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Fifth Meeting of the CCSBT Ecologically-related Species Working Group

To reduce the incidental catch of unwanted species by southern bluefin tuna fishery, the Commission for the Conservation of Southern Bluefin Tuna (CCSBT) held the Fifth Meeting of the Ecologically-related Species Working Group in Wellington, New Zealand over the period of February 2 to 5, 2004. Apart from representatives of the five member states—Japan, Australia, New Zealand, South Korea, and the ROC, Indonesia also sent an observer to the conference.

The main goal of the meeting was to exchange information on the incidental catch of ecologically-related species and relevant research results between member states and other southern bluefin tuna consumer countries, while reviewing the effectiveness of each country's monitoring, control, and awareness measures.

So-called 'southern bluefin tuna ecologically-related species' refer to seabirds, sharks, cetaceans, and sea turtles. Because the

main fishing grounds for southern bluefin tuna are located in the higher latitudes of the southern hemisphere, the main bycatch consists of seabirds. Sharks, cetaceans, and sea turtles are relatively seldom caught. Of the methods currently used by various countries to reduce the incidental catch of seabirds, among the most effective are the use of bird-proof lines, night fishing, employing blue dyeing bait, and the heavier weighting of lateral lines.

While research has shown that blue dyeing bait can lessen the incidental catch of seabirds, more study must be devoted to the problems of applying this method and approaches to reducing costs. In addition, the use of multiple methods to reduce the incidental catch of seabirds (for example, the simultaneous use of dyed bait and bird-proof lines) is more effective than the use of any one method alone.

Taiwan has already adopted numerous measures to reduce the incidental catch of ecologically-related species by long line fishing boats. For instance, Taiwan has stationed scientific observers aboard boats to collect incidental catch data and collect biological specimens. Fishing boat operators have been provided subsidies for the use of bird-proof

INTERNATIONAL CONSERVATION NEWSLETTER

lines, and the government has printed and distributed educational handbooks to strengthen fishermen's awareness of the need to lessen incidental catch of unwanted species. Stepped-up future research will seek to develop relevant control measures suited to Taiwan's fishing industry and put them into actual use. The Fisheries Administration (FA), Council of Agriculture (COA), appeals to fishermen to intensify measures to prevent incidental catch of seabirds and also to provide data on the catch of seabirds to researchers. Apart from preventing losses when seabirds devour bait, appropriate measures to reduce incidental catch will also achieve the long-term survival of both the birds themselves and the fishing industry.



INSIDE

- **Fifth Meeting of the CCSBT Ecologically-related Species Working Groups**
- **Extensive Coral Bleaching Reduces Taiwan's Live Coral Cover to Less than Half**
- **First Symposium on Indo-Pacific Humpback Dolphins in Taiwan**
- **Taiwan Announces Measures to Prevent Bird Flu**
- **Introduction to Taiwan's Nature Reserves: Wushi Coastal Nature Reserve**

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Extensive Coral Bleaching Reduces Taiwan's Live Coral Cover to Less than Half

The live cover of most species of deep-ocean scleractinian or stony corals in eight major coral reef areas around Taiwan (the Northeast Coast, Yilan, the East Coast, Green Island, Orchid Island, Kenting, Little Ryukyu, and the Penghu Islands) has fallen below 50 percent, according to the results of a recent survey by the Chinese Coral Reef Society (CCRS). In some areas, researchers found that coral destruction was so severe that live coverage reached less than 10 percent.

The results of the recently published survey—the first ecological survey of near-shore coral reefs in Taiwan, revealed that the island's corals are currently facing a grave threat to their survival.

Following continuous monitoring of the status of corals in Taiwan's waters over a period of seven consecutive years, the CCRS discovered that the vast majority of near-shore coral reefs around the island have suffered extensive damage from human activities, including dynamite fishing, sedimentation, overfishing, and wastewater pollution from expanding urban development, as well as natural disturbances like typhoons and climate change. Researchers also found that, in some places, corals even faced local extinction. Furthermore, they found that at least six of the 15 species of indicator reef fish species and invertebrates once commonly seen in Taiwan's

INTERNATIONAL CONSERVATION NEWSLETTER

near-shore waters have now disappeared. This is most likely because the loss of coral cover in the waters surveyed has meant that these coral-dependent species can no longer survive. The academics and experts who conducted the study called on Taiwan's government to immediately establish a coral reef conservation area to preserve Taiwan's coral resources, enabling it to protect its reputation as a 'coral kingdom'.

