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**UNDP/GEF PROJECT ENTITLED “REDUCING ENVIRONMENTAL STRESS IN THE  
YELLOW SEA LARGE MARINE ECOSYSTEM”**

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UNDP/GEF/YS/JC.2/4  
Date: 13 April 2006  
English only

**Second Technical Meeting for the Co-operative Study Cruises  
In the Yellow Sea Marine Basin  
For the UNDP/GEF Yellow Sea Project  
Qingdao, China, 26 - 27 April 2006**

**Expected Outcomes and Outputs  
of the Meeting and the Spring Cruise**

In the approved Implementation Plan of the UNDP/GEF Yellow Sea Project, “Reducing Environmental Stress in the Yellow Sea Large Marine Ecosystem (YSLME),” one of the major activities of the project is to undertake surveys of the Yellow Sea marine basin to collect data and information co-operatively, for all the components of the Project.

The “Yellow Sea marine basin” lies within the boundaries of the Yellow Sea (as defined in the Project Document), and is delimited by the surrounding territorial waters of China and the Korean Peninsula.

The main objective of the co-operative surveys is to provide additional basin-wide data and information for the Yellow Sea marine basin based on the data/information requirements identified by the Regional Working Groups, to be used together with other existing data/information in the preparation of the Transboundary Diagnostic Analysis (TDA). These surveys are also necessary to prepare baselines of the status of the Yellow Sea marine environment and will be used in the TDA process to support or refute the ‘perceived problems’ of the Yellow Sea, and in the later stage, as one of the critical indicators for the evaluation of the YSLME Project.

Based on the outcomes from the government approval for the co-operative surveys, this Meeting will focus on the technical and logistical arrangements needed for implementing the Ecosystem, Pollution, and Biodiversity Components of the Spring Cruise.

**A. Expected Outcomes of the Surveys**

As mentioned above, the objectives of the surveys are to provide data and information that for the TDA and to prepare an initial baseline data suite for the Yellow Sea marine basin which will give us an understanding of:

- The status and conditions of the Yellow Sea Marine basin ecosystem;
- The condition and quality of the Yellow Sea marine basin habitat; and

- The biophysical dynamics of the Yellow Sea marine basin system.

More specifically, the data/information collected from the surveys will allow us to determine:

- Status and changes, if possible, in biodiversity of benthic and pelagic resources, shifts in trophic structure, productivity, etc.
- Status and changes in quality and availability of benthic and pelagic habitats;
- Abundance and distribution of introduced organisms in the Yellow Sea marine basin;
- Seasonal changes in the above;
- Basic basin-wide information on the marine environment, including primary productivity, chemical and physical characteristics of the Yellow Sea;
- Status and distribution of marine pollution in sea water, sediment and biota in the Yellow Sea marine basin; and
- Other data and information required.

This data/information will then allow us to identify trends, and/or predict changes under prevailing ecosystem conditions and identify or prioritise interventions for the Strategic Action Programme phase of the project.

The outcomes of the surveys should also include, ultimately:

- Regionally agreed methods for observation, monitoring and sampling of marine environmental parameters in the Yellow Sea;
- An enhanced co-operative mechanism for regional marine environment monitoring and observation;
- Upgraded skills in basin-wide observation and monitoring;
- Better scientific understanding of the basin-wide marine environment/ecosystem status;
- Identification of data/information and knowledge gaps; and
- Increased mutual understanding and trust amongst the participating institutions.

## **B. Expected Outputs from the Surveys**

At the successful completion of the co-operative surveys, the following outputs are anticipated:

1. Detailed reports of the activities for each survey including performance of vessel, equipment, and staff.
2. Recommendations and highlighting of issues that need to be addressed before the initiation of any future co-operative surveys.
3. Assemblage of all raw and analysed data/information collected by all components (in both printed and digitized form).

