



# “It never rains in California”: Constructions of drought as a natural and social phenomenon

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## ABSTRACT

In response to suggestions that, in the West, inaction on climate change is due to climate change's perceived temporal and spatial distance, we examine how people in California responded to the local influence of climate change in relation to the California drought in 2015. Between 2012 and 2016 California experienced an exceptionally severe drought resulting in a variety of social impacts. In this paper, we focus on how people experienced and understood drought (rather than on their views on the connection between anthropogenic climate change and drought). Seventy-one interviews were conducted during ten weeks of fieldwork in late 2015 with people in urban and rural areas of California. Five emerging themes are discussed: (i) *conceptions of normality*, (ii) *location (inside versus outside urban areas)*, (iii) *emotional responses*, (iv) *understanding the drought as a social and political phenomenon*, and (v) *marginalised experiences of the drought*. Examining perceptions of drought can enhance our understanding of how people react to climate change and the construction of proximity and personal relevance.

## 1. Introduction

Between 2012 and 2016 an exceptionally severe drought struck California (Gleick, 2017; Griffin and Anchukaitis, 2014). At the outset, it is important to acknowledge that Southern California is a characteristically dry part of the state and that droughts are “a fundamental feature of the climate of western North America” (Griffin and Anchukaitis, 2014, p. 9017). Drought is generally defined as a lack of precipitation over a longer period of time, leading to a shortage of water for some group, sector or activity. Furthermore, the supply of water is contingent on social, political and economic decisions about its use and distribution:

“Its impacts result from the interplay between the natural event (less precipitation than expected) and the demand people place on water supply, and human activities can exacerbate the impacts of drought”. (National Drought Mitigation Center, 2015; cited in Mann and Gleick, 2015 p. 3859).

It has been suggested that the 2012–2014 period surpassed previous droughts in the mid-1970s and late-1980s and is unprecedented in at least the last 1200 years (Griffin and Anchukaitis, 2014). The drought

was driven by simultaneous low precipitation and extreme high temperatures (AghaKouchak et al., 2014). Unique circumstances in the modern history of California resulted from the combination of increased demand and diminished surface water availability due to reduced snowpack, lower volume streamflows and lower reservoir levels (Griffin and Anchukaitis, 2014). Further, it has been predicted that drought severity in the south-western United States will continue in the future (Cayan et al., 2010). Cook, Ault and Smerdon (2015) have also suggested that risk of extreme drought, influenced mainly by higher temperatures, has been increasing in the western United States, irrespective of precipitation trends. There is evidence that the 2012–2016 drought was linked to anthropogenic climate change (Cook et al., 2015; Diffenbaugh et al., 2015; Mann and Gleick, 2015; Wang et al., 2014), with California's Governor Brown publicly acknowledging this (Knowles and Durisin, 2015).

While media representations do not determine public response to climate change or drought, many people do rely on media coverage to make sense of the complexities of climate change (Boykoff, 2011) and drought (Quesnel and Ajami, 2017). Accordingly, it is important to acknowledge the widespread reach and potential sway that the media can hold. As a consequence of media coverage of the link between

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climate change and the drought, and of the Governor's public response (e.g., Boxall, 2015; Diffenbaugh et al., 2015; Sahagun, 2015; Sobel, 2015), it is likely that many members of the public were aware of a link between the drought and climate change or – at least – were familiar with this suggestion. However, it has been proposed that journalists need to be more explicit about connections to climate change when covering local climate change related events (Allsop, 2018).

The drought itself received news coverage on a state, national and international level (Terhaar, 2015). Quesnel and Ajami (2017) found the media coverage of this drought to be extraordinarily high across nine national daily and California-based newspapers. The authors note that coverage began in 2012 and spiked after the second declaration of a state-wide drought emergency by Governor Brown. In some months, hundreds of newspaper stories covering drought were published nationally. The authors also examined the relationship between public interest and drought awareness (by examining Google search trends) and mass media. They found a significant positive correlation between newspaper article volume and Google searches for "California drought". Further, they found an association between increased news coverage of the drought and reduced water use. However, while it could be expected that climate change coverage might also be higher in California, data by Boykoff et al. (2019) suggest that climate change coverage was similar in the Washington Post and the Los Angeles Times (e.g., there were 120 articles in the former and 105 in the latter in December 2015).

The drought posed significant social and political challenges, with communities across the state being affected by drinking water shortages, reduced water for agriculture, higher wildfire risk and degraded habitat for wildlife (Executive order B-29-15, 2015). On April 1 2015, Governor Brown issued an executive order enforcing state-wide mandatory reductions in urban potable water use by an average of 25% (State Water Resources Control Board [SWRCB], n.d.). Each water district had autonomy over how to achieve this and districts' reduction rates were adapted according to the existing residential per capita usage (with cuts ranging between 4% and 36% [SWRCB, 2015]). The timeframe for reductions was originally set for June 2015 through February 2016 and use reduction was relative to the water used in the same months in 2013. This raises a question over the extent to which the drought was perceived as 'normal' (since there had been previous droughts) or whether, due to its extremity and the imposition of mandatory water cuts, it was perceived as unusually severe.

The case of California is especially noteworthy because of the cultural context in which the drought occurred. Reisner (1986) suggested that the USA (and California in particular) has been constructed as a place where everything is possible, where there are few limits (natural or social); he also noted that several towns and cities in the south-western United States were built in deserts, in direct defiance of nature's hostility. The drought in California presents a reminder of a lack of water in that region and of humans' dependence on their natural environment. These reminders are exacerbated under increasing anthropogenic climate change impacts in the region (Cook et al., 2015; Diffenbaugh et al., 2015; Griffin and Anchukaitis, 2014; Mann and Gleick, 2015). One reason sometimes given for inaction on climate change mitigation is the idea that the effects of climate change are distant in time and location (presumably from 'the West') and are therefore not tangible and immediate (Giddens, 2011; Swim et al., 2009<sup>1</sup>; Weber, 2006). A growing literature on 'psychological distance' has acknowledged that not only spatial proximity but also perceived temporal distance, perceived uncertainty and the extent to which a person feels directly personally affected by climate change will influence whether people engage with climate change issues (e.g., McDonald et al., 2015; Spence et al., 2012).

<sup>1</sup> The authors stated: "The likelihood of seriously and noticeably adverse events as the result [sic] global warming is bound to be small for the foreseeable future for many regions of the world" (p. 22).

