

行政院及所屬各機關出國報告  
(出國類別：出席國際會議)

## APEC「漁具流失及海洋棄置物研 討會」出國報告

服務機關：行政院農業委員會水產試驗所  
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出國地區：美國  
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APEC「漁具流失及海洋棄置物研討會」出國報告

主辦機關:

行政院農業委員會水產試驗所

聯絡人/電話:

/

出國人員:

劉燈城 行政院農業委員會水產試驗所 研究員兼主任秘書

出國類別: 其他

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關鍵詞: 亞太經濟合作組織(APEC); 漁業工作小組(FWG); 海洋棄置物  
(Marine Debris)

內容摘要: 流失之漁具及相關之海洋棄置物, 可能危及船舶航行之安全及造成人員生命與財產之損失。為解決此等問題, 美國於亞太經濟合作組織(Asian Pacific Economic Cooperation; APEC) 漁業工作小組(Fisheries Working Group; FWG) 第十三屆年會中, 提出舉辦「漁具流失及海洋棄置物研討會」之計畫, 並獲APEC財務委員會於2002年9月核可辦理。本研討會之目的在於, 促進APEC各經濟體間, 對於上述問題之積極性對話、資訊交換、技術協助及知能之累積。研討會於2003年元月13日至16日假美國夏威夷大學East-West Center舉行。本人獲邀於會中發表個案研究(Case study)報告及擔任研討會第二分組討論會之主持人, 並由APEC提供本人參加會議時所需的費用。研討會由FWG主導成員(Lead Shepherd)美國國務院的Mr. Stetson Tinkham擔任主席, 廣邀產官學等各界之人士共60餘人出席, 與會人員包括澳洲、日本、韓國、墨西哥、紐西蘭、秘魯、泰國、美國及我國等九個經濟體的代表, 政府間及非政府組織的代表計有: 南極海洋生物保育組織(CCAMLR; Conservation of Antarctic Marine Living Resources), 美洲熱帶鮪魚委員會(IATTC; Inter-American Tropical Tuna Commission)(IMO;), 聯合國糧農組織(FAO; Food and Agriculture Organization), 國際海事組織(International Maritime Organization), 海洋管理局(The Ocean Conservancy), 海魚局(SEAFISH Authority)和南太平洋地區環境計畫(SPREP; South Pacific Regional Environment Program), 西北海峽委員會(NWSC; Northwest Strait Commission)等。四天的研討會內容包括個案研究報告、分組討論會、技術性參訪及壁報展覽。地區性的個案研究報告有美國、韓國、澳洲、中華台北及日本等5篇, 分組討論會有科學及政策(Science and Policy), 漁具及實務(Fishing Gear and Practices), 港口、回收及丟棄物

(Recovery, Ports and Disposal)，國際和國內之法規結構(International and Domestic Regulatory Structures)等4場。研討會於總結及建議時提出，漁具流失及相關之海洋棄置物，將對海洋環境之維護、海洋生物資源之永續利用、航行之安全、棲地之破壞、經濟方面之損失等造成嚴重之影響。因此，研討會認為應採取一些預防措施，並號召APEC的經濟體採取國家層級、地區性、國際性之行動，且籌湊足夠的財源以推動此工作。研討會也認為APEC的相關經濟體，有必要成立一常設團體以研議此等問題。類似此次APEC所召開之國際會議，其所涉及之層面相當廣泛，我國實應跨部會結合相關單位的力量，整合成一個團隊，將各個不同領域的成果，利用國際會議的場合去做國家形象的最好展現。據了解聯合國糧農組織已著手從事一些從流失漁具中找出物主的規範，我國漁業行政單位應未雨綢繆，多方宣導漁民於海上不要丟棄廢漁具，或訂定鼓勵漁民將海上的廢棄物拾回處理等辦法，以符合世界潮流之趨勢。

本文電子檔已上傳至出國報告資訊網

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## 摘 要

流失之漁具及相關之海洋棄置物，可能危及船舶航行之安全及造成人員生命與財產之損失。為解決此等問題，美國於亞太經濟合作組織（Asian Pacific Economic Cooperation; APEC）漁業工作小組（Fisheries Working Group; FWG）第十三屆年會中，提出舉辦「漁具流失及海洋棄置物研討會」之計畫，並獲 APEC 財務委員會於 2002 年 9 月核可辦理。本研討會之目的在於，促進 APEC 各經濟體間，對於上述問題之積極性對話、資訊交換、技術協助及知能之累積。

研討會於 2003 年元月 13 日至 16 日假美國夏威夷大學 East-West Center 舉行。本人獲邀於會中發表個案研究（Case study）報告及擔任研討會第二分組討論會之主持人，並由 APEC 提供本人參加會議時所需的費用。

研討會由 FWG 主導成員（Lead Shepherd）美國國務院的 Mr. Stetson Tinkham 擔任主席，廣邀產官學等各界之人士共 60 餘人出席，與會人員包括澳洲、日本、韓國、墨西哥、紐西蘭、秘魯、泰國、美國及我國等九個經濟體的代表，政府間及非政府組織的代表計有：南極海洋生物保育組織（CCAMLR; Conservation of Antarctic Marine Living Resources），美洲熱帶鮪魚委員會（IATTC ; Inter-American Tropical Tuna Commission）（IMO;），聯合國糧農組織（FAO; Food and Agriculture Organization），國際海事組織（International Maritime Organization），海洋管理局（The Ocean Conservancy），海魚局（SEAFISH Authority）和南太平洋地區環境計畫（SPREP; South Pacific Regional Environment Program），西北海峽委員會（NWSC; Northwest Strait Commission）等。

