

出國報告（出國類別：開會）

**參加 2023 年美國海洋教育者年會
（National Marine Educators
Association, NMEA）出國報告**

服務機關：海洋委員會、國家海洋研究院

姓名職稱：李珊瑩副處長（時任專門委員）、嚴佳代主任

派赴國家/地區：美國華盛頓州貝靈厄姆

出國期間：112 年 7 月 21 日至 112 年 7 月 29 日

報告日期：112 年 8 月 15 日

摘要

海洋教育者年會是全球海洋教育界的盛事，尤以美國的國家海洋教育者協會（National Marine Educators Association）組織社群最具規模。本會 2023 年首次參加之美國國家海洋教育者年會，於同年 7 月 22 日至 7 月 27 日（當地時間）在美國華盛頓州貝靈厄姆西華盛頓大學(Western Washington University • Bellingham, WA)舉辦，這也是自 2021、2022 年年疫情後最大型的實體活動（2020 年停辦）。今年主題為：從海峽到海灣：相聚於薩利希海。在六天的議程中，計有超過 400 人的參與、3 場主題演講及 9 大場次超過百篇論文及簡報發表。本會為提升臺灣海洋教育能見度、拓展國際交流，並強化與各國海洋教育專業者之連結互動，從而了解國際最新政策趨勢與實務方向，除主持其中一場研討發表（45 分鐘），主題為「臺灣海洋科技、教育及文化政策推動與國際展望（Promoting Taiwan's Marine Science, Education and Culture Policies and Exploring International Prospects）」，另有一篇簡短報告（15 分鐘）－「將海洋帶入生活 -臺灣海洋教育經驗分享 Bring the Ocean into your Life -Taiwan's Experiences in Marine Education」，此外，積極參與國際委員會座談、開放式會議、各場次簡報和主題演講，與相關國際專家學者溝通交流，提升參與能量，並奠立未來進一步連繫或合作之基礎。本報告就後續與會評估、參與策略及本次見聞可供參採處提出 3 面向建議，期作為本會持續海洋教育政策及實務推展之參據。

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壹、目的

美國國家海洋教育者協會 (National Marine Educators Association,即 NMEA) 是一個專業、有影響力的會員組織，由來自世界各地的教師、非正式教育工作者、大學教授、科學家等組成，每年輪由各地分會辦理盛大的年會活動，就各國海洋教育的議題與經驗進行論文發表及討論分享。

參與該年會為本會出國計畫項目之一，惟前三年均受疫情影響，會議取消或因國際旅運限制未能成行，爰 2023 年係本會首次參與，其議程摘述如下

一、時間及地點：112 年 7 月 22 日至 7 月 27 日，於美國華盛頓州貝靈厄姆西華盛頓大學舉辦。

二、本屆主題為「從海峽到海灣-相聚於薩利希海」(Strait to Sound: Gathering at the Salish Sea)，包括：

(一) 主要講者與議題：

1. Dana Wilson, Lisa Wilson 主講「Lummi Nation 觀點：人與水資源的關係」(Lummi Perspectives on the Human Relationship with Human Resources)。

2. Susan Haynes, Liz Hoadley 與 Kelly Guarino 主講「透過合作夥伴推動海洋探索」(Ocean Exploration Driven Forward through Partnerships (Kelly Guarino, Susan Haynes and Liz Hoadley)。

3. Lynne Barre, Jeff Hogan 與 Ginny Broadhurst 主講「過去五十年管理學到的，用來教養下一代的薩利希海」(Lessons learned from 50 years of Stewardship: Educating for the future of the Salish Sea)。

(二) 實地參訪：Lummi Nation (原住民保留地)。

(三) 9 大場次演講 (每場次包括 3-5 個分場;每個分場約 3 個簡報發表、合計超過百篇簡報發表;另有海報發表場次、學生會議、委員會議、國際交流會。

由於 NMEA 長期與美國國家海洋與大氣總署 (National Oceanic and Atmospheric Administration,簡稱 NOAA)合作，共同努力促進對淡水和海洋生態系統的理解和保護。每年的盛會都匯聚了數百名致力於海洋、沿海和水環境的專業教育工作者，各國海洋教育教師、學者及機關代表，於會議中就海洋教育等議題進行論文發表、演講、工作坊等討論與分享，NOAA 不僅給予經費支持，在會議的實質參與上也不遺餘力，是相當好的國際交流機會。過去臺灣僅有少數大學教師以個人身份與會，鑒於國際關係之建立及最新海洋政策發展之掌握，本會積極參與並與相關國際專家學者建立溝通管道，對未來政策規劃統合將有助益。

貳、與會過程重點摘述

目前國際四大海洋教育者年會，包括 NMEA(美國海洋教育者協會)、EMSEA(歐洲

海洋科學教育者協會)、AMEA(亞洲海洋教育者協會),以及 IPMEN(國際太平洋海洋教育者協會)。另包括拉丁美洲海洋教育者聯盟(RELATO)、加拿大海洋教育聯盟(CANOE)、澳洲海洋教育者聯盟(AMEN)、印尼海洋教育者協會(IMEA)等區域性社群,各協會成員之間也有密切的交流。臺灣從 2015 年起陸續有大學教師以學者個人身份參與 AMEA、IPMEN、NMEA 會議及發表。其中美國 NMEA 每年舉辦一次之年會,是規模相對盛大、參與人數眾多的場次,輪流由其分會在美國各主要城市舉行。本次會議地點所在的西華盛頓大學,是全美最北的學校,在全華盛頓州九所公立大學中名列前茅,部分公車除直接駛入校園,並設有五個以上的站點,可見其遼闊;其位於貝靈厄姆(Bellingham)小鎮人口數未及十萬,距離美加邊境海關僅有不到一小時的車程,臨太平洋的薩利希海,有錯綜的地形、水道及各式船隻,亦有傳統印第安原住民領域的社區 Lummi Nation。

本次 NMEA 的年會雖然是與學校合作,但主要是硬體的借用,並借重其與社區的關聯性,而實際會議安排均由協會自行處理。為期 6 天的盛會需運用大量的志工及會員協助,其最大支持者 NOAA 除了派員參與,也實際協助發表會的進行,例如擔任主講、協調各資助計畫參與人、甚至加入會場工作如場控計時等,現場所見無分邀請的專業人士、政府機關人員或會議主辦,與會者間均相當熱絡熟稔。

以下依各日議程及實質參與場次分別說明如下:(所有議程詳見附錄一)

Conference At-a-Glance					
July 22 - SAT	July 23 - SUN	July 24 - MON	July 25 - TUE	July 26 - WED	July 27 - THU
Sea Grant Meeting	NMEA Board Meeting <u>Pre-Conference Workshops</u>	Registration & Coffee	Committee meetings & Coffee	Committee meetings & Coffee	Field Trip Day
		Conference Welcome & Keynote	Student Conference <u>Keynote</u>	Keynote	
		Break + Meet-ups	Break + Meet-ups	Break + Meet-ups	
		Concurrent Sessions #1: Workshops	Concurrent Session #4: Workshops	Concurrent Sessions #7: Workshops	
		Buddy Lunch	Lunch+ Posters + Exhibitors + Chapter baskets	Lunch + Committee Meetings	
		Concurrent Sessions #2: Full + Lightning	Concurrent Sessions #5: Lightning	NMEA AGM & Awards	
		Break + Meet-ups	Break + Meet-ups	Concurrent Sessions #8: Fill	
		Concurrent Sessions #3: Double Session	Concurrent Sessions #6: Full Sessions	Break + Meet-ups	
			Registration Opens	NEW NMEA Board Meeting		Concurrent Sessions #9: Full Sessions
	Conference Kick-off Event WWU	Chapter meetings	Stegner Performance		
NMEA Board Dinner		Evening Event - Offsite Picnic	NMEA Auction/Dinner	Farewell Reception	
				<u>Evening On-your-own</u>	

一、 7月22日 Sea Grant Educators Network Meeting

Sea grant 是 NOAA 提出的一項重要計畫，由聯邦政府與大學合作，旨在結合科學與社區，尋求有效的解決方案，其內容性質類似國家海洋資助學院計畫，透過研究－推廣－教育的整合模型，以補助團隊或競爭型計畫的資助，協助沿海及五大湖區民眾取得教育資源，培養參與海洋、社區和經濟的下一代專業人員。Sea Grant 的教育組合包括本科系和研究生教育、教師教育、K-12 課程開發和項目、獎學金、民眾為主的非正式教育、行業特殊培訓項目等等。

目前 Sea Grant 建置有 The Bridge 網站 (<http://masweb.vims.edu/bridge/>) 收集線上海洋教育資源，為教育工作者提供了有關全球、國家和區域海洋科學主題的準確有用的資訊，並成為研究人員教育推廣的聯繫點，合作夥伴除了 Sea grant 本身、還有國家海洋學合作夥伴計畫 (the National Oceanographic Partnership Program, NOPP) 和國家海洋教育者協會 (NMEA)-亦即本次會議的主辦單位。

本日由佛羅里達大學 Mike Spranger 介紹 Sea grant，本會國家海洋研究院詢問參與該計畫之機會，Spranger 教授表示相當歡迎，目前亞洲已有韓國跟印尼加入國際合作平台，並期待能組織臺灣 Sea Grant 系統加入國際合作團隊。

二、 7月23日 NMEA 委員會會議、報到、歡迎活動及啟動會議

委員會會議（開放國際人士參與旁聽）與啟動會議

7月23日9時至15時為委員會會議，並確認明(2024)年7月28日至8月1日將於波士頓辦理第五十屆年會。

15時30分由國際委員會成員至大會委員會進行交流報告。包括來自澳洲、日本、瑞典、菲律賓等國與會人員向大會委員會簡要報告背景與分享議題。

16時會議報到，亦象徵為期五天的會議正式開始，並於會後進行歡迎晚宴。會中各國與會者交流海洋素養與海洋教育發展方向。

本次共計超過400名來自各國的海洋科學家與教育者分享包括海洋教育、氣候變遷、海洋保育教育、海洋數據應用、海洋教案設計、博物館海洋教育、水產養殖教育、海洋教育社群、海洋教育研究、海洋素養評量，以及海洋藝術教育等181篇報告。臺灣本次到訪者以國立臺灣海洋大學師生為主，含本會及所屬人員約10人；亞洲地區另有來自日本、香港、澳洲、菲律賓等地的專家學者。。

