



# Environmental subjectivities and experiences of climate extreme-driven loss and damage in northern Australia

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## Abstract

Australia has objectively suffered climate extreme-driven loss and damage—climate change impacts that cannot or will not be avoided. Recent national surveys demonstrate a growing awareness of the link between climate change and climate extremes. However, climate extremes interact with existing environmental subjectivities (i.e., how people perceive, understand, and relate to the environment), which leads to different social, cultural, and political responses. For example, people in northern Australia are familiar with climate extremes, with the heat, humidity, fires, floods, storms, and droughts intimately connected to identities and sense of place. In this climate ethnography, I demonstrate the value of undertaking environmental subjectivities analyses for research on climate-society relations. I detail how environmental subjectivities influence people's experiences, or non-experiences, of climate extreme-driven loss and damage in northern Australia. I identify a growing concern for climate change and climate extremes are influencing environmental subjectivities. Yet, many northern Australians—even people concerned about climate change—are not, for now, connecting extreme events to climate change. A widespread subjectivity of anticipatory loss supplied people with an imagined temporal buffer, which contributes to non-urgency in political responses. Together with more structural political-economic barriers and a sense of helplessness to affect progressive change, limited action beyond individual consumer decisions and small-scale advocacy are occurring. These, amongst other, findings extend research on the role of climate extremes in climate opinion, lived experiences of loss and damage in affluent contexts, and the environmental value-action gap.

**Keywords** Climate change · Climate extremes · Loss and damage · Environmental subjectivities · Australia

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## 1 Introduction

Australia has objectively suffered climate extreme-driven loss and damage (L&D; IPCC 2022)—impacts that cannot or will not be avoided (Boyd et al. 2021; McNamara and Jackson 2019). From continental-scale bushfires to repeated flooding, climate extremes are negatively impacting Australia’s human and more-than-human worlds. The visceral experience of the long-predicted increase in the frequency and severity of climatic extremes (King et al. 2017; Lewis et al. 2017), many of which are attributable through extreme event attribution (EEA; van Oldenborgh et al. 2021), has, for some in Australia, made climate change a present temporality (Ipsos 2022). The 2022 Ipsos Climate Change in Australia survey indicates over half of respondents perceive climate change as manifesting in most types of climate extremes. Yet, these indicators of a climate-changing world are subjectively experienced in diverse ways, for example, acceptance, alternative science framings, and denial (Fraser et al. 2022; Lewis 2016; Lucas and Davison 2019). This is despite a convergence of subjectivities in relation to other social and cultural particularities such as a sense of belonging to place. Understanding the convergences and tensions surrounding environmental subjectivities in particular geographies is important for science generally, but especially for identifying barriers to climate action.

People living north of the Tropic of Capricorn (~23.5° S) in northern Australia—the empirical site of this research—are familiar with climate extremes (Lee and Neal 1984; Lloyd et al. 2020; Franklin et al. 2014). Butts and Adams (2020) suggest people make a “weather contract” with the place they live, and in northern Australia, the heat, humidity, fires, floods, storms, and droughts are intimately connected to identities and sense of place. Together with living with and in the local ecology and climate, other cultural, economic, and political determinants work to produce different ways of relating to the environment. A desire to better understand how climate extremes interact with existing, and produce novel, ways of relating to the environment and society is what drove this research. Northern Australia, with its long history of climate extremes and diverse social and cultural geographies, provides a rich empirical context for such research.

The concept of environmental subjectivities seeks to explain how people perceive, understand, and relate to the environment (Agrawal 2005; Ford and Norgaard 2020). Environmental subjectivities are strongly influenced by governmentality (Agrawal 2005). Originally introduced by Foucault (1991), governmentality relates to how power radiates through governments, institutions, ideas, knowledges, procedures, incentives, and technologies at various scales. Governmentality seeks to produce subjects conditioned to a society as envisioned by those that wield “power that conducts” (Foucault 1991). How people are conditioned through governmentality to relate to the environment has been a theme in environmental social sciences (Agrawal 2005). Although direct behavioural interventions by powerful actors must be considered, environmental subject formation is primarily driven by non-coercive and deeper-rooted social, cultural, economic, and political norms (Agrawal 2005; Ford and Norgaard 2020). Capitalist social relations and the idea of nature being separate from human society are illustrative examples of this process. However, cultural and other place-based (e.g., local histories, climate, ecology, landscape) factors strongly influence environmental subjectivities and must be considered together with wider political-economic rationalities (Butts and Adams 2020). Moreover, inductive approaches that do not overly presuppose the influence of any processes or factors on environmental subject formation are necessary to understand environmental subjectivities.

The goal of this research is to detail how environmental subjectivities influence people's experiences, or non-experiences, of climate extreme-driven L&D in northern Australia. Specifically, I will analyse how environmental subjectivities influence: (1) perceptions of climate extremes; (2) experiences of climate extreme-driven L&D; and (3) climate politics and societal (in)action. By doing this, I extend research on the role of climate extremes in climate opinion, the lived experience of L&D in affluent contexts, and the environmental value-action gap.

Going forward, I provide a targeted literature review. Next, I summarise the science on climate change in northern Australia. I then outline the methodology and introduce the study sites. Next, I explore the intersection of extreme events and climate opinion. A section on experiences of objective climate extreme-driven L&D follows. The final empirical section explores how extreme events are interacting with environmental subjectivities to influence political (in)action to climate change. The last sections are a discussion and conclusion.

## 2 Environmental subjectivities, climate extremes, and barriers to action

Weather, culture, and place shape subjects' experiences of climate change (Butts and Adams 2020; Hulme 2017; Wright and Tofa 2021). From faith-based (Lutz and Nunn 2021) to more-than-human (Wright and Tofa 2021) relational lived experiences of the climate, an emerging literature looks beyond the scientific study of climate change to illuminate the complex ways humans (re)produce climate-society relations. Whereas anthropologists have long sought to understand how place and culture shapes perceptions of environmental hazards (Furedi 2007; Sillitoe 1993), the extreme events and climate opinion literature has, until recently, bypassed critical insights from this literature. Nevertheless, some studies in affluent countries have provided insights of relevance to this research.