四天的研討會內容包括個案研究報告、分組討論會、技術性參訪及壁報展覽。地區性的個案研究報告有美國、韓國、澳洲、中華台北及日本等 5 篇，分組討論會有科學及政策（Science and Policy），漁

具及實務(Fishing Gear and Practices),港口、回收及丟棄物(Recovery, Ports and Disposal),國際和國內之法規結構(International and Domestic Regulatory Structures)等4場。

研討會於總結及建議時提出,漁具流失及相關之海洋棄置物,將對海洋環境之維護、海洋生物資源之永續利用、航行之安全、棲地之破壞、經濟方面之損失等造成嚴重之影響。因此,研討會認為應採取一些預防措施,並號召 APEC 的經濟體採取國家層級、地區性、國際性之行動,且籌湊足夠的財源以推動此工作。研討會也認為 APEC 的相關經濟體,有必要成立一常設團體以研議此等問題。

類似此次 APEC 所召開之國際會議,其所涉及之層面相當廣泛,我國實應跨部會結合相關單位的力量,整合成一個團隊,將各個不同領域的成果,利用國際會議的場合去做國家形象的最好展現。據了解聯合國糧農組織已著手從事一些從流失漁具中找出物主的規範,我國漁業行政單位應未雨綢繆,多方宣導漁民於海上不要丟棄廢漁具,或訂定鼓勵漁民將海上的廢棄物拾回處理等辦法,以符合世界潮流之趨勢。

關鍵語：亞太經濟合作組織 (APEC); 漁業工作小組 (FWG); 海洋棄置物 (Marine Debris)

## APEC「漁具流失及海洋棄置物研討會」

### 壹、目的

流失之漁具及相關之海洋棄置物，可能危及船舶航行之安全及造成人員生命與財產之損失。加上無主之流失或棄置漁具，則持續捕獲海中經濟性魚類、鳥類及哺乳動物，此即一般所謂的「幽靈漁撈」(ghost fishing) 並且破壞水中生物棲息場所等，對海洋環境及生態造成嚴重之衝擊。

為解決此等問題，美國於亞太經濟合作組織 (Asian Pacific Economic Cooperation; APEC) 漁業工作小組 (Fisheries Working Group; FWG) 第十三屆年會中，提出舉辦「漁具流失及海洋棄置物研討會」之計畫，並獲 APEC 財務委員會於 2002 年 9 月核可辦理。本研討會之目的在於，促進 APEC 各經濟體間，對於上述問題之積極性對話、資訊交換、技術協助及知能之累積。

本研討會由美國負責承辦，美方並函請 APEC 各經濟體推薦專家學者出席 2004 年元月 13 至 16 日於夏威夷 Honolulu 舉辦之研討會，及發表此領域之研究概況以及管理政策等報告。行政院農業委員會漁業署遂於 2003 年 8 月 25 日致函水試所推薦適當人選，俾供主辦單位列為邀請我國與會之參考對象。

本人於 2003 年 9 月 29 日接獲研討會計畫監督 (Project overseer) Mr. Colin McIFF 之正式邀請函，邀請本人於會中發表個案研究 (Case study) 報告及擔任研討會第二分組討論會之主持人，並由 APEC 提供本人參加會議時所需的費用。

### 貳、會議內容

- 一、會議時間：2003 年元月 13 日至 16 日
- 二、會議地點：美國夏威夷大學 East-West Center
- 三、參與人員：

研討會由 FWG 主導成員 (Lead Shepherd) 美國國務院的

Mr. Stetson Tinkham 擔任主席，本研討會廣邀產官學等各界之人士共 60 餘人聚集一堂，與會人員包括澳洲、日本、韓國、墨西哥、紐西蘭、秘魯、泰國、美國及我國等九個經濟體的代表，政府間及非政府組織的代表計有：南極海洋生物保育組織 (CCAMLR; Conservation of Antarctic Marine Living Resources)，美洲熱帶鮪魚委員會 (IATTC ; Inter-American Tropical Tuna Commission) (IMO; )，聯合國糧農組織 (FAO; Food and Agriculture Organization)，國際海事組織 (International Maritime Organization)，海洋管理局 (The Ocean Conservancy)，海魚局 (SEAFISH Authority) 和南太平洋地區環境計畫 (SPREP; South Pacific Regional Environment Program)，西北海峽委員會 (NWSC; Northwest Strait Commission)，各國與各組織代表之與會人員名單如附件 1。

#### 四、會議經過

四天的研討會內容包括個案研究報告、分組討論會、技術性參訪及壁報展覽。地區性的個案研究報告有美國、韓國、澳洲、中華台北及日本等 5 篇，分組討論會有科學及政策 (Science and Policy)，漁具及實務 (Fishing Gear and Practices)，港口、回收及丟棄物 (Recovery, Ports and Disposal)，國際和國內之法規結構 (International and Domestic Regulatory Structures) 等 4 場。研討會之議程如附件 2。研討會每日之活動內容如下：

