

DARWIN INITIATIVE**FINAL REPORT****1. Basic Project Details**

- Project Title: *Marine benthic biodiversity in China*
- Contractor: *Plymouth Marine Laboratory*
- Host country collaborating institute(s):
*College of Marine Life Science, Ocean University of Qingdao,
5 Yushan Road, Qingdao, China*
- Grant Round: 5
- Grant Value: £99,000

2. Project Expenditure

- Total grant expenditure: £99,000
- Breakdown of expenditure (using expenditure categories in the original application form)
 - Salaries (PML staff)
 - Rents, rates, heating, lighting, cleaning
 - Postage, telephone, stationary
 - Travel and subsistence
 - Printing
 - Capital items, sampling & laboratory equipment
 - Recurrent
 - Software licences
- Explain any variations in expenditure +/- 10%: N/A

3. Project Background/Rationale

- Why was the project needed? Please explain the project development process.

The coastal waters of China are now being subjected to increasing anthropogenic pressures in terms of pollution, fishing and intensive

aquaculture. There was a perceived need to train scientists to assess the effects of different human activities on biodiversity in coastal habitats, with a view to developing a management strategy for sustainable use. The study focussed on the semi-enclosed Bohai Sea, which is particularly susceptible to these pressures.

- How was it related to conservation priorities in the host country?

China has no clearly stated conservation priorities with respect to the marine environment. The studies we have instigated were designed to enable an assessment of the 'health' of coastal ecosystems in terms of their biodiversity.

- How was the project intended to assist the host country to meet its obligations under the Biodiversity Convention?

The Chinese government takes its obligations seriously, and has implemented strategies and legal frameworks towards the application of the Convention. Recently it has instigated a complete classification of its biodiversity, but many marine taxa remain poorly studied, including the two very abundant and diverse taxa that we have focussed on in this programme, freeliving nematodes and harpacticoid copepods.

- Was there a clear 'end-user' for the project in the host country? Who?

Yes. Statutory agencies responsible for assessment of the marine environment.

4. **Project Objectives**

- What were the objectives of the project (as stated in the original application form)?

1. To provide training in marine sampling methods and meiofaunal taxonomy, monitoring, statistical design and analysis for community studies for 2 Chinese PhD students at the Ocean University of Qingdao. To provide materials (literature, handbooks, software) and train staff to provide a basis for courses to be run in the future by local personnel.

2. To bring the students to the UK for advanced training in the same range of subjects. Again, the objective was not only to train students, but also to provide the necessary materials and expertise so that the research can continue after the conclusion of the project.

3. To undertake sampling and analysis to examine the effects of man's activities on the biodiversity of coastal habitats in the Bohai sea, in collaboration with Chinese researchers, with a view to developing a management strategy in which these activities and Chinese marine biodiversity can both be maintained.

- Were the objectives of the project revised? If so, how?

No

- Have the objectives (or revised objectives) been achieved? If so, how?

Yes. 2 PhD students (Darwin Fellows) have received training in marine sampling methods, meiofaunal taxonomy, particularly the dominant groups Nematoda and Copepoda, monitoring, statistical design and analysis for community studies. They have now been awarded their PhD degrees by the Ocean University of Qingdao. Assistance with the training of two other PhD students at the Universities of Hong Kong and Wuhan has also been provided. Students have been provided with materials (handbooks, manuals). Further materials (literature, handbooks, software) and training have been provided for 31 Chinese university staff and students, so that courses can be run, and research undertaken, in the future by local personnel. Training materials will be of subsequent use to the Chinese scientists involved and will be used for university courses in the region in the years to come. The library facility ('The Darwin Library') will be used by future generations of students.

PML personnel, in collaboration with staff and the postgraduate students from the Ocean University, have carried out research to examine the effects of man's activities, including oil exploration and industrial pollution, on the biodiversity of Chinese coastal habitats, in particular the shallow Bohai sea where such activities conflict with prawn fisheries. Sampling has taken place on two research cruises, in conjunction with a programme funded by the Chinese National Science Foundation examining the effects of pollution on prawn fisheries. The benthic samples collected have formed the basis of the training of the two students outlined above. The study has, in addition, been used to evaluate techniques for the rapid assessment of biodiversity using new biodiversity measures (eg. taxonomic distinctness) recently developed at PML. Meiobenthic nematodes and copepods have been used as model test-taxa for these analyses. The research has been reported as scientific publications and postgraduate theses. Every effort has been made to publicise the project in local and regional media, to increase awareness of the need for determining the effects of man's activities in coastal regions.