Research has examined how people's beliefs about climate change are affected by personal experience of floods and droughts (e.g., Capstick et al., 2015; Leiserowitz et al., 2012) as well as the effects of such experiences on mitigation and adaptation intentions and behaviours (e.g., Blennow et al., 2012; Diffenbaugh et al., 2015; Whitmarsh, 2008). Leiserowitz, Feinberg, Howe and Rosenthal (2013) reported that 55% of their Californian study sample agreed that they had personally experienced the consequences of global warming and 19% said global warming would cause a great deal of harm to them personally.

The role of personal experience was also highlighted by Capstick et al. (2015), who found that after the winter 2013/2014 floods in the UK, 26% of respondents (of a nationally representative sample living in flood affected areas) indicated that their level of concern over climate change had increased over the previous 12 months (69% reported that their concern remained about the same and 4% said it had decreased). However, it has also been noted that the relationship between the experience of climate events and people's views and engagement is not straightforward. Additional ideological or psychological processes, such as whether or not an individual attributes the experience to climate change, is often crucial for how they respond (Brügger et al., 2015).

Despite the increase in research on local climate change perceptions, fewer qualitative than quantitative investigations have been conducted. Some qualitative studies of drought experience have been carried out in Australia (e.g., Alston, 2006; Anderson, 2009; Pearce et al., 2010) but there has been little corresponding qualitative research in the USA. In contrast to quantitative approaches, qualitative research may provide insight into people's experience of local changes by focussing on the detail of their views and responses. Examining US citizens' experience of the local evidence of climate change is particularly relevant given that perceptions have been argued to influence concern about, and action on, climate change (Armah et al., 2015; Blennow et al., 2012; Capstick et al., 2015; Leiserowitz et al., 2012; Swim et al., 2009). Moreover, the USA, as one of the (historically and current) highest per capita carbon emitters, is widely seen as having a large responsibility to reduce emissions (Klein, 2014; Norgaard, 2011).

### 1.1. Why drought narratives matter

Abbott and Wilson (2015) have suggested that understanding societal reactions to the notion and reality of climate change can be enabled by examining people's lived experience. In this paper we focus on Californian citizens' understanding and experience of the drought in 2015. This examination helps to contextualise views on the link between drought and climate change. The approach taken is similar to that of Pearce et al. (2010) who studied people's perceptions, attitudes, emotions and related responses to drought in South Australia. We investigate what kind of changes residents noticed and how they interpreted those changes. The key research questions were: How do Californian residents make sense of the drought in late 2015? What are some of the factors (e.g., location) that characterise and influence their experience of drought?

## 2. Method

Interviews were our method of choice in order to explore people's experience and understanding of the drought. We were not aiming to make generalisable claims (see Diffenbaugh et al., 2015) about Californians' views or to quantify these. Although the responses are not representative of all Californians, there was replication and overlap in what participants were saying, suggesting common themes. In order to 'evidence' this we have included multiple quotes per analytic theme, ensuring that these come from different participants. Interviews can provide insight into people's experiences to a greater degree than do quantitative survey questions, because the interviewees can openly share their perspectives without being limited by a narrow range of response options. Further, the interviewer can also introduce follow-up questions, prompt elaboration, elicit clarification and thereby explore in

greater depth people's reasoning and feelings.

Between 25th September and December 8, 2015, fieldwork was conducted on perceptions of the California drought. For purposes of anonymity the names of smaller locations are not mentioned and participants are given pseudonyms. The first author visited a range of locations, from large coastal cities to smaller towns in the north, south and east of California, as well as in the Central Valley. In total 71 people were interviewed; they were approached on the street, in cafés, or in other public spaces, or in some cases contacted by e-mail. While this convenience sample is unlikely to be representative of the population of California, we chose a heterogenous sample to capture diversity in that society (rather than selecting one particular demographic group). The literature on appropriate sample sizes for qualitative research predominantly emphasises that there is no fixed guideline because it fundamentally depends on the research aims, methodological and theoretical approaches (Baker & Edwards, 2012; Diffenbaugh et al., 2015). For qualitative research methods, including interview studies, a sample size of around 30 people is often considered appropriate, with recommendations ranging from 5 to 50 participants (Diffenbaugh et al., 2015; see also Mason, 2010).

Following a semi-structured interview schedule, people were asked at the outset whether they thought there was a drought or not, and if so, whether it was affecting them (see Table 1). Only towards the end of the interview were they prompted about what they thought was causing the drought, and whether or not it was related to climate change (these latter findings are presented elsewhere [Becker and Sparks, n.d.]). The interviews were audio-recorded and lasted between 4 minutes and 73 minutes, with an average length of 20 minutes. The interview length varied as most participants were approached in public spaces and were interviewed for as long as was convenient for them. Participants were not asked to provide demographic information (such as age or profession) because this would have seemed intrusive in the informal and conversational setting of the public space interviews.

### 2.1. Analytic approach

Interviews were transcribed including false sentence starts, repetitions and most fillers; these were however removed from quotes reported here. The coding and data analysis were flexible and informed by thematic analysis (Braun and Clarke, 2006). The transcripts were coded in NVivo following a data-driven approach, rather than a pre-existing coding frame, or theoretical preconceptions. This means we identified themes by repeatedly reading and coding the transcripts, noting assumptions, overlap and difference in experience and opinions. The transcripts were coded into meaning units, which were then sorted into larger themes and subthemes. Taking an explorative approach, we noted recurrent topics and how these relate to each other and the research questions. We were also interested in less prevalent views to include difference and divergent opinions and experiences (cf. Elliott and Timulak, 2005).

Employing a broadly contextualist method, we examined how residents made sense of their experiences, while taking into account how

**Table 1**

Interview schedule showing questions relevant for the reported analysis.

Interview schedule
1. To what extent have you perceived there to be a drought occurring in California (specify exact region)? For how long?
2. To what extent have you felt affected by the drought?
3. To what extent do you believe other people in California are being affected by the drought?
4. Have you changed how much water you use? How so?
5. Have you heard of, and if so, what do you think of the introduction of the mandatory cuts in water use (on average of 25%) in urban areas?
6. To what extent have you been affected by these new regulations?
7. What do you think the state should be doing to address the drought?

these experiences related to the broader social context. Braun and Clarke (2006) place contextualist approaches within theories of critical realism, acknowledging how people explain and interpret their experiences, while examining the influence of the larger social context on their interpretations. For our analysis this means we were both interested in people's personal experience, as well as exploring how these were shaped by their surroundings, such as socially shared ideas of 'normal' or 'abnormal' climate.

In the following analysis, the extracts we provide are illustrative examples of the themes we identified as central to people's perceptions.

