‘The Common Cormorant or Shag Lays Eggs Inside a Paper Bag’.[1] A Cultural Ecology of Fish-eating Birds in Western Australia

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ABSTRACT

This paper builds a history of the rise of ecological awareness of the Swan River in Perth, Western Australia through the cultural perceptions of fish-eating birds. A history of understandings of the specific habitat ecology is traced through the rise of scientific knowledge about fish-eating birds as competitors with fishermen. The impact of this changing awareness on the river ecology is discussed as well as how this scientific knowledge became subservient in the political domain to developmentalist ideology.

KEY WORDS

Cultural ecology, environmental history, ecological consciousness, piscivores, cultural history

A line of street-lamps with a distinctive water-bird design decorates one of Perth’s main roads near the corner of Barrack Street and Riverside Drive. They are intended to create a visual identity and a night-time attraction for part of the foreshore.[2] With their silhouette mimicking the head of a pelican and the hoop neck of a swan and cormorant, their design incorporates metaphors for the water-birds known to have once frequented the area. While serving an illumination function and indicating a relationship between the waterfront and the river, the street-lamps become citations, referencing something that is now held in our memories. They are therefore part of a strategy of creating memorials – of using an absence of water-birds to invoke a sense of nostalgia for something ‘that is no longer’.[3]

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FIGURE 1. 'Swan lights', The Esplanade, Perth.
Courtesy Lighting Images

The Swan River, on whose banks Perth is built, holds a place in the cultural imagination of those living in the city. The place of water-birds within this frame has been represented through art and photography.[4] A long series of visual representations of the view from Mt Eliza shows the development of the city, its impact on the landscape and its encroachment into the river as land reclamation swallowed the river shallows.[5] To some, these reclaimed areas have cleansed the river environment, but to those operating at water level these littoral shallows became understood as essential to the fauna of the river. What the view from the Park now shows, as many lament, is that 'the foreshore boatsheds and the old pier and bathing facility at the foot of Barrack Street have been replaced by the freeway complex and parking areas'.[6] While Dominic Serventy describes how his sense of loss is visualised, as a Perth based CSIRO scientist[7] he played an integral part in constructing ecological understandings that formed the foundation for arguments for the river's preservation.

The street-lamps memorialise the loss of water-birds from the river through creating echoes of their form. Placed, perhaps ironically, on the site of their former feeding grounds they stimulate a history of the rise in ecological

FIGURE 2. Archibald Bertram Webb. c.1922. *Shags* [colour woodcut]. Courtesy The Holmes à Court Collection, Heytesbury.

awareness of the Swan River system. As will be discussed, while there has been a long-standing cultural perception in Western Australia that fish-eating birds were the cause of the loss of fish from the river, over time and with increased scientific understanding, reclamation of the river shallows has become understood to be a major contributing factor. What emerges from this intimate case study of the perceptions of fish-eating birds on the Swan River is, in contrast to the case study of the wheat-belt in Western Australia, how scientific ideas infiltrated public policy development.[8] Through such a study it is possible to track the ebb and flow of the political acceptance of scientific advice, albeit for a short window of time, and the ultimate dominance of an ideology of development that blinded decision makers to other forms of advice.[9] Through combining design, function and location, these street-lamps become part of a history of substitution for the 'real thing'. They also become a way of entering a cultural ecology of the attitude towards fish-eating birds in Western Australia.

PRESENCE

Early arrivals from Europe to Western Australia brought with them a sense of natural history and were keen observers and describers of fauna and flora.[10] On most occasions it was the difference between the fauna that they knew from other parts of the world that was documented, rather than the similarities with what was already known.[11] Water-birds were often specifically noted by explorers along the Western Australian coastline prior to settlement. For example in 1688 Dampier noted pelicans in Shark Bay, which is now known to be the nearest substantial breeding ground to Perth.[12] More locally, along with all forms of bird life surrounding the Swan River, fish-eating birds attracted the attention of early visitors. In 1801 de Freycinet noted 'a prodigious multitude' of pelicans at the entrance to the Swan River, and in 1827 Fraser noted the abundance of waterfowl, in particular the black swan. In 1829 Captain Fremantle expressed his amazement at the big flocks of little black cormorants, and noted that for all the species he saw, this was of most interest because of 'the spectacular community fishing technique it has adopted when feeding'.[13] In giving some sense of the volume of bird life on the Swan River, Mrs Jane Roberts reported in 1833 that a friend said he would

> never forget the sight of thousands and tens of thousands of black swans, which as his party coasted the shore, rose and darkened the air to the distance of eight or ten miles.[14]

The process of naming enabled early explorers and settlers to take an active part in re-inscribing the landscape to make it familiar to their own ways of seeing and referencing place.[15] While the act of naming becomes a form of colonisation and silencing through displacing Aboriginal ways of knowing, European names around the Swan River provide evidence of a prior abundance of bird life. The Swan River was named by Vlamingh in 1697 and later, land features around the river were named including Cormorant Rocks and Pelican Point. These naming practices may at once seem to have been a failure of imagination on the part of the explorers to invent new names, but they cemented the fish-eating birds in their place of special cultural significance in the imagination of Western Australians.

The early explorers and settlers to the Swan River did not limit their interaction with the bird life on the Swan to passive acts such as naming and observation. They were also keen shooters for both sport and food.[16] The effects of this level of shooting activity did not escape observation, though it remained unregulated for some time.[17] In 1833 it was noted that the bird life on the Swan was 'rapidly decreasing, the constant warfare kept up against them on the part of the colonists being so active that scarcely one of the feathered race could

escape them'.[18] It is likely that some of the assault on bird life was related to the need for a variety of food – with advertisements appearing in newspapers describing such species as duck, teal and swan for sale as food.[19] The effect of this shooting on the wildlife began to be noticed in official circles. In 1892 it was mentioned in Parliament that 'a general wish has long been expressed that all shooting on Perth Water should be stopped, so that native game might settle there, as it used to do years ago before it was driven away by shooting'.[20] Legislative attempts to reduce the impact of shooting on wildlife were limited to the preservation of species to retain stocks for hunting.

