Newsletter of the International Network for Conservation Paleobiology

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CPN/INCP Newsletter

International Network for Conservation Paleobiology

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International Network for Conservation Paleobiology (INCP)

The CPN has begun transitioning to the International Network for Conservation Paleobiology (INCP). This new non-profit organization will be very similar to the CPN, but will have more flexibility in funding (not restricted by U.S. federal funding requirements), new opportunities for members, and a small membership fee.

We will let the CPN community know through the CPN listserv when you can begin to officially join this new version of the network, so stay tuned!

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Conservation Paleobiology Research Highlight

By Dr. Veronica Padilla Vriesman

Interpreting life-history traits, seasonal cycles, and coastal climate from an intertidal mussel species: Insights from 9000 years of synthesized stable isotope data

Humans have benefitted from coastal settings for thousands of years, and coasts remain economically and culturally important zones today, with 40% of the world's population living in coastal regions. Coasts face a variety of anthropogenic stressors, ranging from pollution to sea-level rise to ocean acidification and warming.

"We needed an archive of past coastal environments to contextualize modern changes, and we needed a sentinel organism to serve as an indicator of current biotic responses."

Motivated by our desire to better understand – and better protect – coastal environments, our research group had a few big questions: we knew that multiple stressors were likely harmful to the rich intertidal ecosystems bordering our coastlines, but exactly how were intertidal organisms responding? What did coastal environments look like in the past? What was "natural" variability, and what was the influence of industrialization? We needed an archive of past coastal environments to contextualize modern changes, and we needed a sentinel organism to serve as an indicator of current biotic responses.

By combing through the literature, we found an abundance of published data from one intertidal organism in particular: the California mussel (*Mytilus californianus*). This mussel is common and well-known in rocky intertidal environments throughout California, and it was an important food source for Indigenous peoples for the past 10,000+ years.

The California mussel is also known as a "foundation species" since it provides a habitat for 300 other species in intertidal environments. We wanted to see if we could use this important organism as a record of past variability and a sentinel organism to track modern responses to stressors.

(Continued on next page)

***Image caption**: Specimens of California mussel (Mytilus californianus) in a museum collection. This mussel is common and well-known in rocky intertidal environments throughout California.*

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Conservation Paleobiology Research Highlight continued

We compiled 6200 stable isotope data points spanning the past 9000 years that archaeologists, ecologists, and geochemists had collected from M. californianus shells throughout southern California for different research purposes. It was important to us to avoid disturbing any sites or ecosystems, so we constructed this record without any fieldwork or additional sampling. By analyzing old data in new ways, we found that the mussel shell record reflected millennial-scale climate variability and recent century-scale warming. The shells also recorded seasonal-scale carbon fluxes (such as upwelling) as well as the influence of anthropogenic carbon from burning fossil fuels.

Old, previously collected data has a wealth of information about pre-industrial ranges of chemical variability, ocean circulation patterns, and seasonality. We encourage the use of the vast collections of published stable isotopic data from archaeological and fossil shells to help contextualize human-induced changes and gauge biotic responses to such changes.

***Image caption**: Specimens of California mussel (Mytilus californianus) in a museum collection. This mussel is common and well-known in rocky intertidal environments throughout California.*

For more info, see article:

Vriesman, Veronica Padilla, Jessica R. Bean, Hannah M. Palmer, and Roxanne MW Banker. "Interpreting life-history traits, seasonal cycles, and coastal climate from an intertidal mussel species: Insights from 9000 years of synthesized stable isotope data." Plos one 19, no. 5 (2024): e0302945.

https://doi.org/10.1371/journal.pone.0302945

Conference of Interest: ICPSEA 2025

There is still time to register for the **4th International Conference on Palaeontology of Southeast Asia**!

22nd - 29th November, 2025 THAILAND

Website: https://sites.google.com/msu.ac.th/icpsea4/home

ICPSEA 2025

Practitioner Perspective *By Lucia Snyderman*

Marynoll S. Susmeña - Fisheries Biologist with the Philippine Seahorse Program (PSP), a collaborative initiative of the Zoological Society of London Philippines and Project Seahorse dedicated to conserving seahorses and promoting their sustainable, legal fisheries and trade in the Philippines.

1. How would you introduce yourself to our readers?

Who would have thought that a girl from a landlocked town in western Mindanao, Philippines, with limited exposure to the ocean and fishing, would be working in marine conservation—focusing on seahorses at that?

Marynoll S. Susmeña is a Fisheries Biologist with the Philippine Seahorse Program (PSP), a collaborative initiative of the Zoological Society of London Philippines and Project Seahorse dedicated to conserving seahorses and promoting their sustainable, legal fisheries and trade in the Philippines. Marynoll earned her bachelor's degree in Fisheries from the University of the Philippines Visayas.