##### (一) 第一天：元月 13 日

上午 8 時辦理報到，9 時舉行開幕式。開幕式由西太平洋地區漁業管理理事會 (Western Pacific Regional Fishery Management Council) 執行長 (Executive Director) Ms. Kitty Simonds 致歡迎詞。此外，FWG 主導成員 (Lead Shepherd) 也是本研討會主席的 Mr. Stetson Tinkham，說明 APEC 舉辦



此研討會之目的及所扮演之角色，並歡迎各與會人員出席此會議。

接著進行會議（plenary session），首先由 The Ocean Conservancy 的 Ms. Seba Sheavly 以 “Marine Debris-An Overview of a Critical Issue for Our Oceans” 為題提出報告。地區性個案研究報告提出之國家及報告人有：1.美國的 Mr. Gregory Schorr 及 Dr. Mary Donohue。2.韓國的 Dr. Dong-Oh Cho。3.澳州的 Dr. Ilse Kiessling。4. 中華民國的 Dr. Don-Chung Liu。5. 日本的 Mr. Toshihiro Watanabe。

中華民國由本人提出個案研究報告，報告的英文摘要如附件 3，主要綱要包括下列五項：

1. 2002 年中華民國的海洋漁業概況並探討各漁業漁具流失之可能性。
2. 與海洋漁業有關的機關及其主要職掌。
3. 漁具流失及海洋廢棄物：以延繩釣及流刺網為例，檢討漁具流失的原因，可能之解決方案。
4. 2002 年人工魚礁清除及海岸淨灘活動(由漁業署及環保署提供相關資料)。
5. 未來展望。

進行第一分組討論會（Science and Policy）由日本 Dr. Tatsuro Matsuoka 擔任主持人，發表報告者計有紐西蘭的 Dr. Murray Gregory，美國的 Mr. Jeff Fune，日本的 Dr. Tatsuro Matsuoka，美國的 Dr. Mary Donohue 及 Dr. Anthony L. Andrady。第二分組討論會（Fishins Gear and Practices）由本人擔任主持人，發表報告者計有美國的 Mr. Brent Paine，英國的 Mr. Philip Mac Mullen，美國的 Mr. Jim Cook, IATTC 的 Mr. Ernesto Altamirano，日本的 Mr. Kiyokazu Inoue。

晚上 6：30 分於 East-West Center 的庭園餐廳舉行歡迎酒會及欣賞保育團體所拍攝之海洋生態影片。

(二)第二天：元月 14 日

進行第三分組討論會 (Recovery, Pots and Disposal) 由美國的 Mr. Howard Wing 擔任主持人，發表報告者計有美國的 Mr. Howard Wing, 薩摩亞的 Mr. Sefania Nawadra, 美國的 Ms. Fran Recht、Mr. Joe Schmitt 及 Mr. James Banigan。

(三)第三天：元月 15 日

進行第四分組討論會，主題為 Domestic and International Regulatory Structures，由美國 Ms. Holly Koehler 擔任主持人，發表報告者計有美國的 Ms. Lindy Johnson，澳州的 Mr. Eric Apple IMO 代表 Mr. Sefaina Nawadra，美國的 LCDR Chris Curatilo、Mr. Ed Araki 及 Mr. Rick Steiner.

最後由研討會主席 Mr. Stetson Tinkham，主持分組討論會及研討會之總結及建議事項的彙整工作。下午 6 時舉行閉幕式。

(四)研討會之總結及建議

研討會認為漁具流失及相關之海洋棄置物，將對海洋環境之維護、海洋生物資源之永續利用、航行之安全、棲地之破壞、經濟方面之損失等造成嚴重之影響。因此，研討會認為應採取一些預防措施，並號召 APEC 的經濟體採取國家層級、地區性、國際性之行動，且籌湊足夠的財源以推動此工作。研討會也認為 APEC 的相關經濟體，有必要成立一常設團體以研議此等問題。與會人員並做成以下八大類之建議：

1. Outreach and education;
2. Monitoring/data collection and research;
3. Engaging stakeholders;

4. Business and industry involvement;
5. Innovation and incentives;
6. Economic impacts;
7. Regulations, compliance, institutions, and infrastructure; and
8. Financing mechanisms.

#### 五、技術性參訪活動

元月 16 日參觀夏威夷金屬再利用公司(Hawaii metal recycling company) 及廢棄物焚化公司 HPower。夏威夷金屬再利用公司主要業務為處理廢棄之金屬物品，也兼處理從海上回收之廢棄網具和繩索等。處理後的網具再送至 HPower 焚化。於下午 3：30 結束技術性參訪活動。

