

Appendix 7: Marine Fishes Sub-group Report

BSAP

Status and Trends and Red List Focus Group

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MARINE SPECIES IN HONG KONG

Marine species make up a significant proportion of the total biodiversity of Hong Kong exhibiting high taxonomic diversity as well as providing considerable economic services. As part of the BSAP process assessments and evaluations of conservation status have been conducted by experts within Hong Kong's community and invited by the government on a broad range of marine species, from marine mammals to a small selection of marine invertebrates. **This report covers the work on marine fishes with separate reports available for other taxa. Other relevant reports cover Sustainable Use and Habitats, among others.**

This report is intended to provide input on marine fishes to assist the government of the HKSAR to address Article 6 of the Convention on Biodiversity requires Parties (ensure that their Biodiversity Strategy and Action Plans (BSAPs) are mainstreamed into the planning and activities of all those sectors whose activities can have an impact (positive and negative) on biodiversity) and Target 17 of the Aichi Biodiversity Targets which states that: 'by 2015 each Party has developed, adopted as a policy instrument, and has commenced implementing an effective, participatory and updated national biodiversity strategy and action plan.'

Relevant Aichi targets:

Target 6: *By 2020 all fish and invertebrate stocks and aquatic plants are managed and harvested sustainably, legally and applying ecosystem based approaches, so that overfishing is avoided, recovery plans and measures are in place for all depleted species, fisheries have no significant adverse impacts on threatened species and vulnerable ecosystems and the impacts of fisheries on stocks, species and ecosystems are within safe ecological limits.*

Target 12: By 2020 the extinction of known threatened species has been prevented and their conservation status, particularly of those most in decline, has been improved and sustained.

Target 9: By 2020, invasive alien species and pathways are identified and prioritized, priority species are controlled or eradicated and measures are in place to manage pathways to prevent their introduction and establishment

MARINE FISHES IN HONG KONG

Because of its location and range of marine habitats and conditions, from a major estuary to the west to coral reef habitat to the east, Hong Kong's marine environment boasts a diverse mixture of tropical and temperate Indo-Pacific species. More than 1,000 marine fishes are known, roughly one third of them predominantly reef-associated. While there are no known endemic marine fishes, the geographic distribution of several species is regionally limited to the northern sector of the South China Sea. Although many of the species are commercially important and, historically, supported a thriving fishery, none have been managed at the species level and, under Hong Kong law, none are considered to be 'wildlife'.

The aim of this sub-group was to conduct a small number of species assessments to (a) test the applicability of IUCN criteria and categories to regional marine fish assessments based on (b) a compilation of available information on marine fishes combined with expert knowledge. According to the findings of the assessments and understanding current management in place and planned we also (c) provide recommendations for conservation management and identify data/education needs and gaps.

For marine fishes, it is noteworthy that they once formed the basis of a vibrant and culturally and economically valuable fishery for the Hong Kong fleet and for Hong Kong people. This fishery is now in an extremely depleted state compared to its former abundance with many fish populations of valuable species much reduced. This situation has greatly diminished the ability to address our own food supply and support livelihoods. Only by properly managing the marine species that make up the marine ecosystem can fish populations recover their food, livelihood and economic values. An ecosystem is made up of individual species and many of those most highly threatened are, or were, also the most valuable economically and include high trophic level species important to the ecosystem as a whole. Restoration of such will not only help to restore

the marine ecosystem but also the value of the local fishery and address the BSAP vision and mission as well as the *stated vision and mission of AFCD: a well-managed natural environment to pass on to our future generations. This to be achieved, in part, by ‘conserve our natural environment and safeguard the ecological integrity’.*

https://www.afcd.gov.hk/english/aboutus/vision_mission/abt_vision_mission.html

PROCEDURE FOR HONG KONG MARINE FISH RED LIST ASSESSMENTS

To accomplish status assessments of selected species, IUCN categories and criteria were determined, as for other taxa, to be applicable and were adapted for regional application (<http://www.iucnredlist.org/technical-documents/categories-and-criteria/2001-categories-criteria>). A format for documenting assessments was used based on IUCN documents and modified for local use by the Status and Trend and Red List Focus Group. The 27 fish species assessed were selected based on a range of factors, from experts’ concerns about their local status or interest in and knowledge of the species, to concerns due to their current global IUCN red list status. Since this non-random subset of assessments was to be used to develop an action plan for species determined to be threatened or otherwise in need of management or conservation action, there was an interest to cover, as far as was possible, a diverse taxonomic range of species from a variety of habitats found around Hong Kong, and exhibiting a range of life histories, inclusive of both exploited and unexploited species.

Regional Red List assessments were conducted by group members based on compiled information of published and unpublished studies, including government reports, EIA consultancy reports and expert knowledge as well as consultation over 5 face-to-face meetings and review of draft assessments by group members by email. All assessments presented were the product of group consensus. AFCD has provided relevant data for species assessments.