- If relevant, what objectives have not been achieved, or only partially achieved, and why?

The second part of Objective 3, concerning management options, has not been fully realised. Whilst we have been able to identify impacted and non-impacted areas of the Bohai Sea, cause and effect relationships have not been firmly established, which precludes the development of a management strategy.

5. **Project Outputs (see the attached list of project outputs which we would like you to use in compiling this section of the report) [NO LIST WAS MADE AVAILABLE]**

- What output targets, if any, were specified for the project? (Please refer to the project schedule agreed with the Department where relevant.)
 - ✓ 1. *2 Chinese students will be trained to PhD level.*
 - 2. *Training materials will be provided for the subsequent use of the Chinese scientists involved and will be used for university courses in the region in the years to come. A library facility ('The Darwin Library') will be provided, to be used by future generations of students.*
 - 3. *The research will ultimately appear as scientific publications and postgraduate theses. Every effort will be made to publicise the project in local and regional media, to increase awareness of the need for determining the effects of man's activities in coastal regions.*
 - 4. *The management options for coastal regions in the Indo-Pacific will be distributed to relevant government and academic organisations throughout the region.*
- Have these been achieved?

Mostly, yes
- If relevant, what outputs were not achieved, or only partially achieved, and why?

Output 4 was not achieved, for the reasons given in the previous section.
- Were any additional outputs achieved?

A much larger number of staff and students (31) than originally anticipated were trained in pollution impact survey, experimental design and statistical analysis of biodiversity data. Additional students were also trained in practical techniques and meiofaunal identification. Students also attended from other Universities and Institutes in China, not only from the OUQ. This extended outreach was largely due to the publicity of the Darwin programme, promulgated within China by Professor Zhang.
- If output targets were not specified, please state the outputs achieved by the project. As far as possible, we would like you to work through the list of outputs attached to this paper and to report on those which are relevant to your project. [NO LIST WAS MADE AVAILABLE]

6. Project Operation/Management

- Research projects - please provide a **full** account of the scientific work undertaken, outlining the methodology adopted, the staff employed and the research findings. The extent to which research findings have been subject to peer review should be addressed.

Ecological Research

Two papers have been prepared for publication and have been subjected to peer review. They are currently being revised according to referees comments, ready for final submission.

1. *The community structure and biodiversity of freeliving nematodes in the Bohai Sea, China, do not reflect severe pollution.*

By Y. Guo, P. J. Somerfield, R. M. Warwick, Z. Zhang

Submitted to *Marine Ecology progress Series*

The waters of the Bohai Sea, China, are highly polluted, and red-tides are becoming increasingly wide-spread and severe. Freeliving marine nematodes were sampled on 2 occasions from an extensive grid of 20 stations in the Bohai Sea and its approaches. Differences within stations between sampling periods were small, resulting from small changes in abundances of dominant species. Differences between stations were significant, and were used to cluster stations into groups with similar species composition. These station groupings revealed a weak faunal gradient leading from the mouth of the Huanghe (Yellow River) to the Bohai Strait. Analyses relating faunal composition to environmental variables showed that there were significant differences in environmental variables between faunally defined groups of stations. The variables most closely correlated with community structure were silt/clay and sand content, depth, phaeopigment concentrations below the sediment surface, organic content and arsenic. These reflect natural processes within the Bohai Sea. The Huanghe is the most turbid river in the world, and its inputs into the Bohai Sea, including silt/clay and naturally occurring As, are the primary factors affecting variation in community structure of the nematodes. A suite of univariate measures are related to distance from the river mouth, with a major discontinuity about 120 km into the Bohai Sea. Comparison of values of the biodiversity measures average taxonomic distinctness (Δ^+) and variation in taxonomic distinctness (Λ^+) suggest that the meiobenthos of the Bohai Sea as a whole is not under major pollution stress. Values from individual stations do not suggest strong large-scale pollution gradients within the study area.

