

Appendix 3 - Ecological and Parks Assessment

Chris McClure – Lizard assessment

What was the baseline of ecology in the area prior to the formation of the bunds?

- There was a large number of lizard population on the application site, prior to earthworks and establishment of industrial activities. While no recorded numbers of present for the area, it is considered highly likely that a substantial number of lizards and habitat has been lost. All areas except 20m of the waterway setback were granted consent before this was identified. There it is difficult to establish a baseline of lizard populations and habitat present on the application site.
- When an official lizard survey was undertaken on the 4th March 2022, the bund was partially constructed and potentially some areas were within the 20m setback. It is therefore difficult to understand the exact number of lizards present in the area prior to these works commencing.
- The lizards identified on the site were Southern grass skinks which have a conservation status of 'At Risk – Declining'

Did the bunds, improve, maintain/protect or diminish?

- Reasonable population of skinks which would have been affected by construction of the bund and overall industrial area (not addressed in previous consent). Overall, there has been a major decrease in lizard population in the locality due to the retrospective works and works to complete the industrial sites. It is likely there is more predation in the area due to pest habituating in the industrial area i.e. rodents however this has not been monitored.
- The bund itself has detrimentally damaged the population and habitat and has caused fragmentation of habitat. A population decline in the local area of the Southern Grass Skinks.
- The bund has in it's current state will likely being used for lizard habitat. This is due to it being north facing, containing rank grass and is established. While the bund allows further protection of the remaining amount of lizards onsite, it does not mitigate the overall loss of lizard population and habitat removed. Fragmentation has occurred as a result. It is considered the application rather diminishes the existing environment rather than protect it.

Enhancement

- If the bund and the surrounding the reserve area established lizard friendly plants it will assist in partially enhancing, however it unlikely to regenerate the population to the previous population numbers. This is due to the suitable habitat area has been overall reduced and fragmentation has occurred as a result (and further still by the creation of the new or existing footpath).
- If tall tree and shrub species are placed on the top of the bund it will create shading on the remaining lizard habitat on the site. Even though the bund will be north facing, any shading will reduce the habitat area and could defeat the purpose of the enhancement (this aligns with the applicant's herpetologist report).
- The lack of protection and diminishing of the lizard population and habitat in the overall industrial development area (including bund) outweighs the ecological enhancement benefits. However, the effects of the bund and it's enhancement potential is finely balanced.
- There is an option to salvage the remaining lizards which would protect the population and remove the need for less dense vegetation along the northern bund. It would not replace or mitigate the effects already occurred. The option of salvaging lizard is a costly exercise.

What was the baseline of ecology in the area prior to the formation of the bunds?

- The Ōpāwaho – Heathcote River at this location is classified as a downstream waterway which has a setback of 30m.
- The water quality and ecology of Ōpāwaho – Heathcote River is monitored regularly with water quality monitoring occurring monthly and aquatic ecology monitoring occurring 5 yearly. The latest aquatic ecology monitoring round was undertaken in 2020 with the most downstream site at Tunnel Road being within the application site¹.
- The Ōpāwaho – Heathcote River is also listed as a Site of Ecological significance (SES/LP/25)² due to supporting several at-risk species and contributing to an important ecological network and a migration route for key species.
- Some of the waterway is concrete lined and therefore has reduced ecological values in certain areas;
- The key purpose of the waterway margin is to provide a suitable buffer zone for the waterway and maintain and enhance ecological connectivity to the upper catchments.

Did the bunds, improve, maintain/protect or diminish?

- The bund has not diminished the values of the waterway, it has resulted in a loss of potential for the riparian margin. The waterway is maintaining what is present in the existing environment.
- The increase in impermeable surfaces has reduced the buffer zone from surrounding development and has resulted in loss of riparian margin enhancement.
- The waterway channel hasn't been altered by the proposal.