4. A preliminary analysis of collected data/information with corresponding descriptions of the following (noting particularly the issues and/or anomalies that exist for each):

**4.1. Benthic and pelagic resources and habitat structure and quality**

- 4.1.1. Describing in detail, diversity and spatial distribution of benthic habitats, prevailing biophysical regimes and noting areas of ecological and commercial significance.
- 4.1.2. Describing in detail, the condition of benthic resources of the Yellow Sea marine basin in terms of: productivity, biodiversity, biomass, distribution and abundance of species in low trophic levels.

**4.2. Trophic and ecosystem structure**

- 4.2.1. Describing in detail, the trophic structure of the Yellow Sea marine basin as a whole, highlighting areas of significance.
- 4.2.2. Describing in detail, the state of the ecosystem of the Yellow Sea marine basin as whole, highlighting areas of significance.
- 4.2.3. Providing a model of carrying capacity for the Yellow Sea basin for selected indicator species.

**4.3. Pollution and water quality**

- 4.3.1. Describing in detail, the physico-chemical state and quality of waters, sediments and biota of the Yellow Sea marine basin in terms of common environmental parameters such as nutrients, organic pollutants, heavy metals, etc., and highlighting any areas of significance.
- 4.3.2. Describing, if possible, potential sources and sinks of these parameters in the Yellow Sea marine basin.

Outputs are expected to be delivered to the PMO within 2 months after the completion of the survey.

**C. Expected Outcomes and Outputs of the Meeting**

At the conclusion of the Meeting, participants are expected to have achieved an understanding of the objective and need for the Spring Cruise, and to have agreed on the arrangements for the cruise as listed below.

**C1. Dates for Spring Cruise**

*Participants should reach agreement for the cruise dates.*

**C2. Sampling stations and transect lines**

Following the agreements from the First Technical Co-operative Study Cruise Meeting (17-18 October 2005, Qingdao, China) and First Scientific and Technical Panel Meeting (4-6 July 2005, Dalian, China), the sampling stations and transect lines were decided, and are shown

in the attached map (Figure 1), and the locations of the sampling stations are shown in Table 1.

However, at the Second Regional Scientific and Technical Panel Meeting (15-17 December 2005, Kunming, China), slight modifications to the sampling stations were made as follows:

- The 3 stations on the south end (A1, A2, A3) of the survey area located in the East China Sea should be removed from the survey plan for the spring cruise; and
- In order to achieve better understanding of the environment status in the Yellow Sea, as many observation stations as possible in the northern part of the Yellow Sea should be kept.

An agreement on the stations should be reached in the 2<sup>nd</sup> Technical Meeting of the Co-operative Study Cruise.

### C3. Parameters to be observed and sampled

Each Component's proposed observation parameters, thus far, are as follows:

(i) Ecosystem component

Oceanographic variables

- CTD with PAR, beam-transmission, fluorescence
- Nutrients

Phytoplankton

- Phytoplankton species counts
- Size-fractionated biomass (chl-a) and primary production
- pico-Phytoplankton cell counts and primary production
- Bio-optics (down-welling and upwelling spectral radiance, attenuation, HPLC, particulate absorption, pigment absorption, etc)

Zooplankton

- Zooplankton species abundance
- Meso-zooplankton biomass
- Meso-zooplankton fecal pellet production
- Meso-zooplankton egg production
- Vertical distribution of fecal pellets from water sample
- Zooplankton vertical distribution, in selected station(s), using MOCNESS (or MPS)

Benthos

- Benthos species diversity, abundance, and biomass (by grab-sample)
- Sediment core (<1m length)
- Grain size of bottom sediments
- Sediment organic content
- Bottom temperature, salinity, and oxygen level

### Bacteria

- Abundance & biodiversity
- Heterotrophic bacterial production
- Limiting resources for bacterial growth (potential impact by yellow sand)
- Heterotrophic bacterial respiration

### Protozoa

- Protistan (flagellate & ciliates, etc..) abundance and composition
- Protozoan grazing on the picoplankton

#### (ii) Pollution component

- Common environmental parameters: including temperature, salinity, pH, transparency, DO, COD, SS, Chlorophyll a;
- Nutrients
- Organic pollutants
- Heavy metals

#### In Seawater

- Routine parameters: temperature, salinity, pH, turbidity, DO, COD, SS, chlorophyll a;
- Nutrients: nitrogen (nitrate, nitrite and ammonia), phosphate, silicates;
- Organic pollutants: total organic carbon, oil, PAHs, PCBs, OCPs;
- Heavy metals: Cd, Cr, Cu, Pb, Hg, Zn, As.