CULTURE

A genealogy of an emerging idea of preservation is clear from the names and intent of the early acts relating to the preservation of fauna in Western Australia. As Spencer Roberts reflected in 1930,

> Game laws are in some respects selfish, for they are sometimes the result of the desire to have a set of conditions which will ensure a supply of material for sport and food. They are not concerned with where the birds breed or their habits.[21]

The intent of the first Preservation of Game Act of 1872 in Western Australia was to 'provide for the preservation of imported Game, and (during the breeding season) of Native Game'.[22] This was achieved through gun control and the introduction of closed seasons to allow game to breed.[23] With similar intent to attitudes expressed across the Australian colonies and in New Zealand, the Game Act of 1892 enshrined the valuing of imported over indigenous species. It achieved this through penalties for killing game out of season being greater for imported than for indigenous fauna.[24] Indicative of the local hunting habits, John Forrest described 'At present, if a duck or a swan happens to show itself on these waters, many persons start off at once with a gun determined to kill it'.[25] Aiming to preserve both imported and native game through closed seasons and game reserves, this act appears to be a laudable attempt at habitat preservation. However, this equally implied 'open season' on game for the rest of the year, thus legislating a culture of hunting. While it was in the schedule to this act that the emu, black swan and pelican first became protected species, all four species of cormorant still lay outside official protection.[26]

Debates around the passage of the Game bill in 1891/2 provide insights into the contemporary culture of preservation. One member provided articulation of popular prejudice surrounding specific native species of birds perceived as pests for which little scientific foundation was evident at this time. He said that 'among the birds proposed to be protected is the cormorant or shag. Now, considering

that this bird destroys a large quantity of fish, I think it is absurd to protect it. … It is of neither use nor ornament.' Likewise he described the pelican as

> another bird that destroys a lot of fish. The pelican is certainly an ornamental bird, and probably it may be necessary to protect it; still, at the same time, the fact remains that the quantity of fish destroyed on the river by pelicans and shags must be something enormous, and in placing these birds on the schedule, the question is whether it will not do a great deal more harm than good.[27]

While there was a predilection for shooting fauna for sport or food, the way Acts designed to protect native fish and fauna related to each other was at best ambivalent. So, while the Game Acts provided protection for certain declared native species, the Fisheries Acts provided for preservation of fish for their value as an economic resource rather than as a native species. While certain species of birds were protected under the 1892 Game Act, the Fisheries Acts of 1899 and 1905 enabled permission to be granted to declare a scale of rewards for 'the destruction of cormorants, pelicans and such other birds as by proclamation may be declared hostile to fish life'.[28] Moreover, the Vermin Act of 1919 enabled the declaration of species as vermin that were protected under the Game Act. Thus, through the way the specific purposes of the Acts were framed, fish-eating birds sit with some ambivalence between their status as native species considered worthy of preservation and a pest seen as competition for fish resources.

Parliamentary debates surrounding fisheries legislation rest on anecdotal evidence that fish-eating birds were seen as competition for and potentially depleting the fish resources at a time when the price of fish was seen as being too high.[29] They also reveal a lack of understanding as to which fish species are being eaten by the birds, and whether these are the same fish as those preferred for human consumption. Thus, one member saw it as 'more important to save the fish in the river than to save the birds. Shags and pelicans are the great enemies of the fish in the Swan River'.[30] Another, showing some ambivalence towards the status of pest versus their aesthetic appeal, stated that

> We want to destroy the shags and pelicans, although I must say the pelicans look very nice swimming on the river. It is a pleasure to see them, but according to my experience they destroy a tremendous lot of fish. I have watched them, and have seen one pelican swallow as many as 20 herrings.[31]

While this member bought into the 'war on nature' he also mused that 'It requires a great deal of consideration as to how we are first to protect the fish from ourselves, and then from these destructive birds and larger fish'.[32] This was a challenge whose complexity would only emerge several decades later.

PREJUDICE

From the scant details which survive, records of commercial fish catches on the Swan River show a pattern of decline. For example, in 1899 the average weight of fish caught per boat was 7704kg, and in 1906 this had reduced to 2349kg per boat.[33] In the late nineteenth century, the removal of fish-eating birds was seen as a way of protecting declining fish resources, despite their fish-eating habits being poorly understood. The official campaign against fish-eating birds as pests in Western Australia began in 1898 with a bounty of threepence a head offered for destruction of cormorants.[34] The Fisheries Act of 1899 formalised this vendetta and raised the bounty to sixpence a head[35] as it was 'not worth the powder and shot to shoot them at that price'.[36] While the number of birds destroyed under the 1899 act was not recorded, Abjornsson, a Fisheries Inspector, wryly noted that the reward did not affect the number of cormorants killed 'for it is only when the ducks are on the river that anyone pretends to be shooting cormorants'.[37] Seven years later in 1906, a bounty on the head of pelicans was introduced.[38] Indicative of the scale of shooting, during this year Abjornsson noted that 'Pelicans have been very numerous on the river throughout the whole year, and although I have shot about 100, and wounded a great number of them, they do not seem scared away'.[39]

Ideas about fish-eating birds enshrined in nineteenth- and early twentieth-century legislation were borne from anecdotal evidence rather than from scientific understandings of ecological relationships. However, meetings of the Australian Association for the Advancement of Science were concerned with the place of science in the national interest, and they invariably discussed the protection of native fauna and flora.[40] In one report on the protection of native fauna, they recognised the binary divide between economic and scientific value of species, and sought resolution to this.[41] In Western Australia, an understanding of the zoology of the State was emerging through interests at the Western Australian Museum, the Royal Society, and community groups.[42] However the rise of professional zoology came too late for scientific knowledge to infiltrate the political imagination sufficiently to be incorporated into the 1912 Game Act.

By the time the Game Act of 1912 was being framed, analyses of relationships between fish-eating birds and their food supply had been published. In 1908 the ornithologist Mattingley argued that the reduction in the supply of fish noted by anglers and fishermen was not due to the cormorant competing for the same fish species as humans.[43] Rather, he argued that cormorants ate fish and crustacea that were predators on commercial species, and that eradicating the cormorants served ultimately to reduce fish stocks as one element in the food chain had been removed. However, while a description of ecological relationships surrounding fish-eating birds was in the public domain, there simply were not enough scientific voices to balance prejudice or influence public policy formation in any meaningful way.

