出國報告（出國類別：開會）

出席第 2 次日本鰻及其他鰻科學家會議

服務機關：行政院農業委員會漁業署
姓名職稱：陳文深副組長、張惟翔科長及劉温馨技士
派赴國家：日本
出國期間：112 年 5 月 27 日至 5 月 31 日
報告日期：112 年 7 月 21 日

摘要

我國鰻魚產業仰賴天然捕撈之鰻苗，現行無法以人工繁殖量產產業所需之鰻苗，近年鰻苗捕獲量不穩，長期統計資料呈現下降之趨勢，為此國際自然保護聯盟於 2014 年將日本鰻列入紅皮書中之「瀕危物種」，華盛頓公約(CITES)自 2014 年第 17 屆締約國大會起提案加強鰻魚資源量及貿易情形調查，並提出日本鰻苗貿易間有不正常的部分；另 2022 年 CITES Cop19 雖未提案列入附錄二，但該次大會由巴拿馬等 17 個國家提案將真鯊科所有物種列入附錄二，儘管其中水鯊之資源量無虞，但仍被列入，鑒於 2007 年將歐洲鰻列入附錄二，並進行嚴格管理，倘鰻鱺屬於 2025 年 CITES Cop20 被提列附錄二，生產國及消費國之貿易將被檢視交易合法性，並被要求提出「無危害證明(NDF)」文件，此在實務上確有困難。

鑒於國際間持續關注，自 2012 年起，臺灣、日本、韓國及中國大陸於 APEC 架構下召開鰻魚資源養護與管理國際合作非正式會議(以下稱非正式會議)，截至今(2023)年止業以召開 15 次，並於 2021 年第 14 屆非正式會議中與會各國同意召開日本鰻及其他鰻科學家會議(以下稱科學家會議)，以科學交流為基礎，作為鰻魚資源利用國政策擬定方向參考，並邀集各國產官學代表共同與會，迄今已召開 1 次。

本次為第 2 次科學家會議，於 2023 年 5 月 29 日至 30 日於日本長野縣上田市召開，計有日本、南韓、中國大陸及我國等四國出席，我國由陳文深副組長率署內同仁、及產、學代表與會，會議由日本東京大學八木信行教授及青山潤教授擔任共同主席，會議內容摘述如下：

一、我國、日本、韓國及中國等 4 國學者分享國內日本鰻捕撈及相關科學活動。

二、會議期間外之任務小組活動報告及未來規劃。

三、日本、加拿大及中國受邀學者分享有關以新興科學及有效方式管理東北亞地區日本鰻資源。

四、由日本水產廳報告日本鰻及其他鰻現況，及日本國內刻正推動水產品流通適正化法，鑒於此情形提議成員間應建立具法律約束力之架構。

五、秘書處報告鰻魚統計資料格式修訂部分，主要修正統計單位由公噸改為公斤、成員意見改為補充說明，可於該處提供科學分析之補充資料。

六、第 16 屆非正式會議將於本(2023)年 6 月 26 日至 27 日於日本東京召開，另第 3 次科學家會議預定於隔(2024)年 4 月或 5 月舉行。

會中日方報告與會 4 國鰻魚資源管理措施，其中我國漁船捕撈鰻苗須申請具執照，始得從事捕撈，惟簡報中顯示我國於捕撈端無相關管理措施，已於會中向秘書處修正，後續將於第 16 屆資源養護非正式會議中說明。

另為了解日本鰻魚室內養殖技術及現況，於會前以自費方式前往日本愛知縣鰻魚養殖場參訪，由一色町鰻魚漁業協同組合山本浩二組合長帶領參觀鰻魚分級場及室內溫水養殖場，並於參觀完畢後進行意見交流。

關鍵詞：日本鰻及其他鰻科學家會議、聯合聲明(Joint Statement)

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日本鰻為東亞地區主要養殖鰻種，近年東亞各國鰻苗捕撈量減少，引發相關國際組織關切，國際自然保育聯盟(International Union for Conservation of Nature and Natural Resources，以下簡稱 IUCN)於 2014 年正式公佈將日本鰻列入 IUCN 紅皮書(Red List)之瀕危等級(Endangered (EN) A2bc)，美洲鰻於同年亦被列入紅皮書之瀕危等級，IUCN 雖不具法律約束力，但瀕危野生動植物種國際貿易公約，又名華盛頓公約(Convention on International Trade in Endangered Species of Wild Fauna and Flora，以下簡稱 CITES)，締約國將參考 IUCN 之評估報告後於大會中提案，於 2016 年 CITES 締約國大會決議通過應加強調查鰻魚資源量及貿易情形，以作為下屆提案與否之參考。2022 年第 19 屆締約國大會雖未將日本鰻提列為 CITES 附錄管理之物種，但該次大會將真鯊科所有物種列入附錄二管理，即使其中水鯊資源無虞，倘鰻鱺屬於大會中被提案，恐衝擊東亞鰻魚產業。

為免鰻魚被列入 CITES 附錄管理衝擊產業，我國、日本、韓國及中國大陸於 2012 年起在 APEC 架構下召開鰻魚資源養護與管理國際合作非正式會議，共同研商合作研究及推動鰻魚資源管理、養護等計畫共識，並確認以科學為基礎，作為導入資源養護管理之根據。

於 2022 年召開第 1 次日本鰻及其他鰻科學家會議，邀集各方產官學代表，就鰻魚研究成果分享及交流，並進一步討論如何提升鰻魚科學合作及交換數據格式等議題，以提供最新科學數據及相關科學意見予鰻魚資源養護與管理國際合作非正式會議，作為管理政策擬定之參考。

貳、會議過程及結果

第 2 次日本鰻及其他鰻科學家會議於本(112)年 5 月 29 日至 5 月 30 日假日本長野縣上田東急 REI 飯店 3 樓會議室舉行，計有南韓、中國大陸、日本及我國等四方產官學代表出席，我國由本署陳文深副組長率本署同仁(張惟翔科長、劉温馨技士)、財團法人台灣區鰻魚發展基金會(汪介甫執行長)及學者(國立臺灣大學韓玉山教授、國立高雄科技大學侯清賢助理教授)等人出席(詳細出席名單如附件 2)。

會議由日本東京大學八木信行教授及青山潤教授兩位歡迎出席者並擔任共同主席，討論情形摘述如下(議程如附件)：

一、分享日本鰻捕撈及科學活動概況：

由各方與會科學家分享國內日本鰻捕撈情況及相關科學研究，本次會議由中國大陸、日本、韓國及我國各 1 位科學家進行簡報，就簡報內容、現場提問及回答簡述如下：

(一)趙峰研究員(中國大陸)

1. 說明中國大陸鰻魚產業概況、日本鰻漁獲量及管理及相關科學研究，並並強調針對日本鰻之相關法規及管理作為，包含「鰻鱺保護國家行動計畫」、「長江十年禁漁」擴大長江口禁漁範圍往外延伸，以保障鰻苗洄游通道。
2. 鰻苗捕撈需領有捕撈證，由國家控管證照總數，並規定漁獲努力量，相關數據則由研究機構或政府相關部門蒐集，針對 10 年禁漁政策之鰻魚資源量調查計畫較少，目前已組成長江流域辦公室專門進行鰻苗監測。

(二)Hiroshi Hakoyama 教授(日本)

1. 呈現日本自 1894 年起日本鰻長期年度捕撈數據，依據政府公告內陸捕撈紀錄，黃鰻於 1920 年達到 4,200 噸後呈現逐年下降，沿岸捕撈量較內陸大幅下降;鰻苗在 1963 年高峰 260 噸後呈現下降情形。
2. 2019 年起收集日本 5 個監測點之漁業獨立型數據，以確定非捕撈期之鰻苗來游情形。
3. 日本東部及西部黃鰻捕撈差異，係因千葉及靜岡縣黃鰻資源量較豐富，故呈現相關較好之自然族群量。
4. 養殖產業從 1900 年開始增加，在 1989 年達到高峰 4 萬公噸，近年維持約 2 萬公噸。透過各都道府縣的鰻魚 2018 至 2019 年數據資料，呈現下降趨勢。

(三)Choi Bohyung 研究員(韓國)

1. 分享透過胃內容物分析及穩定同位素分析可以瞭解鰻線在洄遊過程中的攝食生態學，因生物在成長過程中不同階段可能改變食性，攝食不同物質會反映在生物體內之碳氮同位素，相較於碳同位素，氮同位素的分餾率比較明顯，較容易分析比較，所以可以透過使用氮同位素來瞭解鰻

