



September 2023

Human Nature Projects Ontario Newsletter

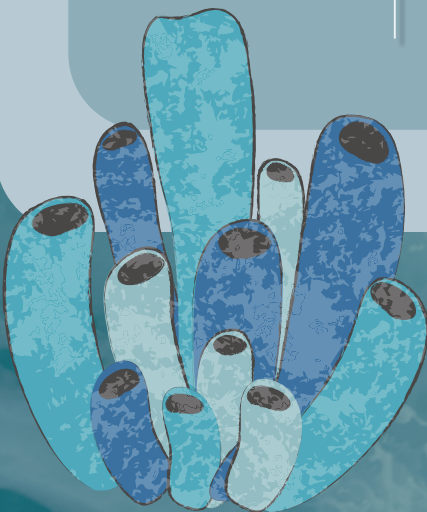


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THE THREAT OF OCEAN ACIDIFICATION



Figure 1. Ocean acidification (Earth.org, 2022).

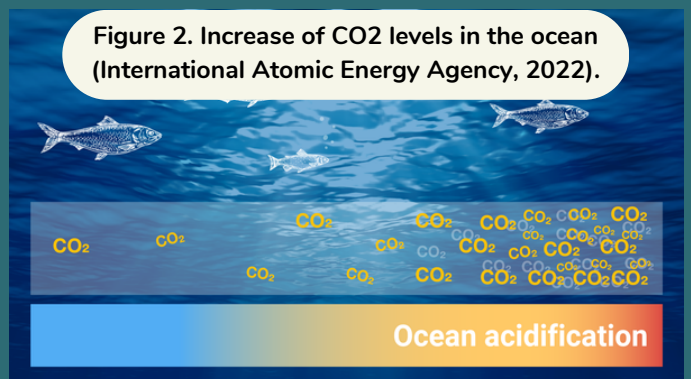
INTRODUCTION

More than 70% of the surface of our world is covered by oceans, which is essential for regulating the temperature, sustaining a variety of ecosystems, and preserving life. Ocean acidification, a developing issue, is casting a shadow on the health of these enormous bodies of water. Approximately 525 billion tons of CO₂ has been absorbed by the ocean from the atmosphere, or 22 million tons each day at the moment (Bennet, 2018). The behavior of organisms that do not produce calcium can also be impacted by these changes in ocean chemistry. More acidic conditions reduce a fish's capacity to detect predators. The entire food chain may be in danger if these organisms are threatened (National Oceanic and Atmospheric Administration, n.d.).

WHAT IS OCEAN ACIDIFICATION?

The combustion of fossil fuels and changes in land use have led to an increase in the atmospheric concentration of carbon dioxide (CO₂) for more than 200 years (National Oceanic and Atmospheric Administration, n.d.). About 30% of the CO₂ that is released into the atmosphere is absorbed by the ocean, and as atmospheric CO₂ levels rise, so do ocean CO₂ levels. Ocean acidification is the term for a long-term decline in the ocean's pH, which indicates a higher acidity (Lai, 2022). Hydrogen ions (H⁺), a type of chemical proton, are mostly responsible for aggravating ocean water's acidity. The water becomes more acidic as hydrogen ion concentrations increase. Water and carbon dioxide can mix to form carbonic acid, which can further split into hydrogen ions and increase the acidity of the water. The pH level of ocean water will naturally change depending on seasonal and regional conditions. For instance, due to carbon dioxide dissolving easily in colder temperatures, the pH is typically lower in cold water. Ocean acidification is thus observed to be particularly prevalent in the polar areas.

Figure 2. Increase of CO₂ levels in the ocean (International Atomic Energy Agency, 2022).



