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Tourism resilience to drought and climate shocks: The role of tourist water literacy in hotel management

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ABSTRACT

The large water demands of tourism threaten the sector's economic viability during climate shocks. Cape Town, South Africa provides an example where the threat of a water "Day Zero" in 2018 caused substantial losses in tourist arrivals, revenues, and subsequent job securities. However, Cape Town's tourism industry also contributed to unprecedented water conservation across the city. Through qualitative analysis of semi-structured interviews with hotel employees in Cape Town ($n = 18$), this paper reveals how internal conservation campaigns not only reduced water use, but also helped mitigate economic impacts, eased political tensions, and upheld their excellent standing among visitors. Our results suggest that during severe water crises, hotel managers can model and enforce water conservation efforts while maintaining customer satisfaction.

1. Introduction

Tourism is a key driver of global economic growth and job creation (Ladkin et al., 2023). This is particularly true within Africa, where tourism receipts contribute significantly to local GDP and are expected to reach US\$260 billion across the continent by 2030 (Signé, 2018). South Africa, in particular, dominates the continental tourism industry, consistently ranking among the top in tourism indicators such as number of arrivals and annual tourism revenue (Signé, 2018; UNWTO, 2023). Despite apparent positive outcomes of employment opportunities and economic benefit, tourism has come under scrutiny in recent decades for its negative contribution to global environmental change. Research identifies the tourism industry as a major contributor of global carbon emissions and a driver of increasing resource consumption (Bekun, Gyamfi, Bamidele, & Udemba, 2022; Lasisi et al., 2021; LaVanchy & Taylor, 2015; Rico-Amoros, Olcina-Cantos, & Sauri, 2009). Unsustainable water consumption is particularly concerning within the tourism sector as tourists often consume disproportionate amounts of freshwater water directly (i.e., drinking, washing, flushing toilets, etc.) and in amounts higher than what they would otherwise use at home (Becken, 2014; Lehmann, 2009). Tourists also consume water indirectly through demand for daily room cleaning and laundry, irrigated parks, gardens, and golf courses, and local food and electricity production, many of

which draw from municipal water supplies (Dolnicar, 2022; Gössling et al., 2012; Warnken, Bradley, & Guilding, 2004). This intrinsic link between tourism and water becomes problematic when considered against the increasing severity of freshwater scarcity around the world. Although our planet's total water volume hasn't changed, there is a growing mismatch between supply and demand due to a variety of environmental, economic, and social factors (Gleick, 2018; Srinivasan, Lambin, Gorelick, Thompson, & Rozelle, 2012). By some estimates, the world may face a 40% gap between water supply and demand by 2030 (World Economic Forum, 2023). Clearly then, the water demand inherent to tourism represents a touchpoint for sustainable and equitable water management.

The amount of water considered "sufficient" for tourism, however, can be misunderstood and is often unknown. Scholars have attempted to quantify this amount by estimating tourism water footprints at various scales (e.g., locally, nationally, and regionally). Barberán, Egea, Gracia-de-Rentería, and Salvador (2013) utilized a water footprint to evaluate water saving measures at the hotel scale in Zaragoza, Spain. Two other studies estimated tourism water demand across broader regions of Spain (Cazcarro, Hoekstra, & Sánchez Chóliz, 2014; Pérez, Martín, Martínez, & Pachón, 2023), whereas another focused on tourism water footprints in the Eastern Mediterranean (Hadjikakou, Chenoweth, & Miller, 2013). The most comprehensive analyses of tourism water footprints were

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compiled by Gössling et al. (2012) and Becken (2014), expanding this concept to the global scale. Collectively, these studies found that tourism water consumption is significant enough to strain local municipal water systems, often at the expense of non-tourists. Given the disproportional water footprint of tourism, hotel management plays an essential role in long-term water security and subsequent economic stability. Additionally, sustainably managed water demand minimizes potential competition and fosters equitable access for local users. In this way, hotel operators can support UN Sustainable Development Goal 6 (access to water and sanitation) while maintaining the economic benefits of stable tourism.

Growing economic, social, and environmental concerns with water overconsumption have forced the tourist industry to improve their practices and understanding of usage. Supply management and alternative water sourcing are frequent topics of investigation within tourism literature (see Armstrong & Butler, 1996; Baños, Hernández, Rico, & Olcina, 2019; Gössling et al., 2012; Pérez et al., 2023). Demand management strategies that target the water-related knowledge, attitudes, and behaviors of tourists, otherwise known as water literacy (McCarroll & Hamann, 2020), are less commonly studied, despite evidence suggesting such tourist water conservation campaigns are important (Baños et al., 2019; Vila, Asfordegan, Agell, Sánchez, & Costa, 2018). These strategies may be essential for achieving necessary water savings during severe droughts and climate shocks, or unusual weather events shaped by large scale changes in climate that ultimately endanger social systems (Clingsmith & Williamson, 2008; Wagner & Weitzman, 2015).

The aims of this article are to (1) examine how hotel managers in Cape Town brought their guests into their water conservation efforts during a water crisis and (2) to evaluate the efficacy of water literacy to shape tourist water usage. The first objective provides an understanding of tourism resiliency in a specific spatiotemporal context, while the second objective provides analysis of a management tool for dealing with crises so as to foster resiliency. We define resiliency as “the ability to withstand, adapt to changing conditions, and recover positively from shocks and stresses” (Willis & Nadkarny, 2020). Ultimately, we were interested in knowing how an important economic sector such as tourism responded to a climate shock that severely impacted the availability of water, which is core to tourist experiences.

After outlining our conceptual framework of political ecology, we describe the physical context of Cape Town and the Day Zero water crisis that forced dramatic water conservation efforts across the city. Next, we describe our methods, then cover the results of our data analyses and discuss their relevance within the larger Day Zero crisis. In many aspects, Cape Town is similar to other Mediterranean destinations where tourism revenue is important to the economy and where limited water supplies face increasing competition. Our findings shed further light on the tourism-water nexus and can guide hotel managers in their efforts to withstand the impacts of climate shocks.