2. *No evidence for anthropogenic effects on the community structure and biodiversity of Harpacticoid copepods in the Bohai Sea, China.*

By F-H. Mu, P. J. Somerfield, R. M. Warwick & Z-N. Zhang

Submitted to *Marine Environmental Research*

The objective of this study was to determine the effects of natural and anthropogenic variables on the benthic harpacticoid copepod assemblages of the Bohai Sea, China. Harpacticoid copepods were sampled on 2 occasions from an extensive grid of 20 stations in the Bohai Sea, China, and its approaches. Differences among stations between sampling periods, although significant, were small and caused by small changes in abundances of dominant species. This is interpreted as a minor seasonal effect. Differences between stations were significant, and were used to cluster stations into groups with similar species composition. These station groupings revealed a weak faunal gradient leading from the mouth of the Huanghe (Yellow River) to the Bohai Strait. Analyses relating faunal composition to environmental variables showed that there were significant differences in environmental variables between faunally defined groups of stations. The variables most closely correlated with community structure were those related to natural processes within the Bohai Sea, namely silt/clay content, depth and phaeopigment concentrations at the sediment surface. The Huanghe is the most turbid river in the world, and its inputs into the Bohai Sea are the primary factors affecting variation in community structure of the copepods. A suite of univariate measures are related to distance from the river mouth. Analyses do not suggest strong large-scale pollution gradients within the study area.

Taxonomic Research

Five papers have been produced. All have been peer-reviewed and are either published or in press.

1. *Two new species of Bulbamphiascus (Copepoda: Harpacticoida: Diosaccidae) and a related new genus, from the Bohai Sea, China.*

By Mu, F-H. and Gee, J.M.

Published in *Cahiers de Biologie Marine* 41: 103-135 (2000)

Bulbamphiascus plumosus sp.nov. and *B. spinulosus* sp. nov. are described from the Bohai Sea, China, provisionally placed in the genus *Bulbamphiascus*, and compared with specimens of the type species, *B. imus*, from near the type locality (off the Northumberland coast, U.K.). Both *B. plumosus* and *B. spinulosus* can be distinguished from *B. imus* by the spinulation patterns on the urosome, the form of the setae on the P5

exopod, and by the lack of sexual dimorphism on the basis of the male P2. *B. plumosus* can be distinguished from *B. spinulosus* by the lack of the ventral spinule row on the preanal somite, by the presence of a large plumose seta VI on the female caudal ramus (cf. short and smooth), by segment 4 of the female antennule being only 1.5 times longer than broad (cf. 2.5 times) and by the lack of spinules on the anterior face of the male P2 endopod (cf. pronounced spinule patches). The relationship of the two new species to others in the genus is discussed.

Bulbamphiascus imus is briefly redescribed and a neotype established. The flexible spine-like structure on the male P2 endopod is described for the first time and its homology discussed. It is shown that, as presently constituted, *B. imus* is a complex of species, and probably is not cosmopolitan in distribution, as previously postulated.

Sinamphiascus gen. nov. is established, to accommodate *S. dominatus* sp. nov., the most common sublittoral diosaccid in the Bohai Sea. The setation of the swimming legs identifies it as a *Bulbamphiascus* but the form of the P1 endopod (non-prehensile, segments almost equal in length), the antennule, the antenna, the female genital field, the spinulation of the urosome and caudal ramus, and sexually dimorphic characters on the male P1 basis and P2 endopod, all suggest a closer relationship with *Haloschizopera*.

2. *A new genus of Cletodidae (Copepoda; Harpacticoida) from the Bohai Sea, China*

By Gee, J.M. and Mu, F-H.

Published in Journal of Natural History 34: 8090822 (2000)

Neoaerenhydrosoma zhangii gen. et. sp. nov. is described from specimens recovered from muddy sediments in the shallow waters of the Bohai Sea. On the basis of the structure of the mouthparts, P5 of both sexes and the female genital field, it is suggested that the taxon is related to the *Aerenhydrosoma*-complex within the Cletodidae. It differs from other known genera in the structure of the exopod in P2-P4 which is two-segmented as a result of the failure to separate of the proximal two segments of a three-segmented ramus; and the P5 in as much as the mucroniform process incorporates the exopod, as well as the endopodal lobe of the baseoendopod.

3. *The freeliving nematode genus Parodontophora Timm 1963 (Nematoda: Axonolaimidae) is not exclusively marine: Parodontophora limnophila sp. nov. from freshwater in China.*

By Wu, J., Somerfield, P.J., Austen, M.C. and Liang, Liang, Y.

