Newsletter of the Conservation Paleobiology Network

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CPN Newsletter

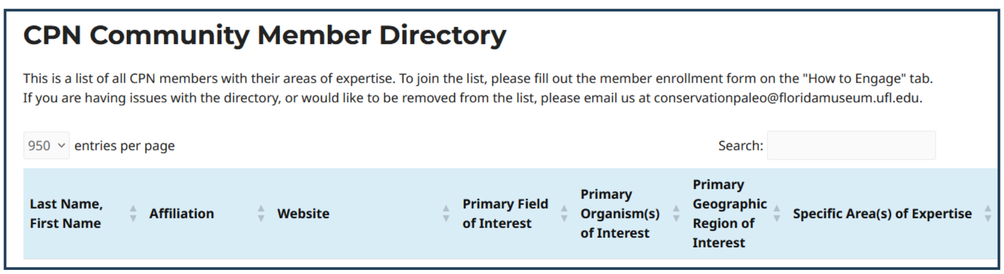
Conservation Paleobiology Network

INSIDE THIS ISSUE:

CPN Member Directory – A Valuable Tool

The CPN is now almost five years old, and our international member base has expanded well beyond what it was in the beginning and continues to grow as new members join. The searchable [CPN Member Directory] is a useful resource available on our website, which currently has over 900 individuals listed. This directory allows anyone to see the names of the members of the network, as well as their areas of expertise, including their fields of interest and geographic regions of interest. In many cases, there are direct links to an individual's website, where their contact information can be found.

The member directory is unique in that there are no other places that assemble the names of so many conservation paleobiologists, and it has the potential to be a valuable resource for students, researchers, and anyone interested in conservation paleobiology topics.



CPN Community Member Directory

This is a list of all CPN members with their areas of expertise. To join the list, please fill out the member enrollment form on the "How to Engage" tab. If you are having issues with the directory, or would like to be removed from the list, please email us at conservationpaleo@floridamuseum.ufl.edu.

950 entries per page   Search:

Last Name, First Name	Affiliation	Website	Primary Field of Interest	Primary Organism(s) of Interest	Primary Geographic Region of Interest	Specific Area(s) of Expertise

***Image caption**: The member database lists names, affiliations, are areas of interest of conservation paleobiologists around the world.*

The CPN also has [other resources] that may be valuable to anyone interested in conservation paleobiology, including past issues of newsletters, a video library, and additional educational resources. These resources have been suggested and compiled by members of the CPN community. Do you have an idea for a resource that we should add? Let us know by emailing us at: conservationpaleo@floridamuseum.ufl.edu.

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Conservation Paleobiology Research Highlight

By Sean Tomlinson, Damien Fordham, Mark Lomlino

Moa extinctions are informing the conservation of New Zealand flightless birds

"Conservation of New Zealand's remaining endemic, flightless birds, can gain invaluable insights from the ghosts of species past."

It is well established that over hunting by Polynesians caused the extinction of moa in New Zealand. However, evidence of how the populations and distributions of these large flightless birds declined across space and through time has been elusive, making it difficult to determine whether these extinctions could have been avoided.

In a paper recently published in Nature Ecology and Evolution we reconstructed the life history and metapopulation dynamics of six species of moa by combining an abundant fossil record with paleoclimatic data, and process-driven simulation models. To do this we generated 300,000 plausible scenarios of interactions among moa, climate, and humans. These scenarios were simulated using spatially explicit population models and validated using inferences of range contraction and extinction from the fossil record.

We found that only a small subset of models had the right ecological, demographic and harvest dynamics to correctly reconstruct timing of occurrence at fossil sites, and location and timing of extinction. These attributes varied across species, influencing timing, but not location, of extinction.

Our modelling suggests that Mantell's moa (*Pachyornis geranoides*) went extinct within just 100 years of Polynesian colonisation, which was nearly 100 years before the extinction of any other moa. In contrast, the stout-legged moa (*Euryapteryx curtus*) overlapped least with the preferred habitats of early colonists. Thus, it persisted longest, going extinct some three centuries after human arrival.

Falling between these bookends of human caused extinctions were disappearances of the other moa, including giant moa (*Dinornis novaezealandiae* and *D. robustus*) that lived on the North and South Islands.

While ecological and demographic differences influenced timings of extinctions, our research shows they did not alter their patterns of range collapses. All moa likely disappeared first from high quality habitats that were the most favoured by people, with rates of population declines decreasing with increasing elevation and distance from the sea.