In Australia and the USA, for example, research indicates pre-existing political-ideological determinants are predictors of belief in climate change driving worsening droughts (Carlton et al. 2016; Cutler et al. 2020; Hughes et al. 2020). These studies find self-identified progressives are more likely to perceive that climate change is exacerbating droughts. Vasileiadou and Botzen (2014) suggest that the Netherlands government stakeholders' direct experiences of life-threatening sudden-onset events were correlated with a growing concern for climate change. Likewise, Demski et al. (2017) found severe flooding in the U.K. in 2013/14 increased risk perceptions, including a heightened sense of personal vulnerability, and may have increased support for mitigation and adaptation action. Thiault et al. (2021) identified a convergence of perceptions within fisheries, tourism, and coastal resident stakeholder groups, after the 2016 coral bleaching events in the Great Barrier Reef (GBR), towards climate change being perceived as the greatest threat. Likewise, Walpole and Hadwen (2022) suggest the 2016/2017 back-to-back bleaching events had influenced the Great Barrier Reef Marine Park Authority to frame climate change as the greatest risk for the reef. Howe et al. (2019) undertook a metareview of the literature on the role of climate extremes in climate opinion in affluent countries, which showed that most studies found a noticeable, albeit small, effect. However, Howe (2021, 129) summarised this literature by writing, "extreme weather has tended to reinforce opinions and behaviours amongst people who are already concerned about climate change".

Although uncertainty remains, there is evidence that extreme events are interacting with existing environmental subjectivities to produce, or reinforce, a range of political and

cultural responses (Howe 2021). Better understanding the “why” of climate opinion is critical, especially as scholars now recognise that increasing scientific knowledge of climate change is not leading to the societal transformations needed to arrest growing L&D (IPCC 2022; Stoddard et al. 2021). Regarding conservation, Toomey (2023, 6) writes, “decades of research in multiple fields have demonstrated the limited effectiveness of scientific evidence for shifting social norms, creating uptake of new behaviours, or even generating effective solutions”. Even with growing evidence of the link between extreme weather and climate change, based on EEA and other attribution methodologies (Otto 2017; van Oldenborgh et al. 2021), together with repeated highly publicised climate extreme driven catastrophes around the world, little is being done to reduce emissions or adapt to inevitable impacts (IPCC 2022; Stoddard et al. 2021).

Gunderson (2023) sought to understand the environmental value-action gap (i.e., more people demonstrating concern for the environment without subsequent action). Recognising the growing centrality of the concept of helplessness as a barrier to mobilisation, Gunderson (2023) differentiates between learned and real helplessness. The former relates to a subject’s attempt to influence change, which they soon learn they are relatively powerless to achieve. This conditions the subject to avoid further attempts. Real helplessness, however, is linked to the structural conditions of capitalist political economy. Real helplessness recognises that even with environmental concern there is very little that an individual or even a moderate-sized movement can do to affect the inertia and real power imbalances in society towards change. This conclusion is not meant to be defeatist; instead, Gunderson (2023) recognises the structural barriers to progressive climate policy and helps to reorientate our efforts towards large-scale collective action to target real power in the global political economy.

Lucas and Davison (2019), employing in-depth and repeated interviews with “climate unconcerned” residents in Tasmania, Australia, found that, beyond denial and believer tropes, there was a spectrum of unconcern—from climate breakdown leading to uncomfortable emotions of not being in control to noticing changes but being relatively unconcerned when compared to other political economic concerns. The latter example came from someone who held moderate environmentalist values and was left leaning. These sorts of findings are crucial for identifying the kinds of environmental subjectivities that serve as barriers to action. It is vital to delve deeper and identify the influence of environmental subjectivities on people’s experiences of climate and why different political responses emanate from the objective climate extreme-driven L&D. Investigating cultural, geographic, and political-economic determinants of such subjectivities may provide rich insights and open fruitful directions for research and praxis to minimise and address growing L&D.

### 3 Climate-driven extremes in northern Australia

I now review the scientific evidence on climate change and extreme events in northern Australia to contextualise my research. Considerable interannual and interdecadal climate variability makes it difficult to predict, or observe, the influence of climate change on climate extremes. Observational and modelling research suggests that in northern Australia there are more warmer days and nights, more frequent and intense land and marine heatwaves, increasing number of extreme fire weather days, less colder days and nights, less frosts, increasing intensity of rainfall (and a slight overall wetting trend), and a decreasing

number of but more extreme tropical cyclones<sup>1</sup> (IPCC 2021). There have been EEA case studies on, for example, heat extremes (Lewis et al. 2017), the 2018 bushfires in Queensland (Lewis et al. 2020) and the 2016 marine heatwave event that led to significant coral bleaching of the GBR (World Weather Attribution 2016), all with suggested climate signatures. Much of the prospective modelling on, for example, the impact of climate change on the Australian Monsoon (Narsey et al. 2020) or prevalence of drought (Kirono et al. 2020) are less certain. Extreme El Niño and La Niña events are likely to increase in frequency, with ENSO implicated in historical dry and wet extremes in northern and eastern Australia (Freund et al. 2019). King et al. (2017, 415) modelled the potential impact on climate extremes with 1.5 °C and 2 °C of warming, finding “the dependence of an El Niño event coinciding with contemporary extreme heat events like the ‘angry summer’ weakens significantly relative to the world of today”. Extreme heat events are likely to occur even without previously necessary combinations of conducive climate patterns. Whilst uncertainty remains, risks posed by sudden and slow-onset climate extremes remain high and are rising, especially when we consider other socioecological drivers of vulnerability (IPCC 2022).

#### 4 Methods and study sites

The data is based on a multi-site climate ethnography in northern Australia (between January and August 2021), focusing on the cities of Cairns, Queensland (QLD); Darwin, Northern Territory (NT); and Townsville, QLD; and their hinterlands. I was living in Cairns throughout 2021 and travelled to Townsville twice, totalling 1 month, and to Darwin once for 1 month. Remote interviews with participants from other regional areas occurred (e.g., Cape York, QLD; Katherine, NT; Tennant Creek, NT). Although interviews and other qualitative methods were employed, most data came from ethnographic research in place with communities, organisations, and other social actors. Ethnographic research is based on, for example, spending significant time in sites, finding gatekeepers to gain access to people and places, and repeated observations and discussions with participants (Creswell and Miller 2000). Participants were purposively sampled initially, after which snowball sampling was employed. One-on-one and group interviews, active and passive participant observation (e.g., conferences, visiting Country with Indigenous Elders, environmental group meetings and activities), embedded fieldwork, and many hundreds of informal discussions comprised core methods. Most interviews—individual or collective—were semi-structured, with 51 captured with a digital recorder and transcribed verbatim. Other participants preferred not to be recorded, and notes were taken during or after interviews with their permission. Data analysis involved inductively coding the data into themes using NVivo software.

