# 2. Fieldwork and analytical programme

## 2.1. Survey execution and sample collection

The survey was conducted from 29 July – 3 August 2010, the sampling log is given in appendix 1. The survey vessel was the *Svetlomor 2*, operated by CBARS. The following personnel participated in the survey:

- James McNee, AmC Senior Consultant
- Ilgar Guliyev, AmC Senior Scientist
- Mustafa Gafarov, AmC Scientist
- Irada Israfilova, AmC Scientist
- Konul Guliyeva, AmC Scientist
- Faruhk Fursi, AmC Technician
- Kamran Ahmedov, AmC Technician
- Andrey Fomin, AmC Technician
- Valeh Karimov MENR Scientist
- Hikmet Zeynalov SOCAR Scientist

## 2.2. Sampling & Analytical Programme

Details of the analytical methods are provided in Appendix 2 of this report. The analytical work was conducted at AmC Caspian Environmental Laboratory. All sampling and laboratory work was carried out in accordance with AmC's quality system.

A standard sediment survey was carried out, using a double 0.1 $m^2$ Van Veen grab to collect samples from the top 10-15 cm of sediment. Two replicate samples were collected at each station for physical (particle size) and chemical analysis and three replicate samples were collected for biological analysis (see table 2.1). Replicate independence was assured by processing one biology and one physical/chemistry sample from two of the three double grabs and a single biology sample from the third double grab.

Biological samples were washed on a 0.5 mm sieve, and all material retained was preserved in 4% formaldehyde solution. Subsamples for physical and chemical analysis were placed in appropriate labelled containers and stored in a freezer on the *Svetlomor 2*, then transferred to freezer storage at AmC's Caspian Environmental Laboratory at the end of the survey. Sample station coordinates and the number of samples taken for each analysis is detailed in table 2.1.

The bioassays was conducted following the Caspian Specific Ecotoxicology Protocol (CSEP). The sediment bioassay procedure uses the Caspian amphipod *Pontogammarus maeoticus*, which is exposed directly to the sediment for 96 hours. Tests were conducted in 1-litre glass vessels, each containing approximately 250 grammes of sediment, 700 ml of filtered Caspian seawater, and 10 adult amphipods. Once preliminary data on contamination levels were available, eight stations were selected for assessment of the toxicity of the sediment by exposing animals to the sediment in laboratory conditions (bioassay). These stations were selected to give a full range of contamination, and maximum possible spatial coverage. Two field replicate samples from each station were tested and the laboratory tests were conducted in duplicate (ie four tests conducted for each station).

Water samples were collected above and below the thermocline at stations 1, 8, 9 & 15 using a 12l Niskin Sampler, the water analysis plan is given in table 2.2.

## Table 2.1 Co-ordinates of Seabed Stations & Sampling Plan

| Station | Easting | Northing | Depth | Physical and Chemical Analysis | | | | | | Biological Analysis | | Water |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | THC | PAH | Phenols | HM | Total Ba | PSA | Bioassay | Taxonomy, Abundance and Biomass | |
| CH1001 | 520428 | 4439465 | 128 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 |
| CH1002 | 520385 | 4439310 | 131 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | |
| CH1007 | 520428 | 4438715 | 117 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | |
| CH1008 | 520428 | 4438465 | 117 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 |
| CH1009 | 519853 | 4438988 | 167 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 |
| CH1015 | 521049 | 4438997 | 128 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 |
| CH1016 | 521277 | 4438116 | 112 | 2 | 2 | 2 | 2 | 2 | 2 | | 3 | |
| CH1025 | 519579 | 4439814 | 153 | 2 | 2 | 2 | 2 | 2 | 2 | | 3 | |
| CH1033 | 521277 | 4439814 | 143 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | |
| CH1034 | 520601 | 4439199 | 126 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | |
| CH1035 | 520645 | 4438840 | 117 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | |
| CH1036 | 520226 | 4438735 | 130 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | |
| CH1037 | 520160 | 4439134 | 113 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | |
| CH1038 | 520725 | 4439375 | 130 | 2 | 2 | 2 | 2 | 2 | 2 | | 3 | |
| CH1039 | 520962 | 4439269 | 130 | 2 | 2 | 2 | 2 | 2 | 2 | | 3 | |
| CH1040 | 520861 | 4438715 | 117 | 2 | | | | 2 | | | | |
| CH1041 | 520678 | 4438532 | 115 | 2 | | | | 2 | | | | |
| CH1042 | 520178 | 4438532 | 127 | 2 | | | | 2 | | | | |
| CH1043 | 519943 | 4438663 | 147 | 2 | | | | 2 | | | | |
| CH1044 | 519995 | 4439215 | 156 | 2 | | | | 2 | | | | |
| CH1045 | 520178 | 4439398 | 130 | 2 | | | | 2 | | | | |
| CH1046 | 520958 | 4439495 | 135 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | |
| CH1047 | 520958 | 4438401 | 121 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | |
| CH1048 | 519898 | 4438435 | 156 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | |
| CH1049 | 519898 | 4439495 | 142 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | |
| CH1050 | 520510 | 4440205 | 142 | 2 | 2 | 2 | 2 | 2 | 2 | | 3 | |
| CH1051 | 521428 | 4438965 | 128 | 2 | | | | 2 | | | | |
| CH1052 | 520428 | 4437965 | 118 | 2 | 2 | 2 | 2 | 2 | 2 | | 3 | |
| CH1053 | 519537 | 4438956 | 173 | 2 | 2 | 2 | 2 | 2 | 2 | | 3 | |
| CH1054 | 519593 | 4438130 | 171 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | |
| CH1055 | 521489 | 4440026 | 146 | 2 | 2 | 2 | 2 | 2 | 2 | | 3 | |
| CH1056 | 521842 | 4440379 | 153 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | |
| CH1057 | 522549 | 4441086 | 177 | 2 | 2 | 2 | 2 | 2 | 2 | | 3 | |

- THC by GC-FID, 2-6 ring PAH by GC-MS
- Phenols measured using spectrophotometry (Merck Spectroquant method)
- HM = Heavy metal analysis: All metals except Hg analysed by ICP-OES, Hg analysed by CVAFS
- PSA = Particle size analysis: Grain size distribution, total organic matter (TOM), carbonate ($CO_3$)

## Table 2.2 Water Sampling Analysis Plan

| Determinand | Method | Method of sampling and preservation for transport to laboratory |
|---|---|---|
| Temperature | pH meter | N/A – analyses conducted immediately |
| Salinity | Multimeter | |
| Dissolved oxygen | DO meter | |
| Turbidity | Turbidimeter | |
| pH | pH meter | |
| Total suspended solids (TSS) | EN 872 | Water is filtered through pre-weighed membrane filter. Filter is placed in labelled plastic Petri dish, dish is sealed and frozen. |
| Total nitrogen, total phosphorus, nitrate, nitrite, ammonia, phosphate, silicate, COD & BOD | Grasshoff *et al* | Water is poured into two (duplicate) sterile 1-litre plastic bottles, then frozen. 2 litres of water is sufficient for all nutrient analyses. |
| THC | GC-FID | Water is poured into 2 x 1litre, DCM-cleaned, amber glass bottle, then refrigerated |
| PAH | GC-MS | |
| Phenols | Merck Spectroquant | |
| Metals (Fe, Cd, Co, Cu, Ni, Pb & Zn) | ICP-MS | Water is poured from Niskin bottle into 0.5-L sterile plastic bottles, then refrigerated |