Since resources (money and manpower) did not allow for the assessment of all (1,000 +) marine fish species, a second list will be produced and more assessments completed once/if resources become available to identify possible ‘Species of Concern’ in Hong Kong based on other criteria (global IUCN red list assessments, China Red List, CITES, etc.). The

assessments highlighted and considered conservation, legislative and fishery-related measures currently in place, as well as planned, and identified actions needed and priorities for action.

This report addresses the outcomes of the 27 assessments, the principal threats faced by the assessed species, conservation or fishery management measures currently in place or planned, recommended actions needed to address the threats (at the species and ecosystem levels), with comment on education needs. FOR SUPPORTING MATERIALS PLEASE REFER TO CITATIONS PROVIDED IN THE 27 INDIVIDUAL SPECIES ASSESSMENTS.

OUTCOMES OF REGIONAL RED LIST ASSESSMENTS

Of the 27 species assessed, 13 are threatened (VU, EN, CR), 6 are near threatened (NT) and 5 are Least Concern (LC) and 3 are Data Deficient (DD). Of the threatened species, one (Chinese bahaba = Giant yellow croaker, *Bahaba taipingensis*) is Critically Endangered – **this species is close to global extinction**. Four species are Endangered (Large yellow croaker, *Larimichthys crocea*, Knobsnout parrotfish, *Scarus ovifrons*, Blackspot tuskfish, *Choerodon schloeneni* and Hong Kong grouper, *Epinephelus akaara*) and 8 are Vulnerable (spotted eagle ray, yellow grouper, longtooth grouper, Dwarf Goby, Melon and Chevron butterflyfishes, , Green Mudskipper and Big-finned Mudskipper). Six species are NT, five species are LC and 3 species are DD; note that it is possible that DD and NT species are threatened but insufficient information is available to assess their status.

The major threatening factor for most species in the assessed subset was population decline due to unsustainable fishing (IUCN criterion A) especially for valuable or otherwise desirable species that mostly have life histories unable to sustain heavy fishing pressure or are very susceptible to fishing. This is of considerable concern for the species, the ecosystem of which they form a part and also as economic value lost to the fishery.

Of the Critically Endangered or Endangered species, these are/were either considered to be valuable economically and/or are/were particularly desirable as food and hence specifically targeted; their loss represents loss to livelihood options and food supply as well as to biodiversity. For example, the croakers were specifically targeted during their spawning

aggregations and are also considered to be globally threatened according to IUCN categories and criteria. All threatened commercially significant species, with the possible exception of the Hong Kong grouper, were targeted (initially at least) at a species-specific level using specialized nets or speargun. All 5 species only occur in east Asia and nowhere else in the world, with the exception of the more widely distributed *Choerodon schloeneni*. Hence conservation action in Hong Kong is highly significant for most of these species.

Some species are of no/ little commercial value in Hong Kong (e.g., butterfly fishes, intertidal gobies) and the main threats they are facing are habitat loss (e.g. due to development-related reclamation) and habitat degradation (e.g. due to development and/ or pollution).

Overall, for threatened assessed species, major past and current threats (regional IUCN red list species) ranged from intensive and uncontrolled fishing, habitat loss or damage, blockage of migratory pathway among essential habitats (e.g., between nurseries and breeding habitats; e.g., eels, Ayu Sweetfish), heavy fishing pressure on juveniles (e.g. groupers, seabream) and incidental bycatch (ray). Historically, the targeting of nursery areas (e.g. for fry for mariculture grow-out of bream and Hong Kong grouper) and of spawning aggregations (e.g. certain croakers) has occurred. Some species are particularly impacted in the form of bycatch (e.g. some rays) and a few (such as butterflyfishes) may occasionally be taken for the aquarium trade, although the latter need further study. Note that there are also other species of conservation concern globally that were not addressed in the red list assessments, including seahorses, sawfish and sharks.

In addition to threatened species, one of the few species-specific stock assessments of trawled species to be conducted in Hong Kong determined that 12 of the 17 species assessed were already heavily overexploited at the time of the study in the late 1990s; heavy overfishing is a precursor to putting species at extinction risk. **These species included important commercial species *Saurida tumbil* (greater lizardfish), *Siganus canaliculatus* (whitespotted spinefood-rabbitfish) and *Trachurus japonicus* (Japanese horse mackerel) and again highlight the importance of understanding status of individual species.** Other species assessed, principally the small high-turnover species that dominated that fishery until it was closed, fell into the fully exploited category (Pitcher et al. 1998).

PRINCIPAL THREATS IDENTIFIED

Heavy fishing pressure has resulted in biological and ecosystem overfishing which are major biodiversity issues in Hong Kong waters due to historic unregulated and unmonitored fishing over many decades, and also the result of ongoing high and uncontrolled fishing selective and non-selective pressure on many species using many gear types (refer Sustainable Use group report). Many of the species of fish once commercially extremely valuable economically to the HK fishing fleet and fishermen are much reduced in catches and a large proportion of landings are now juveniles and faster growing species as a result of recruitment and growth overfishing. There is currently no quota system that controls the numbers of fishermen, fishing gears or fishing boats in HK waters to within limits that are biologically and ecologically viable to ensure sustainability in the marine ecosystem. Unlike most other developed economies, here are no size limits in place to protect juvenile fish or large, highly fecund, females of any fish species. Even in marine parks, fishing, other than trawling, occurs; a limited number of fishing permits have been issued by AFCD to the *bona fide* fishermen or persons who ordinarily reside near marine parks. All fishing activities are prohibited inside the core areas within Tung Ping Chau Marine Park and within the single Marine Reserve. Spearfishing is prohibited in Hong Kong's Marine Parks.

