

NEWSLETTER
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OCEANS PAST INITIATIVE

[A LOOK BACK, AND A LOOK FORWARD]

Happy New Year from all of us at Oceans Past News! In 2017, we highlighted work from **J. Scott McCain** that used historical perspectives to shed light on critical habitat, as well as that from **Andrea Gaynor, with Jodi Frawley and Kathleen Schwerdtner Máñez**, which revealed gendered cultures in fishing over time. **Dalal Al-Abdulrazzak** wrote about why the past matters and how it can illuminate important ethical questions as part of our 10 Questions series. Finally, our November edition focused on the importance of deep time, including work by **Bryony Caswell**, and the **Paleoecology of Subarctic Seas (PESAS)** working group. We thank all of contributors for their time and involvement, and all of you for supporting OPN. We look forward to what is next for our community in 2018.

As always, we welcome your questions, comments, suggestions, and content!

*Emily S. Klein, Southwest Fisheries Science Center & The Farallon Institute, USA
OPN Editor*



[10 QUESTIONS*: LOREN McCLENACHAN]

Dr. Loren McClenachan is the Elisabeth and Lee Ainslie Assistant Professor of Environmental Studies at Colby College, in Waterville, Maine, USA. Previously, she was an Alfred P. Sloan Foundation Fellow in Ocean Science, a National Science Foundation International Postdoctoral Fellow, and a visiting scholar at the University of Queensland, in Brisbane, Australia.

Q1. First – a brief introduction: can you describe your research as it pertains to the past in two sentences or less?

I am a marine ecologist interested in long term changes to marine animal populations. My research aims to quantify ecological change and identify conservation success over centuries and across large geographic areas in order to halt declines and promote recovery of marine animals and ecosystems.

Q2. Why do you find research on the past important?

Embracing data from the past is just good science, because it allows us to think about systems more holistically and to consider what we might be

overlooking when we only use recent ecological data. It also turns out that in a lot of cases, we're not using all the available information to make conservation and management decisions. Historical ecology can help fill in key data gaps and understanding when society's baselines have shifted in a way that affects conservation goals and outcomes.

Each issue of Oceans Past News includes a feature article to highlight research happening in our community, as either an **Oceans Past Spotlight or as **10 Questions**, which will pose the same 10 questions to different leaders in our field. If you would like be considered for either, or to nominate a colleague or mentee, please contact Emily Klein at emily.klein04@gmail.com.*



Q3. Was there a person or event that influenced your commitment to studying history and historical ecosystems?

Yes, absolutely. I met **Jeremy Jackson** at the first **HMAP [History of Marine Animal Populations]** summer school in Denmark in 2001 and was immediately hooked on his way of looking at the world. He's a paleoecologist, and so has this wonderfully deep view of ecological change. He's also someone who thoroughly respects the humanities, and thinks creatively about integrating ecology and history.

Q4. What advice would you give those who want to engage in historical work or collaborate with our community?

I'd say three things. First, think about the components of ecosystem change that historical data might help to better understand. Figuring out why the past matters in any particular place or management context means narrowing in on the parts of that system that have changed in ways that may not yet be well understood. Second, talk to lots of people about data sources. In terms of finding historical data, in my experience, talking to local experts is key- as many as you can. There may be documents in boxes in people's attics or hidden away in archives that no one has discovered or realized are useful to understanding ecological change. Finally, when it comes to thinking about analyses of the data you find, give yourself time to try different things. Often this work involves finding modern datasets to compare to your historical data, or borrowing analyses from different disciplines. Sometimes this process can take a while.

Q5. Do you believe the past can help solve contemporary environmental/social problems, and if so, what is one area we can provide insight on?

Yes, definitely. I think fisheries management is one area that would benefit from embracing historical information more fully. In a lot of cases, there's a strong bias towards recent, easily standardized data, but using this information exclusively results in a narrower view of natural variability. It also directly affects biological reference points and other targets for management and recovery.

Q6. When you do assess our current environmental and societal challenges, what gives you hope?