三、 7月24日主題演講、研討會（含本會發表）、青年研討會

主題演講

特別邀請當地設有領地的原住民族 Lummi Nation，由長老、議會領袖、不同經歷的族人 Dana Wilson, Lisa Wilson 等，描述長年為保存既有傳統智慧及維護生活形態和領域，進行的各項努力、與聯邦政府間的薩利希海漁權協調，及爭取水族館虎鯨回到家

鄉海域等計畫，並以青年族人返鄉及綬帶活動，呈現精神和智慧的傳承，令各方與會者印象深刻。會議主席提及臺灣積極參與國際海洋教育活動，專題演講也提到臺灣海洋科學研究與海洋教育對於原住民文化保留的肯定。

研討會

本日為密集演講及專題，而本會首次參與 NMEA 年會，主要的任務之一就是透過單一完整場次的簡報介紹及發表，介紹及推廣臺灣在海洋國家的願景，與投入海洋教育所作的各項努力，並讓世界更認識臺灣。以下將實際參與場次的內容重點及可茲借鏡處摘述說明如下。

(一) 本會發表：

▲發表主題：臺灣海洋科技、教育及文化政策推動與國際展望（Promoting Taiwan's Marine Science, Education and Culture Policies and Exploring International Prospects，簡報詳附錄二）。

▲發表人：李珊瑩（海洋委員會專門委員）、嚴佳代（國家海洋研究院主任）

▲內容及討論重點：在 NMEA 與會者以教師、科學家等實作者為主的情況下，本會場次吸引滿場聽眾，實屬難得。本場會議總計 50 分鐘，與會成員包括來自日本、澳洲、瑞典、香港、薩摩亞、及美國等代表。臺灣海洋教育發展在全球有一定的知名度，在簡報後，聽眾對於臺灣有專責海洋事務機關，因此對臺灣未來海洋素養推動的可能性充滿期待。與會聽眾提問以資料開放（NODASS），未來可用以進行跨國比較的可行性，以及對於目前海洋科學素養的推廣，如何進行合作（包括國際合作業為主。我國的經驗分享受到相當的迴響肯定，此外，講者也與 NOAA 與會人員討論彼此海洋事務管理機關和轄管業務比較，NOAA 人員提到，NOAA 係隸屬於商務部下的科技部門所管轄，因此會以科學教育推動為主，主要角色是在提供資源，並鼓勵多元研究，亦無附屬之機關（構）。NOAA 與許多國家都有在特定議題（如，氣候變遷）進行合作，未來如有相關議題也樂觀其成。

(二) Concurrent Sessions

▲發表主題：海洋保育課程設計規劃與應用：Marine Conservation Lesson Plan Design and Application

▲發表人：Hannah Yeh

▲內容及討論重點：講者以實體教具現場指導與會者逐步操作，並說明每一個設計環節的意義、可運用的模組，並分享於教學場域獲得的成果與回饋。與會者可以很容易自行上網複製使用，或依不同年級程度學生調整內容深度，是類教具創意及教育意義是本次會議多數教師關注的部分，也大受好評。

(三) Concurrent Sessions

▲發表主題：「亞洲海洋教育者協會」（Asia Marine Educators Association, AMEA）對海洋素養的參與：Ocean Literacy engagement in AMEA

▲發表人：Tsuyoshi Sasaki

▲內容及討論重點：本場由日本東京海洋大學佐佐木教授發表，AMEA 成立於 2015 年，

是亞洲海洋教育整合與國際合作重要的平台，臺灣有多位學者為 AMEA 理監事會成員，與臺灣有許多交流互動的機會。該場次佐佐木教授除介紹 AMEA 的歷史發展外，也分享未來相關合作機制與計畫。佐佐木教授對於本會成立後積極推動臺灣海洋教育資源整合表示肯定，也期待本會與國際海洋科學教育單位持續合作，將臺灣海洋資源連結國際海洋教育發展趨勢。

(四) Concurrent Sessions

▲發表主題：個人在促進海洋素養的角色-NMEA and the UN Ocean Decade: Your Role in Fostering Ocean Literacy

▲發表人：Diana Payne & David Christopher

▲內容及討論重點：本項專題由康乃迪克大學的教育專員 Diana Payne 先介紹聯合國的海洋科學十年永續發展計畫，以及 NMEA 為了與之呼應，所作的為期三年的海洋素養推動專案，迄今透過各項實體和虛擬的會議，NMEA 已成為海洋素養的主要倡議者；前 NMEA 主席 David Christopher 也分享希望透過會議、夥伴合作以及國際的參與，來面對海洋十年的挑戰從根本上改變人與海洋的關係。

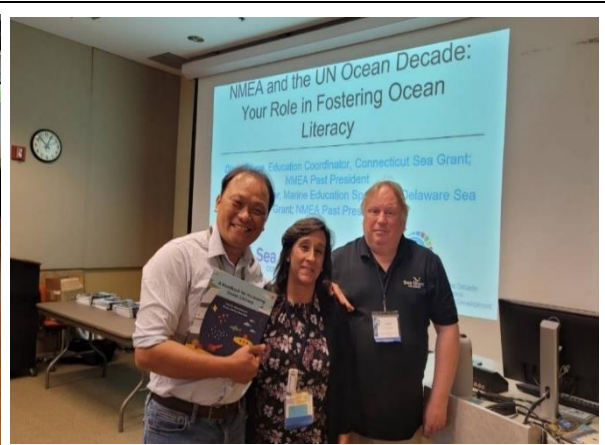
青年研討會

由 NMEA 學生海洋研究專題快閃報告，分別由四組學生上台報告，包括海洋生物與環境教育課程結合、海洋微塑膠危害及減塑、浮游生物缺氧或死亡影響海水 PH 值或酸化，以及利用水下聲景調查專案了解水下噪音影響等。因美國高中生畢業後很少直接上大學，而是利用 GAP YEAR 去 NGO 或是旅遊，並尋找他們的專題興趣，申請大學獎學金，本次研討會發表的均為受 NMEA 補助的學生計畫，由發表中可以感受到他們對於議題的熱情。

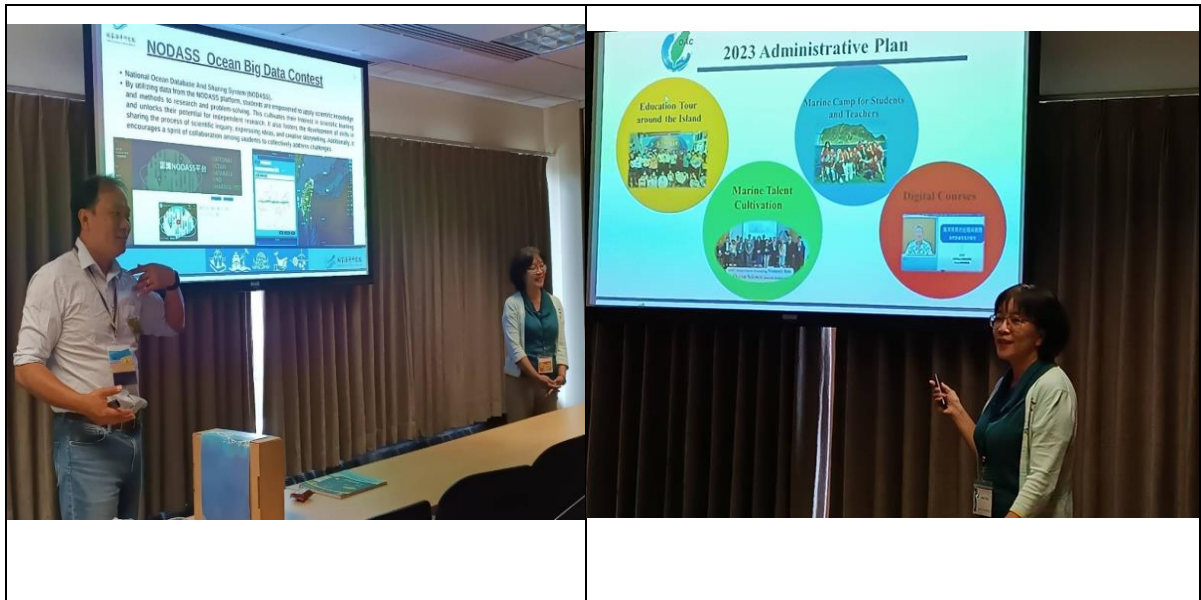
活動照片



與加拿大維多利亞大學 Gloria Snively 教授合影，她是海洋教育領域的活躍人物



與美國海洋素養委員會主席 Diana Payne 及 David Christopher 教授合影



本會以 Promoting Taiwan's Marine Science, Education and Culture Policy and Exploring International Prospects 為題發表

左下圖前排左為 NOAA 漁業署西北科學中心教育協調員 Casey Ralston 女士

四、 7 月 25 日主題演講、研討會（含本會第二篇發表）及交流活動

主題演講

本場次主題為：透過合作夥伴推動海洋探索 Ocean Exploration Driven Forward through Partnerships

其發表方式相當創新，首先由 NOAA 海洋探索教育專案經理 Susan Haynes 與海洋底護專案人員 Liz Hoadley、海洋探險信託基金教育專案主管 Kelly Guarino，及施密特海洋機構分享共同研究的海洋探險成果，藉由影片的播放及生動的解說，與會者看到許多特殊的海洋生物和海洋影像，這些精彩的畫面經過轉製成小卡片和貼紙，成為人手一張的紀念小物；此外，現場更特別與 EV Nautilus 二艘研究船上的老師與學員即時連線，以通訊影像分享研究項目及在船上生活的感受，也開放聽眾提問，氣氛十分熱烈。此種分享的方式相當生動且有助於激起學員對海洋科學研究的興趣，值得效法。

研討會：

本日同樣為密集式的專題發表與討論，依實際參與的場次，摘述說明如下：

(一) 本會發表 (第二篇)：

▲發表主題：將海洋帶入生活-臺灣海洋教育經驗分享 Bring the Ocean into your Life - Taiwan's Experiences in Marine Education (簡報詳附錄三)。

▲發表人：李珊瑩 (海洋委員會專門委員)

▲內容及討論重點：本場次發表是以行政院近年大力推動的「向海致敬」政策，及以海洋驛站作為教育推廣基地的執行成果進行分享。由於臺灣地理位置和政治敏感，聽眾可理解為何會有過去海岸的管制，現行開放海洋、建立海洋意識的必要性，以及本會成立後確立的政策方向和實務推動方式，再輔以政策前後效果和驛站影像的介紹，讓說明更完整。