Published in *Hydrobiologia* 431: 205-210 (2000)

Parodontophora limnophila sp. nov. is described from Poyang Lake, the largest freshwater lake in China. It is characterised by having an amphid with its posterior end close to the base of the stoma, relatively short cephalic setae, opisthocephalic setae arranged as two subdorsal groups of three longitudinally arranged setae and two single subventral setae, excretory pore at the level of the anterior part of the stoma and renette gland 34-47% of the oesophageal length. To date the new species is the only *Parodontophora* species found in freshwater habitats.

4. *Three new species of free-living nematodes from the Bohai Sea, China*

By Guo, Y.Q. and Warwick, R.M.

In Press in *Journal of Natural History*

Three new species of free-living marine nematode, *Setosabatieria jingjingae* sp.nov., *Amphimonhystera circula* sp. nov. and *Belbolla zhangii* sp. nov., from the Bohai Sea, China, are described and illustrated. *Setosabatieria jingjingae* can be separated from the other two species in the genus by the number of amphid turns, the structure of the spicules and the number of pre-cloacal supplements. A pictorial key and tabular information are provided to facilitate species identification in this genus. *Amphimonhystera circula* is characterised by circular amphids, a simple gubernaculum and the shape of the tail. *Belbolla zhangii* is characterised by the number of oesophageal bulbs, the shape of the spicules and gubernacular apophysis, and the size of the two pre-cloacal supplements. The types are deposited in the Natural History Museum (London).

5. *A New Species of Terschellingia (Nematoda) from the Bohai Sea, China*

By Guo Yuqing and Zhang Zhinan

Published in *Journal of Ocean University of Qingdao* 30: 487-492 (2000)

A new species of free-living marine nematode, *Terschellingia austenae* sp. nov. from the Bohai Sea, China, is described and illustrated. *Terschellingia austenae* sp. nov can be separated from a similar species, *T. maldivensis* in the genus by the length of body (L=770 – 950 µm in the former compared to L=2370 µm in the latter), the position of subcephalic setae which are situated either side of the amphids in the former compared to situated posterior to the amphids in the latter and the length of subcephalic setae (longer in the former than in the latter). The amphid width as % of corresponding diameter is larger in the *Terschellingia austenae* sp. nov than in the *T. maldivensis* (50 - 60 vs 45). A tabular key

is provided to facilitate species identification in the group of lack of a distinctly offset, rounded oesophageal bulb in this genus. The types are deposited in the Natural History Museum (London).

Training projects - please provide a **full** account of the training provided. This should cover the content of the training, arrangements for selecting trainees, accreditation, etc.

Four scientists from the Plymouth Marine Laboratory (Drs M.C. Austen, J.M. Gee, P.J. Somerfield and R.M. Warwick) visited the Ocean University of Qingdao from 1-12 October 1997, where they:

1. Conducted a practical course on the processing and identification of meiofauna samples from the Bohai Sea for seven staff and potential PhD students from the OUQ and other institutions in China. The students were provided with a series of lectures and practical instruction on the extraction of marine meiofauna from sediments and its preparation for microscopic examination, based on samples collected on previous research cruises in the Bohai sea. Detailed training was given on the identification of the two major meiobenthic taxa, nematodes and copepods, using keys and other literature provided by the PML. A video camera was used in conjunction with both stereo and compound microscopes for demonstration purposes. The camera was provided by PML, and a monitor purchased in Qingdao, which has been retained by the OUQ for demonstration purposes. A video film on marine meiofauna was shown, and left in OUQ for their future use.

2. Selected PhD students for future more extensive training, both by formal interview and assessment of practical skills. The identification of two candidates from a field of three resulted in the selection of Mu Fanghong and Guo Yuqing. In addition, it was felt that two other Chinese PhD students attending the training workshop would greatly benefit from further training, and the actions taken have been as follows:

Ms Zhou Hong, now undertaking a PhD at the University of Hong Kong, came to Plymouth for a period of further training from 17 Feb-17 Mar 1998 (nematode identification and statistical analysis of community data). Funds for her travel were secured from the Royal Society (i.e. no cost to the Darwin programme).

Ms Wu Jihua, a PhD student on freeliving freshwater and soil nematodes, was probably the best student on the course, and it was agreed (verbally with Valerie Richards of the DETR) that she should come to Plymouth for further training in July 1998 supported by funds from this project.