During fieldwork, gatekeepers mediated access. For example, after being invited and attending the National First Peoples Gathering on Climate Change (NFPGCC), QLD, in March 2021, I formed relationships with two Djungan People who live in the majority Aboriginal community of Yarrabah, QLD. This led to an ongoing relationship with both Elders and their wider networks in Yarrabah, regionally and nationally. When in Townsville and

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<sup>1</sup> It should be noted that Haig et al. (2014) suggest that tropical cyclone activity in Australia is at its lowest point in the past 550–1500 years.

Darwin, they facilitated several interviews with Indigenous people there. Many other gatekeepers mediate access in, for example, the social service sector, environmental networks, and communities. Without such gatekeepers, this research would not have been possible.

At the time of fieldwork in 2021, all Lund University and wider Swedish ethical guidelines and processes were followed. I was initially aware of and closely consulted the Australian Institute of Aboriginal and Torres Strait Islander Code of Ethics and the National Health and Medical Research Council Statement on Human Research to ensure that ethical guidelines (e.g., informed and continual consent, engagement and collaboration, benefit and reciprocity, impact and risk) were followed.

#### 4.1 Main study sites and key aspects influencing environmental subjectivities

The Cairns Region (population ~ 160,000) is a historically poor cane-growing area, which since the 1980s has become dependent on tourism. Marketed as the gateway to the Wet Tropics, this feeds into an identity tied to natural values, more so than other regions of northern Australia. Yarrabah (population ~ 2500) was established in 1892 as a church mission. The massacres and forceful relocation of many disparate peoples to Yarrabah due to the state-sanctioned resource frontier expansion into Aboriginal lands in northern and western QLD interrupted livelihoods, severed knowledge, obligations, responsibilities, and connection to the Country. Yarrabah remains relatively impoverished and is poorly serviced compared to other towns of similar size in the region. Townsville (population ~ 205,000) is a large regional centre, with high levels of services, a large military base, and a port with connecting infrastructure to Burdekin region, which is a major pastoral and mining region. Tourism, although existing (e.g., Magnetic Island), is less important for Townsville. Townsville residents tend to have a more industrial subjectivity. Darwin (population ~150,000) is the capital city of the NT and has been and remains a military outpost and key port for northern Australia. Despite significant economic development, Darwin remains perceived as, and some local subjectivities suggest it is, a frontier town with a frontier mentality (Lea 2020). Whilst services still dominate the economy, resource extraction and live export are key industries, with tourism not insignificant. Although brief, these unique place-based subjectivities help to contextualise the result that follows. Figure 1 provides a map of these key study sites.

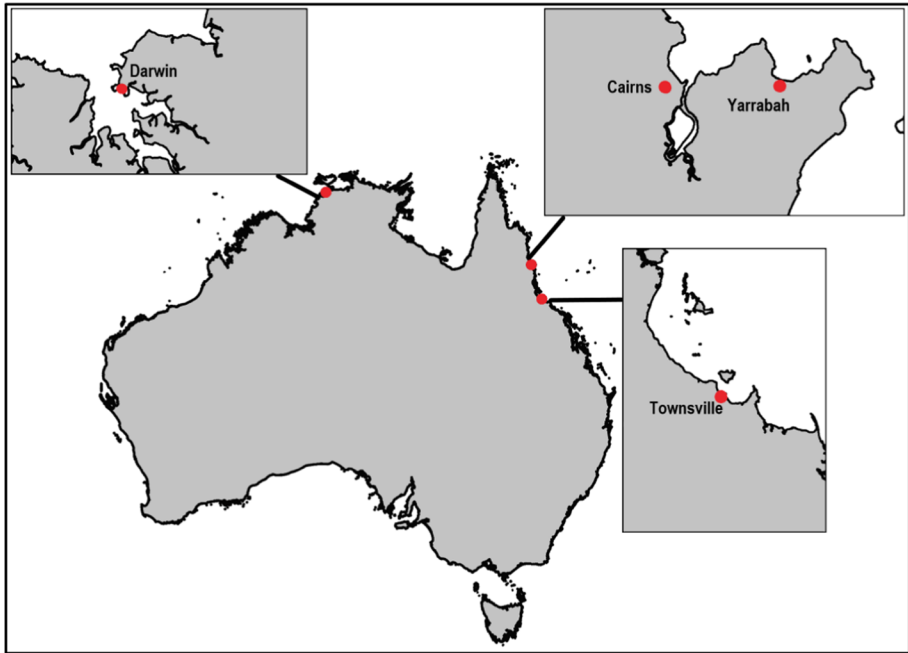
## 5 Results

### 5.1 Extreme events and climate opinion in northern Australia

#### 5.1.1 Cultural reproduction of disasters

“Everybody has an experience of disasters” (Climate consultant, QLD)

Extreme natural variability is inherent to northern Australia’s climates. This contributes to the normalisation and cultural reproduction of climate extremes. Dorothea Mackellar’s 1904 poem *My Country* is a foundational national myth and continues to play a significant role in (re)producing environmental subjectivities. Mackellar describes Australia as a land “of droughts and flooding rains” and many—even many climate concerned—northern Australians experience their climate like this. Those that held counter-hegemonic climate opinions (i.e., denial or natural variability subjectivities), used language similar to



**Fig. 1** Map of Australia with insets of main study sites

the following statement by a Far North QLD farmer: “Australia has always been the place of droughts and flooding rains and bushfires”. This is not just a settler narrative, however, as a Djungan People Elder, during a trip to their ancestral lands around *Ngarraboolgan* (Mt Mulligan, QLD), spoke of “booms and busts” in his peoples’ history. He, and others, detailed customary protocols related to “sharing and caring”, which, amongst other things, formalised assistance within and between peoples throughout the region during times of common climate-related scarcity (e.g., lean periods triggered by drought, floods). In Darwin, NT, one emergency manager said “people that live in the Top End [colloquial term for northern NT], that are used to the living in the Top End, are used to getting isolated for months at a time” due to cyclones and flooding. This sentiment was common. All participants had experienced climate extremes, with heat and wet/dry extremes the most reported, although cyclones were common. The widespread experience of climate extremes has, generally, provided a common environmental subjectivity amongst the diverse communities in northern Australia. Whereas discussions with participants about political responses to climate change would frequently fragment into conflicting ideological camps, when people spoke of “natural” disasters—as they are unfortunately known throughout Australia—a shared identity and, even at times, comradery beyond ethnic and political differences was evident. An Innisfail, QLD, local told me that “until you experience a few cyclones you can’t be considered a local”, which suggests disaster experiences have, over time, influenced environmental subjectivities to the point of becoming part of culture.

