THE CERTAINTY OF CHANGE:
FLOOD, DROUGHT, AND THE GENRE OF ENVIRONMENTAL PROPHECY IN CALIFORNIA'S CENTRAL VALLEY, 1987-2015

by

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ACKNOWLEDGMENTS

It is true that writing may be a solitary existence. Sometimes in the cool quiet mornings when the chorus of others' voices rests behind closed doors, I find that I can hear my own voice with some clarity. At its best, so nourishing this time feels that I build it into my routine in the hope that I can somehow conjure the voice, if not by demand than by sheer repetition. And if mornings are not enough, perhaps a writing retreat will be, I think, and so go to a cabin in the woods. A writer could be tempted to conflate discipline with ownership in these instances—that somehow the act of solitude distills the authorial voice into a singular whole, property of the fragile ego. But it is a fiction to believe that this voice belongs only to me, or that to retreat is to move away from others. In this silence I am actually brought *closer* to the many voices that have shaped me. They are all invisibly present in this thesis. But I would like to make them visible here, for the pages that follow are as much theirs as they are mine.

This project began two years ago, and has evolved through several incarnations since. Among the faculty at University of Wisconsin-Madison, my first debt is to my advisor, Bill Cronon, who has shown me the scholar's craft through both example and pedagogy. His insights always point to a larger lesson to be learned, often with a kind of poetic symmetry between content and process. In so doing, Bill has helped to refine my writing and thinking, and I am forever grateful for his patience, incisiveness, and care with which he's helped me develop. My other committee members, Matt Turner and Morgan Robertson, each provided valuable geographic perspectives on disaster studies, and the thesis is much stronger for them. Rob Nixon's literary example and humble suggestions provided inspiration and fresh

ideas, and I also benefited from Gregg Mitman's keen editorial guidance.

One of the most gratifying aspects of studying at this university has been the wonderful community of graduate students that has come together around the burgeoning field of environmental humanities. My friends Lauren Ayers, Rachel Boothby, Charlie Carlin, Andy Davey, Sarah Dimick, Spring Greeney, Rachel Gross, Nathan Jandl, Adam Mandelman, Garrett Nelson, Eric Nost, Tony Pietsch, Alex Rudnick, Kaitlin Stack-Whitney, Becca Summer, and Kate Wersan have all provided invaluable suggestions, encouragement, and editing throughout the process, as have post-docs Toshihiro Higuchi and Daegan Miller. My friend Rabbi Benjamin Barnett pointed me towards valuable *midrashim*, or commentary, on Biblical depictions of natural disasters. Despite differences among fields and even vocations, it is a gift to know that we are all working on such stimulating and overlapping work, and that we all benefit from each other's sharp minds and generous spirits. I only hope to be able to return the favor in kind for them.

In conducting research for this thesis during the summer of 2014, I had the good fortune of encountering truly helpful resources in California without whom this project would not have been possible. At University of California-Riverside, I benefitted from the generosity of Jessica Greene in locating documents at the Water Resources Collections and Archives. And many individuals at the California Department of Water Resources in Sacramento made possible an enriching tour of the water system and interviews with important people in my story. I would like to specifically thank Mike Anderson, Stein Buer, Jim Goodridge, Karen Hull, Maria Lorenzo, Adolfo Luna, Michael Mierzwa, Ricardo Pineda, Cate Plantaric, and George Qualley for orchestrating the visit, giving me the time to ask questions, and driving me throughout the valley to meet people and observe the

landscape. Their profound generosity gave this project much more texture and nuance, and I hope that my work can somehow contribute to theirs as they seek to address in practice many of the riddles that this thesis poses.

Since we are each an amalgamation of our pasts, I owe a great debt to my former professors at Whitman College, Phil Brick and Don Snow, for opening my eyes to the Gordian knot that is the American West. To be sure, it is a fascinating Gordian knot, which accounts for my enduring emplacement in its landscapes, peoples, and ideas. Phil showed me the paradoxes and unresolved riddles of the West through a semester-long immersion in which I forged a strong enough connection to call myself a citizen. In the West, citizens are made and not born. I have Don to thank for calling myself a writer. This is a bold claim that I often doubt, but it was only through his mentorship and encouragement that I continued beyond those mornings when my voice never arrived.

Finally, I dedicate this thesis to my family. I have sometimes joined my parents in wonder that my interest in environmental history embodies a hybrid of them both. I channel my mother Barbara, a social worker, who has helped hundreds of people make meaning of their own lives through the stories they tell. I channel my father Gordon, a river scientist, in his love of water, landscape, and deep time. To write a thesis about storytelling in the natural world, then, was to also assert both continuity and independence—an action that every son must eventually take. To have two loving parents who have joined in my enthusiasm and enabled my growth is a gift I cannot repay. To have two loving parents who also give their son access to an Oregon river cabin to write? There are some fortunes I do not pretend to deserve or understand. My brother Michael, who I consider to be my best friend, shares my love of relating to the world through stories. His intuitive curiosity, enthusiasm for discovery,

and ability to inspire were deep reservoirs throughout this journey. Together, the family unit forged in Oregon is the product of love and landscape.

I am thus not a solitary voice but rather a mosaic. I cannot take full ownership of anything but my errors.

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INTRODUCTION
CALIFORNIA, LAND OF MODERN PROPHECY

The Fertile Crescent, a vast stretch of desert arcing from Egypt to Mesopotamia, is known popularly as the cradle of civilization for seeing the dawn of pre-modern human history by virtue of rich land and a Mediterranean climate. But such a landscape did not always cradle civilization. Among the most transformative events to overtake its early inhabitants were droughts and floods, which would descend episodically to ruin crops and send people on quests through the desert looking for hospitable terrain. So engrained as parts of a human lifespan were these events that they became mythologized in the *Tanakh* for expressing the wrath of God. Although they were depicted differently, they were both seen as signs of supernatural suffering intended as retribution for wrongdoing. The Hebrew word for flood is *mabul*; for drought it is *ra'av.* Importantly, *mabul* shares no root with any other Hebrew word, even though the words for rain and water are commonly invoked, and one could easily imagine that the word for flood would simply be an intensification of these other more common words. It is the singularity of *mabul* that stands in contrast to *ra'av*, which roughly translates to famine, thirst, and hunger--also very common words. But drought does not have its own singular word, and instead is invoked as a common though no less disruptive phenomenon, as the sky's withholding of rain could send people looking for more fertile ground just as easily as a flood could send them looking for drier ground.

The significance of these words, however, lies less in their individual meanings than in the context of Biblical stories of God's wrath. God sends Noah's Flood to begin and end on precise days, "blotting out" the earth for forty days and killing all but Noah and his ark in

order to establish a covenant.[1] For God to achieve the obedience that the covenant requires, the flood must onset precisely and lethally, and must end by the mercy of equal precision. It is fitting that such a phenomenon would be defined by a unique word. By contrast, drought is presented in verse: "Beware that your hearts are not deceived, and that you do not turn away and serve other gods and worship them. Or the anger of the Lord will be kindled against you, and He will shut up the heavens so that there will be no rain and the ground will not yield its fruit; and you will perish quickly from the good land which the Lord is giving you."[2] In drought, the Bible gives no sense of onset or prospect of finitude to convey an undetermined state of wandering amidst fallow fields.

Other Biblical stories of destruction as a form of retribution organize themselves into narrative arcs on a similar spectrum between discrete moments of drama and diffuse moments of strain: God wipes out Sodom and Gomorrah in Genesis swiftly and spectacularly for hedonistic sin; in Exodus the Israelites wander in the wilderness for forty years because they disobeyed God's word. However different these stories may seem--containing different characters, occurring over different periods of time, with consequences of different proportions--they both carry the same *lessons* of punishment for the sins of the past. This interplay between moments of swift destruction and moments of more prolonged strain seem to organize more than even disasters--on a more fundamental level, the traumatic events of history fit somewhere on this same spectrum. Such variety of lived experience poses a dilemma for how to represent it in a story. As philosopher Elaine Scarry writes, "To have

[1] Genesis 7:1-10:32.
[2] Deuteronomy 11:16-17.

pain is to have certainty; to hear about pain is to have doubt."[3] This barrier between experience and representation brings up questions of audience and authority. If the lived experience of a flood is different from that of a drought, then how does this difference manifest in the stories one tells about it--and how does this overcome the barrier of doubt between author and audience?[4]

Biblical stories of God's wrath are potent because they attempt to overcome this barrier as a particular genre of storytelling called *apocalyptic prophecy*. Abraham Heschel, the great 20th century expositor of the books of prophecy in the *Tanakh*, approached the prophets as cultural critics who invoked prophecy as a rhetorical genre of moral injunction. The genre functions through what I'm calling a "double movement": by looking to the past to rebuke events in which people could have acted differently but didn't, and by looking to the future to foresee punishment for these past completed actions. As such, prophecy gains its power in fiction; the future has not yet happened, of course, so to avoid it, we must envision the wrathful end we will meet if we continue our sinful ways. But the word "wrath" is deceptively complex: it connotes divine *authority*--the cautionary limit to human agency--but it also places the power of translating that authority in human hands. As Heschel writes, "Both in predictions of things to come and in descriptions of things that came to pass, the word about the divine anger...is never a spontaneous outburst, but a reaction occasioned by the conduct of man."[5]

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3 Elaine Scarry, The Body in Pain (New York: Oxford University Press, 1985), 13.
4 William Cronon poses a similar epistemological puzzle that events themselves are "defined and delimited" by how we represent them with stories. See "A Place for Stories: Nature, History, and Narrative." *Journal of American History* (March 1992).
5 Heschel, Abraham J. *The Prophets* (New York: Harper & Row, 1962), 62.

Divine authority spoke through the *prophets*, who were tasked with translating the word of God to the people by connecting divine anger with people's disparate past actions. It is this sense of grand interconnectedness--that what one does had future consequences--that transcends the barrier between author and audience that Scarry poses for us. The prophet is still human, and thus must endure the same consequences that befall the people. Such divine anger was "not a blind, explosive force, operating without reference to the behavior of man, but rather voluntary and purposeful, motivated by concern for right and wrong."[6] There is thus a pattern to the double movement between past and future, where anger and mercy function not as "opposites but [as] correlatives."[7] At its simplest, then, the genre of apocalyptic prophecy needs three attributes: a past to critique, a future to avoid, and a way of avoiding it. Since divine authority mediates Biblical parables, there is great correspondence between prophesied and realized futures. The people's betrayal of the laws of God is the cause of their own punishment, and over and over again it's what gets them into trouble. In this sense, drought and flood, however different their phenomenological descriptions may be, are both morally constitutive of the same prophetic genre.

These pre-modern parables would have been told rather differently as trust in scientific rationalism in 20th century America overtook the divine as the source of causal authority. The laws of physics, atmospheric science, and engineering would now explain what had previously been seen as a direct expression of the heavens themselves. With the technical expertise and infrastructure in the form of dams, levees, and aqueducts to moderate

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6 Ibid. The subjects of prophecy and the prophets garner much debate and critique among Talmudic scholars. See Shai Held's *Abraham Joshua Heschel: The Call of Transcendence* (Bloomington: Indiana University Press, 2013) to contextualize Heschel's thought among Jewish and Christian theologians.
7 Heschel, *Prophets*, 63.

and transport water over the landscape, it became increasingly possible to believe that *other people*, rather than divine judgment, were responsible when catastrophe struck. But disasters were not only to be overcome by people. Indeed the cultural historian Kevin Rozario claims that it was precisely "the catastrophic logic of modernity" that enabled feedback loops: the very infrastructure designed to facilitate the comfort and stability of daily life would at some point fail and be seen as the "cause" of the next natural disaster.[8] Any complex engineered system--dams, levees, aqueducts--could experience an extreme natural event, but it was now human failures rather than natural failures that were seen as the cause of what the sociologist Charles Perrow calls "normal accidents."[9] Attendant to modern methods of controlling nature was what the writer Kathryn Schulz calls an "age of ecological reckoning" in which the destruction of nature as a product of that control became more apparent--the two processes went hand in hand.[10] The modern experience of disaster was an exercise in paradox:

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8 I will leave it to others, such as Kevin Rozario, Rebecca Solnit, and Ted Steinberg to more comprehensively define and differentiate such inter-related terms as "disaster," "catastrophe," and "calamity." Suffice it to say that I will use these words interchangeably, though am very careful in how I differentiate these words from the more capacious word, "event." Many events, including those that might otherwise be deemed disasters at other moments in history, didn't qualify as disasters in modernity, for reasons that get to the heart of my project: there was more infrastructure to soften and alleviate their impacts, and deeper still, the stories by which people defined an event also purposed it to different causal actors, such that an event could exist for some people and not for others. Thus, stories in a very real sense defined an event as much as an event defined stories people told about it. Similarly, because the line between human and natural causation is so blurry in "natural" disasters, and because its very blurriness is of principal importance to this essay, I use the word "disaster" without the prefix of "natural." As the different stories people told of both human and natural actors attest, disentangling the natural from the human aspects of the disaster is not my purpose; rather it is to understand how people mediate--and are mediated by--the natural in these instances. See Kevin Rozario, *The Culture of Calamity: Disaster and the Making of Modern America* (Chicago: The University of Chicago Press, 2007); Rebecca Solnit, *A Paradise Built in Hell: The Extraordinary Communities that Arise in Disaster* (New York: Penguin, 2010); and Ted Steinberg, *Acts of God: The Unnatural History of Natural Disaster in America, 2nd edition* (New York: Oxford University Press, 2000).

9 See Charles Perrow, *Normal Accidents: Living with High-Risk Technologies* (Princeton: Princeton University Press, 1999).