1.1. Political ecology of tourism water use

Political ecology is an established research framework for analyzing complex socio-nature relationships within environmental conflicts (Blaikie, 1999; Robbins, 2012). It emerged from increasing recognition that management of natural resources is fundamentally a political act, influenced by economic and cultural powers (Cole, 2012; Islar & Boda, 2014; LaVanchy, Romano, & Taylor, 2017; Stonich, 1998). From this point of view, resolution of environmental issues must begin with a critical understanding of the inner workings of these power structures and how they influence the accessibility and consumption of natural resources.

Specific to water and tourism, a political ecology approach can illuminate how political, economic, and cultural factors influence water access and water equity within tourism hotspots. The framework was first introduced within tourism water management by Stonich (1998) through a study showing that tourism-related contamination of water

resources was disproportionately affecting local communities in the Bay Islands of Honduras. Since then, political ecology has primarily been used to highlight how tourism development threatens the water security of non-tourists. For example, rapid tourism growth enabled by support from local governments reduced water availability for local and often impoverished communities in Zanzibar (Gössling, 2001), Bali (Cole, 2012), and Nicaragua (LaVanchy, 2017). Tourism-related commodification of water resources has also been tied to driving up water costs beyond the affordability of local communities in Indonesia (Cole, 2017). Collectively, this research demonstrates how the tourism industry can drive or exacerbate water insecurity, especially in contexts of developing countries where complex power dynamics exist. Effectively, tourism water demand can limit the achievement of SDG 6 (UN, 2023).

Despite its rich literature, political ecology is commonly criticized for dissecting power structures without offering much in the way of solutions or pathways forward (Blaikie, 2008; Braun, 2015; Walker, 2006). In other words, political ecology is often “long on critique but short on concrete, actionable recommendations” (Ingalls & Stedman, 2016, p. 6). Whereas understanding the root causes of an environmental conflict are essential to resolution, knowledge alone will not generate policies or actions to effect change. Scholars are thus pushing for more reflective, affirmative, and creative applications of political ecology (Braun, 2015). Ingalls and Stedman (2016) suggested shifting the directionality of political ecology to look backwards and ask what resilience tells us about political ecology.

Additionally, political ecology has yet to be applied to the actions and behaviors of tourists themselves, although evidence suggests tourists have low levels of awareness of the water issues afflicting their destinations (Cole, 2012; Hadjikakou et al., 2013; Miller, Rathouse, Scarles, Holmes, & Tribe, 2010). Despite numerous demand management campaigns targeting tourists in various global destinations, the success of these campaigns is not entirely clear. Cole (2012), for example, suggested that making tourists aware of local water issues can generate a willingness to conserve; however, Gabarda-Mallorquí, Fraguell, and Ribas (2018) demonstrated that awareness alone is not always enough to create environmental proactivity. Indeed, the issue of influencing tourist behavior is particularly complex given the hedonistic nature of tourism (Dolnicar, Knezevic Cvelbar, & Grün, 2016). Notwithstanding these ambiguities and challenges, tourists remain dynamic actors at the center of water issues, creating demand and driving growth of the tourism industry.

Ideologically, our research expands political ecology scholarship in two ways. First, it uniquely focuses on tourist demand management. We seek to understand the political, economic, and social factors that influence the effectiveness of water conservation campaigns specifically targeting tourist behaviors and awareness. Second, it takes to heart the issue of looking backwards to inform future action. The overriding goal is to increase the utilitarianism of political ecology by reflecting on a specific instance of resilience to a climate shock event. We focus on Cape Town (South Africa) where the tourism industry helped the city survive the Day Zero crisis using a suite of water conservation techniques, including the notable “Save Like A Local” campaign and other water conservation measures specifically targeting tourist behaviors. In this context we define resilience as the ability to adapt in the face of challenge. By analyzing how the political, economic, and cultural factors impacted the effectiveness of tourist water literacy, we can better evaluate how investments in visitor education can become a pathway towards managing climate shocks.

1.2. Cape town tourism and day zero

As one of the country's largest economic sectors, tourism is a key driver of economic growth in South Africa. Indeed, pre-COVID pandemic estimates of the tourism sector in 2019 valued total contributions to South Africa's GDP at R425 billion, or 8.6% of the total economy. Additionally, it provided roughly 1.5 million jobs, or 9.2% of the total

employment in the country (SAT, 2019). Tourism is also an important industry within the country's transformation agenda, providing a means of moving further away from the era of apartheid and driving welfare improvements across the country (Booyens & Rogerson, 2016; Maumbe & van Wyk, 2008). Yet, research demonstrates that tourism is generally concentrated in time and space (Gössling et al., 2012), and South Africa's tourism trends are no exception. Cape Town, as the second largest metropolitan area in the country, is widely recognized as a major tourism hotspot.

The City of Cape Town is located in the Western Cape Province at the southwestern-most point of Africa and enjoys a comfortable Mediterranean climate with moderate year-round temperatures, rainy winters, and dry summers. It is home to both Table Mountain, one of the seven natural wonders of the world (New 7 Wonders, 2021), and the Cape Floristic Region, one of the world's most biodiverse ecosystems (Goodness & Anderson, 2013). These iconic attractions and an array of amenities help the city attract long-haul international and leisure tourists and contribute to its ranking as the single most significant destination for tourism in all of South Africa (Rogerson & Rogerson, 2021). As such, Cape Town's tourism industry holds great economic importance, both locally and nationally.

Minimal research is available about the water use of tourism within either the context of Cape Town or South Africa more broadly. Only one study by Gössling et al. (2012) attempted an estimation of the direct water consumption of South African tourists based on number of tourist arrivals, average length of stays, and average water use per tourist per day. Their findings showed the direct water use of tourism accounted for a mere 4.04% of total municipal supplies countrywide. However, they acknowledged the actual water footprint is likely much larger when indirect water use is considered. Additionally, the estimations determined by Gössling et al. (2012) were based on aggregations of national data, which tend to obscure regional and local variations. Given Cape Town's prominence as a tourism hotspot, it can safely be concluded that tourism water demand on Cape Town's local municipal supply is considerably larger than 4.04%.