晚上 6 點於 Waikiki Aquarium 由主辦單位舉辦歡送餐會。

#### 參、心得

- 一、據了解太平洋地區已分別於 1984、1989、2000 年舉辦有關海洋廢棄物之國際間研討會，隨著國際間海洋生態、環保意識的提高，未來有關漁具流失及海洋廢棄物的問題，勢將更受國際的重視。我國為全世界第 6 大公海漁業大國，作業漁船遍及各大洋，對於類似之國際研討會應積極參予，並預作對策及加強對漁友之宣導。
- 二、美國主辦此國際會議，從邀請各國派員參加、發邀請函、蒐集與會人員簡歷、報告摘要、飛機定位、安排旅館及會議結論等工作，從會議籌備到開會為止僅三個月的時間，全部以 E-mail 聯絡，積效卓著，可作為我們而後舉辦國際會議之參考。

#### 肆、建議

- 一、此次 APEC 所召開之國際會議所涉及之層面相當廣泛，實非單獨的一個單位，或一個人去發表一篇「個案研究」報告，就能面面俱到，而應是要跨部會結合相關單位的力量，整合成一個團隊，把我國在各個不同領域的成果，利用國際會議的場合去做國家形

象的最好展現。以此次的會議而言，我國除水試所外漁業署、環保署都應派人與會，或發表報告或提供壁報（poster）展示。以日本為例，與會的代表就有 8 位之多，包括政府官員、學術研究人員、產業界甚至於同時翻譯的人員，頗值得我國之借鏡。

二、據了解聯合國糧農組織已著手從事一些要從流失漁具中找出物主的規範（詳如附件 4），我國漁業行政單位應未雨綢繆，多方宣導漁民於海上不要丟棄廢漁具，或訂定鼓勵漁民將海上的廢棄物拾回處理等辦法，以符合世界潮流之趨勢。

## Annex 1

### Participant List

#### **Australia**

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## Annex 2

### *Derelict Fishing Gear and Related Marine Debris: An Educational Outreach Seminar Among APEC Partners*

ASIA PACIFIC ECONOMIC COOPERATION • JANUARY 13-16, 2004  
EAST-WEST CENTER • HONOLULU, HAWAII

#### Tuesday – January 13

8:00-9:00 Registration

9:00 – 9:30 Opening Ceremony

Welcome – Ms. Kitty Simonds, Executive Director, Western Pacific  
Regional Fishery Management Council

Chairman’s Address – Mr. Stetson Tinkham, Lead Shepherd, APEC  
Fisheries Working Group

9:30 – 12:30 Plenary Session

9:30 – 10:00 "Marine Debris - An Overview of a Critical Issue for Our Oceans"  
Ms. Seba Sheavly  
The Ocean Conservancy

#### Regional Case Studies

Derelict fishing gear and related marine debris is a costly and destructive problem facing many APEC economies. This session will focus on the experiences of four economies in the APEC region to address the derelict fishing gear and related marine debris problem. The case studies will cover issues such as damage caused by derelict fishing gear and related marine debris, research efforts to prevent or alleviate accumulation, and pertinent national policies or programs, including public and private activities.

10:00 - 10:30 Case Study – Hawaiian Islands

Mr. Gregory Schorr  
NOAA Fisheries – Coral Reef Ecosystem Investigation  
U.S. Department of Commerce

Dr. Mary Donohue  
University of Hawaii Sea Grant College Program  
School of Ocean and Earth Science and Technology

## Annex 2

10:30 – 11:00	Morning Tea
11:00 – 11:30	Case Study – Korea  Dr. Dong-Oh Cho Director of Marine Environment & Safety Division Korea Maritime Institute
11:30 – 12:00	Case Study – Australia  Dr. Ilse Kiessling Oceans Liaison Officer National Oceans Office
12:00 – 12:30	Case Study – Chinese Taipei  Dr. Don-Chung Liu Chief Secretary Fisheries Research Institute, Council of Agriculture
12:30 – 2:00	Lunch
2:00 – 2:30	Case Study – Japan  Mr. Toshihiro Watanabe Fishing Methods Section, National Research Institute of Fisheries Engineering Government of Japan
2:30-4:00	Panel 1 – Science and Policy

The Pacific Ocean is characterized by unique circulation and flow patterns that can exacerbate the problem of derelict fishing gear and other marine debris. This panel will focus on defining the oceanographic conditions and physical environment of the Pacific Ocean and include an overview of ongoing research efforts in the region. The Panel will also discuss where and to what extent the physical environment is a factor in damage caused by derelict fishing gear and related marine debris in the APEC region.

*Moderator:* Dr. Tatsuro Matsuoka

*Panelists:*

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4. Dr. Mary Donohue  
University of Hawaii Sea Grant

5. Dr. Anthony L. Andrady  
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North Carolina

4:00 – 4:15	Afternoon tea
4:15 – 6:00	Panel 1 continued
6:30	Opening Reception East-West Center Garden Level Aloha casual dress

### Wednesday, January 14

9:00 – 10:30          Panel 2 – Fishing Gear and Practices

Fishing nets and gear are susceptible to loss at sea during storms, normal fishing operations and entanglement due to their size and unwieldy nature. This panel will explore the types of derelict gear and related debris most often encountered, identify practices employed by fishermen to retain their gear and discuss new technologies that may increase gear retention.