10 Kathryn Schulz, "The Really Big One." *The New Yorker*, July 20, 2015, 59.

infrastructure that was developed to protect people also made them vulnerable to future disasters, but people also needed disasters in order to make moral sense of the narrative trajectories of modern life.[11] The age of ecological reckoning was thus also an age of blame.[12] [13]

This shift in authority from the divine to the scientific not only changed how people saw cause and effect, but also how people experienced time itself during these events. If one believed that other people were now responsible when a flood or drought hit, the myopic timescales associated with causation suddenly came into stark relief. Schulz has called this phenomenon "temporal parochialism," in which natural disasters have to come to signify the repeated intersection of geologic with human timescales.[14] Nowhere was this more prevalent than in the Central Valley of California, a Mediterranean landscape not altogether that different from the Fertile Crescent. The valley, which stretches 400 from north to south and 60 miles from east to west, is paradoxically dry and fertile. The land is flat and the soil rich, sustaining one of the largest agricultural regions in the world, and requiring enormous investment in water infrastrastructure to transport and store water.[15] In the 1930s, dams and

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11 Rozario explores this paradox at length.

12 A 2011 poll conducted by the Public Religion Research Institute and Religious News Service found that most Americans--even those who identified as religious--were more inclined to see other people rather than God as responsible for a disaster. But many also said that they still believed that God was "in control" of the earth, indicating that even though disasters were not seen as direct conversations with the divine, they still saw natural forces as being mediated by divine authority. PRRI Poll "Who do you blame in natural disaster?" March 15, 2011.

[13] Mike Davis explores the irony of California being a place that both experiences disasters in reality but also produces disasters in fiction as a sort of commentary on the relationship between disasters and modernity. Attendant to the production of blame is also the production of fear. See Mike Davis, *Ecology of Fear: Los Angeles and the Imagination of Disaster* (New York: Vintage, 1998).

[14]Schulz, "The Really Big One," 59.

[15]The literature on the mythology of California, and whether it represents Eden or a fall from it, is vast. But for the best hits, see David Wyatt, *The Fall Into Eden: Landscape and Imagination in*

levees would proliferate throughout the country with lifespans commensurate with those of a human. Embedded within the concrete were assumptions of the recurrence and severity of various weather events, which themselves were based on records dating back only several decades. Such development allowed many to form a conception of what "normal" climatic patterns meant, and throughout the 20th century populations, agriculture, and infrastructure proliferated. The water system thus functioned to soften--or at least postpone--the questions of variability and uncertainty that settlers had previously faced directly. People began to live in greater numbers on floodplains and in irrigated areas that received no more than five inches of rain a year.[16] For example, an atmospheric event that a century prior might be experienced as a flood or a drought would now cause nobody to bat an eye if the structural integrity of the system maintained equilibrium. By the same token, when a particularly severe storm or drought hit and overcame the system, it became laden with moral lessons about how it could have been prevented.

Moreover, a different experience of time also meant that these lessons seemed quite different between flood and drought. In the popular imagination, disasters disaggregated into a spectrum of seemingly different species defined by velocity: at one end was a fast disaster

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California (London: Cambridge University Press, 1986); Kevin Starr, *California: A History* (New York: Penguin, 2005); and John McPhee, *Assembling California* (New York: Macmillan, 1993).

[16] The list of scholars who depict what the modern control of nature looks like in the Central Valley is likewise long indeed, but several notable ones are: Donald Pisani, *From the Family Farm to Agribusiness: The Irrigation Crusade in California and the West, 1850-1931* (Berkeley: University of California Press, 1984); Steven Stoll, *Fruits of Natural Advantage: Making the Industrial Countryside in California* (Berkeley: University of California Press, 1998); Norris Hundley, *The Great Thirst: Californians and Water – A History* (Revised Edition) (Berkeley: University of California Press, 2001); and Donald Worster, *Rivers of Empire: Water, Aridity, and the Growth of the American West* (New York: Oxford University Press, 1992). For a hydrologic perspective of past historic floods and droughts in California and the American West, see B. Lynn Ingram and Frances Malamud-Roam. *The West Without Water: What Past Floods, Droughts and Other Climatic Clues Tell Us About Tomorrow* (Berkeley: University of California Press, 2013). The title itself is suggestive of the prophetic genre.

and the other end a slow one. Popular narratives of fast disasters permeated the airwaves, showing houses swept away by floods and death toll counts. Slow disasters, on the other hand, were a harder sell to the popular imagination because they lacked the drama and visibility of their counterparts. The environmental writer Rob Nixon draws this distinction with the term "slow violence."[17] It would be tempting to apply this popular distinction to floods and droughts, as on first glance a flood seems fast and spectacular and a drought slow and atmospheric. Floods could be seen as shock events, where nature rears its head like a loaded spring, a swift and direct punishment; droughts could be seen as strain events, where nature's wrath is doled out more piecewise, waxing and waning according to the severity of scarcity, always an impending catastrophe rather than a realized one. But importantly, this distinction is only useful *during* these events. However different they seemed while they're happening, the stories people told about causation in the past and prophecy of the future invoked geologic timescales as a reminder of the outside force of nature and the cause of change over time. In this way, the modern distinction between fast and slow disasters is mediated by geologic time--a secular version of the divine.

Crucially, who counted as a prophet secularized as well. Whereas during pre-modern times the prophets occupied a particular role as mediators between the divine and the human by communicating directly with God and translating such dialogue into prophecies that would inspire the people to act, when people began to see *themselves* to be in control of nature, *anyone* could cast blame into the past and spin a prophecy of the future. If science

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17 Rob Nixon, *Slow Violence and the Environmentalism of the Poor* (Cambridge: Harvard University Press, 2011). Nixon adds a temporal perspective to Michael Watts' theoretical foundation of these unspectacular but harmful phenomena. See See Michael Watts, *Silent Violence: Food, Famine, and Peasantry in Northern Nigeria* (Athens: University of Georgia Press, 1983).

was now authoritative in explaining causality, scientists and translators of science would now function as modern prophets, providing direction during times of uncertainty, and providing evidence for a vast array of stories that attempted to explain the past and predict the future. It is in this context that the modern prophecy operates--through stories of blame, prophecies of apocalyptic futures to come, and methods of avoiding such futures. The recurrent revelation in this age is not that nature is gone, but that it never left.

Disaster studies, a field that gained prominence in the 1970s in response to growing research on environmental hazards, has now become a robust nexus for geographers, anthropologists, historians, and cultural critics. In 1942, the physical geographer Gilbert White published a groundbreaking work that famously declared that "floods are 'acts of God,' but flood losses are largely acts of man."[18] Such a clear distinction between a hazard and the human *experience of* that hazard as a "disaster" prompted further inquiry into understanding what came to be called the "human ecological approach" in disaster studies. Such an approach focused less on the natural hazard (flood, drought, etc.) than on the processes both structural and particular that made people vulnerable. This focus is perhaps best exemplified by the proliferation of models that attempted to "explain" natural disasters in their complex social and environmental contexts--a laudable if daunting prospect to which many have made valuable contributions. Phrases such as "progression of vulnerability," "causal essence of calamity," and "chain of human choices and natural occurrences" annotate

[18] Gilbert White, *Human Adjustment to Floods: A Geographical Approach to the Flood Problem in the United States* (Chicago: University of Chicago Press, 1945), 2. To trace the lineage of how geographers have considered "natural" disasters to be a combination of both human and environmental factors, see also Kenneth Hewitt, ed. *Interpretations of Calamity from the Viewpoint of Human Ecology* (Crows Nest: Allen & Unwin, 1983).

these models.[19] It is, to be sure, an impressive feat to distill and separate such complex phenomena into discrete schematics that can seemingly be applied to any natural disaster. The famous "pressure and release" model of vulnerability, for example, resembles a nutcracker, where each box is connected to the next one by an arrow to connote a sequential progression from "root causes" to "dynamic pressures" to "unsafe conditions." On the other side of the model, with arrows pointing the opposite direction, is the hazard itself. Combine these two sides and one has the makings for a disaster.[20] But while these diagrams are simple, neat, and offer the comfort of explanations that can be translated from one disaster to the next, they also embody the very problems that I wish to address.

At the most basic level, however oriented towards visual understanding these models may be, they are so complex that they often convey little to no sense of sequence beyond one thing leading to the next. Often entire processes as abstract as power, resources, and structures are given the same conceptual weight as particular individuals or institutions and their access to tools or food, making it difficult to know *how* these concepts are related, let alone any sort of hierarchy of causation. This conceptual problem represents a historical one, for if these processes are related at all, surely they are related differently in different times and different places. This could be a quibbling disciplinary division between the historical inclination towards particularity and the geographic inclination towards theory. But the vast variety of words to connote causation in all its colorful subtlety in different historical

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[19] Steinberg situates these phrases in his depictions of various disasters whose causes came from both human and natural forces, but who would otherwise be labeled as "acts of God," *Acts of God*, xiv, xxi.

[20] For the most comprehensive treatment to date of social theoretical approaches to disaster studies, see Ben Wisner, Piers Blaikie, Terry Cannon, and Ian Davis. *At Risk: Natural hazards, people's vulnerability and disasters, 2nd edition* (New York: Routledge, 2004).

circumstances cannot be conveyed through a simple arrow. More importantly, structural processes are often associated with different timescales than more proximate ones. How such timescales do and don't intersect is as important to understanding causation as any verbs one uses to describe it.

Deeper still, such linear progressions of causality imply that disasters can be explained from a single vantage point that roots the events of the past in time. However valid the relationships between causes and effects may be in these depictions, they nevertheless appear chained to one another, precluding the possibility that other historical circumstances might have played equally important roles. It would indeed be hard to imagine, for example, that hydraulic mining of the late 19th century being a cause of flooding in the late 20th century would appear in one of these diagrams. By the same token, causes that may have been present in the model may have been absent in the historical moments leading up to the disaster. In this linked chain of causality, the disaster becomes the culmination of cause and effect, producing the cataclysmic moment that the chain forecasts. Nowhere present is any semblance of a future beyond the disaster, but surely such a future exists, and is constitutive of how we construct causal sequences in the past.

Any attempt to explain the past is itself a story. Disasters are sufficiently complex in cause and in time that they require stories--and a multiplicity of them--in order to be more fully understood. The more stories that come from particular people, with particular vantage points, the more texture we might add to these models, which connote a "view from nowhere." However explanatory a model may be, it can be enhanced by what David Wyatt calls the "space of interpretation itself," and the ways in which interpretation morphs over time. The narratives associated with a generating historical context may be "necessary

fictions by way of which we control our anxiety about the ambiguity of experience," but we risk confining the past into a rigid and ultimately colorless form if we fail to acknowledge the multiplicity, dynamism, and temporal ambiguity of the stories that establish lines of causation and apportion blame for disasters.[21] In this way, these models may function best as elaborate abstract evidence for the genre of environmental prophecy. Divorced from any narrative context, they provide an assortment of all the possible causes of disaster--both proximate and distant in time--from which prophets might draw when blaming the past and prophesying the future. The causes that some stories deem important are radically different in both timescale and actor from others. Paradoxically, the "chains of explanation," which themselves were created to be holistically explanatory, provide the very fodder for *all kinds* of different causal stories from *all kinds* of different characters.

This thesis is animated by a story showing the promises and limitations of the *genre of environmental prophecy* as it operated in the contexts of two events that afflicted residents of the Central Valley in the late 20th century: a flood event in 1997, which affected mainly northern portions of the valley; and a drought event from 1987-1992, which afflicted the whole state, and especially the Central Valley. The genre involves a *double movement* of narratives that point to both past and future. Chapter 1 is the "looking backward" portion of the double movement, in which I analyze *causal stories:* different narratives that people used to reconstruct the past in a series of connected sequences of people, objects, and natural forces and cast blame for who or what caused the flood and drought.[22] The flood and drought

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[21] David Wyatt, *Five Fires: Race Catastrophe, and the Shaping of California (Reading: Addison-Wesley, 1997).*

[22] I borrow the term "causal stories" from Deborah Stone's "Causal Stories and the Formation of Policy Agendas." *Political Science Quarterly*, Vol. 104, No. 2. (Summer 1989), 281-300. For another perspective on applying this term to disaster, see Adam Sunderberg's "Claiming the Past: History,

looked most different when people told causal stories that place blame on visible actors in the immediate past. As causal stories then pointed to different actors in the *longue duree*, the causal stories began to converge. As such, causal stories always placed blame on someone or something in a narrative sequence that speculated what caused what in the past.[23] Causal stories reconstructed the past on many timescales, but for simplicity, I'm choosing to divide them between *event-centered* and *longue-duree*. Event-centered causal stories focused on the visible individuals and institutions of the present and recent past (within a decade) in assigning blame for the event. *Longue duree* causal stories focus on *processes* in the distant past (since California gained statehood in 1850). Some of these processes were directly related to the water system--urbanization, agricultural intensification, and the construction of water infrastructure. Others, though, are more seemingly tangential, like hydraulic mining in the Sierra Nevadas during the late 19th century.[24]

Chapter 2 is the "looking forward" portion of the double movement of the genre of environmental prophecy, in which I connect the causal stories of Chapter 1 with their *prophesied futures*--the undesirable futures invoked to avoid the lessons of the past--and *proposed solutions* as ways of avoiding them. Similar to Chapter 1, the forward expressions of these stories manifest on two interwoven timescales, and for simplicity I'm dividing them between short-term and long-term. In order to complete the double movement, I will analyze

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Memory, and Innovation Following the Christmas Flood of 1717." *Environmental History,* April 2015, 238-261.