魚攝食生態學。

2. 根據其他研究結果，柳葉鰻主要攝食海洋雪，當前進至開放海洋後則開始以動物性浮游生物為食，但現階段對鰻魚生命週期及鰻魚早期攝食生態學不夠瞭解，仍需要更多研究。韓國鰻魚主要採樣自洛東江及其他河流。

(四)韓玉山教授(我國)

1. 介紹我國日本鰻長期捕撈資料、科學研究及資源保育等議題，捕撈數據呈現下降趨勢，顯示鰻魚資源管理及加入量之重要性。
2. 有關放流親體的最佳時機，須看鰻魚發育階段，如果放流銀鰻，在秋天或冬天比較合適，如果是放黃鰻，任何時候都可以，保護種魚最重要，可以得到更多的鰻苗。
3. 鰻苗洄游至我國季節不同會造成鰻苗平均總體長及相對豐富度之變化。
4. 簡報中提到之鰻魚死亡率係粗略估算，需要更多數據以確保其準確性；另我國目前針對不同捕撈方式造成之死亡率差異進行評估，但具現場觀察，似乎存在差異。

二、非會期之任務組合活動報告：

(一)任務分組 1 負責人 Leanne Folks 博士報告 2022 年及 2023 年迄今活動，包含工作小組建立及辦理線上研討會，會中結論及未來研究建議包括：藉由數據格式的建立，改善數據問題與知識缺口，如標準化 CPUE 數據與漁業捕撈數據等。

(二)任務分組 2 負責人 Hiroshi Hakoyama 教授報告 2022 年及 2023 年迄今活動，辦理線上研討會討論上脫式衛星標識器（Pop-up satellite archival tag, PSAT）追蹤鰻魚洄游研究，以及未來成員希望追蹤的潛在鰻魚物種等資料交換。

三、以新興科學及有效方式管理東北亞地區日本鰻資源：

(一)Akihide Kasai 教授報告利用水中環境 DNA 可調查鰻魚分布及豐度：

1. 此方法具取樣便利、高準確性、高靈敏度、生物友好及廣泛應用等優點。
2. 鰻魚大多數棲息在乾淨水質的地方，但也有部分鰻魚棲息在營養鹽高的水域。鰻魚的洄游及生存主要受到水壩的影響，而洋流則是影響鰻魚的分布，透過環境 DNA 可以監控稀有物種的調查，瞭解鰻魚在時間和空間上分布。
3. 調查結果顯示鰻魚放流數量與環境 DNA 之濃度無明顯模式，且河流大小可能不會影響環境 DNA 濃度。

(二)Nobuto Fukuda 博士報告以以海洋監測調查預測鰻線捕獲量之可能性：

1. 以臺灣及日本捕獲量進行分析，各項氣候變遷因子（Flow speed、Eddy energy、SOI、WPO）均無顯著相關。
2. 孵化後的幼苗會受到北赤道洋流（NEC）向西輸送；柳葉鰻會集中在黑潮邊界以及與黑潮相連的中尺度渦流中。

3.透過模式評估，得到北緯 12~24 度日本鰻魚幼體豐度最高之結果。

(三)日本水產廳金子守男室長介紹東北亞地區野外捕撈及養殖投入量管制措施之有效性：

1.水產廳彙整並報告臺、日、中、韓於第 15 屆非正式會議時提報的科學及管理數據資料(其中臺灣在鰻苗管理部分列出無證照管理，會後與水產廳確認，我國漁業執照已註記漁船許可捕撈鰻苗，符合證照制度，後續將於第 16 屆非正式會議提報資料時候修正)。

2.管控鰻苗放養量為重要養護管理措施，鰻魚生產過程之透明化需透過捕撈端及養殖端管理，日本、韓國及台灣均對放養量進行管理。

3.考量四國海岸線都很長，河川數量多，難以執法管理，但捕撈及進口的鰻苗最終都將投入養殖，爰管理放養量為實務上較為便利且有效之方式。透過非正式會議成員管控投入養殖之鰻線數量，可回推並得到準確之捕獲量。

4.促進 IUU 漁業及鰻線走私貿易國/進口國識別，以確保透明之資源養護及管理措施，不僅適用於日本鰻也適用於其他鰻。

5.2014 年四國共同發布之聯合聲明提到，「與會成員將就日本鰻及其他異種鰻之資源養護與管理措施合作」，透過非正式會議會員國以共同管理標準推動鰻魚資源養護及管理是非常有意義的，且管制鰻魚放養量上限是簡單且有效的方式。

(四)Hiroshi Hakoyama 教授介紹實現東北亞地區日本鰻魚的協同保護和漁業管理：

1.IUCN 將日本鰻魚列為瀕危物種(EN)，主要是因為種群指數、捕撈量（標準 A）的顯著下降。如果改採種群生存力分析（標準 E），重新評估其滅絕風險，結論日本鰻魚不是 CR 也不是 EN。A 標準僅考慮族群減少，且經常在評估如海洋生物等龐大族群時高估其絕種之可能性。

2.強調東北亞地區合作研究之重要性，特別強調為了資源管理，瞭解種群趨勢和評估滅絕風險對於庫存管理至關重要。入池量管理是日本鰻國際資源管理的重要組成部分，應與區域漁業管理和貿易透明度工作相結合，漁業管理需要可執行的法規。除資源管理外，還需要保護河流、湖泊和沿海棲息地。

(五)劉鑒毅研究員報告中國大陸鰻魚資源管理政策：

1.解釋近年鰻魚的捕撈量持續下降，爰加強鰻魚資源管理，即長江十年禁漁。中國強調維持保育及利用兩者間平衡之重要性，並介紹了中國的四項目標原則：(1) 確保保護優先；(2) 發展合理利用方式；(3) 加強科技支撐；(4) 鰻魚漁業管理合作。

2.日方針對其報告提出管理鰻線入池量才是確保透明化養殖生產管理框架的必要基礎，從整個生產鏈如鰻線捕撈到放養，以及成鰻加工、分銷及貿易，僅針對河流及河口進行管制是不足。

(六)DavidK.Cairns 博士介紹評估美洲鰻系群面臨之挑戰：

1. 由於缺乏可用數據且評估鰻魚系群需要更多數據，爰無法評估人為造成之影響(如漁撈活動、水壩及汙染)。資源評估除了因應現行威脅外，應同時開發空間及族群動態模型，並根據現有豐富度指數來管理鰻魚漁業等建議。
2. 美洲鰻於幼體階段可能會受到塑膠微粒影響，但沒有充足數據證明此結論。Cairns 博士對海地等官方無有效管理美洲鰻捕撈及貿易的國家表示關注，並希望出口到加拿大和美國的部分產品可以在更嚴格的控制。

四、由日本水產廳金子守男室長報告日本鰻及其他鰻現況：

(一)日本鰻曾經於 COP17 中被提出，雖未列入附錄二，但仍未排除被提列之可能性。歐洲鰻已被列入附錄二，第 19 屆締約國大會已將資源狀況良好的真鯊科物種(包含水鯊)列入 CITES 附錄二管理，日本鰻雖未被列入附錄管理議題，但難保下一屆或未來不會被提出列入附錄文件中。倘被列入附錄二管理，締約國需要遵守相關貿易限制以及核發 DNF 文件，建議邀請 CITES 動物委員會組成工作小組一起討論，回顧結論及提出更新資料，以及對於歐洲鰻保護提出管理草案與建議。

(二)日本將施行之水產流通適正法，目的係為打擊 IUU，並根據歐盟 IUU 法規制定：

1. 第一類水產品：日本國內市場條例規定 I 類水生動植物不得在沒有漁獲數量和交易記錄的情況下在日本市場銷售，也不得在沒有合法捕撈證明的情況下輸出至日本境外，包含鮑魚、海參、鰻線（小於 13 公分的鰻魚；自 2025 年開始）。
2. 第二類水產品：沒有來源證明書不得輸入日本，確保捕撈符合國際管理規範與保護措施，包含魷魚、烏賊、秋刀魚、鯖魚、沙丁魚。

(三)建議成立區域性鰻魚漁業管理組織（RFMO）

1. 非正式會議應提升為正式會議，提升成為正式會議，可以爭取更多科研經費與人力，以順利推動相關養護管理措施，且可以順利進行多方交談，不僅針對日本鰻魚，也針對其他鰻魚。
2. 將擴大邀集東南亞、東北亞、巴布亞紐幾內亞(PNG)、澳洲及紐西蘭等國加入。考慮建立區域漁業管理組織耗時且長期處理過程，需通過非正式磋商會成員之間的磋商，在科學研究基礎下建立。