Enhancement

- The bunds will make it difficult to create a natural and adequate riparian buffer therefore successful enhancement will not be achieved.
- The bunds and increase in impervious area has removed the wide buffer zone from the surrounding area.
- While the bund materials may not be contaminated, it is unlikely to contain a suitable proportion of natural topsoil for establishing vegetation to its full potential/scale. Landscape species planted at the original / natural ground level are likely to establish, and be more successful/reach suitable heights, as opposed to being planted at an elevated height on an artificial bund. If it was guaranteed that the plants could be successfully established, and thrive, it would be appropriate.
- If vegetation establishment is unsuccessful, it does not achieve the wide functioning riparian margin sought by the District Plan for downstream waterways.
- If the south west bund remains, and vegetation growth/potential is not maximised, this will significantly affect the following Esplanade Reserve values - ecology, ecological habitat, character and amenity.
- It overall loses the opportunity to enhance the reserve successfully.

¹ https://ccc.govt.nz/assets/Documents/Environment/Water/Monitoring-Reports/2020-reports/2020-Heathcote-River-Five-Year_atic-Ecology-Monitoring-Report.pdf

² <https://districtplan.ccc.govt.nz/Images/DistrictPlanImages/Site%20of%20Ecological%20Significance/SES%20LP%2025.pdf>

Andrew Crossland – Bird Ecology (Summarised)

What was the baseline of ecology in the area prior to the formation of the bunds?

Pre-works baseline information for the whole site was described by me in two reports written in c.2008, and in a report as well as a hearing statement (attached) by Dr Peter Harper, the ornithological consultant for the applicants for an industrial sub-division at that time.

Dr Harper's report was provided subsequent to my initial report and made comment on it. My 2nd report incorporated and critiqued Dr Harper's findings and provided an update as to all ornithological information known to both CCC and the applicants.

I don't have my reports at hand, but I found an earlier (dated June 2008) draft of my second report which outlined the baseline avian ecology on site just prior to the original hearing (ie; as at mid 2008). This baseline assessment was based on 20+ years of my previous monitoring and 54 weekly surveys of the site by Dr Harper between 2006 and 2008. It is therefore a reasonably comprehensive record.

In 2008 I provided following list of 47 bird species (erroneously stated as 48 on the report), with annotations as to their status.

Native bird species

- | | |
|---------------------------|---|
| 1. Black Cormorant | - roosting in riverside trees, feeding in river |
| 2. Pied Cormorant | - roosting in riverside trees, feeding in river |
| 3. Little Black Cormorant | - roosting in riverside trees, feeding in river |
| 4. Little Cormorant | - up to 200 roosting in riverside trees, feeding in river |
| 5. Spotted Shag | - occasional 1 or 2s on the river |
| 6. White-faced Heron | - feeding on paddocks and riverbank, roosting in trees |
| 7. Cattle Egret | - rare visitor to paddocks |
| 8. Australasian Bittern | - visitor to Tunnel Rd Saltmarsh, poss. on river at night |
| 9. Royal Spoonbill | - |
| 10. Paradise Shelduck | - pairs and small groups on paddocks and rivers |
| 11. NZ Shoveler | - occasional pairs on river |
| 12. NZ Scaup | - pairs and small groups on river |
| 13. Australasian Harrier | - at least 1 pair resident in this part of Heathcote Vly, others visiting |
| 14. Marsh Crane | - visitor to Tunnel Rd saltmarsh, may occur along river at night |
| 15. Pukeko | - up to 40 birds on paddocks and river – especially at night. |
| 16. Spur-winged Plover | - pairs and small groups on paddocks |
| 17. SI Pied Oystercatcher | - small nos feed on Heathcote riverbank mudflat near Tunnel Rd Bridge |
| 18. Pied Stilt | - small nos on river edge and paddocks when wet |
| 19. Black-backed Gull | - small nos on river and paddocks |
| 20. Black-billed Gull | - occasional on river and paddocks when wet |
| 21. Red-billed Gull | - moderate nos on river, occasionally on paddocks when wet |
| 22. Caspian Tern | - regular in singles or twos on river |
| 23. White-fronted Tern | - rare along river |
| 24. Shining Cuckoo | - small nos in spring/summer in trees |
| 25. NZ Kingfisher | - moderate nos in trees and riparian habitats |
| 26. Welcome Swallow | - regular in pairs or flocks over river and paddocks |
| 27. Grey Warbler | - common in trees and shrubs |
| 28. Silvereye | - common in trees and shrubs |
| 29. SI Fantail | - small nos in trees and shrubs |
| 30. NZ Pipit | - small nos on short grassland and bare ground |
| 31. Bellbird | - occasional visitor to trees and shrubs |
| 32. | |