Although Mediterranean climates attract many tourists looking for warm and dry summer conditions, it also means the City of Cape Town frequently deals with recurring drought, or temporary dry spells, as a normal part of the climatic cycle (Maliva & Missimer, 2012). Occasionally, Cape Town's recurring droughts are worsened by regional shifts in climatic patterns that exacerbate dry spell magnitude or duration beyond the scope of predictability. These unusual droughts are known as climate shocks due to the risk they pose to social systems (Clingsmith & Williamson, 2008; Wagner & Weitzman, 2015). More recently, the Western Cape has witnessed an increase in climate shocks, largely in the form of increasing dry spells, which climatologists largely attribute to warming air and sea surface temperatures and the subsequent shift of normal precipitation patterns (Burls et al., 2019; Otto et al., 2018; Sousa, Blamey, Reason, Ramos, & Trigo, 2018). In this paper, we use the term climate shock in alignment with an emerging definition that describes a climatological event that deviates from normal environmental patterns and has been exacerbated by climate change (Fisher, 2024). These climate events have deleterious impacts on available water supplies for domestic, industrial, and agricultural users.

To protect water supplies during predictable recurring droughts, the City of Cape Town developed an extensive Water Conservation/Water Demand Management strategy to enforce temporary mild water restrictions (LaVanchy, Kerwin, & Adamson, 2019; Luker & Rodina, 2017). Surprisingly, this strategy did not include anything specifically targeting the tourism industry, which was especially problematic because the timing of these recurring droughts typically coincides with peak tourist season in the Western Cape. As a result, there was little in the way of official or structured attempts to engage tourists or include them in conservation plans. Additionally, the strategy's relative newness (implemented in 2001, revised in 2007) meant it was largely untested against climate shocks. That is, until three consecutive years of

historically low rainfall began in 2015. The result was the worst drought in over a century, triggering a countdown to "Day Zero" when city taps would be turned off due to low reservoir levels (Booyens, Visser, & Burger, 2019; Sousa et al., 2018). Cape Town received international attention as the water crisis headlined in media around the world. News stories were paired with evocative images of desiccated reservoir beds and people queueing to collect buckets of water from local springs. These intertwined messages spurred tourism agencies to engage tourists with drought education and water conservation campaigns (see Fig. 1). The Federated Hospitality Association of South Africa (FEDHASA) created a Water Wise Pledge, a challenge to tourism associations and businesses to save water, including the use of "in your face tactics" that generated water conservation while maintaining tourist arrivals (Bizcommunity, 2017). Within hotel rooms, communications emphasized individual actions such as shortened showers, forgoing baths, and collection of shower water for non-potable reuse elsewhere. Hotels provided shower timers (Fig. 1 (e)) and buckets (Fig. 1 (b)) and removed bath plugs to encourage uptake of these actions. Some hotels even replaced bath plugs with rubber ducks to uniquely introduce an element of amusement to conservation (Fig. 1 (a)). Low-flow aerators or misters were installed on faucets, and some public facilities and hotels took further steps by asking tourists to use hand sanitizer stations instead of washing their hands with soap and water (Fig. 1 (d)). Guests were even taught mnemonic phrases like "If it's yellow, let it mellow - if it's brown, flush it down" (Fig. 1 (c)).

Collectively, communications and marketing collateral like those depicted in Fig. 1 targeted the water literacy of tourists. Water literacy is the combination of water-related knowledge, attitudes, and behaviors (McCarroll & Hamann, 2020) and is often utilized to increase appreciation of water systems or generate water-conscious behaviors. Similarly, Cape Town tourists received educational briefings on the city's water system and current drought status in an effort to encourage water-conscious attitudes and values and provide information about specific actions tourists could enact to help conserve. Signage in guest rooms and public areas attempted to increase ownership of water conservation with sayings like "saving water is everyone's responsibility" and "every drop counts". Local travel agencies such as Cape Town Travel (2018) and Go2Africa (2018) wrote blogs for tourists entitled "Save like a local: Water-saving tips" and "How to still visit Cape Town in the drought".

Unsurprisingly, the broad and dramatic coverage of Day Zero wreaked havoc on Cape Town's reputation as an attractive tourism destination (Nhomo & Agyepong, 2019). Tourism data collected during the drought years showed a decline in the number of tourist arrivals during the Day Zero crisis, especially from international locations, and that those who visited stayed fewer nights and spent less money (Dube, Nhomo, & Chikodzi, 2020). Although the city was ultimately able to avoid Day Zero thanks to unprecedented levels of water rationing and conservation across all sectors (Ouwessneel, Winter, & Carden, 2020; Ziervogel & Morgan, 2023), the threat of another Day Zero-type crisis is very real. The impacts of climate change in the Western Cape region increase the likelihood that Cape Town will experience droughts with more frequency and greater magnitude (Otto et al., 2018; Pascale, Kapnick, Delworth, & Cooke, 2020). Thus, learning from Cape Town's experience from the perspective of hotel water management is of tantamount importance, particularly as tourism sectors around the world will need to build resilience to increasingly arid climates and future climate shock events.

