



# Q-quatics 2019: road ahead

Mini-Symposium  
31 January 2019

Training Room 1  
Swaminathan Building  
IRRI, Los Baños,  
Laguna, Philippines

[www.q-quatics.org](http://www.q-quatics.org)



## PROGRAM

---

Time	Topic	Resource Person	Affiliation
9:00 – 9:15	Registration		
9:15 – 9:25	National Anthem	Ms. Patricia S. Yap	Research Analyst, Q-quatics, Philippines
9:25 – 9:35	Welcome Address & Introductory Remarks	Dr. Mary Ann P. Bimbao	Executive Director, Q-quatics, Philippines
9:35 – 9:50	The Small-scale Fisheries Academy in Senegal	Dr. Cornelia E. Nauen	President, Mundus maris, Belgium; Board Chair, Q-quatics, Philippines
9:50 – 10:05	A Global Assessment of the Status of Exploited Marine Populations	Dr. Maria Lourdes D. Palomares	Senior Scientist and Project Manager, <i>Sea Around Us</i> ; Science Director, Q-quatics, Philippines
10:05 – 10:20	A new analysis of global freshwater finfisheries describes strongly divergent trends between well-developed and less- developed countries	Dr. Peter Sorensen	Professor, Department of Fisheries, Wildlife and Conservation Biology, University of Minnesota, USA
10:20 – 10:40	Coffee Break		
10:40 – 10:55	The Safe Risk Area Ports Initiative for Ballast Water Management in ASEAN	Dr. Benjamin M. Vallejo Jr.	Associate Professor, University of the Philippines-Diliman, Q- quatics Board member, Philippines
10:55 – 11:10	Jellyfish and Humans – the Big Picture	Dr. Lucas Brotz	Cnidaria Scientist, Q-quatics, Philippines
11:10 – 11:25	The Use of FishBase and SeaLifeBase Species Identification Tools in the Analysis of Marine Megafauna Using Underwater Videos	Mr. Rodolfo Reyes Jr.	Research Associate, Q-quatics, Philippines
11:25 – 11:40	The FAO/FIRMS Global Record of Stocks and Fisheries: Its Role in SDG14, and the Links with FishBase and SeaLifeBase	Dr. Nicolas Bailly	Taxonomy Coordinator, Q-quatics, Philippines
11:40 – 12:00	Open Forum	Ms. Patricia S. Yap	Research Analyst, Q-quatics, Philippines
12:00nn	Closing	Dr. Cornelia E. Nauen	President, Mundus maris, Belgium; Board Chair, Q-quatics, Philippines

## WELCOME ADDRESS AND INTRODUCTORY REMARKS

---

Dr. Mary Ann P. Bimbao  
*Executive Director, Quantitative Aquatics, Inc*  
*Khush Hall, IRRI, Los Baños, Laguna, Philippines: mbimbao@q-quatics.org*

Dr. Cornelia Nauen, Dr. Maria Lourdes Palomares, Dr. Benjamin Vallejo, Dr. Grant Singleton, Dr. Nicolas Bailly, Dr. Peter Sorensen, Dr. Lucas Brotz, Dr. Rafael Guerrero III, Dr. Annadel Cabanban, Dr. Sheila Vergara, Q-quatics staff and all our guests, good morning and warm welcome to all of you!

We are very delighted that you share with us your precious time in this symposium “Q-quatics 2019: Road Ahead”. To set its tone, we hope to seek the various avenues for Q-quatics to carry out its fisheries and oceans research mandate through valuable collaborations and partnerships with the global scientific community. This symposium will address issues confronting our ocean environment and fisheries strategies worldwide trends from the perspective of Q-quatics experts and partners. It is among the many steps leading up to the forthcoming exciting UN Decade of the Ocean Science for Sustainable Development 2021-2030.

Quantitative Aquatics, Inc. ([www.q-quatics.org](http://www.q-quatics.org)) is a non-stock, non-profit, non-governmental organization established in the Philippines in February 2017. Q-quatics was created to support the assembly and dissemination of key data on living aquatic resources for the development of research tools in collaboration with local and international partners promoting innovative data analyses and new insights.

