

Progress Report of ECF Funded Research Projects

Purpose

This paper updates Members on the progress of the on-going and recently completed research projects funded by the Environment and Conservation Fund (ECF).

Progress

2. As at 30 June 2006, there are 18 on-going research projects funded by ECF. A summary of these projects in respect of its approved project schedule, approved grant and outstanding commitment is given in Table 1. Detailed progress of each project is given in the Appendices 1 to 18 for Members' reference.

3. During the period 1 January to 30 June 2006, four research projects funded by ECF were completed. A summary of these projects in respect of its project schedule, total actual expenditure is given in Table 2. Detailed progress of each project is given in the Appendices 19 to 22 for Members' reference.

Next Report

4. The Secretary will submit the next progress report in six months' time.

Appendix 1

Project Number	3/2002
Project Title	The Ecology and Aspect of Biology of Amphioxus in Hong Kong
Principal Investigator (PI)	Dr CHEUNG Siu-gin and Dr Paul SHIN of the City University of Hong Kong
Project summary	To estimate the area extent of <i>B. belcheri</i> off Sai Kung Peninsula, study its ecology and biology, determine the genomic fingerprint of amphioxus population and formulate a conservation plan for protection of amphioxus.
Latest Progress	Completion report and relevant research reports have been received. The reports would be examined by the Agriculture, Fisheries & Conservation Department (AFCD). An independent evaluation report would also be submitted.
Assessment/Remark	-

Appendix 2

Project Number	4/2002
Project Title	Diversity and Conservation of Bats in Hong Kong
Principal Investigator (PI)	Mr. William SUEN Kai-yuen of the Wildlife Conservation Foundation Limited
Project summary	To monitor various species of bats and the utilization rate of the bat boxes and study the effects of using bat houses for conservation of bats in Hong Kong. Educational programmes regarding the Hong Kong bat ecology for school teachers and students and the public will be organized.
Latest Progress	<p>The ECF Research Projects Vetting Subcommittee decided on 10.2.2006 to terminate the project and no more fund would be disbursed to the applicant. The organisation “Wildlife Conservation Foundation Limited” should be blacklisted for further applications.</p> <p>We have consulted the Director of Audit and proposed to issue a letter to inform the PI of the proposed termination of the project, and ask for the return of unspent balance of the fund granted to the PI.</p>
Assessment/Remark	-

Appendix 3

Project Number	1/2003
Project Title	Oily Wastewater Treatment and Reuse System – a Demonstration Project
Principal Investigator (PI)	Dr CHEN Guohua of the Hong Kong University of Science and Technology
Project summary	To develop a prototype treatment and reuse system for oily wastewaters generated from various sectors such as garages, car washing centres, gas stations, bus depots and marine operation.
Latest Progress	<p>The PI has submitted his completion report and two research papers for the study. An independent evaluation has also been received noting the achievements and weaknesses of the project.</p> <p>On the advice of the Environmental Protection Department, the PI would revise the research reports and resubmit them in August 2006.</p>
Assessment/Remark	-

Appendix 4

Project Number	12/2003
Project Title	Conservation of Horseshoe Crabs in Hong Kong
Principal Investigator (PI)	Dr. CHEUNG Siu-gin & Dr Paul SHIN of the City University of Hong Kong
Project summary	The project will be divided into 2 stages. Stage 1 will involve the update of status of horseshoe crab population in Hong Kong, assessment of human exploitation of horseshoe crabs locally, and trial on artificial insemination and breeding of local horseshoe crabs. If the trial is successful and juveniles can be reared in the laboratory, the PI will seek approval for implementing a full-scale restocking programme at stage 2.
Latest Progress	The third progress report for the period October 2005 to March 2006 would be submitted in due course.
Assessment/Remark	-

Appendix 5

Project Number	14/2003
Project Title	Conservation of House Swifts (<i>Apus nipalensis</i>) in Hong Kong: Preliminary Field Trial of Artificial Nest Box for Breeding House Swifts
Principal Investigator (PI)	Dr YAU Wing-kwong of the Tai Po Environmental Association
Project summary	To study the utilization of artificial nest box for House Swifts in Hong Kong and to compare the breeding progress and success of House Swifts in natural and artificial nests.
Latest Progress	<p>In early 2006, when the contractor started to dismantle those artificial nests boxes, the PI noted from the premises owners of the sites (in Yuen Long and Sheung Shui) that some artificial nests were utilised.</p> <p>The PI proposed to further extend the study period till the end of the current breeding season, i.e. October 2006.</p>
Assessment/Remark	The detailed justifications for proposed extension of project period have been set out in the ECF Paper 11/2006-07 for Members' consideration.

