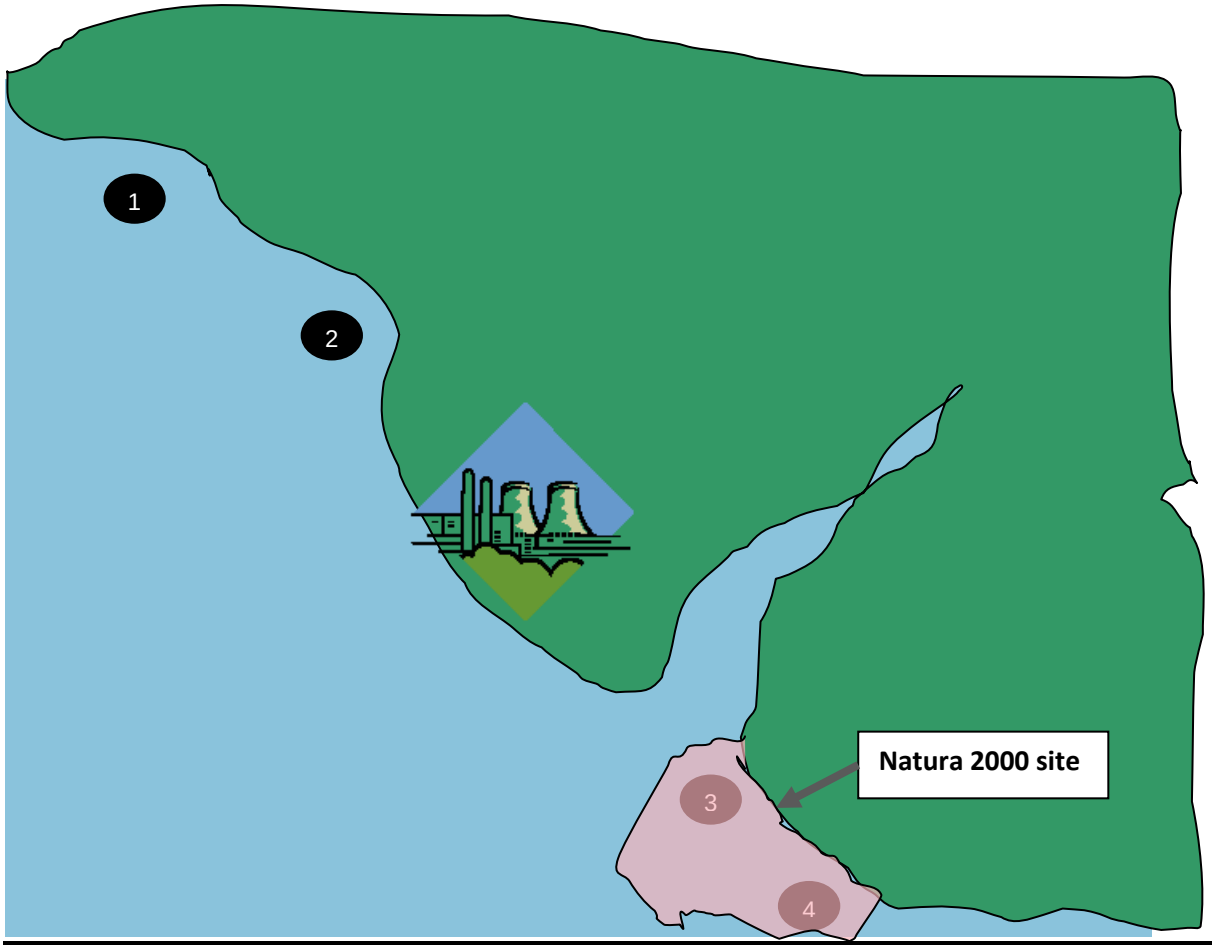

Figure 2 Sampling points in relation to Natura 2000 site