That change is non-linear. Ecologists talk a lot about thresholds in terms of degradation of ecosystems, but I also think these are important in social systems, and can be positive in terms of achieving environmental or social goals. There was a great article in **National Geographic** (<http://bit.ly/2Bjs34f>) a few years back about how birth rates in Brazil dropped from 7 to 2 in two generations – because of soap operas and the way they made having a small family an aspirational goal. I think the **#MeToo** movement is another example of how the social landscape can shift quickly in a positive way. We can't predict what sorts of sudden changes will happen to help address things like climate change and but I can only think they will.

Q7. What knowledge would you like to pass on to the next generation, of the public or of scientists?

Sylvia Earle makes the really important point that we're living at this unique moment in human history. We've never consumed so much of the Earth's resources so quickly, but we've also never had as much knowledge about the consequences of our actions or what's at stake. We're uniquely poised to destroy our life support system or to come up with ways to save it. I think this is something we should all be thinking about.

Q8. What field of research – besides the one you are working in – do you consider most exciting?

I have two young kids and also spend a bunch of my time teaching, so I think a lot about education. I'm really interested in social justice issues, and in particular how different access to educational resources affects individuals and society as a whole. I teach environmental topics & think that one of the keys to conservation success will be to diversify environmental sciences. This –and lots of other similarly lofty social goals– won't happen without some real attention to bigger issues of equity and education.



Loren during fieldwork outside the Aquarius underwater habitat in the Florida Keys.



Teaching a field course to Colby students in French Polynesia
(Loren is fourth from the right, in yellow)

Q9. What are you reading at the moment?

I've been reading a book by an environmental historian here in Maine named **Connie Chiang** called *Shaping the Shoreline*. I also discovered an amazing writer this summer named **Alexandra Fuller** who writes about her experience growing up in Zimbabwe during the Rhodesian War and since then have read just about everything she's written. And over the holidays, I started **Joan Didion's** newest book, *South and West*.

Q10. What is a critical but perhaps under-acknowledged question we as a community should be asking?

I think the question of how we apply historical ecological data to conservation and management is still being worked out. This is partly a social goal, but also a technical question in terms of how we better integrate historical data into existing management frameworks.

Recently, along with colleagues, Loren's research used centuries-old nautical charts alongside satellite data to understand coral reef loss in the Florida Keys. This work suggests more than half the coral reef habitat mapped in the late 18th century has been lost, with some areas, particularly near land, losing as much as 90%. Some noted as reef in the past are not classified that way today. These estimates are critical additions to modern observations of coral degradation, demonstrating just how drastic coral reef loss in the Keys is and revealing a shifted baseline in expectations of habitat there. The work also shows the importance and precision of earlier historical charts and related technology for and relative to contemporary study. **Related publication:** McClenachan, L, and G O'Connor, BP Neal, JM Pandolfi, JBC Jackson. 2017. "Ghost reefs: Nautical charts document large spatial scale of coral reef loss over 240 years." Science Advances. It was also written up in the Washington Post: <http://wapo.st/2mGyOaX>.

RESEARCH NEWS

Spatial reconstruction of a disappearing spawning fishery: Spawning aggregations are critical for many species, yet these aggregations are inherently vulnerable to exploitation. However, studies of exploited breeding aggregations tend to focus on catch rate and often overlook changes in geographic range. **Sarah Buckley and colleagues** investigated the Queensland Spanish mackerel spawning-aggregation fishery in the Great Barrier Reef. The fishery started more than 100 years ago, but official catch and effort stretched back only to the late 1980s, leaving large gaps in the understanding of long-term changes. Exploring Australian newspaper archives revealed articles containing quantitative information on Spanish mackerel commercial landings from 1921 to 1943. In addition, Spanish mackerel fishers were able to recall fishing from as early as the 1940s, providing memories of changes in catch, gear and technology and locations fished, to reconstruct a comprehensive record. This work combined the catch and effort data from historical newspapers with fisher memories from 1950 to 2013, enabling reconstruction of a 103-year record of the fishery. Results showed spatial expansion of effort masked sequential exploitation and the loss of 70% of exploited spawning aggregations. After standardizing for improvements in gear and technology, the authors found that catch rates of Spanish mackerel spawning fishery have declined by 90.5 per cent over the past 80 years. Preventing the decline and loss of fish spawning aggregations is a priority for the Great Barrier Marine Park Authority, and the research is being used by the Queensland Government to inform stock assessment. **Related publication:** SM Buckley, RH Thurstan, AJ Tobin & JM Pandolfi 2017. Historical spatial reconstruction of a spawning aggregation fishery. Conservation Biology DOI: 10.1111/cobi.12940.