In Townsville, for example, and many other towns and cities, the local council organise a yearly “Disaster Ready Day”. Insurance and government advertisements frequently advise residents to be disaster prepared/ready during “disaster season” (austral summer) in northern Australia. From a sociological perspective, disasters, not just hazards, are seen

as “natural” and expected. Even before climate change was factored in, residents perceived climate hazards as being beyond the limits to adaptation and that L&D could be reduced but not avoided. A Queensland Fire and Emergency Services (QFES) commander said: “Queensland is Australia’s most disaster-prone state, and I think it is a fairly comfortable statement to say that the Far North is probably the most disaster-prone region in the state”. In northern Australia, extreme events are rationalised as being a part of life—even a “part of doing business in North Queensland” (a Chamber of Commerce director)—and whilst mitigation action is encouraged, even legislated for, disasters are perceived as being inevitable. A Department of Agriculture and Fisheries (DAF) officer claimed that “resilient” businesses “can withstand long-term droughts, or floods, or what you might call a knock to the business”.

### 5.1.2 Climate-as-process subjectivity

Few QLD government workers denied climate change was a risk factor (more NT government workers did), but they typically spoke of climate and hazard risk separately. Why is this? An economist, who I did a plenary talk with on climate change at the Financial Counselling Australia national conference in Darwin (20-05-2021), said to the audience: “It’s not like you just open your front door and go here’s climate change”. What they meant was, for them, and many others, climate change is perceived as a significant, even at times an existential, threat, but was understood as a changing of average weather and no single event could be indicative of climate change. This framing is reiterated here by a senior social service stakeholder in Darwin:

Maybe 20 years ago a friend was talking about coming up... and she asks: what are the temperatures like? 35, 36? And I said no, it never gets like that. You will feel warm because it’s so humid, but it never gets to 35 degrees here. Within 20 years it’s not true. That weather is really noticeable, the increasing heat. And, I don’t know if, I’m trying to think about it, because you can’t look at *one particular weather event* and say that it is climate change, but you can look at a trend or a pattern.

This quote indicates a changing subjectivity towards the realisation that climate change is occurring now, but it also highlights the common climate-as-process subjectivity. Indeed, most participants associated climate change with mitigation action to prevent—typically framed as future—slow-onset processes such as sea-level rise, increasing average temperatures, and biodiversity loss. A climate-as-future-condition perception was deeply rooted amongst northern Australians, which I term the “anticipatory loss temporality”. Indeed, many failed to connect historical or contemporary climate extremes as manifestations of climate change, instead most expected significant L&D in some undefined future.

In Townsville, known as Australia’s most flood-prone city (Lloyd et al. 2020), few non-experts spoke of climate change increasing the severity of the 2019 floods that devastated the low-lying suburbs along the Ross River and its tributaries, nor the extended drought in the years prior to the flood. One councillor, during an interview about their family’s experience of the flood where they had to evacuate and their house was considered a total loss, did not mention climate change once in relation to the flood. They did, however, mention climate change in relation to projected sea-level rise and increasing temperatures. Townsville residents, more so than those in Cairns, self-identified as being politically and socially conservative, which may explain the higher levels of climate scepticism. However, a community organiser for climate action in Cairns stated, “I think part of the challenge is really



knowing, at least in Australia, how closely any given event is linked to climate change, that's not something we do much". This indicates that even amongst climate activist networks—those that expressed high levels of climate loss—local climate extremes were not always linked to climate change.

Yet, disaster practitioners associated specific hazards to climate change, for example, heat waves, intense rainfall, droughts, and subsequent fires. One disaster practitioner from Townsville claimed: "You've got climate change... well it is increasing drought and bush-fire, it is definitely having an increasing impact on floods, where you go from very dry to very wet. There's no evidence that it is having any direct impact on cyclones". Here, observational records and experiential knowledge were foregrounded. One thing Northern Command QFES leaders had noticed is increasing intense rainfall over short durations. For one QFES participant, who had been involved in risk assessments for many existing dams in North Queensland (e.g., Copperlode Falls Dam, Cairns), this concerned him immensely as models of the annual exceedance probability (AEP) of rainfall events during various dams construction had not factored in climate change. Real concern was evident when he considered the future of the region, but few decision-makers were heeding his warnings and he felt relatively helpless to influence policy.

### 5.1.3 Denial and acceptance

A council employee in Townsville said, "the climate is doing what it has always done", whilst a young male from Darwin admitted that he and his friends think "climate change is just made up" and that "it is always hot in Darwin" regarding a question about increasing heat. These openly denier sentiments were in the minority. There were, however, outlier perceptions, from all extremes uncritically being linked to climate change, which was more common amongst activists and some environmentalists, to climate change not even existing (very rare and typically from self-identified conservative men) or occurring but part of natural variability (occasionally). Several scientifically trained actors, which other climate-concerned participants would not consider as likely holding natural variability beliefs, did, in fact, hold these views. An ecologist who was working and living in the Iron Ranges, QLD, during Cyclone Trevor, drought, and then extreme fire events in the rainforest in 2019 (see ABC 2019), said: "They were certainly extreme events [cyclone, drought, fire] but probably still within the range of historical variability in climate. Changes relative to long-term cyclone and fire interactions were likely due to changes in human communities, rather than climate change or other abiotic factors". Similarly, a NT hydrologist stated: "The variability hasn't changed, the pressure on the water supply has changed. And we're not really seeing an influence from climate change". Of course, others disagreed. A medical doctor in Katherine stated: "People talk in Katherine all the time about the fact, Indigenous and non-Indigenous, that it's hotter than it has ever been and it's dryer than it's ever been". Overall, however, conservative agricultural producers were most likely to view climate change through a natural variability lens, but, as my evidence suggests, they were not alone.