Q-quatics manages both the global biodiversity information systems FishBase ([www.fishbase.org](http://www.fishbase.org)) and SeaLifeBase ([www.sealifebase.org](http://www.sealifebase.org)), and the aquatic biogeography initiative AquaMaps ([www.aquamaps.org](http://www.aquamaps.org)). Q-quatics works closely and supports the cutting-edge databases and research developed by the *Sea Around Us* ([www.seaaroundus.org](http://www.seaaroundus.org)), a research initiative under the Institute for the Oceans and Fisheries of the University of British Columbia (UBC), Canada.

At this point, I would like to acknowledge Dr. Daniel Pauly (University Killam Professor & Principal Investigator, *Sea Around Us*, UBC, Canada) and Dr. Rainer Froese (Scientist, GEOMAR, Helmholtz-Centre for Ocean Research, Germany), who are the architects or the Fathers of FishBase, which they conceptualized as a taxonomic and biological reference for fishes way back in 1989. Equally fitting to acknowledge is Dr. Cornelia Nauen (President, now Mundus maris, Belgium) who secured the initial funding for FishBase as a project under the ACP (African Caribbean and Pacific group of countries) cooperation with the European Union, and remained connected to FishBase and its team over the years. SeaLifeBase was created in 2005 through a project led by Dr. Daniel Pauly and Dr. Maria Lourdes Palomares (Senior Scientist and Project Manager, *Sea Around Us*, UBC, Canada). AquaMaps which was developed through the PhD research of Dr. Kristin Kaschner (University of Freiburg, Germany), went online in 2006 and completed our information system triad with FishBase and SeaLifeBase.

I would also like to acknowledge the role of the FishBase Consortium, a network of 12 institutes and organizations who support our information systems providing funded projects and steering its scientific direction. The Consortium was created in 2000 with seven founding members. Q-quatics became a member of the Consortium in December 2017.

The Consortium members are: Food and Agriculture Organization of the United Nations (FAO), Rome, Italy; GEOMAR Helmholtz-Centre for Ocean Research, Kiel, Germany; Swedish Museum of Natural History (NRM), Stockholm, Sweden; Royal Museum for Central Africa (MRAC), Tervuren, Belgium; National Museum of Natural History (MNHN), Paris, France; University of British Columbia (UBC), Vancouver, Canada; WorldFish (WorldFish), Penang, Malaysia; Aristotle

University of Thessaloniki (AUTH), Thessaloniki, Greece; Chinese Academy of Fishery Sciences (CAFS), Beijing, China; Universidade Federal De Sergipe (UFS), Sergipe, Brazil; Quantitative Aquatics Inc. (Q-quatics), Laguna, Philippines; and University of Western Australia (UWA), Perth, Australia.

As a research organization, Q-quatics considers this symposium as part of its commitment to scientific collaboration and knowledge sharing in the wider quest to support solutions to the interconnected Sustainable Development Goals of the United Nations, in particular SDG14, Life below water.

The theme for this year's presentation is "Q-quatics 2019: Road Ahead" with a blend of global analyses and their two-way connections for more local or specialty experiences. We hope that the different presentations will give you a snapshot of the research thrusts and activities of Q-quatics. We believe that strengthening our research collaborations through joint projects will together make us more effective in broadening the knowledge base for our societies to cope with the considerable challenges of overfishing, climate change and other strains on marine and fresh waters and the communities depending on them for a living.

We will be making this symposium an annual event in conjunction with the annual meeting of the Board of Trustees of Q-quatics. We will be inviting you to join us as resource speakers for an even more vibrant exchange next year.

Thank you very much for coming. Your presence today means a lot to us and I wish all of us a meaningful and productive exchange of fisheries knowledge and field experiences in the pursuit of healthy waters, and prosperous coastal and riparian communities.

To all our guests, on behalf of the Q-quatics Board of Trustees and our 24-strong Q-quatics team based in Los Baños, again a warm welcome!