2. Methods

Data for this study were collected in 2019 through semi-structured interviews ($n = 18$). Such qualitative methods, which often trade smaller sample sizes for depth and detail among data, are useful for uncovering complex and context-dependent phenomena in a detailed and nuanced manner (Adeoye-Olatunde & Olenik, 2021). Initial participants were identified through purposive sampling of established

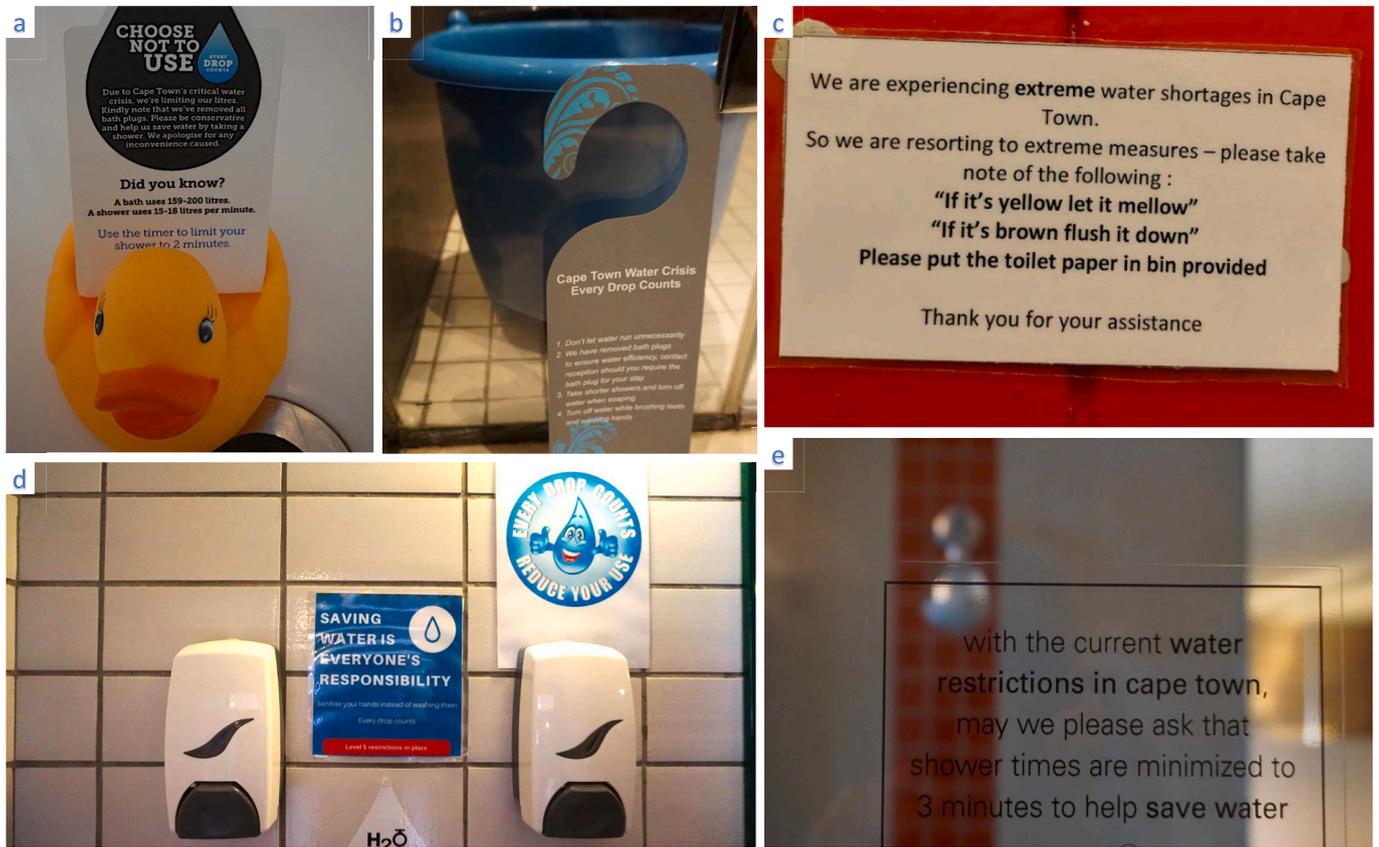


Fig. 1. Signage to create awareness and water literacy for tourists: (a) rubber duck to replace bath plug; (b) bucket to collect shower water; (c) instructions for “if it’s yellow, let it mellow”; (d) hand sanitizer substitutes in bathrooms; and (e) guides for timing showers. Images by authors. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

contacts within Cape Town’s tourism industry and then expanded using the snowball sampling method. Hotel managers and staff were targeted for the first interviews. Managers typically have broad oversight of tourist experiences and sustainability programs, whereas staff directly influence on-site water consumption (i.e., cleaning, gardening, cooking, etc.) and maintain direct contact with hotel guests regarding water conservation initiatives (Gössling, Hall, & Scott, 2015). Beyond hotel employees, the snowball technique introduced us to several additional key tourism stakeholders including owners, consultants, and activists. Our data sources were as follows:

- Fifteen employees from four 4-star hotels, one 5-star hotel, and one hostel.
- One employee of FEDHASA.
- The owner of an environmental consultancy hired by numerous hotels during Day Zero to analyze water inefficiencies and implement conservation techniques.
- One individual who owns an Airbnb and led the Drought Response Learning Initiative, which preserved the observations and lessons of the Day Zero crisis by documenting 39 in-depth interviews with local experts from various backgrounds, including the tourism sector.

Surveying tourists directly could have contributed valuable data to this study; however, access to tourists was not possible as hotel operators were unwilling to release customer records and were also reluctant to contact previous customers on behalf of the survey. Most of the hotels have established post-stay surveys and did not want to conflate those with this study. Thus, the focus of the study was on the tourism industry workers listed in Table 1. Interviews were conducted in the English language, South Africa’s lingua franca and one of the eleven official languages of South Africa (SAT, 2023). Six guiding questions were used

Table 1
Description of Interview Participants.