五、未來工作計畫：

(一)非會期之科學活動及合作藍圖規劃，預計於 2024 年 1 月或 2 月召開任務分組線上研討會、3 月或 4 月舉行第 3 次日本鰻及其他鰻科學家會議及 5 月或 6 月舉行第 17 屆鰻魚資源養護與管理國際合作非正式會議。

(二)依據任務分組 1 線上研討會提出修正鰻魚數據格式，將單位由公噸改為公斤，以利精準紀錄鰻魚及黑子重量；提供新的表格以利成員填入有用之額外資訊。

(三)第 16 屆鰻魚資源養護與管理國際合作非正式會議將於 2023 年 7 月 26 日至 7 月 27 日假日本東京舉行。

參、會前參訪

本署於 5 月 28 日前往三河安城參觀一色町鰻魚養殖場。由一色町鰻魚漁業協同組合山本浩二組合長帶領本團參觀鰻魚分級場及室內溫水養殖場。該地區主要以溫棚結合重油加熱使養殖場全年維持攝氏 35 度、水溫 30 度，塭體為水泥、塭底為土質，水車全日開啟。

該地區可放養 5 公噸鰻苗、年產量約 4,000 公噸，水源係直接引自 92 公里外之矢作川川水，每年供應養殖用水約 600 萬公噸，需給付日本政府日幣 20 萬元水權費，由協同組合負責維護。謹就參訪後意見交流摘要如下：

一、日本鰻魚以室內養殖是否有考慮裝設太陽能板？

有考慮過，但因鰻魚養殖場生產過程需要太陽光進行消毒等需求，且養殖場用電量大，太陽能產電即使透過儲能亦不足以供應養殖場所需，目前沒有考慮裝設，但於加工廠或空地等較大規模廠區有加裝光電板。

二、一色町為什麼會成為主要產區？是否有甚麼優勢？

(一)本地具 130 年歷史，明治 20 至 30 年已開始鰻魚捕撈，昭和 35 年因颱風造成海水倒灌，農田因土地鹽化無法種植，故開挖養殖池嘗試養殖，因成效不錯，養殖面積開始擴散，並造就目前養殖區域。

(二)昭和 40 年除開始引進室內養殖，且飼料進口有進展，以往水源與農業水源共用，為避免使用農藥殘留水源，自 90 公里外直接引水使用，加之養殖技術提升，結合良好水源及沒有疫病問題，一色町產出之鰻魚逐漸建立作法及品牌。

(三)日本鰻魚分為東日本及西日本料理方式，東日本為先蒸後烤，西日本則是直接進行烤製。一色町鰻魚與其他大面積養殖鰻魚不同，肉質較具口感及彈性，適合西日本直接烤的料理方式。

三、一色町鰻魚產量佔全日本總產量之比例？是否有考慮分級自動化？

年產可達 4,000 公噸，佔日本年產量約 20%，但會受鰻苗產量不穩定影響。約 15 年前曾花費百萬導入自動化魚體選別系統，但因鰻魚為活體會移動，不適合機械分類，人工較為快速且精準。

四、三河灣鰻苗產季為何？

每年 12 月中旬至 4 月 30 日為捕撈期，需申請許可才能進行捕撈，主要捕撈方式 2 種：1.將漁船駛至河川出海口，以頭戴探照燈方式找尋魚群，以手抄網捕撈，漁季於 3 月 31 日結束。2.於岸際以手抄網捕撈，漁季於 4 月 30 日結束。

五、養殖過程沒有自動化設備，是否有缺工問題？協同組合在鰻魚產業扮演角色為何？日本官方是否有提供協助？

(一)缺少機械會設備人力確實是問題，特別是鰻魚選別過程需要人力，現行組合共有 90 個會員(即 90 個家庭)，家庭成員可加入，且本地多從事鰻魚生產，可互相支援，加上臨時工配合，產季期間人力影響非常小，倘自動

化設備有進展，也期待後續可以導入。

(二)全日本有許多組合，能力不同，一色町鰻魚漁業協同組合主要採聯合生產制度，衡平養殖業者及加工廠生產成本制定當年度鰻魚價格，具流通及議價功能，且有盈餘會分配予會員。主要通路為鰻魚蓋飯業者，所以需要人力進行細膩分配。

(三)由日本水產廳內水面漁業振興室生駒潔室長說明，中央地方管理權限有分工，由地方政府投入輔導，水產廳則偏向資源管理、人工種苗等政策面。

肆、心得及建議

一、自 2016 年 CITES 第 17 屆締約國大會決議調查鰻鱺屬資源及貿易情形，及歐盟於 2016 年 4 月 27 日寄給華盛頓公約組織的公開信指出，日本鰻資源管理措施最大的問題是「違法交易情形令人相當憂心」，並指出東亞地區針對防止濫捕的管理體制並不完善，鰻鱺屬被列入附錄二管理之壓力持續籠罩東亞各國。

一、 2022 年 CITES 第 19 屆大會決議將真鯊科所有物種列入附錄管理，其中水鯊之資源無虞，顯見未來並非針對單一物種提列，倘鰻鱺屬之資源及貿易管理仍不完善，考量鰻鱺屬資源狀況不佳，第 20 屆大會恐將相關物種列入附錄二之管理下，締約國需要遵守相關貿易限制並核發 DNF 文件。

二、日本水產廳於本(2023)年 5 月 16 日到訪本署，並就建立鰻魚區域性漁業管理組織一事提出討論，以向 CITES 表明鰻魚資源係透過具法律約束力之管理組織之下，惟本次第 2 次日本鰻及其他鰻學家會議中僅於水產廳生態保全室室長報告中提出說明，各方並未就本議題提出意見及交流。

三、本次會議主要為科學意見交流，四國科學家報告內容聚焦在「鰻魚棲地環境保護」、「鰻苗捕撈量評估」、「入池量管制有效性」、「成立區域性漁業管理組織」四大面向，鰻苗產業包括前端捕撈、中端養殖加工及後端出口貿易，三者環環相扣密不可分，管理措施應從整體產業鏈個階段進行考量評估推動，建議如下

面向	參考案例	臺灣鰻魚管理應用建議
棲地環境	一、長江十年禁漁。 二、eDNA 於河川進行鰻魚分布與豐度評估。	封溪護鰻河段利用 eDNA 進行分布調查，減少網具、籠具等方式較易受到地形限制，可針對鰻苗洄游及成鰻棲息重點河川加強管制及環境維護。
捕撈評估	三國表示均有證照制度，經洽詢如下： 一、日本：只有岸際人力捕撈，捕撈者發給鰻苗捕撈許可證，結合水產品流通適正法，減少非法漁獲（水產廳）。 二、韓國：以小船捕撈，核發捕撈許可證(韓國研究單位） 三、中國：漁業證照登記可捕撈鰻苗（中國簡報）	四國均有捕撈統計資料不完善之處，建議： 一、三國中只有漁民可以捕撈，核發捕撈許可有其必要性，將證照制度法制化(本年度已請韓玉山教授研析作法)，但恐引發歷年有捕撈苗業者反彈。 二、除捕撈端管理，承銷端不透明及養殖端應併同考量一併管理(當前問題，漁業法無法管制承銷人)，強化養殖來源，避免捕撈量與入池量差異。 三、出口貿易透明化，是日方未來會

		提到的問題，也是臺灣遲早要面對的問題，未透明化導致統計資料缺乏、市場價格波動、走私猖獗、要求無限量捕撈對產業鏈無助益，如同日本準備在 2025 年將鰻苗在國內市場流通需檢附捕撈來源證明，目的就是要確實掌握捕撈量，避免 IUU 漁業，可參考白帶魚出口應遵行事項管理機制，但鰻魚養殖業者可能會有反對聲浪。 四、水產廳彙整各國於第 15 屆會議時提報的科學及管理數據資料（對外公開數據），其中僅臺灣在鰻苗管理部分列出無證照管理，會後與水產廳確認，我國漁業執照已註記漁船許可捕撈鰻苗，是否符合證照制度，水產廳表示此為證照制度，可以在下一次提報資料時候修正。
入池量管制		依據水產廳報告，入池量管制對於鰻苗捕撈以及養殖產業都有所助益，現階段係中國想打破規則（因長江已禁漁，無需要對入池量進行管制），可能在第 16 屆非正式會議提出，本次未深入討論，可持續關注。
區域性漁業管理組織(RFMO)	美洲鰻、歐洲鰻有 ICES 工作小組。	目前為起草階段，尚未深入討論，可持續關注，加入後必須年度提出捕撈量及有效管理作為，因此，棲地環境維護管理與捕撈量管理（證照制度核發數量與捕撈量）極為重要，必須及早進行。