In 1998 Four Chinese scientists visited Plymouth, as follows:

Prof. Zhang Zhinan (20 July-25 August 1998) – discussion of progress and future planning

Ms Wu Jihua (20 July-25 August) – training in nematode taxonomy and ecology

Ms Mu Fanghong (20 July-20 October) – training in taxonomy and ecology of harpacticoid copepods

Ms Guo Yuqing (20 July-20 October) – training in taxonomy and ecology of freeliving nematodes

The latter 2 were PhD students registered at the Ocean University of Qingdao under this project. Their work was continually assessed according to university regulations. During their visit large quantities of literature was copied, which now form the basis of a comprehensive collection of meiofaunal literature at OUQ. All four attended the 10th International Meiofauna Conference at the University of Plymouth, 27-231 July 1998, where Zhang, Mu and Guo presented some preliminary results in a joint presentation.

In 1999 Drs Warwick, Somerfield, Austen and Gee visited OUQ from 7-21 June and gave a course on 'Pollution Impact Survey and Experimental Design' which included hands-on statistical analysis of data using the PRIMER software package. The course was attended by 31 Staff and students (see appended list). Further practical training was provided for Mss Mu, Guo and Zhou. Mss Mu and Guo came to Plymouth from 3 October to 17 December to complete the analysis of their data and draft thesis chapters and papers under our guidance.

- Did any issues or difficulties arise in running and managing this project?

We had some minor problems with the shipment of materials and equipment from Plymouth to the OUQ, but no really serious problems were encountered. This is in no small measure due to the efforts of Prof. Zhang Zhinan, our counterpart at the OUQ, with whom we developed an excellent working relationship. Our experience has been that there are very many bright and enthusiastic young scientists in China who are interested in biodiversity issues and but who are starved of literature, resources and training. They are prepared to make considerable personal sacrifices to gain knowledge and experience, and we tried to extend the outreach of this programme as far as the agreed funding will allow. Cooperation with the OUQ has been excellent, and both partners found the programme very rewarding.

7. Project Impact

- To what extent has the project assisted the host country to meet its obligations under the Biodiversity Convention, or to what extent is it likely to do so in the future? Please take account of the following in preparing this section of the report:

- The way in which research findings have been **used** to address biodiversity objectives. What actions have been taken, or are expected to be taken, as a result of the project? How will these contribute towards the conservation of biodiversity in the host country concerned?

We could not have expected the results of the research and training provided by this project to lead directly to conservation legislation in China, in the way that a single-species conservation project might do. As in Britain, there is a wide gulf between those responsible for implementing conservation objectives and those providing the scientific underpinning that should provide a basis for such implementation. We believe that we have contributed to this scientific underpinning, and also made a significant contribution to building the capacity for marine (and other) research on biodiversity issues in China.

The extent to which training provision has improved the capacity of the host country to conserve biodiversity in the future, and the extent to which the training has addressed real skill needs. Information should be provided on what **each** student/trainee is now doing (or what they expect to be doing in the longer term), and the extent to which their skills are being used in a positive way to promote biodiversity conservation in the host country.

We have provided skills in taxonomy and the statistical analysis of biodiversity data that previously did not exist in China. It has been impossible to trace the current status of all 31 trainees that attended our courses, but in 2000 Mu and Guo were awarded PhD degrees by the University of Qingdao (see photograph!). Dr Guo has now taken up a lecturing post and the University of Xiamen, and Dr Mu has a position on the staff of the Ocean University of Qingdao. Dr Wu now has a PhD from the University of Wuhan and a staff position at the University of Shanghai, and Ms Zhou is finalising her PhD at the University of Hong Kong.

The wider impacts of the project in terms of the level of collaboration achieved between UK and host country institutions, and the prospects for greater joint working/information exchange in the future. To what extent has good collaboration been achieved?

We believe that excellent collaborative links have been established, which will be extended into the future with varying degrees of certainty. For example, Dr. Mu has been awarded a Royal Society grant to return to the UK for further research on harpacticoid copepods this year, and we are pursuing various sources of funding to continue our collaboration with Professor Zhang.

8. Sustainability

- Did the host country institute(s) contribute resources to this project (these may have been provided in-kind, for example staff, materials etc)?

Yes

- If so, what is the monetary value of the resources committed to the project by the host country institute(s)?

The Chinese Academy of Sciences contributed to the costs of the research cruises on which the research programme was based, but the monetary value of this contribution is not known. The Chinese National Science Foundation provided a small grant to cover the subsistence of MSS Mu and Guo whilst in Qingdao; again the value is not known (but would have been very small).

- To what extent was Darwin funding a catalyst for attracting resources (including in-kind contributions) from other sources? Please provide details on the other sources from which resources were secured for this project.

