WETLANDS IN A DRY LAND

More-than-Human Histories of Australia's Murray-Darling Basin

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INTRODUCTION

MY FIRST EXPERIENCE OF THE COORONG LAGOON WAS FROM THE water. The boat I was in moved downstream across the calm freshwater of Lake Alexandrina toward a barrage that marked our entrance to the Coorong. This area is located at the end of the Murray River system on the coast of South Australia and is a Ramsar Wetland of International Importance. At the barrage, we entered a lock, which permitted boats to travel between the two water bodies without allowing their waters to mix. The barrages—five in total—were approved by the Murray River Commission (a cross-border, river-focused organization composed of federal officials and state representatives from South Australia, Victoria, and New South Wales [NSW]) and built by the South Australian state government in the 1930s. The barrages were intended to protect agricultural interests upstream by stopping salty water moving from the Southern Ocean, through the mouth of the Murray River, into the northern end of the Coorong, and from there into the lake and, crucially, into the Murray River, along which irrigated agriculture was expanding. The barrages have also prevented freshwater from flowing down the river and into the Coorong, which has since become increasingly saline.

While we waited for the transfer of water to take place in the lock, we watched the long-nosed fur seals lounging along the barrage, some occasionally flopping into the water to catch fish nearby. Their presence heightened our anticipation of the salty waters beyond. A few minutes later we

were through the barrage. The water level dropped. We had passed through a threshold into an entirely different place. I could smell and taste salt. As we moved farther into the Coorong, the shores flattened into sand banks where many birds, such as pelicans and sandpipers, waded. The vegetation changed from tall trees and grasses to sedges, rushes, and low, dense shrubs. We passed commercial fishing boats and recreational fishers casting rods from the shore. We turned a bend, narrowly avoiding a sand bank, and there was the mouth of the Murray River. It was open to the ocean. Sometimes, when not enough freshwater is let through the barrages—to preserve it for irrigation use—the mouth closes up. At these times the Coorong becomes even more saline, further and significantly disrupting the lives and reproduction of fish along with other animals and aquatic plants. We continued traveling south along the Coorong, with sand dunes separating us from the ocean on one side and a flat, salt-pan landscape on the other. We stopped along the sand dunes to visit a midden, a large mound of pipi shells made by Ngarrindjeri Aboriginal people over thousands of years. We walked over the dunes to the beaches that stretched along the coast and there dug for pipis with our feet at the waterline. The sun was getting low in the sky. This is where we turned back. Although we had only made it a short way down this narrow, shallow lagoon, it was already clear that this was a place rich not only with wildlife, plants, and striking landscapes but also in histories that profoundly and centrally involved both humans and nonhumans.

Each visit to the Coorong, along with further archival research, revealed new layers to its history and possible future. Over the following years, as I talked to people who lived and worked along the Coorong, I started to form a deeper understanding of the significance of what I had seen on my initial first short trip to this landscape. Ngarrindjeri people and fishers spoke of the impact of the barrages on wildlife, fish, and vegetation. They told me that the seals were a newer disruptive presence, only arriving in large numbers starting in 2007; their prior presence in the area was contested. In the late eighteenth and early nineteenth centuries, sealers had decimated seal populations along the nearby coastline, but in recent decades long-nosed fur seal numbers seemed to be rebounding. These seals were now visiting the Coorong, at least partly because the fish caught in fishers' nets presented a ready food supply. The seals have reduced fish hauls and damaged nets, as well as causing injuries to wildlife such as pelicans. Through further research it became clear that pelicans and other birds were crucial in understanding the history and effects of enclosing parts of the Coorong and its

islands as protected areas, including private and government prevention of Ngarrindjeri people's harvests of their eggs. This Ramsar wetland, which we might be tempted to see as natural, is in fact deeply historical, shaped by entangled changes to human and nonhuman lives.

Eight hundred and fifty kilometers upstream, along the Murray and its tributaries, are the checkerboard farms of the Murrumbidgee Irrigation Area (MIA), Coleambally Irrigation Area, and Murray valley irrigation districts. Parts of these areas grow rice by flooding paddies to germinate seed and encourage growth at particular points in the life cycle of these crops. Government water officials divert water that would otherwise flow to local as well as distant wetlands—like the Coorong—to grow rice in the region. During dry times, for example during the Millennium Drought, which lasted from approximately 2000 to 2010 in eastern Australia, government decisions over where to prioritize water delivery—either to wetlands or to farms—have become extremely contentious. Driving around these areas during that drought period, I saw many signs hung by those involved in the rice-growing industry protesting government decisions to reduce water allocations to these farms and instead allow water to flow to rivers and wetlands. One sign read, "You can't eat a wetland." Yet, as many Aboriginal people will tell you, you can eat a wetland by cultivating and harvesting plants in them, hunting animals such as ducks, and catching fish. From the 1970s, the management of wetlands by governments in Australia and elsewhere has focused on their conservation as natural places, largely framing them as separate from humans and culture. This has ultimately served to pit these places against farmers and to undermine understandings of them as valuable to many people for a range of reasons, including denying the long histories of Aboriginal groups' connections to particular wetlands.