The biology and/or ecology of some species, especially those that have high longevity, specialized or limited habitat requirements and which may be particularly easy to catch at certain times such as in nursery or spawning areas, typically require fishery management. Incidentally, many of these are particularly valuable or desirable species in the fishery. If populations become heavily reduced they need time, and, in some cases protective measures, to recover their numbers and their value. Examples include Tolo Harbour and channel for seabream juveniles and the Pearl River Delta area for valuable spawning croakers and other species that once predominated in western waters; historically the PRD was an important spawning area for many commercially important and other species. Many coastal habitats, such as shallow soft shores, shallow pebble shores, coves and bays, are also believed to be/or once were important nurseries for fishes. Coral communities support species of butterflyfishes found nowhere else in local waters. Some species, such as the larger sharks, have been virtually extirpated due to intensive fishing pressure in Hong Kong and surrounding waters, and their ecological role as top predators in the ecosystem eliminated.

However, many of these habitats are degraded and some have disappeared (e.g., through reclamation). The quantitative effect of these impacts on fish stocks is not known but there is every reason to believe that the disappearance of these nurseries would have negative effects on some species which rely on them to complete certain life stages. The loss in terms of economic value, food and livelihoods has been considerable.

Several important commercial species in Hong Kong have a limited geographic range largely confined to China and adjacent areas (such as South Korea and Taiwan). Given the high fishing pressure and overfishing in China generally, fishing and coastal development activities in Hong Kong are significant for the future of some of these species (examples are the Giant and Large yellow croakers and Hong Kong grouper – see above).

Lack of information on the great majority of Hong Kong's marine fishes or fisheries makes their conservation condition, fishery status and history, and sustainable management challenging to assess or achieve. While there have been many studies related to fisheries and exploited species going back to the 1940s by AFCD (and previously AFD), universities, NGOs and during environmental impact assessments, there are no consistent studies of species or species-specific fisheries over the long-term to inform on the history of HK's fishery, and virtually no information for species-specific fishery assessments. Nonetheless, from existing work, unpublished studies and expert knowledge, there was sufficient knowledge to complete 24 red list assessments, with the remaining 3 species determined to be DD and requiring more information.

Lack of species-specific protection clearly represents a threat to several species. Hong Kong legislation does not include marine fishes as among those that can receive species-specific protection; marine fishes (and invertebrates) are not included under the HKSAR Wild Animals Protection Ordinance (Cap 170) because they are not considered to be 'animals' (or 'wildlife'). This limits the potential for species-specific action that could, however, be addressed under the Fisheries Protection Ordinance (Cap 171). In addition to the Critically Endangered and Endangered species identified in our assessments, an illustrative example of the need for species-specific action for threatened species was the incidental catch by fishers several years ago of a whale shark in HK waters, a globally threatened species, for which there was no legal means of protection in HK. Many species that might or do need conservation attention are not protected by any fishery management or conservation

regulation nor do they receive much/any protection in MPAs: the current marine parks and reserve do not include many habitat types and MPAs do not generally address heavy fishing impacts because they were set up to protect habitat and fishing continues in all marine parks.

The lack of species-specific protection produces a situation, as we see presently in Hong Kong, whereby species with slow life histories, some of which are commercially important fishery species, become threatened while those that replace themselves more quickly (mainly small pelagic species) proliferate. Hence, a shift in species composition to smaller, less economically valuable species (larger reef fish species and larger croakers, for example), and a loss of larger, more valuable species which are much more susceptible to overfishing has occurred. This situation is totally inconsistent with the objective of ecosystem management and Aichi targets 6 and 12 (below). It is also incompatible with developing a thriving and valuable fishing industry and inconsistent with several CSF and AFCD objectives on sustainability and conserving natural environment and its integrity.

Amendments to the HK Fisheries Protection Ordinance (Cap 171) were made in 2012 intended to maintain a sustainable level of fishing effort based on capping fishing capacity. Although the recently introduced trawling ban removed a destructive fishing method and major fishing pressure, it is estimated that the trawling ban reduced over 70% of the total engine power of fishing vessels operating in local waters, it does not address conservation concerns of many fish species, of associated habitats, or of the range of species that make up the local marine ecosystem and fishery. The trawl ban, moreover, cannot, alone, restore endangered or critically endangered species or address particularly vulnerable ones. Remaining fishing vessels number about 3,000 sampans and small vessels that use a range of gear types and fish around all waters of Hong Kong and represent considerable fishing effort.