COLLABORATIONS

Documenting the history stock assessment, scientific advice and fisheries management: Fisheries stock assessment and scientific advice have been an important driver for activities in the **International Council for Exploration of the Seas (ICES)** for the past 40-45 years. A noticeable feature of that advisory process is that it is mostly geared towards tactical and strategic advice for the (near) future. Relatively little effort has been put into understanding scientific advice through time. In a new project that has been taken up by several researchers and in collaboration with the **ICES Secretariat**, efforts are directed at documenting past assessments and advice. The aim is to investigate how the frameworks, methods, requirements and social organization of ICES stock assessments and scientific advice have changed over time (~1970-now). This will be done by recovering past stock assessments from databases or from old working group and advisory reports. Ultimately, this is expected to lead to a publicly accessible database of all stock assessments published by ICES from 1986 onwards, and if possible even going back to the early 1970s. A lot of the data recovery process has been undertaken already and is now in the phase of checking the data. The next steps will be to document the basis for the assessments and advice and to publish a first overview of the data. After that, the intention is to analyze the match-mismatch between scientific advice and fisheries management in Europe.

The smallest fish in historical ecology? Exploring the centennial dynamics of sticklebacks:

Studies on marine ecosystems through time often focus on exploited species as they often have associated catch data. However, unexploited species can provide information about dynamics less affected by fisheries that may reflect natural processes occurring in the ecosystem and environment – although studying these species can be especially challenging given a lack of data. As part of a Short Term Scientific Mission under the Ocean Past Platform program, **Dmitry Lajus** of St. Petersburg State University in Russia, worked with colleagues **Leif Christian Stige** and **Nils Christian Stenseth** of the University of Oslo in Norway addressed such a species using novel sources of information in the White Sea: the threespine stickleback. Sticklebacks are a small (<6cm length) bony fish with little commercial significance and thus appears rarely in fisheries statistics. Yet in the White Sea during the World War II and for some years after, stickleback were fished to feed people and domestic animals. They are also described in other, nontraditional resources, as sticklebacks are very visible along the coast when abundant. For example, Russian ichthyologist Vladimir Chernavin, a political prisoner in the 1930s, was forced to organize a fishmeal production from stickleback, and used associated field work finding locations for stickleback fishing as a means for escaping the Gulag in the White Sea. In his memoirs, he observed "*...the stickleback were moving from the sea side like an endless band formed a solid mass along the entire coast Our 50-m beach seine during fifteen - twenty minutes brought us more than a ton of fish*". Leveraging across these multiple sources, Lajus and colleagues reconstructed changes in White Sea stickleback population from the late 19th century to modern times, finding initially dramatic increases that peaked in the 1930s, a gradual decline and a near-disappearance by late 1960s, and an increase again starting in the 1990s. To compare historical and former abundance, the "calibration" seine hauls were performed (*see figure*). Today, sticklebacks may be the most numerous fish in White Sea. The team also found possible correlations between abundance and climate indices, but further efforts are needed to validate a causal link.



Repetition of historical stickleback fishing in the White Sea to compare former and current abundance (all fish released alive).

Australia to revisit 110°E line as contribution to IIOE-2: In May and June 2019, Australia is to revisit the original 110°E International Indian Ocean Expedition (IIOE) line in the SE Indian Ocean with the new, 93 m RV *Investigator* and conduct a coupled bio-physical examination of the pelagic ecosystem in this oligotrophic part of the ocean. The multi-disciplinary, multi-national team of 30 scientists will be led by **Lynnath Beckley** of Murdoch University. During the



Lynnath Beckley, Chief Investigator for the 2019 IIOE-2 voyage, with the Australian RV Investigator (photo: Wayne Rochat).