Even farther upstream from the Coorong—1,500 kilometers along the Murray, then up the Darling and Macquarie Rivers—are the Macquarie Marshes. On one of my visits to this Ramsar-listed wetland, as I drove along the winding dirt road with a group of environmental scientists, the kangaroos kept pace with our car. Finally on foot, we waded into the reed beds of the marshes—some of the largest in Australia—closely observing the water hens that were moving nimbly along the tops of the reeds. The extent of these reed beds was even more apparent from the air. Joining some scientists on a helicopter flight, I could see reeds out to the horizon. Back on the ground, we listened to Danielle Carney Flakelar, a Wailwan Aboriginal woman whose ancestors had deep connections to this place, a relationship

that she and others continue today. She told us about weaving workshops she had held in the marshes to share knowledge within and between diverse Aboriginal cultures, as well as about some of the contemporary challenges to caring for her Country—a term used by Aboriginal people to refer to the nourishing interconnections between multiple beings—including from cotton farms that farmers continue to establish with government approval, both encroaching on the marshes and taking water. Indeed, irrigation, drainage, and other diverting of masses of freshwater by people are crucial for understanding wetland history and futures, especially the way the category of wetlands emerged and has operated in Australia and around the world.

These three sites—the Coorong, the rice-growing areas, and the Macquarie Marshes—are all located within the Murray-Darling Basin, a complex of linked rivers in four states and the Australian Capital Territory in eastern Australia. This massive and highly engineered river system, the largest in Australia, is the major agricultural water source for much of the nation and, as a system subject to irregular but major flooding, it has numerous wetlands along the course of its waterways, many of which are of international importance. Most are freshwater, but at the Murray's mouth in South Australia, the ocean waters of the Great Australian Bight meet the river waters, although this meeting is now obstructed by the strictly controlled barrages. Here is the culturally and ecologically important estuary wetland of the Coorong. There have been significant and ongoing losses of wetlands in this river basin since the late nineteenth century, as there have been around the world, due to drainage, the development of irrigation, the construction of associated dams, and the expansion of urban areas. But as my visits to these three sites showed me, old debates about development versus preservation, culture versus nature, do not capture the complex histories and contemporary realities of these areas, and indeed are having adverse effects on them. New ways of understanding, managing, and relating to wetlands in the Murray-Darling Basin—and elsewhere—are urgently needed.

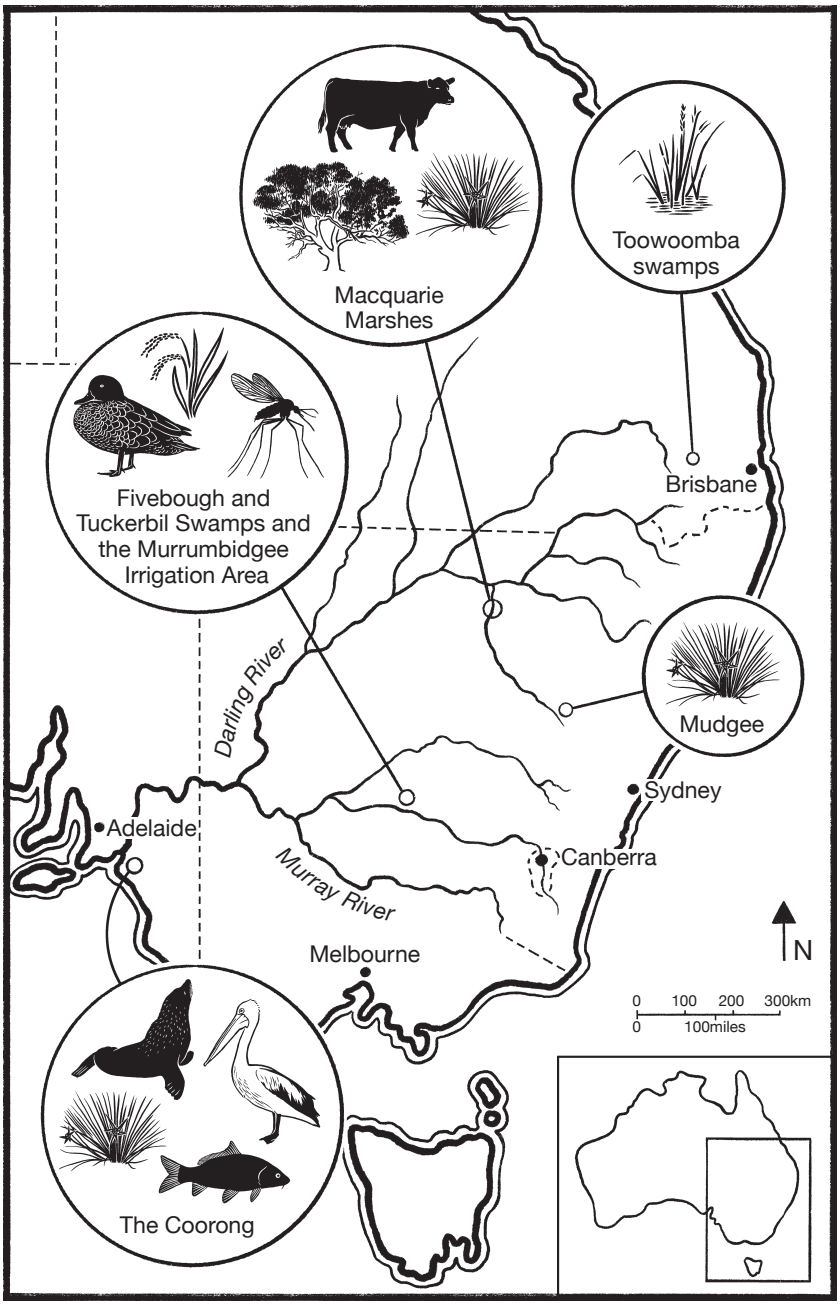
The place to begin is a recognition that wetlands in the basin are rich not only in diverse kinds of plants, animals, and insects but also in human histories. Through my research on wetlands, I have gained a greater appreciation of how humans and nonhumans have together formed these places. *Wetlands in a Dry Land* therefore develops a history that is expansive, examining the ways diverse humans and nonhumans have mutually shaped these places, from the late nineteenth century to the present. It aims to provide new