---

Mary Ann P. Bimbao has been involved with administrative and financial management of FishBase and SeaLifeBase projects under a non-stock, non-profit Philippine NGO since 2003. With a BS degree in Agricultural Economics at the University of the Philippines-Los Baños (UPLB), she started her career as an Agricultural Commodity Analyst with the Philippine Ministry of Agriculture. After a fellowship grant by the Agricultural Development Council for an MS Economics program at the National University of Singapore, she returned to government service as an Agricultural Specialist with the Bureau of Agricultural Statistics (BAS). She joined the International Center for Living Aquatic Resources Management (ICLARM, now WorldFish) in 1986 as Program Assistant and left as Senior Research Associate. With a PhD in Community Development from UPLB, her research includes aquaculture socioeconomics, participatory research, farming systems and gender issues. She capitalizes on her social science academic background and her experience working in national and international projects to establish and maintain relations with donors and research partners.



## ABSTRACTS

---

### THE SMALL-SCALE FISHERIES ACADEMY IN SENEGAL

Cornelia E. Nauen

*President, Mundus maris - Sciences and Arts for Sustainability*

*Brussels, Belgium; [ce.nauen@mundusmaris.org](mailto:ce.nauen@mundusmaris.org)*

The small-scale fisheries academy in Senegal was launched by Mundus maris in partnership with professional organisations in the country and the support of local academics end 2018. It is intended as a multi-stakeholder space for co-production of knowledge and focused on the implementation of the (FAO) Small-Scale Fisheries (SSF) Guidelines, part of the Sustainable Development Goals (in particular SDG14). The talk will focus on the priority setting by the representatives of men and women in SSF, what that means for curriculum development of the academy. It will explore how research results could be made more readily accessible to them with emphasis on biodiversity databases and modes of co-production of knowledge between fishers and researchers.

---

Cornelia E. Nauen holds a PhD in fisheries science from Kiel University, Germany. She worked in FAO's Fisheries Department on aquatic and coastal pollution issues and later in the species identification programme. Between 1986 and 2012 she served in the European Commission in development cooperation and international science cooperation. There she helped fund the early stages of FishBase. Critically engaged science to support policy and action for social inclusion and sustainable living and being were a major focus. Since 2010 she heads the international non-profit association Mundus maris – Sciences and Arts for Sustainability. Mundus maris seeks to combine scientific concepts with practice embedded in local and global cultural spaces. It supports awareness raising and education about the ocean, e.g. through promoting conversations that matter and enable action. Mundus maris recently launched the small-scale fisheries academy in Senegal together with partners from across the SSF spectrum and wide-spread interest of academics as a multi-stakeholder space for co-production of knowledge and support for SDG implementation.



## ABSTRACTS

---

### A GLOBAL ASSESSMENT OF THE STATUS OF EXPLOITED MARINE POPULATIONS

Maria Lourdes D. Palomares

*Senior Scientist and Project Manager, Sea Around Us, Institute for the Oceans and Fisheries,  
University of British Columbia, Canada; [m.palomares@oceans.ubc.ca](mailto:m.palomares@oceans.ubc.ca)*

An assessment of the status of 1320 fish and invertebrate populations (or ‘stocks’) of 483 species exploited by fisheries in 232 Marine Ecoregions (MEs) overlapping with the Exclusive Economic Zones (EEZs) of 218 countries and their overseas territories was performed using the CMSY method applied to annual catches (1950-2014) reconstructed by the *Sea Around Us*.

The main finding was that a large majority of the assessed populations (73.4%) had biomass below that associated with Maximum Sustainable Yield (BMSY), 8.2% were collapsed ( $B < 0.2$  BMSY), and 18.5% were considered healthy and can produce MSY. Thus, these populations would be expected to generate higher sustainable catches if allowed to rebuild. A preliminary conservative estimate gives the foregone catch for the examined stocks as 20 million tonnes (24%), when catches in 2014 are compared with 90% of MSY level catches. The 90% reduction accounts for the fact that predator-prey interactions make it impossible to achieve MSY for all stocks simultaneously. This study examined only stocks identified to the species level. If the above percentage is scaled up to the total catch, this would amount to a preliminary estimate of about 26 million tonnes of foregone catch.