四、政策方向等相關議題可能於本年 7 月 26 至日 27 日於日本東京召開之第 16 屆鰻魚資源養護與管理國際合作非正式會議中討論，該次會議將由各國官方代表出席，為了我國鰻魚資源維護及產業穩健發展，應持續參與國際合作事宜，並主張以平等互惠之立場參與漁業管理組織。

五、日本鰻魚養殖主要於前一年度之 11 月放養鰻苗，利用溫棚養殖維持一定溫度，以因應每年 7 月之土用丑日。我國因國土狹長，南部氣候炎熱，可參

考日本養殖模式，利用我國捕撈之頭期鰻，除了可減少非法貿易情形，亦可將鰻苗留在台灣。

伍、會議照片


Chinese Taipei

FISHERIES AGENCY
MINISTRY OF AGRICULTURE, FORESTRY AND FISHERIES, GOVERNMENT OF JAPAN
1-2-1, Kasumigaseki, Chiyoda-ku, Tokyo 100-8907, Japan

Annex 1

Opening Remarks

Japan

On behalf of Fishery Agency of Japan, I wish to extend a warm welcome to you who have come from all parts of Northeast Asian region to attend the 2nd Scientific Meeting on Japanese Eel and Other Relevant Eels.

Nagano Prefecture as the venue for the 2nd Scientific Meeting is in the center of Japanese main island. Nagano is surrounded by 3000-meter-high mountains such as the Japanese Alps, which hosted the 18th Winter Olympic Games in 1998.

Although there is no ocean in Nagano Prefecture, it is the source of Japan's major rivers such as Chikuma River, Japan's longest first-class river, which flows across the center of Ueda City.

This time, we were able to host the 2nd Scientific Meeting here in Ueda City, Nagano Prefecture, with the cooperation of the Institute of Freshwater Biology of Nagano University. The IFB has Japanese Eel Unit Team, which conducts eel stock survey and assessment projects for Fisheries Agency of Japan. We would like to thank Professor Hakoyama and all the members of IFB for their cooperation.

Using the best scientific information available, which is a ground of the discussion in this meeting, form a basis of effective and efficient conservation and management measures for Japanese eel and other relevant eels.

I hope that this meeting offers an excellent opportunity to share the best scientific information among all participants for the two days and to develop close relationship among scientists and researchers in the Northeast Asia region.

Thank you very much.

附件 2

Annex 2

The 2nd Scientific Meeting on Japanese Eel and Other Relevant Eels
- Participant List -

【Co-chair】

	Category	Title	First name	SURNAME	Position	Organizaiton
1	Co-chair (online)	Prof.	Jun	Aoyama	Professor	Atmosphere and Ocean Research Institute, Tokyo University
2	Co-chair	Prof.	Nobuyuki	Yagi	Professor	Tokyo University

【Members/Observers/Interpreters】

●China

	Category	Title	First name	SURNAME	Position	Organizaiton
1	Members	Prof.	Feng	ZHAO	Deputy Director	East China Sea Fisheries Research Institute, Chinese Academy of Fishery Sciences
2	Members	Prof.	Jianyi	LIU	Professor	East China Sea Fisheries Research Institute, Chinese Academy of Fishery Sciences
3	Members	Mr.	Lei	GAO	Assistant Professor	East China Sea Fisheries Research Institute, Chinese Academy of Fishery Sciences
4	Members	Ms.	Dezhen	LI	Assistant Secretary General	China Aquatic Products Processing and Marketing Alliance
5	Members	Mr.	Hongchun	RONG	President	Jiangsu Qidong Eel Seedling Industry Association
6	Members	Ms.	Hongfang	SHENG	Chairman	Jiangsu Hongman Agricultural Technology Co., Ltd
7	Interpreters	Ms.	Lu	FANG		Interpreter

●Japan

	Category	Title	First name	SURNAME	Position	Organizaiton
1	Members	Prof.	Hiroshi	Hakoyama	Professor	Nagano University
2	Members	Dr.	Leanne	Faulks	Researcher/Guest Associate Professor	Nagano University
3	Members	Mr.	Morio	Kaneko	Director of Ecosystem Conservation Office	Fisheries Agency of Japan
4	Members	Mr.	Naohito	Okazoe	Assistant Director, Ecosystem Conservation Office	Fisheries Agency of Japan (Co-Secretariat)
5	Members	Mr.	Fumiya	Takahashi	International liaison officer, Ecosystem Conservation Office	Fisheries Agency of Japan (Co-Secretariat)
6	Members	Ms.	Kifumi	Onoda	Officer, Ecosystem Conservation Office	Fisheries Agency of Japan (Co-Secretariat)
7	Members	Mr.	Kiyoshi	Ikoma	Director of Inland Waters Fishery Promotion Office	Fisheries Agency of Japan
8	Members	Mr.	Shinobu	Nakai	Assistant Director, Inland Waters Fishery Promotion Office	Fisheries Agency of Japan
9	Members	Mr.	Kenta	Nonoshita	Officer, Inland Waters Fishery Promotion Office	Fisheries Agency of Japan
10	Members	Mr.	Akihiro	Mae	Director	Global Guardian Trust (Co-Secretariat)
11	Members	Dr.	Iwao	Fujii	Environmenetal Management Unit	Global Guardian Trust (Co-Secretariat)
12	Observers	Prof.	Noritaka	Mochioka	Professor	Kyushu University

13	Observers	Prof.	Sakie	Kodama	Associate Professor	Nagano University
14	Observers	Dr.	Alessandra	Cera	Researcher	Nagano University
15	Observers	Ms.	Ishmerai	Galang	Research Assistant	Nagano University
16	Observers	Dr.	Tomoyuki	Nakamura		Japan Fisheries Research and Education Agency
17	Observers	Dr.	Hiroaki	Kurogi		Japan Fisheries Research and Education Agency
18	Observers	Dr.	Daisuke	Shimizu		Japan Fisheries Research and Education Agency
19	Observers	Dr.	Takahiko	Kameda		Japan Fisheries Research and Education Agency
20	Observers	Dr.	Norio	Yamashita		Japan Fisheries Research and Education Agency
21	Observers	Dr.	Junichi	Abo		Japan Fisheries Research and Education Agency
22	Observers	Mr.	Hitoshi	Omori	President	All Japan Association for Sustainable Eel Aquaculture Incorporated
23	Observers	Mr.	Kouji	Yamamoto	Vice-President	All Japan Association for Sustainable Eel Aquaculture Incorporated
24	Observers	Mr.	Takayuki	Shimizu	Executive Director	All Japan Association for Sustainable Eel Aquaculture Incorporated
25	Observers	Mr.	Toru	Kitamura		JAPAN NUS Co., Ltd.
26	Observers	Ms.	Mai	Miyamoto		JAPAN NUS Co., Ltd.
27	Observers	Ms.	Yumi	Okochi		JAPAN NUS Co., Ltd.

●Korea

	Category	Title	First name	SURNAME	Position	Organizaiton
1	Members	Dr.	Shin-Kwon	Kim	Researcher of Aquaculture Research Division	National Institute of Fisheries Science, Ministry of Oceans and Fisheries
2	Members	Dr.	Ha-Yun	Song	Researcher of Inland Fisheries Research Institute	National Institute of Fisheries Science, Ministry of Oceans and Fisheries
3	Members	Dr.	Bohyung	Choi	Researcher of Inland Fisheries Research Institute	National Institute of Fisheries Science, Ministry of Oceans and Fisheries
4	Interpreters	Mr.	Jae-geol	Yang	Policy Analyst	Korea Overseas Fisheries Cooperation Center

●Chinese Taipei

	Category	Title	First name	SURNAME	Position	Organizaiton
1	Members	Dr.	YuSan	Han	Professor&Director, Institute of Fisheries Science	National Taiwan University
2	Members	Dr.	ChingHsien	Ho	Assistant Professor	National Kaohsiung University of Science and Technology
3	Members	Mr.	WenSen	Chen	Deputy Director, Aqualculture Division	Fisheries Agency
4	Members	Ms.	WenHsin	Liu	Associate Specialist, Aquaculture section	Fisheries Agency
5	Members	Mr.	WeiHsiang	Chang	Section chief, Resource Management section	Fisheries Agency
6	Members	Dr.	ShuennDer	Yang	Freshwater Aquaculture Research Center Researcher & Chief	Fishery Research Institute
7	Observers	Mr.	ChiehFu	Wang	CEO	Taiwan Eel Farming Industry Development Foundation
8	Interpreters	Mr.	ChinYaw	Wang	Senior Secretary, Economic Division,	Taipei Economic and Cultural Representative Office in Japan