Conducted by a team of academics, conservationists and researchers headed by Chinese Coral Reef Society chairman and Academia Sinica Institute of Zoology associate researcher, Dr. M. H. Cheng, and Professor Chang-feng Dai of the Institute of Oceanography at National Taiwan University, the survey utilized the Reef Check methodologies currently used in global efforts to monitor the world's coral resources. The survey team undertook regular inspections of the coral reefs surrounding Taiwan to better understand their current status and monitor changes in the reefs' condition.

The researchers chose a total of 32 survey sites within the eight marine areas off the Northeast Coast (Tungpei-chiao), Yilan, the East Coast, the Hengchun Peninsular (Kenting), Green Island (Lutao), Orchid Island (Lanyu), Little Ryukyu (Hsiao Liu-chiu), and the Penghu Islands (the Pescadores). At each site, the researchers extended a 50-meter by 50-meter mesh to calculate the number of coral reef indicator species. These included seven coral reef indicator fish species and eight invertebrates. They then surveyed the rate of

cover by stony corals (scleractinian corals), soft corals (leather corals), algae, sea sponges, empty substrate, dead coral, gravel, sand, mud and other materials within the limits of the survey mesh. Finally, the two types of data were analyzed by cross-check analysis in order to determine the ecological status of coral reef populations around Taiwan.

The results of the survey revealed that, of the seven indicator fish species, only the butterfly fish was commonly seen, with small numbers of Haemulidae, Lutjanidae and Epinephelus species also being seen. Members of the Petrochromis, Labridae, and Scaridae families and the Barramundi cod (*Cromileptes altivelis* Valenciennes) were practically non-existent. As for indicator invertebrates, a small number of *Diadema setosum* (Leske, 1778), *Tridacna crocea*, edible sea cucumbers and banded coral shrimp (*Stenopus hispidus* Hansen) were found, but no records of pencil urchins (*Heterocentrotus mammillatus*), crown-of-thorns starfish (*Acanthaster planci*) and trumpet triton (*Charonia tritonis*) were made.

As far as the rate of scleractinian coral cover was concerned, it was found that coral coverage at Kenting, Little Ryukyu, and the He-mei and Mao-ao marine areas of the Northeast Coast was tending to fall, revealing that the coral populations there are declining. However, some cheer was to be found in the fact that scleractinian coral populations in the waters around Green Island and Orchid Island still maintain a reasonably high level of coverage. Researchers said that this was mainly

INTERNATIONAL CONSERVATION NEWSLETTER

because Green Island and Orchid Island are virgin territory for corals and, therefore, still have relatively untouched areas of coral reef. They recommended that the government should immediately establish a coral reserve in both areas and prohibit all large-scale fishing activities and aquaculture in the region.



First Symposium on Indo-Pacific Humpback Dolphins in Taiwan

The National Museum of Marine Biology Aquarium (NMMBA) held the First Symposium on Indo-Pacific Humpback Dolphins in the Waters of Taiwan on February 23, 2004. The domestic and foreign experts and specialists invited to this conservation symposium provided their recommendations concerning research into and conservation of the Indo-Pacific humpback dolphins (*Sousa chinensis*, also known as the Chinese white dolphin) found living off the west coast of Taiwan by NMMBA in 2002 and 2003 (see Issue 11-3 for further details). Participants of the symposium also drafted a conservation and ecological research action plan intended to help the Indo-Pacific humpback dolphin to continue to survive in Taiwanese waters.

Participants of the symposium jointly listed known or potential threats to the humpback dolphin schools found off the west coast of Taiwan. These threats include:

- * **Reduction in freshwater runoff:** Humpback dolphins are extremely dependent on river mouth habitats. The destruction of river mouth ecosystems due to reduction of freshwater runoff may, therefore, possibly place severe restrictions on the scope of the dolphins' habitat.
- * **Large-scale coastal development:** While it is difficult to determine the effect on the dolphins of ongoing coastal industrial development, seawall construction, sand and gravel extraction, and the filling of marine areas to create land, these forms of development may represent a major threat.
- * **Accidental killing of dolphins in nets:** Dolphins are often caught and killed in widely used gill nets.
- * **Toxic pollution:** Pollution from industry, farmland, and household sewage contains toxic chemicals that may affect dolphins' health and also harm food organisms (pollution may cause reproductive abnormalities or weaken the dolphins' immune systems).
- * **Disappearance of food sources:** Overfishing and the disappearance of marine habitat off the west coast of Taiwan are eroding the quality and quantity of the dolphins' food sources.