[23] Historian William Cronon observes that any narrative "speculate[s] about what caused what, why people acted as they did, [and] how a particular event happened." In "Why the Past Matters," *Wisconsin Magazine*, 6.

[24] The following conversation provides a more detailed analysis of timescales associated historical depictions of environmental crisis: Richard Hoffman, Nancy Langston, James McCann, Peter Perdue, and Lise Sedrez. "AHR Conversation: Environmental Historians and Environmental Crisis." *American Historical Review* (December 2008).

the correspondence or lack thereof between the timescales associated with causal stories and those associated with their envisioned futures. Importantly, I am separating the past and future in my analysis of causal stories, which of course do not present themselves that neatly. As such, the "backwards looking" timescale of a causal story may or may not correspond to the projected timescale of a future solution. Moreover, many of these causal stories point to futures that are not realized in material solutions, a point to which I will devote my concluding chapter. If, together, both chapters represent the role of prophecy in depicting modern disasters, then causal stories present a paradox: on one hand, an intensively managed water system where one casts blame not to God but to one's neighbor would appear to be removed from Biblical understandings of disaster. And yet it is precisely the role of nature--as a kind of secular deity--that mediates all stories on all timescales. In short, prophecy is alive and well, but in an incarnated form that is much more complex than the one in Biblical times.

To do this, I've drawn from a trove of archival documents from the Water Resources Collections and Archives at University of California-Riverside and the Sutter County Library, and from landscape observation as I toured the Central Valley water system. The archival documents consist mostly of periodical articles of different people narrating the flood and drought, but are also augmented with speech transcripts from politicians that reflect responses to each event. As with any documents that represent the past, but especially with ones whose purpose is to illustrate how people narrated these events, I was careful to take into full account the article author's bias when reflecting on its narrative. I thus differentiate in the chapters that follow between article *author* narration, reflecting the views of the *writer*, and the interview *subject's* narration, reflecting the views of a resident. I included a large

variety of voices, including the journalist's, to more fully depict the multiplicity of stories that people created. This was a tricky task, as authors sparred with each other as often as residents did in their construction of causal stories, and it was often difficult to extract voices from their narrated contexts within an article. For example, William Kahrl, a water historian who wrote an editorial that I use to critique the dominant narrative of the drought, wrote the following about articles appearing in the *Los Angeles Times*: "[I]n the history of California water, the *Times* has been much more than a journal of record: it has been a player."[25]But this distinction ends up providing a more well-rounded portrait of the multiple voices that spoke, and I attempted to represent them as singularly as I could.

In categorizing stories, I was *myself* weaving a story. Since many articles were stronger at depicting causal stories than prophesied futures, and vice versa, I had to make strategic choices about which stories of the past corresponded with which stories of the future. In so doing, I risked making connections between narrated pasts and prophesied futures among different characters that may have been speculative. But since my focus was on the genre of prophecy and the timescales on which it operated, these stories did not need to have one-to-one correspondence in author, as long as their subject was the same. For example, a farmer might have claimed that the drought was caused by fish-protecting environmentalists, but made no reference to a future. Another farmer may have spoken about his fear that the future would imperil his family's way of life and thus the need to modernize his crop practices, but make no reference to a past cause that made him think that way. Either way, I connected these stories even though they didn't have the same author because I

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[25] William Kahrl, "Chinatown Redux: The Two Droughts," *California Republic*. February 1992, 21-22.

wanted to understand the variety of ways that farmers as an analytical category made sense of the past and future. It was especially nice when such stories of past and future aligned from the same characters, as they did on multiple occasions, but that was not a requirement for the story I had to tell.

Finally, landscape observation appears throughout the essay. There is the obvious obstacle that my 2014 reading of the landscape would not allow me to see the evidence of these historical (though relatively recent) events. In many cases, I noticed just how difficult it would be to know that the landscape episodically experienced floods and droughts, as the uniformly flat agricultural corridor made it difficult to imagine these events in the past. It was, of course, easier to do so with drought, since I was visiting when California was in the midst of its third year of a severe one. But the fact that it was difficult to read the evidence of these events on the landscape revealed an important truth about their perceptibility and ephemerality over time, but also about the empathy that a researcher must feel for the characters of the past: it was difficult for them to perceive change over time then, as it is difficult for me now. I can only hope that such awareness translates into the pages that follow.[26]

[26] I take inspiration for interpreting these characters' stories from Kai Erikson's *Everything in Its Path: Destruction of Community in the Buffalo Creek Flood* (New York: Simon and Schuster, 1976). While he used ethnographic interviews to make his argument, his approach in conveying the textured experiences of disaster survivors remains useful to mine.

CHAPTER 1
THE EVIDENCE OF THINGS UNSEEN: BLAMING THE PAST

The prophetic genre starts with a look to the past, so it is here that the story of flood and drought begins. In looking to the past, those who were affected by each event constructed *causal stories* in which they cast blame for whom or what was responsible for the event based on their understandings of the past. As we will see in Chapter 2, these causal stories are only half of the "double movement" of the prophetic genre: by dictating causality, causal stories framed the past in particular ways to extract lessons in order to envision certain future solutions. In Chapter 2, I will discuss these envisioned solutions and ask whether or not they were realized, but suffice it to say that Chapters 1 and 2 together embody this "double movement" between past and future that so defines the genre of prophecy.

Different timescales attended these causal stories. The flood and drought looked most different in causal stories that pointed to causes on *event-centered* timescales, or timescales that were within about a decade leading up to each event. As causal stories pointed to more distant *longue-duree* causes in the story of California's developing waterscape, the flood and the drought began to resemble one another more closely. Lurking behind all of these causal stories was a question of authority. While it was people who were at the center of these narratives, it was the punishing power of nature on geologic timescales that acted rhetorically as an arbiter of human action, giving moral traction to the ways in which people cast blame. Causal stories thus took on a sisyphean identity, in which understandings of human fault led to lessons about the hubris of taming and inhabiting a capricious landscape over and over again. The flood and the drought, even though they were singular events, contained a great deal of history both proximate and distant. To make sense of the past, as those closest to these events surely did, was thus to summon evidence of things unseen.

The quality of this evidence, however, looked rather different *during* the flood than *during* the drought. In January 1997, three warm, rain-heavy storms in quick succession filled reservoirs to their limits, prompting the California Department of Water Resources to release water to prevent overtopping. These releases caused river levels to rise to flood stage and strained downstream levees surrounding agricultural community such as Yuba City and Modesto. When it became clear that these levees might overtop, inhabitants were evacuated to higher ground. Meanwhile, levees that protected the farmland outside of city limits failed and inundated fields and pastures, causing several fatalities and hundreds of millions of dollars in damage. Local volunteers, National Guardsmen, and DWR employees worked around the clock to secure the levee breaks. The only deaths were residents who disregarded or did not receive evacuation orders and stayed in their homes. After about one week of displacement, the 100,000 flood victims returned to their homes, or what was left of them, and began the slow process of rebuilding or moving altogether.

Residents had taken for granted the Sutter County flood control system during uneventful years. Water sat placidly behind Oroville Dam, and the levees, berms, and weirs blended imperceptibly into the fields of alfalfa and livestock. Most residents of the Meridian Basin were unaware that this system would protect them as waters swirled in the Feather River to the east and Sacramento River to the west. In flood, these lines of slight topographic relief—the dams, levees, weirs, and aqueducts—*became* the landscape itself, separating dry from wet with surgical precision. As such, the water system of Sutter County surprised residents by its discrete interconnectedness. Clara Manes, a lifelong resident of Yuba-Sutter County who had survived previous floods in 1955 and 1986, used her past flood experience to dampen her surprise at the destructive force of water. She could remember every flood that overcame the control system

with remarkable detail: "I remember all of those floods and every year when it starts getting winter time, I get a little nervous. Coming across the bridge was the first time I saw the river at 10th Street bridge." Her sense of time was determined by how high the water reached on familiar markers. This awareness of high water marks crystallized past floods in her mind, but also made her aware of the water infrastructure only when a flood recurred. Thus, her memory connected these events as distinct from everyday life, and the floods became identified with the surreal scenes of bridges underwater and the extraordinary force of water. Numerous accounts expressed similar awe at the sublimity of an otherwise familiar substance. "You cannot believe the devastation of water," said another resident.[1]

Perhaps more importantly, Manes narrated her anxiety with noteworthy geographic precision: one can tell precisely how high the water was, and where the levee failed that caused the waters to rise. A Forest Service employee observed, "Downieville got hit real hard - the highway, the bridge and buildings were damaged. It's like something out of a movie." This combination of geographic acuity with an allusion to Hollywood disasters was not accidental, for the image of a fortress under siege does the double work of fitting destruction at precise points along the walls of dams and levees into a familiar motif of war. During these fearful moments of inundation, Nature was deemed the fearsome enemy--the Other that would destroy one's home and render the landscape unrecognizable, thus exposing the hubris of "normal life" in the face of this always-impending catastrophe. One article claimed, "Up and down the great Central Valley, the full toll of the 1997 New Year's flood is yet to be tallied, but a sobering realization is sinking in: the world's most sophisticated system of hydraulic control is no sure defense against the sort

[1] Sherry Barkas, "Evacuee recalls other floods," *Appeal-Democrat*, January 4, 1997.

of fury that more and more often comes raining from the skies."[2] There was a mix of resignation and awe as the water poured into the pastures and homes; who could one blame other than nature itself when trying to find respite on dry ground?[3]

This sense of resigned survival would quickly morph as levees broke and the fields became an inland sea, as suddenly people began to see other people as responsible for their own predicament. As water officials identified the precise locations where the levees weakened and failed—Country Club Road, Colusa, Olivehurst—this war motif would transform. No longer was nature the villain, as the faces of *other people* could be seen behind every levee in a meticulously managed water system. Levees failed for several reasons: seepage underneath, overtopping, and erosion. As floodwaters rose, the County Sheriff monitored the dozen boils surfacing next to west Colusa levee of the Sacramento River on an hourly basis, and proclaimed, "There is no immediate threat." That levee would later fail. Because nobody could identify the precise cause of levee failure, only that failure was inevitable (the geomorphologist Jeffrey Mount was quoted by a local newspaper as saying, "[Levees are] a nightmare of engineering...There are only two kinds of levees. There are levees that have failed, and there are levees that will fail.") many pointed to infrastructural weakness at various levels of the flood control system.[4] The Olivehurst levee, which broke in several places, was due for an upgrade after it had weakened in a 1986 flood. Congress had authorized over 1,000 miles of levee repairs after that flood, but these projects were uncoordinated for several reasons: a complicated assemblage of local reclamation districts, flood control agencies, counties, and municipalities managed them; and repairs had

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[2] Elliot Diringer and Ramon McLeod, "Floods Warn Valley of Worse to Come," *San Francisco Chronicle*, A1 & A8, March 3, 1997.
[3]Darrell Smith, "Residents head for the hills." *Appeal-Democrat*, A4. January 4, 1997.
[4] "Engineering Nightmare turns to red-tape terror." *Oakland Tribune*, A1 & A5, March 3, 1997.

been tied up in litigation for a decade following the event. As national interest and funding waned after the 1986 flood, the event became subordinated to other pressing concerns.[5]

And if the engineers and bureaucrats of both the present and the recent past could be blamed for the flood, so too could other people in the more distant past. But the causal stories of the *longue duree* were more abstract than the visceral finger-pointing that characterized the event-centered causal stories. No longer could one point to a breach in a levee or decision to release floodwaters and see particular faces, for it was *patterns* and *processes* rather than *individuals* and *institutions* that marked these stories. As soon as two weeks after the flood, the very development of California's water system--and not just inadequate response to prior floods--became fodder for ridicule. Hydraulic mining in the foothills of the Sierra Nevadas during the late 19th century released large quantities of silt and sediment downstream, accreting at first quickly and then more slowly throughout the 20th century in the flat bottoms of the Yuba, Feather, American, and Sacramento Rivers. Urbanizing patterns that attracted residents to a landscape whose levees were designed for agricultural use in the early 20th century made many more people vulnerable to flooding than even fifty years prior. The dams and levees that would provide so much protection during the first half of the 20th century, when public approval and government funding for these projects was at an all-time high, suddenly seemed dangerous, crumbling, and obsolete.

But who could be blamed, if the miners, Progressive Era bureaucrats, and post-war developers were buried in cemeteries (or dislodged by the deluge from their subterranean depths and now floating eerily on the vast inland sea) and thus couldn't be expected to bear the burden of reparations and prevention of future catastrophe? To be sure, they became prominent players

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[5] Jennifer Kerr. "Olivehurst levee that failed due for upgrade." *Appeal-Democrat,* A5, January 5, 1997.

in the story of the disaster, as many newspaper articles in the weeks and months following the flood followed a ritualistic recounting of the history of development in the valley by paraphrasing the water historian Robert Kelley, whose book *Battling the Inland Sea* accounted for not only past floods but also the complicated mining, agricultural, and urban interests that dictated water development throughout 19th and 20th centuries.[6] Such grand chronological narratives manifested cultural unease about development and inhabitation in the valley, and indicated that this flood was not unique in exposing these anxieties, since floods as far back as 1907 led residents to express their surprise that the valley was not as static as they thought, and that the highly engineered system would not protect them.