Interestingly, the 2019/2020 "Black Summer" bushfires, which primarily affected South-Eastern Australia frequented discussions as a disaster perceived to have been influenced by climate change. These fires were only directly experienced by five participants. In interviews with those who considered climate change as actually occurring, some suggested that the media coverage on the national broadcaster ABC, which emphasised the climate signal in coverage, informed and/or reinforced their perceptions. Nevertheless, even those

who perceived climate change was linked to increased intensity and frequency of climate extremes typically framed this as a future problem. One council officer in Cairns representatively stated, “there’s *anticipated* to be less frequent but more intense cyclones, more of these flood events and things like that too”. Conversely, those who perceived climate signatures in historical extremes said something akin to the following observation from an Aboriginal Elder from Yarrabah, QLD, “things that happened once every 100 years are happening every 10 years, and things that happened every 10 years are happening every year”. For those that attributed climate change to extremes in Cairns, land and marine heatwaves (and subsequent coral bleaching) and heavy rainfall were mentioned most frequently. In Darwin and other NT towns such as Katherine and Tennant Creek, water insecurity from droughts and extreme heat were most consistently linked to climate change.

#### 5.1.4 Examples of experienced climate change-exacerbated extremes

In the Cairns Region, the November 2018 (23rd–30th) heatwave (BOM 2018) was linked to climate change by > 20 participants. For over 9 days, the mercury rose above 35 °C, but there were 2 days above 42 °C (the council recorded 47 °C in urban Cairns). This heatwave took many by surprise and was often perceived as unprecedented. A resilience officer in Cairns stated:

I mean when it happened [2018 heatwave], we had actually had a briefing on it [heatwave] from the state a few months before. So, it was kind of ironic because a whole bunch of us from different councils had been sitting up at the hospital listening to this guy talking about it and going oh that’s terrible you know. And we were all thinking five years’ time, ten years’ time, and then blow me, four months later. Nobody had thought about it, no procedure, no process.

Whilst the heatwave led to significant impacts to people’s health, with hospital admissions rising, the most reported negative experience was the large-scale death of spectacled flying foxes. The previous quote also helps to cement the widespread “anticipatory loss temporality”. However, it, again, captures a shifting subjectivity of some towards a realisation that the climate crises is *here* for some.

The 2019/2020 NT wet season/summer was the driest for 26 years and one of the hottest on record (BOM 2020). Around 15 participants from the NT mentioned this during discussions. One medical doctor stated: “The summer of 2019/2020 was the hottest in the Top End of the NT ever recorded by a very, very long way. The heat, the word unprecedented doesn’t do justice to that summer”. The two greatest environmental concerns for participants in the NT were water security and heat, and the 2019/2020 summer likely influenced these subjectivities. Environmental lawyers in the NT suggested that water security was the framing they used to encourage communities to litigate against fracking, for example, and First Nations’ participants framed their concerns about climate change around impacts to “sacred water”. The recognition of the importance of water security by disparate communities was perceived as a common value on which collective organisation against climate change exacerbating policies could be achieved.

The GBR bleaching events in 2016, 2017, and 2020 were strongly associated with climate change by some, particularly scientists and environmentalists. During a meeting with senior marine scientists in Townsville, they suggested that “Australia panicked during the 1998 bleaching event [during an El Niño year]” where only 10% bleached, but after 2016, “where 50% bleached, 10% would be seen as a good year”. No GBR stakeholders denied

the role of climate change on the decline of the GBR, although disagreements about the extent of the influence of climate change on coral bleaching and the politics of climate change emerged. These participants also reported being amazed how quickly bleaching events had been normalised amongst the wider public.

## 5.2 The influence of environmental subjectivities on experiences of loss and damage

### 5.2.1 Different experiences of climate extremes

The Cairns heatwave in November 2018 previously introduced (BOM 2018), led to the death of ~23,000 endangered spectacled flying foxes—keystone pollinator species throughout the Wet Tropics. Over 20 participants expressed profound grief over this event, which made them question the future of the Wet Tropics ecosystem. Cairns' modern economy is tied to eco-tourism—the “Gateway to the Wet Tropics”—and a considerable proportion of residents hold moderate-to-strong environmentalist values. Cairns has a 50-year history of Western-styled environmentalism and a high proportion of Indigenous Australians who, whilst clashing with environmentalists over, for example, national parks and resource access, have found some common political ground over conservation. However, a Natural Resource Management (NRM) stakeholder, who knows both the Cairns environmentalist (frequently labelled as “Greenies”) and, what they termed, the “mainstream community”, suggested that the experienced loss from the deaths of spectacled flying foxes was more isolated, stating:

They'll be telling you about those events because they were absolutely big events, but I am not sure they are what has driven the public, the general public, to shift [their perceptions of climate change] necessarily. Because in Cairns we have a major problem with perceptions of flying foxes. The *majority* of Cairns residents think they're a rodent, they're a pest and they should be eradicated.

For those unconcerned about flying foxes, the heatwave was still distressing. Worms were seen coming out of the ground, dogs died, and people, particularly the elderly and those with inadequate cooling (which are many), were affected. As expected, however, those who were climate sceptical felt no climate extreme-driven L&D; they experienced the event as, in the words of one participant, being “just a bloody hot few days”. For others, the heat made them fearful of what a climate-changing world held. Additionally, Indigenous participants used this extreme event, amongst others, to foreground inadequate housing and other forms of marginalisation, before speaking of the loss of culturally important species. These disparate experiences show how one climate extreme can mean so many different things to people and result in different L&D.

### 5.2.2 Anticipatory loss and damage

In the NT, existing L&D was captured (e.g., towns and settlements running out of water, loss of territory and cultural heritage from sea-level rise, mangrove die-offs<sup>2</sup>), but

<sup>2</sup> For each claim of climate attribution, there were other causal explanations forwarded such as misuse of water resources, natural erosion processes, and development-induced landscape change.

anticipatory losses were again emphasised. One environmental lawyer, already perceiving irreparable L&D, said “We’re feeling... I have three kids and they won’t be able to grow up in Darwin”. A medical doctor and researcher based in the NT, when commenting on their research (Pendrey et al. 2021) that found 34% of medical doctors were thinking of leaving the NT due to future increases of climate extremes, especially extreme heat, said: “First I was really shocked, then I wasn’t surprised, of course it was 34%, especially when I think of the number of my colleagues that are thinking of leaving”. This future concern, although there is evidence that climate change is already impacting migration and labour retention in the NT (Zoellner 2019), was reiterated by a long-term resident of Tenant Creek, NT: “And I think the danger of climate change is they [professionals] won’t settle down in places like Central Australia, Tennant Creek, and northern Australia, except the local people who might end up being more and more precarious”. With Tennant Creek predicted to be over 40 °C for much of the year, the viability of many settlements will be significantly tested.