perspectives on wetlands and, in so doing, open up possibilities for new kinds of relationships with and futures for them.

The sites discussed in this book include wetlands recognized as internationally significant under the 1971 Ramsar Convention on Wetlands of International Importance (the Coorong, along with Lake Albert and Lake Alexandrina, South Australia; Macquarie Marshes, NSW; Fivebough and Tuckerbil Swamps, NSW); aquacultural and agricultural landscapes (the Coorong; Fivebough and Tuckerbil Swamps and surrounding irrigation farms; Macquarie Marshes); and wetlands drained by British colonists (Toowoomba swamps, Queensland). All of these sites are connected through the rivers and aquifers of the Murray-Darling Basin. They are also tied to each other and many other places in multiple ways, including through movements of biota and ideas.

The Murray-Darling Basin has been the subject of substantial research and scholarship based in human-focused humanities and social sciences as well as the natural sciences. This book is different in a number of ways. First, it develops the emerging approach of more-than-human histories, which emphasizes that these histories and landscapes have been fundamentally cocreated by varied human and nonhuman agents. Histories that have pitted the "nature" of wetlands against the "culture" of agricultural development have failed to recognize these entangled agencies and have, in turn, reified binaries that have gotten in the way of a more just and sustainable form of environmental management. My approach builds on recent arguments by historians and others that we need to understand wetlands not merely as natural but as socioecological landscapes.[1] Further, this approach is in dialogue with, and draws together, recent themes in environmental history with those in interdisciplinary more-than-human and multispecies scholarship.

Second, this book shows the interconnections among past, current, and indeed future changes in and to wetlands. Each chapter traces more-than-human conflicts and cooperation over time while also demonstrating the continued significance and effects of past events, policies, and interactions on wetlands today. These issues include, for example, the ongoing effects of the constitution of wetlands as an international category of conservation, imbued with specific values, in the 1960s and 1970s within a global recognition of the losses of these places. It further highlights the sustained connections of Aboriginal custodians to particular wetlands as they have sought, and continue to seek, to fulfill their obligations to care for wetland sites. Crucially, tracing these



MAP 1.1 Map of the Murray-Darling Basin

histories and their legacies shows that the way wetlands have been understood cannot be disentangled from the more-than-human lives that have constituted these places. Understandings have been formed through these multispecies relationships and have in turn reshaped them.

A third important difference in my approach is that I foreground the experiences and understandings of Aboriginal people. Key chapters engage with Aboriginal custodians and their histories in relation to specific wetlands, emphasizing the diversity of Aboriginal cultures and their dynamic pasts and presents. These chapters highlight Aboriginal people's experiences, which include actively cocreating these places in relation to and together with an array of plants, animals, and forces. An engagement with Aboriginal histories and practices undermines simple environmental narratives of wetlands as degraded by human activity and rather demands that we attend to the diverse interactions people can have with these places. The chapters engage with the ways Aboriginal people and groups have grappled with the dramatic and continuing changes brought about by colonialism and, more recently, the fluctuations of globally circulating technologies and economic impacts. Indeed, far from distracting from issues and ideas of race, a more-than-human perspective provides a further means for interrogating them, revealing the ways they have been reinforced and resisted in complex more-than-human relationships.

Fourth, my approach foregrounds class and gender. Wetlands have been places in which these issues—which intersect with racial ideologies and different views about the relationship between people and nature—have played out and taken shape, in the process remaking these places. Indeed, ideas of class and gender have shaped the diverse values people associate with wetlands as well as changes to these over time. Attention to these issues further reveal the continuing pressures and changes experienced by all populations, colonized and colonizing as well as newly immigrant.