Interview No.	Sex	Title/Role	Years in Role	Organization Type
1	M	General Manager	13	four-star Hotel
2	M	Director	4	Environmental Consultancy Organization
3	M	Environmental Manager	18	Hotel Group
4	M	Food and Beverage Manager	9	four-star Hotel
5	F	Guest Relations Specialist	12	four-star Hotel
6	F	Guest Relations Intern	>1	four-star Hotel
7	M	Technical Manager	4	four-star Hotel
8	M	Deputy Manager	2	four-star Hotel
9	F	Executive Housekeeper	–	four-star Hotel
10	M	Maintenance Manager	–	four-star Hotel
11	F	Personal Assistant of General Manager	–	four-star Hotel
12	M	General Manager	1	five-star Hotel
13	F	Guest Relations Specialist	5	four-star Hotel
14	F	General Manager	2	four-star Hotel
15	M	Maintenance Manager	3	four-star Hotel
16	F	General Manager	4	Hostel
17	M	Former Chairperson	2	FEDHASA
18	M	Initiative Co-lead	1	Drought Response Learning Initiative and Airbnb Owner

to focus each interview, but the use of semi-structure allowed freedom and flexibility to follow related tangents and new leads as they arose (Adeoye-Olatunde and Olenik, 2021). The guiding questions provided an understanding of hotel tourist water conservation campaigns during the Day Zero crisis. The guiding questions included:

- How did your hotel/organization react to the Day Zero crisis?
- What communication or information was provided to tourists during the Day Zero crisis?
- Was this communication something that was provided to tourists pre-Day Zero? Do you continue to provide this communication, post-Day Zero?
- Why did you target tourist behaviors/awareness?
- What were common reactions or feedback received during this time?
- In your opinion, did water conservation among tourists make a difference?

Interviews lasted from 30 to 65 min and were audio-recorded and transcribed, with the exception of two, in which the interviewees requested not to be recorded. Interviewers also took detailed notes and wrote post-interview summaries. The collection of transcriptions and interviewer notes were then coded by the primary researcher both deductively, using the guiding interview questions, and inductively, identifying instances of repetition and similarity within participant quotes. To establish credibility of the coding process, a codebook was produced by the primary researcher, then checked using an inter-coder agreement (ICA) method outlined by Hennink, Hutter, and Bailey (2020). This entailed a second researcher from our team coding the same selection of text, following the codebook framework. Three of the 18 interviews were then randomly selected for ICA and the codebook was adjusted until an 82% level of agreement was reached. Field observations were also documented by the three authors during trips to Cape Town from 2016 to 2019, focusing on visible conservation marketing collateral displayed in tourist hotspots, local restaurants, and hotel rooms. These observations helped inform the structure of the interviews and connect qualitative data with visual evidence of tourist communications.

3. Results

The deductive and inductive coding process revealed two dominant themes across the interview data. The first was drivers of tourist water conservation campaigns, or why hotel managers chose to bring tourists into their larger efforts of conserving water (e.g., leak detection, efficiency upgrades, and alternative water sourcing). The second theme reflects tourist reactions to hotel initiatives and includes a breakdown of the various ways tourists responded to and engaged with water literacy campaigns. These data help to explain the efficacy of the campaigns and provide helpful examples for other hotel managers needing to reduce their water footprint. The themes and their relative frequencies are detailed in Table 2 and discussed in detail below.

3.1. Drivers for tourist conservation campaigns

Tourist water conservation programs are an important contributor to overall water savings, particularly during climate shock droughts (Baños et al., 2019; Gabarda-Mallorquí et al., 2018). Thus, describing the drivers of successful conservation initiatives from the Day Zero crisis was central to our research and will likely guide conservation efforts in tourism destinations facing future water shortages and/or increasing demand.

When participants in our research were asked to explain why they targeted tourist water conservation, three primary drivers were revealed. These were (1) external pressures from sources outside the tourism industry (including imposed expectations from political leaders and local community members to use less water); (2) internal pressures

Table 2
Emergent themes of conservation campaign drivers.

Theme/Topic	No. of times mentioned	No. of interviewees who mentioned topic (% of total interviews)
<i>Drivers for conservation/water literacy initiatives</i>		
external pressures (i.e., political and community)	14	9 (50%)
internal pressures (i.e., environmental and social responsibility)	24	12 (67%)
economic pressures of Day Zero	26	12 (67%)
<i>Tourist reactions</i>		
selfish cancellation	6	5 (28%)
selfless cancellation	7	6 (33%)
anger/frustration	10	8 (44%)
understanding/cooperation	13	11 (61%)
enthusiasm/inventiveness	7	5 (28%)

from within the tourism industry; and (3) economic pressures from negative public communications of the Day Zero drought (see Table 2). In short, the entire city was expected to come together and mobilize to avoid Day Zero. Political leaders who had the voice and platform to push for action did so loudly and often. Within the tourism industry, this included direct phone calls and in-person visits, sometimes unexpected, to hotels and tourism organizations.

“The Mayor approached [our hotel] early 2018, and said, ‘you’re still way out of line because you were supposed to be making 50% less [water use] and you aren’t anywhere close to that.’”

(Interviewee 3, male, environmental manager)

This quote provides an example of external pressure from then-Mayor Patricia DeLille. In fact, DeLille was a frequent topic of conversation brought up by interviewees for her accusatory, apocalyptic approaches during the Day Zero crisis (Robins, 2019). And as the quote reveals, such political peer pressure was not framed as friendly suggestions but rather as blame and demands for action. Similarly, interviewees described experiences of blame-throwing from local community members who took it upon themselves to enforce water conservation at all levels.

“We had a few local people walk into the property... and they didn’t see any [marketing] collateral, any notices or anything like that. And they made quite a bit of noise. So they put it on Facebook and in social media, because they felt as a hotel, we have a responsibility to also do our part.”

(Interviewee 14, female, general manager)

“There are many annual events that take place traditionally in March. And also, from around January through April, every year. And they [the locals] are saying, well, if we’re so short on water, why are you bringing these additional tourists? Why do we have marketing to get international tourists to come to our city, when they’re telling us we got no water?”

(Interviewee 17, male, FEDHASA chairperson)

Despite rigorous efforts among hotel owners to fix leaks, access groundwater through boreholes, and harvest rainwater, accusations of water wasting from the community mirrored those from political leaders. With so many fingers pointing towards the tourism industry, implementing every drought management strategy possible was of utmost importance. Marketing, water literacy campaigns, and clear communication to tourists became an important way to maintain reputations and alleviate the impact of outside pressures during the Day Zero crisis.

Interviewees also described internal pressures that emerged from environmentally and socially responsible business plans. Indeed, the City of Cape Town has pushed for responsible tourism since the 2002 World Summit on Sustainable Development in South Africa (Fang,

2020). The concept of responsible tourism was frequently mentioned by interviewees, and many stressed that sustainability and green initiatives were not new within Cape Town's tourism industry.