1960s, Australia made significant contributions to knowledge about the SE Indian Ocean during the first IOE. The 110°E line was regularly sampled across 30 degrees of latitude and a benchmark established of the unusual oceanographic and biological characteristics occurring off the western side of the continent. Five decades on, despite advances in global understanding of ocean ecosystems, very little subsequent work has been undertaken in this atypical part of the world's oceans. During the month-long voyage in 2019, the team of a dozen principal investigators, their staff and students will apply modern techniques to investigate the physical, biogeochemical and biological processes supporting ecosystem functioning along the 110°E line. The voyage will allow comparison of the properties of the deep ocean against

the 1960s benchmark, incorporate bio-optical and cutting-edge molecular techniques, measure more biogeochemical parameters, and develop models to underpin mechanistic understanding of trophic linkages. Expected outcome include improved understanding of physical, biogeochemical and trophic processes that regulate pelagic ecosystems in the SE Indian Ocean, and use of new technologies will provide updated reference points and allow examination of oceanic processes. The work will also significant for fisheries management in the data-deficient Australian EEZ, especially with respect to the extremely valuable Western rock lobster fishery as this part of the Indian Ocean is important for their pelagic larvae. The voyage should also considerably enhance knowledge about the pelagic ecosystem at the western extent of Australia's marine jurisdiction which now incorporates several new Marine Parks which are poorly studied but include prominent geological features such as the Naturaliste Plateau, Wallabi Saddle and Cuvier Abyssal Plain. More on the cruise and its history at <http://www.iioe-2.incois.gov.in/IIOE-2/index.jsp> and <http://www.iioe-2.incois.gov.in/IIOE-2/iioe.jsp>. ~ Dr. Lynnath Beckley, Murdoch University, Australia

COLLABORATIONS: GET INVOLVED

New projects aim to apply paleodata to better understand of future change: PAGES 2k

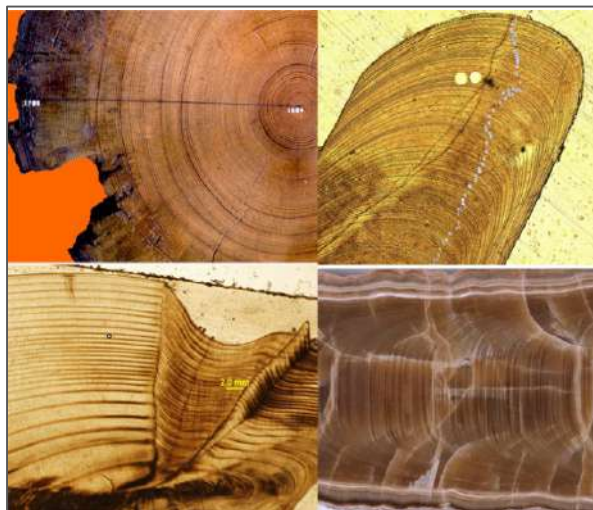
is a network of projects run by **PAGES (Past Global Changes)** whose aim is to develop understanding of the Earth's past environment (specifically over the past two thousand years) to improve future climate and environmental predictions and inform future sustainability. PAGES 2k is now launching three new marine-focused projects, all of which make use of new annually-resolved marine proxy archives:

MULTICHRON ("Constraining modeled multidecadal climate variability in the Atlantic using proxies derived from marine bivalve shells and coralline algae") will build on previous and ongoing research to develop a data set of annually-resolved records, and will use this data to develop reconstructions in conjunction with state-of-the-art climate models to identify and explore key mechanisms driving variability in the marine climate of the Northeast Atlantic Ocean. More on MULTICHRON: <http://pastglobalchanges.org/ini/wg/2k-network/projects/multichron/>.

ARAMATE ("The reconstruction of ecosystem and climate variability in the north Atlantic region using annually resolved archives of marine and terrestrial ecosystems") is focused on using a wide range of archives and data sources (including records developed in MULTICHRON, other proxy archives of climate and ecosystem variability, historical documents, and instrumental records) to understand the relationship between ecosystem change and climate change in the North Atlantic over the past 2,000 years. More at <http://pastglobalchanges.org/ini/wg/2k-network/projects/aramate/intro>.