#### In Sediment

- Sulfide, TOC, Oil, Total nitrogen, Total phosphate, Heavy metals (Cd, Cr, Cu, Pb, Hg, Zn, As), Eh;
- Organic pollutants: PAHs, PCBs, OCPs.

#### In Biota

- Heavy metals: Cd, Cr, Cu, Pb, Hg, Zn, As;
- Organic pollutants: oil, PAHs, PCBs, OCPs.

#### (iii) Biodiversity component

- Marine mammal observation - visual observation, identification and documentation through line transect survey and daily watch, include (but not limited to) seals, finless porpoise and whales
- Sea Bird – Visual Observation, identification, and documentation

*Team leaders will be invited to review and update this list.*

C4. Scientists to be on-board the vessel and each person's responsibilities

Details on the research vessel will be provided in a separate document. Based on the discussion of the workload for the different project components, participants should agree on the distribution of the scientists on-board the vessel.

- Regional Working Group for Ecosystem:
- Regional Working Group for Pollution:
- Regional Working Group for Biodiversity:  
Total:

C5. Equipment to be transported from Korea

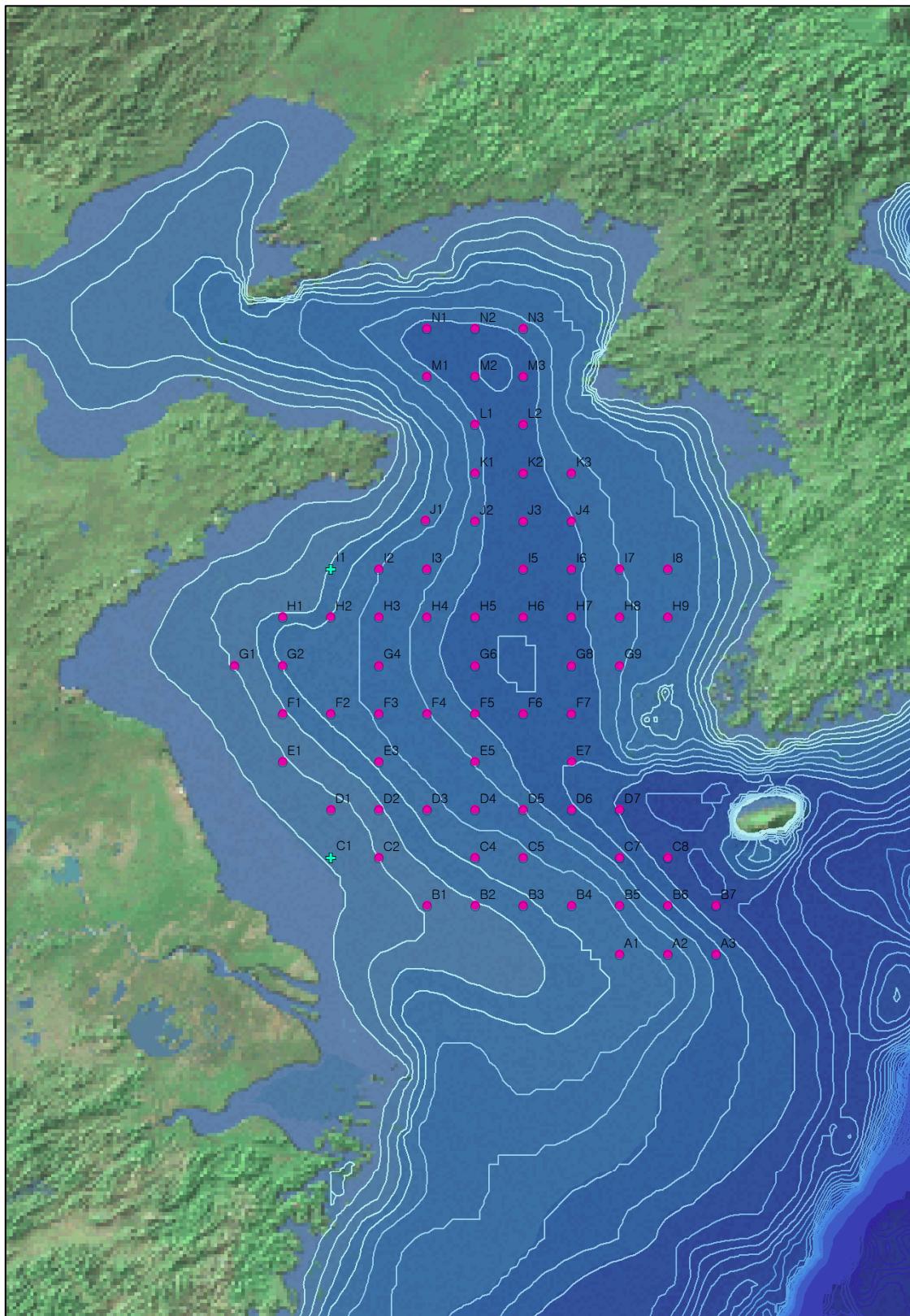
C6. Equipment to be provided by Chinese scientists