Apart from the impact of human activities, the remaining potential threats include small population (which may reduce genetic diversity and survival ability), disease (infectious diseases may cause large-scale die-offs),

INTERNATIONAL CONSERVATION NEWSLETTER

isolated accidents (such as major spills of petroleum or chemicals), and climate change (which may cause the frequency and intensity of typhoons to increase or cause droughts in watershed areas and reduction of river mouth freshwater flow), etc. Humpback dolphins may be very vulnerable to any or all of these threats.

Participants at the symposium stated that the following research tasks must be performed before any effort can be made to protect Taiwan's humpback dolphins:

1. A population estimate must be made.
2. The humpback dolphins' preferred ranges, seasonal movements, and major habitats must be determined.
3. A clearer understanding of the nature, distribution, and severity of the threats facing the dolphins must be obtained. This research should, for instance, investigate fishing catch per unit effort (including types of fishing gear, numbers of boats, and number of days at sea), freshwater treatment efforts, and coastal development, etc.).
4. Researchers must keep tabs on pollution sources along the west coast of Taiwan, and identify and evaluate the risks accompanying exposure to toxic substances.

The symposium concluded with three recommendations: (1) The habitat needs of humpback dolphins must be taken into consideration when performing environmental impact assessments. Attention should be paid to the direct or possible impact of coastal and interior development on the dolphins; (2) If

possible, a supervisory system consisting of personnel in different professional fields (similar to Hong Kong's Marine Mammal Conservation Working Group) should be established to oversee dolphin conservation research and activities; and (3) Regular working conferences should be held to oversee research and program implementation. Because the Indo-Pacific humpback dolphin is not migratory, it may be extremely vulnerable to habitat destruction. It is recommended that a regionally-based management strategy, perhaps similar to Hong Kong's protection zones, be adopted.

Note: SWAN is grateful to Mr. Tse-Ming Hsiao of the National Museum of Marine Biology Aquarium for providing symposium information.

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Taiwan Announces Measures to Prevent Bird Flu

Cases of highly pathogenic avian influenza—commonly known as bird flu—have turned up in 10 Asian countries. While avian influenza has not appeared in Taiwan thus far, the island's geographical location close to other Asian countries where the disease has occurred and the region's busy passenger and cargo traffic puts it at considerable risk. In addition, avian influenza can be transmitted to many kinds of wild birds, especially migratory waterfowl, and Taiwan is located along major north-south migration routes. Because many birds whose travels have taken them through areas where avian influenza has occurred are currently migrating through Taiwan, the

INTERNATIONAL CONSERVATION NEWSLETTER

government has therefore announced measures to prevent the entry of avian influenza via migrating birds, as follows:

1. Poultry raisers have been asked to set up surrounding nets to prevent migratory birds from entering poultry farms. Poultry raisers are also taking steps to disinfect their farms.
2. Strengthening migratory bird monitoring activities: In addition to four existing migratory bird monitoring points in Taipei, Yilan, Tainan, and Kinmen, the Bureau of Animal and Plant Health Inspection and Quarantine has commissioned the Wild Bird Federation Taiwan to establish long-term avian influenza virus monitoring stations near major bird habitats in Taipei, Yilan, Changhua, Tainan, Kinmen, Chiayi and Penghu. These stations will monitor more than 100 flocks of migratory birds for the avian influenza virus.
3. All poultry farms in the vicinity of migratory bird habitat will be subject to intensified testing. The number of chickens tested at each farm will be increased to 3,000, and the sampling rate increased to almost 60 percent. Simulation exercises will be used to establish procedures for dealing with outbreaks.
4. Active sampling and testing of suspected cases of the disease: The four regional poultry health centers will perform active sampling and testing of terrestrial birds suspected of having contracted the disease. City and county animal disease control

agencies will perform active sampling and testing of waterfowl. Poultry or migratory birds will be immediately killed and disposed of if found to carry the highly pathogenic avian influenza virus.

5. Ports and airports will implement strengthened quarantine measures intended to guard against smuggling and the less-pathogenic form of avian influenza.