The Select Committee inquiring into the Game Bill sought expert opinion about specific birds, indicating concern at their status as both native species and pests.[44] Opinions solicited about the pelican range from 'I do not think it does much harm', to the oft repeated anecdote that it was 'an unmitigated nuisance. He destroys enormous quantities of fish'. It was Bernard Woodward, director of the Western Australian Museum, and J.G. Hay who introduced ecological information into the debate.[45] Woodward stated 'the pelican is a handsome bird and very attractive, and feeds largely on the cobblers and other fish that live in the shallow water and eat the spawn and young of useful fish'. He specifically noted the effects of removing cormorants on the economically valuable fish species, and showed his awareness of Mattingley's work when he said that 'if you shoot them all off the cobblers will increase and the mullet decrease'. When pressed for his personal opinion about the pelican he responded 'I do not think it does much harm, and it is a thing of beauty'.[46]

Drafted after comparison with acts in Australia and New Zealand, the 1912 Game Act reveals a desire to preserve species for their scientific and economic value, and thus a nascent transition from a hunting to a conservation culture.[47] As one member noted, the resources of the State were gradually being understood as finite and there was an emerging desire to protect native fauna for the longer term. He saw the harm done to native game by 'shooting them out of season and by killing them by most unsportsmanlike methods, [and] it must be recognised that it is time that some step was taken to put an end to such an undesirable state of affairs'.[48] While the Act introduced equal penalties for killing introduced and native fauna, its approach to creating schedules of protected species led to considerable confusion.[49] This failure to grasp the complexity of the issues being addressed may have been a consequence of a failure to listen to the scientific information presented. Triumph of prejudice over science rests with the evidence that the pelican and all species of cormorants were explicitly left off the schedule and thus could be shot when seen as competition for fish or as pests.[50] Scientific answers to whether the fish consumed by cormorants were economically valuable species were not to be provided in Western Australia until 1936.

MYTH

Between the 1912 Game Act and the 1950 Fauna Protection Act[51] there was a marked increase in ecological knowledge of the inter-relationships between fish and birds, and the nature of the Swan River ecosystem. Over time, newspapers played a role in shifting the tension between prejudice and science around the perceived evil of the fish-eating birds with rhetorical flourish. Perth's inefficient system for distributing and marketing fish was of concern,[52] and in 1919 the intensity of the river fishing industry is noted with 130 professional fishermen in eight miles of the Swan River.[53] Despite these factors being seen as possible

contributors to the high price of fish and stock reduction, fish-eating birds continued to be the focus of public discontent. Thus, one letter in 1919 concluded that 'fish should be one of our cheapest foods, but unless the Pelicans, Shags and Swans are driven out of the Perth waters fish will never be plentiful'.[54] The most common solution offered was to shoot cormorants, but this met with a consistent official Fisheries Department response. Typical of these are that shooting is 'likely to result in serious consequences', and that 'the little shooting at cormorants permitted under authority quite recently, led to several complaints'.[55]

There was consistent public pressure to rid the river of the cormorants.[56] Under one headline 'Shags or fish? We cannot have both', the rhetoric was restated. It proffered its case that

> so long as the shags are allowed to thrive and multiply and deplete the river, so long will the people yearn and hunger for food which should be part of the daily diet. … The shags should be hunted off the Swan to give the fish a chance. War should be declared on them.[57]

Gradually, information arising from studies by ornithologists, including White into the dietary consumption of cormorants and Mattingley's ecologically based arguments relating the removal of cormorants to the reduction of fish stocks, became evident in Fisheries Department policy and public responses.[58] Official policy shifted from granting permits to shoot the birds, to arguing that the cormorant is not 'an unmixed evil' as it eats fish that are seen as inedible such as cobblers.[59] Alongside this gradual change in official attitude that cormorants did more harm than good, and while war was declared on the enemy of fish, the interdependence of aquatic life was also being discussed.[60] In response to a flurry of correspondence, the Chief Inspector of Fisheries wrote that 'to my mind, a man should get at the facts of the web of life before, not after, he advocates drastic destructive measures'.[61] However, systematic scientific work on bird and fish life on the Swan River began in 1936.

SCIENCE

As scientific studies stimulated by perceptions of fish-eating habits of the birds began to challenge their popular image internationally, new prejudices against cormorants emerged from a more powerful class of wealthy leisure boat owners on the Swan River. Agitation in regard to boat damage by cormorants was first mooted in Parliament in 1892, and its re-iteration in 1928 represents a shift in the focus of prejudice. This time, ironically, the debate led to a significant advance in understanding the fish-eating habits of the cormorants.

In 1928 a parliamentarian echoed the interests of his yacht-owning constituents, stating that cormorants 'eat tremendous quantities of fish and ruined yachts anchored in the river'.[62] While the Fisheries Department reiterated that cormo-

rants did more good than harm, they acknowledged that 'by using sailing boats, launches etc, as resting places, they cause a considerable amount of annoyance'. Indicative of the political influence that the yacht owners enjoyed, a deputation to the Minister resulted in the issue of specific permits to shoot cormorants. During this time the Chief Harbour Master reported that 'serious damage has been done to navigation lights on the Swan River', intimating this may have been done by those with permission to shoot cormorants either by direct firing or by ricocheting.[63]

During this time, the newspapers began to introduce a more informed debate, which itself reveals the speed at which information published internationally infiltrated public debate in Western Australia.[64] That natural history and ecological relationships were gradually creeping into discussions about the role of cormorants in maintaining fish stocks in Western Australia followed a similar trend in England on the same issue. In 1932 a report in the Perth *Sunday Times* described the volte-face by the Cornish fishermen. When it was shown cormorants did not compete for fish with fishermen the birds were placed on protected lists at their request.[65] From this point, the newspapers began publishing articles from a range of naturalists in an attempt to raise public understanding of the ecological roles of fish-eating birds.

As scientific debate began to quell the cacophony of public outrage against cormorants, there was a new entrant into the politics of food and sporting resources in Western Australia. With their letterhead depicting partridge, trout and pheasant, the Fish and Game Protection Society were clearly on the side of human control over the environment.[66] They took up the public cause for creating a resource for sporting shooting and fishing, and while concerned with the depletion of fish stocks in the Swan River, they were keen to be seen as more than a mouthpiece for the Yacht Clubs. As their minutes of meetings show, they were rigorous in their pursuit of scientific answers. Thus,

> the question of the menace or otherwise of the shag or cormorant on the Swan River was discussed. Dr Serventy should be requested to investigate thoroughly the desirability or otherwise of an onslaught of these birds, which in the popular opinion, are destroying large quantities of fish in our rivers.[67]

Following international trends where the diets of cormorants have been studied specifically because they were perceived as competitors with humans for food,[68] Serventy's study of the fish-eating habits of cormorants in Western Australia was undertaken at the request of the Fish and Game Protection Society in 1936.[69] Similar studies had been undertaken by Abjornsson in Western Australia,[70] nationally[71] and internationally.[72] In analysing whether cormorants ate economically valuable fish or those considered unfit for human consumption, these studies addressed whether the cormorant was a pest or an ornamental occupant.