Fifth, chapters examine the roles and practices of various sciences in shaping wider understandings of wetlands. From entomologists studying mosquitoes as vectors of disease to ecologists working toward wetland conservation, scientists have provided particular sets of expertise and kinds of knowledge through which wetlands have been appreciated. Crucially, the chapters show that the focuses of particular sciences have reflected and reinforced specific sets of values at different times.

Sixth, nature—in many ways the central element in each of these stories—is treated neither as static nor pristine. Species, as well as individuals

within species, react differently to different pressures. Hungry seals, migrating birds, and newly arrived European carp have all lived in wetlands, but their numbers, behaviors, and interest in these places have changed over time as wetlands themselves have changed. Their dynamism as species and individuals counters narrow notions of nature as simply a background to human concerns. As these animals and plants have gone about their lives, they have both altered and been shaped by diverse human projects. Their specific behaviors and needs have helped shape these places and histories. *Wetlands in a Dry Land* aims to foreground the agency of the more-than-human world, inviting the reader to consider how attention to diverse and specific agencies suggests how we might engage differently with wetlands.

Indeed, wetlands have been shaped both with and against other species, from saving birds, to weaving sedges, to eradicating mosquitoes. The diverse values people have associated with wetlands have been formed through their relationships with particular, historically dynamic nonhuman species. Specific and changing understandings of these places—from Indigenous cultural landscapes to gardens, miasmic wastelands, and precious wetland ecosystems—have emerged out of multispecies interactions. The unruly movements of ducks and other waterbirds have impacted farmers. The behaviors of seals have created significant problems for the fishing industry in the Coorong. Mosquitoes buzzing and biting their way through the landscape have frequently defied efforts to fully understand, let alone control, them. Countless other animal and plant lives, along with microbes and others, go on playing their own significant roles in the histories of these wetlands; in all their diverse forms, wetlands are multispecies achievements. Imagining, inventing, and ultimately remaking wetlands has been and remains a multispecies project.

Finally, while this book offers an in-depth history of an important part of Australia, the questions it raises and the conflicts it deals with are global. This book is of direct relevance for all former settler colonies, including the United States, Canada, and New Zealand, but also more widely, including the formerly colonized worlds of India and Latin America and among European former colonizers. Wherever human and nonhuman populations and ecologies grapple with massive economic change, demographic and technological change, and—overarching all—climate change, the issues raised by these chapters will be relevant. This book details clashes between the knowledge and practices of Indigenous peoples and the new economies with which they are dealing. It addresses the class and gendered impacts of

changing technologies across all human populations at the same time as these populations interact with nonhumans, including resurgent and declining "native species" as well as "invasive species" (for better or worse). These are all issues faced globally, on larger or smaller scales, even though the local details may differ.

This is a global story, but it takes particular forms in Australia, the driest inhabited continent on Earth. Many regions experience long dry periods punctuated with intermittent wet years in which large floods flow through and temporarily expand watercourses, increasing the number and size of wetlands. Australian environmental and more-than-human histories offer important insights into how people, animals, and plants have lived in and together helped shape such landscapes. Indeed, Australia offers crucial perspectives on ways of living with uncertain water and climate regimes in which dynamic human and nonhuman agencies respond to and thus shape emergent worlds. These perspectives are even more important in this era characterized by climate change and ecological crisis.[2]

Indeed, in these circumstances, wetlands offer vital perspectives. Today ecologists estimate that as much as 87 percent of the world's wetlands have disappeared in the past three hundred years, and over 50 percent of those have been lost since 1900, largely due to drainage to prevent disease and encourage urban growth, along with water diversion to support intensive agriculture.[3] The continued reduction of wetlands globally has had cascading consequences, from biodiversity loss to the erosion of cultural sites. In this context, many wetlands have become sources of contestation—and at times conflict—between various groups and uses: irrigation farmers, Indigenous communities, conservationists, developers, and government officials have all used and valued wetlands in different ways at various moments in time.[4]

These issues are being exacerbated due to changes to wetlands—and shifting understandings of their value and vulnerability—under anthropogenic climate change. Wetland ecosystems, which support approximately 125,500 freshwater species globally, are some of the most biodiverse in the world but also some of the most sensitive to changes in water availability, new species, floods, and droughts. Coastal wetlands play an important role in buffering storm surges; without them the effects of cyclones and hurricanes are much worse for humans, plants, and animals. They are carbon sinks, and being drained, having water diverted, or otherwise being lost releases carbon dioxide as well as methane into the atmosphere, contributing to

climate change. Some researchers have even argued for wetlands restoration as a means to store carbon dioxide and lessen the effects of storm surges, floods, and droughts on people and other species.[5] In this and other ways, wetlands draw us into histories and futures of the Anthropocene, a proposed geological epoch in which humans play an increasingly significant role in shaping the planet's ecological, hydrological, climatic, and other systems.[6]