C7. List of samples to take back to Korea for analysis

C8. Budget and contracting details

*During Agenda Item 8, participants will divide into working groups to finalise, as much as possible, the cruise requirements for their team.* Please refer to the template in Document UNDP/GEF/YS/JC.2/6, for the above four items.

Figure 1. Sampling stations as agreed to-date.<sup>1</sup>



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<sup>1</sup> See explanation about sampling stations in Section C2.

<u>Station No.</u>	<u>Longitude</u>	<u>Latitude</u>
A1	125	32
A2	125.5	32
A3	126	32
B1	123	32.5
B2	123.5	32.5
B3	124	32.5
B4	124.5	32.5
B5	125	32.5
B6	125.5	32.5
B7	126	32.5
C2	122.5	33
C3	123	33
C4	123.5	33
C5	124	33
C6	124.5	33
C7	125	33
C8	125.5	33
D1	122	33.5
D2	122.5	33.5
D3	123	33.5
D4	123.5	33.5
D5	124	33.5
D6	124.5	33.5
D7	125	33.5
E1	121.5	34
E2	122	34
E3	122.5	34
E4	123	34
E5	123.5	34
E6	124	34
E7	124.5	34
F1	121.5	34.5
F2	122	34.5
F3	122.5	34.5
F4	123	34.5
F5	123.5	34.5
F6	124	34.5
F7	124.5	34.5
G1	121	35
G2	121.5	35
G3	122	35
G4	122.5	35
G5	123	35
G6	123.5	35

<u>Station No.</u>	<u>Longitude</u>	<u>Latitude</u>
G7	124	35
G8	124.5	35
G9	125	35
H1	121.5	35.5
H2	122	35.5
H3	122.5	35.5
H4	123	35.5
H5	123.5	35.5
H6	124	35.5
H7	124.5	35.5
H8	125	35.5
H9	125.5	35.5
I2	122.5	36
I3	123	36
I4	123.5	36
I5	124	36
I6	124.5	36
I7	125	36
I8	125.5	36
J1	123	36.6
J2	123.5	36.5
J3	124	36.5
J4	124.5	36.5
J5	125	36.5
K1	123.5	37
K2	124	37
K3	124.5	37
L1	123.5	37.5
L2	124	37.5
M1	123	38
M2	123.5	38
M3	124	38
N1	123	38.5
N2	123.5	38.5
N3	124	38.5
Environmental stations		
I1	122	36
C1	122	33