By the 1930s the Fisheries Department in Western Australia incorporated the 1908 argument that removing cormorants may lead to a diminution rather than

an improvement in fish stocks.[73] They also began to explain the ecology to complainants – that some fish leave their ova in the rushes where they are eaten by crustacea which form the diet of cormorants. More informed correspondents showed the extent to which these ecological studies were known. One wrote that 'Clearly it is not the shags but the methods of the white man that have so badly deteriorated the fishing … to save our fisheries it is necessary to leave the shag alone. … They eat the destroyers of the marketable fish spawn'.[74] Thus, Serventy's study in Western Australia was based on established methods, and had an informed national constituency to greet it. It had an equally established set of local prejudices against which to measure his scientific observations.

Serventy analysed the stomachs of 441 birds and concluded that the cormorant did not prey upon the commercially valuable estuarine fish. He attributes this to the fact that most edible and sporting fish are too agile to be caught by the cormorant. He noted that interactions between the fish and birds could operate either as competition for the fish food supply, or as a check on their predators. He discussed briefly that, while cormorants ate some species of fish which were also food for marketable fish, he thought it unlikely that the cormorant was a limiting factor on the food of the commercial fish. In concluding that these relationships require much more study to be fully understood, he was cognisant of the complexity of the ecological relationships of fish-eating birds and their food source.

Serventy's results concurred with international studies of the fish-eating habits of cormorants. These also concluded that popular perceptions that cormorants compete with fishermen for edible species tend to be without foundation.[75] Of particular note are results of studies in England which were decisive in shifting public and commercial attitudes towards the fish-eating habits of the birds.[76] However, Serventy's paper did not have the desired effect on public policy in Western Australia, and the strength of his conclusions was not enough to counter the depth of local prejudice against the fish-eating birds.

CONSERVATION

That new fauna protection legislation was needed in Western Australia was acknowledged at the Australian and New Zealand Association for the Advancement of Science conference held in Perth in 1926. Against the post 1945 backdrop of an increasing population, extensive clearing for agriculture, and recognition of the need for industrial development, there was concomitant recognition by some individuals of the need for some kind of environmental protection. Specialist scientific advice about the conservation of native game, and the introduction of game from outside the State was eventually provided to government by the Fauna Advisory Committee.[77] Amongst its more routine

duties of assessing requests for permits to shoot native fauna, one task of this Committee was to frame new fauna protection legislation.

Much work in shaping the new fauna protection legislation was undertaken by the ornithologist, and good friend of Serventy, Major Whittell. He wrote of the profound cultural shifts in ecological thinking that should be reflected in new legislation. Thus he argued that

> All legislation to date has stressed as the titles thereto indicate, the aspect of fauna as 'game', a word which denotes something available for hunting and killing. Modern lines of thought discard the word game, preferring 'Fauna'. … That legislation is necessary is obvious if we are to retain our native fauna in its natural habitat and the principle such legislation should apply is *Conservation* rather than *Game Protection.* … The peculiar and interesting native fauna is an integral part of the Australian environment and should be conserved for its own sake.[78]

Scientific influence, in particular from the Fauna Advisory Committee, is clear in this legislation. The Fauna Protection Act 1950 ensured that all terrestrial vertebrate native fauna were protected unless otherwise declared vermin or scheduled to be unprotected. It contained provisions relating to habitat preservation first mooted in debate in the 1912 act.[79] Thus, this legislation reflected the shift evident in the naturalists' literature for some time – from species protection to habitat protection.

Advice given by Whittell and the Fauna Advisory Committee was evident in the debates surrounding this act. In introducing the Bill, the Minister for Fisheries stated that 'The basis of this measure is not to preserve wildlife to enable it to be shot or otherwise hunted, but for the value and interest it will have to the people of Western Australia.'[80] Likewise, another member said that 'In the past many species of birds and animals have been slaughtered indiscriminately because they were thought to be pests, but time and experience have shown that they were friends of man, in that they kept other pests down'.[81] While saying this, much of the debate revealed concern at the possible protection of species seen as a pest to farmers – grasshoppers and the emu in particular.

Even with the decline in the fishing industry the cormorant remained the focus of prejudice for the river-based Yacht clubs.[82] However the birds' role in the removal of fish paled into insignificance in the eyes of the leisured yacht owners compared to the emphasis on the damage to their boats. In 1953 a meeting with the Minister for Fisheries enabled the yachtsmen to present their case. They stated that

> The damage to our marine craft is absolutely terrific. For instance it costs £30 to £150 to cover a boat, which lasts about three years. … It is a terrific business on a Saturday afternoon to get on one's boat. It meant going at least an hour earlier to make it clean enough to take anyone on board.[83]

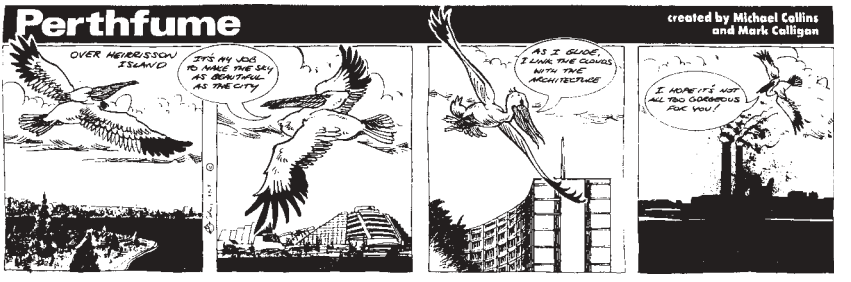

FIGURE 3. 'Over Heirrisson Island'. Perthfume, 1989.
Created by Michael Collins and Mark Calligan.
Reproduced with permission from Michael Collins, Black Splash, Western Australia.

In response to these complaints the Minister noted to the meeting that 'I know it will get a strong abuse from birdlovers and various other societies, but we will just have to put up with that'.[84]

The Fauna Advisory Committee refused a related application by the Yacht Racing Association to shoot cormorants in the vicinity of the Club premises.[85] Serventy explained that the little pied cormorant, the species causing most of the fouling of the boats, was protected precisely because it is the sole producer of guano, and that with 'the shortage of super-phosphate, destruction is shortsighted'.[86] The Minister accepted the advice from his Advisory Committee that cormorants are 'valuable natural control of such commercially useless shoal fish as hardyheads. … Any upsetting of the natural balance may have a serious permanent effect on the aquatic life of the Swan River'.[87] He suggested that the Yacht Clubs continue to experiment with measures to protect their craft from roosting birds.