The Department of Health's Center for Disease Control (CDC) announced on March 31, 2004 that its monitoring data indicates that the number of probable cases of influenza in Taiwan, and the rate of positive detection of the virus, are both gradually declining, which suggests that the peak flu season is drawing to an end in Taiwan. However, the CDC still appeals to poultry and livestock raisers, and to persons who have recently returned to Taiwan from areas of spontaneous avian influenza outbreaks, to immediately seek medical attention if they experience any possible symptoms of influenza. The CDC further urges all hospital physicians to immediately notify it if they encounter any clusters of fever patients or persons suspected of having influenza.

Although the migratory gray-faced buzzard is a raptor species that spends most of its time in mountainous areas, for instance, the Mt. Pakua area, while in Taiwan, and are very unlikely to come into contact with poultry farms, the fact that some of the buzzards may have come from the avian influenza-infested areas of Southeast Asia spurred government agencies to consider canceling or scaling back the annual "Buzzards over Mt. Pakua" activity

INTERNATIONAL CONSERVATION NEWSLETTER

held in late March. However, the Changhua Wild Bird Federation ultimately went ahead and held the 2004 Buzzards over Mt. Pakua activity from March 27 to 28, 2004 allowing the public to appreciate the gray-faced buzzard and other rare birds.



Introduction to Taiwan's Nature Reserves Wushi Coastal Nature Reserve

Located in eastern Taiwan, Wushi Coastal Nature Reserve has some of the best coastal promontory landscape in Taiwan. The Reserve was formally established by the Council of Agriculture (COA) in January 1994, with the aim of conserving the region's coastal forest and unique headland scenery.

The Reserve is situated on Wulin Coast at Su'ao in Yilan County. It juts out from the eastern edge of Taiwan into the Pacific Ocean in a nose-shaped promontory, cutting the coastline into Nanaowan to the north and Tungaowan to the south. The terrain is precipitous and the promontory represents the most unusual and interesting natural feature along this stretch of coast. To the west of the Reserve, steep cliffs overlook the Pacific with a rocky beach formed by fallen, broken rocks down below. Many years of weathering and erosion by strong winds and waves have created a spectacular and unique shoreline topography. The Reserve is long and narrow in shape and covers a total area of 311 hectares. It encompasses all the land from the highest seaward-facing hill-line at Tung'ao Peak to the west, at an elevation of 701

meters above sea level, all the way down to the sea to the east.

Geological analysis of the rock strata shows that the area belongs to the Paleozoic era group of rocks known as Tananao schist, formed approximately 400 million years ago, making it a relatively ancient piece of land. Facing onto the Pacific Ocean, the Reserve is of the tropical marine climate type. The region is subject to strong coastal winds all year round and, on average, it rains for more than 200 days each year.

The plant cover within the Reserve is of subtropical low broadleaf forest type, including virgin Taiwan oak. Most of the flora is evergreen broadleaf forest with a few deciduous trees interspersed within. Lauraceae species like the Large-leaved nanmu (*Machilus kusanoi*), *Machilus thunbergii* Sieb., and *Lindera megaphylla* Hems. are the predominant species. In addition, there are also large numbers of other tree species, including sycamores, Yellow basket-willows (*Engelhardtia roxburghiana*), Formosan michelia (*Michelia compressa* var. *formosana*), Snowball trees (*Styrax suberifolia*), *Elaeocarpaceae sylvestris*, and Ring-cupped oaks (*Cyclobalanopsis glauca*). On account of the warm, damp climate, there is also an abundance of shrubs, lianas (creepers) and ferns.

As the forest cover preserved by the Reserve is relatively intact, as many as 113 different species of butterfly have been recorded there, including the rare and precious Heng-chun birdwing butterfly or Golden

INTERNATIONAL CONSERVATION NEWSLETTER

birdwing (*Troides aeacus kaguya*), *Byasa impediens*, and others. The area is also habitat to 59 species of wild bird. In addition to the black bulbul (*Hypsipetes leucocephalus*), the yellow-throated minivet (*Pericrocotus solaris*), and the gray-cheeked fulvetta (*Alcippe morrisonia*), all of which are commonly seen within the Reserve, the area also has a stable population of crested serpent eagles (*Spilornis cheela*) and has recorded sightings of such endangered species as the black eagle (*Ictinaetus malayensis*) and the honey buzzard (*Pernis ptilorhynchus*). In addition, a number of wild animals live in the forest, including the red-bellied tree squirrel (*Callosciurus erythraeus* (Bonhote)) and the Formosan rock-monkey (macaque) (*Macaca cyclopis* (Swinhoe)) among others.

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