Introduced bird species

1. Mallard - pairs and small groups on river and paddocks
2. Feral Rock Pigeon - small groups on paddocks
3. Little Owl - small nos in trees and shelter belts
4. Blackbird - common in wooded, grassland and riparian habitats
5. Song Thrush - common in wooded, grassland and riparian habitats
6. Dunnock - common in wooded and riparian habitats
7. Skylark - common on grassland
8. House Sparrow - common in wooded, grassland and riparian habitats
9. Chaffinch - common in wooded, grassland and riparian habitats
10. Redpoll - common in wooded, grassland and riparian habitats
11. Goldfinch - common in wooded, grassland and riparian habitats
12. Greenfinch - common in wooded, grassland and riparian habitats
13. Yellowhammer - common in grassland and riparian habitats
14. Cirl Bunting - rare in wooded, grassland and riparian habitats
15. Starling - common in wooded, grassland and riparian habitats
16. Australasian Magpie - common in wooded and grassland habitats

At this time, Dr Harper also provided the following summary of his observations. He added seven native/migratory species I'd not observed (Reef Heron, Black Swan, Grey Duck, Grey Teal, Turnstone, Banded Dotterel, Spine-tailed Swift), as well as three introduced bird species (Canada Goose, California Quail, Pheasant).

So, between CCC and the Developer's consultants, the total list was 57 bird species (38 native/migratory, 19 introduced).

Dr Harper's list is copied below:

Appendix A

Species list & maximum numbers observed at any one time

Black cormorant (<i>Phalacrocorax carbo</i>)	native	4 visitor
Little black cormorant (<i>P. sulcirostris</i>)	native	6 visitor
Little cormorant (<i>P. melanoleucos</i>)	endemic	32 roosting
Pied cormorant (<i>P. varius</i>)	endemic	6 visitor
White-faced heron (<i>Ardea n.novaehollandiae</i>)	native	9 in paddocks
Reef heron (<i>Egretta sacra</i>)	endemic	1 straggler (seen twice)
Black swan (<i>Cygnus atratus</i>)	native	14 visitor
Giant Canada goose (<i>Branta canadensis maxima</i>)	introduced	91 visitor
Paradise shelduck (<i>Tadorna variegata</i>)	endemic	6 pr resident
NZ Shoveler (<i>Anas rhyncholtis variegata</i>)	endemic	6 pr
Mallard (<i>Anas p. platyhynchos</i>)	introduced	24 in flooded paddocks; 17 on river
Grey duck (<i>A. s. superciliosa</i>)	endemic	23 visitor
Grey teal (<i>Anas gibberifrons</i>)	native	17 visitor
NZ Scaup (<i>Aythya novaeseeladiae</i>)	endemic	5 pr resident
Turnstone (<i>Arenaria interpres</i>)	migrant	3 visitor
Banded dotterel (<i>Charadrius bicinctus</i>)	endemic	5 visitor
Harrier (<i>Circus approximans</i>)	native	9 birds, no breeding on site
Californian quail (<i>Lophortyx californica</i>)	introduced	1pr with 7 young
Pheasant (<i>Phasianus colchicus</i>)	introduced	2 seen
Pukeko (<i>Porphyrio p. melanotus</i>)	native	14 pr resident