This divergence of opinion resulted in a meeting between the yachtsmen, the Fauna Protection Advisory Committee and politicians, grandly entitled a 'Conference on cormorants'.[88] With the yachtsmen unwilling to believe his 1936 survey results, Serventy undertook another analysis of bird diets and like his published results concluded that 'none of the stomachs contained fishes of commercial value'.[89] With his scientific status at the meeting, Serventy introduced the idea of the cultural role of the cormorant in the Western Australian imagination. He expressed the opinion that a large section of the public sought protection for the cormorants 'on aesthetic grounds, and considered that they were a picturesque part of the attractions of the Swan River which could be a bare stretch of water without them'.[90] The outcome of this 'Conference' finally showed the primacy of science over prejudice. While it was acknowledged that

cormorants cause inconvenience and expense to boat owners, the Minister considered that 'the views of all sections of the community had to be considered'.[91]

HABITAT

Disputes over the fish-eating birds fed popular prejudice against individual species and stimulated scientific and ecological studies, but their conclusions were not always respected. In response to requests for permits to shoot cormorants in 1941, Serventy wrote in a forthright manner that the

> cormorant is not an important predator. The danger of fisherman and fishermen's organisations focussing their attention on such factors as cormorants is that they may overlook the real causes making for diminution and hence neglect to take the requisite remedial measures in time. Such causes as like as not, are over-fishing.[92]

In pointing out potential threats to bird life beyond immediate prejudice, he may have been thinking another threat was the lack of scientific understanding of the ecology of fish-eating birds.

In 1903 Abjornsson showed contemporary understandings of cause and effect when he wrote that he 'visited the rookeries and destroyed eggs, nests and young shags. This method of destruction is proving effective'.[93] Serventy showed that relationships between the decline in birds and fish stocks on the river were much more complex than such anecdotal evidence suggested. In 1940 he wrote that the reduction in bird life is as likely to be related to 'changes which settlement has made in the bird's normal environment' as the targeted shooting or egg collecting from individual species.[94] As understandings of the relationships between species on the river developed, the focus of study shifted from the fish-eating habits of birds to the habitats of the fish. What emerged from these studies was that the most biologically productive parts of the Swan River were the shallows, and therefore the reduction in fish and birds from the river was likely to be related to the loss of these areas of the river.[95] However, as these ecological relationships were being investigated, a greater ideological threat to the River emerged – that of government-sponsored development.

CULTURAL ECOLOGY

Inland from where the street-lamps now stand, Jesse Hammond noted Aboriginal people in the 1860's spearing cobblers in the shallows between Barrack and William Street.[96] These fertile shallows were removed during reclamation projects which have continued at regular intervals since the middle of the nineteenth century.[97] The advantages of reclamation were seen to include the

removal of mosquitoes and smells from rotting algae, a desire to have easier access to the water, and the creation of additional land. By the 1950's what was once seen as an important clean-up technique was to become an environmental contest. As knowledge of the role of the shallows of the river increased, so did concern for proposals for major reclamation works in the 1960's that were to engulf them.

Once a marine environment, the Swan River is now a seasonally fluctuating estuarine environment.[98] The salinity of the river in summer is similar to that of the ocean, whereas in winter the water can become practically fresh after a heavy downfall.[99] In winter the lowering of the water temperature and the freshwater plume overlying the salt water wedge resulting in deoxygenation have a profound influence on the fauna of the river.[100] Studies into the effects of this seasonal variation on the river show that the deeper portions of the estuary become untenable for animal life in winter.[101] As a consequence, it is understood that the biologically productive parts of the river are areas less than ten feet deep where the fauna is less affected by seasonal variation in the temperature and salinity of the water.[102] With this increasing ecological understanding of the river, Serventy wrote that it is 'becoming apparent that the reclamation of the shallows has greater deteriorative effect on the fauna than its occasional overexploitation by over-fishing, amateur or professional'.[103] He argued that the loss of the shallows reduced suitable feeding areas in the estuary and in part led to the reduction in bird life that so impressed early visitors. Thus, while the shallow areas were designated 'foul ground' and were thus the focus of reclamation, they were 'equally important feeding grounds for commercially valuable fish as well as waterfowl'.[104]

In the 1950s, when there was a growing understanding of the ecological value of the river shallows, the stage was being set for public conflict with 100 acres of shallows earmarked for reclamation for a freeway interchange near the newly opened Narrows Bridge. Successive Western Australian governments showed a preference to defer to political ideologies over scientific advice, as seen in the area of land clearance for agriculture.[105] While previous threats to the river ecology from fishermen and yachtsmen had been fairly benign and thus scientific advice had a window of attention from politicians, in the 1960s the threat was the Brand Government's development imperative.[106] While ecological knowledge of the river was harnessed by a coalition of naturalist and scientific groups in opposition to the proposed developments, the battle against private transport policies and the development of the river for roads could not be won on arguments about the river shallows being important faunal habitats. Even arguments about sustainable transport rang hollow against Brand's populist rhetoric. He reported the progress of reclaiming shallows for

> beautifying the Swan and Canning Rivers, and making them more accessible to the people of Perth. … New beaches have been created, unsightly tidal flats have

> been filled to provide clean access to the water, and a long term programme to turn swampy marshlands into useful foreshore is well advanced.[107]

On the heels of the freeway reclamation came a 1965 proposal to fill in some areas of shallows around the western suburb of Nedlands – from Pelican Point to the Nedlands Jetty. This proposal hit the heartland and homeland of many of those active in the protests and raised (yet unrealised) fears that this would lead to another freeway across the river. It was proposed to fill in shallows close to the bird habitat on Pelican Point where prior work filled in some of the marshes in 1936. This area was noted and named in 1827 and was the site of Serventy's bird observations, as he lived very close by.[108]

The Naturalists Club argued these shallow areas of the river were critical to the life in the river, and that the flats proposed for reclamation between Pelican Point and Nedlands Jetty were known feeding grounds for commercial species of fish.[109] As Serventy explained clearly on behalf of the Club 'The flats are important *feeding* grounds for the birds which *roost* at Pelican Point bird sanctuary. It seems pointless to leave birds a roosting place but not a feeding place'.[110] However, once again, the battle against reclamation of river shallows was lost. While the multiple long-term effects of this reclamation have yet to be fully studied, recent bird counts at the sanctuary show that overall, the bird life has returned to the area at levels higher than noted by Serventy in the area in 1936.[111] There are several likely reasons for this. Serventy undertook his survey during a time of widespread river reclamation which led to the local loss of the samphire marshes on Pelican Point, and thus a likely low point in bird numbers.[112] The more recent closure of the Point to public access in 1976, a nearby jetty which altered the water flow on one side of the point causing dune stabilisation, and the changes in vegetation over time are considered to have assisted in the increase in bird life.