*Moderator:*  
Dr. Don-Chung Liu

#### *Panelists:*

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4. Mr. Ernesto Altamirano  
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5. Mr. Kiyokazu Inoue  
Deputy Director  
Ecosystem Conservation Office Resources and Environment  
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Fisheries Agency, Government of Japan

10:30 – 11:00	Morning tea
11:00 – 12:30	Panel 2 continued
12:30 – 1:30	Lunch
1:30-2:00	Photo
2:00 – 4:00	Panel 3 – Recovery, Ports and Disposal

Once fishing nets and gear have deteriorated or been too damaged to be repaired, disposing of them properly can be a challenge due to cost and a lack of readily available facilities. This Panel will discuss the challenges economies face to promote proper and safe disposal of fishing nets and gear and what technologies may be available to help alleviate the costs associated with disposal. The Panel will also examine disposal problems unique to islands and developing economies. It will explore possible ways to overcome the challenges associated with disposal, including technological solutions, with particular reference to island and developing economies.

*Moderator:* Mr. Howard Wiig

*Panelists:*

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4. Mr. Joe Schmitt  
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5. Mr. James Banigan  
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6. Video of GENSCO Inc. cutting machine:  
Mr. Eric Kingma (Western Pacific Regional Fishery Management Council)  
Ms. Seba Sheavly (The Ocean Conservancy)

4:00 – 4:15            Afternoon tea

4:15 – 5:30            Panel 3 continued

### Thursday, January 15

9:00 – 10:30            Panel 4 – Domestic and International Regulatory Structures

A variety of national regulatory and infrastructure mechanisms pertinent to gear loss, disposal, and removal of derelict gear are in place. There may also be international legal and policy frameworks, as well as institutional mechanisms that may provide opportunities to address such issues. This Panel will discuss national measures taken and the possibilities for addressing derelict fishing gear and related marine debris nationally, regionally and internationally.

*Moderator:* Ms. Holly Koehler

*Panelists:*

1. Ms. Lindy Johnson  
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6. Mr. Ed Araki  
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7. Mr. Rick Steiner  
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10:30 – 11:00	Morning tea
11:00 – 12:30	Panel 4 continued
12:30 – 2:00	Lunch
2:00 – 5:45	Plenary Session resumes Chairman: Mr. Stetson Tinkham  Summary of panel discussions and seminar report and recommendations
5:45– 6:00	Capstone speaker  Ms. Holly Koehler Office of Marine Conservation U.S. Department of State
6:00	Traditional Closing Ceremony

## Annex 2

### Friday, January 16 – Excursion

Technical Tour: Hawaii Metals Recycling (HMR) and City and County of Honolulu's H-Power

Participants will be able to tour the HMR operation with a guide and observe from a safe distance the processing of debris in a large whirling chamber. In addition, participants will have the opportunity to inspect the blades and watch the heavy equipment operator pull nets out of a large bin and chop them up into small pieces. The operation is awesome and the time it takes for the chopping operation depends on the net resistance. The chopped nets are then loaded into a bin for transport to Hawaii-Power. Participants will then tour the H-Power facility.

The tour will depart from the Ala Moana Hotel at approximately 8:30 am and will return in the afternoon at approximately 1 pm.

Cameras welcome. Lunch on own.

6:00 – 9:00pm      Closing Luau Dinner  
Waikiki Aquarium  
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Aloha casual dress

Sustaining our Vital Oceans: Chinese Taipei's Vision

Don-Chung Liu  
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In this report, the status of marine capture fisheries and the administrative framework of Chinese Taipei will be briefly introduced. The primary discussion will focus on the prevention of lost gillnet and longline fishing in coastal area, the types of debris in coastal waterways and possible recycling methods to promote coastal cleanup, and a future perspective.

The marine capture fisheries of Chinese Taipei are divided into far sea fisheries, offshore fisheries, and coastal fisheries. Its landings occupied 75% of total fisheries products. Among this total, over 60% of the catches result from net gears. Although production of coastal fisheries is comparatively low at only 4.7%, the coastal fisheries are the most active sector. The percent of fishers working in coastal fisheries is as high as 57.5% of total capture fisheries.

The role of the Council of Agriculture (COA) and Fisheries Agency (FA) in Chinese Taipei is to make fisheries policy and act as the chief fisheries administrative agency, respectively. Besides COA and FA, other organizations which deal with marine capture fisheries issues include the Fisheries Research Institute, Environmental Protection Administration, Coast Guard Administration, National Park Administration, National Coastal Scenic Area Administration, and local (county/city) governments.

Trawler, gillnet, and longline are recognized to be the most likely derelict fishing gears among coastal fisheries. For gillnet and longline fishing gears, the loss of the gear is mostly caused by inclement weather, over-harvesting, gear fouling, sea disaster, and defective equipment. To help mitigate the problem of derelict fishing gear, such solutions as buy back licenses, developing low cost GPS radio buoys, and conducting oceanographic surveys around Taiwan waters have been undertaken. As for marine debris, the reuse and recycling rate is difficult to estimate, but this activity is believed to be considerable.

As the standard of living has increased and the number of working days (five days per week) has decreased, more and more people spend their leisure time in the coastal areas. This results in various kinds and increased quantities of garbage being left at the coastal areas. Coastal cleanup activities are mainly conducted by the Environmental Protection Administration with the assistance of various groups and volunteers who are deeply concerned about keeping a clean environment. In 2002, as many as 131,670 persons participated in six coastline cleanup activities. As a result, 689,598 tons of garbage was removed from 1,000 kilometers of coastline. As for the artificial reefs in the coastal area, clean up is managed by Fisheries Agency. In 2002, more than 5.2 tons of waste net was collected from 15 artificial reef sites by 8 divers working 64 days.