Mirroring and contributing to this global situation, many wetlands in the Murray-Darling Basin have disappeared, or significantly changed in character, due to the intensification of land and water use in the region starting in the late nineteenth century and accelerating in the twentieth century.[7] However, ecologists cannot currently give any precise assessment of the losses of these places. This is partly due to the difficulties posed by the category of wetlands in this region, which has complex boom-and-bust hydrologies influenced by intermittent wet and dry periods that can last years and radically fluctuating numbers of nonhuman species, such as birds, frogs, and fish. Yet ecologists' evidence shows that the basin has sustained a disproportionately high rate of wetland losses in Australia.[8] Climate change further exacerbates the effects of water diversion from wetlands in the basin, as both droughts and floods continue to increase in intensity in this region.[9] In this context of global wetland losses and valuable Australian perspectives, the Murray-Darling Basin and its wetlands—both diverse in kind and large in number—offer unique insights and represent an important global case study.

WETLANDS IN A DRY LAND

The hydrology of the rivers and wetlands in the Murray-Darling Basin is central to their ecology. All the rivers are characterized by variable flows and experience periods of intense drying as well as large floods. Because of this, many wetlands are ephemeral or increase significantly in area during flood flows. During floods, biodiversity in wetlands, along rivers, and on floodplains increases as floods trigger breeding cues for many plants and animals.[10] In the basin, wetlands often see bursts in life during wet years, and some also become important sites of sustenance during dry years—which are the norm—as they continue to hold some water and support life long after other water sources have dried up. In fact, the basin contains over thirty thousand wetlands, with many recognized as being of national importance and sixteen of international importance under the 1971 Ramsar Convention (out of a national total of sixty-five).[11]

The basin is also Australia's agricultural heartland and is often referred to as the nation's food bowl. According to available statistics, in 2005 the region accounted for 39 percent of Australia's agricultural value and contained 65 percent of the irrigated land, with 84 percent of land in the basin owned by agricultural businesses.[12] Today, the basin poses environmental management challenges at a range of scales. Most prominently, these challenges center on competing views over agricultural water diversion from rivers and wetlands for farming, the channelization of rivers, and the construction of irrigation infrastructures, as well as Aboriginal peoples' access to water for a range of reasons, including spiritual, cultural, and economic values and activities. These contemporary debates and physical landscapes have been shaped by past approaches to wetlands, including local uses—such as hunting, fishing, and farming—that have both created bonds with particular wetlands and altered them.

Wetland environments in the Murray-Darling Basin and in Australia more generally need to be understood in the context of Aboriginal people's millennia-long history of living in and with these places. Aboriginal people have cocreated diverse landscapes across the continent over tens of thousands of years, including many wetlands, for example through burning and other agricultural, aquacultural, and spiritual practices.[13] Paying attention to this cocreation disabuses us of notions that these wetlands are simply natural and thus by definition threatened by human activity.

British colonization beginning in the late eighteenth century radically altered Aboriginal people's relationships with wetlands in this region. Despite the often-deliberate efforts by British colonists to sever Aboriginal people's connections with wetlands, many Aboriginal people and groups maintained their relationships with these places. Histories of Aboriginal people's struggles and resistances as well as of colonization have influenced recent postcolonial and decolonizing changes in water and wetlands management in Australia, as recognition of Aboriginal people's knowledge of and rights to lands and waters has grown.[14]

British colonists moved inland from the east coast starting in the mid-nineteenth century, toward what they later called the Murray and Darling river systems, driven by a desire to find new grazing pasture for sheep and cattle.[15] The colonists were drawn to wetlands as important sources of freshwater in this often dry region. While European colonists were thus brought into close proximity to wetlands—which they rather called swamps, marshes, and lagoons—they and others frequently viewed them as dangerous areas, wastelands, and sources of disease. They channelized and later drained many

wetlands, modifying water flows and bringing a host of new organisms to these places, with important consequences. In addition, waves of other new migrants, such as those from China during the mid- and late nineteenth century, also altered wetlands, including through establishing irrigated market gardens along their edges and by sinking wells. However, the new kinds of expertise and knowledges introduced by the British (which drew on diverse knowledges from many other places) came to dominate the shaping of wetlands in this region.[16]

Perhaps most significantly, these approaches informed the construction of large dams and extensive irrigation networks by state, interstate, and federal government bureaucracies, particularly across the twentieth century. These were built to support river navigation and, increasingly, agriculture. Together with the long-term pumping of aquifers, these projects have reduced the water available to wetlands. While rivers had been dammed and diverted for agricultural production before this, the rapidity and scale of agricultural expansion and the associated water diversion in the twentieth century were new. In that century many of the 105 large dams that now stand in the Murray-Darling Basin were built.[17] In the Murray River system alone, the Lake Victoria Reservoir, Hume Dam, Snowy Mountains Hydro-Electric Scheme, five barrages on Lake Alexandrina blocking the Murray mouth, thirteen locks spanning the Murray, Lake Mulwala, and other works were completed between 1915 and 1974, all at least under construction by the mid-1950s. While such projects were undertaken across Australia, the Murray-Darling Basin was a particular focus for state and federal governments which aimed to overcome the vagaries of drought, increase agricultural production, and increase settlement in the inland, and which also competed with each other over use of the water from this cross-state river system.[18] Indeed, historical geographers Trevor Langford-Smith and John Rutherford noted in the mid-1960s that the plains of the Murrumbidgee River in NSW, which flows into the Murray River, had "by far the greatest concentration of irrigation development" in Australia.[19] In these changing waterscapes of the Murray-Darling Basin important new kinds of wetland environments emerged with complex histories and ecologies of their own: places like rice paddies and sewage treatment works.[20]

