

**BEFORE THE CANTERBURY REGIONAL COUNCIL**

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***IN THE MATTER OF:*** the Resource Management Act 1991

**AND**

***IN THE MATTER OF:*** a submission on the partially operative  
Canterbury Land and Water Regional  
Plan – Plan Change 4 (Omnibus)

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**EVIDENCE OF DR NICHOLAS REX DUNN  
FOR DIRECTOR-GENERAL OF CONSERVATION**

**Dated 18 December 2015**

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Counsel: Susan Newell**

## STATEMENT OF EVIDENCE OF NICHOLAS REX DUNN

### INTRODUCTION

1. My full name is Dr Nicholas Rex Dunn.
2. I am appearing on behalf of the Director-General of Conservation. I am employed by the Department of Conservation (DOC) as a Freshwater Science Advisor in the Freshwater Section of the Science & Policy Group. I have held this role since September 2012. I was employed by the Department as a Technical Support Officer Freshwater in the Canterbury Conservancy between December 2010 and September 2012.
3. I hold a Bachelor of Science (Earth Sciences) degree from the University of Waikato where I majored in hydrology and soil science, and a Master of Science (Environmental Science) (First Class Honours) degree from the University of Canterbury, majoring in freshwater ecology and hydrology. I also hold a Doctor of Philosophy degree from the University of Otago, in which I investigated aspects of the influences of flow regimes on the ecology of non-migratory galaxias fishes.
4. I am familiar with Canterbury mudfish, lowland longjaw galaxias, and bignose galaxias. Dr Leanne O'Brien (whose thesis focused on the conservation ecology of Canterbury mudfish (*Neochanna burrowsius*)) and I have co-authored a number of publications and reports detailing Canterbury mudfish, their habitats, and conservation management. Dr O'Brien and I have also conducted research on lowland longjaw galaxias in the Kauru River, and held this species in captivity.
5. I have undertaken field surveys or visited waterbodies within the Canterbury area containing the above species periodically since 2001.
6. I have read the Environment Court's Code of Conduct for Expert Witnesses, and I agree to comply with it. My qualifications as an expert are set out above. I confirm that the issues addressed in this brief of evidence are within my area of expertise.

7. I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

### **SCOPE OF EVIDENCE**

8. My evidence provides a threatened native fish perspective on the matters raised in the Director-General's submission on Variation 4 Omnibus of the Canterbury Land and Water Plan. Specifically, my evidence addresses the need for identification of the habitats of Canterbury mudfish, lowland longjaw galaxias, and bignose galaxias habitats.

### **THE NEED FOR THREATENED SPECIES SCHEDULES**

9. A number of threatened freshwater species are endemic to the Canterbury region, meaning they only occur in Canterbury, or have distributions largely confined to Canterbury. Knowledge of, and identification of the distribution of species and communities thus provides a basis for effective conservation (Leathwick et al. 2008).
10. These additions to Schedule 17 were submitted to provide greater clarification of areas of particular aquatic biodiversity value, where activities may adversely affect threatened freshwater fish, both on public and privately owned/managed land.

### **CREATION OF SPECIES DISTRIBUTION DATA**

11. For Lowland longjaw galaxias "Waitaki" and bignose galaxias, data were obtained from the NIWA administered New Zealand Freshwater Fish Database (NZFFD), the adult fish distribution prediction models of Leathwick et al. (2008), and from local DOC staff knowledge of habitats.
12. The prediction models of Leathwick et al. (2008) are based on the river network originally developed as the River Environment Classification (Snelder et al. 2004). The prediction models relate the occurrence of individual fish species to biologically-relevant descriptors of the river and stream environments (but not lakes

or wetlands), at sampled sites as given in the NZFFD (Leathwick et al. 2008). These models were then utilised to develop environment-based predictions of the probability of occurrence for each species, for all river and stream segments in the River Environment Classification (Leathwick et al. 2008).