Appendix 6

Project Number	16/2003
Project Title	The use of biomarkers for ecotoxicological assessment of persistent organic pollutants (POPs) and heavy metals on birds at Mai Po Nature Reserve and other wetlands
Principal Investigator (PI)	Prof M H WONG of the Hong Kong Baptist University
Project summary	The major aim of the proposal is to investigate the potential use of feather and eggshells, instead of eggs, to setup and evaluate biomarkers in birds for risk assessment of POPs and heavy metals at Mai Po Marshes. If significant correlations can be established between the two (eggshells and feather, with eggs), future biomarkers can be performed on eggshells and/or feather, instead of eggs, which will be more convenient and less invasive.
Latest Progress	<p>The second half-yearly progress report for the period from October 2005 to March 2006 has been received.</p> <p>As field trips to Mai Po and Mainland China scheduled for March to May 2006 have been cancelled due to the potential avian flu transmission, the PI proposed to extend the project period up to end of August 2007 so as to arrange make-up field trips in the next breeding season.</p>
Assessment/Remark	The detailed justifications for proposed extension of project period have been set out in the ECF Paper 11/2006-07 for Members' consideration.

Appendix 7

Project Number	22/2003
Project Title	Study of Marine Air Pollutant Emission around Kwai Chung Containers Terminal
Principal Investigator (PI)	Dr. FUNG Ka-shuen of Hong Kong Institute of Vocational Education (Tsing Yi)
Project summary	To develop an alternative method for estimation of emission inventory by using a systematic database of individual engine power of the ocean going container vessels, which are one of the main sources of marine emission.
Latest Progress	The completion report for the project has been received. The report would be examined by the EPD. As reported in the financial statement, an unspent balance of \$3,698.64 would be refunded to the Secretariat.
Assessment/Remark	-

Appendix 8

Project Number	6/2004
Project Title	Ecological and Physiological Response of Hong Kong Coral Communities to Changing Temperature and Oxygen Level
Principal Investigator (PI)	Prof. David RANDALL and Dr Paul SHIN of the City University of Hong Kong
Project summary	The aim of the project is to study the behavioural and physiological responses of local corals and their associated reef fish communities in Hoi Ha Wan Marine Park with respect to changing environmental factors, especially dissolved oxygen, salinity and temperature.
Latest Progress	The first progress report for the period ending November 2005 has been completed satisfactorily. Second report for the period ending May 2006 would be submitted in due course.
Assessment/Remark	-

Appendix 9

Project Number	8/2004
Project Title	Development of pre-bloom fluorimetric assays for the monitoring of harmful algal blooms
Principal Investigator (PI)	Dr. Joseph Tin-yum WONG of the Hong Kong University of Science and Technology
Project summary	The proposal aims to develop an array of combinatory micro-fluorimetric assays, that are based on the detection of agents that modulate membrane potential, intracellular calcium and sodium ions. As the vast majority of algal toxins involved in harmful algal blooms (HABs) belong to such modulation agents, and their assays require only a small amount of algal materials and a short sample preparation time, a combinatory micro-fluorimetric assay would generate timely information before the actual bloom is formed.
Latest Progress	The first progress report for the period July to December 2005 has been completed satisfactorily. Second report for the period ending June 2006 would be submitted in due course.
Assessment/Remark	-

Appendix 10

Project Number	17/2004
Project Title	On-Farm Organic Waste Composting Trial for Organic Farmers: Demonstration Project
Principal Investigator (PI)	Prof. Jonathan WONG of the Hong Kong Baptist University
Project summary	The proposal aims to develop on-farm composting trial using waste coming from nearby sources with the dual purposes of composting production and waste recycling. A suitable site will be identified at Tai Lung Experimental Station of AFCD for establishment of a demonstration composting system. The PI will also arrange training workshop in composting techniques for farmers.
Latest Progress	Completion report and relevant research reports have been received. The reports would be examined by the AFCD and EPD.
Assessment/Remark	-

Appendix 11

Project Number	20/2004
Project Title	Water Conservation through Enhanced Biological Wastewater Treatment and UV Disinfection
Principal Investigator (PI)	Dr. Josie CLOSE of the University of Hong Kong
Project summary	This project explores the biological treatment of sewage to meet the standards and criteria for irrigation purposes as well as discharge into a Marine Reserve. The study uses the existing waste treatment process at the Swire Institute of Marine Science (biological filtration plus chlorination) and compares its effectiveness with an enhanced biological treatment using aquatic plants and UV disinfection. A comparison of the process costs will be made.
Latest Progress	<p>Completion report and relevant research reports have been received. The reports have been examined by the EPD and the Drainage Services Department (DSD).</p> <p>The PI proposed to transfer funds from the unspent balance of the project to cover the cost of dismantling the wetland installation in the Swire Institute of Marine Science (SWIMS).</p>
Assessment/Remark	The detailed justifications for proposed virement of funds have been set out in the ECF Paper 11/2006-07 for Members' consideration.