In the 1960s and 1970s, many people became concerned over the decline in wetlands in Australia and globally. Local movements but also, crucially, international efforts to save wetlands were reactions to accelerating losses of these landscapes around the world. Indeed, it was in this period that

"wetlands" became an international category and object of conservation amid these campaigns, which reinforced and were supported by global efforts in broader environmental protection. This new global nomenclature was supported by governments and scientists around the world to shed the negative associations of terms like "swamp." They instead deliberately reframed these as precious places that needed to be set aside for conservation. In many ways this represented a radical new mode of imagining these places that positioned them as internationally significant wildlife habitat, especially for migratory waterbirds. Indeed, these global efforts led to the establishment of the Ramsar Convention on Wetlands of International Importance, Especially as Waterfowl Habitat, in 1971. This convention in turn intersected with the reframing and recategorization of these places by scientists and governments in Australia as sites for the conservation of nature. In Australia, an agreement with Japan on the protection of birds that migrated between the two countries further reinforced the government's focus on conserving wetlands as bird habitat. In all of these ways, wetlands in the Murray-Darling Basin have been deeply shaped by past, including recently past, water and environmental politics and cultures.

Most histories related to water in the basin have focused on the lives of water engineers, the construction of water storage and diversion projects, and the role of water bureaucracies in manipulating water flow.[21] These histories have been important in revealing some of the rationales behind and consequences of these schemes. Yet there were many other actors, including a diverse array of humans and other species, that shaped these histories. This book expands traditional narratives by highlighting the diversity of human and nonhuman agencies that have cocreated wetlands. Examining nonhuman agencies further underscores the need for new narratives of colonization in this region, showing how relationships among Aboriginal people, European settlers, and others were dynamically embedded within and shaped by wider more-than-human relationships. In engaging with these approaches and arguments, this book aims to further develop emerging approaches to more-than-human histories.

MORE-THAN-HUMAN HISTORIES

In 2010, I went into the archives looking for government documents on water use in commercial rice growing in NSW and Victoria, but I came out thinking about wetlands. In the context of an ongoing drought, I wanted to

know more about the changing water politics of irrigation and rice. How had this water-intensive crop come to be grown and then to dominate agriculture in areas that had previously experienced long droughts?[22] As expected, I found large files on water and rice growing created by the state governments. What I had not expected were the almost equally large files on ducks in rice-growing areas. I knew the annual duck migrations across the rice-growing areas of California had proved challenging for managers there, but the Australian ducks were not migratory.[23] They were instead nomadic, following less predictable movements of water. In the MIA, these ducks presented some unique challenges for managers, farmers, and scientists. For many farmers, various species of ducks had become pests soon after they started growing rice there in the 1920s. These birds damaged rice crops when they settled in paddies and ate freshly sown rice. But for the ducks, the flooded rice paddies were additional watery, grassy places where they could swim and forage—sometimes replacing other wetland habitat as farmers diverted water for this farming. In this way the flooded rice paddies became a kind of wetland, with not only ducks and rice but many other plants, frogs, birds, and insects moving into them. Some farmers welcomed some of these new arrivals, others not. Much depended on the farmer. As I entered farther into the ducks' stories, they offered a different view of the history of rice growing, water, and wetlands, one that gave insight into their needs and values as well as their influence on a range of human concerns. Further, their movement and attraction to water seemed to contest the human boundaries between agricultural lands and natural areas. The question the ducks prompted me to ask is this: What has counted as a wetland, for whom, and with what consequences? For the ducks it mattered that many farmers did not consider the paddies to be wetlands. Special open hunting seasons were regularly declared by the NSW state government on ducks in these areas, as they still are. Ultimately, the ducks started to change my sense of who the important actors were in this history and just how much control humans had over the histories they tried to make.