THE THREAT OF OCEAN ACIDIFICATION

THE EFFECTS OF OCEAN ACIDIFICATION

Marine ecology is endangered by ocean acidification. Numerous marine creatures are particularly vulnerable in an ocean that is more acidic because acidic water eliminates carbonate ions, an essential component of shells and skeletons (Lai, 2022). Carbonate ions play a crucial role in the formation of structures like coral skeletons and seashells (National Oceanic and Atmospheric Administration, n.d.). For calcifying animals including oysters, clams, sea urchins, shallow water corals, deep sea corals, and calcareous plankton, declines in carbonate ions can make creating and sustaining shells and other calcium carbonate structures problematic (National Oceanic and Atmospheric Administration, n.d.). Ocean acidification may cause changes in marine species' growth, development, abundance, and survival. Large undersea structures known as coral reefs, which are made of the coral-like skeletons of colonial marine invertebrates, are immensely vital to our planet since they house one of its most biodiverse ecosystems (Lai, 2022). It is crucial to conserve them because they provide protection to coastlines and serve as supplies of nitrogen and other nutrients for marine food systems. Unprecedented rates of mass coral bleaching, which are primarily brought on by ocean acidification, are worrisome. Even though fish do not possess shells, the impacts of acidification still affect them. A fish's cells frequently absorb carbonic acid to bring the pH of the seawater into harmony with the lower pH of the surrounding water (Bennet, 2018). This causes acidosis, a condition where the pH of the fish's blood fluctuates. A fish must work its body into overdrive to restore its chemistry because it is likewise pH sensitive. It will use more energy to remove the additional acid from its blood in order to accomplish this. This drains the energy a fish needs for other activities like digestion, swimming quickly to fend off predators or obtain food, and reproduction.



Figure 3. Branching corals in acidic water (Plaisance, n.d.).

WHAT CAN BE DONE NOW?

The best strategy to slow down ocean acidification is to address climate change by finding ways to drastically cut back on the consumption of fossil fuels (Union of Concerned Scientists, 2019). We can greatly lessen the impact to marine ecosystems if we significantly decrease our emissions that contribute to global warming and we limit future warming. We may all help by lessening our personal environmental impact. To lessen our carbon footprint, we can buy locally produced goods, recycle our waste, use fewer plastics, choose renewable energy to power our homes, and if possible, refrain from using fossil fuel-powered vehicles (Lai, 2022). We can contribute to maintaining the well-being of our oceans by making small, gradual changes.



NAVIGATING ECO ANXIETY: FOSTERING BALANCE IN A CHANGING WORLD

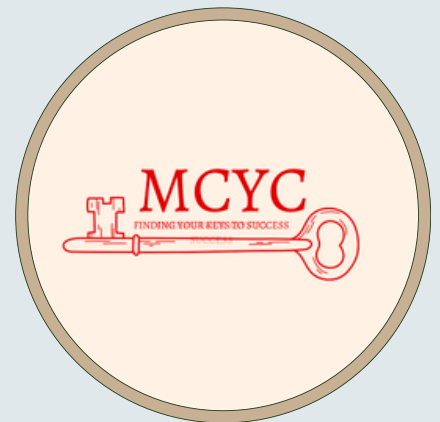
Introducing HNP Ontario & MCYC's Eco-Anxiety Panel!

Date/Time: Sunday, September 17 from 5:00-6:00 ET

Eligibility Criteria: Open to participants of all ages!

Up to 2 volunteer hours will be granted for involvement in the community!

Volunteers must fill out a feedback form following the event to claim their hours!



@mcyc.22

Hosted in collaboration with Main Characters' Youth Council!



Prizes

HNP Ontario has prepared over \$800 in awards! Possible prizes include:

- Let's Go Eco Summer Subscription Box x3 (valued at \$300)
- JOMO Studios Virtual Consultation (valued at \$300)
- Etee x2 (valued at \$150)
- Kanel (valued at \$50)





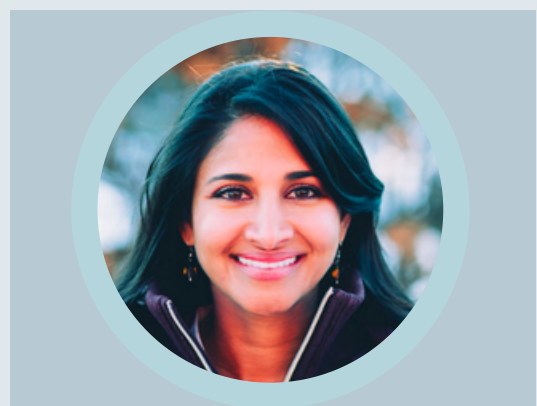
NAVIGATING ECO ANXIETY: FOSTERING BALANCE IN A CHANGING WORLD

Meet our Guest Speakers!