As part of recent fishery measures, the Agriculture, Fisheries and Conservation Department (AFCD) is monitoring the fisheries resources in Hong Kong waters to assess the effectiveness of the trawling ban. AFCD is conducting fishing surveys by shrimp trawling, stern trawling and purse seining to assess fisheries resources in Hong Kong waters. The objective of the surveys is to establish information for review of fisheries management measures. Research fishing permits have been sought for trawling surveys. AFCD believes that the threat of trawling to species that occupy former trawling grounds, especially high catches and heavy

take of juveniles using trawl nets with small mesh sizes, and the physical habitat damage caused by bottom trawling, has been much reduced by the trawling ban that went into effect December 31st 2012. The trawling ban has also reduced the potential threat of incidental bycatch of certain vulnerable species such as rays and sawfish. The trawling ban does not address threats to reef-associated species.

The major gears that continue to be used and continue to take most of the species assessed to be threatened are hook-and-line (both recreational and commercial fishing) and gillnetting (commercial), and to a lesser extent fish traps (commercial) and purse seining (commercial). Spearfishing for some reef fishes is practised by hundreds of recreational fishermen particularly interested in targeting larger groupers, parrotfish and wrasses. For full coverage of fishing gears in relation to sustainable use, please refer to the report of the Sustainable Use Working Group.

Habitat Loss and Degradation Habitat loss and degradation that can affect marine and coastal fish populations are caused by a range of impacts which continue to impact many species. These include reclamation, pollution and certain fishing methods. Impacts caused by reclamation and pollution from land-based development are usually overlooked but their impacts on marine fishes are disastrous. They would not only impact on intertidal species, usually of no commercial value, but would also affect species need to live in intertidal/shallow areas to complete their life cycles (e.g., utilising those areas as nurseries); many of these species are of moderate to high commercial value (e.g., seabreams, snappers, mullets, whittings). Effects of pollution (e.g., harmful algal blooms) would also have a profound impact on fishes living offshore and their habitats. Prior to the trawling ban, bottom trawling extensively damaged marine substrate in Hong Kong waters and contributed to overfishing. It is expected to take a number of years for the habitat to recover and for affected fish population to show signs of recovery. Other fishing gears, still in use, can also damage habitat under certain circumstances (see Sustainable Use Working Group). Another impact on marine fishes is the effect of human activities along the shore, such as sewage systems, construction, reclamation, etc. Please refer to report of the Marine Impact Assessment Focus Group. While MPAs may provide limited protection to some reef fishes, they cover < 2% of Hong Kong waters and most MPAs focus on coral and rocky reef habitat which is not the preferred habitat for approximately 2/3 of the fish species in Hong Kong waters.

Responses to threatening factors

MANAGEMENT AND CONSERVATION CURRENTLY IN PLACE OR PLANNED

Individual species of marine fishes have not been the focus of conservation or management measures to date in Hong Kong and few species-specific data were available. This includes species specific detail in AFCD records on commercially exploited species. Indeed no vulnerable or threatened marine fish is addressed under Hong Kong legislation: Wild Animals Protection Ordinance (Cap. 170), Animals and Plants (Protection of Endangered Species) Ordinance (Cap. 187), or Fisheries Protection Ordinance (Cap. 171). For some species, marine protected areas (MPAs) may offer some protection although these (MPAs) were established for habitat protection, and in all but the single marine reserve at Cape D'Aguilar fishing continues (except for trawling) under licence (Cap. 476 Marine Parks Ordinance).

In relation to sustainable fisheries, the Committee on Sustainable Fisheries (CFS) was established in 2006 to study the long-term goals and advise the Administration on the direction and feasible options for the sustainable development of the local fishing industry. **According to the Committee on Sustainable Fisheries (CSF) report, one priority should be the conservation of marine ecosystem and fisheries resources: without this sustainable fisheries development that depends on biological and ecosystem health cannot be achieved.** Since the CFS submitted its report in 2010, the Administration has begun implementing or planning for measures recommended by the CFS to take the industry back to a sustainable path.

The CSF proposed, in addition to the trawling ban recently implemented, several other measures to control fishing effort in local capture fisheries and sustainable development of the fishing industry. Relevant to marine fishes:

- (1) Maintain an appropriate number of fishing vessels;
- (2) Strengthen fisheries management and law enforcement.
- (3) Protect, conserve and rehabilitate the marine ecosystem and fisheries resources.
- (4) Control fishing effort of capture fisheries; and
- (5) Conserve and enhance fisheries resources.