【Invited experts/specialists】

	Category	Title	First name (Middle name)	SURNAME	Position	Organizaiton
1	Invited expert	Prof.	Akihide	Kasai	Professor, Division of Marine Bioresource and Environmental Science, Faculty of Fisheries Sciences,	Hokkaido University
2	Invited expert	Dr.	Nobuto	Fukuda	Senior Research Scientist	National Research Institute of Fisheries Science
3	Invited expert	Dr.	Kazuki	Yokouchi	Senior Research Scientist	National Research Institute of Fisheries Science
4	Invited expert	Dr.	David K.	Cairns	Scientist Emeritus	Department of Fisheries and Oceans, Canada

附件 3

Annex 3

List of meeting documents

Document Number	Document Title
SMJE-2/MD/01	Concept Paper on the Scientific Meeting on Japanese Eel and Other Relevant eels
SMJE-2/MD/02	Meeting agenda of the 2nd Scientific Meeting on Japanese Eel and Other Relevant Eels
SMJE-2/MD/03	Annotated agenda of the 2nd Scientific Meeting on Japanese Eel and Other Relevant Eels
SMJE-2/MD/04	Participant List
SMJE-2/MD/05	Basic Rules of Meeting Procedure for the Scientific Meeting
SMJE-2/MD/06	NOTIFICATION TO THE MEETING PARTICIPANTS Ver.0 (including the list of meeting documents)
SMJE-2/MD/07	The Overview of eel industry (China)
SMJE-2/MD/08	The Overview of Japanese Eel catch and scientific activities (Japan)
SMJE-2/MD/09	Applications on Stable isotope analysis for understanding Feeding ecology of Anguilla japonica (Korea)
SMJE-2/MD/10	The Overview of Japanese Eel catch and scientific activities (Chinese Taipei)
SMJE-2/MD/11	Interim report of the intersessional activities- Minutes of Task Team 1 workshop in February 2023
SMJE-2/MD/12	Interim report of the intersessional activities- Minutes of Task Team 2 workshop in February 2023
SMJE-2/MD/13	Emerging techniques- application of environmental DNA
SMJE-2/MD/14	A possibility of forecasting glass-eel catches based on the larval estimator obtained by monitoring surveys in the ocean
SMJE-2/MD/15	Effectiveness of actions to restrict initial input of glass eels and eel fries taken from the wild into aquaculture ponds in the farming practice in North East Asia
SMJE-2/MD/16	New scientific assessment of Japanese eel resources and resource management based on the scientific assessment in Northeast Asian region
SMJE-2/MD/17	The challenge of assessing the American eel stock

SMJE-2/MD/18	Eel resource management in China
SMJE-2/MD/19	Situation concerning Japanese eel and other relevant eels
SMJE-2/MD/20	Revised updated roadmap of scientific activities/collaboration
SMJE-2/MD/21	Standard working format for data and information
SMJE-2/INF/01	Summary Report of the 1st Scientific Meeting on Japanese Eel and Other Relevant Eels
SMJE-2/INF/02	Summary Report of the 15th Meeting of Informal Consultation on International Cooperation for Conservation and Management of Japanese Eel Stock and Other Relevant Eel Species
SMJE-2/INF/03	Joint Statement of the Bureau of Fisheries of People's Republic of China, the Fisheries Agency of Japan, the Ministry of Oceans and Fisheries of the Republic of Korea and the Fisheries Agency of Chinese Taipei on International Cooperation for Conservation and Management of Japanese Eel Stock and Other Relevant Eel Species
SMJE-2/INF/04	CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES OF WILD FAUNA AND FLORA (CITES-SC74 Doc. 64.1)
SMJE-2/INF/05	CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES OF WILD FAUNA AND FLORA (CITES-AC32 Doc. 36)

附件 4

Annex 4

The 2nd Scientific Meeting on Japanese Eel and Other Relevant Eels

Venue : Ueda Tokyu Rei Hotel, Ueda city, Nagano, Japan
Date: May 29-30, 2023

Agenda

1. **Opening of the meeting**

2. **Meeting arrangement**

3. **Adoption of Agenda**

4. **The overview of Japanese eel catch and scientific activities**

5. **Report of the intersessional activities**
   (1) Task Team 1
   (2) Task Team 2

6. **Emerging Science and practical solutions in the management of Japanese eel resource in the Northeast Asian region**
   (1) Emerging techniques- application of environmental DNA
   Prof. Akihide Kasai
   Division of Marine Bioresource and Environmental Science
   Faculty of Fisheries Sciences, Hokkaido University
   (2) A possibility of forecasting glass-eel catches based on the larval estimator obtained by monitoring surveys in the ocean
   Nobuto Fukuda, PhD, National Research Institute of Fisheries Science
   Kazuki Yokouchi, PhD, National Research Institute of Fisheries Science
   (3) Effectiveness of actions to restrict initial input of glass eels and eel fries taken from the wild into aquaculture ponds in the farming practice in North East Asia
   Morio Kaneko, Fisheries Agency of Japan
   (4) New scientific assessment of Japanese eel resources and resource management based on the scientific assessment in Northeast Asian region
   Prof. Hakoyama, Nagano University, Japan
   (5) The challenge of assessing the American eel stock
   David K. Cairns, Ph.D.
   Scientist Emeritus, Department of Fisheries and Oceans, Canada
   (6) Others
   Eel resource management in China
   Prof. Jianyi LIU
   East China Sea Fisheries Research Institute, Chinese Academy of Fishery Sciences

7. **Situation concerning Japanese eel and other relevant eels**

8. **Revised roadmap of scientific activities/collaboration**

9. **Standard working format for data and information**

10. **The date and venue of the next Informal Consultation and Scientific Meeting**
    - The 16th Session of the Informal Consultation
    - The 3rd Scientific Meeting.

11. **Other matters**

12. **Adoption of summary report of the meeting**

13. **Closing of the meeting**

附件 5

Annex 5

Updated Roadmap for Scientific Activities and Collaborative Research on Japanese Eel and Other Relevant Eels (2023-24)

Prepared by the Task Team leaders with support from the Co-Secretariat

Task Team leaders would like to propose revisions of the two intersessional tasks for the roadmap for scientific activities and collaborative research as below, which were originally identified at the 1st Scientific Meeting on Japanese Eel and Other Relevant Eels and approved by the 15th Meeting of the Informal Consultation on International Cooperation for Conservation and Management of Japanese Eel and Other Relevant Eels.

PURPOSE

1. Task Teams are established under the Scientific Meeting on Japanese Eel and Other Relevant Eels for the efficient implementation of the tasks.

2. The Task Teams aim to promote scientific activities and collaborative research on the Japanese eel to provide available best scientific data and information to the Scientific Meeting.

ACTIVITIES

3. The Task Teams focus on the following activities and research:

Task 1: Develop close relationship among scientists in the Northeast Asia region, and collect and organize long-term time-series data including fishery-independent data such as environmental DNA on Japanese eel and other relevant eels in order to understand and forecast the stock trend of Japanese eel in the Northeast Asian region.

Team Leader: Dr. Leanne Faulks, Researcher/Guest Associate Professor, Nagano University

Task 2: Exchange information on tracking techniques in order to track migration paths of Japanese eels and the other relevant eels from rivers to spawning grounds in Northeast Asia and other regions, and to analyze and evaluate tracking data.

Team Leader: Prof. Hiroshi Hakoyama, Nagano University

4. The roadmap for scientific activities and collaboration research on Japanese eel and other relevant eels is updated as attached.

5. The team leaders lead their task teams and carry out their duties in email correspondence or by hosting virtual meetings.

6. Each country/region Member registers scientists/researchers as team members for the two task teams.

7. Team members works in coordination and cooperation with others to ensure the efficient execution of the team's mission.

8. The Task Teams prepare and present an interim report for each task term in accordance with the new updated Roadmap for Scientific Activities and Collaborative Research on Japanese Eel over the next year.