As expected, cases with unreliable catch statistics generated questionable results and high uncertainties. In particular, the CMSY method, when applied to catch statistics from countries that ‘manufactured’ high catches in recent decades, suggested lower declines in biomass than likely occurred. This implies that the results presented herein are conservative, i.e., do not exaggerate declining trends in biomass.

This study is preliminary in that informative priors could be provided only for fish and invertebrate populations in the waters of countries conducting systematic fisheries research on their major exploited populations. A plan is briefly presented on how this shortcoming will be mitigated in the second year of this project, which will also see the development of new features on the website of the *Sea Around Us*, allowing for the biomass estimates and other data from our stock assessments to be downloaded and/or the assessments to be rerun by users with different prior estimates. In the meantime, summaries (in form of PDFs) for all 1320 stocks may be found at [www.seaaroundus.org](http://www.seaaroundus.org) under the respective MEs or EEZs.

---

Maria Lourdes D. Palomares is the [Sea Around Us](#) Project Manager since June 2017. She is one of the creators of and is the lead of [SeaLifeBase](#) (since 2005), a biodiversity information system on the world’s marine organisms other than fish, which is patterned after [FishBase](#) (i.e., the fish biodiversity information system on the world’s fishes). Deng helps with molding the scientific thrusts (e.g., in defining projects, and the work-flow associated in producing deliverables in a timely manner) of the Philippine NGO, Quantitative Aquatics, as its Science Director. She serves as Specialty Chief Editor of *Frontiers in Marine Science*’s section on Marine Fisheries, Aquaculture and Living Resources (since 2016). Originally from the Philippines, Deng obtained a PhD from the *École Nationale Supérieure Agronomique de Toulouse* (France) in 1991 and worked with the FishBase Project at the International Center for Living Aquatic Resources Management (Manila, Philippines) for 10 years before joining the *Sea Around Us* team in 2001.



## ABSTRACTS

---

### A NEW ANALYSIS OF GLOBAL FRESHWATER FINFISHERIES DESCRIBES STRONGLY DIVERGENT TRENDS BETWEEN WELL-DEVELOPED AND LESS-DEVELOPED COUNTRIES

Peter Sorensen

*University of Minnesota, Minnesota, USA; [soren003@umn.edu](mailto:soren003@umn.edu)*

Although the questions of how global fisheries capture and culture are faring is of critical importance, they remain largely unresolved for freshwaters which both serve as the main source of food for hundreds of millions of the world's poorest while fueling a multi-billion dollar recreational fisheries for the world's most well-to-do. In this study we examined freshwater capture and culture data reported to the FAO since 1950s for the first time, correct obvious reporting problems, isolate finfish, group data by fisheries type (capture, culture), fish life history (fresh, brackish, diadromous), and the socioeconomic status of the country that reported them. Three socioeconomic tiers were discerned (with tier-one being the most well-off countries). Astonishingly divergent trends were observed for each tier group and fishery, most of which contrast dramatically with many of those reported in marine systems. First, reported overall freshwater finfisheries are presently increasing (about 5% a year) and now strongly dominated by culture (about 45 million metric tonnes vs 10 million metric tonnes for capture). Second, while second-tier countries (largely China) dominate important finfish culture (accounting for about half of all cultured fishes), overall capture finfisheries are dominated by third-tier countries (7 million tonnes vs 2 million tonnes for second-tier with only half a million tonnes for first-tier countries). Third, while brackish water capture finfisheries are nearly the same size as freshwater capture fishes (and also dominated by third-tier countries), they only comprise about a tenth of the cultured finfisheries. Fourth, while diadromous capture finfisheries are relatively small, constant, and play similar roles in all countries, diadromous finfish culture is rising rapidly in first-tier countries and now far exceeds diadromous capture fisheries by about 10-fold. Lastly, and perhaps most notably, with the exception of third-tier country capture fisheries, capture fisheries for fresh, brackish and perhaps diadromous finfish are either stable or declining. Declines are especially evident in the first-tier countries whose reporting and management strategies are presumably the best, perhaps suggesting declines in high-quality sustainable global freshwater capture fisheries. Of course, in all likelihood this decline is why second-tier countries are shifting to culture, presumably at the expense of managing sustainable wild fisheries as whole-lake culture seems to be common practice. In conclusion, our results strongly suggest that most traditional wild freshwater finfisheries are very likely in decline and call for new approaches to confirm the quality of reported data, reconstruct them, and then evaluate them in even more insightful manners to provide guidance to managers concerned with global sustainability.