In North Queensland, future-framed existential questions over the viability of settlements also arose. A climate consultant relayed that a local mayor “basically said to me, we’re stuffed aren’t we? And he’s desperate to find ways to help his community survive. Whilst at the same time seeing that both sea-level rise and increased intensity of rainfall is just going to decimate them”. These sentiments were not uncommon and capture emerging subjectivities of vulnerability and anticipatory loss. Most people, however, whilst concerned, remained oblivious to the life-altering nature of climate change due to their region’s exposure and vulnerability. Others obscured their personal vulnerability but recognised that disproportionate impacts were occurring in Australia, with remote Indigenous communities centred in such discourses. There were subjectivities of affluence-as-resilience to climate change, which, when held against increasing L&D even in affluent communities, may be wishful thinking.

### 5.2.3 Anthropocentric subjectivities of loss

Regarding increasing bushfire risk in the NT, which is recognised as being exacerbated by climate change (IPCC 2021), there was an identified tension between different subjectivities of loss. For some, only risk to human life and property were discussed. An NT Emergency Services officer stated:

When you get to Howards Springs [south of Darwin], and that area, fires become a risk because of the population density. When you get down South, they would just let the fire burn tens of thousands of acres because it’s a *natural* thing... the risk is only there at the interface with humans<sup>3</sup>.

In Australia, emergency management prioritises responses to prevent loss of human life, property, and then environmental damage. Several participants from the Cairns and Townsville Regions perceived a bias in response and recovery by the government towards highly populated areas of Southeast QLD during the 2018 and 2019/2020 fires, with one stating:

The Australian government said that these were the priority areas [South East Queensland] for fire recovery, of course none of it was up here [North Queensland]. So even the parts of the rainforest that burned down south of Cairns, none of that

<sup>3</sup> It should be noted that this participant believed in climate change and its role in exacerbating bushfires.

made it as a national priority, even though it's hugely significant. We're not talking about fire in ecosystems that can handle fire, we're talking about ecosystems that *don't exist anymore*.

For this participant, who held strong conservation values, the loss of ancient rainforest was a significant loss to cultural heritage and biodiversity due to a hard natural adaptation limit being crossed, one they felt was underappreciated by decision-makers and public. Self-defined conservationists felt heightened loss and grief from development and climate change-driven impacts on ecosystems. This brings to attention a conflicting valuation when considering experienced or future L&D. Currently, non-economic L&D (e.g., cultural heritage, identity, sense of place) is rarely considered by decision-makers unless it has a clear economic value. Nonetheless, my ethnography illuminated a growing environmental subjectivity of concern for the more-than-human world and the massive losses that are occurring. Even climate sceptics would sometimes bemoan the loss of a familiar landscape, for example.

#### 5.2.4 Indigenous subjectivities of loss

Although not a ubiquitous subjectivity in Yarrabah, QLD, people were experiencing L&D. Like the wider population, there were those who were climate sceptical, for example, questioning “White man’s science” (see also Morgan-Bulled et al. 2021) or being “pro-development” on their lands, for the quite understandable reason of wanting better socioeconomic outcomes. Although, like Cairns, they had avoided major cyclone impacts for many years, coastal, riverine, and flash flooding was perceived to have been increasing. One Elder captured a theme saying, “our graves are being washed away, our houses are being flooded” and “some residents get cut off during heavy rains due to Yarrabah being built on a swamp”. Fears for the future were significant with one Yarrabah participant saying the “ocean will make much of the land cut off and inaccessible”. This participant mentioned extreme heat as well, which with limited air conditioning, poor housing, and overcrowding frequently leads to increased tension and violence during high-temperature days and nights and impacts social cohesion and well-being. One contact said: “Aboriginal people and organisations get it because it’s every day, you live in poor houses it’s getting hotter. Those kinds of structural inequalities are quite evident”.

Yet, those disproportionately vulnerable to climate extremes—as Yarrabah residents’ objectivity is—rarely centred climate extreme-driven L&D. They were, like all marginalised people, just trying to make a living and battle through the everyday hazards associated with living on the margins of neoliberal Australia. For example, inadequate and overcrowded housing, poor physical and mental health, over policing, the taking of children by the state, and money were perennial concerns amongst Aboriginal people in Yarrabah, QLD, and this is also true in Townsville, Darwin, and elsewhere. Climate change, although consistently acknowledged as occurring and concerning, is very abstract in comparison to the immense challenges they continue to face. The irreparable cultural, social, and environmental losses First Nations people have experienced over the last 150 or so years in northern Australia are immense and continue, with climate change another driver of such loss (see Lyons et al. 2020). Overall, Yarrabah residents were more likely to have environmental subjectivities tied to a temporal understanding of climate change as a continuation of settler-colonial harms.

The NFPGCC, which I attended in Cairns, in March 2021<sup>4</sup>, brought together First Nations people from around Australia to discuss climate change impacts, science and traditional knowledge, and solutions (see Morgan-Bulled et al. 2021). From mangrove die offs in Queensland and the NT, which affects cultural practices and food security for remote communities, to the perceived reduction and changed distribution of key species (e.g., dugong, turtles, shellfish) and loss of territory and cultural heritage, permanent, irreparable loss was being experienced. During this event and in other fieldwork, Indigenous people spoke of the Country being sick and needing tending to (see Rigby et al. 2011). Djungan People, for instance, were concerned the land their ancestors knew so well, was changing rapidly and their knowledge and sense of ontological security was being affected (see McNamara and Westoby (2011) for a Torres Strait example).