與會聽眾提問關心臺灣周邊海域遊憩的安全性 (是否為高風險的水域或有大型生物如虎鯨等出沒)、驛站的功能以及對當地的意義，此外，講者也主動詢問在場各老師及專業工作者們，期待政府在海洋教育的推動上應該扮演那些角色或可以再做那些？答案是很實際的「經費贊助」，也有與會者提到，彙集資源供下載使用、辦理此類大型國際會議，供實務界、學術界能相互交流見習，善用機關的專業網站提供整合型的資訊及交流平台，就是最大的幫助。

(二) Concurrent Sessions — VR 虛擬實境的應用: The Virtual Field

▲發表主題：「客廳中的牡蠣」(An Oyster Farm in your Living Room)

▲發表人：Emily Nicholson, Renee O'Neill, and Ford Evans

▲內容及討論重點：本次會議至少有五場上都談及 VR 虛擬實境的應用，所參加的其中二個場次，都是以 VR 裝備和自行製作的影片作為實際教學應用的討論：第一場題名為客廳中的牡蠣，讓原本無從接觸牡蠣養殖的學生，藉由 VR 體驗，有如置身養殖場，能觀察到牡蠣細微的生長及水質情況，從而思考這些水產養殖與環境的關聯。

▲發表主題：The impact of VR marine experience on students' marine awareness and ocean literacy and memory retention

▲發表人：Chou Yi-Te and Ray Yen

▲內容及討論重點：第二場更進一步研究 VR 等科技運用在海洋教育的效果。實證研究的結論是，VR 應用於課程之中，能夠提升學生的學習，並建議未來教師在使用 VR 進行課程教學時，教師可利用高吸收率的「學習金字塔模式」進行課程，並成為海洋教育課程的模式之一。

(三) Concurrent Sessions--永續議題研究

▲發表主題：Research on the Integration of Marine Education Board Games into Primary School Curriculum

▲發表人：Claire Chou

▲內容及討論重點：示範如何在課程中導入並結合 SDGs14、海洋主題與雙語教育，同時強調邊做邊學的學習歷程，可提升學生海洋知識學習，於內化後與身邊的朋友家人分享尤為重要。

▲發表主題：(Research on sustainable fish-eating cognition and consumption behavior prompted by sustainable aquaculture industry education

▲發表人：Hsin-Tsun Lai

▲內容及討論重點：本場次是以產養殖產業轉型，作為課程設計時的示範主題，先由全球糧食議題切入，探討永續養殖重要性，並設計食魚環節讓學生能親身品嚐水產品。再分別從養殖業者角度，及現場養殖現況來認識養殖產業，希望透過「食魚」連結學生對養殖產業、環境議題及環境保護意識。由於課程設計完整並兼有互動實作效果，與會氣氛相當熱烈。

國際委員會晨會

由國際委員會主席瑞典哥登堡大學 Geraldine Fauville、IPMEN 主席澳洲 Harry Breidahl、AMEA 主席日本東京海洋大學 Tsuyoshi Sasaki 共同主持，討論如何繼續鼓勵年輕人參加國際社群以增加國際能力。NMEA 本身設有學生獎學金（學生會員第二年可申請，經審核後獲得參加年會的補助）、經營 FB 社群，也會期待經由實體參與年會以及 FB 的持續互動，讓這個領域不斷有新血加入。

活動照片



		
<p>與澳洲 Deakin 大學 Prue Francis 教授合影,她是澳洲海洋素養教育的重要推手</p>	<p>與佛羅里達大學教授 Mike Spranger 合影 ,ablc 是 NMEA 前主席</p>	<p>與美國高桅帆船的倡議者 Nancy Richardson 合影</p>

五、 7月26日主題演講、研討會及交流活動

主題演講

主題為：由過去五十年管理和職責學到的，用來教養下一代的薩利希海 Lessons learned from 50 years of Stewardship: Educating for the future of the Salish Sea。

本項演講、性質近似會議的專家總結座談，是由 NOAA 漁業署 Lynne Barre、NGO 團體「Killer Whale Tales」執行長 Jeff Hogan，以及當地(Salish-薩利希海)組織成員 Ginny Broadhurst 主任等共同討論，聚焦於依過去 50 年的職責及實踐經驗，未來對這片海洋能有什麼協助？

與會者說明，Salish 海具有綿長的海岸、豐富的自然資源，及豐富的海洋生物種類，當地有 15 個部落集結，人口持續增加中，地方生態保育近年逐漸受到許多水文、生物及海岸管理等不同領域科學家關注。目前各方嘗試與學校（加州大學）連結，將科學知識及專業科學家的經驗帶入校園中，希望能培養學生對科學探索的興趣，未來有機會朝向科學家方向發展，從大眾視角提供科學化及符合現場事實的資訊，期能擴大民眾與海洋連結的機會。

Salish 海有其地方上、環境上等複雜的問題，需要更多政策及合作，雖然各方關心的焦點有所不同，但專家們認為參與是最重要的，只要持續投入，所有的挑戰都會被一一解決。

研討會

(一) Concurrent Sessions

▲發表主題：編織工藝與海洋思維 SeaWeaver: Hand-crafting foundations of rich subtidal ecologies

▲發表人：Leonardo E Hummel

▲內容與討論重點：講者 Leonardo E Hummel 是環境設計工程專業，看似與海洋議題並無相關，然而他分享的是過去在華盛頓大學求學期間參加了地球實驗室 (EarthLab)，看到部分地區因為先天環境或後天破壞，珊瑚無法養成的問題，為了解決而提出一項名為 SeaWeaver (海洋編織) 的行動方案，藉由簡單廉價的材料，編織為不同形狀後放入海中，觀察珊瑚附著生長的狀況。這項作品融合海洋生態科學、海洋農業實踐、傳統編織工藝知識和現代工業設計思維，經過不斷的改良以及在泰國成功的實驗結果，未來也有機會將製作的方式交給當地沿海社區，成為高價值、有意義的環境行動。

(二) Concurrent Sessions

▲發表主題：科學家與教育學家對於傳統社區的合作：Linking Traditional Ecological Knowledge and Ocean Literacy across the Pacific

▲發表人：Harry Breidahl, Mike Spranger and Ray Yen

▲內容與討論重點：由友會 IPMEN 分享歷次會議的精華，國海院嚴主任也於會中分享臺灣承辦 2018 年會議的經驗，該次會議結合多元校園活動，參與人數眾多令與會者均印象深刻，場次主持人 Harry Breidahl 未到訪過臺灣，大家對於下次臺灣見充滿了期待。

今年 2023 年會議於加拿大舉辦，除了海洋科學外，更加強調太平洋地區對於傳統海洋文化技藝知識的保存及傳承，以「THE FIRST PEOPLE」表示對於文化起源的重視及強調傳承的重要性；此次會議也結合維多利亞當地所重視的海嘯災害議題。來自加拿大及日本學者接續分享海嘯科學監測及災害防治的重要性，包含針對大眾的海嘯教育，及有效認識災害形成與防治措施，才能在面臨災害時做出最有利的防治策略。



與 AMEA 佐佐木教授及佛羅里達大學 Mike Spranger 教授合影



與 NOAA 海洋探險教育專案計畫的負責人 Susan Haynes(右一)合影

活動照片



與 NMEA 規劃委員會、也是本次 Lummi 原民社區的長期關注者 Glen Alexander 討論



與 EarthEcho International 執行長 Stacey Rafalowski (右)及青年領導計畫主任 Sean Russell(左)合影



與 Craig Strang 合影，他是海洋科學素養及教育年會的推手，也曾多次造訪臺灣



與國際委員會委員及青年代表合影



與 IPMEN 主席 Harry Bredahl 合影

參、心得及建議

本次完整會議至 7 月 26 日下午 4:30 分結束（7 月 27 日為另付費之當地導覽行程，約有半數與會者 26 日晚間起即陸續離開），在會議期間有大量的專業知能報告及意見交流機會，屬於訊息及強度極大的會議，如能積極參與，對於臺灣未來的海洋教育論述、與專業人士的討論分享，以及 NOAA 等美國政府機關（構）的業務交流等，均能有相當助益。爰就本次參與經驗再由三面向整體評估說明如下：

（一）與會評估：

建議應持續長期參與本項會議，主要原因包括：1.NMEA 的參與者均具有相當代表性且同時為各國國際團體和多領域的活躍人物，NOAA 也有實質和深度的參與；2.在相關的教育者年會中，美國是相對規模大而有序且對臺灣十分友善的，值得成為常態性參與及未來連結拓展之基礎。

（二）遴員及參與方式：

建議由政策及專業層面思考 1.政策面由本會依預算遴派至少 2 員（所屬視況參與），主要任務為海洋教育國際走向了解及國際人士（含海洋機構、聯邦或地方政府及 NGO 人士）交流並建立長期關係 2.教師及學生於海洋教育創新方案之專業參與，可積極鼓勵協助本會重要政策或參與本會競賽、活動等優選之師生團隊，至會議發表並拓展專業網路。

（三）可茲借鏡參酌之作業方式：

美國的海洋教育由 NOAA 作為主要的支持者（非教育部），以常態和計畫型補助的方式支持學校教師和學生，同時也引進其他的資金和 NGO 等團體的能量，並以 NMEA 作為其發表和交流的場域，因此該會議能有大量的結案成果、創意及教案分享，也獲得專業團體的信賴；年會與在地的大學合作，善用學校的場域設備及在地連結，對於出資的政府機關、承辦的協會、在地團體與學校，是多贏的結果。

臺灣是海洋國家，有獨特的地理環境和政治經濟發展脈絡，積極參與國際研討會除了可展現我國海洋科學研究量能，更可提升本國國際能見度，藉由與世界各國專家的相互討論，除了可以強化本身的研究訓練與質量，更可藉此建立國際人脈，可謂一舉數得。

海洋教育國際研討會通常在半年前啟動，未來本會可及早就經費及與會代表的規劃或推薦先行作業，除了藉投稿發表場次讓國際更了解臺灣的實務推動情況、培育我國的海洋教育跨領域人才，亦需與主辦方及重要人士建立長期交誼，尋求未來合作並擴大參與及交流成效。