---

Peter Sorensen is a Professor in Fisheries, Wildlife and Conservation Biology at the University of Minnesota. His expertise is in fish behavioral ecology and physiology but he has a long standing interest in fisheries conservation. Peter is presently working on the concept of freshwater protected areas which he explored while on sabbatical leave at the University of British Columbia. He earned his PhD in Biological Oceanography from the University of Rhode Island for discovering that migratory eels find fresh water using the scent of freshwater microbes. He then completed a postdoc at the University of Alberta



where he discovered that most sex pheromones used by fish are derived from hormones. At Minnesota, he has deployed this understanding of fish biochemistry and molecular biology to develop new means of controlling fish behavior, especially invasive fish, and censusing them. He worked for 16 years on sea lamprey control in the Great Lakes where he identified and implemented the first migratory pheromone identified in a fish. He founded the Minnesota Aquatic Invasive Species Research Center in 2011 and presently works on invasive common carp and Asian carp behavior (and control) but wonders if protecting the Mississippi River would not have been a much better way to go.

## ABSTRACTS

---

### THE SAFE RISK AREA PORTS INITIATIVE FOR BALLAST WATER MANAGEMENT IN ASEAN

Benjamin M. Vallejo, Jr.

*Associate Professor, University of the Philippines-Diliman  
Quezon City, Philippines; [b.vallejo@q-quatrics.org](mailto:b.vallejo@q-quatrics.org)*

The Safe Risk Area for international ports in ASEAN was proposed by the ASEAN ministers of transportation in July 2018 as a compliance to the International Ballast Water Convention of the International Maritime Organization. The International Ballast Water Convention is now part of domestic law of IMO member nations with 77 countries ratifying the treaty. In this talk, I will describe various approaches to determining the SRA using marine biodiversity baseline information provided by biological databases.

---

Benjamin M. Vallejo, Jr. is Associate Professor at the University of the Philippines-Diliman where he teaches biogeography, environmental science, and science, technology and society. His research work has focused on the biogeography of the Philippines and Wallacea, coastal and intertidal ecology, urban environments and the biology of invasive species.



## ABSTRACTS

---

### JELLYFISH AND HUMANS – THE BIG PICTURE

Lucas Brotz

*Cnidaria Scientist, Quantitative Aquatics, Inc.*

[l.brotz@oceans.ubc.ca](mailto:l.brotz@oceans.ubc.ca)

Reports of jellyfish interfering with human activities are on the rise, resulting in substantial economic losses for several industries. But are jellyfish blooms actually increasing, or are we just noticing more of them as they get in our way? Demand for jellyfish as food for humans is growing, and some have suggested that perhaps we can fish our way out the problem. A number of other counter-measures have also been developed to try and control jellyfish populations, with mixed results. Preventing a more gelatinous future appears unlikely, so adaptation may be our best bet.

---

Lucas Brotz has been studying jellyfish for more than a decade, including population dynamics, interactions with humans, and jellyfish fisheries. He has been a member of numerous international working groups on jellyfish, and currently serves on the Scientific Steering Committee for the 6th International Jellyfish Blooms Symposium to be held in South Africa in November 2019. He holds a PhD in Zoology, an MSc in Oceanography, and a BSc in Astrophysics. He was previously employed as a Postdoctoral Research Fellow with the *Sea Around Us* and is based at the University of British Columbia's Institute for the Oceans and Fisheries.



## ABSTRACTS

---

### THE USE OF FISHBASE AND SEALIFEBASE SPECIES IDENTIFICATION TOOLS IN THE ANALYSIS OF MARINE MEGAFUNA USING UNDERWATER VIDEOS

Rodolfo B. Reyes, Jr.