These measures are important and many of the recommendations in this marine fish report address aspects of the measures proposed by CSF, including conserving fisheries resources and the marine ecosystem, strengthening fisheries management and law enforcement and maintaining an appropriate number of vessels. However, to enable progress on these above issues, monitoring of the resources is needed, fishing effort (gears, number of fishers) need to be controlled or modified (gears) and measures are needed for enhancement. **There are no proven solutions to habitat or resource enhancement in Hong Kong. Artificial reefs have been proposed and deployed but there is no available evidence that they work to bring net economic or biological benefits to marine ecosystems or species; they are still experimental and very expensive so their continued use needs to be justified, scientifically and economically.**

One of the key measures already taken to help recover the depleted fisheries resources to an ecologically sustainable level is banning of trawling activities in Hong Kong waters since 31 December 2012, among other already-existing destructive fishing bans, such as the use of explosives, toxic substances, electricity, dredging and suction. The Agriculture, Fisheries and Conservation Department (AFCD) is conducting fisheries resources surveys to determine what changes have occurred to fisheries resources such as demersal fishes with a view to assessing the effectiveness of the ban. To complement the trawling ban, the Fisheries Protection Ordinance (Cap 171) was amended in 2012 to establish a registration system for the local fishing vessels, limiting new entrants to maintain an appropriate level of fishing effort as determined by fishing power, restricting fishing activities of local non-fishing vessels and prohibiting fishing activities aided by non-local vessels in Hong Kong waters. As the ban has only been implemented for a short time, more biological data would be needed for analysis and monitoring of the effectiveness and trend of the measures. These measures do not address commercial fishing activities that utilize other types of fishing gear (refer to Sustainable Use WG) or recreational fishing.

The Government has various measures to protect the marine environment and reduce the impact of development work and water pollution. These measures include designation of marine parks and a marine reserve to protect habitat, such as corals, enforcing the legislation governing environmental impact assessments, water pollution control, and implementing schemes to strengthen control of pollution sources and sewage treatment. However, the

enforcement of these laws is sometimes ineffective and this is recognised by the Government (e.g., the enforcement of the Water Pollution Control Ordinance).

Fisheries management measures are intended to put the development of the fisheries industry on a sustainable track although monitoring of progress and enforcement of regulations will be necessary, but these require resources. AFCD considers that, in the short to medium term, priority should be given to establishing Fisheries Protection Areas (FPAs) (i.e., Tolo Harbour and Channel and Port Shelter) to protect important spawning and nursery grounds (these grounds need to be clearly identified), conduct fisheries resources enhancement programmes (although these do not address threatened species and have not been proven to be effective to date), and assessment of effectiveness of the trawl ban, etc. Although existing data on spawning and nursery grounds seem to be only preliminary (e.g., the 1998 study by ERM) and it is not known if the grounds still exist, some studies have already shown that some near-shore habitats, such as shallow soft shores, mangroves, etc., can be important fish nurseries.

To address the relevant Aichi targets, action is urgently needed to stem declines and aid recovery of several threatened marine species in Hong Kong waters as well as move towards a more biologically sustainable approach to fisheries management. Action in Hong Kong will be important for reducing threats to locally threatened species and for reducing/eliminating unsustainable practices. These can threaten species and greatly reduce societal benefits in the case of valued species. Increasingly, political entities are having to consider regional measures/collaborations to address problems of threats and overfishing in the case of particularly mobile species. In the case of Hong Kong, regional engagement is particularly important to consider given the city's heavy involvement in international trade of marine species and the wide spatial reach of its fishing fleets and businesses. Moreover, international cooperation is increasingly discussed as a means of dealing with threats to species and is also relevant to Hong Kong.

Recommendations

The following section highlights TEN recommendations emerging from the consideration of the status and current management of marine fishes in the light of Aichi targets, and government stated policies. **PRIORITY issues for action are highlighted.**

Species and Biodiversity

1. HIGH PRIORITY – THREATENED SPECIES For those species considered to be threatened according to the red list assessments, attention is clearly needed; high priority should be assigned to seek practical measures to manage/conservate several species listed as endangered or critically endangered. **The following 5 species urgently need species-specific attention: Chinese bahaba (or Giant yellow croaker), *Bahaba taipingensis*) Critically Endangered, and four Endangered (Large yellow croaker, *Larimichthys crocea*, Knobsnout parrotfish, *Scarus ovifrons*, Blackspot tuskfish, *Choerodon schloeneni* and Hong Kong grouper, *Epinephelus akaara*).** The 8 Vulnerable species (spotted eagle ray, yellow grouper, longtooth grouper, Dwarf Goby, Melon and Chevron butterflyfishes, Green Mudskipper and Big-finned Mudskipper) would need further data collection and some need immediate management or conservation actions (e.g., habitat protection).

Species-specific measures could be achieved by developing legislation in line with the protection of other (non-marine) Hong Kong wildlife and would need to legally require one or several appropriate measures, among them release with accidental capture, minimum size controls, or controls on relevant gears (such as spearfishing or mesh size) or places (e.g nurseries) for species determined to be at high level of threat. Moreover, threatened species could be designated as protected species under this ordinance. Under Section 4 – Regulations, the Chief Executive in Council may by regulation provide for (c) the prohibition or restriction of the taking of any variety of fish, or fish of any size, from the waters of Hong Kong; (d) the prohibition or restriction of the use of any specified kinds of net or of nets having a mesh of any specified size for the purpose of fishing; (g) the protection of spawning areas; (ga) the prohibition or restriction of the use of any apparatus of a class or description specified under paragraph (gb), for the purpose of fishing; and (h) generally, the protection or regulation of fishing. Use of marine resources is inclusive of fishing, scientific research, education and ecotourism.