Appendix 12

Project Number	23/2004
Project Title	Towards developing an engineering strategy to reduce tire-pavement noise
Principal Investigator (PI)	Dr HUNG Wing-tat of the Hong Kong Polytechnic University
Project summary	<p>The objectives of this proposed research are as follows:</p> <ul style="list-style-type: none"> (a) to design and fabricate a trailer-based device employing the Close Proximity Method to measure the tire-pavement noise; (b) to conduct on-road tire-pavement noise surveys employing the trailer over selected low-noise pavement segments; (c) to conduct roadside traffic noise measurements over selected points along the road segments surveyed in (b) above; (d) to assess noise-reduction performance of various types of road pavements; (e) to evaluate the effects of different tire constructions and conditions on tire-pavement noise; and (f) to provide recommendations that facilitate the development of an engineering strategy to reduce tire-pavement noise.
Latest Progress	The first half-yearly progress report for the period November 2005 to May 2006 has been received. The reports would be examined by the EPD.
Assessment/Remark	-

Appendix 13

Project Number	25/2004
Project Title	Atmospheric Deposition of Mercury in Hong Kong
Principal Investigator (PI)	Dr. N. S. Duzgoren-Aydin of the University of Hong Kong
Project summary	<p>The primary objective of this project is to quantify atmospheric deposition of Mercury (Hg) in various parts of Hong Kong. Based on the collected information, the study will give insight to:</p> <ul style="list-style-type: none">(a) rate of atmospheric Hg loading in the environment of Hong Kong,(b) spatial and seasonal variation(s) in atmospheric Hg deposition,(c) possible influences of cross-boundary transport of Hg, and(d) evaluate potential long-term ecological and human health impacts of atmospheric Hg in Hong Kong.
Latest Progress	The project commenced in February 2006. Progress report will be submitted accordingly.
Assessment/Remark	-

Appendix 14

Project Number	03/2005
Project Title	Species Identification, Ecology and Biological Control of Apple Snails in Hong Kong
Principal Investigator (PI)	Dr. Jian-wen QIU of the Hong Kong Baptist University
Project summary	<p>This project aims to:</p> <ul style="list-style-type: none"> (a) conduct an up-to-date and comprehensive survey of apple snails to determine the number of species present in Hong Kong, their distribution and environmental characteristics; (b) study the population dynamics of apple snails in different types of habitats; (c) determine their preference for local vegetables and natural hydrophytes, and the association between food preference and feeding rate, growth and reproduction; (d) assess the effects of apple snails on other freshwater gastropods; and (e) explore the use of a biological method in apple snail control.
Latest Progress	The project commenced in June 2006. Progress report will be submitted accordingly.
Assessment/Remark	-

Appendix 15

Project Number	04/2005
Project Title	Capacity building – identifying the missing links: developing the model for future community-operated renewable energy (BIPV) project
Principal Investigator (PI)	Dr. Josie CLOSE of the University of Hong Kong
Project summary	<p>The project has the following purposes:</p> <p>(a) to identify the learning curve and areas of necessary capacity building to ensure the successful take-up (operation) by the community of renewable energy applications beyond research or demonstration projects in order to create the Model for future projects; and</p> <p>(b) to design and specify an appropriate low-cost BIPV monitoring system for general applications.</p>
Latest Progress	The project commenced in June 2006. Progress report will be submitted accordingly.
Assessment/Remark	-

Appendix 16

Project Number	06/2005
Project Title	Environmentally-Friendly Nanosorbents for Recovery of Precious Metals from Waste Effluents
Principal Investigator (PI)	Professor KL YEUNG and Professor Gordan McKay of the Hong Kong University of Science and Technology
Project summary	<p>The purposes of the project are:</p> <ul style="list-style-type: none"> (a) to produce and characterize 2-to-3 selective nanosorbents from mesoporous silica; (b) to test their ability to remove and recover low concentrations of precious metals including gold and silver from waste effluents – microelectronics, metal plating, jewellery wastewater; (c) to perform precious metal recovery and nanosorbent regeneration studies; and (d) to undertake a preliminary process design and technical/industrial investigation for full-scale commercial development.
Latest Progress	The project commenced in February 2006. Progress report will be submitted accordingly.
Assessment/Remark	-