"This hotel is renowned, not only in Cape Town but throughout the country, for being a leader in environmental sustainability. Long before the water crisis hit Cape Town, this hotel, or this group rather, was implementing environmental sustainability strategies. So, it wasn't just a knee jerk reaction or reactive approach."

(Interviewee 8, male, deputy manager)

Many echoed the sentiments within this quote when describing how tourist water conservation campaigns were just another way to do their part in shaping sustainable tourism. Equally important was social responsibility and ensuring tourism wasn't using water at the expense of local communities.

"You are here just for a while; you pop in and pop out. You must think of the people that live in that environment, right... So if you've got them [tourists] at reception, you've got a captive audience, because you're not getting your key card until I'm done talking. It's selfish, but at that time we were selfish."

(Interviewee 13, female, guest relations specialist)

"If you are Mr. Jones staying in the Cape Flats in a struggling environment, you've got no water because there isn't any. But here's this luxury hotel with all the people from overseas with lots of money, and they're getting plenty of water, and they're not using 50 liters per day..."

(Interviewee 3, male, environmental manager)

Expressed here is a perceived accountability for ensuring equitable water access. The first quote frames tourism within the context of the local community, highlighting how tourist's awareness of drought was raised to ensure water availability for all Cape Town residents. The second quote expresses a similar framing but with a focus on the socio-economic context of townships. Tourist water conservation campaigns provided a means of taking ownership over local water security and contributing to social justice.

The most mentioned driver for tourist water conservation campaigns stemmed from the economic pressures arising from the use of the phrase "Day Zero." The choice by the city to use the phrase was largely deemed a scare tactic, conveying the seriousness of the situation while inspiring action through fearmongering. Media coverage of the drought, both nationally and internationally, clung to that fear, spreading doom-and-gloom messages to the far corners of the world. Interviewees attributed their numerous booking cancellations, ranging from individuals to entire conferences, to public communications they described as "over-exaggerated", "over-sensationalized", and "destructively negative". Indeed, research calculated city-wide tourist arrival declined as much as 12.6% during the peak period of Day Zero (Dube et al., 2020). Other sources suggested that bookings at the hotel scale were down between 10 and 50% (Jainchill, 2018). Interviewees correlated the reduced tourist numbers to a variety of economic impacts to the tourism sector.

"It [tourist water conservation] was something that if we wanted to keep on to business at the time, the way that was being said then with Day Zero, it had to be done."

(Interviewee 16, female, general manager)

"For every ten visitors into Cape Town, we support one job. So by you, or a conference of one hundred people, saying, 'sorry, I feel very sorry for you and I can't come and use your water', we go, 'ok, well you just cost 10 jobs'."

(Interviewee 1, male, general manager)

The first of these two quotes describes how the Day Zero crisis threatened business, implying a reduction in industry profits. This corresponds with official reports of revenue losses between R723 million

and R1.7 billion (US\$54 and \$127 million) per year during the entirety of the drought (Dube et al., 2020). The second quote links decreased tourist arrivals and subsequent loss of revenue to decreased job security within the service industry. Without reliable revenue, hotels were simply unable to maintain normal staffing salaries. This also corresponds with official reports tracking job losses to between 1707 and 4024 per year (Dube et al., 2020). Interviewees also described more drastic economic impacts, including the possibility of bankruptcy and closing altogether. The enormity of these economic impacts motivated hotel operators to implement any and all drought management strategies that would allow them to earn revenue and stay open, including tourist water conservation campaigns. Thus, conservation campaigns fostered collaborative reductions in water consumption, and offered an important mechanism through which to persuade tourists to keep coming to Cape Town.

"I think if we can get the message out to the rest of the world or whatever, that we're not in crisis-mode here, and we're not at Day Zero... then it will certainly go a long way."

(Interviewee 4, male, food and beverage manager)

This communication approach to potential tourists proved essential to combating negative media and encouraging continued tourist flows. Tourist conservation campaigns providing education about the drought, current dam levels, and city usage rates helped explain the situation, while guidance on how tourists could reduce their own water demands during their visit helped alleviate tourist concerns about burdening an already-stressed system. Tourists were given a way to take ownership of their impact while still enjoying their holidays.

3.2. Tourist reaction to conservation campaigns

Interviewees in our research reported mixed responses from tourists to drought communications. The most notable and detrimental to businesses, as noted previously, were outright cancellations of hotel bookings and scheduled trips to Cape Town. Interviewees elaborated on these cancellations to explain the rationales tourists provided for these cancellations.

"People had this almost guilty feeling that they don't want to travel to Cape Town and add to the pressure, they'd rather go to Johannesburg, Durban or whichever elsewhere, than come into Cape Town. Because you feel guilty that you're going to add to the stress of our water resources. There was definitely that, that trend. And also, people who don't want to spend money staying here when they didn't have the luxury of the amenities that they used to."

(Interviewee 14, female, general manager)

This quote clearly distinguishes between two separate rationales, which we differentiate as *selfless* and *selfish*. The *selfless* rationale emerges from a consideration for burdening the already-stressed water system and reducing the availability of water for the locals. Such an explanation given by tourists demonstrated empathy and thoughtfulness regarding water insecurity. In contrast, the *selfish* rationale emerges from a concern that the drought would impact the quality of one's experience while on holiday. For example, hotel staff relayed how tourists asked if they would be required to queue themselves to collect water during their trips. Although emerging from very different logic, the results of either rationale were the same. Tourists reconsidered whether their trips were still worthwhile in view of the drought.

Interviewees also described mixed reactions to water conservation measures for tourists that decided to visit Cape Town anyway. These ranged from anger to understanding, to enthusiasm and inventiveness. The least common reaction was frustration or anger at water restrictions.

"Attitudinally, [they] were treating it like, 'it's your problem, not mine'. You know, 'I'm paying X amount of money to stay in your hotel. I'm on holiday. So don't make your problems my problems.'"