In the near future, action must be undertaken to uphold the vision of sustaining our vital oceans. For instance, a need exists for a ministry-level organization to develop innovative administrative efficiencies in marine affairs. The recently submitted “Coastal Act”, which will fully protect the nature ecosystem of the coastal areas, is a good first step in allowing this type of innovative oversight. The “Coastal Act” is now under legislation. If enacted, it will promote more emphasis on the health of the coastal waterways through the field of education and by public awareness.

**PART I**  
**REPORT OF THE CONSULTATION**

**INTRODUCTION**

1. At the 18<sup>th</sup> Session of the FAO Committee on Fisheries, it was noted that for the purpose of determining ownership, no international regulations, guidelines or common practices exist for the marking of fishing gear deployed outside of national jurisdictions. Some delegations noted the problem as it related to the protection of living marine resources from entanglement in fishing nets and in the case of discarded fishing gear. It was noted that the elaboration of a standard for the marking of fishing gear would be of benefit to coastal states and recommended that further studies should be undertaken.
2. In connection with this discussion, most delegations agreed that there was also a need for a review of lights and shapes displayed by vessels engaged in fishing and certain types of fishing gear. The Committee invited the Director-General of FAO to bring the matter to the attention of the International Maritime Organization (IMO), and noted that careful consideration must be given to the costs that any changes may imply.
3. The Maritime Safety Committee (MSC) of IMO considered the request of the Director-General for a review of the regulations related to lights and shapes (Collision Regulations) at its Fifty-eighth Session 21-25 May 1990, and, after consideration referred the issue to its Sub-Committee on Navigation which met 3-7 September 1990.
4. The Sub-Committee on Navigation decided that consideration might be given to a possible amendment of Rule 26 of the 1972 Collision Regulations and requested Members to submit comments and proposals on the need to amend Rule 26 at its next session.
5. The Sub-Committee on Navigation also noted that FAO intended to convene an Expert Consultation on the marking of fishing gear, where the identification of ownership of lost, abandoned and unattended fishing gear was to be considered. Since this issue constituted a hazard to sea mammals and birds as well as to the safety of navigation the Sub-Committee would consider recommendations resulting from the FAO Expert Consultation.
6. In order to prepare for the Expert Consultation on the marking of fishing gear. An ad-hoc Working Group was convened in Rome 28-29 January, 1991. The Group reviewed existing international and national rules and regulations concerning the markings of fishing gear and addressed the magnitude of the problem. In this connection the working group identified:
  - i) the need to mark fishing gear for the purpose of establishing ownership of the gear;
  - ii) the need to mark fishing gear for the purpose of indicating its position in the sea;

- iii) the need to review, and perhaps make recommendations for changes to Rule 26 (and associated Annex II), the need to review, and perhaps make recommendations for changes to Rule 26 (and associated Annex II) of the Regulations for Preventing Collisions at Sea (COLREGS) for the display of lights and shapes by fishing vessels engaged in fishing.
- 7. The Committee on Fisheries, at its Nineteenth Session held in Rome, 8-12, April. 1991, was advised of the findings of the Working Group and that an Expert Consultation would be convened in Canada in July 1991 to develop a system for the marking of fishing gear on the basis of existing technology. The Report of the Consultation would be considered by FAO regional fisheries bodies whose comments will be taken into consideration prior to referring the standards and guidelines to IMO for issues relating to safety of navigation and subsequent discussion to the Twentieth Session of the Committee.
- 8. The Expert Consultation on the marking of fishing gear was held in Victoria, British Columbia, Canada 14 -19 July 1991, where guidelines for a system were prepared. A number of experts participated in the Consultation and are listed in Part III of this Report. In adopting the Report, one of the participants requested his reservations with regard to the Guidelines for the Marking of Fishing Gear be noted.
- 9. A system for the marking of fishing gear was developed on the basis of the following requirements:
  - i) a simple and inexpensive system by which marks could be easily attached to fishing gear that would not interfere with the performance of the gear, and which would permit easy identification of ownership of gear and the identification of the position of gear in the water.
  - ii) a system that was without prejudice to international conventions, national and bilateral practices.
  - iii) implementation would be at minimum cost to Governments.
  - iv) the system should benefit fishers, including safety at sea considerations, as well as contribute to responsible fishing as related to protection of the environment.
- 10. The Consultation discussed whether it was necessary to include all types of fishing gear in developing a system, or whether a system should only include gears that were not attached to a vessel and were therefore unattended. It was decided that all gear should be included in the system, and it was noted that the guidelines for the implementation of a system would allow Governments to select only those gears that were required to be marked in any national situation.
- 11. The Consultation also recognized that while there was clearly a need to develop a system for the marking of fishing gear to improve responsible fishing practices, there was equally a need for other users of the seas, lakes and rivers to examine their practice with a view to discharging their responsibilities in connection with the protection of the environment. In this connection a number of unacceptable practices were discussed which should be brought to attention of IMO.