(Attachment)

Dates	Scientific Meeting/ Informal Consultation/ Task Teams 1 and 2	Works Contents
(*2023*) May	The 2nd scientific meeting	■ Discuss on the interim report of each task team ■ Draft an updated roadmap
July	The 16th meeting of the Informal Consultation	■ Authorize the latest statistics (catch, trade, input, etc) on eels submitted by Members ■ Approve the draft updated roadmap
August	Task Teams 1 and 2	■ Register team members for each task team ■ Determine work plan and role assignments ✓ Task Team 1 - Review the available statistics - Improve collection of fisheries statistics and complementary data - Share and improve knowledge on model analysis - Discuss the potential use of eDNA surveys - Discuss/identify specific indicators/parameters for stock assessments or trend analysis of Japanese eel as the

		single stock in Northeast Asian region - Others ✓ Task Team 2 - Improve migration tracking survey techniques - Discuss field research plan in Northeast Asian region
August-December	Task Teams 1 and 2	■ Collaborative work based on the plan
(2024) January-February	Task Teams 1 and 2	■ Online workshop for the Task Teams 1 and 2 / An interim report for the task
March-April	The 3rd Scientific Meeting	■ Discuss on the interim report of each task team ■ Draft an updated roadmap
May-June	The 17th meeting of the Informal Consultation	■ Authorize the latest statistics (catch, trade, input, etc) on eels submitted by Members ■ Approve the draft updated roadmap

附件 6

【Revised Standard Working Formats for Eel Statistics (2023)】 Members：XXX Annex 6

Format 1：Data on Catch of Japanese Eel (Data is limited to taken from the wild)

Item	Unit	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Catch of glass eel	kg											
Catch of eel fry (kuroko)	kg											
Catch of wild adult eel	kg or tons											

【Notes】:

1. The catch data of Japanese eel are entered by glass eel, eel fry and wild adult eel, respectively.
2. Unit for catch of glass eel and eel fry should be weight in kilograms. Unit for adult eel should be weight in metrc tons.
3. When there are no relevant data or data is not available, "-" should be entered. When data is identified as zero, "0" should be entered.
4. The statistic period of the data related to glass eel and eel fry (catch of glass eel and eel fry) should be the fishing season of glass eel and eel fry ("20XX-XX+1"means the input season which starts from 1st Novemver, 20XX to 31st October, 20XX+1.), while that for "wild adult eel data" should be the calendar year.

○Comments by Members：

Format 2：Data on Fishing effort on Japanese eel

Item	Unit	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Fishing effort on glass eel	number of licences (or fishermans, fishing vessels)											
Fishing effort on eel fry (kuroko)	number of licences (or fishermans, fishing vessels)											
Fishing effort on wild adult eel	number of licences (or fishermans, fishing vessels)											

【Notes】:

1. The data of fishing effort on Japanese eel are entered by glass eel, eel fry and adult eel, respectively.
2. Examples of unit for fishing effort may include the number of licenses, the number of fishermen or the number of fishing vessels.The unit can be chosen in accordance with each domestic legislations.
3. When there are no relevant data or data is not available, "-" should be entered. When data is identified as zero, "0" should be entered.
4. The statistic period of the data related to glass eel and eel fry (fishing effort on glass eel and eel fry) should be the fishing season of glass eel and eel fry ("20XX-XX+1"means the input season which starts from 1st Novemver, 20XX to 31st October, 20XX+1.), while that for "wild adult eel data" should be the calendar year.

○Comments by Members：

Format 3：Input of eel seeds (glass eels and eel fry (kuroko)) into aquaculture ponds

Species	Unit	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
japonica	kg											
domestic catch	kg											
imports	kg											
Other eel species	kg											
bicolor	kg											
anguilla	kg											
rostrata	kg											
marmorata	kg											
mossambica	kg											
Total	kg											

【Notes】:

1. Inputs of eel seeds (glass eels and eel fry) into aquaculture ponds are entered by japonica and other eel species, respectively
2. The data of japonica are entered by domestical catched seeds and imported seeds, respectively
3. However, eel seeds which transferred by other countries and regions are not included in the data of input of eel seeds.
4. Unit for catch of glass eel and eel fry should be weight in kilograms.
5. When there are no relevant data or data is not available, "-" should be entered. When data is identified as zero, "0" should be entered.
6. The statistic period of the data related to eel seeds (input of glass eel and eel fry) should be the fishing season of glass eel and eel fry ("20XX-XX+1"means the input season which starts from 1st Novemver, 20XX to 31st October, 20XX+1.).

○Comments by Members:

Format 4: Aquaculture production

Species	Unit	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
japonica	kg or tons											
Other eel species	kg or tons											
bicolor	kg or tons											
anguilla	kg or tons											
rostrata	kg or tons											
marmorata	kg or tons											
mossambica	kg or tons											
Total	kg or tons											

【Notes】:

1. The data of aquaculture production are entered by japonica and other eel species, respectively
2. Unit for aquaculture production should be weight (kilograms or metrc tons) as far as possible.
3. When there are no relevant data or data is not available, "-" should be entered. When data is identified as zero, "0" should be entered.
4. Aquaculture production data should be the calendar year.

○Comments by Members:

Format 5: Other data on aquaculture

Item	Unit	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Scale of aquaculture industry	number of aquaculture operators											

【Notes】:

①Unit for scale of aquaculture industry may include the number of aquaculture operator or the dimensions of aquaculture ponds.

②When there are no relevant data or data is not available, "-" should be entered. When data is identified as zero, "0" should be entered.

○Comments by Members:

Format 6: Import of eel seeds (glass eels and eel fry)

Species	Type/Size	Unit	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
japonica	glass eel	kg											
	eel fry (kuroko)	kg											
Total		kg											
Other eel species	glass eel	kg											
	eel fry (kuroko)	kg											
Total		kg											

【Notes】:

1. The data of import of eel seeds (glass eels and eel fry) are entered by japonica and other eel species, respectively
2. The statistic period of the data related to eel seeds (import of glass eel and eel fry) should be the fishing season of glass eel and eel fry ("20XX-XX+1"means the input season which starts from 1st Novemver, 20XX to 31st October, 20XX+1.).
3. When there are no relevant data or data is not available, "-" should be entered. When data is identified as zero, "0" should be entered.
4. Unit for catch of glass eel and eel fry should be weight in kilograms.

○Comments by Members:

Format 7: Import of eel and eel products

Species	Type/Size	Unit	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
japonica	live eel	kg or tons											
	broiled eel	kg or tons											
Other eel species		kg or tons											
		kg or tons											
Total		kg or tons											

【Notes】:

①The data of import of eel and eel products are entered by japonica and other eel species, respectively

②Examples of type/size of import of eel and eel product may include live eel, frozen eel, chilled eel or broiled eel.

③When there are no relevant data or data is not available, "-" should be entered. When data is identified as zero, "0" should be entered.

④Unit for import of eel and eel products should be weight (kilograms or metrc tons) as far as possible.

○Comments by Members:

Format 8: Export of eel seeds (glass eels and eel fry)

Species	Type/Size	Unit	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
japonica	glass eel	kg											
	eel fry (kuroko)	kg											
Total		kg											
Other eel species	glass eel	kg											
	eel fry (kuroko)	kg											
Total		kg											

【Notes】:

1. The data of export of eel seeds are entered by japonica and other eel species, respectively
2. The statistic period of the data related to eel seeds (export of glass eel and eel fry) should be the fishing season of glass eel and eel fry ("20XX-XX+1"means the input season which starts from 1st Novemver, 20XX to 31st October, 20XX+1.).
3. When there are no relevant data or data is not available, "-" should be entered. When data is identified as zero, "0" should be entered.
4. Unit for catch of glass eel and eel fry should be weight in kilograms.

○Comments by Members:

Format 9: Export of eel and eel products

Species	Type/Size	Unit	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
japonica	live eel	kg or tons											
	broiled eel	kg or tons											
Other eel species		kg or tons											
		kg or tons											
Total		kg or tons											

【Notes】:

1. The data of export of adult eel and eel products are entered by japonica and other eel species, respectively
2. Examples of type/size of export of eel and eel product may include live eel, frozen eel, chilled eel or broiled eel.
3. When there are no relevant data or data is not available, "-" should be entered. When data is identified as zero, "0" should be entered.
4. Unit for export of eel and eel products should be weight (kilograms or metrc tons) as far as possible.

○Comments by Members:

Format 10. Mean value of wight and length of Japanese eel

	Unit	When catching	When inputing into aquaculture ponds	When importing	When exporting
glass eel	weight (g)				
	body length (cm)				
eel fry	weight (g)				
	body length (cm)				
adult eel	weight (g)				
	body length (cm)				

【Notes】:

1. The data of weight and length of Japanese eel into aquaculture ponds are entered by glass eel, eel fry and adult eel, respectively.
2. The data entered can be either mean value or figures in certain ranges (e.g., XX – YYg or cm). If mean value is available, it should be clearly mentioned in the comments by Members that the mean value of weight and length figures are based on biological or administrative standards or figures obtained from industry associations, etc.
3. When there are no relevant data or data is not available, "-" should be entered. When data is identified as zero, "0" should be entered.
4. "Body length" is the length of a fish measured from the tip of the snout to the posterior end of the last vertebra.