### 3. Results

The analysis presented in this paper is primarily concerned with people's perceptions of drought, in order to provide an insight into how people interpret local and specific climate developments. This serves as a basis for understanding how people construe climate change in their surroundings - even when climate change is not mentioned explicitly. We focus specifically on people's experience of drought, such as whether or not they acknowledged the drought and which factors they describe as influencing their experiences and interpretations. The analysis enables the examination of how changes in people's surroundings are experienced; although these changes may be associated with climate change by scientists, they may not be by all members of the public. Examining perceptions of drought is a baseline for understanding how and why people may or may not link drought to climate change.

Themes are marked in bold type and subthemes are in italics. Ellipses indicate that a passage has been removed and words in brackets explain what the participant meant.

#### *Theme 1. Conceptions of normality*

This theme explored people's ideas of what was considered 'normal', in relation, for example, to rainfall patterns, snowfall, and lake and river levels. These ideas involved certain conceptions of nature, which often reflected nature as separate from humans. Nature was conceptualised as weather, landscape features such as lakes, trees and mountains, and was contrasted to the human-built environment, such as cities. The idea of what constituted normality also had a temporal dimension, since people used comparisons with what had been 'normal' in the past: "The mountains were barren and normally it should have been just packed and white" (Anna, speaking of a visit to a mountainous region in eastern California). Notions of time were also involved in claims about droughts as being natural and cyclical (recurring over time) and therefore 'normal'.

Jake (not originally from California) noted that people in Los Angeles (LA) were used to not having water, as it had always been transported into the city from elsewhere and that therefore nothing had really changed as a result of the drought:

Jake: "It's weird, when you talk to people that have lived here all their lives, they're kinda like, 'yeah, whatever' ... 'we've never had water' ... it just it never rains here, and they're used to that and they get their water from somewhere else and always have ... if you look around there's nothing different."

Establishing an idea of what is normal is necessary as a baseline comparison for noticing both landscape and weather changes, and changes in access to water. Anna's comment above presents her idea that previously the mountains would normally have been covered in snow at that time of year, the absence of which she characterised as unusual. In contrast, Jake's response demonstrates that because Los Angeles "never had water" (i.e. it is imported), the absence of the city's own water had become normal; therefore the drought did not necessarily present a different state of affairs or cause for concern. People 'knowing' that the region was dry and their being used to this meant that the drought condition did not pose an 'abnormal' comparison.

## Theme 2. Location (inside versus outside urban areas)

The level of exposure to changes in weather and landscape varied according to location, which influenced whether people described the drought as feeling more real or abstract. People in cities sometimes described noticing changes in weather, while people in rural areas also tended to notice changes in landscape.

### The role of weather in cities

In San Francisco some people commented on the weather being warmer, on changes in the timing of seasons and, above all, on the absence of fog, which was seen as characteristic of the city. Anna described the noticeable changes in terms of warmer weather but suspected that people in her city did not feel the effects as much as did people in other places.

Anna: "This kind of warmth that you've experienced day after day, after day, after day, is really unusual so, but, I don't know if people think it's the drought or if it's climate change, or if they just are like 'well' ... they don't care. But I don't feel that ... we have to cinch our belts as much as like southern California or maybe other places."

### Observing changes in landscape

People who lived in rural areas or towns tended to describe changes in their immediate surroundings. One town lay in a region that has historically experienced abundant water and mention of the pristine water supply tended to come with a sense of appreciation. Here, however, water supplies were also running low and there was talk of the local springs running dry (see also Table 2).

Rod: "Because there has been a drought the last four years ... they had to turn the wells on, and last year ... between the wells and the springs it barely kept up with demand."

Since that particular town relied on some of these springs for its water supply, people living there were able to closely monitor water running low. This was different from places such as LA, where water is brought in from elsewhere and where people are less closely familiar with their water source. However, in the abovementioned town water was still flowing from taps, so although people knew about direct changes in their surrounding landscape, they were not yet directly experiencing water shortages themselves.

### Drought as psychologically distant: In the city people feel less affected

People described feeling affected by the drought to differing degrees, depending on location. For example, in larger cities people seemed more likely to mention learning about the drought from the media than from direct experience. Larissa in San Francisco said she only knew about the drought from news sources and that she did not feel personally affected.

Larissa: "But I only know that (there is a drought) because, I read it in the paper and see it on the news ... I don't personally feel anything different. I mean, I believe it ... but ... it hasn't really affected me so much."

A similar point was made by Geoffrey in the same city (Table 2). Although people had been asked to reduce their water usage, some people in the city did not describe this mandate as a significant way in which the drought affected them. In the same area, Layla also stated that despite the water reduction measures, she sometimes forgot about the drought and that in the city people were "isolated" and did not understand its "seriousness" (Table 2). Similarly, Deborah in LA described that there was an "intellectual" but not a "practical awareness" of the drought, and she suggested that one reason for this was because everyday life was continuing as normal. This shows that, not only were ideas of what constituted normal weather patterns or landscapes important, but ideas of normal daily life also shaped people's experience of the drought. Because everyone else was continuing as usual, little disruption was experienced.

Deborah: "We have been quite aware through the media of the drought issue ... we haven't seen any difference in terms of every day of our lives and so it's just an intellectual awareness, but it's not a practical awareness. That's how it feels, that we're just hearing about it, they're scaring us about it, but ... it's not affecting like our everyday life. Which can be disconcerting because you kind of go on with your life like everything is normal and you know, at what point will we feel the impact, you know, that's the question."

Related to Deborah's question about when people would feel the impact, Arthur thought that it had to get to the point where water was not coming out of the taps anymore (Table 2). Arthur also commented that "people need to feel it before they react", suggesting that effects of the drought were not yet bad enough to cause a more significant response.

Several of the above extracts suggest that people equated drought with water shortage. Since they did not experience direct water shortage, they took it to mean that they were not affected by the drought. However, institutional definitions of drought do not suggest that residents will necessarily experience running out of water during drought. This indicates that there might be a mismatch between how drought is defined in professional settings (e.g. less water availability than expected in relation to demand) and how it is understood in everyday conversation (where drought seems to be equated to experiencing water shortage). The importance of not being in touch with a gradually-declining water supply was highlighted by Tom (in the Bay Area), in response to a question about whether he was personally affected by the drought.

**Table 2**

Theme 2. Location (inside versus outside urban areas) – illustrative quotations.