More-than-human approaches help us understand these sorts of socio-ecological relationships. These approaches have developed over the last two decades through a transdisciplinary dialogue among science and technology studies, anthropology, geography, philosophy, and other fields. This dialogue has shaped an interdisciplinary set of concerns that have come to sit within the environmental humanities. In general terms, this scholarship

rejects notions of human exceptionalism that, in Western traditions, have helped separate "nature" from "culture" and justify human exploitation of an externalized nature. Instead, it argues for richer examinations of socio-ecological relationships that more fully account for a diversity of actors, both human and nonhuman. Crucially, these approaches emphasize the importance of situating shifting modes of understanding that have been used to make sense of and inhabit these relationships. These modes of understanding, including those in the sciences, have been formed within specific histories, cultures, and more-than-human relationships, and have had particular consequences.[24]

In many ways, environmental historians have shared these concerns. Environmental history is an established field that emerged in the 1970s and has since sought to interrogate changing human relationships with the environment. Indeed, historians have sought to reveal the dynamic roles of other organisms, from Alfred Crosby's "ecological imperialism" to Harriet Ritvo's work on animals in Victorian England, and the contributors to a recent collection titled *The Historical Animal* who argue for the importance of taking animal perspectives and behaviors seriously, including in the making of films.[25] However, these works have largely focused on animal histories, not always explicitly aiming to contribute to multispecies and more-than-human scholarship.

While environmental historians increasingly identify with the environmental humanities, the field has largely treated this as an umbrella rather than an interdisciplinary space that it too can transform and also be transformed by.[26] There have been ongoing calls by some environmental historians for the field to engage more fully with key work—such as by Donna Haraway and Bruno Latour—that has informed more-than-human and multispecies approaches in order to enrich their narratives with a more diverse array of actors (human and not) and more thoroughly situate knowledges.[27] However, practitioners have been reluctant to do so. Indeed, more-than-human scholarship has also been slow to engage with approaches in environmental history. This lack of sustained and explicit dialogue has meant that environmental historians have often overlooked key aspects of multispecies and more-than-human scholarship that complicate their approaches. These approaches often either maintain a division between nature and culture and a focus on human actions, or they do the opposite, failing to sufficiently entangle natural agencies with the human. Indeed, even the hybrid approaches that have come to characterize

environmental history still maintain the categories of and separation between nature and culture while seeking to examine their interactions.[28] This means that more-than-human agencies and their historical consequences are not fully examined. Further, as environmental historian Gregg Mitman has noted, though environmental history is committed to relationality, it has been "deeply resistant to embracing a relational ontology in which things exist not in themselves" but rather in "changing material, social, and symbolic relations between and among human and non-human actors."[29]

There is, however, a growing body of historical scholarship that explicitly engages with these multispecies and more-than-human approaches to examine the agency of other biota in shaping (human) histories, while also being attentive to shifting and diverse ways of knowing, human and beyond.[30] These more-than-human histories show that both environmental history and more-than-human approaches are needed to fully account for the diversity of humans and nonhumans that have shaped socioecological relationships and how these relationships have shifted over time. Environmental historians pay close attention to the ways specific relationships—that include humans and nonhumans—have been coconstituted over time, which can help us understand why and how particular worlds were produced out of these relationships. Indeed, to fully appreciate coconstitution, we need histories, as relationships that make worlds are formed and re-formed over time. At the same time, environmental history can learn from interdisciplinary more-than-human approaches, particularly in studying and situating shifting and diverse ontologies and ways of understanding that have helped shape particular worlds within dynamic more-than-human relationships. This book builds on and engages with these emerging approaches and in so doing aims to bring environmental history and the environmental humanities into closer, productive, explicit dialogue.

These more-than-human histories are always situated and partial, and they necessarily run counter to overarching grand narratives. In engaging with particular sets of more-than-human relationships and situated knowledges, such approaches emphasize diversity and multiplicity.[31] In this way, they work to avoid homogenizing and universalizing the human, so as to pay close attention to differences in human experiences, even as they aim to rethink and reposition human lives in the context of multispecies entanglements. Questions of race and gender are deeply entangled in multispecies

worlds, which can be meaningfully examined through detailed historical studies.[32] More-than-human histories are necessarily engaged in complex ethical considerations, seeking to find careful paths through and possible ways forward within these dynamic relationships. Rather than arguing for simply protecting nature or defending human activities, they must contend with more mixed consequences. Within this dynamism, they must carefully, and ultimately, argue for particular kinds of understandings and more-than-human worlds over others.

By approaching the past in such a relational way, this book positions humans within temporally as well as spatially dynamic interspecies relationships.[33] It aims to show that being attentive to these relationships—and how they have been imagined and lived by an array of human and nonhumans—can reveal a range of inequities and draw attention to both human and nonhuman diversity. A more-than-human and multiscale history can further reveal the deep roots of inequities and power relationships, highlighting how the ways in which we humans know and act are shaped by inheritances we don't always recognize. Attending to multiple ways of interacting with and understanding wetlands opens up not only new histories but also futures for these places—histories and futures that might better account for and even promote this diversity.[34]

Wetlands are liminal places. They are where land and water meet. But where land ends and water begins is muddy and unclear. Different kinds of waters, from fresh to brackish to salt, can meet and mingle in wetlands, as in the Coorong lagoon. In this way, wetlands prompt a range of questions about borders, crossings, and leakages for various agents, human and not, in various times and places. These issues of borders and transgressions return throughout the book as it examines who has a stake in establishing borders and some of the consequences of doing so, as well as the way wetlands, different species, and people have disrupted these boundaries. This understanding of wetlands resonates with feminist, more-than-human, and multispecies ideas about bodies not ending at the skin but rather being "leaky" and fluid.[35] Much is at stake in these borderlands and their crossings. This book seeks to better understand these places and their boundaries by engaging with diverse more-than-human relationships, examining the ways they have shifted and endured over time. We might regard wetlands, then, not so much as separate places but as far-reaching and temporally rich entangled multispecies processes.