附錄一 完整議程

4		NMEA 2023 • Bellingham, WA	
<i>Conference At-a-Glance</i>			
Saturday, July 22			
8:00 am - 4:00 pm	Sea Grant Educators Network Meeting	.....	VU 565 A/B/C
6:00 pm	NMEA Board Dinner	.....	Chuckanut Bay Distillery
Sunday, July 23			
8:00 am - 4:00 pm	NMEA Board Meeting	.....	VU 565 A/B/C
9:00 am - 1:00 pm	Pre-Conference Workshop (must pre-register; see p. 4)	.....	VU 464
4:00 pm	Registration Opens	.....	VU MPR
5:00 - 7:00 pm	Gathering at the Salish Sea—Welcome Mixer	.....	VU Courtyard
Monday, July 24 - detailed Monday information on pages 10-13			
8:00 am - 5:00 pm	Exhibits Open	.....	VU MPR
8:30 am	Welcome and Blessing by Dana Wilson, Lummi Nation	.....	PAC
9:00 - 10:00 am	Keynote: Lisa Wilson, Lummi Nation	.....	PAC
10:30 am - 12:00 pm	Concurrent Session #1	.....	Session Rooms in VU
12:00 - 1:00 pm	Buddy Lunch and Exhibits	.....	VU MPR
1:00 - 5:00 pm	Concurrent Sessions #2 & #3	.....	Session Rooms in VU
6:00 - 9:30 pm	Lummi Salmon Bake	.....	Lummi Nation
Tuesday, July 25 - detailed Tuesday information on pages 14-17			
7:45 - 8:45 am	Chapter Meetings & Coffee	.....	Session Rooms in VU
8:00 am - 5:00 pm	Exhibits Open	.....	VU MPR
8:30 am - 5:30 pm	Student Conference (see p. 23)	.....	VU & Miller Hall
8:45 - 10:00 am	Keynote: Ocean Exploration	.....	PAC
10:30 am - 12:00 pm	Concurrent Session #4	.....	Session Rooms in VU
12:00 - 1:30 pm	Lunch	.....	VU MPR
	Poster Session & Exhibits	.....	VU MPR
1:30 - 4:00 pm	Concurrent Sessions #5 & #6	.....	Session Rooms in VU
4:00 - 5:00 pm	New Board Meeting	.....	VU 567
5:30 pm	Dinner and Auction	.....	Sheraton Four Points
Wednesday, July 26 - detailed Wednesday information on pages 18-21			
7:45 - 8:45 am	Committee Meetings & Coffee	.....	Session Rooms in VU
8:45 - 10:00 am	Plenary Panel: 50 Years of Endangered Species	.....	PAC
10:30 - 12:00 pm	Concurrent Session #7	.....	Session Rooms in VU
12:00 - 1:00 pm	Lunch, Committee Meetings	.....	VU MPR
1:00 - 2:00 pm	NMEA AGM & Awards	.....	PAC
2:00 - 4:00 pm	Concurrent Sessions #8	.....	Session Rooms in VU
4:15 - 5:15 pm	Stegner Lecture: Rena Priest	.....	PAC
5:15 - 6:00 pm	Geoduck Singalong & Ice Cream Social	.....	Old Main Lawn
Evening	On your own (ticketed events)	.....	Bellingham Area
Thursday, July 27 - field trip information on page 23			
All day/Partial day	Optional Field Trips (must pre-register)	.....	Bellingham Area

Sessions: Monday, July 24

Monday session descriptions available on pgs. 24-27 and online.

All sessions in the PAC on Monday will be hybrid sessions that will allow virtual participation for those who cannot attend the conference in person. These sessions will be presented in person to both an on-site audience at the conference, and simultaneously broadcast via Zoom to a remote audience. Remote participants can find session Zoom links in the agenda on the Whova app. Presentations will be recorded and available to all participants for three months after the conference through the Whova app.

HYBRID SESSIONS



	PAC -Hybrid	VU 462A	VU 462B	VU 464
10:30 am - 12:00 pm	<i>Daphne Austin</i> Pushing For a Sustainable Future with Climate Change Pedagogies	<i>Shih Han Yen</i> Marine Conservation Lesson Plan Design and Application	<i>Tracy D'Augustino</i> Taking a Bite out of Lunchroom Waste - Marine Debris Prevention at a system level	<i>Susan Wood</i> Exploring and visualizing data to improve ocean and data literacy
1:00 - 1:50 pm	<i>Craig Strang</i> Do Students of Color and Girls Benefit More from Outdoor Science Programs?	<i>Chia-Dai (Ray) Yen</i> Taiwan's Marine Science, Education and Culture Policy Promotion and International Prospects	<i>Savanna Finley</i> Finding Nemo in Our Estuaries: Bringing estuarine animals into the classroom to promote a lasting appreciation and understanding of local ecology	<i>Samantha Capers</i> Classroom Course for Community Resilience
2:00 - 2:15 pm	<i>Cait Goodwin</i> The Virtual Field: Take field trips to ecosystems around the world!	<i>Lin, Cheng-Yeh</i> The study on the influence of Regional revitalization of Tourism Itineraries in Fishermen Village on Place Identity and Community engagement	<i>Karin Jakubowski</i> Using Humor in Messages to Motivate Proper Cigarette Butt Disposal	<i>Tami Lunsford</i> Pollution and Climate Change- Science, solutions, and art
2:15 - 2:30 pm	<i>Steve Morton</i> Increasing Accessibility and Diversity for NOAA Citizen Science	<i>Shi-Jie Zhao (Jessie)</i> Marine experiential learning course on marine environmental awareness, ocean stewardship and pro-environmental behavior of school students	<i>Joanna Philippoff</i> What is success? An examination of the long-term effects of a teacher professional development in aquatic science	<i>Katie Pelon</i> Coastal Nature Journaling: Engaging Fiction to Inspire Young Community Scientists
3:00 - 3:50 pm	<i>Ardi Kveven</i> Engaging Students in Shipboard Science in the Salish Sea	<i>Tsuyoshi Sasaki</i> Ocean Literacy engagement in AMEA	<i>David Christopher</i> Microplastics on the Move!	<i>Parker Murphy</i> Electric Currents & Energizing Waves
4:00 - 4:50 pm	<i>Brianna Shaughnessy</i> Integrating sustainable seafood topics into environmental education: Resources and best practices	<i>Lindsay Patterson</i> NMEA Chapter Engagement	<i>Kim Zumach</i> The Problem with Plastic: Exploring Hands-on and Interactive Learning with Ocean School	<i>Cassie Stymiest</i> Student led Miniboat Experiences Advancing Science and Ocean Literacy

Sessions: Monday, July 24

Monday session descriptions available on pgs. 24-27 and online.

VU 552	VU 565A	VU 565C	VU 567	VU 565B	
<p><i>Holli Watne</i></p> <p>STEM Stormwater program for Middle School</p>	<p><i>Carol Cotterill</i></p> <p>Travelling back in time through Earth's history with scientific ocean drilling</p>	<p><i>Amy Lang</i></p> <p>Aquaculture in Action: Rising with the Tide</p>	<p><i>Shu-Min Tsai</i></p> <p>Uncovering the effects of environmental identities and worldviews (EIW), and cultural-historical contexts on people's perceptions of local marine issues</p>	<p><i>Jennifer Willup</i></p> <p>Between Two Worlds Indigenous Science; Traditional Education and Tribal Sovereignty in Science and the Classroom</p>	10:30 am - 12:00 pm
<p><i>Diana Payne</i></p> <p>NMEA and the UN Ocean Decade: Your Role in Fostering Ocean Literacy</p>	<p><i>Aeriel Wauhob</i></p> <p>Citizen Science is the Problem: Rebranding and why it matters.</p>	<p><i>Emily Yam</i></p> <p>Kelp Me, Kelp You: Changing the Conversation on Seaweed Aquaculture</p>	<p><i>Hilary Peddicord</i></p> <p>Building Insights Through Observation - Integrating Ocean Data Science Education with Art</p>	None	1:00 - 1:50 pm
None	<p><i>Rachel Wold</i></p> <p>Improving access to ocean and coastal data: How the Northwest Association of Networked Ocean Observing Systems serves the Pacific Northwest</p>	<p><i>Orlay Johnson</i></p> <p>Seattle Aquarium Beach Naturalist Program and a few intertidal organisms found along the shores of the Salish Sea.</p>	<p><i>Russell Fielding</i></p> <p>Teaching The Tragedy of the Commons for Marine Resource Conservation through an Iterative, Performance-based, Embodied Cognition Pedagogy</p>	None	2:00 - 2:15 pm
<p><i>Yuen Sam Diana Wong</i></p> <p>Attitude-laden educational approaches for learning about shark - a case study in Hong Kong</p>	None	None	<p><i>Leigh Lubin</i></p> <p>Whole Being Teaching: Framework For Integrated Learning</p>	None	2:15 - 2:30 pm
<p><i>Bronwen Rice</i></p> <p>Create inspiring, learner-centered environmental investigations using NOAA's latest educator guide</p>	<p><i>Jenny Huntley</i></p> <p>The Continued Evolution of an Environmental Tall Ship: Adventurers' People and Programs</p>	<p><i>Grace Simpkins</i></p> <p>Fundamentals of Shellfish Farming Yesterday and Today</p>	<p><i>Rus Higley</i></p> <p>1,000 Words: Defining what a scientist is through pictures</p>	None	3:00 - 3:50 pm
<p><i>Sarah Schoedinger</i></p> <p>Ocean Literacy in Action: Lessons from the Field for Incorporating Ocean Literacy into Your Work</p>	<p><i>Stacey Rafalowski</i></p> <p>An Ocean of Opportunity: Engaging Students in the Blue Economy</p>	<p><i>Megan Ewald</i></p> <p>Communicating Aquaculture Science</p>	<p><i>Rochelle Strauss</i></p> <p>Bringing Ocean Literacy to Life Through Books</p>	None	4:00 - 4:50 pm

Sessions: Tuesday, July 25

Monday session descriptions available on pgs. 24-27 and online.