Participant	Quotation
2.2. Observing changes in landscape	
Thomas	We definitely see some of the springs that have shallow aquifers, they're starting to dry up seasonally. (One) spring ... it hasn't flowed for like the last two years.
2.3. Drought as psychologically distant: In the city people feel less affected	
Geoffrey	I'm thinking most people in the cities are only aware of it (drought) from the media, but they haven't faced any true dilemma ... I think anyone whose livelihood depends on water, is gonna be more affected.
Layla	Those measures are happening but I just feel like, even personally for me, like sometimes I forget there is a drought ... I think we are pretty isolated from like people who are actually experiencing drought, like people who really don't have water coming out of their tap ... just places that really aren't the city ... I know that there are places that actually felt that, like, struggle and I feel like we are not a group of people who have actually really like experienced it, so we are not really understanding the seriousness of it at all.
Arthur	If you go outside the city ... you can see it's just burnt up, everything is so brown and dry and hot and so you kinda see it when you leave the city ... San Francisco people I think are aware and conscious and they, a little bit, try to do stuff to cut down on water but, I don't think people are making that big of a deal of it ... because we turn on our taps, we get water.
Kyle	Everything tourist-related, restaurants, accommodation, rentals, tour guiding ... really everybody, and everybody knows somebody who works in that business, so if it didn't affect them directly, ... well, hypothetically, I don't have as much money, because I'm not making money here, so I can't spend it on other things in town. So it affects the entire economy ... (The drought is) talked about a lot, but it's also ignored a lot. It's the sort of thing that, it doesn't always interest people that much, because it doesn't affect them directly ... yet, if you listen to people who are really talking about it and discussing the facts, it is pretty dire, in a lot of situations, certain counties, certain cities, and if it persists the way it is, it'll be, you know, it'll affect lots of people drastically ... But, I don't know, for the time being people just kind of see what happens, just kind of wait it out.



**Table 3**

Theme 4. Understanding the drought as a social and political phenomenon – illustrative quotations.

Participant Quotation	
Chleo	There has been people in this community who have said multiple times throughout the summer that we are not in a drought ... and I just want to scream because you don't know what the definition of drought is then (laughs) because ... one of the things I'll tell you is that we are not in a situation of a water shortage. We have a very stable water supply, and ah, so that a lot of people up here they know that ... and they confuse water shortage with drought. It's like, well, they are often related but they are not the same ... But if the drought continues then we probably will be looking at a water shortage.
Felicia	We have the largest water supply ... I think there's some political ... agendas involved ... Oh yes, we're in a major drought, but I think that it's more than that ... I mean, my water rates have increased 30% ... my question is, I never see the numbers that are being used at (the water reservoir).
Betty	It's not raining, we know it isn't. It isn't a scam from the government that it's not raining ... I think, if the rain stops they're (corporations) like "ok, maybe we can raise rates" ... They're the jackal of what's happening outside, but they're not the cause of it.
Rod	Consumptive water rights claims are five times more than the available water supply in a normal water year ... what that means is that California is in a perpetual drought, regardless of how much it rains ... so if we build more dams and reservoirs they are going to be empty in the fourth year of drought ... so until California does an accounting of how much water is actually available and who is entitled to it, there is always going to be a demand for more water than exists and we are always going to be living beyond our means.
Jane	When you drive around highways in California it's really common to see signs saying like "we're in a drought - conserve water", you know "turn that tap off when you brush your teeth" really basic kind of suggestions which imply that individual people are the main cause for bad water practices, for unsustainable water practices ... this kind of information is promoting the idea that all you have to do is change your habits and daily life and then we won't be in this problem, which completely disregards the fact that farmers, and agriculture, are the biggest industry that is utilising most of the water in California, and then things like fracking ... People are very much being targeted to kind of imply that's the root cause and that they have kind of autonomy over that, which is just such an illusion.
Martin	We've got this inherent conflict between agriculture and the cities and the environment, whether you help the fish ... and let the rivers run free in order to help the fish, or whether you hold them back and help the people and of what you hold back, how much goes to the cities and how much goes to the farmers, so it's really that three-fold argument.

Tom: "No, it's living in a city ... (the water is) all piped down here ... the city has been living unnaturally since the beginning so, as long as there is enough water in the reservoir, and the reservoir is low, but you know the way the system is set up is that you either have water or you don't, it's not really a question of degree."

Kyle (in eastern California) mentioned that the drought in general had affected tourism because of the lack of snow, yet later he stated that even in this area people (including himself) weren't being directly affected (Table 2). There was sometimes the sense that the drought was worse elsewhere and might get worse in the future. So, although people knew about drought, and even if their local area was being affected, some people seemed to experience the drought as distant. There was thus a sense that people in cities predominantly noticed the drought when they left the city (e.g., through seeing changes in landscape) or learned about it via the media. But even in more directly affected places, there was often reference to the drought having a greater impact 'elsewhere' in the State.

### Theme 3. Emotional responses

Experiencing changes in the natural environment evoked different emotional responses, especially fear. Changes in 'normal' landscape and weather patterns were widely perceived as frightening. However, there were also attempts to remain optimistic and hopeful by focussing on positive dimensions of the drought.

#### Fear

Several people described the changes they were seeing as being "scary". Anna discussed a previous visit to a mountainous region in eastern California.

Anna: "I just looked at the mountains, we couldn't go skiing because it wasn't enough, and we just like went for a walk or something, and I just was like 'wow this is really scary'."

Another participant described the drying of a lake which she noticed on a car journey from San Francisco up through northern California.

Jane: "So there is most definitely a drought happening ... Lake Shasta is not a lake anymore ... we have seen a decrease over the last couple of years, but this is, it basically looked like a dried up meadow with a tiny, tiny stream coming to it. There is barely any water there at all ... rain is such a rare occurrence ... And it feels very miserable and scary actually."

This extract illustrates how people use their direct personal experience to inform and confirm their understanding of the occurrence of a drought. Concern was also raised specifically in relation to the future.

Lennard (Bay Area): "It kind of scares me, that's like the future, like water's going to be a real big deal out here."

Tom (Bay Area): "There's a sense of foreboding around here, like this isn't right, and this is a real concern, and things could get worse and we are all very worried about it."

#### Optimism<sup>2</sup>

While several people referred to the changes as "scary", one person in a town in northern California weighed up the pros and cons of the drought.

Thomas: "On the positive side, there's more recreational opportunities in terms of camping, hiking, that sort of thing. On the downside, skiing has really suffered ... all the little businesses in town like especially the restaurants ... they're not making money, we've actually seen a few that have closed up ... So there is an economic effect from the drought ... But, on the positive side, the town didn't have to spend any money on snow removal (laughing). And nobody here had to shovel snow for the first time in a long time, which is back breaking intensive work when you're trying to shovel out your driveways and stuff."

Thomas' analysis of advantages and disadvantages and level of optimism are noteworthy, given that he described serious economic impacts, as well as previously mentioning nearby springs running seasonally dry.