STRUCTURE OF THE BOOK

Each chapter of *Wetlands in a Dry Land* centers on a key theme that illuminates an important aspect of the history of wetlands in the Murray-Darling Basin and beyond: weaving, leaking, infecting, crossing, enclosing, migrating, and rippling. These are themes that highlight relationships, especially the socioecological entanglements of humans and nonhumans, many of which take place across and complicate Western modernist human borders. These accounts draw on original archival research as well as interviews and time spent in these landscapes. In each case, I have sought to read and listen for multiple agencies. While many of the chapters focus on specific animals and plants, these discussions are situated within a bigger cast of organisms and forces to show the multiple more-than-human relationships at stake.

The chapters' thematic focus allows each to bring together past and more recent events, policies, and interactions. The book begins with contemporary concerns, in order to foreground the pressing issues that Aboriginal people, particularly women, grapple with as they seek to create healthier Country amid multiple pressures and historical legacies. By focusing on *weaving*, chapter 1 shows that the concerns of Wailwan and other Aboriginal groups—concerns that may seem disparate to others—are in fact intimately connected. It aims to provide a complex, richly woven understanding of what is at stake in the lack of water in wetlands. Weaving interconnects generations and Country, water politics, and access to wetlands.

The remaining chapters are roughly chronological, focusing on successive events and particular wetlands that are important in understanding the history of wetlands in this region and elsewhere from the mid-nineteenth century. In chapter 2, I focus on *leaking* in the city of Toowoomba, in southeastern Queensland. Toowoomba is a town that was built on swamps. This chapter considers the swamps as historical actors, focusing on disease as one of the key ways they shaped this township from 1850 to 1940. At the same time, it takes up important questions of race and class, examining interwoven processes of swamp improvement and control, many of which ultimately failed, creating new health problems for humans.

Chapter 3 centers on *infecting*, analyzing changing understandings of mosquitoes and irrigation systems in light of a series of government investigations into the possibility of an outbreak of malaria in the MIA between 1919 and 1945. Engaging with the context of two world wars and increasingly militarized approaches to environments, this chapter focuses on how the

mosquitoes reveal and connect the shifting biocultural terrains of agriculture and nature, the home and nonhumans, as well as approaches to race and health.

In chapter 4 I look more closely at the *crossing* of borders by wildlife into agriculture. This chapter focuses on the MIA's changing relationship with Fivebough and Tuckerbil Swamps, which are nestled within its expansive rice farms, established there starting in the 1920s. It examines the highly consequential work of establishing and maintaining the boundaries between agriculture and wildlife, with a particular focus on the repercussions of this boundary work for the native species of ducks that have sought to move within and across these landscapes.

Chapter 5 focuses on the *enclosing* of wetlands, a practice that has a long history in many places and significant implications for Aboriginal people in Australia. This chapter centers on the fallout from a mass slaughter of pelicans in 1911 on a group of islands used as rookeries in the Coorong lagoon, South Australia, highlighting the way ideas of race and private property have together played a role in establishing protected areas. In so doing, the chapter foregrounds the complex interplay between the values and approaches of conservationists and Aboriginal people, an interplay that has frequently shaped wetland environments and possibilities in Australia.

Chapter 6 examines the role of *migrating* birds in shaping the emergence of wetlands as a category of conservation in the 1970s. This historical situation has had lasting consequences. After joining the Ramsar Convention on Wetlands of International Importance and the Japan-Australia Migratory Bird Agreement in this period, Australian government conservation departments initiated a nationwide Wetlands Survey. This survey was ultimately abandoned, partly due to disagreements over whether wetlands were primarily an object of conservation as waterbird habitat or for other uses and values.

Chapter 7 engages with sealing in the late eighteenth and early nineteenth centuries as rippling capitalism, with ongoing effects, importantly shaping contemporary controversies in the Coorong lagoon area that in many ways are hallmarks of the Anthropocene. In this region, long-nosed fur seals have become the center of a heated debate as their numbers exploded over the last decade, causing financial and cultural upheaval for Ngarrindjeri people and fishers. Some fishers have turned to invasive European carp to recoup their economic losses. Is it possible or even desirable to manage wetlands toward their state prior to British colonization?

The afterword brings key issues and themes raised in the chapters into dialogue with the long dry period experienced by humans and nonhumans throughout the basin culminating in the summer of 2019–20, and into a consideration of future changes in these wetlands in the context of climate change. In undertaking a multiscale and more-than-human history of wetlands, this book tries to widen the scope for reimaging these places as they continue to be lost, to show that things might have been, and might still be, different.