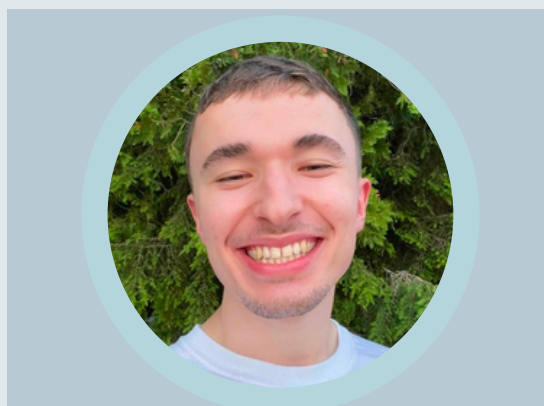
Rachel Malena-Chan (she/her)

- Creator of Eco-Anxious Stories
- Professional Story Strategist with a background in Population Health
- Outreach Specialist at Canadian Centre for Climate Services



Jothsna Harris (she/her)

- Founder of Change Narrative LLC
- Producer of the 2022 MN Fringe Festival 'Venue Pick' show: "Changing the Narrative: Climate Stories for Justice"
- 2023 Obama USA Leaders Fellow



Kieran Maingot (they/them)

- Manager of Communities, Climate Transitions at the Tamarack Institute
- Focused on climate grief and anxiety, youth climate leadership, Indigenous land defense, and more

REGISTER
NOW TO EARN
TWO
VOLUNTEER
HOURS!!



SEA BUTTERFLY LIFE CYCLE THREATENED BY CLIMATE CHANGE IN THE SOUTHERN OCEAN

INTRODUCTION

Although tiny, sea butterflies play a major role in the marine ecosystem. Sea butterflies are shelled pteropods (group of free-swimming sea snails) which live close to the ocean surface. They use their muscular feet as flappers to swim across the surface. A new study suggests oceans and its populations are becoming severely affected by climate change (British Antarctic Survey, 2023).

Oceans absorb about 25% of all the carbon dioxide emissions leading to the oceanic pH levels to fall known as ocean acidification. Ocean acidification also leads to lower carbon ion concentrations causing sea butterflies' thin outer casing to dissolve. This thin outer casing is like a home for these creatures and so it leaves them exposed to harsh conditions when the layer dissolves (Gardner et al., 2023).

Recent studies looked at life cycles, abundance and seasonal variability of sea butterflies in a region undergoing the fastest climate change in the Southern Ocean known as the north-east Scotia Sea.



Figure 1. Sea Butterfly, also known as shelled pteropods. (Peck, 2023).

POPULATION STABILITY ESSENTIAL FOR SPECIES SURVIVAL

A team of researchers investigated the life cycles of two shelled pteropod species. The scientist began by collecting sea butterflies in an sediment trap (sampling device anchored at 400 meters in depth). The scientists observed different life cycles for the two dominant species collected: *Limacina rangii* and *Limacina retroversa*, which lead to different vulnerabilities to the ocean conditions (Down To Earth, n.d.).

The life cycles of *L. rangii* is that both juvenile and adult were found during the winter months, while only adults were seen for *L. retroversa* in the winter months. The ocean pH levels lowers even more in winter as cooler water is capable of observing more carbon dioxide, making the winter months more harsher for these creatures (British Antarctic Survey, 2023).

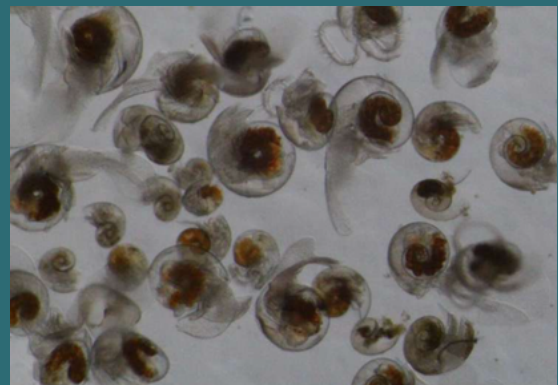


Figure 2. Summer population of *L. rangii* species from the Scotia Sea. Larger juveniles living alongside smaller, larval stages. (Peck, 2023).