Oyster catcher (<i>Haematopus ostralegus</i>)	endemic	5 visitor
Spur-winged plover (<i>Vanellus miles novaehollandiae</i>)	native	22 in paddocks
Pied stilt (<i>Himantopus h. leucocephalus</i>)	native	6 visitor
Black-backed gull (<i>Larus dominicanus</i>)	native	frequent transient
Black-billed Gull (<i>L. bulleri</i>)	endemic	frequent transient
Red-billed gull (<i>L. novaehollandiae</i>)	endemic	frequent transient
Shining cuckoo (<i>Chrysococcyx l. lucidus</i>)	endemic	8 visitor, heard
Little owl (<i>Athene noctus</i>)	introduced	1 pr resident
NZ Kingfisher (<i>Halcyon sancta vegans</i>)	endemic	4 pr resident
Skylark (<i>Alauda a. arvensis</i>)	introduced	up to 16 resident
Pipit (<i>Anthus novaeseelandiae</i>)	endemic	up to 7 pr
Welcome swallow (<i>Hirundo tahitica neoxena</i>)	native	up to 17
Spine-tailed swift (<i>Hirundapus caudacutis</i>)	straggler	2 transiting during westerly gale

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Song thrush (<i>Turdus philomelos clarkei</i>)	introduced	9 pr resident
Blackbird (<i>Turdus m. merula</i>)	introduced	11 pr resident
Fantail (<i>Rhipidura fuliginosa</i>)	endemic	16 visitor
White-eye (<i>Zosterops l. lateralis</i>)	native	up to 33
Grey warbler (<i>Gerygone igata</i>)	endemic	6 pairs resident
Yellowhammer (<i>Emberiza citrinella caliginosa</i>)	introduced	9 pr
Cirl Bunting (<i>Emberiza cirlus</i>)	introduced	1 straggler
Chaffinch (<i>Fringilla coelebs gengleri</i>)	introduced	3 pr resident
Greenfinch (<i>Carduelis c. chloris</i>)	introduced	up to 350
Goldfinch (<i>C.c. Britannica</i>)	introduced	up to 210
Redpoll (<i>C. flammea cabaret</i>)	introduced	up to 70
Hedgesparrow (<i>Prunella modularis</i>)	introduced	3 pr
Sparrow (<i>Passer domesticus</i>)	introduced	up to 31
Starling (<i>Sturnus v. vulgaris</i>)	introduced	450+
Australian magpie (<i>Gymnorhina tibicen</i>)	introduced	5 pr resident
Feral pigeon (<i>Columba livea</i>)	introduced	19 visitor, possibly breeding

In 2008 I reported the following observations around the cormorant night roost in the trees along the Heathcote River:

“This roost is the principal and longest-standing night roost for Little Cormorant in the greater Avon-Heathcote Estuary area. At peak seasons when upwards of 150 birds have been counted using it, this site is the most important Little Cormorant night roost in all of Christchurch. Indeed, further investigation and comparison with other sites is likely to show that this is a roosting site of regional importance. Given that disturbance impacts on this roost are likely to be such that it becomes abandoned; and given that even when disturbance ceases after a number of years reoccupation of a deserted roost is not guaranteed, then it not clear how a conclusion could be reached that effects will be no more than minor?”

Further information is required on this. This information needs to do more than assume a movement of these birds away from the study area to some other site is acceptable. It needs to consider the likely displacement or even permanent loss of an important ecological feature from lower Heathcote River system and even potentially from the environs of the Avon-Heathcote Estuary”.

Dr Harper provided detail commentary on this issue of bird displacement due to habitat loss and disturbance. His belief was that yes it would occur, but it would be sufficiently mitigated by the temporary nature of disturbance and by extensive provision of new habitat. He made many statements in his report and evidence, including these:

- 4.4 Birds fly into roost sites at dusk and are away again as dawn approaches. The effects of noise, dust and lighting on roosting birds, such as little cormorants, could be avoided by ceasing earth working and machinery operations on areas of the site in close proximity to the Heathcote river during these times - preferably one hour after sunrise and one hour before sunset. This is, in my view, an important proviso to prevent some bird species leaving the area in the short to medium term. I understand that a rule is proposed to manage any potential effect on roosting birds, by restricting construction activities to one hour before sunset and one hour after sunrise. I support this approach.