12. During the discussion concerning the preparation of a system for the marking of fishing gear, the experts were assisted by display of some of the available equipment for the marking of fishing gear for ownership as well as for its position in the water. It was noted that the costs of the equipment displayed ranged from simple, inexpensive technology to more advanced, yet moderately priced equipment.

#### **MARKING OF FISHING GEAR TO DETERMINE OWNERSHIP**

13. In the discussion concerning the need to mark fishing gear as a means to identify ownership the Consultation noted that this practise is already common for some gears around the world. The practice developed from a clear need for fishermen to identify their fishing gear as a means to prevent its theft and interference of the gear by other fishers. In the same way, the Consultation considered that extending this practice to the marking of other gears, in particular the establishment of an acceptable standard method of marking fishing gear for ownership, would benefit fishers in their damage claims for gear destroyed by other users of the sea. This could result in a more effective insurance cover for fishers in certain parts of the world.
14. It was further noted that the identification of fishing gear for ownership could significantly contribute to fisheries management where the amount of gear deployed by any fisher was restricted.
15. In the discussion on the effect of marking fishing gear for ownership as a means to prevent the discard of gear at sea, the Consultation noted that the removal of identification marks from gear before discarding gear overboard could be a simple task and therefore not a sufficient deterrent to stop such practices. However, if a system could be implemented requiring fishers to report the position of lost gear to a competent authority, without penalty, there would thus be little incentive for many to remove identification marks. The reporting of positions of lost gear would, however, have a significant benefit in determining the magnitude of lost gear as an environmental hazard.
16. In this connection, the Consultation noted that manufacturers of non-biodegradable fishing gear materials should be required to provide means by which their material could be identified and for which records of commercial sales of such material would enable government authorities to trace discarded gear to the purchasers of such material. In this way. The Consultation believed that the practice of discarded gear at sea would be more effectively discouraged.
17. It was further noted that Governments may wish to give attention to providing appropriate means of encouraging fishers to bring any redundant gear ashore for subsequent disposal, for instance by an incentive scheme, and thus remove any need for its discard at sea. A number of other uses of used fishing gear were recognized by the Consultation.
18. Concerning the need to maintain a register of ownership of fishing gear, the Consultation was of the opinion that Administrations needed only to consider providing a register of ownership of gear where such gear is not associated to nor part of a licensed or registered fishing vessel. The only additional requirement for a register would be where the amount of gear permitted by regulation is restricted. The Consultation was therefore of the



opinion that the requirement for a register was minimal and the adoption of the system for marking fishing gear would be of minimal cost to Governments.

#### **MARKING OF GEAR TO INDICATE POSITION**

19. Virtually all fishers mark their deployed gear, if not attached to the vessel with some kind of buoy or float so as to ensure it can be relocated and retrieved and to warn other mariners of the presence of the gear. Although such markings may be required in some regions by national legislation or international agreement, there is no global standard for such marks and actual practice varies widely.
20. The Consultation took note of existing practice and the general obligation to mark anything placed in the sea that might present a hazard to other mariners. The requirements of the Convention on the Conduct of Fishing Operations in the North Atlantic (the so-called London Policing Convention), which is not actually in force were noted as examples of how some types of gear can be marked to indicate position.
21. There was agreement that in order to protect the fishers and their gear and to warn mariners and their vessels of the presence of deployed fishing gear, a standard system of lights and shapes would be useful.
22. The Consultation also agreed that the technical specifications of such a system would need to be distributed to all mariners so that all would know and understand the marks, lights, radar reflectors and shapes that might be encountered at sea. Such information would need to be included in training programs not only for fishers but other mariners as well.
23. It was pointed out that some fishing gear that presents a surface hazard may extend for many miles and may or may not be attached to the fishing vessel from which it was deployed: in many cases the gear may be encountered by a transiting vessel when there is no fishing vessel in sight at all. Accordingly, such gear should be marked so as to indicate both its position and extent.
24. Any visible mark will indicate the position of that portion of the gear to which it is directly attached but will not necessarily indicate the extent of the gear as a whole. In fact, none of the currently employed marking techniques do much to indicate extent of gear. For example, even if a long set of gear was marked at one mile intervals with white light (a current practice) the white lights could easily be mistaken for a number of small craft with nothing between them or series of marks of bottom set gear with no surface connection between them, etc.. Accordingly, some more specific means were required to be devised to indicate a continuous line of surface hazard.
25. In this regard, it was agreed that the solution at night is to adopt the use of yellow light for the marks, at suitable intervals, for such gear. The yellow is indicative of a special hazard and cautions the mariner to remain well clear. If adopted in this circumstance it would alert the mariner to be alert for similar marks in a line of gear presenting a surface hazard. In the daytime, coloured flags might serve the same purpose. Additionally, for both night and day, radar reflectors should be employed.

26. The Consultation agreed that radio beacon buoys, transponders and other more sophisticated devices might well be of significant use to the fisher, but were not likely to contribute significantly to the solution for the general mariner.
27. A further problem was noted by the Consultation in respect of vessels, such as seiners, which are hampered to a significant extent by their gear and for which the light or shape indicating the direction of deployment of the gear is essentially meaningless due to constant manoeuvring. In such cases, as noted in the COLREGS section below, an effective solution may be to extend the use of the yellow/amber lights prescribed for purse seiners to use by other similarly encumbered vessels.
28. The Consultation agreed that FAO staff should be given the task to further develop the technical details of the markings in accordance with the above discussions.