In particular, for species with relatively narrow geographic distributions of which Hong Kong is an important part, such as several largely confined to Chinese, including HK, waters, improved and effective local measures could be extremely important for the global status of the species. A clear example of this is the highly threatened Chinese Bahaba which only occurs in Hong Kong and nearby regional waters. Conservation

actions in Hong Kong will be important for their recovery and to reduce the currently high chance of extinction. For such species, conservation action is urgently needed. Conservation action could be carried out at a regional level, with Hong Kong adopting similar protection (in this case) to that already in place in China.

2 HIGH PRIORITY - ADDRESSING BIODIVERSITY/ECOSYSTEM THREATS

The combination of some species at high risk of extinction, due to their biology, with other species that have faster life cycles and a low risk of extinction, but which now dominate the fishery and our marine ecosystem, requires for additional fishery management measures (in addition the control of fishing capacity and the trawling ban) and the provision of sufficient no-take protected areas to address a range of species that exhibit. Only in this way can ecosystem level threats be addressed

From a biodiversity and species conservation perspective the current uncertainty about the sustainability of the fishery, and lack of legislation that allows fishing effort to be capped through quotas, or limits on the amount of fishing that can be done per vessel, should the fishery be found to not be sustainable, remains a serious challenge to meeting Aichi targets. Control of vessel power alone will not address the range of threats faced by the fishery and marine species that comprise it.

3. MEDIUM PRIORITY-COLLABORATIONS: REGIONAL AND CROSS-

BORDER In the case of species exploited in Hong Kong or by Hong Kong fleets for which there is conservation concern but a wide regional distribution, action by Hong Kong may also be important. For example, for certain species such as larger skates and rays, and migrating fishes such as seabreams, regional actions or collaborations might be important for protection of stocks and biodiversity. This issue of the need for regional cooperation is increasingly under discussion globally for marine ecosystems and mobile species. One specific example is the development of management plans under the FAO International Plan of Action for the Conservation and Management of Sharks (IPOA-Sharks), in the Asian region, by Brunei Darussalam, Indonesia, Japan, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam. China has also indicated that it is involved in this process. The main aims of the IPOA-Sharks are to improve species-specific catch and landings data collection, and the monitoring and management of shark fisheries taking account of its widespread movements,

the need for a regional approach and the importance of country-specific actions. For marine species and with its geographically widespread fishing fleet, it is clear that Hong Kong should also be considering regional issues. Another relevant accord is the Convention on Migratory Species participation in which could address protection for whale shark, giant manta etc.

For species with relatively narrow geographic distributions of which Hong Kong is an important part, improved and effective local measures could be extremely important for the global status of the species. A clear example of this is the highly threatened Chinese Bahaba that only occurs in Hong Kong and nearby regional waters.

4. MEDIUM PRIORITY - MARINE INVASIVE SPECIES Marine invasive species have not been specifically addressed and are not known to be a specific threat to any of the 27 species considered, hence here is not considered high priority. Moreover, it is covered by other working groups. Nonetheless, it can be a serious problem to marine ecosystems, species and fisheries and certainly merits attention. Globally recognized and also relevant to Aichi target 9 is the control or eradication of invasive species and the prevention of their establishment. Measures are needed to control the import of invasive species through the importation for fish farming, religious (mercy) releases and releases of aquarium fish because implications for native species are not known and potentially harmful, according to experience elsewhere. For instance, Red Drum (*Sciaenops ocellatus*) is a popular species in Hong Kong's marine fish farms (floating cages). Individuals of this species are now common in local waters (may be escape from the farms or be introduced by mercy release). This croaker species would have the potential to compete with local croakers; at least two local croakers are considered to be critically endangered. In recent years, marine fish farms in Hong Kong are growing hybrid groupers from Malaysia and some individuals of the Sabah grouper (cross of *Epinehelus lanceolatus* and *E. fuscoguttatus*) have already been seen in the wild in local waters: many more grouper hybrids are being developed in the region. 'Mercy' release for religious reasons is another problem causing impacts on the marine fish community. While release of exotic predatory species could clearly be a problem, even release of species considered to be native could affect the local community (e.g., affect the genetic integrity). Measures should be put in place to understand control these activities. Moreover, given that novel artificial substrates, including artificial reefs, are known to be favoured by some invasive species, attention should be paid to this matter.

Habitat Loss and Degradation

A significant threatening factor for a number of species of concern is loss of, or damage to, their habitat, including, for some species, key nursery or spawning areas. Under current legislation, there is much opportunity to build on the current MPA system in Hong Kong by expanding on, and better connecting, protected areas currently in place. This could require incorporating a wider range of habitat types for protection to address species for which little or none of their habitat is protected and expanding the area full protected from fishing. It should be noted that under Section 4A – Orders, The Secretary (Secretary for Food and Health) may, by order published in the Gazette, (a) designate any area of the waters of Hong Kong to be a fisheries protection area to promote the conservation and management of marine and fisheries resources.