Our research also compared these sites of last populations of moa with distributions of New Zealand's living flightless birds. We found that the last havens for moa shelter many of today's persisting populations of endangered flightless birds, including takahē (*Porphyrio hochstetteri*), weka (*Gallirallus australis*) and great spotted kiwi (*Apteryx haastii*). While the processes threatening New Zealand's native flightless birds today are different from those that caused the ancient extinctions of moa, this research shows that the spatial dynamics of population decline remain similar. Ultimately

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Conservation Paleobiology Research Highlight continued

highlighting the immense importance of future protection of isolated areas, where the key to preventing future extinctions is the preservation of geographic and ecological isolation.

To determine whether the extinction of moa could have been avoided, we used our validated models of the range collapse and extinction of moa to test counterfactual scenarios in a paper published in Science of the Total Environment. This found that moa could not have persisted under any level of human harvesting. Harvesting only 4-6% of birds per year was enough to rapidly drive all species of moa to extinction. Even reducing harvest rates to less than 0.5% of birds resulted in precariously low abundance and, thus, a high likelihood of extinction.

Hunting of moa was only possible if half of each Island of New Zealand was gazetted as no-take zones (Māori *rahui*). This is greater than the entire protected area network in New Zealand today.

Together these studies show that the conservation of New Zealand's remaining endemic, flightless birds, can gain invaluable insights from the ghosts of species past. They also show how process-driven simulation models can be applied to paleo data to better understand how past extinctions transpired on islands.

Image caption: *Crested Moa. Pachyornis australis, by Paul Martinson.*

For more information see the article:

Tomlinson, S., Lomolino, M.V., Wood, J.R., Anderson, A., Perry, G.L., Wilmshurst, J.M., Austin, J.J. and Fordham, D.A., 2025. Was extinction of New Zealand's avian megafauna an unavoidable consequence of human arrival?. Science of The Total Environment, 964, p.178471.

https://www.sciencedirect.com/science/article/pii/S0048969725001056.

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Practitioner Perspective *By Lucia Snyderman*

Chloe Hatton – Catchment Restoration Officer for Severn Rivers Trust

1. How would you introduce yourself to our readers?

A passionate environmentalist, with a love of marine and freshwater ecology. But primarily, a generalist! My work to date has varied so much… from studying the impacts of microplastics on blue mussels, to working with communities on green health and wellbeing opportunities, facilitating environmental decision-making processes, to undertaking freshwater fish surveys and delivering river restoration projects. I suppose what ties it all together is that I'm a 'people-person' and enjoy working with others to deliver outcomes for nature and the environment.

Image caption*: Chloe Hatton in the field.*

2. Tell us about your work with Severn Rivers Trust. Does your work intersect with historical and palaeontological data? If yes, how?

I am a Catchment Restoration Officer working for an environmental charity on the UK's longest river, the Severn. Although I'm often thinking at catchment scale, a significant part of my work focuses on conservation, restoration and reconnection of freshwater fish habitats in the lower Severn. Particularly for enigmatic, culturally important species such as Atlantic salmon, sea/brown trout and European eel. Understanding historical population dynamics is key to understanding priorities for restoration (for example removal of a weir or other barrier to fish migration where historically we know spawning grounds lay upstream) and helps to avoid shifting baseline syndrome. Historical landscape information is also key to promoting habitat restoration in places naturally suited to it! For example, reconnecting river paleochannels to re-meander historically straightened channels, or restoring natural wetlands in areas that have previously been drained.

Practitioner Perspective continued

3. What have you learned from engaging with stakeholders?

Stakeholder engagement is useful at all stages of project design, delivery and monitoring. Often the tacit and experiential knowledge that local people have about a place, issue, species or habitat is invaluable. All types of knowledge, not just scientific, play into good decision making… so I'm constantly learning!

4. What would you say to scientists who are hoping to apply their research directly to conservation? To students who hope to get involved in conservation work?

Go for it! Our natural world is facing an urgent climate and nature emergency, and the most useful and rewarding work is surely delivering solutions and active conservation work. It's impossible to study to be an 'expert' in conservation, and sometimes I've felt nervous as a young practitioner. But I'd recommend getting out there and having confidence in your ideas. Bring your skills and enthusiasm, listen to others and work collaboratively to deliver for nature.

Conservation Paleobiology Symposium in Zurich

Reminder: you can still register to attend the Crossing the Paleontological-Ecological Gap & Conservation Paleobiology Symposium in Zurich in person or online (for free) 27 July to 1 August!

If you are presenting at the CPB conference and would like to practice your presentation ahead of time and get feedback from your peers, or are interested in providing presentation feedback (regardless of whether you are attending the conference), please indicate your interest and availability HERE!