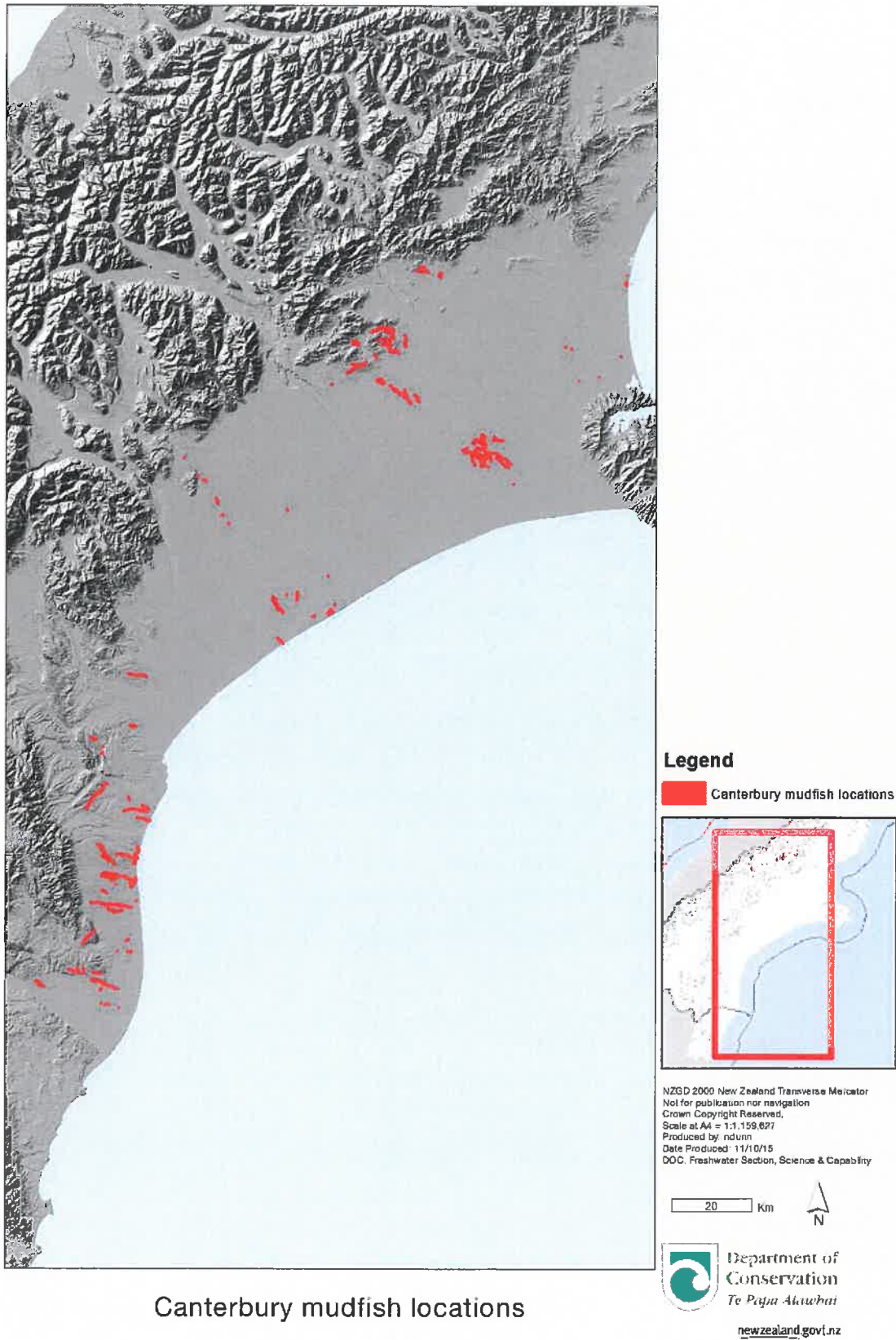
13. Distributions for each species were generated using predicted occurrences of  $\geq 0.2$  in reaches in the vicinity of NZFFD records and which were considered likely habitat.
14. For Canterbury mudfish, another approach was required. The predicted distribution of this species was not mapped by Leathwick et al. (2008), principally because it does not occur in habitats included in the REC reaches. To develop distributions of sub-populations of Canterbury mudfish, areas in the vicinity of NZFFD records considered by Dr Leanne O'Brien (Ichthyo-niche) to be likely habitat, were delineated digitally on LINZ (Land Information New Zealand) and CRC georeferenced orthographs.

#### **Canterbury mudfish (*Neochanna burrowsius*)**

15. Canterbury mudfish is an indigenous freshwater fish species found in sixteen river catchments from the south bank of the Ashley River to the south bank of the Waitaki River (Figure 1; New Zealand Freshwater Fish Database (NZFFD), O'Brien & Dunn 2007a).
16. Under the New Zealand Threat Classification System (Townsend et al. 2008), Canterbury mudfish has the conservation status of Threatened – Nationally Critical, which is based on the criteria that irrespective of size or number of subpopulations it has a very high (>70%) ongoing or predicted decline (Goodman et al. 2014).
17. Furthermore, the three qualifiers of Conservation Dependant, Range Restricted, and Sparse apply for the threat classification for Canterbury mudfish. Conservation Dependant means 'the taxon is likely to move to a higher threat category if current management ceases' (Townsend et al. 2008, p 28). The next highest classification is Extinct. Range Restricted means 'taxa confined to specific substrates, habitats or geographic areas of less than 1000 km<sup>2</sup>' (Townsend et al. 2008, p 29). Sparse means

'taxa that occur within typically small and widely scattered populations' (Townsend et al. 2008, p 30).