(Interviewee 8, male, deputy manager)

A small number of tourists even argued with hotel staff about taking baths or using the pool during peak evaporation hours. This frustration with tourist conservation campaigns mirrored the emotions behind the tourists who canceled for selfish reasons. Some people did not want to sacrifice the luxury of their vacations because of a drought that was not 'their problem'. However, interviewees unanimously agreed that anger was by far the minority reaction among visiting guests. In fact, most displayed far more understanding and cooperation with water restrictions and conservation campaigns.

"The feedback was amazing. Very positive... The international clientele really took to it, were proud of what we were doing, listened to us and understood."

(Interviewee 12, male, general manager)

Drought and conservation information from hotel staff and various marketing collateral were appreciated and understood by the vast majority of tourists. Interviewees received feedback from guests that they were actually following the conservation instructions for shorter showers and letting toilets "mellow". This "how-to" information is categorized as functional knowledge within water literacy frameworks and represents a critical component for translating water-related knowledge and attitudes into actions (McCarroll & Hamann, 2020). This was evident in our research as interviewed hotel managers reported a marked decrease in water usage corresponding with the timing of tourist water conservation campaigns. In their view, endeavors to build functional knowledge resulted in the desired effect.

Perhaps most interesting though are reports of guests who took conservation actions a few steps further. Interviewees described conversations with tourists who not only followed suggested conservation guidelines within hotels, but also voluntarily enacted additional behaviors to save even more water.

"The bulk [of our tourism] is leisure. So they were more understanding. In fact, you would find that some of them would even travel with their own water."

(Interviewee 14, female, general manager)

"Some guests would say that they left their wash basin full, so every time in the day they would use that."

(Interviewee 5, female, guest relations specialist)

These quotes illustrate how a handful of guests were inspired to invent their own ways to reduce their water footprint, which they excitedly shared with hotel staff. By purchasing and bringing their own bottled water or filling their bathroom sinks with water for personal reuse, tourists reduced their demand on the municipal system even further. No one asked these tourists to take extra steps, but interviewees described the pride and enthusiasm of the guests as they relayed to hotel staff how they were going above and beyond prescribed conservation measures. Similarly, many guests told interviewees how they were taking new practices home with them.

"I had a number of my long-staying guests through February from the UK saying, 'I've trained my husband, if it's yellow let it mellow' ... I actually had one of our couples who stayed, she's from Scotland, and she said to me, 'where we come from in Scotland, we'll never have a water issue' but, they took this practice back with them to Scotland."

(Interviewee 1, male, general manager)

A lot of guests have taken them [shower timers] home for their children. Meaning buying them...

(Interviewee 5, female, guest relations specialist)

Tourists excitedly told staff how they planned to continue water-conscious behaviors in their own homes, even if they came from more water-secure regions. Shower timers in particular became so popular that several hotels began selling them to guests as souvenirs at reception.

Participating in the drought management in Cape Town created an eye-opening event for tourists, allowing them to not only understand but take pride in their ability to help avoid Day Zero.

4. Discussion

Data collected from eighteen tourism interviews in our study demonstrate the complexity of responding to climate shocks and building resilience within a tourism context. The Day Zero crisis originated from historically low rainfall over a period of several years, necessitating broad action when the gap between water supply and demand reached dire proportions. The responsibility for water conservation to shorten the gap fell on the shoulders of all in Cape Town – residents, businesses, and tourists alike. Our analysis of the tourism industry through a political ecology lens demonstrates that tourism resilience must be understood through and across multiple factors. Specifically, we find that conservation measures influence and are directly influenced by political, economic, and social systems.

Recourse to water shortages has often been pursued by water managers through supply augmentation schemes such as recycled wastewater or desalination. However, these projects require longer construction time than climate shocks permit, are much more expensive, and negatively impact surrounding ecosystems (Baños et al., 2019). For instance, Pérez, Martín, Martínez, and Sáez-Fernández (2020) questioned the efficacy of desalination to buffer the gap between water demand and water supply in the ultra-tourist hotspot of Ibiza, Spain. They concluded that even with sufficient construction lead time, energy costs associated with the desalination process made it a cost prohibitive choice for water managers. They argued that water reuse offered a more cost-efficient path to bring water demand and water supply into alignment. However, water reuse requires substantive lead time to integrate into existing water infrastructure, which is not possible during a climate shock. Thus, targeted water conservation measures such as those implemented during Cape Town's Day Zero crisis offer the next recourse to close the supply-demand gap.

Although many hotels in Cape Town promoted internal environmental initiatives and water conservation actions prior to the Day Zero crisis, the historic drought forced hotel managers to expand water savings through all means possible. Decisions to conserve water in areas where guests have minimal impact (e.g., kitchen operations, landscaping, maintenance, etc.) are straightforward, albeit potentially expensive. Our research found that hotel managers needed to engage their customers (tourists) to achieve further water savings, while simultaneously strengthening the perception they were equal participants with all of Cape Town in averting the crisis. In this way, water literacy campaigns were linked to the push and pulls of broader political, economic, and social systems.

Interviewees in the tourism sector described negative interactions with politicians and the broader Cape Town community, which placed hotel reputations at risk. Hotels perceived as wasting water were verbally attacked and shamed in news stories and public forums. Such defamatory attention decreased the attractiveness of the establishments in question for both local travelers and international tourists. Conversely, innovative tourist water conservation campaigns allowed hotels to visually demonstrate their solidarity and maintain esteem in their operations. Additionally, these campaigns allowed hotels to reassure tourists that their visits would not overwhelm the local water system. In this way, tourist water conservation campaigns offered a pathway to alleviate the guilt of guests and maintain positive business relationships. For many hotels in Cape Town, being environmentally responsible was already a priority, but avoiding mass cancellations, huge profit losses, and widespread layoffs drove them to strategically maximize water conservation.