Since the 1960s, the effects of foreshore development on bird life have faded from public consciousness. Contemporary debates relating to the Swan River concentrate on conflicting uses, for example the appropriateness of jet-skis, and the speed of river craft.[113] The Gallop Government has publicly recognised the need to protect the river landscape – including natural elements and the built form – so as to 'sustain the environmental, cultural, economic and social values' of the river.[114] Political concern for the biological diversity of the river rests with electoral promises to return the symbolic black swan to its former habitat.[115]

The fish-eating birds recede both from view on the river, and from public debate from the 1960's as pressing ideologies of development over-rode emerging ecological understanding, while community based management of the Swan River has tried to address conflicting concerns.[116] Thus, the appearance of the street-lamps as some kind of memorial is all the more apposite. Situated on land reclaimed from what was once biologically rich shallows that formed their predecessors' feeding grounds, they stand as mute and immobile monuments to

a range of once dynamic ecological, political and cultural contexts. As an integral part of a new foreshore development, their stark poles and metaphoric design represent a set of displacements. They are reminders of the emergence of development ideology over science, and situated on a sterile, reclaimed environment they rest as a reference to a rich, fertile and diverse biotic past. In using art as a substitute for a natural environment, they serve to aestheticise the memory of a site that was once decorated by fish-eating birds.

NOTES

[1] First two lines of an anonymous rhyme. Work on this paper was funded as part of an Australian Research Council Linkage Grant with the National Trust of Australia (W.A.).
[2] 'Swan lighting concept' passed by City of Perth 9.6.98. Email from Roger Blackburn, Senior Urban Designer, City of Perth 9.4.2002.
[3] Malcolm Chase and Christopher Shaw, 'The dimensions of nostalgia', in *The Imagined Past: History and Nostalgia*, ed. C. Shaw and M. Chase (Manchester: Manchester University Press, 1989), 1–17.
[4] See for example A.B. Webb. c1922. *Shags* [colour woodcut], reproduced in Roderick Anderson, *Early Western Australian Art from the Robert Holmes à Court Collection* (Perth, W.A.: Heytesbury Holdings, 1983).
[5] Many of the key photographs and artworks showing views from the Park over the City are reproduced in George Seddon and David Ravine, *A City and its Setting: Images of Perth, Western Australia* (Fremantle, W.A.: Fremantle Arts Centre Press, 1986).
[6] Dominic Louis Serventy, 'The Swan River – a history of natural history discovery' (undated), Dominic Serventy papers, Battye Library 4893A/272.
[7] Commonwealth Scientific and Industrial Organisation.
[8] Quentin Beresford, 'Developmentalism and its environmental legacy: the Western Australian wheatbelt, 1900–1990's', *Australian Journal of Politics and History* 47(3) (2001): 403–14. For a slightly later example of an in-depth case study of the rise in ecological consciousness in Victoria, see Libby Robin, *Defending the Little Desert: The Rise of Ecological Consciousness in Australia* (Carlton, Vic: Melbourne University Press, 1998).
[9] For discussions of development ideology in Western Australia see Lenore Layman, 'Developmental ideology in Western Australia, 1933–1965', *Historical Studies* 40 (1982): 234–60.
[10] Tom Griffiths, *Hunters and Collectors: The Antiquarian Imagination in Australia* (Cambridge: Cambridge University Press, 1996).
[11] In 1696, Vlamingh took several Black Swans, which were entirely different to those seen in Europe, alive to Batavia. Details of them were published by the Royal Society of London in *Philosophical Transactions*, 1698.
[12] M. Blakers, S.J.J.F. Davies and P.N. Reilly, *The Atlas of Australian Birds* (Melbourne: Royal Australian Ornithological Union, 1984).
[13] Serventy, 'The Swan River – a history of natural history discovery'.
[14] W.B. Alexander, 'History of zoology in Western Australia. Part III 1829–1840', *Journal and Proceedings of the Royal Society of Western Australia* 3 (1917): 39–40.

[15] Tim Bonyhady and Tom Griffiths, *Words for Country: Landscape and Language in Australia* (Sydney, N.S.W.: University of New South Wales, 2002).
[16] For an ethnographic study of the Swan River, and resource competition between Aboriginal people and Europeans see Paul Weaver, 'An ethnohistorical study of the Swan-Canning fishery in Western Australia: 1697-1837' (BA(Hons) diss., Edith Cowan University, 1991) and Sylvia Hallam, 'Aboriginal resource usage along the Swan River', in *The Swan River Estuary Ecology and Management: Proceedings of a Symposium on the Swan–Canning Estuarine System, Western Australia, 1986*, ed. J. John (Curtin University Environmental Studies Group report no. 1. 1987): 21–33.
[17] In Western Australia the earliest regulation relating to fauna preservation was the 1853 Kangaroo Ordinance. For a discussion as to the experience in New South Wales, see Tim Bonyhady, *The Colonial Earth* (Melbourne: The Meigunyah Press, 2002).
[18] Lieutenant H.W. Breton quoted in Alexander, 'History of zoology in Western Australia. Part III 1829–1840', 38.
[19] *Perth Gazette and West Australian Journal*, 23.11.1833
[20] Western Australia. *Parliamentary Debates* 1892, 194
[21] Spencer Roberts, 'The preservation of our birds', *Emu* 30 (1930), 196.
[22] Preamble to the *Preservation of Game Act*, 38 Vict no, 4.
[23] With the emerging knowledge that recognisable breeding cycles were different across Australia, the 1878 amendment to the *Preservation of Game Act* acknowledged the impossibility of creating a single closed season for native game across the State. For a discussion of attitudes to native fauna in other Australian colonies, see Bonyhady, *The Colonial Earth.*
[24] Western Australia. *Game Act* 55 Vict no. 36.
[25] Western Australia. *Parliamentary Debates* 1891, 83.
[26] The Emu was preserved under the *Game Act* 28.9.1894 thus beginning a history of its status as native fauna but its place in the cultural psyche as a pest. In the late 1940s its status was equally declared vermin and protected species.
[27] Western Australia. *Parliamentary Debates* 1891/2, 84.
[28] *Vermin Act*, no. 39 of 1919, *Fisheries Act*, no. 47 of 1899, *Fisheries Act*, no. 18 of 1905.
[29] Western Australia. Fisheries Department. *Report on the Fishing Industry for the Year …* 1900–1915.
[30] Western Australia. *Parliamentary Debates*, 1899, 2382.
[31] Western Australia. *Parliamentary Debates*, 1899, 2376.
[32] Western Australia. *Parliamentary Debates*, 1899, 2377.
[33] Based on figures compiled in R.C.J. Lenanton, 'The commercial fisheries of temperate Western Australian estuaries: early settlement to 1995', *Western Australian Fisheries Department Report* 62 (1984): 44.
[34] Western Australia. *Government Gazette* 19.1.1898.
[35] Western Australia. *Government gazette* 10.11.1899.
[36] Western Australia. Fisheries Department, *Report on the Fishing Industry for the Year 1900 by the Chief Inspector of Fisheries* (Votes and proceedings of the Legislative Council Paper 5/1901).
[37] Western Australia. Fisheries Department, *Report on the Fishing industry for the Year 1900 by the Chief Inspector of Fisheries.* The 1913–14 year was the only period in which records survive of the total bounty paid on the heads of shags (albeit excluding the Swan River). The total payment of £42.7/6 represented rewards on about 2000 heads. Fisheries