### Theme 4. Understanding the drought as a social and political phenomenon

Despite the majority of people stating that they believed there was a drought, some thought there was more to the drought than just a lack of water due to physical changes in nature. Their contestation varied from the argument that there was no drought at all, to milder versions suggesting that there was also a political dimension to the drought. This highlighted that people did not understand the drought purely in terms of natural and physical changes, but also pointed to a social component, concerning the demand and allocation of water.

In some cases the notion that there was still water coming from the taps and that life continued as "normal" meant that people only had an "intellectual awareness" (Deborah, above) of the drought. However, in other cases the absence of a personal water shortage led people to conclude that there was actually no drought. Chleo who worked for a water utility company in eastern California voiced her frustration at people not believing in the drought because they confused experiencing water shortage with drought (Table 3).

Some participants suggested that the severity of the drought was

<sup>2</sup> Optimism could be argued to be an emotion management strategy to avoid experiencing an unpleasant emotion (Norgaard, 2011).

exaggerated and used by politicians for ulterior motives (Rod: "it's being exploited"), although they did not argue that the drought was being made up (Felicia, Bay Area, Table 3). Betty (Bay Area) thought it was implausible that the drought was literally a fabrication of politicians or corporations, but agreed that they might use the situation for profit (Table 3). Another example of people implying a political dimension to the drought was highlighted by signs along the roads in the Central Valley (the agricultural centre of California) that were critical of Governor Brown's approach to the drought.

Rose: "I'm trying to remember exactly what the signs say, but they imply that politicians have created the water crisis and that we need to get them to stop it. And there are ... quite a few of them up and down the freeway ... and there will just be these signs posted 'government caused water crisis' you know, 'stop' ... 'water equals jobs', all through, so somebody is putting up those signs, more than one person."

There were also criticisms from other sectors and perspectives regarding the political handling of water allocation (Rod, Table 3). Rod was highly critical of the state government's handling of water, including a specific measure the state was funding:

Rod: "Politicians are owned by the big corporations, for instance, there's ... [names], they live in Beverly Hills, they are billionaires ... Californians in the cities were told to cut their water consumption on average of 25% because of the drought, (but) the state is allowing people like [names] and others to continue to plant permanent crops like almonds in areas with poisoned ground, over-drafted groundwater, where the ground is actually sinking because they are pumping so much water ... and there's no constraints ... And again it's a classic example of the corporations and the wealthy people buying the politicians ... It's a very, very corrupt system and it's very discouraging."

This extract illustrates the awareness that some Californians had of large-scale water use in agriculture and the state's relationship with 'big' agriculture. Another example of contestation of the handling of the drought (but not the drought itself) related to the individualised approach of water conservation. Jane suggested that individuals were being targeted as the culprits for bad water practices when she thought that fracking and 'big' agriculture made the real difference (Table 3). How the drought is understood is important because people's interpretations influence their views on appropriate responses. One example of this is how different water interests were sometimes constructed as opposite and mutually exclusive. In response to the question of what he thought should be done to better prepare for droughts in the future, Martin (Bay Area) proposed increasing storage capacity, but said that this would cause conflict with environmentalists (Table 3). Martin's assumption seemed to be that there was not enough water for everyone (water scarcity) and therefore he saw an 'inherent conflict' in water distribution. He was in favour of prioritising farmers and cities and increased water storage over the preservation of landscape and fish supplies. These contrasting claims concerning the cause of and solutions to the drought highlighted the political nature of what is sometimes framed and understood as a merely physical phenomenon.

#### *Theme 5. Marginalised experiences of the drought*

Finally, there were effects and experiences of the drought which were not commonly acknowledged or mentioned. There were some people who were being affected more severely than were others and whose predicament seemed to receive little attention. For example, there were low-income, mostly Latinx, farm-working communities in the Central Valley who had actually run out of water. Two women working for a water utility company mentioned the water problems in the Central Valley, which existed prior to - but were exacerbated by - the drought.

Lucy: "In the Central Valley people don't have access to safe drinking water ... their groundwater is contaminated ... people have to drink bottled water. They don't have the luxury of going to their tap to drink ... California, one of the most developed economies of the world ... people don't have access to safe drinking water ... it goes back to how water has been used: land uses."

Further, one of the springs that was running dry seasonally (mentioned by Thomas) is a sacred site for one of the Native American tribes (personal communication, Norgaard, 2016). One person mentioned another example of how Native Americans were impacted by the drought through the decline in salmon populations due to low water levels and water management practices by the state.

Rod: "On the Trinity and Klamath rivers we have Indian tribes over there that have rights to catch half of the fish, so if those fish go extinct, you're talking a cultural change to those tribes."

Factors such as location, infrastructure, social, economic and cultural status and sources of information influenced how people were affected by and understood the drought.

## **4. Discussion**

Ideas of normality and perceptions of time are relevant to people's understanding of drought. The passage of time can influence people's interpretation of what is normal; for example, when people have experienced previous droughts, they are potentially less inclined to view droughts as unusual. Perceptions of normality and change also depended on location, e.g., what was considered 'normal' in LA was based on an existing awareness of dryness in that area. Thus, it could be argued that the way city life is arranged, renders the lack of water and dryness invisible, at least in some places (cf. Ruddell et al., 2012). The combination of city infrastructure which provided water, as well as narratives which rendered California's dryness to be normal, appear to result in a situation where people can continue to have and see water without feeling threatened by a discourse of lack of water.

### *4.1. Location and perceived distance of drought*

In some areas people observed changes in their immediate environment, for example in weather patterns and the landscape. Almost everyone agreed that in recent years there had been noticeable changes, which ranged from the loss of 'luxury' recreational activities (such as skiing), to the reduction in available sources of water (springs, reservoirs and wells running low).

Consistent with Armah et al. (2015), the present findings challenge the suggestion that inaction on climate change is due to its distance in time and location. Climate change and its impacts are not consistently distant (in time and space), although perceptions of distance can be socially created (Gamson, 1992; Norgaard, 2011). Zerubavel (2006) and Norgaard (2011) have suggested that collective silence and ignoring occur at a societal, rather than just an individual, level. Even the more local occurrence of drought was not consistently perceived as close, relevant and real because the perception of this occurrence was influenced by other factors. For example, cities' water infrastructures were mentioned as to why some people only experienced the drought intellectually and did not feel affected by the drought. These findings stand in contrast to suggestions that concern about water is directly linked to water availability in the region (e.g., Evans et al., 2015). Despite aridity, people in LA, for example, still had access to water and did not report being more concerned about the drought than did people elsewhere in California. Accordingly, the complex relationship between, on the one hand, precipitation and temperature changes and, on the other hand, concern about drought or access to water, is moderated by factors such as water infrastructure and ideas of 'the normal', not simply levels of precipitation in a given region.