*Research Associate, Quantitative Aquatics, Inc.,  
Los Baños, Laguna, Philippines; [r.reyes@q-quatics.org](mailto:r.reyes@q-quatics.org)*

Species identification is a tedious task, requiring many hours of training and experience to learn and attain a level of proficiency useful in research. FishBase and SeaLifeBase have species identification tools using various approaches to cater to users with different levels of proficiency. The Q-quatics – University of Western Australia collaboration on the analysis of marine megafauna applies the Quick Identification Tool to identify fish and non-fish species in underwater videos. The talk will briefly describe the process and the challenges in species identification in underwater videos. It will present the features added in the Quick ID tool for this work and discuss the initial experience of Q-quatics staff.

---

Rodolfo B. Reyes, Jr. works on life history information, morphometrics in relation to species identification, and the development of tools that use data in FishBase for analyses in general. He also reviews research manuscripts on growth and life history of fishes for international journals. He is an Associate Editor of *Acta Ichthyologica et Piscatoria* and a member of the Editorial Board of the *Journal of Applied Ichthyology*.



## ABSTRACTS

---

### THE FAO/FIRMS GLOBAL RECORD OF STOCKS AND FISHERIES: ITS ROLE IN SDG14, AND THE LINKS WITH FISHBASE AND SEALIFEBASE

Nicolas Bailly  
*Taxonomic Coordinator, Quantitative Aquatics, Inc.*  
[n.bailly@q-quatics.org](mailto:n.bailly@q-quatics.org)

In [2015](#), the United Nations Member States set up and agreed on 17 goals for the [2030 Agenda for Sustainable Development](#). The [goal 14](#) is dedicated to oceans: “Conserve and sustainably use the oceans, seas and marine resources for sustainable development”.

Goals are subdivided in targets for which indicators were developed. As a UN Agency, FAO and its Fisheries and Aquaculture Department is responsible for four targets dedicated to fisheries. In particular, the SDG14.4: “By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics”. And its indicator: “Proportion of fish stocks within biologically sustainable levels”.

In order to support the monitoring of this indicator, FAO developed a dedicated Virtual Research Environment (VRE) in the D4Science platform during the BlueBridge Horizon 2020 European project, a follow up component of the iMarine initiative. As a start, the Global Record of Stock and Fisheries assembled 3 major source of stock information, those coming from different and authoritative sources namely, FIRMS ([Fisheries and Resources Monitoring System](#)), RAM ([RAM Legacy Stock Assessment Database](#)), FishSource ([FishSource](#)), recording respectively 560, 1156, 1406 records on stocks, and 3765, 0, 3073 records on fisheries. The first work was to allocate unique identifiers and names to stocks and fisheries after matching the three lists to detect which records were the same, and incidentally to allocate to the stocks. So far 597 unique stocks and 595 unique fisheries (as assessment units) were identified, and the work is still ongoing. Other information from stock assessments are to be linked like abundance levels, catches, etc. to help to follow up the indicator SDG14.4.1.

Since the beginning, FishBase and SeaLifeBase have the capacity to record information at stock level. This capacity is hindered by a lack of consensus taxonomy about stocks reported by countries and RFBs. This new FAO standard should help a lot to create records beyond the European and North American stocks. In return, GRSF could benefit from other types of information from FB and SLB.

In the end, the GRSF VRE should be managed by a FIRMS – GRSF partnership between FAO, the RFBs represented by FIRMS, and the non-fishery partners who developed the VRE.

---

Nicolas Bailly (PhD) is Q-quatics' Taxonomy Coordinator. He was formerly employed at the National Museum of Natural History (MNHN) in Paris where he started to develop his experience in Biodiversity Informatics. He helped organize the FishBase Consortium in 2000 and became Chair years later (2004-2005). He joined WorldFish as the FishBase Project Leader (2005-2014) and worked with the LifeWatchGreece Team at the Institute of Marine Biology, Biotechnology and Aquaculture (IMBBC), Hellenic Centre for Marine Research (HCMR), Greece (2014-2016). He worked as a consultant for FAO (2017-2018) to develop a business model for the information system on all fishery stocks, the Global Record of Stocks and Fisheries. He is now the Assistant Curator of the UBC Fish Collection at the Beaty Biodiversity Museum (2019-present).