So when Rick Craig, a rural resident of Modesto 40 miles downstream of the Don Pedro Dam observed to the *Oakland Tribune* that "I've lived near the river my whole life, and I thought we'd never have big flood again after they built the new Don Pedro. It's real obvious to me - they wanted to keep the water, and they held it too high. And we paid for it," it is unclear to which "they" he is referring.[7] It could be the Bureau of Reclamation, which built the dam in the 1920s, but he invokes the dam so abstractly that it comes to stand for a whole era of dam development. It is not the particular agency that he seems to be holding responsible, but rather the more diffuse ideology that led to the construction of many dams throughout the northern Central Valley and low Sierras, of which Don Pedro was one. The decision to keep the reservoir full fulfilled a logic of the Progressive Era: to provide water for power and farms, to the point that the federal government even offered millions of dollars to keep the reservoir emptier and its operators at the time declined. Thus, in blaming the processes of the past, one had to also

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[6] Robert Kelley, *Battling the Inland Sea: Floods, Public Policy, and the Sacramento Valley* (Berkeley: University of California Press, 1989).
[7] Diringer & McLeod, "Floods Warn Valley."

confront the foreign historical moment in which past decisions were made--a daunting task in empathy for anyone, but especially so for one looking to make sense of loss.

Not only landowners expressed such newfound anxiety, as many officials wondered whether people should inhabit the valley at all. Walter Yep, Chief of Planning at the Army Corps of Engineers Sacramento Office, pointed to the history of encroaching urbanization during the post-war years onto floodplains: "I feel very strongly that the solutions we've been following are not the right solutions. We just need to keep people out of the flood plain." Even the chairman of the house subcommittee said, "It's crazy to just build up what's been damaged by the floods and keep rebuilding and rebuilding."[8] But such decisions throughout the 20th century were as much matters of land use patterns as they were of personal choice. If a resident wanted to live in the valley and a flood hadn't occurred for several decades, the known risks among the living residents of that community would be close to nil, and the purchase of insurance would be dissuaded. One resident whose house in the floodplain had been destroyed said, "They said we didn't need flood insurance, so we didn't get it."[9]

This recurrent theme in which each flood throughout the prior century and a half became a watershed moment for examining the *longue duree* history leading up to it suggests that the causal stories associated with the *longue duree* required moments of crisis to bring about levels of introspection and critique of the "normal years," but also required a level of distance from immediate danger. It would indeed be difficult to imagine such sweeping histories of causation during acute moments of crisis. Thus, what these causal stories gained in holistic causal perspective--as they exposed not only the history of past floods but also the intermediary years--they lost in causal acuity, for surely it would be easier for residents to blame local water officials,

[8] "New post-flood possibility: don't rebuild, just move," *Oakland Tribune*, A3, March 30, 1997.
[9] Diringer & McLeod, "Floods Warn Valley."

or for local water officials to blame the Army Corps of Engineers, than it would be to hold an entire era of water projects responsible.

It was the valence of expectation--that blame derived power from the promise of future redemption--that rested on the shoulders of the living. One water official said, "We convinced ourselves 60 or 70 years ago that we could stop flooding by engineering dams or levees. We could engineer rivers so humans could do whatever they wanted and ignore the rivers. As we spent $30 billion to $40 billion on structural works, we figured out that flood damages continue to increase. We ask ourselves what's going wrong. Are we leading ourselves down the primrose path? Yes, we probably are."[10] In this way, all causal stories that sought to understand the past, whether event-centered or longue-duree, inevitably pointed towards the reparations of the future. Whether and how a lead character in a causal story might be capable of such reparations is worth pondering.

The authority for these stories rested in the reminding, and surprising, force of nature. Jeffrey Mount, the geomorphologist, took a reporter to a site on the North Fork of the American River that had undergone dramatic transformation during the flood. "Oh, wow!" he exclaimed, "This has changed. I don't even know where the hell I am!" Where there had been beaches, there were now car-sized rocks. Where willow trees once stood, there were now "oblong stones [lying] in ranks like fallen soldiers...the river's geometry [was] profoundly different." Mount balanced his incredulity with his geologic knowledge. "As a geological event," he said, "those floods are not abnormal. They are a regular thing. It is the way the Earth sculpts itself." Yet even as a geologist he was surprised: "You can calculate things, but until you see them, you can't really

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[10]Frank Sweeney. "State's levees are 1930s technology," *Appeal-Democrat*, January 7, 1997; Todd Hansen, "Renewed interest in dam," *Appeal-Democrat,* A1 & A8, January 10, 1997; Harold Kruger, "Controlling rivers an impossible task," *Appeal-Democrat*, A1 & A2. January 12, 1997.

understand the power involved. Nature is big." He juxtaposed this revelation with the way that "we plan for a static era. Then we're surprised when it goes through a period of rebuilding. To a river, and a watershed, life is like that of a soldier. It is 99 percent boredom, and 1 percent terror." It just so happened that the 1 percent terror had intersected with the human lifespans on its banks.

The lesson that nothing was as certain as the certainty of change gave moral valence to all causal stories of the flood. But if one could point to other people of the present and hold them responsible, the illusion that one could rectify the problem remained tangible and possible, if perhaps shortsighted. Conversely, there was a melancholy to the stories that pointed to causes in the distant past. Without particular people or institutions to blame, the mediating force of nature seemed more a tragic companion in the story than an enemy, as the timescale of the longue-duree transcended a human lifespan and intersected more with that of the atmospheric events. In the following poem, written for the Yuba City *Democrat Herald,* a bystander expresses this convergence:

> Water touches sky / Water's high… / Touches sky. / Grass is green, / Really high… / What is that I see floating by? / Birds serenely dip and bob, / Water's high… / They thrive. / Horses, children, cattle and sheep, / Behind high fences we keep. / Fences keep them from stray, / Now there's no way to get away. / Mother Nature not inept, / Uses flood plains to adapt. / Masters of the water controls, / Knows the rises and the flow. / The water breaks through and goes, / Mother Nature knows. / No boats allowed on our proud bay, / Too much debris to get in the way. / Now the rivers, streams and bays, / Take their more normal ways. / Summer will bring a full bouquet, / More birds and fish… / But how can we dismiss / What we will miss? / Dad saw pictures in '55, / Not realizing that later he, too, would reside. / An island in the water and no place to hide. / Water touches sky. / Water's high… / Touches sky.[11]

Here she contrasts Mother Nature's "knowledge" with the way her father did not heed the prescient warnings of photos of prior floods. The notion that the flood was normal and even

[11] Katherine McKeown, "Water and Sky," A4, January 9, 1997.

expected gives voice to the recurrence and unpredictability of the event, but also of its boundedness in time. A flood thus acted here as a discrete premonitory unit.

Drought, at least in hindsight, operated similarly throughout the twentieth century, in which past droughts were invoked as warnings of droughts to come. But what are we to make of the causal stories that surfaced *during* the drought event of 1987-1992 itself? The drought began in 1988 as a rather peculiar "natural" disaster. Unlike the flood, which stood to many from the outset as an overt expression of nature's wrath, the drought was more ghostly in onset, prompting many to begin pointing their fingers at other water users as they began to feel the strain of less available water. "The great water shortage of 1988," read a caustic *San Francisco Bay Guardian* article, "is a great political hoax."[12] The notion that a natural phenomenon could be instead chalked up to politicking stands in stark contrast to the incontrovertible presence of the flood. Indeed, the drought even required an official declaration, itself a political decision based on who needed water where. Such proclamations led one to believe that the causes of the drought could be found among neighbors near and far, as there was no shortage of water users to blame.

Crucially, all of these water users were among the living. Some said the environmentalists were at fault, for protecting the salmon or Delta smelt and preventing water from being put to productive human use. Others said it was the fault of Central Valley industrial farmers—whose groundwater withdrawals increased throughout the drought to overcome rainfall shortages—for causing subsidence and altering the landscape. Still others blamed the profligate water use of urban residents and suburban lawn owners, igniting campaigns of water policing among neighbors. Such stories carried the expectation that those who were responsible would

[12] Patrick Porgans, "The Great Drought Hoax," *San Francisco Bay Guardian*, pp. 1-9, 12, September 7, 1988.

also be responsible for curtailing future use. There was a moral certainty to each of these event-centered causal stories stories. An accuser's moral certitude in blaming others gave the sense of having finally rooted out the cause of one's suffering. And while no single story was sufficiently explanatory, each was partially so. Blame derived power by simplifying and distilling causality.

Such event-centered causal stories proliferated throughout the drought, and waxed and waned according to its severity. Among the most representative of this proximate view of causality were those that pitted farmer against urbanite. Patrick Porgans, the same author who declared the drought a "hoax," also wrote, "While residents and businesses in cities like San Francisco, Berkeley, and Oakland are taking short showers, flushing less often and letting their lawns and gardens wither and die, agriculturalists are continuing to turn desert into farmland, taking advantage of millions of dollars in tax subsidies and millions of gallons of cheap federal and state water to grow crops that make little economic or ecological sense."[13] It was a sentiment echoed by many urban water users who felt unfairly required to develop a "water ethic" when agriculture was using most of it. Farmers, for their part, blamed urbanites less than they defended their own use. But such defenses were about more than water, for the drought became a proxy for what many farmers felt to be an endangered way of life. Two farmers' wives, for example, organized the Family Water Alliance to connect the bread that urbanites ate to the familiar that grew its grain. "This [drought's] got us up against the wall. It's not like I can pull up stakes and go somewhere else. It's this or nothing," said a second-generation farmer in the imperiled southern portion of the valley.[14] Signs that read, "No water, no jobs" sprouted up, and the

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[13] Porgans,"Great Hoax."
[14] Eric Brazil, SF Examiner, "No more water for Westlands farmers," B1 & B3, February 23, 1992.

drought came to be lumped into other categories such as traffic jams, smog, and population growth that farmers feared were signs of their threatened existence.[15]

Other farmers' stories conveyed a sense of betrayal from water cutoffs to the north. "We're at a crossroads in this state. We've been living off the good life for so long, and now we're finally going to have to face reality," said Fred Starrh, a wealthy industrial farmer who had to downsize his operation. He blamed the crisis less on a natural state of scarcity than on urban politicians who were interested in keeping water in streams for endangered fish and urban water users. Starrh's comment stands as a paradoxical contrast to other appeals to temperance by other water users. He was not criticizing the use or development of water so much as the unmet expectation from decades prior that the State would deliver farmers the supplies they felt entitled to. The "good life" was the urban life. In this way, farmer's causal stories suddenly transcended any culprit of the present, as they unearthed multi-generational resentment, a nostalgia for a time that the role of agriculture figured more prominently.

Others, though, found these internecine squabbles petty and short-sighted. "We've lived an illusion, creating an environment we could not support. California has always been a semiarid environment, and that means we are naturally in a state of shortage. That is how we must learn to live," said one Sonoma County Water Agency expert.[16] This was a kind of backward gaze that sounded remarkably similar to Starrh's--exposing a multi-generational misalignment with nature--and yet her conclusion of who was to blame couldn't have been more different. It was not a sense of entitlement over urban interests that dictated this causal story, but rather the need for structural changes on the state and federal agency levels. For example, in 1978, one year after

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[15] Jim Mayer, "Farmers fight for water, way of life," *Sacramento Bee*, A1 & A16, January 31, 1992.
[16] Elliot Diringer and Lori Olszewski, "Why Water Crisis Won't End," *San Francisco Chronicle*, A1, A6, April 15, 1991.

the previous brief but intense drought ended, a Department of Water Resources report "discussed lessons learned from the drought and suggest[ed] future actions to enable us to better use our State's limited water resources. We must take the opportunity now, while events are still fresh in the mind, and we have the breathing spell provided by 1978 rains, to plan for coping with the next dry period." It wasn't until 1988, however, one year into the next drought, that agencies began to unearth these now-decade-old artifacts.

With historical hindsight, it is easy for one to feel a sense of righteous indignation when confronted with this evidence that structural changes were so attainable yet so overlooked. In the moment, however, mediating such stories was the idea that drought could be averted based on statistical probability. "There was a nine in ten chance that the next year would be wet," one hydrologist said in 1989. "We gambled, and we lost. If we were to do it again, we'd probably take the same bet." Robert Potter, Deputy Director of the the Department of Water Resources, based his assessment on the fact that "there has never been a third-year drought." But such statements contradicted reports from his own agency that "the frequency of precipitation [in California] is highly variable from year to year, including dry periods that have persisted from one to several years...the longest drought since flow measurements began persisted from 1928-1934." Over and over again, managers expressed a sense of surprise at the dire straights they now found themselves in, but also tempered such exclamations with a quiet self-lashing at their own lack of foresight. One metropolitan water district senior manager said, "Before, we didn't really think there was any prospect of being short before the turn of the century. I don't think we really took it seriously. Now, by God, we're taking it seriously."[17]

[17] Diringer & Olszewski, "Why water crisis."

This self-immolating story was, to be sure, a popular sentiment because it encouraged a form of shared contrition, a view that seemed to place figures of the recent past in ownership of the drought's complex causes. But in 1992, now the fifth year of the drought, the historian William Kahrl wrote a scathing rebuke of what he deemed to be its pseudo-authenticity.