### 5.2.5 Reef grief and subjectivities of hopelessness

Scientists and practitioners working directly on the GBR overwhelmingly perceived climate change as causing L&D. These participants' heightened sense of loss was linked to a subjectivity tied to conservation, as was common, but also their livelihoods and, in the words of one marine biologist, "just the complexity of an ecosystem, and we don't understand how an ecosystem genuinely functions". Although tourism operators, coastal residents, and fishers all valued the reef for aesthetic and livelihood-related reasons, marine scientists were the most likely to display visible grief during my ethnography. Beyond my personal observations, a clinical psychologist interviewed in Townsville relayed:

I've had a couple of them [marine biologists] towards the end of 2019, when it was really bad [coral bleaching] on the reef, come in here and just break down. They've gone out and soft corals are just sludge, the places that they have been studying for decades are now just a graveyard.

Moreover, a government researcher in Townsville said the following:

... being connected to the reef community here, there's a real community that are passionate about the reef from a science and management perspective in Townsville... It was very tangible, it was in the air, people were really upset by it [2016 bleaching event]... The [GBR Marine Park] Authority just slumped. The thing they are all there to passionately protect, beyond their control, had just suffered massive, huge impacts resulting in the death of X per cent of the entirety of the system.

Other similar observations were made by physical and social scientists and practitioners about the significant L&D experienced due to the marine heatwaves and subsequent bleaching events in 2016, 2017 and 2020.

Amongst the broader public, however, these subjectivities of loss were not the norm. Many people live much of their life in North Queensland without experiencing the reef, and the lack of widespread concern by Australians regarding the GBR's perceived death throes caused those participants who experienced loss significant mental anguish when thinking about the future. Most participants were concerned about anticipatory L&D but did not appear to value the GBR's potential death above other political-economic concerns.

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<sup>4</sup> Although I took copious amounts of fieldwork notes, I, being invited into this space, agreed not to use any direct quotes from this week-long gathering.

One environmentally minded participant told me that “it’s all very sad, but there is nothing I can do about it”.

## 6 Environmental subjectivities and societal (in)action

A key question raised by participants who experience climate change as a present temporality was: what level of loss will lead to concerted action to address climate change? They were dumbfounded that the growing evidence base together with the visible manifestations of climate change were not leading to rapid societal transformations. I argue that environmental subjectivities analysis provides useful insights into societal (in)action in northern Australia.

I spoke with five members of Doctors for the Environment Australia (DEA), which is an environmental advocacy organisation. As medical professionals, they reflected on their relatively privileged access to societal trust, which they were leveraging to try and influence people’s environmental subjectivities through, amongst other things, connecting climate extremes to human health. One participant said: “...that’s the whole shtick in climate medicine, it’s saying, this affects you. It affects you, it affects me. It affects my family and, certainly, the elderly patients in my practice”. All thought, however, there was limited societal-wide understanding of how climate change is currently affecting Australians, which was, for them, a perceived barrier to transformation. They suggested this was slowly changing and extreme events were playing a role in these shifting subjectivities. They were not naïve to the structural barriers to transformational change, but they did not yet feel a sense of helplessness.

During a focus group with social services workers in QLD, a participant suggested that Australia may be at turning point regarding the wider subjectivity of connecting climate change to climate extremes. They saw political opportunities arising from the normalisation of this discourse. Conversely, another participant cited the highly politicised nature of climate change and, like others, highlighted the perceived role of the media in which “everything becomes contested and politicised”. Another theme was captured by the following response by an NT NGO participant who suggested that “scientists have kind of like dumbed us down, we’re hearing it [unprecedented] so much that we’re [Australians] not listening anymore”. Here, they stressed the potential limitations of an emergency narrative—through frequent use of the term unprecedented to the point of normalisation—which they suggested had led to complacency and inaction. This is despite their recognition, and direct experience, of ongoing and worsening L&D in northern Australia.

Another perceived barrier to societal action included the climate-as-future condition. An academic and political figure suggested that in the NT “thinking is confined to the foreseeable future” despite no one really “disagreeing with the problem we’re going to face as a result of sea-level rise”. This captures a prevalent theme, whereby there is an acceptance of future L&D without subsequent prioritisation of anticipatory action or more transformational change. As captured in previous sections, there was an imagined temporal buffer between now and inevitable impacts, which most understood as being significant, in some generally undefined time in the future.

Finally, an underlying current of pessimism emerged, even amongst those participating in collective action (e.g., activism, local awareness campaigns, legal mobilisation). This came through in several extreme examples, such as doomsdayism and prepping for the “inevitable collapse of society”, as one participant put it. However, more commonly

pessimism emerged through a lack of belief in the power of Australian subjects to influence their elites and global political economy. One Cairns environmentalist spoke of the learned and real hopelessness they felt after years of activism and advocacy, stating: “I’m thinking of leaving Cairns altogether because, you know, I don’t want to be here to witness this ongoing loss. I guess I’m coming from the opposite perspective to others. I kind of have just given up”. They had “given up”, and many other climate-concerned residents thought there was little they could do to effect real change at the spatial and temporal scales needed to arrest the growing L&D they were witnessing.

## 7 Discussion

Many factors drive subjects’ experiences of climate change (Butts and Adams 2020; Hulme 2017; Wright and Tofa 2021). Scholars know that political determinants are strong predictors of perceptions of climate change influencing climate extremes such as floods and droughts (Carlton et al. 2016; Hughes et al. 2020). Conversely, experiences of extreme events have some effect on climate opinion and support for mitigation and adaptation in affluent countries (Howe et al. 2019). What has been missing is critical ethnographic examinations of *why* beyond dualistic political determinants or simplistic cause and effect (Butts and Adams 2020; Ford and Norgaard 2020).

The concept of governmentality is useful for understanding environmental subject formation (Agrawal 2005). Governmentality helps to explain why despite a diversity of environmental subjectivities in northern Australia, there were no more differences than similarities. For example, disasters have been normalised and—as governments have deployed the scientifically and politically inaccurate term “natural disasters”—naturalised over generations. Through environmental subject formation the experience of “natural disasters” are a common subjectivity for northern Australians. Even with a highly urbanised population, there remains a country-based mythos throughout Australia, which amongst settlers’ links to a subjectivity of having “tamed” the wild and dangerous frontier (Curthoys and Konishi 2022). It is not so much banishing of all risks, which is impossible, but more an acceptance of the perceived to be untreatable risks that appeared most strongly. Governments at all scales, have contributed to a framing of disasters as being inevitable, partly to depoliticise the drivers of uneven vulnerability, which are political, economic, and social. When taken together with place-based and experiential factors, such as extreme events being a part of the culture in northern Australia, this has contributed towards many participants being unable to apprehend any climate signal in extreme events—despite much science suggesting the probability, scale, and intensity of climatic extremes is changing (IPCC 2022; King et al. 2017; Lewis et al. 2017).