5. HIGH PRIORITY – PROTECT IMPORTANT HABITATS Key considerations in relation to marine species biodiversity should be given to identifying and protecting eliminating fishing (commercial and recreational) entirely within MPAs to ensure full protection of threatened species, as well as their habitat, from all fishing activities and to maintain areas for biodiversity build-up and conservation. There is also need to consider designation of “no-go areas” (e.g., no more destructive development, no more reclamation) to maintain/ preserve important habitats/ areas. This should also help to improve the coral habitat which health depends partly on associated faunal biodiversity (such as herbivores to reduce algal build-up and predators, such as the black-spotted tuskfish, to reduce coral predators). Important habitats (e.g., near shore nurseries) need to be protected from man-made disturbance and impacts. Globally, targets for MPAs are in the region of 10-20% and HK should move to such global goals in the near term. Improved land use planning system should also be applied to prevent the impacts from land-based developments along the shorelines. Greater habitat protection in reef areas could be achieved by establishing anchoring moorings for recreational boats, especially dive boats and yachts. Although the fisheries impacts arising from most reclamation proposals and some projects, e.g. impact on fisheries habitats/spawning and nursery ground, are already assessed and evaluated in the statutory EIA process, the present EIA system is often criticised by some environmentalists as being not effective and not comprehensive enough; there is in general a believe that the BSAP would need to seek for ways to improve the decision making processes and thus to

improve the protection of important habitats (see reports from Legislation Focus Group, Marine Impact Assessment Focus Group, Marine Habitat Focus Group, etc). MITIGATION. Destructive fishing activities have been prohibited under Fisheries Protection Ordinance (Cap.171). Hong Kong is a small place with relatively long coast line and a multispecies fisheries industry targeting a very diverse catch composition.

Habitat Degradation

6. HIGH PRIORITY –POLLUTION. Degradation of habitat from pollution needs addressing. For example, while the HATS (Harbour Area Treatment Scheme) and the re-direction of sewage discharge (from Shatin Sewage Treatment Plant) from Tolo Harbour to Kai Tak have improved the marine water quality of some areas and would also benefit to some of the habitats for marine fishes, many coastal waters are still suffering from pollution created on land and many important fish habitats are suffering due to this. **In order to mitigate the impact, we need to ensure that the pollution sources can be reduced, or, would not further increase.** For instance, the communal sewer network cannot reach some highly remote coastal areas (e.g., some Country Park Enclaves) so alternatives are needed for pollution mitigation with (e.g., greatly reduce the size of the Village Type Development zone). For areas with communal sewers, the connection rate of this system with private sewerage should be increased through enhancing enforcement of existing law(s) or by other administrative measures. The effectiveness of the Water Pollution Control Ordinance should be reviewed.

Data gaps/research needs/monitoring

7. HIGH PRIORITY-MONITORING OF FISHERY RESOURCES/BY-CATCH: There is a need to much improve the monitoring of key fishery resources and threatened species, identify spawning and nursery areas for important species for FPA/protected area placement, to expand the marine park network (and ban commercial fishing within them) and **to determine the levels of fishing (by all gears) that can be sustained biologically to effectively limit fishing effort to within biologically sustainable limits.** A strategy for monitoring marine species, especially commercially important or threatened species, in terms of biology, ecology, use and populations trends, as well as identifying key habitats, such as spawning and nursery areas is needed. Such monitoring needs to be conducted in a consistent,

scientifically based, and standardized way that encompasses long term data collection planning and monitoring to evaluate stock status as well as the effectiveness of introduced actions. Such monitoring can be selectively designed to address key/indicator species, issues and concerns. There are a number of modelling and fishery assessment approaches available for multi-species fisheries that require different levels of data acquisition. For exploited species, monitoring should encompass all gear types that continue to be extensively used (including hook and line, gill nets, spear-fishing) (see report of Sustainable Use Working Group).

8. HIGH PRIORITY - FOCUSED RESEARCH ON THREATENED SPECIES

There is a need to conduct research on species of actual or suspected concern. AFCD research addresses a number of terrestrial species but research on marine fishes is almost absent. A more balanced approach to developing and conducting a research agenda by AFCD is needed.

In general, other than the identified highly threatened species, priority for conservation action could be focused on those species with high commercial value and greatly reduced in numbers due to overfishing, those with specialized habitat requirements, or with restricted distribution due to their habitat requirement (e.g., fish species highly depending on coral/ certain coral species/ mudflat/ mangrove) and some diadromous species that might be particularly susceptible to environmental changes. While the difficulties of enforcement and cost effectiveness of species-specific measures should not be underestimated, such measures are feasible, have variously been applied in other countries and are essential for biodiversity conservation and sustainable fisheries.