SEA BUTTERFLY LIFE CYCLE THREATENED BY CLIMATE CHANGE IN THE SOUTHERN OCEAN

L. retroversa is at more risk than *L. rangii* as *L. rangii* have a more survival advantage. *L. rangii* can exist as both adults and juvenile over winter months. If one cohort is at risk, the overall population stability is not at risk. However, for *L. retroversa*, if one cohort is at risk, the overall population is at risk (Gardner et al., 2023).

PROLONGED EXPOSURE IS A SURVIVAL CHALLENGE

Although there is a contrast in the way the species are affected, prolonged exposure to these harsh ocean pH conditions will harm both species.

As the ocean acidification intensity and length increases, it will interfere with the life stages of the sea butterflies. For instance, when the ocean acidification extends into spring, overlapping with the spawning events, the larvae (most vulnerable life stage) will be at most risk. This could lead to succeeding life stages being affected, overall diminishing future populations (Gardner et al., 2023).

More studies are to be done including the investigations of habitats in Scotia Sea to further understand how sea butterflies are affected there (Down To Earth, n.d.).

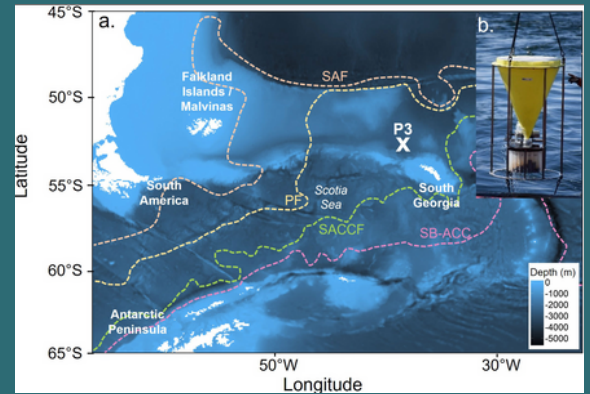


Figure 3. The location of sediment trap mooring (Gardner, 2023).

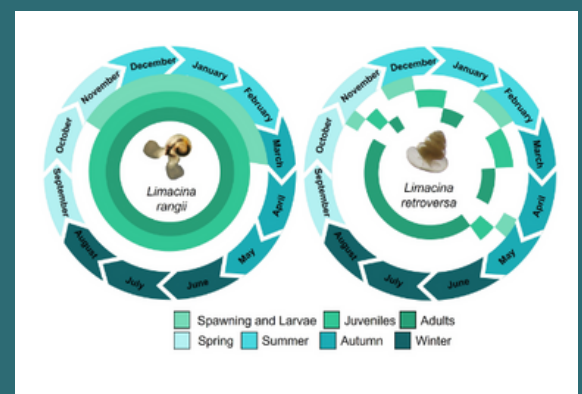


Figure 4. An illustration of the seasonal and monthly presence of veliger, juvenile and adult *L. rangii* and *L. retroversa*, as well as their spawning period (Gardner, 2023).

20 | Youth Environmental 23 | Advocacy Fellowship

Thank you to our:

185+ Applicants

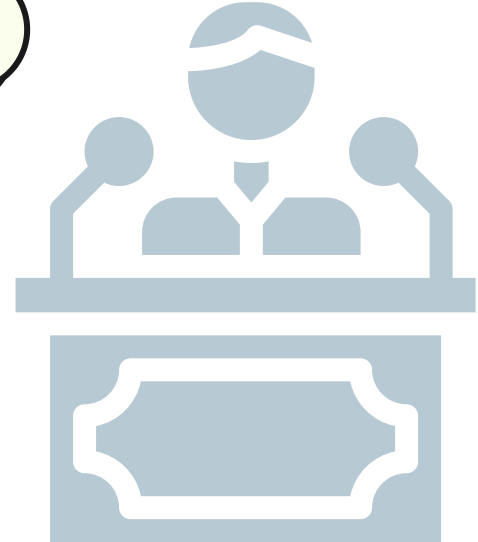


75+ Participants

13 Guest Speakers

10 Interviewees

25+ Executives



Our Guest Speakers + Workshops



Dr. Kiera Brant-Birioukov

Honouring Their Words: Standards for Academic and Indigenous Citation Practices



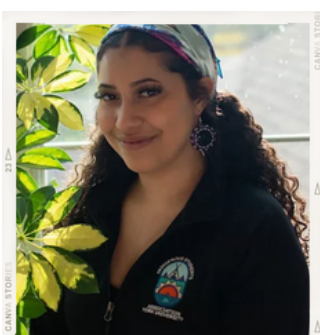
Dr. Lorrilee McGregor

Indigenous Canada 101



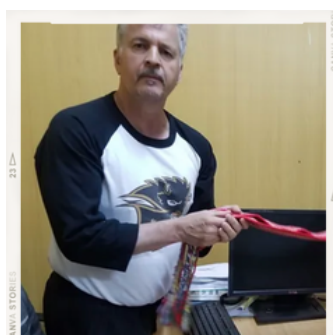
Krista McCracken

Archives, Communities and Ethics



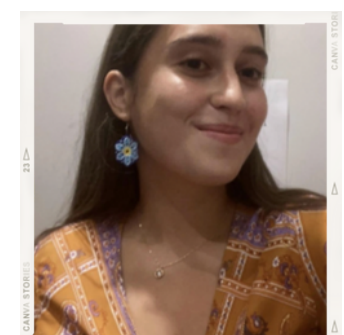
Cheyenne Schmidt-Harlick

Reading Critically and Finding Sources



Dr. Brian Rice

Indigenous Health and Wellness As We Age



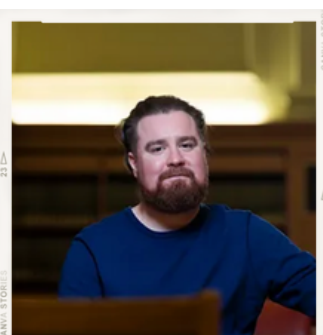
Yara Libertad Gálvez-Pozo

Landback Movements



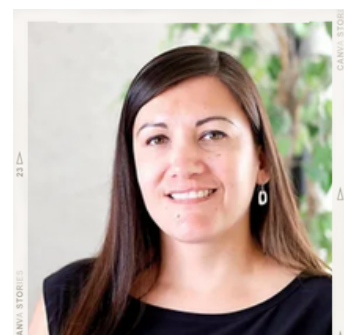
Dr. Romila Verma

Water Speaks



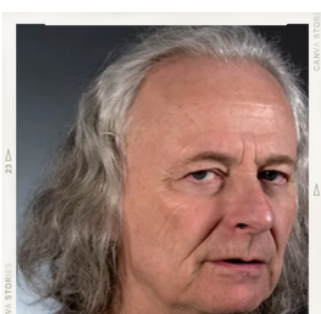
Dr. Matthew Wildcat

Indigenous Policy Analysis



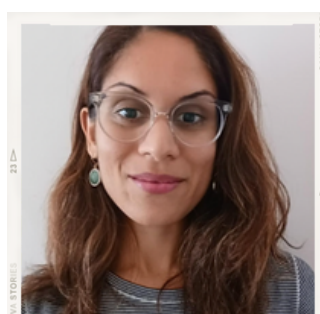
Dr. Joey-Lynn Wabie

Tending To Your Inner Fire



Dr. Frank Tough

A Primer on Section 35 Treaty and Aboriginal Rights: Understanding the Requirements for Judicial Recognition



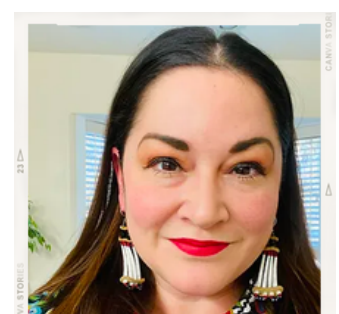
Rohini Patel

Writing and Research Ethics for Indigenous Environmental Advocacy



Dr. Hiliary Monteith

Writing and Research Ethics for Indigenous Environmental Advocacy



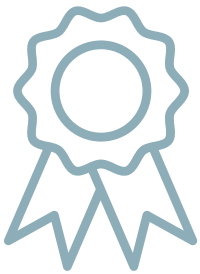
Dr. Crystal Fraser

By Strength, We Are Still Here: Indigenous Peoples and Canada During the Twentieth Century

Participant Recognition!

Most Attentive

Most Welcoming



Kimberly Nguyen

Ohuh George Ugbeda

Overall Contribution



Early Bird



Alisha Ali

Most Encouraging

Noah Check



Rachel Harrylal

Fellowship Testimonials!