Arctica islandica shells from the Faroe shelf. Photo: Carin Andersson



Annually resolved increments in proxies: Clockwise from top left: Tree rings (photo H.D. Grissino-Mayer), hinge part of a bivalve shell (photo Paul Butler), speleothem (speleothem science.org), fish otolith (photo Bryan Black)

CLIM-ARCH-DATE ("Integration of high resolution climate archives with archaeological and documentary evidence for the precise dating of maritime cultural and climatic events") is a transdisciplinary collaboration between historians, archaeologists and climate scientists which aims to integrate high resolution, precisely-dated climate archives with archaeological and documentary evidence in order to improve understanding of the temporal and spatial relationships between maritime cultural change and environmental change. This will enable us to take a more evidence-based approach to theories of environmental determinism and improve models of how environmental change might affect societal stability, cultural change, and patterns of human migration in the future. More at <http://pastglobalchanges.org/ini/wg/2k-network/projects/clim-arch-date/intro>.

All three projects are open; anyone interested in participating can subscribe to project mailing lists or contact the project coordinators directly (both available on the websites).

Interactions between dolphins and fishing communities: During the pre-industrial Greek fishery period (1911-1946) dolphins were pictured as 'implacable enemies' and authorities were urged to protect 'noble and desperate fishermen, whose families are deprived from their bread because of the beasts'. Hence, Greek professional fishermen would be rewarded, by the Ministry of Industry, with 600 Drachma (approximately €162 current value, a very significant prize back in 1961) for each dolphin killed; a strategy shared by other Mediterranean countries until the early 1970s. With respect to the Greek case-study, historical research on dolphin (or other marine mammals) abundances and level of interaction with the professional fishermen would be conducted through grey literature (i.e. fishing magazines, newspapers, and unpublished technical notes). The period of the study will cover the early Greek fisheries (1925) till the end of the 20th century. The type of the data to be searched will be related with: (a) subsidies on dolphin culling, (b) areas of dolphin peaks and interactions, (c) the views of the professional fishermen and of the society about culling dolphins, (d) season of dolphin interactions, and (e) management issues. The researchers are happy to discuss and collaborate with scientists from other countries conducting similar research in order to share ideas and forward collaboration. **For more contact:** Dimitrios K Moutopoulos at dmoutopo@teimes.gr.



Nets captured two dolphins in Astakos port, Western Greece.

NEW PUBLICATIONS

Bennett MB, & FF Coman, KA Townsend, LIE Couturier, FRA Jaine, AJ Richardson. (2017). **A historical and contemporary consideration of the diet of the reef manta ray (*Manta alfredi*) from the Great Barrier Reef, Australia.** *Marine and Freshwater Research* 68(5): 993-997. <https://doi.org/10.1071/MF16046>.

Braje TJ, & TP Leppard, SM Fitzpatrick, JM Erlandson. (2017). **Archaeology, historical ecology and anthropogenic island ecosystems.** *Environmental Conservation*. 44(3): 286-297.

Buckley SM, & RH Thurstan, A Tobin, JM Pandolfi. (2017). **Historical spatial reconstruction of a spawning-aggregation fishery.** *Conservation Biology*. doi:10.1111/cobi.12940.

Early-Capistrán M-M, & A Sáenz-Arroyo, J-G Cardoso-Mohedano, G Garibay-Melo, SH Peckham, V Koch. (2017). **Reconstructing 290 years of a data-poor fishery through ethnographic and archival research: The East Pacific green turtle (*Chelonia mydas*) in Baja California, Mexico.** *Fish and Fisheries*. doi: 10.1111/faf.12236.

Hernawan UE, & K van Dijk, GA Kendrick, M Feng, E Biffin, PS Lavery, K McMahon. (2017). **Historical processes and contemporary ocean currents drive genetic structure in the seagrass *Thalassia hemprichii* in the Indo-Australian Archipelago.** *Molecular Ecology*. 26(4): 1008-1021. doi:10.1111/mec.13966.

Jones P. 2017. "We Cannot See Them...They Have Gone Out of Our Reach': Narratives of Change in the Fisheries of Scotland's Great Firths, c.1770-1890" in D. Worthington (ed.), *The New Coastal History: Cultural and Environmental Perspectives from Scotland and Beyond*. Palgrave Macmillan: Basingstoke. pp.283-300.

McClenachan L, & G O'Connor, BP Neal, JM Pandolfi, JBC Jackson. (2017). **Ghost reefs: Nautical charts document large spatial scale of coral reef loss over 240 years.** *Science Advances*. 3(9):e1603155. doi: 10.1126/sciadv.1603155.