	PAC	VU 462A	VU 462B	VU 464
10:30 am - 12:00 pm	<i>Craig Strang</i> Working Towards Racial Equity: Stories of Organizational Transformation	<i>Hilary Peddicord</i> Science on a Sphere (SOS): Adding to your Data Visualization Education Toolbox	Student Conference Lightning Talks	<i>Alexandria Gillen</i> Marine Debris "MAP"-ping in the Classroom: Introducing the Guide to NOAA's Marine Debris Monitoring and Assessment Project for Educators!
1:30 - 1:45 pm	<i>Maia McGuire</i> Microplastics 201 Full Session (1:30 - 2:20 pm)	<i>Brenda Cannaliato</i> Sea Turtle Conservation Module 1: Free Online Student Resource	<i>Samantha Capers</i> Plastic Free Gulf Coast	None
1:45 - 2:00 pm		<i>Kyle Halstead</i> Plankton in 3D!: Tools for the Classroom to Explore the World of Plankton	<i>Jill Bartolotta</i> Trash Bots: Engaging with underserved and underrepresented students to pilot trash removal technologies	<i>Teresa Kennedy</i> The United Nations Decade of Ocean Science for Sustainable Development
2:00 - 2:15 pm		<i>Karin Jakubowski</i> Citizen Opportunities for Accessing Science Training on the Sound (COASTS)	<i>Dani Dillullo</i> Marine Microplastics Portal: A NOAA Tool to Aid in Microplastic Education	<i>Ya-Chien Chou (Claire)</i> Research on the Integration of Marine Education Board Games into Primary School Curriculum
2:15 - 2:30 pm		<i>Laura Jim</i> Engaging students in authentic field opportunities	<i>Tina Miller-Way</i> The Gulf of Mexico Literacy Education and Activities Project (GoM LEAP)	<i>Shan-Ying Lee</i> Bring the Ocean into Your Life-- Taiwan's experiences in marine education
3:00 - 3:50 pm	<i>Maggie Allen</i> Elevating youth perspective on environmental issues through a new pilot program	<i>Hannah Nanovu</i> Becoming an Ocean Literate School	<i>Jennifer Kennedy</i> Foam, Fragments, Films and Filaments: Microplastics on Beaches and Inspiring Solutions	<i>Jess Newley</i> Dive into the Salish Sea with Virtual Reality!

Sessions: Tuesday, July 25

Monday session descriptions available on pgs. 24-27 and online.

VU 552	VU 565A	VU 565C	VU 567	
<p><i>Rick Reynolds</i></p> <p>New! Free Water + Climate Action Video Game + Hands-On Resources</p>	<p><i>Adi Hanein</i></p> <p>Bringing Global Ocean Observing Educational Activities to Your Classroom</p>	<p><i>Emily Nicholson</i></p> <p>An Oyster Farm in your Living Room</p>	<p><i>Sandra Bilbo</i></p> <p>Learning How to Block Print: A Mini Art Workshop</p>	10:30 am - 12:00 pm
<p><i>Chou, Yite</i></p> <p>The impact of VR marine experience on students' marine awareness and ocean literacy and memory retention</p>	<p><i>Ginny Carlton</i></p> <p>Innovative Approaches to Great Lakes Literacy and Marine Debris Prevention</p> <p>Full Session (1:30 - 2:20 pm)</p>	<p><i>Holly Keedy</i></p> <p>Neah Bay High School Fish Hatchery</p>	<p><i>Kelsie Fowler</i></p> <p>Youth's Embodied Knowledges Create Thick Shoals for Justice Seeking</p>	1:30 - 1:45 pm
<p><i>Géraldine Fauville</i></p> <p>Exploring the potential of underwater virtual reality for ocean literacy</p>		<p><i>Linda Chilton</i></p> <p>Aquaculture: change begins now</p>	<p><i>Prue Francis</i></p> <p>Fostering ocean literacy through informal marine education programs</p>	1:45 - 2:00 pm
<p><i>Willem Klajbor</i></p> <p>NOAA's National Marine Ecosystem Status Website: A Tool for Educators</p>		<p><i>Megan Ewald</i></p> <p>Aquaculture Opportunity Areas, Charting the Course for Resilient Seafood</p>	<p><i>Rachel Stendahl</i></p> <p>Environmental Education for Adjudicated Youth</p>	2:00 - 2:15 pm
<p><i>Sara Welsh</i></p> <p>Partnership Pathways in Environmental Science</p>		<p><i>Stena Troyer</i></p> <p>Experimental Olympia Oyster Restoration in the Salish Sea; South Puget Sound</p>	<p><i>Cátia Freitas</i></p> <p>Using children's literature to enhance ocean literacy in primary schools</p>	2:15 - 2:30 pm
<p><i>Elizabeth Vernon (E.V.) Bell</i></p> <p>A Model for Stewardship: Engaging Multigenerational Audiences in Salt Marsh Community Science</p>	<p><i>Jackie Lindsey</i></p> <p>Building Bridges: K-12 hands-on learning through citizen science</p>	<p><i>Lai Hsin-Tsun</i></p> <p>Research on sustainable fish-eating cognition and consumption behavior prompted by sustainable aquaculture industry education</p>	<p><i>Maria Madrigal</i></p> <p>Representation Matters: Marine Biology Children's Book</p>	3:00 - 3:50 pm

Sessions: Wednesday, July 24

Monday session descriptions available on pgs. 24-27 and online.

	PAC	VU 462A	VU 462B	VU 464
10:30 am - 12:00 pm	<i>Renee O'Neill</i> Environmental Graphiti: Data Reimagined as Art	<i>Mark Roddy</i> Ocean Education for a World of 8 Billion	<i>Leonardo Hummel</i> SeaWeaver: Hand-crafting foundations of rich subtidal ecologies	<i>Amy Keiper</i> Explore the Salish Sea Workshop
2:10 - 3:00 pm	<i>Angela Greene</i> Expand Your Community of Practice with Virtual Learning Opportunities	None	<i>Frances Lang</i> A New Toolkit for Engaging Youth in Ocean Health and Conservation	<i>Jill Bartolotta</i> Eerie Eight: Water Invaders
3:10 - 4:00 pm	<i>Cindy Wilems</i> NOAA Virtual Watershed Education and Training	<i>Christina Samau</i> "Fili Fa'atasi"	<i>Lindsay Carroll</i> Engaging students with coastal hazard and engineering topics through hands-on design challenge	<i>Dianne Kask</i> Seaquaria: Tidal Pools in Schools

Alan's Geoduck Sing-along & Ice Cream Social



Bring your instrument, your voice, and your enthusiasm for a fun-filled, end-of-the-conference musical extravaganza, complete with ice cream. A long-standing NAME tradition, the marine-themed sing-along welcomes everyone, regardless of skill or talent. We'll even provide the song book so you can sing along. Come join us as we rock out in the name of water-centric education. And eat ice cream!

View the songbook on your device: bit.ly/geoducksingalong

Past Presidents Circle

The NMEA Past Presidents Circle will meet on Wednesday, July 26 from 4:15 - 6:15 pm at Galloways Cocktail Bar (1200 Tenth Street, Unit 102) in the "Niche Bar"



Sessions: Wednesday, July 24

Monday session descriptions available on pgs. 24-27 and online.

VU 552	VU 565A	VU 565C	VU 567	
<p><i>Hannah Sarver</i></p> <p>LIMPETS, a Community Science Program for Middle and High School Students</p>	<p><i>Rick Reynolds</i></p> <p>Investigating Crayfish + Freshwater Ecosystems</p>	<p><i>Ruth Sofield</i></p> <p>Seaweed School: Beach to Classroom Across Cultures and Time</p>	<p><i>Tina Miller-Way</i></p> <p>Let's play the classroom version of The Watershed Game: Coast Model!</p>	10:30 am - 12:00 pm
<p><i>Harry Breidahl</i></p> <p>Linking Traditional Ecological Knowledge and Ocean Literacy across the Pacific</p>	<p><i>Géraldine Fauville</i></p> <p>Ocean XR: Assessing Immersive Technologies for Marine Education</p>	<p><i>Ashley Eaton</i></p> <p>Educator Exchanges - the Power of Peer Learning in Marine Science Education</p>	<p><i>Dani DiIullo</i></p> <p>Researcher - Teacher Collaborations: Bringing Louisiana Phenomena into the Classroom</p>	2:10 - 3:00 pm
<p><i>Andrea Sassard</i></p> <p>NOAA Education Community Town Hall</p>	<p><i>Aaron Nather</i></p> <p>Project SALINE: A Former Amazonian's Perspective on How Technology Can Empower Collaborative Learning for Teachers, Students, Outside Experts, and Learning Institutions</p>	<p><i>Brandon Schroeder</i></p> <p>Lake Sturgeon: Connecting Classroom, Community and Conservation</p>	<p><i>Gloria Snively</i></p> <p>Northwest Coast Indigenous Science: Proven, Practical, Timeless</p>	3:10 - 4:00 pm

Chapter Baskets

Chapter representatives should plan to set up your chapter's basket in the VU Multipurpose Room on Wednesday, July 26th before 11:30 am.

Chapter basket tickets may be purchased in advance at the registration desk and from committee members during lunches. We accept cash and credit card payment for chapter basket tickets. Tickets will be \$1.00 each or \$10.00 for 15 tickets.

The baskets will be on display in the VU Multipurpose Room on Wednesday at lunch. Place your tickets in the bag by the Chapter Baskets you hope to win. Winning tickets will be drawn at the NMEA AGM & Awards on Wednesday. Winners can collect their baskets after the meeting.



Strait to Sound: Gathering at the Salish Sea

21

附錄二 本會發表 1



Promoting Taiwan's Marine Science, Education, and Cultural Policies and Exploring International Prospects

Chia-Dai (Ray) YEN, NAMR
Shan-Ying (Shining) LEE, OAC



Agenda



- 1 Marine Education in Taiwan
- 2 Marine Education Policy of OAC
- 3 Marine Education Research of NAMR
- 4 International Cooperation
- 5 Conclusion



Taiwan

A beautiful ocean nation

擁有1,988公里海岸線
大航海時代的Formosa



1

Taiwan Marine Education Policy





教育部 2017 Marine Education White Paper

Section 1: Issues with National Marine Awareness

1. Influence of Mainland Thinking and Cultural Inheritance
2. Long-term strict regulation of maritime activities
3. Lack of awareness among the population regarding the protection and proper utilization of the ocean



Section 2: Issues in Guiding Educational Policies

1. Education policies prioritize mainland over maritime topics
2. Insufficient emphasis on ocean awareness curriculum
3. Lack of marine experiential venues and activities
4. Inadequate of education on exploring marine careers

Section 3: Discrepancies in Talent and Industry

1. Discrepancy between the types of talent cultivation and industry demand
2. Discrepancy in the quality of talent cultivation and industry demand
3. Inadequate transfer of research and development capabilities from schools to industries
4. Challenges faced by marine science schools in terms of development



教育部

2017 Marine Education Policy White Paper

Chapter 5: Key Strategies and Specific Measures for Marine Education Section 1: Strengthening Mechanisms for Promoting Marine Education

01

Establishing sound systems for promoting ocean education within educational administrative agencies at all levels

02

Enhancing integration and communication platforms for promoting ocean education

03

Facilitating the sharing, exchange, and utilization of resources and information related to ocean education



教育部

2017 Marine Education Policy White Paper

Chapter 5: Key Strategies and Specific Measures for Marine Education Section 2: Enhancing Ocean Literacy for All Citizens

01

Incorporating Marine education into the textbooks in the 12-year national curriculum

02

Strengthening marine education-related courses and instruction in schools at all levels

03

Coordinating with the 12-year national curriculum & career exploration education

04

Fostering positive values regarding marine careers among parents & public

05

Collaborating with social education institutions to promote marine education



Ocean Affairs Council since 2018



On April 29, 2018, Ocean Affairs Council Established President Tsai outlined three key directions for the future efforts of the Ocean Affairs Council including (1) strengthening the legal framework for the ocean, (2) ensuring effective ecological conservation; (3) promoting ocean industry in line with policies; and enhancing research capabilities in the marine field while cultivating talents in this domain.