Protection Act. Cormorants and Black Shags – General file, 1914–1962, Fisheries Dept file 170/23, State Records Office of Western Australia (hereafter SROWA) Acc 477.
[38] Western Australia. *Government gazette* 23.3.1906. The system of rewards ceased in 1914 due to financial constraints.
[39] Western Australia. Fisheries Department, *Report to the Chief Inspector of Fisheries 1906*, (Votes and proceedings of the Legislative Council Paper 4/1907).
[40] Libby Robin, *The flight of the Emu. A hundred years of Australian ornithology, 1901–2001* (Melbourne: Melbourne University Press, 2001), 14.
[41] Australian Association for the Advancement of Science, *Report on the protection of native fauna*, Colonial Secretary's Office file 1609/94, SROWA Cons 652.
[42] W.B. Alexander was appointed as zoologist at the Western Australian Museum in 1912, and in 1913 Dakin was appointed as the first professor of biology at University of Western Australia.
[43] A.H.E. Mattingley, 'Cormorants in relation to fishes', *Emu* 8 (1908): 18–23.
[44] Select Committee of the Legislative Council of Western Australia, *Report of the Select Committee of the Legislative Council on the Game Bill 1911* (Votes and proceedings of the Legislative Council Paper A4/1911).
[45] J.G. Hay was involved in the Gould League in Western Australia after its foundation in 1939.
[46] Select Committee of the Legislative Council of Western Australia, *Report of the Select Committee of the Legislative Council on the Game Bill 1911*.
[47] Western Australia. *Game Act*, no. 72 of 1912.
[48] Western Australia. *Parliamentary debates*, 1911, 310.
[49] J.R. Kinghorn, 'Bird protection in Australia', *Emu* 29 (1929): 263–71.
[50] The black swan appeared on the schedule of protected species in 1912, the pelican in 1914, and all species of cormorant in 1917.
[51] Western Australia. *Fauna Protection Act*, no. 77 of 1950.
[52] Lenanton, 'The commercial fisheries of temperate Western Australian estuaries: early settlement to 1995', 9.
[53] R.C.J. Lenanton, 'Fish and exploited crustaceans of the Swan-Canning estuary', *Western Australian Department of Fisheries and Wildlife Report* 35 (1978), 14.
[54] Letter from Anderson's Saddlery Works, *West Australian* 12.6.1919.
[55] Chief Inspector of Fisheries 21.6.1919. Fisheries Protection Act. Cormorants and Black Shags – General file, 1914–1962.
[56] See for example, *West Australian* 21.5.1924, *Sunday Times* 3.5.1925, *Sunday Times* 26.6.1927.
[57] *Sunday Times* 26.6.1927.
[58] Mattingley, 'Cormorants in relation to fishes', S.A. White, 'An investigation concerning the food of cormorants', *Emu* 16 (1916): 77–80, S.A. White, 'Further notes on cormorants, other foods, temperatures etc', *Emu* 17 (1918): 214–15.
[59] Chief Inspector of Fisheries 21.6.1919. Fisheries Protection Act. Cormorants and Black Shags, 1914–1962.
[60] Paper read by E.J. Prout at the Naturalists Club. *West Australian* 6.4.1937.
[61] *West Australian* 18.6.1936.
[62] *West Australian* 22.8.1928.
[63] Chief Harbour Master to Chief Inspector of Fisheries 5.2.1929. Fisheries Protection Act. Cormorants and Black Shags, 1914–1962.