> The version of the drought that everyone knows saw public officials scrambling to make a system that never had to handle more than two years of drought stretch to cover five. In urban areas, massive appeals on behalf of water conservation were taken up by a responsible citizenry, while on the farms, some of the largest agricultural enterprises on Earth were suddenly cut off from their normal irrigation supplies. It was a story of hardship, sacrifice, and much cooperation in the face of natural adversity.[18]

Instead, Kahrl claimed there was a more sinister "hidden drought" that lurked behind these gestures of humility. Rather than the urban and intensive agricultural areas that were deemed to be most affected, it was "the vast parts of California, the bulk of its land area where few people live" where trees were dying in large swaths, rivers and marshlands drying up, and land was subsiding. According to this logic, people were not making the sacrifices that they claimed they were making, nor were they feeling the drought's effects as dramatically as they trumpeted.[19] Groundwater pumping, for example, did not start as a process to which farmers turned when they ran out of surface water. Long before groundwater pumping became a last resort for farmers in the latter part of the century, many pumped water as their primary method of irrigation during both wet years and dry years, thus causing the land to collapse in on itself in giant sinkholes. It would not be until 1935 that rapidly advancing irrigation technology, coupled with federal support, saw the development of the massive water projects in the state. Such projects allowed groundwater stores to replenish, as farmers could now withdraw surface water without depleting their stores underneath their fields. But the damage had already been done, and would continue,

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[18] William Kahrl, Chinatown Redux: The Two Droughts, *California Republic*, 21-22, February 1992.
[19] Ibid.

as such projects would not prevent withdrawals during particularly short years throughout the century. San Jose, for example, had already sunk 13 feet lower than it was in 1920 from groundwater pumping that stopped in 1969. Similar strains occurred during the short but intense drought from 1976-1977.[20]

Others narrated the *longue-duree* history of water development in California in a way similar to the flood, but both aggrandized and criticized the folly of turning the desert green. Such grand declensionist narratives always ended with the lesson of what happens when one developed infrastructure that could not quench an insatiable thirst, that "those projects could not satisfy everyone's needs forever."[21] For the pessimists, there was a kind of self-indulgence to these narratives, a way of claiming that such travails had been misguided all along. "For those Americans convinced that Los Angeles is a latter-day Sodom, the news that California is now heading for its seventh year of drought--its longest dry patch for 400 years--has a pleasingly apocalyptic ring," read one *Economist* article.[22] But the drought, almost infuriatingly, never reached the climax of destruction towards which these narratives of folly pointed. The causal sequence lay in a constant state of impending doom.

It would not be until 1992 that the drought came to be seen as a harbinger of climate change, and even here it was a debatable proposition. "If this drought continues," wrote one columnist for the *Oakland Tribune*, "it is almost certain to become worse than the 1928-1935 drought, the one that the state's water project designers assumed would be the worst drought California would ever face. And if the drought continues, future meteorologists may look back and identify 1987 as the year that global warming - the much-debated 'greenhouse effect' - first

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[20] Porgans, "Great Hoax"; Diringer & Olszewski, "Why Water Crisis."
[21] Diringer & Olszewski, "Why Water Crisis."
[22] "Locusts Next?" *The Economist*, November 28, 1992, 25.

made its effects known on California's precipitation patterns."[23] Tree ring studies showed indisputable evidence that droughts had occurred in varying degrees of severity and duration over the previous several millennia. But the fact that the flood did not embody the rhetoric of this permanent misalignment with nature conveys the extent to which the drought's continuing presence conjured up visions of an era to come. However aberrant the flood may have been in the context of a human lifespan, the drought seemed to subvert life as people knew it over time. It was recognizable enough to "normal life" that people could point to its causes, yet foreign and ongoing enough that it seemed to bespeak a dystopic landscape where even nature would cease to act in familiar ways.

In a strange way, this "death of nature" moral stood in contrast to the "nature is alive and well" observation that Jeffrey Mount made in response to the flood. While both messages engaged the hubris that nature could be controlled, the flood seemed to represent nature as a judge of morality as if to say that it would always have the last word, while the drought seemed to represent the nature as the absence of morality, as if to say that through living beyond one's means, we have systematically eradicated our knowledge of right and wrong. As Chapter 2 demonstrates, this difference would dictate the kinds of futures that these stories envisioned and solutions that were proposed.

[23] Russell Clemings, "State Readies for another dry winter," *Oakland Tribune*, October 4, 1992, B6.

CHAPTER 2
THE SUBSTANCE OF THINGS HOPED FOR: PROPHETIC FUTURES

During a tour of the Sutter County flood control system, I asked my host to pull over atop the West Sutter Bypass levee, the site where, in 1997, the National Guard had detonated explosives to relieve pressure on the levee downstream. To my west below the levee, an expansive field of alfalfa dominated the landscape, and to my east the Feather River could be seen through the slats between cottonwoods. It was difficult to imagine this as the site of such drama, where two Department of Water Resources officials ducked for cover in a pickup truck half a mile away as soldiers packed dynamite and the floodwaters licked their boots and debris went skyward. Now, the only clue that the levee had been broken, let alone rebuilt, was a thin veneer of gravel. Across the basin, the farmhouse where the wife of a water official had been killed in the flood stood at the end of a long driveway against a backdrop of trees and fields. The inland sea that had overcome the Meridian Basin existed in memory alone. The only visible reminders were the levees, and even those blended into the landscape as symmetrical linear hills dotted with vegetation.

The day before, I had driven 250 miles north through the Central Valley from Los Angeles. The air was dusty and hot and the visibility bad, focusing my peripheral attention on the fields adjacent the highway rather than on the distant horizon. These fields had no pattern; some were fallow, others contained rows of orange or lemon trees whose greens stood out against the browns of the air and ground. I was encountering the valley during another drought, this one in its third year. Signs along the highway placed by farm bureaus referred to the valley as a “Dust Bowl,” and agricultural laborers were looking for work near a pit stop in Bakersfield. This landscape signified drought in ambivalent ways. In its tangible desiccation, the land alluded to droughts of the past, and it was not difficult to imagine a similar landscape during the drought of

1987-1992. But in its aridity, the land also did not easily evince much material evidence of that past drought, leaving to the imagination the kinds of human adaptations and responses that inhabitants made during those years. If conjuring the flood required one to stand atop a levee and see a landscape for its capacity to channel and direct water, conjuring the drought required one to envisage adaptations derived from thirst—the over-allocated flows, the fallow fields, the reluctant asceticism of brown lawns.

I focus on the evidence of human responses to these events because solutions are the forward expressions of the causal stories of Chapter 1. If the prophetic genre involves a double movement—looking backward towards past human faults and forward towards future redemption—then causal stories are more than simply explanations of causation; they do real work in the world and have real consequences. Causal stories, in other words, function as conditional statements by using hypotheses about causation to lead to conclusions about solutions. *If an event is caused by x,* the story goes, *then the prescribed solution should be y, where y is the correction of x.* As such, a causal story attempts to configure the future as much as it attempts to reconstruct the past. In this way, just as we can read causal stories as justifications for hoped-for substantive solutions, so too can we read substantive solutions as reflective of causal stories.

The fact that, decades after the 1997 flood and the 1987-1992 drought, I could see the repaired levees but not the homes that had been abandoned, or that I could notice salt-infused soil but not a drought water bank that had been used to transfer water between farms and urban areas, should be fair warning that different timescales attached to different responses to these events. Of course, many responses were not even visible in the first place. But it wasn't only that different causal stories engendered different timescales. Crucially, these different timescales

were the forward expressions of past understandings of causation, in that the timescale attached to a causal story of the past corresponded to the longevity of the proposed solution of the future. Thus, one might fairly ask what kinds of substantive solutions attached to different timescales for each event, and how were they related to the causal stories of the past?

During the flood, water came from the heavens, but in the aftermath, people began to believe it came by the hands of others. This knowledge weighed heavily on Frank Anderson, the Don Pedro Dam powerhouse manager responsible for dam releases, who had never encountered a flood of this magnitude in his 26 years of service. The reservoir, like Oroville and Shasta to its north, was at full capacity. Any more rain and it would overtop, rendering the dam useless as a method of flood control, and potentially damaging it permanently. If this happened, water would pour into the flatlands and take out whatever lay in its unpredictable path. Even though it was a risky decision to open the floodgates--as nobody really knew what path the water would follow--the decision seemed safer than the uncontrolled waterfall that would result if they weren't opened. Shortly before 6 p.m., Anderson got the call from the Army Corps, who designed the flood control guidelines. He opened the control panel, where he encountered three buttons: "Raise, Lower, and Stop." The instructions, he recalled, were at once comforting in their simplicity and alarming in the destruction they represented. "I made the call," he said. "I was very unhappy because I knew this water was going to Modesto. I knew this water was going to flood homes. It was not a giddy moment." With a finger, he released a "sea of woe" downstream.The *Oakland Tribune* described the release as follows:

> In the Modesto area, the Tuolumne rose to 70 feet, 15 feet above flood level and the highest volume since 1950, when the river reached 69 feet. Along the Tuolumne between Don Pedro and Modesto, there are no levees to contain the flow. There are, however, farms, nurseries, trailer parks and homes that received clearance to be built in the path of a flood that no one apparently

> thought would come. The release from Don Pedro had turned the flood plain into a hyperkinetic bayou.[1]

Further north, mandatory and voluntary evacuations among leveed low-lying areas sent thousands of residents to shelters. Survival instincts did not give much time to find a cause for suffering, so during rare moments of respite, many turned their eyes skyward, expressing awe at the force of water and gratitude in their rescuers and companions. The coupling of survival actions--dam releases, evacuations, acts of goodwill--with a naturalized understanding of the flood can be seen as a directly causal relationship: water presented danger, and people adapted. One displaced resident at a converted school said, "I'll just be happy when the water is receded and we can go back home."[2] But such homecomings would not necessarily bring the happiness that these residents envisioned. Frank Anderson, for one, foresaw the flood of rage that would follow his decision to open the floodgates, a gesture at the fraught future landscape the hyperkinetic bayou would become. In Sutter County, as the water receded and a week of distance allowed residents to reconstruct the past, they would begin to view their levees with similar apprehension. Even after the floodwaters receded, the hyperkinetic bayou would remain a literal and figurative touchstone to justify what was to be done.

What was to be done? If Central Valley residents were known for a reticent small-town demeanor, they betrayed no sign of this in offering diagnoses and solutions in the weeks and months to follow. As Chapter 1 demonstrated, it was during this time that causal stories proliferated, intermingled, and conflicted as residents and water managers looked to the past and

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[1]Tom Goff, *Oakland Tribune,* "Decision to open spillway gates a painful one." January 12, 1997.
[2] Dan Crawford, "6,000 evacuees fill Sutter High School," *Appeal-Democrat*, January 4, 1997.

attempted to identify the cause of the flood and thus justify future courses of action.[3] The flood went from divine to corporeal, and so too did the solutions. If water came not from heavens but from hands, then surely those responsible for causing the mess could engineer their way out of it. But even the engineers expressed doubt in managing a system of their own making. Just as they felt unfairly accused in causing the flood, so too did they temper their plans for rebuilding with the knowledge that their solutions would not hold up against the forces of nature. In this sense, although the flood had firmly transitioned into the territory of Act of Man rather than Act of God, divine causation lingered ever-present behind every proposed solution, functioning rhetorically to expose the hubris of any solution in which humans were deliberately disobeying the laws of nature.

Solutions ranged in their projected longevity, and each often represented both short- and long-term timescales. Many of the event-centered causal stories focused on infrastructure and the agencies responsible for its maintenance, and thus pointed to potential solutions that could be enacted by these agencies in the immediate future. Levees, needing repairs, were subject to scrutiny: should they be restored to their original heights under 100-year flood protection, or overhauled to 200-year protection? Should the Army Corps build a bypass structure to divert flow from a swollen Feather River after a dam release? Should another dam be built to store the water that might not have inundated the rivers downstream? Even though causal stories attached

[3] Importantly, both event-based, and *longue-duree* causal stories emerged as justifications for both temporary and long-term solutions. But whereas historical remove allows one to categorize causal stories according to their associated timescales, the timescales associated with solutions are less identifiable, as not enough time has passed to know whether they are indeed long-term or short-term solutions. For example, even a levee rebuilt to withstand a 200-year flood event could, 10 years from now, come down in a 50-year flood. Therefore, we can only derive insight from the *projected* timescales of these solutions rather than their *realized* timescales, further illustrating the asymmetry between realized timescales associated with the past and projected timescales associated with the future.

to each of these infrastructural proposals were focused on both event-centered and longue-duree timescales, they tended to focus exclusively on the flood events themselves, and on discrete moments of weakness. Patrick Porgans, for one, proposed to "Recalculate the flood frequency by incorporating rainfall and runoff data from 1862 to the present." So the projected infrastructural solutions remained potent only as long as the event remained fresh in memory. As the event faded over time, lawsuits flagged, funding appeals lost their urgency, and the levees were repaired only to their initial 100-year flood protection. Even the repairs that had been slated from the prior 1986 flood had not been finished when the 1997 flood hit. In other words, many of these proposed solutions were subordinated to the pressing needs of the moment, or were forgotten altogether. Richard Meehan, a professor at Stanford University, remarked, "[The Army Corps] wait[s] until the flood is surging--when the levees are about to burst at 2 in the morning--then do their best. They assume that nothing can be done. Why not worry about the problem when the sun is shining?"[4] So despite the both short- and long-term timescales represented in the infrastructure solutions, they were event-centered in that they were determined only with the crises of the past and the potential crises of the future in mind--there was no focus on the slow, accretive buildup of everyday patterns of living. The antiquated and piecemeal levee system that the causal stories pointed to as a source of the flooding would not be abated by even the awareness and desire to create a more relevant and long-term solution. Ironically, the infrastructural solutions proposed to rectify this were dependent on the very crises they hoped to forestall. Without the constant urgency of a flood, nothing would be done to rectify this, and the incompatible past would remain hidden under the guise of normalcy and the visible faces of the present. Infrastructure signals temporary and long-term solutions in complex and perhaps

[4] Richard Meehan, quoted in Mark Evans, "Valley's levee system under fire," *Appeal Democrat*, A6, January 12, 1997.

contradictory ways. On one hand, past flood events fit squarely *in* the past in that they occurred a long time ago, and thus could be seen as part of the *longue duree*. At the same time, however, the flood events of 1955 and 1986 were moments of crisis themselves, engendering causal stories and substantive solutions as the 1997 flood did. This kind of historical acuity towards which we can point is actually quite different from the more gradual process of accretion represented by the accumulation of silt due to hydraulic mining. But it forces one to consider what equivalent processes cause similar accretive damage.