○Comments by Members:

●Data Sources and/or Methods to collect or estimate the data

(* Please fill in data sources and/or methoods to collect or estimate the data entried in from format 1 to format 14 respectively.)

1. Catch of glass eel	
2. Catch of eel fry (kuroko)	
3. Catch of wild adult eel	
4. Fishing effort on glass eel	
5. Fishing effort on eel fry (kuroko)	

6. Fishing effort on wild adult eel	
7. Input of eel seeds into aquaculture ponds	
8. Aquaculture production	
9. Scale of aquaculture industry	
10. Import of eel seeds	
11. Import of eel and eel products	
12. Export of eel seeds	
13. Export of eel and eel products	
14. Mean value of wight and length of Japanese eel	

附件 7

Annex 7

Draft

The Sixteenth Meeting of the Informal Consultation on International Cooperation for Conservation and Management of Japanese Eel Stock and Other Relevant Eel Species (Informal Consultation)

Date: From 26th (Wed) to 27th (Thu) July, 2023, Tokyo

Agenda

1. Opening of the meeting

2. Meeting arrangement

3. Adoption of Meeting Agenda

4. Issues concerning the 2nd Scientific Meeting on Japanese Eel and Other Relevant Eels

5. Review of input, output (catch and aquaculture), and trade statistics (export/import) of glass/adult eels during the season 2022-2023

6. Domestic conservation and management measures for eels

7. Revision of the future work plan

8. Other matters

9. Finalization of a joint press release

10. The date and venue of the next Scientific Meeting and Informal Consultation
- The 17th Session of the Informal Consultation
- The 3rd Scientific Meeting.

11. Adoption of summary report
- Schedule for circulating a draft summary report of the meeting.

12. Closing of the meeting

附件 8

Summary Report of the 2nd Scientific Meeting on Japanese Eel and Other Relevant Eels

Venue: Ueda Tokyu Rei Hotel, Ueda City, Nagano, Japan

Date: May 29-30, 2023

Item 1: Opening of the meeting

1. The co-Chairs of the meeting, Prof. Nobuyuki YAGI (Graduate School of Agricultural and Life Sciences, University of Tokyo) and Prof. Jun AOYAMA (Atmosphere and Ocean Research Institute, University of Tokyo), welcomed participants and declared the opening of the meeting.

2. Mr. Morio Kaneko (Director, Ecosystem of Conservation Office, Fisheries Agency of Japan) delivered an opening address as the host Member of this meeting (Annex 1).

3. A head of delegation of each Member made a self-introduction and introduce members of their delegation (Annex 2).

4. The list of meeting documents is provided in Annex 3.

Item 2: Meeting arrangement

5. The co-secretariat explained the rule of the meeting procedure.

Item 3: Adoption of Agenda

6. The provisional agenda was adopted without any modification (Annex 4).

Item 4: The overview of Japanese eel catch and scientific activities

7. Scientists from each Member (China, Japan, Korea, and Chinese Taipei) reported the overview of Japanese eel catch and scientific activities in their country.

8. China presented the overview of the eel industry, the Japanese eel catch and management, and the related research activities in the country. For the management of Japanese glass eels, he mentioned relevant laws and management actions including the ten-year fishing ban on the Yangtze River (SMJE-2/MD/07).

9. Questions were asked by Japan to China regarding how many licences of glass eel fisheries are issued, how fishery data are collected, and whether eel fishing ban is implemented in rivers other

than the Yangtze River. China answered that the ten-year ban on eel fisheries in Yangtze River is to restrict the number of vessels, nets, and fishing days, and that data are collected by the research institute and the local governments. He also responded that, in other rivers, such as the Yellow River, fishing moratorium is implemented in spring, and it contributes to the management of glass eel fishery. He also indicated that, in coastal areas, fishing moratorium is posed on these areas starting in May each year. Also, he explained that fishing licences are issued by each province, and the total number is controlled by the central government.

10. Another question was asked by Chinese Taipei to China whether there is a plan to survey eel distribution in the Yangtze River, following the implementation of the ten-year fishing ban. China replied that the fisheries supervision office is planning to conduct such a survey.

11. Japan presented long-term data of Japanese eels' annual catch which have been recorded since 1894. He also introduced a set of fisheries-independent data collected from 2019 in five prefectures in Japan to investigate the status of glass eel arrivals during non-fishing seasons (SMJE-2/MD/08).

12. A question was asked by Chinese Taipei to Japan regarding a difference in the reported yellow eel catches between the east and west part of Japan. Japan answered that yellow eel is generally abundant in Chiba and Shizuoka prefectures, and the data represented the eel natural population relatively well.

13. Other questions were asked by China to Japan whether yellow eels are caught for human consumption or farming, and how much progress has been achieved in eel tagging and tracking. Japan responded that yellow eels are traditionally consumed by communities, and that details of the progress of eel tagging and tracking techniques were discussed at the 1st Task Team 2 workshop (SMJE-2/MD/12) and would be presented in the agenda item 5.

14. Korea shared with participants results of the research related to the feeding ecology of Japanese eels using a stable isotope analysis, with a focus on the glass eel (SMJE-2/MD/09).

15. A point was noted by Chinese Taipei regarding a possible difference in the diet between Leptocephalus from the wild and artificial (farmed) eels. Korea answered that there is still a lack of knowledge in the life cycle of eels and feeding ecology of eels in early stages, and therefore more research is necessary to address the point.

16. A question was asked by the co-Chair to Korea whether eels were sampled for examination in Jeju Island. Korea responded that Jeju Island is not a major place for eel catch to the best of his knowledge, but Nakdong and other rivers where sampling was conducted.

17. Another question was asked by China to Korea regarding the diet of leptocephalus. Korea explained that, based on the findings by other studies, leptocephalus mainly consumes marine snows, and that they are close to the trophic level of zooplanktons. He also added that, as they proceed to open sea areas, they start feeding zooplanktons.

18. Chinese Taipei presented its long-term catch of the Japanese glass eels, its scientific research, and conservation issues related to Japanese eels. He showed results of the glass eel catch, explaining that data exhibited a declining trend over time and highlighted the importance of the glass eel management for securing its recruitment (SMJE-2/MD/10).

19. A question was asked by China to Chinese Taipei regarding the best timing of releasing spawners. Chinese Taipei answered that winter is the best timing for releasing silver eels whereas yellow eels can be released any time in the year.

20. A question was asked by Japan to Chinese Taipei regarding the necessity of protecting yellow eels along with glass eels. Chinese Taipei responded that there should be more effort to protect yellow eels. Another question was asked by Japan to Chinese Taipei regarding reasons for changes in the mean total length and the relative abundance of glass eels over time. Chinese Taipei mentioned several reasons for these results including differences in the main season when glass eels migrate to Chinese Taipei.

21. A question was asked by Korea to Chinese Taipei regarding the calculation method of the eel mortality. Chinese Taipei replied that it is a rough estimation, and that more data are required for ensuring accuracy.

22. A question was asked the co-Chair whether there is a difference in the mortality rate among different fishing methods. Chinese Taipei responded that such a difference has not been assessed yet, but there seemed to be different mortality among fishing methods based on his in-situ observation.

Item 5: Report of the intersessional activities

(1)Task Team 1

23. The Task Team 1 leader, Dr. Leanne Faulks, reported activities conducted so far in years 2022 and 2023 including establishment of the team and the online workshop. She also shared main discussion points including data improvements through creating a data format and knowledge gaps including CPUE standard data and fisheries independent data (SMJE-2/MD/11).

24. The Secretariat suggested that some ideas of the needs for improving data collection raised during the workshop 1 can be incorporated to improve the statistical data format. At the same time, he suggested that, if Members wish to incorporate such ideas, on the second day, they need to clarify and agree on common objectives to collect such additional data because complex statistical data format would discourage Members from collecting data.

(2) Task Team 2

25. The Task Term 2 leader, Prof. Hiroshi Hakoyama, reported activities conducted so far in years 2022 and 2023 including research of eel tracking using a satellite pop-up tag, and information exchange regarding surveys of tracking Japanese eels conducted by each Member and potential eel species to be tracked (SMJE-2/MD/12).

26. Several questions related to methods and results of the tracking surveys were made by the co-Chair and Members including what can be evaluated through data of such surveys and whether the task team has consulted tag manufacturers about the development of small tags. The Prof. Hakoyama answered to them accordingly by stating that tracking surveys are useful to identify the eel migration path, that the combined information on the biomass of each region contributes to estimating the extent to which a specific region contributes to eel abundance, and that the task team is working with a tag manufacturer for small-sized tags.