9. MEDIUM PRIORITY - ENVIRONMENTAL IMPACT ASSESSMENTS AND

MITIGATION There is a need to incorporate the consideration of regionally assessed threatened species regularly within EIA evaluations for development projects in Hong Kong and, moreover, ensure that any mitigation measures intended/required following development projects are not only carried out but also assessed for their effectiveness. When the government is providing comments on new development proposals, the work land-use zoning plans that could affect the habitats of threatened species should be considered and the survival of highly threatened species given top priority in terms of planning and the approach to development work being conducted. A clear example of the need for this is the common

and expensive application of artificial reefs to mitigate marine habitat damage – this experimental approach is of no proven benefit to date in Hong Kong for conserving species or providing net economic or biological benefit, and urgently needs to be evaluated.

Education

10. HIGH PRIORITY - EDUCATION AND OUTREACH It is important to increase public and government awareness and appreciation of the value and biodiversity of Hong Kong's marine environment. This should lead to better support and understanding of the need for management initiatives, and highlight the longer term benefits of increased management and conservation activities. Fishes are wildlife too and a key part of the rich biodiversity of the city!

We have truly amazing marine life in HK, but it remains poorly known, or viewed simply as food. We need to move beyond this to a better recognition of the need to conserve marine life in its own right as well as acknowledge the economic and cultural value of thriving marine biodiversity.

APPENDIX – OUTCOMES OF 27 RED LIST ASSESSMENTS (REGIONAL TO HONG KONG) WITH SPECIES NAMES, ASSESSORS AND RED LIST CATEGORIES AND CRITERIA

Latin name	Chinese name	ASSESSOR	Common English name	HK RL Category	RL Criteria
<i>Acanthogobius ommaturus</i>	斑尾刺鰕虎魚	Tony Nip	Asian freshwater goby	NT	
<i>Acanthopagrus latus</i>	黃腳	Calton Law	Yellowfin seabream	NT	
<i>Acanthopagrus schlegeli</i>	黑魷	Calton Law	Black seabream	LC	
<i>Aetobatus narinari</i>	雀仔魷	Andy Cornish	Spotted eagle ray	VU	A2d+4d
<i>Bahaba taipingensis</i>	大澳魚	Yvonne Sadovy	Croaker, Chinese bahaba	CR	A2bd
<i>Bostrichthys sinensis</i>	中華烏塘鱧	Tony Nip	Four-eyed sleeper	NT	
<i>Cephalopholis boenak</i>	烏絲斑	Felix Chan	Chocolate hind	LC	
<i>Chaetodon lunulatus</i>	荷包魚，冬瓜	Stan Shea	Oval butterflyfish	VU	D
<i>Chaetodon plebeius</i>	荷包魚，雲蝶	Stan Shea	Blueblotch butterflyfish	NT	
<i>Chaetodon trifascialis</i>	荷包魚，箭蝶，排骨蝶	Stan Shea	Chevron butterflyfish	VU	D
<i>Choerodon schoenleinii</i>	青衣	Andy Cornish	Blackspot tuskfish	END	A4ad
<i>Collichthys lucidus</i>	獅頭魚，黃皮	Stan Shea	Lion head croaker	DD	
<i>Epinephelus akaara</i>	紅斑	Yvonne Sadovy	Hong Kong grouper	END	A2d
<i>Epinephelus awoara</i>	黃釘，黃釘斑，黃斑	Allen To	Banded grouper, yellow grouper	VU	A2d
<i>Epinephelus bruneus</i>	泥斑，雙牙仔	Allen To	Longtooth grouper, grouper	VU	A2d
<i>Epinephelus quoyanus</i>	花頭梅，花狗斑	Allen To	Longfin grouper	LC	
<i>Evynnis cardinalis</i>	二棘扯，扯	Calton Law	Crimson sea-bream, threadfin porgy	LC	
<i>Harpadon nehereus</i>	九肚	Emily Poon	Bombay duck	DD	
<i>Larimichthys crocea</i>	黃花	Yvonne Sadovy	Yellow croaker, croceine croaker	CR	A2d
<i>Lutjanus fulviflamma</i>	五間畫眉	Stan Shea	Dory snapper	DD	
<i>Oligolepis acutipennis</i>	尖鰭寡鱗鰕虎魚	Tony Nip	Barecheek goby	NT	
<i>Pagrus major</i>	七星魷，沙魷，紅魷，赤魷	Calton Law	Red pargo, Japanese seabream	NT	
<i>Pandaka bipunctata</i>	雙斑矮鰕虎魚	Tony Nip	Dwarf goby	VU	D2
<i>Periophthalmus magnuspinnatus</i>	大鰭彈塗魚	Tony Nip	Big-finned mudskipper	VU	D2
<i>Pomacanthus annularis</i>	白尾藍紋，白尾藍環	Stan Shea	Bluering angelfish	LC	
<i>Scartelaos histophorus</i>	青彈塗魚	Tony Nip	Walking goby	VU	D2
<i>Scarus ovifrons</i>	鬼頭衣	Andy Cornish	Knobsnout parrotfish	END	A2a