### **LIGHTS AND SHAPES**

29. The Expert Consultation considered the issues raised in the report of the Ad Hoc Working Group, and in the guidance from COFI, as related to Rule 26 of the International Regulations for Preventing Collisions at Sea, 1972 (COLREGS), and Annex II to the COLREGS, with respect to the lights and shapes displayed by fishing vessels engaged in fishing, to determine whether any recommendations should be made for revisions to the COLREGS.
30. The Consultation agreed that FAO should offer the comments and suggestions below to the International Maritime Organization (IMO) for their consideration. Three items for possible revision were agreed:

First, that the option of displaying a (fish) basket in lieu of two cones apexes together by vessels under 20 metres (Rule 26 (b)(i) and Rule 26 (c)(i)) should be discontinued and all such vessels be required to display the two cones.

This recommendation is based on the perceived inconsistent interpretation of the basket shape and the lack of availability of the traditional basket in many areas of the world.

Second, that the lights provided for, on an optional basis, in Annex II for use by fishing vessels engaged in fishing in close proximity to other vessels engaged in fishing should be:

- (i) made mandatory for fishing vessels over 20 metres in length;
- (ii) required when fishing in sight of any other vessel (rather than just other vessels engaged in fishing).

This recommendation is based on the view of the Consultation that the display of such lights can provide useful information to all mariners in sight, not merely other nearby fishing vessels. And since the information so displayed is useful, mariners should be able to rely on its display at all times, not just when the fisher chooses to exercise the option.

Third, that the lights provided for in Annex II for display by purse seiners should also be prescribed for use by other vessels engaged in fishing operations when those operations involve extensive alteration of course or speed, or both, and when the vessel is hampered by its gear

This recommendation is based on the view of the Consultation that certain fishing vessels other than purse seiners (such as, for example, Danish seiners) when setting and working their gear, are severely hampered by their gear and may be manoeuvring in ways that could appear unpredictable or confusing to a non-fisher mariner.

The Consultation noted that if the above changes to COLREGS (Rule 26 (d)) and Annex II were to be made, the Title of Annex II would also need to be changed.

- 31 In a different vein, the Consultation discussed several other issues but recommended no other changes to COLREGS. The Consultation noted the increasing use of high power strobe lights in some regions by fishing vessels at anchor at night and not engaged in fishing, and noted that the current use of such lights is to cover the fact that a proper lookout is not being maintained (in violation of Rule 5 of the COLREGS). The Consultation was advised that the lights are required by insurance companies writing coverage on the vessels and recognized the value of the lights in drawing attention to the presence of those vessels. While noting the violation of Rule 5, the Consultation was, nevertheless, of the opinion that the practice of using strobe lights should not be discouraged.
32. The Consultation also took note of the growing use of high powered (e.g. halogen) deck lights to illuminate working areas at night. Certainly such lights may often obscure the vessel's navigation lights and may also limit the ability of the watch to see beyond the loom of the lights. At first glance, this would seem to be in violation not only of Rule 26 (a) but also the practice of good seamanship. On further consideration, however, it is clear that the high power deck lights provide a major safety enhancement for fishers operating machinery and handling fishing gear on decks. Given Rule 20 (b) of the COLREGS, what is required is for vessel operators to make every attempt to shield and direct the beams of their work lights so as to confine the light to the work area, and away from the watch in the pilot house and the lookout.
33. The Consultation noted that in the COLREGS, a single white light is prescribed for a vessel of less than seven metres, a sailing vessel and a vessel under oars, and therefore white lights should preferably not be used to mark the position of fishing gear. The Consultation agreed that consideration should be given to the use of yellow/amber lights on deployed fishing gear. Similarly, it was noted that the lights and shapes prescribed in Rule 26 (c)(ii) provide no meaningful information to approaching vessels as to the extent of fishing gear extending more than 150 metres horizontally from the fishing vessel. Indeed, such gear may extend for tens of miles and be encountered long before the deploying fishing vessel is in sight.
34. Accordingly, the Consultation agreed that there is a need for specific surface marking on deployed gear, that the standards for such marks need to be made known to the maritime community as a whole and that there is some justification for adopting yellow lights for

such gear to indicate the special hazards associated with it and the need to give it a wide berth. Since the issue is marking of gear rather than vessels, however, the Consultation agreed that the standard marking should not be included in the COLREGS.

35. In this regard, concern was expressed that in some developing countries the technology to produce yellow lights instead of white might not exist at present. The Consultation noted that there would likely be some simple solutions to that problem (such as colouring the inside of existing lenses) but where the problem was intractable a phase-in period might be necessary.

## **CONCLUSION**

36. The system described in the guidelines for the marking of fishing gear meets the criteria established in paragraph 09 of this report and can be adopted as a system.
37. Additionally, the system will substantially contribute to the ability of member States to meet their obligations under MARPOL. The marking system should result in less gear being abandoned at sea and a greater likelihood of lost gear reporting systems being effective, potentially enhancing the ability to retrieve such gear.