### *4.2. Emotions*

In line with previous research on emotional reactions to environmental change, some participants described emotional responses to the drought (Norgaard, 2006, 2011; Pearce et al., 2010; Petrasek MacDonald et al., 2013). For example, there was some indication that people reacted emotionally to the visual experience of a changing landscape,

which served as confirmation of what they already 'knew' about the drought from news coverage. It has been suggested that people's judgements and opinions are influenced by affective factors that are often unacknowledged in the broader literature on decision-making. Slovic, Finucane, Peters and MacGregor (2002), for example, have proposed an 'affect heuristic' whereby people use their own affective responses as an important cue that drives their decisions. Affective processes, in turn, are highly influenced by mental 'imagery'; states of affairs that do not conjure up any imagery (e.g., rather abstract notions of drought) may be less likely to elicit affective responses and subsequently less likely to influence decision making. On the other hand, states of affairs that are associated with a strong imagery (e.g., absence of snow cover on a mountain range) are more likely to elicit strong affective reactions and are more likely to influence processes of judgement.

#### 4.3. Sources of information

Several participants mentioned knowing about the drought through media coverage, highlighting that people not only relied on their direct experience, but also on media to gain understanding of the drought. Gamson (1992) examined the influence of experiential knowledge (e.g., personal experiences and those of close others), popular wisdom (e.g., shared knowledge in a particular subculture) and media discourse, on people's constructions of proximity and the meaning of an issue. He argued that whether or not an issue touches people's daily lives and has personal relevance is not an intrinsic property of the issue, but depends on how it is framed and interpreted. In the present research, some city dwellers who neither personally saw the changes in landscape, nor felt personally affected, described feeling "isolated" from the drought. Hearing about it on the news did not necessarily suffice to make it 'real' or 'close'.

The issues at stake in media representations of drought parallel many of the broader issues surrounding the framing of climate change. The broader attention given to climate change issues in the media (Boykoff and Yulsman, 2013; Olausson and Berglez, 2014) and the different ways of framing climate change issues within the media are widely acknowledged as critical to public responses (Broadbent et al., 2016; Broadbent et al., 2016; Olausson and Berglez, 2014), since the media are an important source of information on climate change (Boykoff and Yulsman, 2013). Consequently, it has been suggested that the low priority given to the importance of climate change by many members of the general public might be rectified by framing climate change issues in different ways (e.g. Nisbet, 2010): for example, by emphasizing its deleterious economic consequences and the moral injustice of burdening future generations or other countries with those consequences. However, the relationship between media frames and people's behaviour should not be oversimplified (Boykoff, 2011; Boykoff and Yulsman, 2013).

#### 4.4. Social construction of scarcity and environmental issues

Some participants viewed the drought and its impact partly as a political and social phenomenon, rather than simply an environmental one. The findings regarding the social contestation of water management and on the influence of political decisions on water availability, correspond to the notion that water management is inherently political (Mollinga, 2008). Discourses of natural scarcity may be one way of depoliticising and naturalising a conflict, rather than looking at its social and political origins (such as power relations which influence access to resources and distribution). Selby and Hoffmann (2014) pointed to the importance of policy, politics and economic structures in determining how valuable a resource is deemed, rather than conflicts being driven by the relative abundance or scarcity of a given resource. In California too, notions of water 'scarcity', the extent of drought and the political handling of water were frequently challenged and debated.

The way in which drought was construed in California was important because it influenced how it was responded to, publicly and politically. Gamson (1992) noted the impact of omissions on the framing of an issue. For example, not many participants seemed to know about, or mention, low-income farm-working communities' water problems or the effects of water practices on Native American communities. This resonates with Zerubavel's (2006) work examining collective silence and omissions, since attentional processes influence perceptions of relevance.

Future research could usefully investigate how certain communities are being affected more by drought than are others, because of how the impact of drought is related to social and economic status. Additionally, it would be beneficial to examine how perceptions of drought and water shortage influence people's water usage, and how these effects are moderated by social and economic factors, as well as by media representations.

In this research we have outlined how drought is not consistently perceived as either close or distant, real or abstract (see also Callison, 2014; Gamson, 1992; Norgaard, 2011), but how different meanings are actively constructed depending, for example, on the surrounding infrastructure and landscapes, personal experience, the media and broader social reactions to drought. Climate change and drought are not inherently distant or abstract; instead it depends how their features are experienced and communicated.

To conclude, it could be important to have increased media coverage on the link between local events, such as the drought in California, and climate change (Allsop, 2018), as well as covering marginalised experiences of the drought to increase awareness and support. Further, drought policies are likely to be critically examined by members of the public who do not treat drought as a purely natural phenomenon but question the political handling of water management. Since we need to avoid overgeneralising the findings of our research, we have to tread carefully in suggesting direct policy implications of the emerging themes that we have identified. However, what is apparent is that people will interpret the same climate events in different ways and that these different interpretations may well influence different responses to those climate events and to related policies. At the same time as acknowledging the multifarious ways in which climate events are framed and construed, we need to be aware both of the broader social influences on the content of those frames (e.g., Boykoff and Yulsman, 2013) and the complex relationship between those frames and public responses to climate events and climate change.

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#### Data statement

The research data is not publically available due to issues relating to confidentiality and disclosure.

#### Declaration of competing interest

None.