The fellowship's most enjoyable facet is connecting with a diverse array of individuals and absorbing insights from their unique perspectives. This experience has provided an invaluable opportunity to broaden my understanding and foster meaningful learning interactions.

-Binta Jatta

The most enjoyable part of this fellowship for me is the diverse voices and experiences I have listened and interacted with. Listening to stories and traditional knowledge - from not only the North American Indigenous Peoples, but also other communities that have been impacted by either colonization or the adverse effects of the environment provide unique insights into the connections between health and the environment. Furthermore, this allowed me to have a more holistic understanding of the effects of the environment on Indigenous health and potentially lead to more effective strategies for addressing these health disparities.

-Alisha Ali

The most enjoyable part of the fellowship was the profound learning opportunity provided through workshops led by well-known Indigenous community members and outstanding professors. Hearing from these experts about their passion for Indigenous history, environmental advocacy, and wellness was enlightening and inspiring. Meeting like-minded individuals at networking events and interviewing Indigenous community members further helped strengthen the sense of community. As a result, I became more aware of the intricate connections between health, the environment, and Indigenous culture.

-Shlok Mehta

Talking with other members of your group is a dynamic and rewarding experience that promotes teamwork and shared learning. These encounters provide a forum for the exchange of ideas, insights, and knowledge, therefore driving the group's collective creativity. Each chat, whether boisterous or focused problem-solving sessions, contributes to a sense of camaraderie and shared purpose. These are the times when ties are formed, ideas thrive, and the group's synergy is utilized to handle obstacles and achieve common goals. Furthermore, group interactions frequently transcend the current work at hand, allowing for personal growth, humour, and the building of long-lasting friendships.

-Derrick Qi

THANK YOU!

To the Sprouts
Idea Fellowship
for supporting
our Youth
Environmental
Advocacy
Fellowship for
2023!

The Sprout Ideas
Fellowship helps
the youth of
Canada create
and implement
impactful
projects in
communities
across Canada.



An initiative
by Taking IT
Global

PHOTOS From the Fellowship!



EXECUTIVE OF THE MONTH



Hello everyone, I'm Danya Shafi!
Here's a bit about me and my
time here at HNP!



1. What do you enjoy most about being on the HNP team?
My favourite part of being on the HNP team is being able to learn about and engage with so many different and unique aspects of environmental advocacy!



2. Tell us more about the recent task you've been working on.

As one of the Events Directors, I am responsible for planning and organizing upcoming events in the fall. We are currently collaborating with other environmental organizations to make our next few events fun, impactful, and enjoyable!

3. Tell us more about the significant role you play in being a part of the executive team.

In my position, I work with the Events Team and collaborate with other departments to accomplish the goal of planning, funding, and advertising our events. All teams are interconnected and everyone works together to make all events successful!

4. What is something you learned while being a part of the HNP team?

Aside from staying informed on current environmental issues, I have learnt a lot about environmental stewardship across the GTA and how I can engage in keeping my local community healthy.

5. What is your most memorable experience with HNP?

My most memorable experience with HNP was when we were preparing for our first in-person event a few years ago. Our team was a little nervous, but the incredible participants welcomed us and actively engaged in cleaning up the community, it was a wonderful sight to see!

6. How does it feel to be a member of the HNP team?

I love being a part of the HNP team because all of the members are incredibly supportive and talented. It is a very inclusive environment!



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<https://discord.gg/2rfG9SyBNW>



CREDITS

COMMUNICATIONS TEAM



Neelaksha Srisangar

CO-DIRECTOR



Uyanda Mntambo

CO-DIRECTOR



Tarani Esparam

CO-DIRECTOR



Vlishurdeey Sivakumar

ASSOCIATE



Tracy Lin

ASSOCIATE



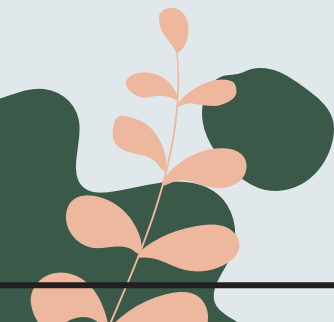
Tanisha Patel

ASSOCIATE



Sadra Ghaderpanah

ASSOCIATE





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