(3) Other matter

27. A question was asked by the co-Chair to the Secretariat regarding whether Members are supposed to authorize reports of the past activities and agree on future activities. The Secretariat answered that the reports may be approved in this agenda item, but that the future activities may be evaluated and approved on the second day of the meeting.

28. The reports of the two task teams were adopted without objection.

Item 6: Emerging Science and practical solutions in the management of Japanese eel resource in the Northeast Asian region

29. Prof. Kasai, as the Invited Expert, presented the emerging techniques to estimate eel distributions and concentrations, with a specific focus on the application of environmental DNA (eDNA) (SMJE-2/MD/13).

30. Several questions were asked by participants including the relations between the number of farmed eels released and the concentration of eDNA, and the relations between the river size and the eDNA concentration. He responded that there seem to be no clear patterns between the number of eels released and the eDNA concentration, and that the river size may not influence the eDNA concentration while it has not been assessed scientifically.

31. Dr. Fukuda, as the Invited Expert, presented a potential method of forecasting glass eel catches based on estimation of larval distribution in and around the North Equatorial Current (NEC) (SMJE-2/MD/14).

32. Several questions were asked by participants including a difference in larval densities between the eddy region and the NEC. He mentioned the ocean current speed, which is slow in the eddy and fast in the NEC, possibly causing a higher larval density in the eddy. One of the participants commented that it would be useful to analyze long-term oceanographic data to further investigate relations between oceanographic conditions and larval densities.

33. Japan presented the effectiveness of actions to restrict initial input of glass eels and eel fry taken from the wild into aquaculture ponds in the farming practice in Northeast Asia (SMJE-2/MD/15).

34. Recalling that the 2014 Joint Statement stipulates that "Members will cooperate on the conservation and management measures (CMMs) of Japanese eel stock and other relevant eel species" and considering that Japanese eels are the single stock in Northeast Asian region, Japan shared its view that it is meaningful to conserve and manage eel stocks based on "a management standard" that are commonly understood as a set of "Merkmals" by all Members of the Informal Consultation. He also highlighted that measures to restrict initial input of glass eel and eel fry into aquaculture ponds become effective as: (1) the cornerstone of the management framework for aquaculture production; (2) efficient and simple CMMs; and (3) transparent CMMs for not only Japanese eels but also for other relevant eels. He concluded the presentation by reiterating that, for the eel industry in the Northeast Asian region, the most effective and efficient CMM is the restriction of initial input of glass eels into aquaculture ponds.

35. Statements were made by the eel association of Japan explaining how much the measure to restrict the input of glass eels into ponds contributes to the conservation and management of Japanese eel

stock, including through raising awareness of benefits of eel management among eel aquaculture farmers.

36. Japan highlighted the importance of collaborative research activities in the Northeast Asian region (SMJE-2/MD/16). In particular, he highlighted the importance of the spatio-temporal fishery data (time-series of catch and CPUE) in understanding stock trends and assessing extinction risk for stock management. He also stated that the restriction of inputs of glass eels into ponds, combined with regional fisheries management and trade transparency efforts, play a critical role in the regional resource management for Japanese eels.

37. China presented its domestic eel resource management policy (SMJE-2/MD/18). He explained that the capture volume of glass eels has been declining over time, leading to enhancement of eel resource management, namely the ten-year ban on glass eel fisheries in the Yangtze River. China concluded its presentation by stressing the importance of maintaining the balance between conservation and utilization and presented China's four target principles: (1) ensuring conservation prioritized; (2) developing the way of rational utilization; (3) enhancing scientific and technical support; and (4) cooperation for the eel fisheries management.

38. Japan made a general comment on China's presentation that it is not sufficient to only regulate fisheries in rivers and estuaries, and that the input of glass eels into aquaculture ponds is necessary as the cornerstone of the management framework for aquaculture production to ensure transparency throughout the whole supply chain, such as glass eel catch, their inputs into aquaculture ponds, processing/distributing/trading of adult eels.

39. Chinese Taipei pointed out that the reported contribution of glass eel catch in the Yangtze River in the total catch (>60%) seems to be overestimated and the actual contribution is around 30%. China responded that this fishing year there were more glass eels coming to the Yangtze River, which is why the percentage of the contribution is higher.

40. Japan asked details of conservation measures for other relevant eel species which China input into their aquaculture ponds. China stated that American eels are managed by controlling their imports.

41. Dr. Cairns, as the Invited Speaker, presented the challenge of assessing the American eel stock (SMJE-2/MD/17). He discussed that effects of anthropogenic impacts (fishing, dams, contaminants) on eel populations could not be assessed due to the lack of available data, and that further data are required for the eel stock assessment. He summarized ongoing attempts to assess the stock status of Anguillid species and examples of substitution for analytic assessments in the

other parts of the world. He recommended continuing to address these threats while developing spatial and population dynamics models and managing eel fisheries based on the existing abundance indices.

42. Several questions were asked by participants including effects of microplastics on American eels and a concern about conservation of American eels in Central and Latin America. Dr. Cairns answered that American eels can potentially be affected by microplastics in their larval stage while noting that there is not sufficient data available to conclude this argument. He also expressed a deep concern that American eels are harvested and exported by many countries such as Haiti where their governance is not sufficient and noted that nonetheless he has a hope because a part of the exports destined to Canada and the United States can be under a stricter control.

Item 7: Situation concerning Japanese eel and other relevant eels

43. Japan presented the situation concerning Japanese eel and other relevant eels in relation to situation concerning commercially exploited aquatic species in the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). He also reported the newly introduced Japanese Catch Documentation Scheme (CDS) under the Act on Ensuring the Proper Domestic Distribution and Importation of Specific Aquatic Animals and Plants (SMJE-2/MD/19). Considering these emerging circumstances, he highlighted the importance of starting frank exchange of views among Members about the possibility of introducing a legal framework such as a new regional fisheries management organization (RFMO) for eels.

44. Dr. Cairns supported the proposal of starting discussion and asked about the context of a legal framework being needed, including whether the framework could be an newly established eel-only organization or the existing RFMOs whose mandate is broaden to cover eels. Japan clarified the possible modality of such a new framework by stating that such an RFMO for eel could be an organization similar to the tuna-RFMO with functions to implement conservation and management measures. He also responded that it will take a long time to go through numerous procedures before establishing an RFMO and that we have to go forward step by step with consultation among Members of the Informal Consultation.

Item 8: Revised roadmap of scientific activities/collaboration

45. Dr. Faulks as the leader of Task Team 1 exhibited the draft updated roadmap for scientific activities and collaborative research on Japanese eel and other relevant eels (SMJE-2/MD/20). She mentioned that the collection of fishery-independent data such as eDNA as a new activity added to the draft updated roadmap for Task 1 and Task 2 activities had no substantial changes in its roadmap.

46. The revised roadmap for Task 1 and 2 was adopted with no objection (Annex 5). The co-Chair welcomed Members, if any, to propose additional activities intersessionally.

Item 9: Standard working format for data and information

47. The Secretariat explained the slightly revised standard formats for eel statistic formats which was improved based on the comments made during the workshop of the task team 1 (SMJE-2/MD/21). Major changes are: (1) the unit of measurement with "ton" replaced with "kg" to record weights of glass and kuroko eels more accurately; (2) a new space "Comments by Members" which replaces "Footnotes" section and where Members are, as appropriate, supposed to present additional information that is useful for scientific analysis such as spatial information and protocols for data collection.

48. The revised standard working format was adopted without objection (Annex 6).

Item 10: The date and venue of the next Informal Consultation and Scientific Meeting

49. Japan proposed that it would host the 16th Session of the Informal Consultation on 26 and 27 July 2023 in Tokyo (Annex 7) and the 3rd Scientific Meeting planned to be held between April and May 2024. Also, Japan asked participants to convey its proposals to each authority of Members of the Informal Consultation.

50. Members agreed the proposal on the date and venue of the next Informal Consultation and Scientific Meeting by Japan without objection.

Item 11: Other matters

51. No other matter was raised by Members.

Item 12: Adoption of the summary report of the meeting

52. Members agreed on a suggestion by the co-Chair that the draft summary report would be circulated among participants for their comments after the meeting rather than discussing it in the meeting.

Item 13: Closing of the meeting

53. The co-Chairs, Prof Yagi and Prof. Aoyama, expressed appreciation to all the participants for their useful exchange of information and comments while highlighting the importance of trust-building among Members face to face, and closed the meeting.