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## References

- Abbott, D., Wilson, G., 2015. *The Lived Experience of Climate Change*. Springer, London, UK.
- AghaKouchak, A., Cheng, L., Mazdiyasi, O., Farahmand, A., 2014. Global warming and changes in risk of concurrent climate extremes: insights from the 2014 California drought. *Geophys. Res. Lett.* 41 (24), 8847–8852. <https://doi.org/10.1002/2014gl062308>.
- Alston, M., 2006. 'I'd like to just walk out of here': Australian women's experience of drought. *Sociol. Rural.* 46 (2), 154–170. <https://doi.org/10.1111/j.1467-9523.2006.00409.x>.
- Allsop, J., 2018, 12. Climate change plays second fiddle as California burns. *Columbia Journalism Review*. Retrieved on 19.05.20 from [https://www.cjr.org/the\\_media\\_today/california\\_wildfires\\_climate\\_change.php/california\\_wildfires\\_climate\\_change.php](https://www.cjr.org/the_media_today/california_wildfires_climate_change.php/california_wildfires_climate_change.php).
- Anderson, D., 2009. Enduring drought then coping with climate change: lived experience and local resolve in rural mental health. *Rural Soc.* 19 (4), 340–352. <https://doi.org/10.5172/rsj.351.19.4.340>.
- Armah, F., Yengoh, G., Luginaah, I., Chuenpagdee, R., Hambati, H., Campbell, G., 2015. Monitored versus experience-based perceptions of environmental change: evidence from coastal Tanzania. *J. Integr. Environ. Sci.* 12 (2), 119–152. <https://doi.org/10.1080/1943815x.2015.1017505>.
- Baker, S., Edwards, R., 2012. How many qualitative interviews is enough? National Centre for Research Methods Review Paper. Retrieved on 20.03.19 from [eprints.ncr.m.ac.uk/2273/4/how\\_many\\_interviews.pdf](https://eprints.ncr.m.ac.uk/2273/4/how_many_interviews.pdf).
- Sarah Becker, Paul Sparks. The Influence of Personal Experience of the California Drought in 2015 on Views of Climate Change. In preparation.
- Blennow, K., Persson, J., Tomé, M., Hanewinkel, M., 2012. Climate change: believing and seeing implies adapting. *PLoS One* 7 (11), e50182. <https://doi.org/10.1371/journal.pone.0050182>.
- Boxall, B., 2015, 2. Scientists explain how climate change helps fuel California drought. *LA Times*. Retrieved on 03.08.19 from <http://www.latimes.com/science/sciencenow/la-sci-sn-california-drought-hot-and-dry-20150226-story.html>.
- Boykoff, M.T., 2011. *Who Speaks for the Climate? Making Sense of Media Reporting on Climate Change*. Cambridge University Press, Cambridge, UK.
- Boykoff, M., Daly, M., McAllister, L., McNatt, M., Nacu-Schmidt, A., Onok, D., Pearman, O., 2019. United States newspaper coverage of climate change or global warming, 2000–2019. Center for Science and Technology Policy Research, Cooperative Institute for Research in Environmental Sciences, University of Colorado, Media and Climate Change Observatory Data Sets. <https://doi.org/10.25810/jck1-hf50>.
- Boykoff, M.T., Yulsman, T., 2013. Political economy, media, and climate change: sinews of modern life. *WIREs Climate Change* 4 (5), 359–371. <https://doi.org/10.1002/wcc.233>.
- Braun, V., Clarke, V., 2006. Using thematic analysis in psychology. *Qual. Res. Psychol.* 3 (2), 77–101. <https://doi.org/10.1191/1478088706qp0630a>.
- Broadbent, J., et al., 2016. Conflicting climate change frames in a global field of media discourse. *Socius* 2, 1–17. <https://doi.org/10.1177/2378023116670660>.
- Brügger, A., Dessai, S., Devine-Wright, P., Morton, T.A., Pidgeon, N., 2015. Psychological responses to the proximity of climate change. *Nature Climate Change* 5, 1031–1037. <https://doi.org/10.1038/nclimate2760>.
- Callison, C., 2014. *How Climate Change Comes to Matter: the Communal Life of Facts*. Duke University Press, Durham, NC.
- Capstick, S.B., Demski, C.C., Sposato, R.G., Pidgeon, N.F., Spence, A., Corner, A., 2015. Public perceptions of climate change in Britain following the winter 2013/2014 flooding. In: *Understanding Risk Research Group Working Paper 15-01*. Cardiff University, Cardiff, UK.
- Cayan, D.R., Das, T., Pierce, D.W., Barnett, T.P., Tyree, M., Gershunov, A., 2010. Future dryness in the southwest US and the hydrology of the early 21st century drought. *Proc. Natl. Acad. Sci. Unit. States Am.* 107 (50), 21271–21276. <https://doi.org/10.1073/pnas.0912391107>.
- Cook, B.I., Ault, T.R., Smerdon, J.E., 2015. Unprecedented 21st century drought risk in the American southwest and central plains. *Science Advances* 1 (1), e1400082. <https://doi.org/10.1126/sciadv.1400082>.
- Diffenbaugh, N., Swain, D., Touma, D., 2015. Anthropogenic warming has increased drought risk in California. *Proc. Natl. Acad. Sci. Unit. States Am.* 112 (13), 3931–3936. <https://doi.org/10.1073/pnas.1422385112>.
- Elliott, R., Timulak, L., 2005. Descriptive and interpretive approaches to qualitative research. In: Miles, J., Gilbert, P. (Eds.), *A Handbook of Research Methods for Clinical and Health Psychology*, first ed. Oxford University Press, Oxford, UK, pp. 147–160.
- Evans, J., Calabria, J., Borisova, T., Boellstorff, D., Sochacka, N., Smolen, M., Mahler, R., Risse, L., 2015. Effects of local drought condition on public opinions about water supply and future climate change. *Climatic Change* 132 (2), 193–207. <https://doi.org/10.1007/s10584-015-1425-z>.
- Executive Order, 2015. Retrieved on 09.07.16 from [https://www.gov.ca.gov/docs/4.1.15\\_Executive\\_Order.pdf](https://www.gov.ca.gov/docs/4.1.15_Executive_Order.pdf).
- Gamson, W., 1992. *Talking Politics*. Cambridge University Press, Cambridge, UK.
- Giddens, A., 2011. *The Politics of Climate Change*. Polity Press, Cambridge, UK.
- Gleick, P., 2017. Impacts of California's Five-Year (2012–2016) Drought on Hydroelectricity Generation. Pacific Institute.
- Griffin, D., Anchukaitis, K., 2014. How unusual is the 2012–2014 California drought? *Geophys. Res. Lett.* 41 (24), 9017–9023. <https://doi.org/10.1002/2014gl062433>.
- Klein, N., 2014. *This Changes Everything: Capitalism vs. The Climate*. Simon & Schuster, New York.
- Knowles, D., Durisin, M., April 5. Jerry Brown: California drought shows 'climate change is not a hoax'. Retrieved on 03.10.16 from <http://www.bloomberg.com/politics/articles/2015-04-05/jerry-brown-california-drought-shows-climate-change-not-a-hoax>.