Appendix 17

Project Number	07/2005
Project Title	Study upon the Vegetation Effects and Potential Economic Habitat Management Benefits of Introducing Asian Water Buffalo <i>Bubalus bubalis</i> into the Freshwater Ponds at Mai Po Nature Reserve
Principal Investigator (PI)	Mr. Bena SMITH of World Wide Fund for Nature Hong Kong
Project summary	<p>The objectives of the project are:</p> <ul style="list-style-type: none"> (a) to investigate the impact of buffalo grazing upon the composition and structure of freshwater pond bankside and internal vegetation; (b) to investigate the impact of buffalo grazing upon avifauna; and (c) to undertake a comparison of the cost effectiveness of habitat management between buffalo and human methods.
Latest Progress	The project commenced in January 2006. Progress report will be submitted accordingly.
Assessment/Remark	-

Appendix 18

Project Number	10/2005
Project Title	Seabird migration survey in southern and southeastern Hong Kong waters, Spring 2006
Principal Investigator (PI)	Dr. CHEUNG Ho-fai of the Hong Kong Bird Watching Society Ltd.
Project summary	<p>The objectives of the study are:</p> <ul style="list-style-type: none">(a) To fill up information gap of present knowledge about the abundance and distribution of migrant seabirds in Hong Kong waters.(b) To publish result of the surveys and to promote conservation importance.(c) To arouse the awareness of the general public on the natural occurrence of seabirds annually in Hong Kong, as very few efforts have been put up in the past.
Latest Progress	The project commenced in March 2006. Research report will be submitted accordingly.
Assessment/Remark	-

Appendix 19

Project Number	25/2003 (completed)
Project Title	The impact of air pollution on public health – a regional analysis
Principal Investigator (PI)	Dr. WONG Heung of the Hong Kong Polytechnic University
Scope	The project aims to provide an in-depth statistical analysis of the impact of air pollution to the public health of Hong Kong, with emphasis on the delineation of factors of pollution
Summary of findings	<p>The research sheds light on the impact of various pollutants on patients suffered from respiratory diseases during the period of the study, i.e. from 2000 to 2002. As temperature is a dominant factor affecting the patients, statistical models were built for the data with and without controlling the temperature effect. It was found that RSP (respiratory suspended particles) was not affecting the patients so much during the period, as RSP was not at a high level. On the other hand, sulphur dioxide, which was not showing apparent effect when temperature was in the model, turned out to be a rather important pollutant for the patients when temperature effect was controlled. This is probably a result of rising sulphur dioxide level during recent years. By looking at the number of large positive coefficients, of the four regions under our classification, patients in New Territories East seem to be more affected by the environmental factors as compared with the other areas. From plots of the fitted values of the model and the original data, it can be seen that the fittings are promising. The trend and changes are well captured. A forecasting comparison was made between our model and two other popular models in predicting the number of patients, and our model outperformed the others.</p>

Appendix 20

Project Number	7/2004 (completed)
Project Title	Population Dynamics and Ecology of Water Buffalo in Pui O, Lantau
Principal Investigator (PI)	The Lantau Buffalo Association Limited, and Dr. Sukhmani Kaur Mantel of the University of Hong Kong
Scope	<p>The objectives of this study are:</p> <ul style="list-style-type: none"> (a) To identify plants consumed by the water buffaloes. (b) To identify herd composition and to identify distinguishable individuals. (c) To determine activity period, behaviour and habitat usage by water buffaloes during dry and wet seasons. (d) To determine habitat preference and requirement by the water buffaloes. (e) To estimate optimum sustainable number of buffaloes. (f) To enhance awareness of the ecological importance of water buffalo in Pui O.
Summary of findings	<p>The main findings of the ecological study were that there were two main herds in Pui O – a mixed herd and a bachelor herd. At the end of the study, the mixed herd consisted of 15 or 16 1st year individuals, eight 2nd year individuals, fifteen 3rd year juveniles and nineteen adult females in Pui O wetlands. The bachelor herd consisted of 12 bachelor males. The Pui O buffaloes appear to spend majority of their time grazing and ruminating during the daylight hours irrespective of season. Both the mixed and the bachelor herd spent most of their time in the main wetland / open grassland areas. Grass was the preferred food of the buffaloes although some browsing of trees, vines and macrophyte plants growing in the wetland/grassland areas was present</p>