Ocean Affairs Council: Vision and Mission



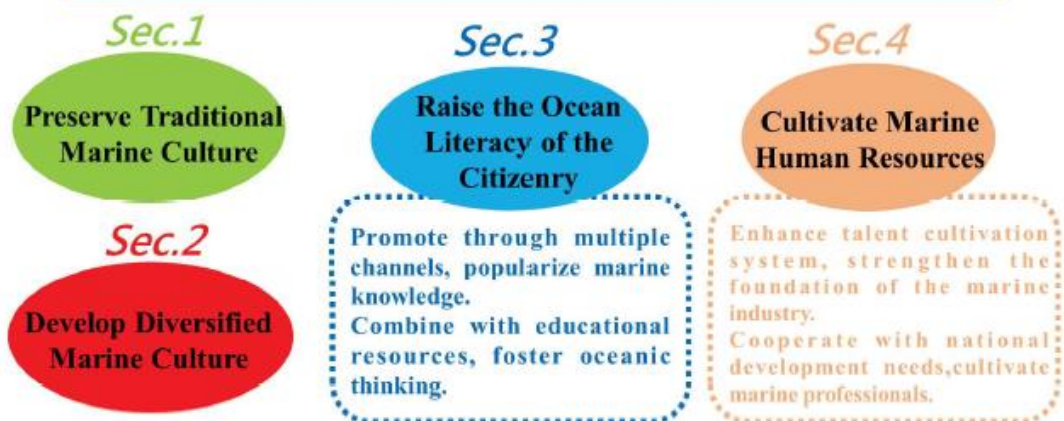


Ocean Affairs Council: Organization and Duties



Marine Education Policy of OAC

Chapter 6 of Nation Ocean Policy White Paper (2020)
Marine Culture, Education, and Talent Cultivation





From School to Society

Stage	Strategy
Elementary	<ul style="list-style-type: none">➤ Providing amendment suggestions of “Curriculum Guidelines of 12- Year Basic Education” at Marine Education Facilitation Panel, Ministry of Education➤ Marine Camp for Teachers
Middle school	<ul style="list-style-type: none">➤ Providing amendment suggestions of “Curriculum Guidelines of 12- Year Basic Education” at Marine Education Facilitation Panel, Ministry of Education➤ Marine Camp for Teachers➤ Marine Camp for Students
College	<ul style="list-style-type: none">➤ Review the Establishment Plan of Ocean-related Program➤ Marine Camp for Students
Society/ Secondary	<ul style="list-style-type: none">➤ Marine Series Lecture and Marine Career Exploration Activities➤ Marine Education Tour around the island➤ Online Courses



2023 Administrative Plan





Education Tour around the Island



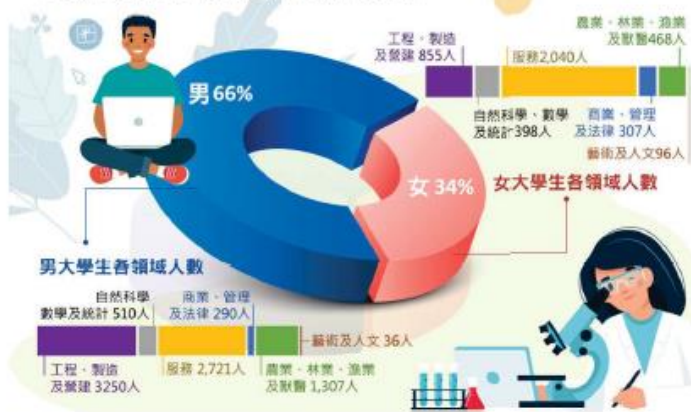
Marine Camp for Students and Teachers

Marine Camp for Teachers	Marine Camp for Students (Dongsha東沙)	Marine Camp for Students
<p>Lectures & Outdoor Experience Activities</p> <p>475 participants</p>	<p>Patrol Cutter Experience</p> <p>Dongsha island ecological tour</p> <p>40 participants</p>	<p>Coast Guard Experience Tour</p> <p>Marine Station(海洋驛站) & Maritime Museum Tour</p> <p>420 participants</p>
		



110學年度國內公私立大專校院 海洋相關科系大學生男女性別比例分析

資料來源：教育部統計處/University TW網站 (110年度)



Fact Sheet (2021) Ocean-Related Program in Taiwan

MALE	66%
FEMALE	34%
PROFESSION	STUDENT %
ENGINEERING	33%
NATURAL SCIENCE	7%
POLICY, LAW, MANAGEMENT	5%
FISHERY & AGRICULTURE	15%
ARTS, SOCIAL SCIENCE	1%
SERVICES	39%



Marine Talent Cultivation

Elementary
(Age:7-13)

- Marine Culture
- Marine Recreation
- Marine Science & Technology
- Marine Resources & Sustainable Use
- Ocean & Society

Middle School
(Age:13-18)

- General School**
- Nature Science
 - Social Science
- Vocational School**
- Aquaculture
 - Food Science
 - Marine Affairs
 - Hospitality & Tourism
 - Business & Management

College
(Age:18-22)

- Fishery Science
- Aquaculture
- Marine Science
- Marine Resources
- Marine Biology
- Marine Affairs
- Ocean Engineering
- Shipbuilding
- Shipping/ Transportation Management
- Marine Recreation
- Navigation

Occupation

- Fishery
- Aquaculture
- Marine Science & Development
- Ocean Engineering
- Shipbuilding
- Ocean Transportation
- Marine Recreation
- Navigation



Digital Courses



Marine Conservation



Marine Industry



Marine Culture & Education



Marine Security & Safety



Marine Policy & Law

All courses (videos) are available on OAC official website and YouTube channel.(Mandarin Only)



Marine Tech

PROMOTING INNOVATIVE RESEARCH ON ALL FIELDS OF MARINE SCIENCE

NATIONAL MARINE SURVEY
 Marine hydrology, ecology, topography, sea-floor surveying, and establishment of the National Ocean Database

MARINE POLICY, MARINE CULTURAL AND HISTORICAL RESEARCH
 Marine policy and maritime law research, maritime culture and maritime history research, coastal settlements and social-ecological systems research, and underwater cultural heritage law research

MARITIME INDUSTRY AND SCIENTIFIC RESEARCH
 Marine energy, deep ocean nuclear, construction of a national ship model laboratory, marine drift detection and tracking, local marine forecast, and marine safety monitoring and contingency technologies

MARINE PROFESSIONAL CULTIVATION
 Education and training of ocean conservation and coast guard personnel, technical cooperation with industries, international collaboration and exchanges, and promotion of ocean awareness

CONSTRUCTION OF RESEARCH STATIONS
 Construction of the NAMR laboratory site, planning and construction of international research stations, and construction of a marine ecology and water quality laboratory, marine bioprotection analysis laboratory, and marine organism specimen bank

NATIONAL ACADEMY OF MARINE RESEARCH
 The National Academy of Marine Research (NAMR) was established on April 24, 2019 in Keelung.

NAMR is devoted to studying the sea. Our main mission is to assist the Ocean Affairs Council with the planning and implementing of national marine policies, surveying of marine resources, scientific research, and promotion of international exchanges between technographic institutions and talents, as to keep abreast of the world's latest marine knowledge. We serve as Taiwan's dual marine research think tank.

EXPLORE RESPECTFULLY, TREAT EQUALLY AND PROTECT CONSTANTLY. FEARLESSNESS AND COURAGE, COEXISTENCE AND WISDOM, AND A THRIVING BLUE ECONOMY.



Planning and Training Center

Organization Directions of Planning and Training Center

- Planning, managing and auditing research projects
- Establish a National Marine Research Fleet
- Education, Training, Certification and Management of CGA(Coast Guard Administration), OCA(Ocean Conservation Administration) and MI(MARINE INDUSTRY) personnel
- Promotion of popular marine science education

Mission and Goals

1. Establishing a National Academy for Training Marine Professionals
2. Developing an outline of marine science and technology policies and implementation plans
3. Promoting the integration of marine science and technology resources and marine science popularization education
4. Establishing mechanisms for international cooperation in promoting Ocean literacy.



Marine Policy and Culture Research Center

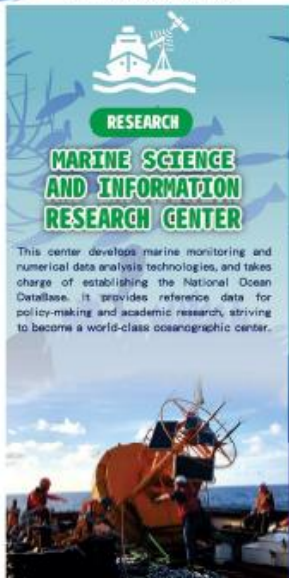
Organization Directions of Marine POLICY and CULTURE

1. Research on general marine policies and legal institutions.
2. Research on international and cross-strait marine policies and institutions.
3. Research on international laws relating to marine affairs and domestic legalization of international conventions.
4. Cooperate and interact with international and cross-strait organizations on marine affairs, marine law and politics, and cultural research.
5. Research and promote of maritime culture, history, and education.
6. Other issues relating to marine policy and cultural research.