- Leiserowitz, A., Feinberg, G., Howe, P., Rosenthal, S., 2013. Climate change in the American mind: a focus on California, Colorado, Ohio, and Texas. Yale University, New Haven, CT. Yale Project on Climate Change Communication. Retrieved on 08.07.16 from [http://climatecommunication.yale.edu/wp-content/uploads/2016/02/2013\\_10\\_Climate-Change-in-the-American-Mind.pdf](http://climatecommunication.yale.edu/wp-content/uploads/2016/02/2013_10_Climate-Change-in-the-American-Mind.pdf).
- Leiserowitz, A., Maibach, E., Roser-Renouf, C., Hmielowski, J.D., 2012. Extreme Weather, Climate & Preparedness in the American Mind. Yale University and George Mason University. Yale Project on Climate Change Communication, New Haven, CT. Retrieved on 07.07.16 from <http://environment.yale.edu/climate/files/Extreme-Weather-Climate-Preparedness.pdf>.
- Mann, M., Gleick, P., 2015. Climate change and California drought in the 21st century. *Proc. Natl. Acad. Sci. Unit. States Am.* 112 (13), 3858–3859. <https://doi.org/10.1073/pnas.1503667112>.
- Mason, M., 2010. Sample size and saturation in PhD studies using qualitative interviews. *Forum: Qualitative Social Research* 11 (3). <https://doi.org/10.17169/fqs-11.3.1428>.
- McDonald, R.L., Chai, H.Y., Newell, B.R., 2015. Personal experience and the 'psychological distance' of climate change: an integrative review. *Journal of Environmental Psychology* 44. <https://doi.org/10.1016/j.jenvp.2015.10.003>.
- Mollinga, P.P., 2008. Water, politics and development: framing a political sociology of water resources management. *Water Altern. (WaA)* 1 (1), 7–23.
- Nisbet, M., 2010. Communicating climate change: Why frames matter for public engagement. *Environment: Science and Policy for Sustainable Development* 51 (2), 12–23. <https://doi.org/10.3200/ENVT.51.2.12-23>.
- Norgaard, K.M., 2006. "People want to protect themselves a little bit": emotions, denial, and social movement nonparticipation. *Socio. Inq.* 76 (3), 372–396. <https://doi.org/10.1111/j.1475-682x.2006.00160.x>.
- Norgaard, K.M., 2011. *Living in Denial*. MIT Press, Cambridge, Mass.
- Olausson, U., Berglez, P., 2014. Media and climate change: four long-standing research challenges revisited. *Environmental Communication* 8 (2), 249–265. <http://doi.org/10.1080/17524032.2014.906483>.
- Pearce, M., Willis, E., Wadham, B., Binks, B., 2010. Attitudes to drought in outback communities in south Australia. *Geogr. Res.* 48 (4), 359–369. <https://doi.org/10.1111/j.1745-5871.2009.00639.x>.
- Petrasek MacDonald, J., Harper, S., Cunsolo Willox, A., 2013. Edge, V., & rigolet Inuit community government A necessary voice: climate change and lived experiences of youth in rigolet, nunatsiavut, Canada. *Global Environ. Change* 23 (1), 360–371. <https://doi.org/10.1016/j.gloenvcha.2012.07.010>.
- Quesnel, K.J., Ajami, N.K., 2017. Changes in water consumption linked to heavy news media coverage of extreme climatic events. *Science Advances* 3 (10), 1–9. <https://doi.org/10.1126/sciadv.1700784>.
- Reisner, M., 1986. *Cadillac Desert*. New York, N.Y.: Viking.
- Ruddell, D., Harlan, S., Grossman-Clarke, S., Chowell, G., 2012. Scales of perception: public awareness of regional and neighborhood climates. *Climatic Change* 111 (3–4), 581–607. <https://doi.org/10.1007/s10584-011-0165-y>.
- Sahagun, L., 2015, 20. California drought: Climate change plays a role, study says. But how big? *LA Times*. Retrieved on 20.05.20 from <http://www.latimes.com/science/la-sci-climate-change-drought-20150820-story.html>.
- Selby, J., Hoffmann, C., 2014. Beyond scarcity: rethinking water, climate change and conflict in the Sudans. *Global Environ. Change* 29, 360–370. <https://doi.org/10.1016/j.gloenvcha.2014.01.008>.
- Slovic, P., Finucane, M., Peters, E., MacGregor, D.G., 2002. The affect heuristic. In: Gilovich, T., Griffin, D., Kahneman, D. (Eds.), *Heuristics and Biases: The Psychology of Intuitive Judgment*. Cambridge University Press, New York, pp. 397–420.
- Sobel, A., 2015, 8. Did climate change cause California drought? CNN. Retrieved on 19.05.20 from <https://edition.cnn.com/2015/04/08/opinions/sobel-california-drought/index.html>.
- Spence, A., Poortinga, W., Pidgeon, N., 2012. The psychological distance of climate change. *Risk Analysis* 32 (6), 957–972. <https://doi.org/10.1111/j.1539-6924.2011.01695.x>.
- State Water Resources Control Board (n.d. Adopted text of emergency regulation. Article 22.5 Drought emergency water conservation. Retrieved on 19.04.16 from [http://www.waterboards.ca.gov/water\\_issues/programs/conservation\\_portal/docs/emergency\\_reg/final\\_reg\\_enacted.pdf](http://www.waterboards.ca.gov/water_issues/programs/conservation_portal/docs/emergency_reg/final_reg_enacted.pdf).
- State Water Resources Control Board, 2015, 7. Emergency Conservation Regulation Fact Sheet. Retrieved on 08.03.19. [https://www.waterboards.ca.gov/water\\_issues/programs/conservation\\_portal/docs/factsheet/implementing\\_25percent.pdf](https://www.waterboards.ca.gov/water_issues/programs/conservation_portal/docs/factsheet/implementing_25percent.pdf).
- Swim, J., Clayton, S., Doherty, T., Gifford, R., Howard, G., Reser, J., Stern, P., Weber, E., 2009. Psychology and global climate change: addressing a multi-faceted phenomenon and set of challenges. A report by the American psychological association's task force on the interface between psychology and global climate change. Retrieved on 07.07.16 from <http://www.apa.org/science/about/publications/climate-change-booklet.pdf>.
- Terhaar, J., 2015, 18. Media must make a difference in coverage of California's drought. *The Sacramento Bee*. Retrieved on 22.03.19 from <https://www.sacbee.com/opinion/opn-columns-blogs/joyce-terhaar/article18722001.html>.



- Wang, S., Hippias, L., Gillies, R., Yoon, J., 2014. Probable causes of the abnormal ridge accompanying the 2013-2014 California drought: ENSO precursor and anthropogenic warming footprint. *Geophys. Res. Lett.* 41 (9), 3220–3226. <https://doi.org/10.1002/2014gl059748>.
- Weber, E., 2006. Experience-based and description-based perceptions of long-term risk: why global warming does not scare us (yet). *Climatic Change* 77 (1–2), 103–120. <https://doi.org/10.1007/s10584-006-9060-3>.
- Whitmarsh, L., 2008. Are flood victims more concerned about climate change than other people? The role of direct experience in risk perception and behavioural response. *J. Risk Res.* 11 (3), 351–374. <https://doi.org/10.1080/13669870701552235>.
- Zerubavel, E., 2006. *The Elephant in the Room*. Oxford University Press, Oxford, UK.