Natural variability and alternative science framings are key subjectivities identified in the literature on climate scepticism in Australia (Fraser et al. 2022), and these were themes in my ethnography. Lewis (2016) suggested the “natural variability argument” cannot be upheld in the face of evidence but stopped short of critically analysing why. When I asked why, like Lucas and Davison (2019) did in relation to “climate unconcerned” residents in Tasmania, a spectrum of subjectivities was identified. For example, some denied anthropogenic climate change whilst others accepted changes are occurring, but they were perceived to be of less concern compared to other political-economic challenges. Nonetheless, there are indications subjectivities are shifting in response to experiences of “unprecedented” climate extremes and wider societal discourses emphasising the role of climate



change in exacerbating these extreme events (see Ipsos 2022). It is likely this trend will continue at the societal level as L&D increases and EEA methodologies (van Oldenborgh et al. 2021) continue to be improved, are further accepted by decision makers, and reported in the media.

Indeed, as I conveyed, climate extremes, normalised as they were in northern Australia, remain a significant concern. Coastal residents are beginning to frame their future in relation to predicted climate change and are questioning the viability of their communities. Moreover, some people, particularly Indigenous, natural scientists, and self-identified conservationists, are already experiencing significant L&D from impacts to the human and more-than-human world despite the widespread and persistent temporality of anticipatory loss. The threat of increasing climate extremes made people experience a whole gamut of emotions, some of which were influencing climate politics at different scales. Contemporary social problems, whether, for example, out-migration of skilled workers from remote regions of the NT, ecosystem loss, and worsening inequalities are beginning to be considered in relation to the climate changes participants were experiencing or *believed* would occur. Some social service participants indicated they were beginning to consider the role of climate change in exacerbating social problems and were *acting* within their institutions to effect further progressive change. Others still would speak in a detached way during an interview, and then become very emotional afterwards when thinking about the future of their home, having been given the space to consider and reflect on their future in a warming world. These findings reiterate the importance of ethnographic research as part of a growing “science of loss” (Barnett et al. 2016; Tschakert et al. 2019). Looking beneath the often-captured indicator of “concern for climate change”, we find a range of environmental subjectivities that interact with climate extremes and lead to different kinds of political (in)action.

My ethnography supports the theory of the environmental value-action gap (Gunder-son 2023). Gunderson (2023) emphasises the real helplessness of individuals and collectives to influence political-economic change in the face of structural barriers such as concentrated political power in capitalist societies motivated by the growth imperative and endless accumulation—which are root causes of climate change (Stoddard et al. 2021). Wright et al. (2021, 7), for example, undertook a discourse analysis on fossil fuel industry narratives and stated, “Despite growing public concern over climate change, the Australian fossil fuel sector has maintained a firm hold over political decision-making and succeeded in delaying any meaningful attempts at emissions regulation and decarbonization”. Many northern Australians had internalised this understanding of the political economy of Australia. Explicit and implicit pessimism emerged even amidst ongoing mobilisation to address the climate change. Participants sensed that despite growing concern, there was little they could do apart from individual consumer-based changes such as installing home solar panels, flying less, and consuming less meat. In Australia, for meaningful change, widespread movement-based political and legal mobilisation will be needed going forward, and this necessitates new kinds of environmental subject formation strategies that consider the nuances of environmental subjectivities.

For example, participants consistently foregrounded their individual and family well-being, keeping lifestyles at a level they had been accustomed to, and other more mundane economic rationalities. Capitalist values and motivations, particularly desires for prosperity, are strong and people have been enculturated into neoliberal rationality (Lucas and Davison 2019). Indeed, for those more critical of climate science, and even some that were advocates, the perceived potential losses to lifestyles due to a transition away from fossil fuels were emphasised (see Randall 2009). The far deeper governmentality linked to (neo)liberalism—property rights, individualism, and deregulated capitalism—works to create conscious

and unconscious subjectivities of what a “good life” means in Australia. Raudsepp-Hearne et al. (2010) theorised the “environmentalist’s paradox”, whereby human well-being is increasing despite declines in ecosystem services. In northern Australia, most participants had observed a relative increase in living standards over their lives. Despite a growing acceptance of L&D, this subjectivity remains persistent. The observed political mobilisation towards action, driven mostly by those who recognise climate signatures in the extreme events they are experiencing, is materially limited by these deeper political-economic subjectivities. The desire for prosperity, even amongst those experiencing climate extreme-driven L&D, and the growing clouds over the future—including expected future climate change—made people, understandable, concerned about the economy, which conforms with previous research in Australia on climate opinion (Lucas and Davison 2019).

## 8 Conclusion

I employed the concept of environmental subjectivities and ethnographically investigated the “why” in climate extremes influence on climate opinion, differential experiences of climate extreme-driven L&D, and societal (in)action. I identified many northern Australians—even people concerned about climate change—are not yet connecting extreme events to climate change. Nonetheless, a growing number of people are making this connection and experiencing significant L&D. For them, the perceived increase in the frequency and intensity of climate extremes was influencing their shifting environmental subjectivities. However, even amongst these participants, widespread subjectivities of anticipatory loss are supplying people with an imagined temporal buffer, which contributes to non-urgency in responses. Together with more structural political-economic barriers and a sense of helplessness to affect progressive change, limited action beyond individual consumer decisions and small-scale advocacy are occurring. Environmental subjectivities analyses can contribute to understanding why people are experiencing climate change L&D so differently and may provide concrete strategies for overcoming the growing environmental value-action gap. Indeed, in affluent countries, such as Australia, which produce disproportionate greenhouse emissions, linking ongoing L&D to climate change has proven useful for political mobilisation at smaller scales. Fundamentally transforming societies, however, necessitates producing new environmental subjectivities of care, responsibility, and human and more-than-human justice. This can only happen through larger-scale political mobilisation that must start from an understanding of existing environmental subjectivities.

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## Declarations

**Ethics approval** The study conforms with all Lund University, Sweden ethics standards at the time of fieldwork.

**Consent for publication** Guy Jackson consents for the publication of this manuscript.

**Competing interests** The author declares no competing interests.

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