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Paleo Proxy Spotlight – Chironomids

By Dr. Neringa Gastevičienė and Dr. Darja Dankina, Nature Research Centre, Vilnius, Lithuania

What are Chironomids?

The family Chironomidae, commonly known as non-biting midges, belongs to the order Diptera, class Insecta, and kingdom Animalia. It is one of the most abundant insect families, comprising over 15,000 species worldwide (Armitage et al., 1995; Pape et al., 2011), with nearly 1,300 species documented in Europe (Spies and Saether, 2013).

Chironomidae larvae are highly adaptable to a wide range of environmental conditions, with a natural range extending from the tropics to the Arctic. While some Chironomidae larvae are terrestrial or semi-aquatic, the majority are strictly aquatic, thriving in both flowing (lotic) and standing (lentic) freshwater environments (Armitage et al., 1995). They are most commonly found in freshwater habitats, but some species also inhabit wet leaf litter and moss. Over 160 species have been identified in the northern coastal zone of the Baltic Sea (Paasivirta, 2000). The marine genera Clunio (Neumann et al., 1991) and Pontomyia (Edwards, 1926) are particularly adapted to the intertidal zone. Larvae have also been found in cod stomachs (Chernovskii, 1949).

Many species exhibit narrow tolerances for factors such as temperature, trophic state, salinity, and acidity, making them valuable bioindicators of environmental changes and water quality. This adaptability allows fossil chironomids to be used in reconstructing environmental histories from both recent and more distant geological periods (Giłka et al., 2022). As an example, one of the oldest known chironomid species is dating to Upper Triassic deposits (Krzemiński & Jarzembowski, 1999).

Some Chironomidae can tolerate temperatures up to +40 °C (Pinder, 1995), while others thrive in volcanic lakes with pH levels as low as 1.4 (Yamamoto, 1986). Certain groups can survive for years in drying water bodies (Hinton, 1960). It is believed that Chironomidae evolved in temperate mountain rivers (Brundin, 1966), where they adapted to cold environments (Brooks et al., 2007).

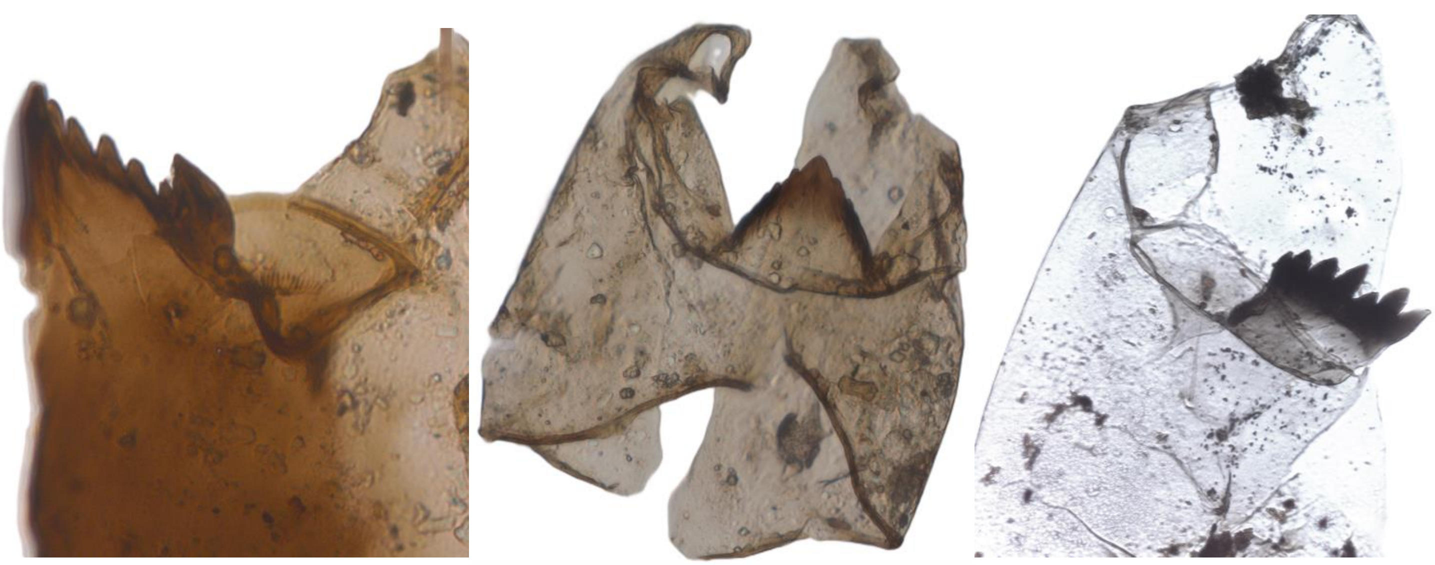

***Image caption**: Chironomids under a light microscope: Cladopelma lateralis (left), Cricotopus intersectus (middle); Chironomid pseudochironomus (right).*