The appearance of prioritizing environmental sustainability was also important during the Day Zero crises. Hotels needed external parties to perceive them as water conscious to save their reputations. Posting

marketing collateral about drought initiatives and conservation campaigns in lobbies, restaurants, bathrooms, and guest rooms helped to reduce the defamatory shaming while easing concerns of politicians and locals who wanted to ensure everyone was doing their part. Communications to tourists about how they can “Save Like a Local” offered peace of mind to concerned tourists that their visits wouldn't contribute substantially to water insecurities. Previous research on hotel sustainability more broadly demonstrates that green practices can boost customer satisfaction and hotel reputation (Aydin & Alvarez, 2020; Aznar, Sayeras, Galiana, & Rocafort, 2016). In a similar sense, engaging tourists with drought management helped to alleviate the guilt of guests and maintain positive business relationships. Thus, our research demonstrates that tourist water conservation campaigns also provided psychological benefits, which subsequently help mitigate the economic impacts of drought.

Finally, our research revealed that tourists in Cape Town overwhelmingly responded positively to water literacy and conservation campaigns. Interviewees described interactions with a few selfish tourists who reacted with anger and frustration when burdened with someone else's water crisis, but simultaneously clarified these interactions were few and far between. Instead, nearly all tourists displayed understanding and willingness to change their own behaviors, thus underscoring the importance of functional knowledge within water conservation campaigns. Additionally, the frequency and intensity of positive conversations interviewees had with guests during the Day Zero drought highlights a strong valuation of sustainable tourism and a desire to reduce the environmental impacts of holidays. This supports other research that suggests tourists are looking for “guilt-free” vacations (Burrail, Buda, & Stanford, 2019; Fang, 2020). In this way, tourist water conservation campaigns offer an opportunity to increase tourist water literacy, alleviate their concerns about visiting during droughts, and provide them with the knowledge and tools to take control of their own impact.

It is also worth noting that our results suggest the benefits of tourist water literacy may extend beyond the geographic boundaries of the tourist destinations. Several interviewees were informed that tourists intended to take their newly learned behaviors home with them. One guest, in particular, told hotel staff that she would ‘let it mellow’ back home in Scotland where they “never have a water issue”. Although typically a water-secure country, parts of Scotland are in fact beginning to experience drought. The Scottish Environment Protection Agency reported extreme variability in 2022 precipitation patterns that resulted in water scarcity within eastern regions of the country (2023). Thus, it is possible that by increasing the water literacy of these guests, and others in similar situations, tourist water conservation campaigns could increase appreciation for and efficient use of water elsewhere around the world.

5. Conclusions

Climate shocks that produced Cape Town's Day Zero water crisis give rise to significant and far-reaching socio-economic consequences. The risk of running out of water generated powerful political tensions and extensive economic impacts for the whole of Cape Town. It also threatened the economic viability of tourism in Cape Town, an industry vitally important to South Africa's GDP. Responding to these threats and collaboratively avoiding the arrival of Day Zero required a combination of water management strategies, including unprecedented levels of water conservation across the entire city. This included innovative conservation within the tourism industry, targeting tourists themselves as part of the solution. Our research investigated the response of six Cape Town hotels to the Day Zero climate shock through a political ecology lens to extract key lessons for tourism water management. Through interviews with eighteen hotel and tourist industry leaders, we found that hotel water conservation campaigns are as important for mitigating economic, political, and social impacts as they are for reducing water

consumption during a climate shock and stretching diminished water resources further.

Surprisingly, we also found an overwhelmingly positive response from tourists to extreme water conservation campaigns. Hotels that actively increased the water literacy of guests, generated water sensitive attitudes and appreciation for the value of water. The provision of functional knowledge (i.e., detailed instructions and guidelines on reducing individual water consumption), gave guests agency to change their behaviors. Apart from a minority group of selfish tourists who responded with anger and frustration, water conservation campaigns were positively received and inspired creative efforts above and beyond what was asked. The clear success of hotel managers in lowering their water footprint and generating positive consumer (tourist) response speaks to the resiliency of the tourism sector of Cape Town. As Marchese et al. (2018) noted, resilience is a quality that speaks to the ability of a system to respond to disturbances. With this in mind, we argue the response of hotel managers to the water crisis resulting from the Day Zero climate shock demonstrated resiliency within Cape Town's tourism. Their efforts to educate tourists proved effective in their overall aims to reduce water demand and engender positive tourist experiences and demonstrated the usefulness of water literacy.

Climatologists expect the Western Cape to become increasingly hot and dry with rising global temperatures, thus escalating the risk of future climate shocks (Otto et al., 2018; Pascale et al., 2020). Hotels, and the tourism industry more broadly, will be forced to contend with such extreme droughts and their economic consequences on a more frequent basis. Additionally, the climatic forecast of the Western Cape mirrors trends in other popular tourism destinations with warm climates and natural tendencies for drought (LaVanchy, 2017; Scott, Hall, & Gössling, 2019). This future of increased risk of climate shock will require hotel managers to implement innovative strategies to lower their water footprint. Our results reinforce findings from previous studies (i.e., Baños et al., 2019; Gabarda-Mallorquí et al., 2018; Pérez et al., 2020) that recommend greater water demand management within tourist populations for tourism water resiliency and sustainability. Additionally, we find that tourist water literacy campaigns provide other benefits, including mitigating economic impacts during a crisis, maintaining customer satisfaction, growing visitor loyalty, and possibly spreading conservation awareness across the globe.

This exploratory study utilized qualitative data collected from a small sample of tourism industry employees and leaders, surrounding a very specific example of climate shock. We recognize our purposive sampling techniques limit the generalizability of our results and recommend further research to expand the value beyond this geographical context and more broadly across a larger spectrum of hotel ratings and destination types. Additionally, direct surveying of tourists during a water crisis could elicit informative details on the efficacy of water literacy campaigns and further refine best practices for hotel managers.

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CRedit authorship contribution statement

Meghan J. McCarroll: Writing – review & editing, Writing – original draft, Validation, Methodology, Investigation, Formal analysis, Conceptualization. **G. Thomas LaVanchy:** Writing – review & editing, Writing – original draft, Validation, Supervision, Investigation, Conceptualization. **Michael W. Kerwin:** Writing – review & editing, Supervision, Investigation.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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