- 4.5 I expect that the little cormorants will leave their longstanding roosting site while the noise and disturbance takes place. They are particularly prone to human disturbance, and I would anticipate that these birds will move to roost in another locality during construction at the site - even though the pines and their roosting trees might be retained. Adult pied cormorants are more tolerant of human disturbance, and might remain, provided that some trees overhanging the river are not removed. Cormorant roosts in other parts of the City occur in close proximity to urban activity, and I would expect the trees adjacent to the Heathcote river to be used in the future by these birds. Cormorants are very resilient to changes in their environment, as many of their trees used for nesting are either killed off by their voluminous guano, or subside and drop into the sea because of storm and wind damage. The birds simply move to the nearest suitable trees.

Dr Harper had (1) too much faith that the developer would follow his advice once a consent was granted, and (2) he was too wishful in his thinking that the large flock of roosting cormorants would move away temporarily and come back in force once disturbance subsided.....

15 years later what actually happened is well documented by monitoring. The cormorant night roost was frequently disturbed with noise, dust, lights, people passing too close. Numbers of birds using the roost fell and numbers that still use it (under existing disturbance levels) is much lower. Roost sizes of 100-200 birds have not been observed since. The highest recent count is 47 birds, including 42 Little Cormorants.

Comparative counts include:

Species	pre-works		works		currently			
	1/08/2006	3/08/2006	26/02/2010	20/03/2011	16/04/2023	23/04/2023	26/04/2023	12/06/2023
Black Cormorant	1	1	0	2	1	0	0	0
Pied Cormorant	3	3	2	6	1	0	0	2
Little Cormorant	112	100	29	15	25	42	20	21
Little Black Cormorant	0	0	0	0	1	1	0	0
Spotted Shag	0	0	0	0	1	4	3	0
White-faced Heron	0	0	0	0	1	0	0	0
Royal Spoonbill	0	0	0	0	0	0	0	1
TOTAL	116	104	31	23	30	47	23	24
Observer	dusk AC	dusk AC	dusk AC	dusk AC	dusk AC, H.Murdoch	dusk H. Murdoch	dusk AC	dusk AC

For the whole Avon-Heathcote Estuary system, Little Cormorants (the main species using the Cumnor/Kennaway site), as I warned (and contrary to Dr Harper's prediction) did not find a new alternative main roost elsewhere in the estuary area. They continued to use several secondary roosts in small numbers but overall numbers have diminished substantially. The total in 2022 was 28 birds compared to 142 in 2010.

The table below gives late summer cormorant data for the whole estuary area. It shows a large decline in Little Cormorants through the whole system and confirms the Cumnor/Kennaway birds didn't simply find a new roost in trees nearby. A large part of the estuary population have in fact disappeared – presumably to some other part of Canterbury?.

observer	AC	AC	AC	AC	AC	AC	AC, PC
	2010	2011	2012	2013	2014	2019	2022
Species	Jan	Mar	Feb	Jan	Feb	Feb	Feb
Little Cormorant	142	105	143	122	56	50	28

Did the bunds and activity, improve, maintain/protect or diminish?

- In my professional opinion, the situation for wildlife was diminished post 2008 by the failure of the developer to sufficiently curtail disturbance generated by human/vehicle activity, noise, dust, light spillage, etc.
- Habitat enhancement did not occur.
- Screening vegetation was not developed.
- Existing partial screening vegetation (comprising mostly exotic weed species like box thorn) was removed – mostly (as I understand it) by community volunteers undertaking track-building, planting and weeding activities, and a lesser by the developer while undertaking bund construction and other works.