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Paleo Proxy (Chironomids) continued

Chironomidae undergo four life stages: egg, larva, pupa, and adult. During the larval stage, they molt four times, with the rate of development influenced by water temperature and food availability (Johannsson, 1980). While all four larval stages are represented in lake sediments, head capsules from the third and fourth instars are most commonly found. Earlier instar head capsules are rarely recovered during preparation due to their smaller size, less developed structure, and faster decomposition, as their chitin is more fragile (Iovino, 1975; Walker et al., 1987).

Currently, palaeoecological research on Chironomidae fossils focuses on two main directions:

1. Development of a quantitative and qualitative framework based on the diversity of modern Chironomidae taxonomic groups in specific geographical biomes.

2. Stratigraphic analysis of Chironomidae fossils collected from deep sediment layers in basins (Il'yashuk et al., 2004).

Over the past three decades, Chironomidae data have been extensively used to analyze environmental and temperature changes, enabling the identification of local long-term environmental trends. Additionally, the study of globally occurring short-term climate fluctuations has provided insights into biosphere changes (Il'yashuk et al., 2004).

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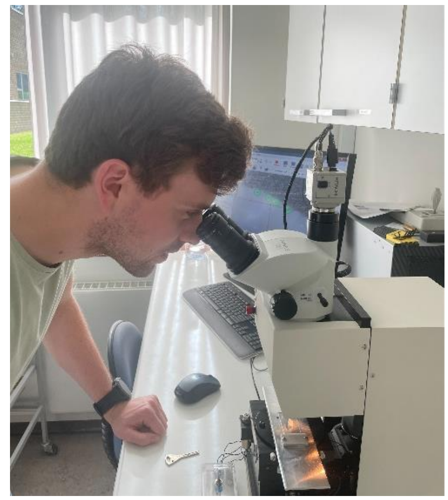
Postcards from the Field

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



Sander Digre – Aarhus University, Denmark

My name is Sander Digre, and I am currently pursuing a Ph.D. at Aarhus University. My research focuses on temporal variations in Atlantic cod (*Gadus morhua*) and haddock (*Melanogrammus aeglefinus*) populations in Faroese waters. Specifically, I employ stable isotope analysis of otoliths to reconstruct trophic positions and estimate metabolic rates, generating a nearly 80-year chronological dataset extending back to the 1950s. By establishing this long-term record of dietary patterns and energy expenditure, we aim to identify key oceanographic variables influencing growth, metabolism, and feeding ecology. Ultimately, these insights will contribute to improving predictions of future stock dynamics.

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Conservation Paleobiology Network

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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!

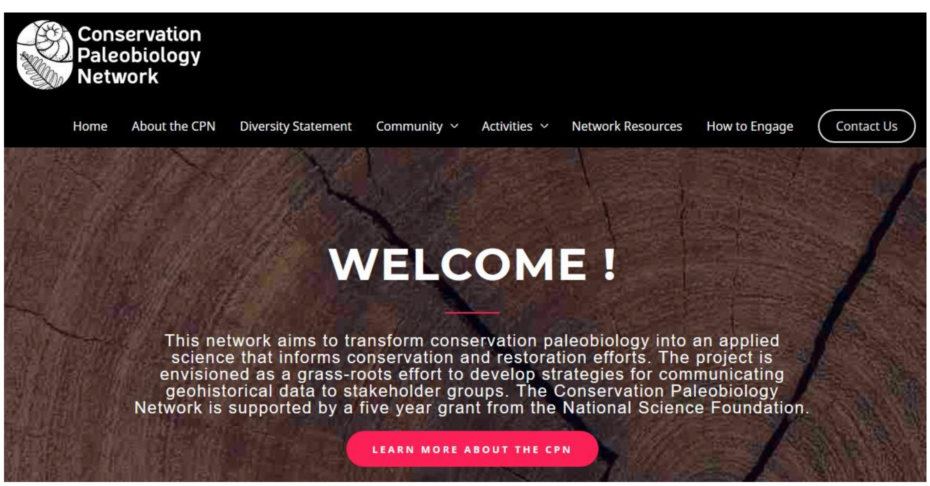
If you know people who might be interested in our network, please invite them to join. You can use the link below to extend your invitation on behalf of our network.

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/



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