Research Projects

- Symposium on Open and Cooperation: Rules-based International Order and South China Sea Disputes
- Symposium on Japan's New Security Legal System and Ocean Policy
- International Symposium on the 40th Anniversary of UNCLOS
- Research on Spatial Data Structure Planning of Taijiang (台江) Inland Sea and Dayuan Maritime Culture Development
- Taiwan's Marine Photography Collections: Taiwan and her islands
- Promoting Coastal Settlements Development via the Collaborative Partnership
- Research on the Traditional Place Names and Maritime Culture of Hualien (花蓮) and Taitung (台東) Coast
- Research on the Traditional Place Names of the Northeast Coast and Sea Areas (東北角海岸)
- Domino Effects or Last Piece of Puzzle: The Consequence of Chinese Military Expansion

Marine Science and Information Research Center

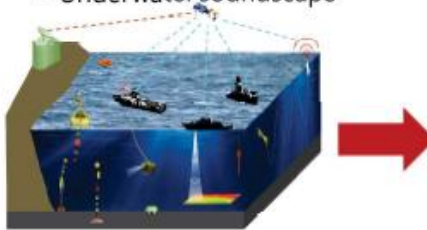


Organization Directions of Marine Science and Information Research Center

- Establish a national marine observation network
- Establish a national marine database and big data application
- Conduct long-term and basic marine science research

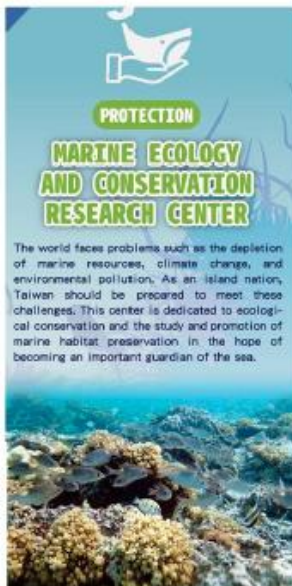
Main objectives of MSIRC

- Physical oceanography
- Chemical oceanography
- Geology/Bathymetry
- Numerical simulation
- Underwater soundscape



<https://nodass.namr.gov.tw/>

Marine Ecology and Conservation Research Center



Organization Directions of Marine Ecology and Conservation Research Center

- Long-term monitoring of marine ecology
- Impact of marine pollution and climate change
- Conservation of marine organism and habitat
- Prevention and control technique of marine invasive species
- Research and development of marine biotechnology

Main objectives of MECRC

- ✓ Offshore wind farms monitoring
Ecological and underwater acoustics monitoring
- ✓ Impact of sand extracting
Hydrology, substrate, benthos and planktons R/V survey
- ✓ Baseline biodiversity survey
Intertidal and subtidal scuba census, eDNA evaluation
- ✓ Value-added application
Sargassum propagation, re-habitation, and utilization



Marine Industry and Engineering Research Center



Organization Directions of Marine Industry and Engineering Research Center

- Technology of shipbuilding and ship repair
- Marine industry; blue economy
- Investigation of saltwater intrusion and hydraulic model test
- Research and technology promotion for marine renewable energy
- Disaster prevention technology



2023

海洋科學序列教材推廣計畫

Ocean Science Sequences (OSS G3-G5)

指導單位：

主辦單位：

合辦單位：

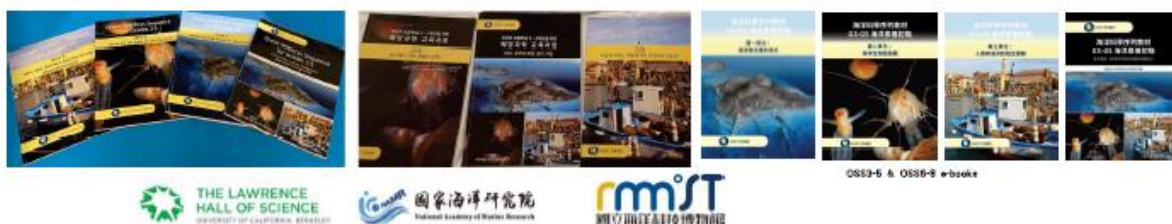
委辦單位：

2019 NMMST First contact with Lawrence Hall of Science



Ocean Science Sequence (OSS) in Taiwan

- - Introduced to Taiwan in 2019 and authorized translation by the National Museum of Marine Science & Technology (Chinese version) and KOMET in South Korea (Korean version) in 2020.
- - In 2022, the translation and publication of OSS 3-5 and 6-8 in Korean were completed.
- - In 2022, the National Academy of Marine Studies completed the OSS 3-5 translation and e-book publication as part of the relaunch project. In 2023, the translation and e-book publication of OSS 6-8 will be completed.
- - In 2023, the National Academy of Marine Studies obtained authorization and printed the OSS 3-5 teaching materials for promotion. In 2024, the printing and promotion of OSS 6-8 are planned.





2022 OSS G3-5 workshop



2023 OSS G3-5 workshop



加州大學海濱分校科學學習設計總監Johnathan Curley(左)與國家海洋研究院陳建宏院長(右)共同簽署協議書 (112年6月28日)

2023 OSS G6-8 workshop

國家海洋研究院
National Academy of Marine Research

海洋科學序列教材

NAMR OSS official website

- 課程使用具有彈性：海洋科學序列由三單元構成，分別有8、11及6個小時。每單元內容，根據前一單元之知識繼續深入發展。
- 強效的教學策略：教師可藉由課程呈現序列的課程，並提供專業發展的資源。
- 完整的評量系統：OSS包括對學生理解每單元重要概念的檢核，以實施評量。
- 重要概念及概念變遷：源自國家研究委員會的國定科學教育標準、美國科學從業員的科學素養的框架-海洋素養、K-12海洋科學基本原則(Benchmarks for Science Literacy: Ocean Literacy: The Essential Principles of Ocean Sciences K-12) (<http://www.oceanliteracy.org/>)。
- 半學年制：每單元的學業，每個學業都經過精心編排，都有助於支持各單元重要概念的學習目標，並與隨性的融入小節與閱讀材料。
- 學習科技：除了教師手冊，在網站上還有一片影像以及短片；有些融入小節內容，有些則可當作課後補充教材讓教師對調採用。



海洋科學序列教材

第一單元:海洋是怎樣的地方

第二單元:海洋生物面面觀

第三單元:
人類與海洋的相互關聯

OSS lesson plans & teaching materials

第一單元： 洋是怎樣的地方	第二單元： 海洋生物面面觀	第三單元： 人類與海洋的相互關聯	其他教學資源
1.1 海洋星球	2.1 介紹海洋生物	3.1 人類與海洋的相互關聯	彩色學習單
1.2 模擬洋流	2.2 比較棲息地	3.2 翻腳的證據	卡片套組
1.3 海水分層	2.3 利用證據保護棲息地	3.3 調查漁業	G3-G5初階彩色投影片
1.4 認識洋流	2.4 觀察浮游生物	3.4 調查污染	單元一：教材影印包
1.5 海床	2.5 運動的適應	3.5 探索解決的方案	單元二：教材影印包
1.6 光、壓力、溫度和鹽度	2.6 攝食的適應	3.6 溝通問題與解決問題	單元三：教材影印包
1.7 水下漫翔機	2.7 大洋食物網		單元一：調查筆記本
1.8 生存空間	2.8 河口食物網		單元二：調查筆記本
	2.9 小小旅行家		單元三：調查筆記本
	2.10 棲息地的關聯		

Social Network



Furture cooperation



Korean



USA



Taiwan



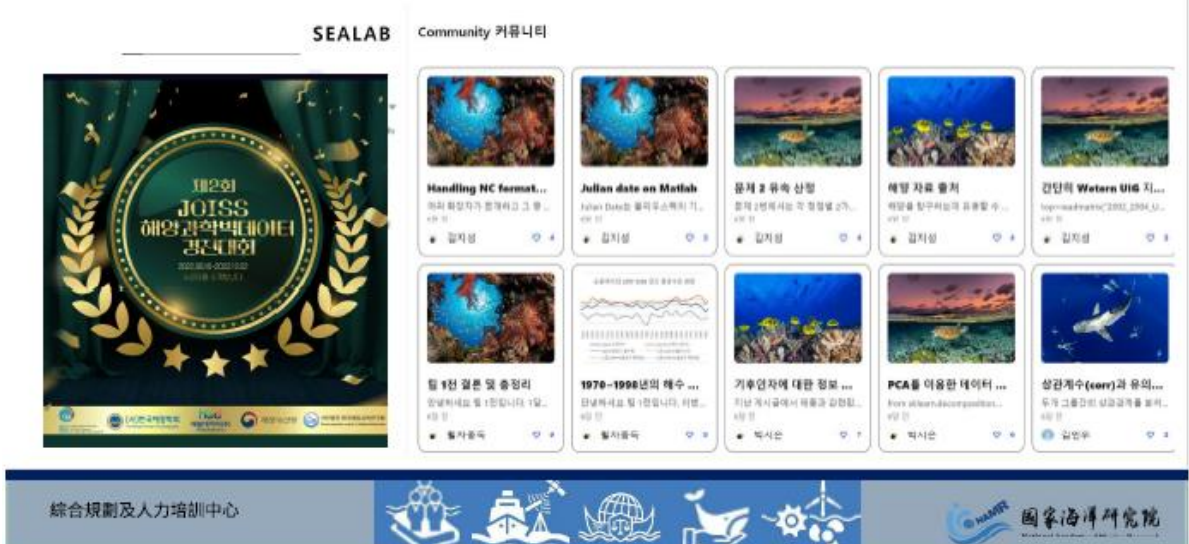
NODASS Ocean Big Data Contest

- National Ocean Database And Sharing System (NODASS).
- By utilizing data from the NODASS platform, students are empowered to apply scientific knowledge and methods to research and problem-solving. This cultivates their interest in scientific learning and unlocks their potential for independent research. It also fosters the development of skills in sharing the process of scientific inquiry, expressing ideas, and creative storytelling. Additionally, it encourages a spirit of collaboration among students to collectively address challenges.




2024 Asia Cup Ocean Big Data Contest

SEALAB Community 커뮤니티



The image shows a screenshot of the 2024 Asia Cup Ocean Big Data Contest website. On the left is a large banner for the '제24회 JOISS 해양과학빅데이터 경진대회' (2024 JOISS Ocean Big Data Contest) with a green and gold theme. To the right is a grid of challenge cards under the 'SEALAB Community 커뮤니티' header. The cards are arranged in two rows of five. Each card has a title, a brief description, and a '참여하기' (Participate) button. The challenges include: 'Handling NC format...', 'Julian date on Matlab', '문제 2 유속 산정' (Problem 2: Current Calculation), '해빙 자료 출처' (Iceberg Data Source), '강간의 Waters UIG 지...' (Waters UIG for Rainfall), '질 1점 잃은 뱀 송정리' (Snake Losing 1 Point in Songjeongri), '1976-1996년의 해수...' (Sea Level 1976-1996), '기후변화에 대한 정보...' (Information on Climate Change), 'PCA를 이용한 데이터...' (Data Analysis using PCA), and '상관계수 (cov)과 유의...' (Correlation Coefficient and Significance).