- Construction of new roadways, driveways, buildings, yards, fences and storage areas were all undertaken without any apparent effort to mitigate bird disturbance. And certainly any mitigation that did occur was not successful.
- Bird species living on the previous pasture, rank grass, cultivated and bare earth areas were all displaced. This included breeding species like Pukeko and Spur-winged Plover, as well as seasonal visitors like flocks of Paradise Shelduck.
- The more recent construction of bunds destroyed nesting habitat for some birds such as Pukeko.

Of the full 57 bird species list documented in 2008, only 42 species (27 native, 15 introduced) - highlighted in yellow - have been observed since 2020:

Black Cormorant

Pied Cormorant

Little Black Cormorant

Little Cormorant

Spotted Shag

White-faced Heron

Reef Heron

Cattle Egret

Australasian Bittern

Royal Spoonbill

Black Swan

Paradise Shelduck

Grey Duck

NZ Shoveler

Grey Teal

NZ Scaup

Australasian Harrier

Marsh Crake

Pukeko

Spur-winged Plover

SI Pied Oystercatcher

Pied Stilt

Banded Dotterel

Turnstone

Black-backed Gull

Black-billed Gull

Red-billed Gull

Caspian Tern

White-fronted Tern

Spine-tailed Swift

Shining Cuckoo

NZ Kingfisher

Welcome Swallow

Grey Warbler

Silvereye

SI Fantail

NZ Pipit

Bellbird

Introduced bird species

Canada Goose

Mallard

Feral Rock Pigeon

Little Owl

Pheasant

California Quail

Blackbird

Song Thrush

Dunnock

Skylark

House Sparrow

Chaffinch

Redpoll

Goldfinch

Greenfinch

Yellowhammer

Cirl Bunting

Starling

Australasian Magpie

- The bunds have also “lifted” the projection of disturbance on the cormorant roosting trees by both permitting people to be elevated higher than the riverbank paths, and by pushing the human movement and activity corridor closer to the base of the river-side trees.
- The stacked storage of containers *en masse* have created both a physical obstacle to cormorants and other birds moving between the roosting trees and the estuary, and have eliminated clear sight lines to the roosts. Bird approach routes have now changed. The containers, fences and other infrastructure have added to the potential collision hazards for incoming birds, which had previously mainly comprised high tension power lines and tower structures further east and north in the wider area. The photos below are local examples – Left: a Little Black Cormorant negotiating high tension power lines over Charlesworth Wetland on its way to roost, and right: a dead Pied Cormorant caught in a tower at Bromley Oxidation Ponds.



- In my assessment the bunding has provided no benefit to the cormorants and other birds using the riparian trees and the river corridor. The development of buildings roads and infrastructure has ofcourse completely destroyed the pre-existing farmland and wasteland bird habitat.

Enhancement

- The bunds, haulage route provide no benefit to birds whatsoever in their current state.

Pete Barnes – Parks

In agreement with the Council ecologists that a bund located within Esplanade Reserve land (particularly on the south west bund) creates adverse effects for ecology ecological habitat and public access and should be removed for the following reasons:

- The bund will make it difficult to create a natural and adequate riparian buffer;
- Landscape species planted at the original / natural ground level are likely to establish, and be more successful/reach suitable heights, as opposed to being planted at an elevated height on an artificial bund;
- While the bund material may not be contaminated, it is unlikely to contain a suitable proportion of natural topsoil for establishing vegetation to its full potential/scale;
- If the south west bund remains, and vegetation growth/potential is not maximised, this will significantly affect the following Esplanade Reserve values - ecology, ecological habitat, character and amenity.

Bund matter aside, the landscape species proposed are adequate and are not opposed.

From a reserve /asset owner perspective, considers a bund located within the Esplanade Reserve imposes unnecessary challenges to construct a re-aligned pedestrian access track within the relatively narrow Esplanade Reserve, managing CPTED concerns and accommodates the variety of ecological habitat.