Whereas infrastructure was an omnipresent, slow to build and erode, solution intended to fix discrete moments, dredging occurred in discrete moments to correct centuries of accretive buildup of sediment and silt from hydraulic mining. Dredging--the process of removing gravel bars, sediment, and silt from the bottoms of the rivers--worked the other way around. We can think of its goal as to develop a kind of homeostatic equilibrium, where nature itself needed intervention every once in a while to maintain protection over time. So whereas in engineered infrastructure, to mitigate nature's wrath, one needed long-term solutions that focused on discrete moments of crisis, nature's infrastructure could be seen as a focus of intense human investment over short periods of time to allow for long-term natural stasis. The dredging itself could be seen as the event here. Whereas infrastructural solutions, however long-sighted they were, depended on agencies who were the ones blamed for the failure of that infrastructure, the ghosts of California's hydraulic past were buried. And so the faces associated with the silt and sediment accumulated on the bottom of the Feather and Yuba rivers were not the miners but the dredgers. Interestingly, even though the dredgers were responsible for the removal of this sediment, they were not themselves held responsible for the accumulation of it in the causal stories for the flood--and neither, for that matter, were the miners themselves. But the Army Corps, who would

be the logical agency to enact this dredging, demurred, saying that they only had the authority to dredge for navigation purposes; not for flood control. So if the response to build more infrastructure heightened the association between responsible parties and causation for flooding, dredging did the opposite. So if levees were the building up of sediment to forestall crisis, dredging was the removal of sediment to maintain stasis. Perhaps because there was no perceived need to make this a regular activity--after all, wasn't hydraulic mining, which was banned in 1884, a relic of the past?--there was no real human face associated with it. It would not require a huge investment of time, and would only need to be completed once. Others, though, wondered what other sources of erosion in the Sierra Nevada Mountains could be seen as contemporary agents of sediment buildup in the rivers. Like the engineered infrastructural response, this sediment was only seen as a cause during flooding, but unlike the engineered response, it was a short-term solution for a long-term causal story.

What, then, would a long-term solution to a long-term causal story look like? If both humans' and nature's infrastructure solutions were focused on mitigating flood risk, they also presumed human inhabitation. But, as the causal story about development patterns made clear, the floodplain itself was not always intended for people to live on. Thus, the flip side of the antiquated infrastructure were development patterns that made it antiquated. So, calls for people to abandon the floodplain were prominent. It was a curious argument to make, especially because it was the very artificial flood control structures themselves that allowed for the population to grow. Not only that, but it was also the discovery of gold that drew such a population. So embedded within each of the causes I have named (hydraulic mining and infrastructure) was the implicit sign of growing human population to support gold mining and later agriculture. But if the causal story named both of these as contributing to the rise in population, the forward

projection of the long-term solution was defeatist. The closest they got was to point to the government buying up homes, moving out the occupants, and putting deed restrictions on the land to bar future development after the 1993 Mississippi floods in the Midwest. But in the most agriculturally productive valley in the world, many expressed doubt that such a goal was even possible. "You virtually have to buy the Sacramento-San Joaquin Valley to do that...there's going to be a lot of starving people." Meanwhile 20 towns were slated to go up in the valley over the course of the next decade. But however impractical such an aspiration may have been, it expressed perhaps the most hands-off vision of the river system to, in the words of one water official "give that river enough room to flex its muscle when it has."[5] In this projected future is a certain nostalgia for a lost past, when the inland sea took over the valley. It was this landscape that they called Eden, and it was this landscape from which they fell, before the control of nature. Any solution devoid of people would recover that lost identity, but it is also perhaps fitting that such a vision was functional in rhetoric alone.

Perhaps because the timescale attached to an uninhabited landscape is eternal, and because lurking behind every solution is the notion that Nature will expose the hubris of mankind in the future as it did in the past, this vision of an uninhabited landscape is perhaps most illuminating of the relationship between the phenomenon of the flood event and the moral meanings attached to it. It is this perceived futility--that no matter what people did, nature would return with a vengeance--that returns the causal stories of the flood with all their implied solutions back to the beginning. For there is a paradox in play here: a flood prophecy looks to the past to define a problem, and a future to define a solution. But if the ultimate forward projection

[5] Harold Kruger, "Controlling rivers an impossible task," *Appeal-Democrat*, A1, A2, A5, January 12, 1997.

lies in the eternal futility of solutions, then of what use is the enterprise anyway? One newspaper article analyzing potential solutions turned to a famous quote by Mark Twain: "You cannot bar a river's path with an obstruction which it will not tear down, dance over and laugh at."[6] If the goal of any flood solution was to maintain a kind of peace with nature--a truce that rectified past imbalance--then this was achieved with different forms of lasting permanence. But this fact also signifies a deeper truth: what was *to be* done did not necessarily correspond with what *was* done.

The relationship between causal stories and the proposed solutions in the flood was a complex one. On one hand, these causal stories pointed to very specific fixes: floodgate decisions, levee repairs, control of development. On the other, these fixes spoke to multiple timescales. If the flood's proposed solutions--and their enactment--depended on the public urgency that the flood generated and then faded as time passed, then what are we to make of the proposed solutions to the drought? And what is their relationship to their causal stories? As Chapter 1 demonstrated, one of the most peculiar aspects of the drought was in its prolonged strain, thus not allowing for the more linear narratives that came out of the flood. So, the passage of time operated on three levels: first, time alone created the drought, in that the drought was only declared after a year of scarcity. Second, it exposed an interconnected geography of water users who, during times of abundance, had not known such connectedness over vast geographic areas. Third, this knowledge of interconnectedness created an atmosphere in which different actors blamed one another, for it was unclear who exactly was responsible. Thus, the drought

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[6] Jennifer Kerr, "Levees reshape the valley," January 12, 1997, A1&A7; Mark Twain, *Life on the Mississippi* (Boston: James Osgood & Co., 1883).

became California's, and a spate of solutions was proposed commensurate with the event-centered causal stories of Chapter 1.

The drought occurred amidst a potent trifecta of other fears: a dawning awareness of the role of greenhouse gases in causing climate change, a population crunch, and turn-of-the-millennium existential uncertainty. Drought came to symbolize all of these fears in the prophecy that if the wasteful ways of the past continued, the 21st century would be an "era of permanent drought." The *San Francisco Chronicle* wrote, "California, a land built on dreams, now faces the harsh reality that there is simply not enough water for everyone...the drought gives us a little window to see what might be ahead. Industries leave. Jobs lost. The economy will hurt mightily if we don't solve this. But we will solve it. The stakes are too high if we don't."[7] It was a textbook prophecy: invoking the feared-for future that would necessitate solutions, and ending on a hopeful note that such solutions could avert crisis.

To avoid such a future would be no easy task. The notion that the drought could extend throughout the century with no end in sight gave the proposed solutions a sense of urgency. People were not trying to mitigate future droughts; they were simply trying to figure out how to weather the present one. These solutions were often proposed under the western trope of "water wars," a term that in practice betrayed the violence it alluded to, since so many of these conflicts required an ongoing level of commitment. It was a peculiar cultural dynamic: if, in the flood, causal stories could both assign blame for past fault and responsibility for mitigating future floods, then the drought's ongoing nature required that people simultaneously assign blame with

[7] Elliot Diringer and Lori Olszewski, "Why Water Crisis Won't End," *San Francisco Chronicle*, A1, A6, April 15, 1991.

causal stories and prophesy solutions not for the distant future but for the present moment, since nobody knew when it would end.

If the term "water war" conveyed a sort of enemy, then there were as many heroes as villains, and the only thing that united them all was that they blamed on another. "California's water battle is no longer just north vs. south or urban vs. rural. It is a three-way tug of war - pitting the pressing demands of the cities against the established claims of the farmers against the ancient needs of the natural environment."[8] This engendered a series of proposed solutions that whomever was the responsible party would become responsible for enacting. If industrial farmers' withdrawal of groundwater beyond their means meant land subsidence and an altered landscape, then surely water restrictions should pertain to them. Unless, of course, suburban lawn owners were to blame, in which brown was promoted as the new green and campaigns of water policing turned neighbor against neighbor. Then again, it could've be the environmentalists all along, in that their protection of endangered fish meant less water for more productive human use. As one newspaper article put it, "California's water battle is no longer just north vs. south or urban vs. rural. It is a three-way tug of war--pitting the pressing demands of the cities against the established claims of the farmers against the ancient needs of the natural environment."[9]

This rise in the complexity of interests manifested in a slew of proposed solutions from every direction. The same *Chronicle* article proposed a series of "solutions to the water shortage": Conservation, Reclamation, Water Projects, Desalination, and Water Transfers.[10]

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[8] Ibid.
[9] Ibid.
[10] Ibid.

What is striking about each of these proposed solutions was that it drew on different causal stories, thus linking the responsible parties to enacting the solution. Whoever was responsible for each of these proposed solutions, it was clear that the mounting evidence of drought--visible in the lawns and reservoirs and sinking land--would require concurrent solutions derived from state intervention, local adaptations, and free market mechanisms that connected these disparate interests. So the state began to propose voluntary and mandatory water restrictions in urban and suburban areas and decrease state-allocated water to the lower San Joaquin Valley, whose farmers were dependent on State Water Project water allocations. Such restrictions often didn't apply to rivers whose in-stream flows protected fish rights, drawing the ire of everyone else. But perhaps most importantly, the most pervasive solution found its expression in water transfers among farmers and cities.

Water transfers, at their simplest, worked like this: those who had more water than they knew what to do--usually farmers in the north--could sell their water to urban areas for a fee. They would be compensated for fallowing land, sell land, conserving water, or a dry year option in which urban areas pay farmers to use their water only in dry years.[11] On face value, these transfers seemed like a win-win, until long-standing water rights became part of the equation. Many farmers had water rights that dated back to the Homestead Act in 1862, which predated by far the construction of the federal and state water projects that delivered water primarily to cities. To these farmers, many of whom were undertaking drastic measures to curtail their water use, the selling of their water rights represented a long-term relinquishment of what they referred to

[11] Kristine Strawser, "Different Kinds of Water Marketing Deals Now in Effect," *San Francisco Chronicle*, A5, June 7, 1992.

as "the real California."[12] The debate went back-and-forth between two powerful interests--the cities and the farms. And while it was ostensibly a moment-focused debate in that they were all trying to allocate enough water to meet the needs of the following year, the undercurrent had to do with farming representing a way of the past and the cities representing the way of the present and future. As the drought ended, so too did these water marketing arrangements. On one hand, interests remained generally intact and in good faith, as long-term water rights were not relinquished. On the other, such arrangements bespoke a problem in the length of time that causal story could remain potent. If a solution was only possible when derived from interests in the visible present, then how might the longer-term causes be addressed?

Still, state policymakers and urban water districts expressed a renewed sense of direction, or at least an awareness that they were negotiating in an era when the past water wars no longer would solve problems. One policymaker was quoted as saying, "We must not backslide to the old days when whiskey was for drinking and water was for fighting over," and others expressed similar optimism that the crisis would herald in a new era of water control.[13] The notion that water markets were the wave of the future in that they envisioned free market control of water as somehow the mediator of entrenched disputes reflected a kind of *laissez faire* optimism that many credited the drought with inspiring. If the years of the "water wars" were defined by one user's wealth at the expense of another, then the free market promised to rectify these animosities by simply using the dollar as the arbiter of fair water use. On the whole, these markets facilitated the movement of millions of gallons of surface water from agricultural regions to the metropolises of Los Angeles and San Diego, and promised to signify a kind of

[12] "Thirsty Cities Covet Water Used by Farms," *San Francisco Chronicle*, April 17, 1991.
[13] Sam Delson, "Water ward ends with a gurgle," *The Oakland Tribune*, A1 & A1, March 26, 1994.

future that wouldn't have to rely on infrastructural solutions. As Tim Quinn of the Metropolitan Water District of Southern California said, "We're not going to be able to solve our problems with more concrete. Building dams was the last half-century. Marketing is the next half-century."[14] The notion that the past represented both antiquated water wars and infrastructural solutions was not accidental. But the surficial transfers would portend two deeper problems: how would farmers whose water rights dated back to, in some cases, the late 19th century, give up water? The fears that many farmers felt in places like the Westlands irrigation district that received no water from the Central Valley Project were that it would "revert substantially to its pre-irrigation condition--a sagebrush and tumbleweed desert."[15] The idea that the long-term consequence of a short-term relinquishment of water would turn the landscape into a desert shows just how deeply the timescales intertwined. The relinquishment of a year's worth of water deliveries forecasted a kind of developmental desert, a subversion of the eden they had tried to maintain. To these farmers, the story that the drought was caused by diversions of water elsewhere evoked a timescale of permanent desuetude. To the flush urban water districts, the diversions represented simply a patch on a slow leak. But what would happen to the water markets once the drought ended?