Rieser A. (2017). **The Herring Enlightenment: Adam Smith and the Reform of British Fishing Subsidies, 1783-1799.** *International Journal of Maritime History*, 29(3): 600-619. <https://doi.org/10.1177/0843871417708182>.

Tulloch, VJD., & EE Plagányi, R Matear, CJ Brown, AJ Richardson. (2017). **Ecosystem modelling to quantify the impact of historical whaling on Southern Hemisphere baleen whales.** *Fish and Fisheries*. doi:10.1111/faf.12241.

ANNOUNCEMENTS: PLEASE PARTICIPATE

Overcoming objections: harnessing the full potential of historical research for marine policy development. In the November edition of OPN, we announced a new **Oceans Past Initiative (OPI)** project to survey the community on the kinds of objections encountered regarding why approaches and the application of historical marine ecology and marine environmental history are not required, not relevant, or do not have the necessary evidential foundation to connect with contemporary science and marine systems management. This survey aims to understand these objections and ask which are most prevalent and have been the greatest hurdles to advancing research or having findings accepted by fisheries managers and policy makers. The survey is **now live on the OPI website** (<http://oceanspast.org/index.html>, "Click here for Common Objectives Questionnaire"), and your participation is essential to the success of this study! Please download and complete the survey, and return it to the project team as indicated. The study team, led by **Alison MacDiarmid and Gesche Krause**, will collate the range of objections encountered, explore their validity, recommend robust rebuttal arguments where warranted, and provide advice. Results will be presented at the 2018 **Oceans Past VII** conference in Bremerhaven, and published in the conference proceedings.

ANNOUNCEMENTS: CONFERENCES

Call for papers - Oceans Past VII (OPVII): The call for papers for OPVII, "Tracing human interactions with marine ecosystems through deep time: implications for policy and management" is now open. The conference aims to bring together the vast knowledge pool of two decades of marine historical ecology and environmental history to inform the policies of the Anthropocene. OPVII welcomes researchers, practitioners, policy-makers and students of all disciplines under the unifying view of our oceans as networks of social-ecological or coupled human-nature systems. For more information and to submit, please visit <http://oceanspast.org/oceanspastvii.html>.

The logo for Oceans Past VII, featuring the words "Oceans" and "Past VII" in white serif font on a blue rectangular background.

The **53rd European Marine Biology Symposium (EMBS53)** aims to “link the history, the present, and the future of (European) marine biology”, and one of the four conference themes is **Science from a historical perspective**. Organized by the Flanders Marine Institute (VLIZ) and Lifewatch Belgium, EMBS53 will take place 17-21 September 2018 in Ostend, Belgium. Registration and abstract submission opens 15 January 2018: <http://www.embs53.org/>.

The University of Toronto’s Centre for Comparative Literature’s 28th Annual Conference, **The Ocean and the Seas/L’océan et les mers**, will be held on the unceded territory of the Huron-Wendat and Petun First Nations, the Seneca, and most recently, the Mississaugas of the Credit River, at the University of Toronto, on February 23 and 24, 2018. More information at <https://complitconference2018.wordpress.com/>.

International Conferences on Environmental Humanities, **“Stories, Myths, and Arts to Envision a Change.”** Alcalá de Henares, July 3-6, 2018. More information at <http://www.institutofranklin.net/en/events/international-conference-on-environmental-humanities/>.



CONTACT

Oceans Past News is a quarterly newsletter that aspires to both unite and inform the worldwide community interested in historical perspectives of marine social-ecological systems by providing insight into the wide-ranging and excellent work being done and the resources available. If you would like to propose work for OPN in the future, please contact our editors, **Emily Klein** (emily.klein04@gmail.com) or **Cristina Brito** (escolademar@gmail.com).

*The next Oceans Past News will be out mid-April 2018. We **warmly welcome submissions** through March, 2018.*

RESOURCES

The Oceans Past News Archive is available online: <http://oceanspast.org/newsletter.html>

More on the Oceans Past Initiative: <http://oceanspast.org/index.html>

We are also on Facebook: <https://www.facebook.com/groups/122288493384/>