***Image caption**: Marynoll doing the seahorse sign*

She has worked with various conservation organizations such as Large Marine Vertebrates Research Institute Philippines and Oceanus Conservation. Her experience spans fisheries research, marine protected areas, and mapping biodiversity hotspots to guide conservation efforts. Her interests include exploring how behavior change can be made effective in sustaining conservation and fisheries management measures to protect the people, the marine environment, and the wildlife.

Like a slowburn love story, her passion for conservation and helping fishers developed gradually—now stronger (and deeply rooted within her) than ever!

2. Tell us about your work with the Philippine Seahorse Program. Is historical or palaeontological data relevant for informing conservation?

My work with PSP is focused on addressing the problematic fisheries that impact seahorse populations. Despite existing laws against seahorse collection in the Philippines, they are still caught. A 2019 study done by Foster et al. reported that seahorses are targeted by various small-scale fishing gears (e.g., spear/skin divers, compressor divers, gleaners) and taken incidentally (e.g., gillnets, trawls, and traps). To see the bigger picture, we at PSP are assessing the impacts of problematic medium- and large-scale fishing gears such as bottom trawls and Danish seines, particularly in Philippine Fisheries Management Area (FMA) 10. It is worth noting that bottom trawls are banned within Philippine municipal waters while Danish seines are banned in all Philippine waters.

Practitioner Perspective continued

Alongside this research, I have also been building networks and partnerships with local governments, FMA 10 governance bodies, and other stakeholders to co-develop an inclusive and adaptive management plan, ensuring that our recommendations are not only evidence-based but also actionable and widely supported.

The output of our work in PSP will better inform government institutions strengthening fisheries regulations and marine conservation policies, minimizing, or potentially eradicating, problem fisheries leading to improved seahorse conservation outcomes and sustainable fisheries. These current efforts are strengthened when combined with insights from the past. Historical data can play an important role in this work. For instance, past records of seahorse occurrence and distribution help us see long-term population and habitat trends. Local ecological knowledge passed down through generations can provide us insights into historical abundance and behavior of seahorses in certain areas. As for palaeontological data, they are difficult to relate to seahorse conservation directly since seahorses have a very poor fossil record due to their small size and delicate skeletons. Nevertheless, integrating historical knowledge allows us to come up with better conservation and management decisions.

***Image caption**: Marynoll during an interview with a former baby trawl fisher.*

3. What would you say to scientists who are hoping to communicate and apply their research directly to conservation?

I say, “Go for it!” Conservation has limited resources—be it funding, manpower, or technical capacity. This is why your research is so valuable because it guides us conservationists on where and how to focus our efforts, building on existing initiatives more effectively. However, your work shouldn’t just stay within conservationists or the scientific community alone. It needs to reach grassroots communities, be understandable to them, and drive action based on your findings. Because when conservation is rooted within communities, it becomes part of their way of life and, therefore, more sustainable.

Paleo Proxy Spotlight – Diatoms: A key to understanding the history of aquatic environments

By Irina Sosnina, State Scientific Research Institute Nature Research Centre, Vilnius, Lithuania

The tiny algae with a unique cell structure are responsible for producing more than 20% of the world's oxygen. Who would believe that these microorganisms love to inhabit in nearly all aquatic environments worldwide? As long as conditions permit their life cycle, diatoms can even be found in pounds and soil.

One of the most distinctive features of diatoms is their transparent, opaline silica cell walls, known as frustules. These consist of two valves covered with ornamented patterns and joined by girdle bands (Battarbee et al., 2001). Frustules vary in size from 2 µm to 500 µm, and some species can be observed simply to the naked eyes, especially when they form colonies. For precise identification, however, the scientists rely on light or scanning electron microscopes. Thanks to their silica composition, diatoms cell does not decompose and preserve fossils over long periods of time.

When the innumerable remains of dead diatoms accumulate in one basin, they form a distinctive sedimentary rock called diatomaceous earth or diatomite. The diatomite has a variety of applications for industrial purposes, including dynamite production, water filtration, and refractory bricks (Reka et al., 2021).

Beyond their industrial value, diatoms are highly significant for environmental research. They thrive under specifically defined ecological conditions and respond quickly to environmental stress through changes in community composition (Spaulding et al. 2021).

This sensitivity makes diatom assemblages excellent indicator for water quality monitoring and reveals their potential to track past environmental shifts. Geologists and palaeoecologists study fossil diatoms to infer changes in relative water levels, salinity, pH/alkalinity, flow regime, nutrients. These data provide detailed records of how aquatic ecosystems have evolved over time, offering valuable insights into past climate and hydrological variability.