However much the water wars represented the ways of the past, they also represented a kind of democracy among water users that sleek free market solutions attempted to smooth over. As water managers promised, no longer would water users have to wrestle out the hard moral questions related to blame and causality if they could simply use their wallets instead. Some even expressed nostalgia for the water wars of yore, saying that the water markets did not resolve and

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[14]"Farm Water Supplies--New Boom Crop," *San Francisco Chronicle,* June 7, 1993
[15] Eric Brazil, "No more water for Westlands farmers," *Examiner* B1 & B3, February 23, 1992.

instead masked issues of inequity. "You hear a lot about how water transfers are the solution, but when you try to put together one of these deals it's nearly impossible," observed one frustrated farmer.[16] Thus, the conflictual past that these markets were intended to ameliorate did not disappear; it simply morphed. Perhaps the deepest expression of the limits that markets represented was the ways in which they forecasted a kind of future dystopia. "By 2040," one author observed, "one third of the Central Valley's farmland will grow nothing but subdivisions and parking lots."[17] The markets in their transience of salvation expressed a longer term transience of another kind--the transition from farmland to the suburban. However one conceived of the dystopic future--whether it was tumbleweeds or subdivisions--the solutions during moments of crisis engendered a vision of the future that was by turns overly populated or unpopulated. The water transfers, in other words, lived in both a never-ending present and a forecasted future.

In February, after months of rain, state water managers declared the drought over, and the water transfers faded along with the dryness. One op-ed, aware of the political expediency provided by crisis, emphasized that "we cannot forget the long-run solution." Some argued that such a long-run solution depended on the "continued reform of California's system of water allocation so that water becomes freely transferable within the state." This itself wasn't a remarkable vision. What *was* remarkable, however, was what followed: "Otherwise, agricultural consumption of water will inevitably fail to reflect the market value of water, and future urban water shortages will once again be unfairly attributed to Mother Nature, not the political control

[16] "Boom Crop."
[17] Wade Graham, *Harpers*, June 1998, 54.

of water allocating institutions."[18] The observation was prescient, not because it foresaw a future correctly, but because it illustrated just how engrained understandings of causation (farmers unfairly attributing the drought to Mother Nature and thus getting a higher price for their water than they should) dictated a prescribed political solution. The notion that the sense of crisis would generate a kind of groundswell of lasting transformation was an attractive one during the event, but as the water historian William Kahrl noted, "The natural shortages were indeed very real. But there was still water enough to keep industry running, to sustain our communities despite a singularly ineffectual approach to resource conservation, and even to stave off what is clearly our historical inclination toward being stampeded into adopting a new water policy based on a carefully induced sense of panic."[19] Even in moments where it seemed as if event-centered causal stories would dictate lasting transformation, they seemed to capitulate to a familiar historical theme. Environmentalists embraced a form of mandatory asceticism because they thought it would teach people to "live within natural limits." Ironically, the timescales attached to those natural limits were as ephemeral as the drought itself. When it ended, so too did the appeals to mandatory conservation, water transfers, and sense of moral imperatives engendered by crisis. Coupled with this was the idea that conservation ended up creating diminishing returns, because people would get used to having less water, and yet that would become the new normal. Paradoxically, the appeals to live within natural limits ended up creating new limits that were artificially manufactured.

But that same sense of crisis could also be used to justify development on much longer timescales. Infrastructural solutions did not have to depend on the drought in order to be

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[18] R.H. Mnookin and T.G. Melling, "Water Reform Beyond the Drought," *San Francisco Chronicle*, A20 March 13, 1993.
[19] William Kahrl, "Chinatown Redux: The Two Droughts," *California Republic*, February 1992, 21-22.

proposed, but they did depend on the sustained awareness and funding. The notion that the Central Valley Project had not been completed at the time of the drought impelled a new piece of legislation that gave federal funding for its completion as the Central Valley Project Improvement Act. But that ended up floundering in the years to come. Similarly, the Peripheral Canal, a hot-button issue during the early 1980s, surfaced again as an option to transfer water around the Delta. Desalination plants and even multi-purpose dams were proposed as late as 1994, after the drought was long over.[20] However proponents defined infrastructural solutions, a sense of acute scarcity could engender radically different solutions, and the one that was shortest term was the one based on the causal story that "we're not living within our limits." The longer-term solution was more about the notion that we could build our way out of the drought. Ironically, the infrastructure and funding that would be required to sustain such development would need support after the crisis was over. Thus, both of these efforts ended up being unsuccessful for the same reason--fading awareness--even though they bespoke radically different timescales.

And what are we to make of the causal story that people shouldn't have been there in the first place--that without people there would be no drought? In a sense, this is a peculiar solution, but it is everywhere present, lurking behind every causal story and proposed solution in the drought. For some farmers, it represents the worst possible outcome--evoking a tumbleweed flat as a symbol of a fall from Eden. To others, it represented Eden itself--the way the landscape was intended, coupled with native imagery as the kind of place that is more natural, more normal, more outside the hubris of human manipulation. However people conceived of an unpopulated landscape, it's important to recognize the basest of conditions--either as an unimproved

[20] "Auburn Dam proposal may rise--again--in GOP Congress," *Oakland Tribune,* December 21, 1994.

wasteland or as a vision of a lost landscape of the past. In either case, these landscapes evoke eternity, and function rhetorically to either expose the fear of "resorting" to a state of scarcity as nature forbade, or "returning" to a state of scarcity that nature intended. Importantly, the notion that eternity resided in these unpopulated landscapes appealed to longue-duree causation (development of water infrastructure and burgeoning population of California throughout the twentieth century). Without people, there would be nobody to blame, and thus these visions of dystopic or utopic futures mediated stories of blame. But nature still existed in these envisioned unpopulated landscapes. The most unsettling prospect of all, of course, was that nature itself would cease, and with it, so too would moral authority. "Nature, which has already paid heavily, stands to lose even more. Birds on the Pacific Flyway and some fish in the Sacramento-San Joaquin Flyway and some fish...are at an all-time low. Threatened species...may pay the ultimate price: extinction."[21] Extinction, in other words, came to stand for a land without law or rule, where people had killed even the source of *discerning* right from wrong.

However water users conceived of solutions to the drought, one thing united all interests: a desire to overcome the conflicts that had defined the past. Of course, the proposed ways of overcoming such conflict re-capitulated conflict itself. But over and over again, the desire to enter a new era was invoked, and functioned rhetorically to expose the long timescales of causation. In a speech delivered while the drought was in full swing in 1991, Congressman George Miller said to the Colorado River Water Users Association, "The fight that we are engaged in in our state is for the future of our state...but we must deal with the past, apparently, in order to get to the future." What would it mean, though, to deal with the past in proposed solutions? If the solutions engendered by event-centered understandings of causation were

[21] Diringer & Olszewski, "Why water crisis."

commensurately short-term, how could a longer-term understanding of causation dictate other kinds of solutions? Miller goes on to use an anecdote about the Secretary of the Interior renewing 40-year contracts between the Bureau of Reclamation and the water districts to show that "It's almost inconceivable that in a state that is moving to 40 million is going to be bound by contracts that were designed when Harry Truman was President and the candy bar was a nickel."[22] "The citizens of California," he said, "[have] a right to try and restore the adverse impacts of decisions that were made in the '40s, the 50s, and the '60s, many of them out of ignorance; not out of bad faith; not out of contempt for others; we simply didn't know about the environment what we know today."[23] It is a curious speech, given the fact that he doesn't mention drought but once, other than referring to a "cataclysmic event" on the distant horizon that might cause farmers to lose their right to farm. He invoked catastrophe as a not-yet-having-happened event, even in the midst of severe drought, to inspire action.

> We must move now. We must take steps to mitigate our past mistakes. It's not about blame. It's not about finding fault. Many of you were in rooms like this with Bernie Frisk and John McFall. People from California who were brilliant at getting cement poured in the Central Valley, rechanneling our rivers and building our dams. But today is a different era...In terms of the demands on this system who's support of this environment, the human environment, that was chosen to live in one of the most inhospitable places in our country. We now must change that system. We must transition that system to those diverse uses. We all know it's happening. We just don't want to be public about it.[24]

In a classic prophetic move, he then turns it into a choice: "are you going to be the architects of that change or are you going to be the tenant of the results?" One would think from this prophecy that he's talking about the change of nature, but it's really about changing human relationships. When he says, "you will not be able to hold [the change] back," he's referring to the transition of

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[22] George Miller, Keynote Address, "A Paper Delivered to the Colorado River Water Users Association," December 12, 1991.
[23] Ibid.
[24] Ibid., 11

farmfields to parking lots, to the obsolete uses of levees, to the water allocation system that dates back centuries. In short, it's a human prophecy, not a natural one. And yet it cannot be overlooked that he was making this appeal during the drought, for the drought exposes these kinds of antiquated relationships that may have been obscured during times of plenty. He continues,

> Some of you will carve out niches for another year of privilege, for another year of subsidy, for another year of not meeting your obligations...but eventually it will happen, and I suspect it will be more painful each and every year that it's delayed because the demands will be greater by those who do not share in this wonderful resource, who are handicapped because they cannot compete for the lack of resource, and eventually it will simply result in a taking. That we cannot let happen because that cannot protect the agricultural community, and that cannot protect the real diversity of this system."[25]

Let's take stock of these stories. What I have attempted to do in this Chapter is to show the forward expressions of the causal stories for both flood and drought in Chapter 1, and the timescales attached to those expressions. In the flood, the immediate aftermath saw survival mechanisms that would not be understood as causes until the weeks to follow. During those weeks, people pointed fingers at both living and long-dead actors, and thus spun stories that functioned on both event-centered and longue-duree timescales. What these causal stories gained in moral acuity in blaming people within a decade of the event they lost in holistic perspective in that they narrowed the field of vision for causal explanation. Conversely, the stories that pointed to infrastructural features pointed to decisions that were made a long time ago and reflected long-term trends that the event-centered stories lacked. Together, both timescales painted a complex and interwoven portrait of causation, and both were inspired by the crisis. The length of time that prophesied futures would last anywhere from levee repairs and dam construction, which would take several years, to reclaiming entire portions of the floodplain and dismantling the levees,

[25] Ibid., 12-13.

which would take many years to realize. However, it's important to make a distinction between the amount of time that it would take to complete these projects and the amount of time that these projects would last and take effect. In this sense, we can categorize these responses as those that were constructive (rebuilding) and those that were destructive (moving, dismantling). But it's important to note that these responses required a narrow window of time to enact based on the sense of crisis engendered by the flood's destruction. As the crisis faded, so too did the sense of acute urgency, perspective, and high-definition that these stories had during the crisis. Most people continued to live where they lived, flood levee repairs back to their normal 100-year floodplain height, a dam wasn't built, and the funding for any longer-term infrastructural adjustment wasn't allocated.

Whereas the flood engendered responses afterwards, the drought engendered responses during. It wasn't so much the understandings of causation that changed as what people did with these understandings. Like in the flood, causal stories pointed towards discrete actors (water wars) in the present and long-dead actors in the past (water project construction). Often, event-centered and longer lasting causal stories converged, in that they focused on discrete past drought events. But the strain of the drought focused attention on two things: how to mitigate it (get out of the drought); and how to prevent another one in the future. Thus the solutions were both temporary (either pointing to sacrifice that discrete actors would need to make; water transfers) and longer-lasting (CVPIA, desalination plants, more dams). But all were intended to alleviate the suffering of the drought on hand, since it hadn't ended yet. When it did in fact end, the only lasting solution was the CVPIA. As the drought faded in memory, inertia, forgetfulness, and higher funding priorities sent the drought solutions into the dust bin like in the flood. Anti-development sentiments functioned as an agent of fear (to expose what was to be avoided) or

correction (to expose a fall from Eden). Thus the dichotomy between construction (building out of it) and destruction (depopulating the area) that accompanied the flood was just as prevalent in the drought. But as the geographic front lines were not as apparent in the drought, nobody knew quite who should or would bear the burden of such adjustments.

Thus, we see in the flood a gradient of urgency from days to weeks to months to years, a gradual decrescendo of awareness, motivation, and desire to do anything about it. What's striking is the quickness by which the event faded from memory. Often the longest-term solutions required more investments of time than the shorter-term ones. The arc of a fading awareness of crisis in flood that I have just narrated engenders a kind of nostalgia for the crisis and the feeling of change that it provoked. There are benefits and drawbacks to this narrative shape. On one hand, it is predictable how it loses its charge over time and how the solutions that come with this fading charge fade too over time. On the other, a crisis had a temporally limited ability to inspire introspection. The arc of fading awareness existed after drought, too, but since the event-centered causal stories and solutions looked different than they did for the flood, the drought's solutions during the event itself spiked and waned according to its severity. After each event, by and large, event-centered causal stories engendered short-term proposed solutions. Longue-duree causal stories engendered proposed longer-term proposed solutions.

Predicted futures did not come to pass, as people recovered from each event, and the landscape swallowed most semblances of these events. Signs of high water marked the bridge over the Sacramento River, and in the southern portion of the valley, a pole stood showing land subsidence over time. But by and large, even the most unrecognizably foreign landscapes transformed back into their more recognizable forms. Prophesied futures of an uninhabitable

landscape following the flood stopped within several months as people moved back and floodwater subsided. Prophesies of the never-ending apocalypse were absent most newspaper articles within a year following the declaration that the drought had ended. The only material solutions were levee repairs and renewed interest in water infrastructure, which lay over the landscape like the backbone of a dormant dragon.

CONCLUSION
THE SUBSTANCE OF THINGS FORESEEN

In a landscape shaped by both flood and drought, the prophetic genre functions as a form of dialogue between the heavens and earth. It is the recurrent though unpredictable nature of these phenomena that makes them seem so laden with lessons, and with the idea that with right behavior, we might avoid them. But in each of the stories I have told, the crises, which looked different from each other while they were happening, functioned rhetorically similar in their aftermaths. Whoever people were inclined to blame and whichever causal stories they told to evoke it, as the sense of crisis faded, so too did the motivation for solutions. However much public awareness each event generated, the prescriptions did not match. What are we to make of the fact that so few of the things hoped for actually came to pass?