[64] For example A.H.E. Mattingley, 'Cormorants in relation to fisheries', *Condor* 29 (1927): 187–7 was quoted in the *West Australian* 9.1.1928.
[65] *Sunday Times* 8.5.1932.
[66] This group was active between 1935 and 1946. Fish and Game Propagation Acclimatisation and Protection Society, 1934–1946, Fisheries Department file 47/35, SROWA Acc 477.
[67] Minutes 11.6.1936, Fish and Game Propagation Acclimatisation and Protection Society, 1934–1946.
[68] Ralph W. Schreiber and Roger B. Clapp, 'Pelicaniform feeding ecology', in *Seabirds: Feeding Ecology and Role in Marine Ecosystems*, ed. J.P. Croxall (Cambridge: Cambridge University Press, 1987): 173–88.
[69] Dominic Serventy, 'The feeding habits of cormorants in South-Western Australia', *Emu* 38 (1938): 293–316.
[70] This work is mentioned in *Daily News* 13.7.1932. Serventy also notes this work though was unable to find evidence of this study.
[71] White, 'An investigation concerning the food of cormorants', White, 'Further notes on cormorants, other foods, temperatures etc', W.T. Forster, 'Cormorants: are they pests or otherwise?', *Emu* 18 (1918): 103–5.
[72] C.H. Hartley and J. Fisher, 'Marine food of birds in an inland fjord region in West Spitzbergen, Part II', *Journal of Animal Ecology* 5 (1936): 370–89, G.A. Steven, 'The food consumed by shags and cormorants around the shores of Cornwall (England)', *Journal of the Marine Biology Association* XIX (1933): 277–92, A. Wetmore, 'The amount of food consumed by Cormorants', *Condor* 28 (1927): 273–4.
[73] Chief Inspector of Fisheries 27.5.1932, Fisheries Protection Act. Cormorants and Black Shags, 1914–1962.
[74] Mr Clarke, Kulin to Chief Inspector of Fisheries 6.5.1936, Fisheries Protection Act. Cormorants and Black Shags, 1914–1962. The Department followed up on his information and collected data relating to cormorants in South Australia.
[75] Schreiber and Clapp, 'Pelicaniform feeding ecology', 178.
[76] Steven, 'The food consumed by shags and cormorants around the shores of Cornwall (England)'.
[77] The Committee, initiated in 1944, comprised of A.J. Fraser (Chief Inspector of Fisheries), L. Glauert (Director of the W.A. Museum), D.L. Serventy (CSIRO), and H.M. Whittell (Ornithologist).
[78] Hubert Massey Whittell, Western Australia. Fauna Advisory Committee, (1944–1950), H.M. Whittell papers, Battye Library 559A/3.
[79] Western Australia. *Parliamentary Debates* 1912, 1009.
[80] Western Australia. *Parliamentary Debates* 1950, 796.
[81] Western Australia. *Parliamentary Debates* 1950, 939.
[82] In 1953 there were 18 professional fisherman removing total of 66885lbs of fish at an average of 3715lbs per boat. At the 1948 conference of Western Australian Fisheries Inspectors, it was noted that the 'fishing industry in the Swan River is practically finished. Almost 10 years ago there were about 25 men operating full-time'.
[83] 1.7.1953, Fisheries Protection Act. Cormorants and Black Shags, 1914–1962.
[84] 1.7.1953, Fisheries Protection Act. Cormorants and Black Shags, 1914–1962.
[85] 20.6.1953, Fisheries Protection Act. Cormorants and Black Shags, 1914–1962.
[86] 20.6.1953, Fisheries Protection Act. Cormorants and Black Shags, 1914–1962.

[87] 31.7.1953, Fisheries Protection Act. Cormorants and Black Shags, 1914–1962.
[88] 13.8.1953, Fisheries Protection Act. Cormorants and Black Shags, 1914–1962.
[89] Western Australia. Fisheries Department. Conference of Fisheries Inspectors, *Report* (Perth, W.A. Government Print, 1943–1953). 1953 report, 24.
[90] 13.8.1953, Fisheries Protection Act. Cormorants and Black Shags, 1914–1962.
[91] 13.8.1953, Fisheries Protection Act. Cormorants and Black Shags, 1914–1962. On file on top of this debate is a pamphlet for recipes for the shag published by the Piscatorial Club of South Australia
[92] Serventy to Chief Inspector of Fisheries 14.8.1941, Fisheries Protection Act. Cormorants and Black Shags, 1914–1962.
[93] Western Australia. Fisheries Department. *Report to the Chief Inspector of Fisheries 1903* (Votes and proceedings of the Legislative Council Paper 5/1905).
[94] Dominic Serventy, 'Reflections on bird protection – the neglect of habitat protection', *Emu* 40 (1940): 153–8.
[95] Western Australia. Swan River Reference Committee, *Report by Sub-Committee on Pollution of Swan River* (Perth, W.A.: Government Print, 1955).
[96] Jesse Hammond quoted in Hallam, 'Aboriginal resource usage along the Swan River'.
[97] Seddon and Ravine. *A City and its Setting: Images of Perth, Western Australia*, 121.
[98] D.M. Churchill, 'Late quaternary eustatic changes in the Swan River district', *Journal and Proceedings of the Royal Society of Western Australia* 42 (2) (1959): 53–55.
[99] J.M. Thomson, 'New crustaceae from the Swan River estuary', *Journal and proceedings of the Royal Society of Western Australia* 30 (1946): 35–53.
[100] Dominic Serventy, 'The fauna of the Swan River estuary', in Western Australia. Swan River Reference Committee, *Report by Sub-Committee on pollution of Swan River* (Perth, W.A.: Government Print, 1955): 70–77.
[101] Western Australia. Swan River Reference Committee, *Report by Sub-Committee on pollution of Swan River*.
[102] Dominic Louis Serventy, 'Reclamation of the Swan River', (undated), Dominic Serventy papers, Battye Library 4893/115.
[103] Serventy, 'The Swan River – a history of natural history discovery'.
[104] Serventy, 'Reclamation of the Swan River'.
[105] For example see Beresford, 'Developmentalism and its environmental legacy: the Western Australian wheatbelt, 1900–1990', and for a broad discussion of development ideology see Layman, 'Development ideology in Western Australia, 1933–1965'.
[106] David Brand was Liberal (Conservative) Premier of Western Australia between 2.4.1959 and 3.3.1971.
[107] Serventy, 'Reclamation of the Swan River'.
[108] Dominic Louis Serventy, 'Waders and other aquatic birds on the Swan River estuary, Western Australia', *Emu* 38 (1938): 18–29.
[109] Letter from WA Naturalists Club to Charles Court 2.11.1965, Serventy papers.
[110] Serventy, 'Reclamation of the Swan River'.
[111] Max Bailey and Kate Creed, 'Observations of bird species at Pelican Point, Perth, Western Australia', *Western Australian Naturalist* 17(8) (1989): 229–32.
[112] Dominic Louis Serventy, *The Birds of the Swan River District Western Australia* (Melbourne: Brown, Prior, Anderson, Pty. Ltd, 1948), 15.
[113] Environmental Resources Management Australia, *Review of Speed Limits on the Swan and Canning Rivers: Final Report* (Perth, W.A.: Department of Transport, 2000).

[114] Swan River Trust, *Introducing the Swan and Canning Rivers Precinct Planning Project* (Perth, W.A.: Swan River Trust, 2002). The Labour government of Geoffrey Gallop came to office on 16.2.2001.
[115] ATA Environmental, Bamford Consulting Ecologists and MP Rogers and Associates, *Bringing Back the Swans* (Perth, W.A.: Waters and Rivers Commission, 2000 report no. 63).
[116] Max Shean, 'The Swan River Management Authority and its functions', in *The Swan River Estuary Ecology and Management: Proceedings of a Symposium on the Swan-Canning Estuarine System, Western Australia, 1986,* ed. J. John (Curtin University Environmental Studies Group report no. 1. 1987): 314–17.