Ms Zhou Hong who attended our first training course at the OUQ came to Plymouth for a period of further training from 17 Feb-17 Mar 1998 (nematode identification and statistical analysis of community data). Funds for her travel were secured from the Royal Society (i.e. no cost to the Darwin programme).

- What is the monetary value of resources generated for the project from other sources (please provide an estimate for each funding source)?

Not known, but probably in the region of £2000

- To what extent is work begun by the project likely to be continued in the future (if this is relevant - some projects may come to a natural end at completion)? This is more likely to be relevant for research-based projects.

As indicated above, the research elements of this programme will continue with various alternative sources of funding.

- Has the project acted as a catalyst for other projects/initiatives in the host country? Is it likely to do so in the future?

Certainly this programme has stimulated marine biodiversity research in Hong Kong and freshwater biodiversity research in Wuhan. Since so many staff and students have received training, it is inevitable that this knowledge will be utilised elsewhere in China, but this is unquantifiable.

9. Outcomes in the Absence of Darwin Funding

- Had Darwin funding been unavailable for the project, what would have been the most likely outcome:

- *The project would not have proceeded*

- Had this project not been undertaken, how would the users/beneficiaries of the project have met their requirements? Would other organisations/initiatives have been able to meet their needs (at least to some extent)?

We don't know the answer to this.

10. Key Points

- What would you identify as the key success factors of this project?

We have provided key information on the biodiversity status of the Bohai Sea.

We have provided the capacity for Chinese marine biologists to continue this research and promulgate their skills within China.

We have established collaborative links that will extend into the future.

- What were the main problems/difficulties encountered by the project?

There were no major problems. An atmosphere of friendly and helpful collaboration has made this project both pleasurable and profitable.

- What are the key lessons to be drawn from the experience of this project? Please try to provide as much information on this point as you can so that others can learn from the experiences of your project.

Perhaps the key lesson, as already stated above, is that there are very many bright, enthusiastic and environmentally conscious young scientists in China who are interested in biodiversity issues and but who are starved of literature, resources and training. They are prepared to make considerable personal sacrifices to gain knowledge and experience. It has been a pleasure to work with such highly motivated and industrious people, which sadly has not been our experience on Darwin projects in some other developing countries.

- Does the experience of this project imply a need to review arrangements for developing and managing projects funded as part of this Initiative?

Perhaps so. It has to be recognised that some projects concerning, for example, the conservation of rare, conspicuous or endangered species are

very much in the public eye and seem to be favoured by the Darwin Initiative. Others concerning the evaluation and management of biodiversity per se, particularly if this involves small and less conspicuous groups of organisms (which may well be ecologically important) are less favoured because they will not lead directly to the development of management plans and do not attract public interest. These kinds of project, which provide the scientific underpinning of biodiversity issues, should be given due weight when making awards.

11. Project Contacts

To assist future evaluation work, please provide contact details (name, current address, tel/fax number, e-mail address), for the following:

- UK project leader (and other key UK staff involved in the project)

Professor R.M. Warwick, Plymouth Marine Laboratory, Prospect Place, West Hoe, Plymouth PL1 3DH, UK.

Also at above address: Dr P. Somerfield, Dr M. Austen, Dr J.M. Gee

- Host country project leader/co-ordinator (and other key people involved in the project at the host country collaborating institute)

Professor Zhang Zhinan, Department of Life Sciences, Ocean University of Qingdao, 5, Yushan Road, Qingdao 26003, Peoples Republic of China. E-

- 'End users' for the output produced by the project in the host country (ie. government departments, agencies, universities, local communities etc)

N/A

- Project trainees/students

Dr Mu Fanghong, Department of Life Sciences, Ocean University of Qingdao, 5, Yushan Road, Qingdao 26003, Peoples Republic of China. E-

Dr Guo Yuqing.

Dr Jihua Wu. E-

Ms Zhou Hong. Swire Marine Laboratory, University of Hong Kong.

- Other project beneficiaries

N/A

- Other key players involved in the funding/operation/utilisation of the project.

N/A

**PLEASE REMEMBER TO ATTACH COPIES OF ALL DOCUMENTATION
PRODUCED BY THE PROJECT IE. REPORTS, PAPERS,
MANUALS GUIDES, CONFERENCE/WORKSHOP PROCEEDINGS
TRAINING MATERIALS ETC**

Ref: 9120/FORMS/9120-FRS