It is not a new question. John Steinbeck asked something to similar effect in 1952 in the novel *East of Eden*: "And it never failed that during the dry years the people forgot about the rich years, and during the wet years they lost all memory of the dry years. It was always that way."[1] Throughout his career, Steinbeck came to be seen as a prophet of California, telling stories of the landscape and its inhabitants that frequently contained morals like this one that bespoke outer natural limits as checks on California's technological ingenuity--and, by extension, America's. But this line is particularly salient for a deeper reason. The seamlessness in the way Steinbeck combines observations of landscape (natural attributes) with memory loss (human attributes) imbues the past with a naturalized identity. It is a view of history that would be publicly invoked in the decades after the book's publication to

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[1] John Steinbeck, *East of Eden* (New York: Viking, 1952), 5-6.

justify the political and imaginative inertia following subsequent floods and droughts. It seems to say, *just as a natural attribute of California's landscape are its cycles between floods and droughts, so too is the human sin of forgetfulness--this is the way things are*. It simultaneously gives voice to the problems of the past (forgetfulness), but also ossifies those problems ("it was always that way"). One might rightly wonder how the story transcended these moments of crisis during the intermediary years.[2]

But we must first ask whether the story was *capable* of such temporal transcendence. It would be tempting to take Steinbeck at face value and note that the forgetfulness is produced by the alternation between abundance and scarcity. There may in fact be some truth to this claim, in the way that the events most immediate and visible garner the most attention as a product of an intensely managed water system that quickly dispenses with the aftermath of these events. But such explanations are partial at best and distracting at worst. There are deeper forces at work here that are not unique to flood, drought, or even natural disaster. At its root, this amnesia bespeaks more general promises and pitfalls of the prophetic genre: it inspires introspection and humility insofar as amnesia requires repentance, but also gives the impression of the past as static and the future as tragic. In the final scene of Steinbeck's other prophetic novel, *The Grapes of Wrath*, a mother attempts to nurse her stillborn child as the floodwaters rise around her, depicting the apocalyptic future that might be met if such forgetfulness continues. But Steinbeck doesn't resolve the story with a glimpse of redemption, thus evading the move that so defines the genre. The final scene signifies tragedy in both content and form: the stillborn represents a fictive future that never comes to

[2] Steinbeck's other novels, including *The Grapes of Wrath* (New York: Viking Press, 1939), also depicted disconnects between prophesied prosperity and the often harsh realities posed by the California landscape.

pass, and the story itself does not reach hopeful resolution.[3] The scene therefore comes to signify a macabre subversion of the hope we expect to conclude the story.

Even so, his readers continued during subsequent floods and droughts to invoke the "dry years and rich years" quote in a more classically prophetic mode, neglecting that Steinbeck himself painted a much bleaker (and perhaps absent) picture of salvation. We are thus left wondering whether prophets are as much made in hindsight by others as they are self-annointed. Rachel Carson, perhaps the exemplar par excellence of the environmental prophet, wrote *Silent Spring* in a self-aware prophetic mode and saw the dawn of environmentalism in the wake of Hiroshima.[4] She capitalized on the cancer fears that it generated to evoke a dystopic future where pesticides--as invisible and slow-acting as radiation--might have similarly catastrophic effects. It was a brilliantly effective rhetorical register, enlivened by her literary gifts, that transformed awareness of the effects of pesticides and ultimately led to sweeping legislative changes. But the book's real widespread success came in the decades following its posthumous publication, as readers reinterpreted the book through the lens of their own crises and futures to be avoided, thus lending credence to the idea that prophecies endure via interpretive hindsight, and their power exists in the futures they imagine more than the ones that are realized.

This disconnect between fictive and realized futures bespeaks the ultimate similarity of drought and flood over the long term. It would not be too much to say, from the California story I have told, that just as tragedy is prophetic, so too is prophecy tragic. A paradox of the vividly depicted futures of wrath and redemption that prophecy forecasts is that in a highly

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[3] Steinbeck *Wrath*, 436-455.
[4] Rachel Carson, *Silent Spring* (New York: Houghton Mifflin, 1962).

managed water system, they rarely come to pass as a disaster fades away--a phenomenon equally true for drought as it is for flood. The beseeched transformations are vivid in their potential but muted in their realization. Indeed, Rob Nixon applauds particular writer-activists as prophetic voices that conjure "premonitory landscape[s] prefiguring the consequences...of wasted foreknowledge" to give "preview[s] of the aftermath," but the warned-against landscapes all too often come to pass and the solutions to avoid them do not.[5] As a kind of dark symbol of this phenomenon, many such writer-activists are killed or die in their struggle to represent the long aftermaths, and we wonder whether it is precisely their deaths and the unrealized potential of their dreams that makes their words so powerfully premonitory for those who seek their wisdom after they are gone. Is martyrdom also a condition of prophecy?

Since the prophetic genre involves looking to the past *and* looking to the future, the tragedy is doubly potent in that unrealized futures become the *causes* of future disasters as time moves forward. Thus, the levee repairs that occurred after the flood, restoring the levees back to their original 100-year floodplain heights, and the Central Valley Project Improvement Act passed after the drought, are the only lasting proposed solutions to these events, all others cast aside as too costly in time or money, too controversial, or too forgettable as time moved forward. But the lessons remained the same: *we should have fortified x, or we shouldn't have done y.* The future carried the weight of these lamentations, and was invested with all that they wished had happened. Thus we are left with a feedback loop, in which the unrealized futures of one event's prophecy become the sinful pasts of the next's. This loop connects the flood of 1997 and drought of 1987-1992 with those that

[5] Nixon, "Slow Violence," 264-265.

preceded them throughout the twentieth century: the floods of 1986 and 1955, the droughts of 1976-1977 and 1928-1934. It is thus understandable that Steinbeck would say that amnesia was "always that way."

It is the knowledge that things could have been different--that people could have fared better--that makes a prophecy so compelling. In this sense, then, it is precisely the recurrent though unpredictable nature of both flood and drought in the Central Valley that makes prophecy such an attractive narrative genre. Indeed, had these events not intersected repeatedly with the scale of a human lifespan, prophecy would not have garnered the kind of acute awareness that these disasters tended to provoke. There is a not-so-subtle irony in the recurrent and perhaps familiar drama of the genre; counterintuitively, the very storytelling that is intended to inspire change depends precisely upon the unrealized solutions of the past in order to gain moral traction. And thus a prophecy becomes self-fulfilling.

How might we conjure the sensorial presence of these events--what some have called the "civic memory of catastrophe"--when they become fixtures of the past without risking the tragedy of always-unrealized solutions?[6] What might a genre of storytelling look like that avoids such symbolic and material deaths, in which hoped for futures are realized, foreseers lives are not lost, and pasts are more forgiving? It is, to be sure, a less dramatic form of storytelling, since the future is ever-changing and thus doesn't conform to the narrative convenience of death and promised redemption. But its promise lies in better correspondence between hoped-for futures and realized adaptations. The term "anticipatory history" has recently gained prominence as a strategic way to both represent and enact a multiplicity of

[6] I borrow the useful phrase "civic memory of catastrophe" from Seismologist Lucy Jones. "To sway public, scientists need to tell stories," *National Public Radio*, June 16, 2015. By attaching a civic valence to memory retention, the term signifies both personal and public components.

stories beyond the genre of environmental prophecy.[7] By treating the past as more dynamic and the future as more transient, such stories envision the kinds of adjustments people might make to weather disaster in their own future lives by drawing on the lessons of the past. By the same token, adapting behavior to fit transient circumstances requires one to re-imagine the past by telling new stories. That past and the future are those always in dialectical motion.[8]

This narrative genre requires one to confront obstacles of both representation and agency. For example, as of 2015, California is in the midst of yet another drought, now in its fourth year. A drought relief package was passed to appropriate funding from a 2006 flood protection bond act that would create "setback levees," or levees that mimicked the natural floodplain, thus allowing rivers to expand and contract over wider areas.[9] Significantly, such adjustments would also allow for the floodplain to absorb more water, thus providing more groundwater during drought. Flood and drought act as opposites in some ways because the adjustments one must make to provide water in dry years are often antithetical to the adjustments one must make to wick water in wet years. In the wake of both flood and drought, water managers constantly remark how difficult it is to plan for one in the presence of the other. It is as if there are two types of water gods who must both be appeased, constraining the kinds of adjustments one can make. One cannot go too far towards

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[7] Caitlin DeSilvey, Simon Naylor, and Colin Sackett, eds. *Anticipatory History* (Devon: Uniformbooks, 2011).

[8]Historian William Cronon describes this dialectical relationship in his essay, "Why the Past Matters," by claiming, "our ability to project ourselves into the future, imagining alternative lives that lead us to set new goals and work toward new ends, is merely the forward expression of the experience of change that we have learned from reflecting on the past." *Wisconsin Magazine*, Autumn 2000.

[9] Joshua Viers and Graham Fogg. "Making every drop count in drought -- and deluge." *California Water Blog*, April 9, 2015.

managing for scarcity without being unprepared for floods, and vice versa with drought. But this adjustment accomplished several things that solutions engendered by prophecy did not: it was managerial, and thus avoided the mythic visions of an uninhabited landscape; it retained the memory of flood during drought, and vice versa; and it treated human engineering as a complement rather than a solution to floodplain problems. It was perhaps only possible after the repeated and familiar lessons of past floods and droughts throughout the 20th century.

The notion that engineers could build their way out of flood and drought in California is not unique to the 20th century, but these projects were enacted on such an unprecedented scale that they stand as strident examples of the promises and pitfalls of modern engineered solutions to catastrophe. The engineer Henry Petroski made a prescient statement to this effect when he wrote, "To engineer is human."[10] One might easily scoff at the hubris of such a statement, rightly pointing to the folly in believing that engineering failures necessitate engineered solutions, that such a belief perpetuates a myth that we can tinker our way into dominion over nature as the lead characters in the natural world. But in the context of this story of flood and drought in California's Central Valley, Petroski's observation might also give us compassion for the uniquely human instinct to fix things. There is even a kind of tenderness in the constant, repeated, and imperfect striving for adaptive solutions. A levee operator in the meticulously managed Mississippi River levee system once told the writer John McPhee, "When nature shifts, man shifts."[11] In a future where climate change will bring floods, droughts, and other atmospheric variability that seems to render the landscape increasingly foreign, it is precisely the instinct to fix things--to shift--that might allow us to

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[10]Henry Petroski, *To Engineer is Human: The Role of Failure in Successful Design"* (New York: Vintage, 1992).
[11] John McPhee, *The Control of Nature* (New York: Farrar, Straus, and Giroux, 1989), 78.

recognize the constitutive elements of the past in our present. It is up to us how we go about doing the fixing by drawing on the stories of the past and the imaginings of the future to choose which solutions we might want, whether engineered or otherwise.

But for all that anticipatory history may give us in seeing alternative stories that re-envision the past and future, it does not give us a way of *evaluating* which among these stories to tell, and how best to tell them. For this, we remain forever indebted to the moral summons of prophecy, for there is perhaps no better way of instilling the basest of emotions than with appeals to a source of authority outside of ourselves. The saving grace is this: the prophetic genre gives moral weight to the stories we use to blame one another and prophesy the future. Simultaneously, the genre does not necessarily require that we place ourselves at the center of our own stories, nor does it preclude the possibility that the past and future might constitute one another, constantly and dynamically. It is easy to forget this in such a highly managed water system, where the causes and solutions to a one-week disaster seem so different from six-year disaster in the context of a human lifespan. But as the memory of both disasters fade in the rearview mirror, their moral lessons remain the same. To combine the merits of both prophecy and anticipatory history, then, would be to choose what futures we want, how they are informed by the stories of past, and what timescales are attached to such stories. Prophecy and anticipatory history can be seen as complements rather than as contrasts in this way.

A 2015 exhibit at the Natural History Museum in London takes one on a journey through environmental disasters of air, fire, land, and water. One is led through a labyrinth, past panels that allow one to feel the tactile sensation of geologic movement both slow and fast. The exhibit is designed in such a way as to funnel one towards a concluding sign that

reads the following: "Slow or fast, change is inevitable. Some processes work so slowly that in a human lifespan nothing seems to change. Sometimes change comes with terrifying speed. Over geologic time, both are important. Both alter whole landscapes out of recognition."[12] In such altered landscapes, nature appears on a spectrum between an avenging angel that vanquishes humans and as a senescent ghost vanquished by humans. However tempting it may be to believe these realities can be fixed through the ingenuity of engineering and the promethean logic of modernity, infrastructure obscures but does not eradicate the omnipresent role of nature as arbiter of human action. In this sense, *all* change requires that one grapple with the past in order to make sense of the future.

At the seam between all that did happen and all the might happen lies a choice about how one is to interpret the past and how one is to imagine the future. We cannot know *when* a disaster will happen; only that it *will* happen, and when it does, that we will tell a story about it. The control we exert over nature in these instances lies less in the dams, levees, or aqueducts than in the simple words we use to represent an event, and how those words inspire us to act. In encountering the outer limits of our own capacity for control, we may also briefly glimpse the substance of things foreseen. And then, just as inexplicably, the waters either fade or return, and if we are lucky we are left alive but somehow changed.

[12] "Restless Surface," Natural History Museum, London, July 9, 2015.

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