***Image caption**: The incredible diversity of diatoms revealed through a scanning electron microscope. Image credit: Irina Sosnina, Paleontology Institute RAS.*

***References**:*

Battarbee, R.W., et al., 2001. Diatoms. In: Tracking environmental change using lake sediments: terrestrial, algal, and siliceous indicators (pp. 155-202). Developments in Paleoenvironmental Research, vol 3., Dordrecht, Springer Netherlands. https://doi.org/10.1007/0-306-47668-1_8

Reka, A., et al., 2021. Diatomaceous Earth: Characterization, thermal modification, and application. Open Chemistry, Vol. 19 (Issue 1), pp. 451-461. https://doi.org/10.1515/chem-2020-0049

Spaulding, S. A., et al., (2021). Diatoms.org: supporting taxonomists, connecting communities. Diatom Research, 36(4), 291–304.

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Postcards from the Field

In this feature of our newsletter, we showcase members' research in the field, lab, or other settings. Please submit your "postcards" with approximately 100 words of text to us at conservationpaleo@floridamuseum.ufl.edu

***Image caption**: Workshop participants at the Joan and Franklin Randall Preserve in Tehachapi, California in July 2025.*

Lily Weissman and Lola Henderson-Thomas – Middlebury College, Vermont USA

This July, we spent two weeks at the Joan and Franklin Randall Preserve in Tehachapi, California, participating in a CPN-funded workshop hosted by The Nature Conservancy. The CPN workshop was led by Maria Viteri and Alexis Mychjliw, with help from Stewardship Coordinator, Andrew Clare. Our days were filled with rewarding fieldwork in the mornings and presentations by visiting scientists in the afternoons. We were also able to travel around Southern California, visiting numerous tar pits, learning and understanding the importance they have had to fossil preservation in the region.

International Network for Conservation Paleobiology

Florida Museum of
Natural History
University of Florida
1659 Museum Road
Gainesville,
Florida 32611
USA

Are you interested in:

…contributing to **Postcards from the Field**?
…sharing a recent publication as a **Research Highlight**?
…being featured in a **Practitioner's Perspective** piece?
…providing other content suggestions for this newsletter?

If yes, please email us at conservationpaleo@floridamuseum.ufl.edu

Invite Your Colleagues to Join our Network!

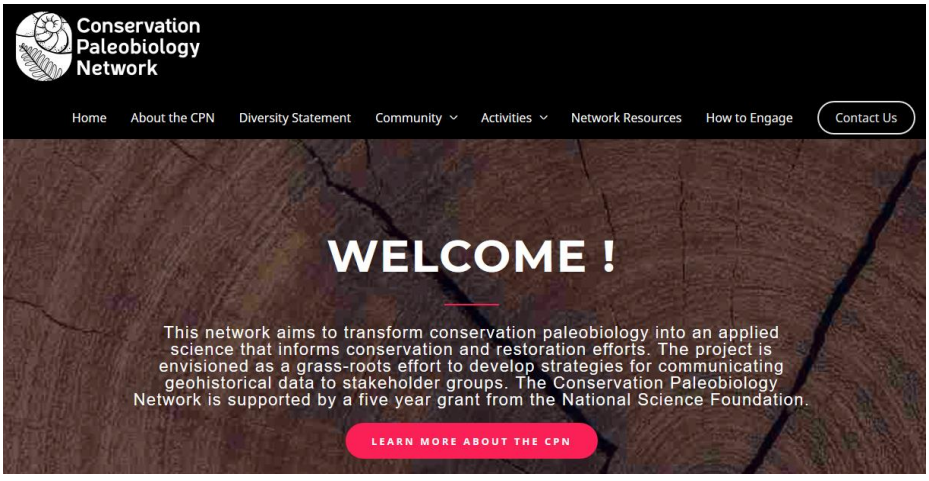
If you know people who might be interested in our network, please invite them to join. You can use the link below to extend your invitation on behalf of our network.

By joining the network, you become a member of our Community of Practice. The membership does not impose any obligations, but enables participants to engage fully in network activities. Members will be able to:

1. Participate in the CPN mailing list
2. Nominate and self-nominate for committees and panels
3. Submit announcements for publication in the CPN Newsletter
4. Apply to participate in the CPN activities
5. View CPN webinars and submit proposals for webinar modules

To join please go to our website and select "Join the Network"

Visit the website! https://conservationpaleorcn.org/



E-mail us at: conservationpaleo@floridamuseum.ufl.edu

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