	<p>during the drier times of the year (winter and spring seasons).</p> <p>The study found that in comparison to the summer season, there is greater sharing of wetland/open grassland area by the mixed and bachelor herd, reduced wallowing time, foraging of a wider area and greater frequency of village visits during the winter and spring seasons.</p> <p>Another important result of this study was the quantifying of the high population increase in Pui O and the high density of buffaloes for the wetlands in Pui O. The instantaneous population growth rate of water buffaloes in Pui O area was found to be 0.0953 and the population density of buffaloes was calculated to be 2.8 buffaloes per hectare or 277 buffaloes per km². It is suggested that the population density of buffaloes in Pui O be reduced to 1 or 1.2 buffaloes per hectare or a total population of 20-24 buffaloes.</p>
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Appendix 21

Project Number	13/2004 (completed)
Project Title	Development of Single Analytical Method for Simultaneously Determining Dioxins and Dioxin-like PCBs in Ambient Air
Principal Investigator (PI)	Dr. Zongwei CAI of the Hong Kong Baptist University
Scope	This project will focus on developing single analytical procedure for simultaneously analyzing dioxins and dioxin-like PCBs. The method development will be based on individual standard analytical methods and more importantly, on intensive experience with dioxins and dioxin-like PCBs analyses in ambient air. The outcome of this project will benefit both current and future dioxin monitoring programs in Hong Kong.
Summary of findings	The current standard methods (e.g., US-EPA, EU and WHO methods) involve two separated sample preparation procedures and HRGC/HRMS analyses for dioxins and dioxin-like PCBs, which is time-consuming and costly. The separated analyses particularly hinder environmental monitoring and academic research on ambient dioxins and dioxin-like PCBs because the air sample often cannot be separated into two portions. Thus, this project aims to develop method for simultaneously analyzing dioxins and dioxin-like PCBs in one single sample. Method development based on individual standard analytical procedure for simultaneously analyzing seventeen 2,3,7,8-chlorine substituted PCDD/Fs and twelve WHO-specified dioxin-like PCBs in air samples was conducted. The performances of various chromatography columns with different elution solvent mixtures on the separation of the PCBs from the PCDD/Fs and the further cleanup for PCBs were examined and compared. The obtained results showed that acidic alumina chromatography column could not be used to separate dioxins and dioxin-like PCBs because they were eluted out together. However, the separation could be achieved by using either florisil or activated carbon column. Further investigation indicates that the florisil column was found to be most

	suitable for the separation. Efficient separation of dioxins and dioxin-like PCBs has been achieved and validated with clean sample extracts and acceptable recoveries.
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Appendix 22

Project Number	22/2004 (completed)
Project Title	Aerosol Size Distribution Study of Cooking Fumes Emitted from Real Life Cooking Activities
Principal Investigator (PI)	Dr. YEUNG Lam-lung of the Hong Kong University of Science and Technology
Scope	This project aims to develop new instrumental methods for the evaluation of the aerodynamic diameter in cooking fumes; to study the size distribution of cooking fumes generated from typical real-life Chinese and Western style cooking processes which generate the densest cooking fumes; and to find and set up a cooking fumes in real-life cooking but also with similar size distribution. The new cooking fume generation method will be adopted in the Standard Testing Procedure (STP) for the evaluation of the performance of air pollution control equipment.
Summary of findings	Submicrometer and ultrafine particles were found in cooking fume generated from both Chinese and Western style real-life cooking. In comparing of the two types of real-life cooking, stir frying in Chinese-style cooking generated relatively higher levels of particles with higher median diameters (MD). High temperature and water content together with fat/oil promoted high emissions of cooking fumes due to the low boiling point of water, which agitates the emission of oil particles. High concentrations of cooking fumes caused the disappearance of small aerosols due to coagulation. As stipulated in the original STP for the performance tests on the pollution control equipment, the generation of cooking fume was carried out by heating oil at 300°C. This method for the generation of cooking fumes was found not satisfactory because the physical size of the aerosols generated was different from the real-life cooking. Finally, heating a water and oil mixture in 1:1 ratio at 300°C could simulate real-life Chinese-style cooking emissions not only in terms of submicrometer particle counts (467,404 cm ⁻³) but also with similar median diameters of 134 nm. This new method for the cooking fume generation can

	potentially be adopted in the STP for the performance test of the air pollution control equipment.
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