綜合規劃及人力培訓中心



國家海洋研究院
National Academy of Marine Research


附錄三 本會發表 2



Bring the Ocean into your Life Taiwan's experiences in marine education

Lee Shan Ying

2023/7/25



Outlines

O c e a n A f f a i r s C o u n c i l

- 1 Taiwan and the Ocean
- 2 Vision and Commitments
- 3 The Role of OAC in Marine Education
- 4 Policy and Practices
- 5 Conclusion



Taiwan

A beautiful ocean nation

With 1,988 km of coastline

Formosa in the Age of Discovery

Abundant, important and sensitive



4

Vision and Commitments

Ocean Affairs Council




Sustainability

Security

Prosperity

5

The Role of OAC in Marine Education

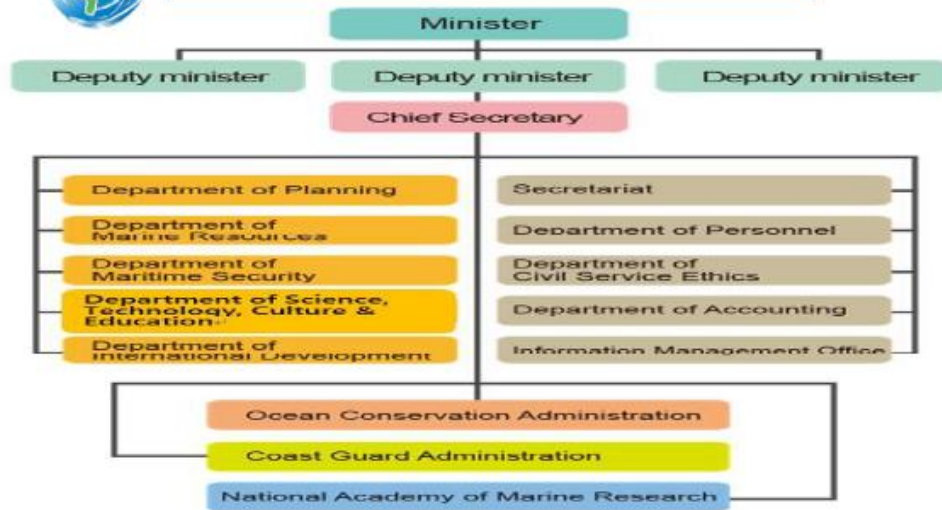
Ocean Affairs Council

Ocean Affairs Council Profile

- Specialized Agency
- Marine Policy-Whit Paper
- Design on Education



Structure of OAC

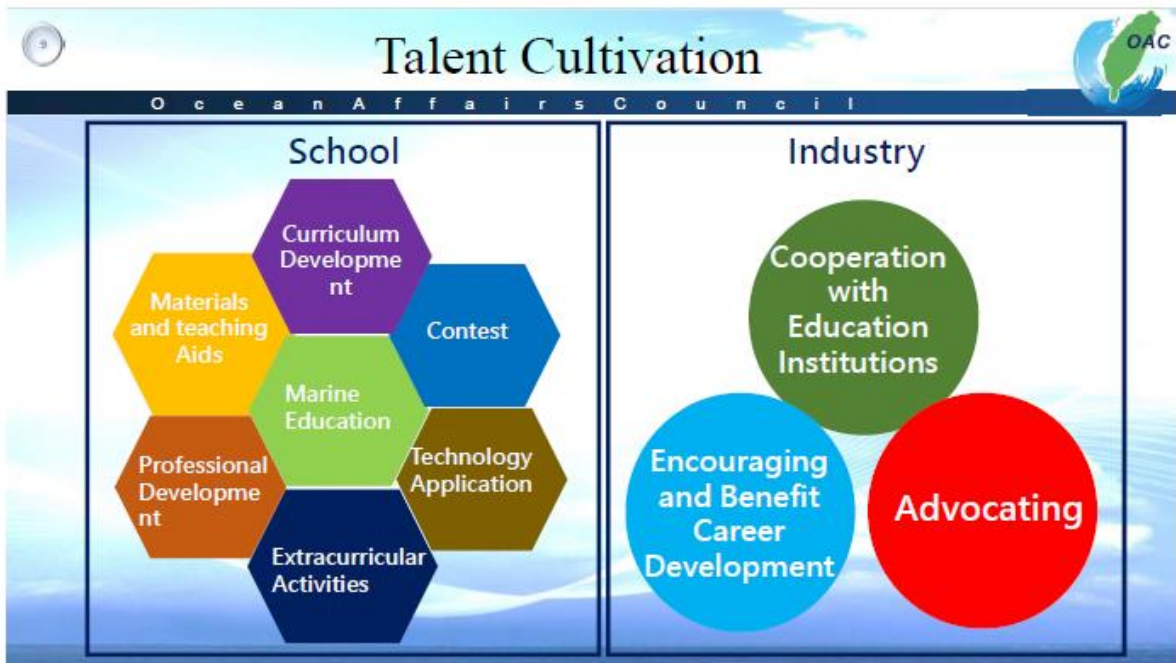


Marine Policy

O c e a n A f f a i r s C o u n c i l

Facilitating cooperation between the public and private sectors and academic institutions.
Restoring marine ecosystems and their natural interconnectedness.
Respecting, preserving, and conserving marine cultural assets.
Cultivating domestic talents and industry chains.
Promoting widespread marine education for all citizens.
Developing legal regulations and policies.
Enhancing the execution capacity of marine affairs.
Allocating sufficient budget for marine affairs.
Participating in regional and international cooperation.





Salute to the Sea

Ocean Service Stations

Salute to the Seas

Learn about the sea
Deepen marine research

Clean up the sea
Tidy every inch of coastline

Engage with & enter the sea
Foster a robust and open ocean



Deregulation

1
2

Before

The competent authorities set up regulations due to maritime disasters in the sea areas under their jurisdiction.



After



Lifted and relaxed prohibition announcements on maritime usage.



Subsiding and setting more warning signage in risky areas.



Enforcing Risk Management
– Equipment, training and practices.

Promoting and expanding friendly fishing areas.

1
3

Before

Marine recreational and fishing activities were strictly controlled by the government.



After



Establishing the Demonstration Zones for fishing friendly.



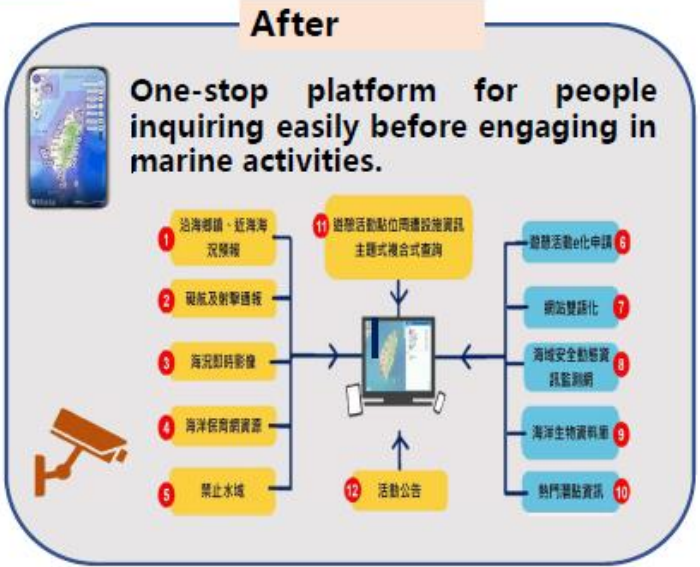
Enhancing Fishing Safety and Access and Providing Free Use of Life Jackets.



Developing marine insurance offerings that cover various aspects of maritime activities.

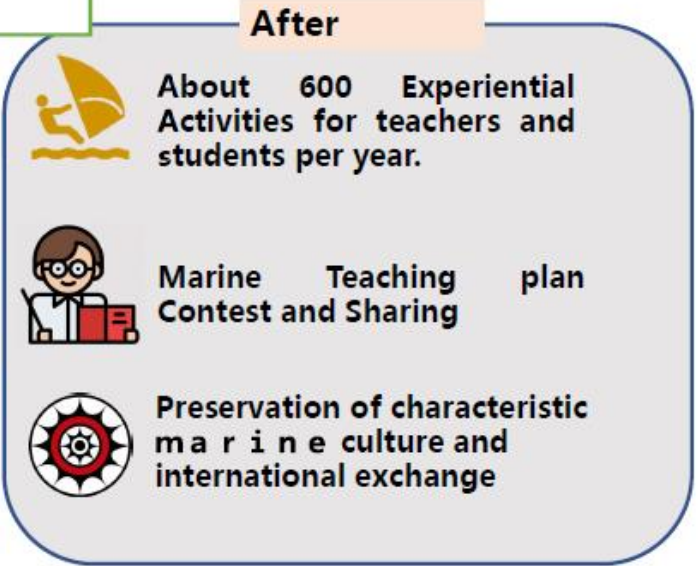
Information

Before
 Marine information such as weather, current activities, etc. is scattered in different agencies.



Deepen, linking and experiencing

Before
 The allocation of resources and the emphasis on the ocean are insufficient and affect awareness and access.



Ocean Affairs Council

石滬Shi Hu (stone tidal weir, Stone Fish Weir)

海洋驛站導覽
線上預約系統

預約導覽 預約查詢 驛站列表 檔案下載

海洋委員會
海域遊憩
Ocean 一站式網站

活動申請 法令資訊 遊憩資訊 海濱攝影 創舉遊覽 海域聯合資訊

基隆(白海豚) 海洋驛站
基隆(太平洋鼠) 海洋驛站
基隆(小水獺) 海洋驛站
基隆(黑邊海狗) 海洋驛站
基隆(網網) 海洋驛站
基隆(黑背黃斑海狗) 海洋驛站

龍鳳(白海豚) 海洋驛站
龍鳳(太平洋鼠) 海洋驛站
龍鳳(小水獺) 海洋驛站
龍鳳(黑邊海狗) 海洋驛站
龍鳳(網網) 海洋驛站
龍鳳(黑背黃斑海狗) 海洋驛站

新竹(石狗公) 海洋驛站
新竹(黑鰐魚) 海洋驛站
新竹(網網) 海洋驛站
新竹(黑背黃斑海狗) 海洋驛站

臺南市海軍區大門區大門1號 (02)24991707
宜蘭縣南澳鄉海路99號 (03)985157
苗栗縣竹南鎮

12 Ocean Service Stations around the Island

O c e a n A f f a i r s C o u n c i l



Activities



Services



Knowledge



Revitalization

Make great progress in encouraging and attracting people to participate in sea-related activities and get closer to the ocean.

19

Conclusion

O c e a n A f f a i r s C o u n c i l

OAC

Awakening the oceanic spirit, embracing marine education, our island nation sails towards sustainability and technological prowess.

To be a small country with big contributions to the ocean.