18. I have estimated the total habitat area of Canterbury mudfish as 32 ha across 89 known sub-population habitat fragments (Dunn unpublished update of O'Brien & Dunn (2012)).
19. In addition to the sub-populations described above, twenty-nine sub-populations which have previously been recorded across Canterbury have gone extinct.
20. Canterbury mudfish are wetland specialists (O'Brien & Dunn (2007b)). Their habitats are still or very slow-flowing, meandering, swampy streams with deep pools, seepage streams, spring fed streams, scour holes and stockwater races. The diverse range of habitats in which Canterbury mudfish are now found may be, in part, a consequence of the removal of the once extensive wetlands that covered the Canterbury Plains which has forced mudfish to occupy whatever habitat remains that they can tolerate (O'Brien & Dunn 2007b).



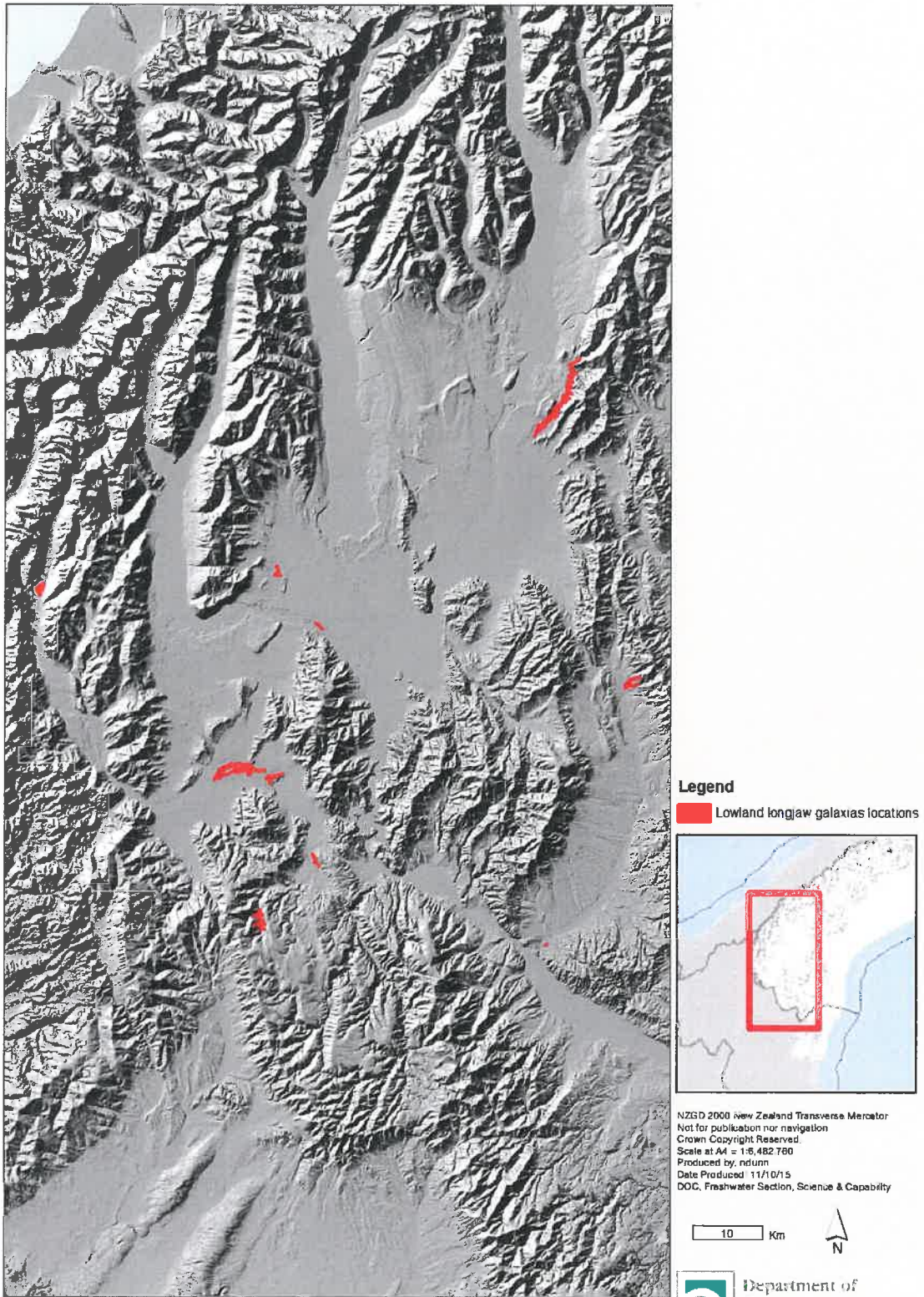
Canterbury mudfish locations

Figure 1. Distribution of Canterbury mudfish.

## Lowland longjaw galaxias (Waitaki River) (*Galaxias affinis cobitinis* "Waitaki")

21. Lowland longjaw galaxias "Waitaki" is an indigenous freshwater fish entity found only in the Waitaki River catchment (Figure 2; NZFFD).
22. Under the New Zealand Threat Classification System (Townsend et al. 2008), lowland longjaw galaxias "Waitaki" has the conservation status of Threatened – Nationally Critical, which is based on the criteria that irrespective of size or number of subpopulations it has a very high (>70%) ongoing or predicted decline (Goodman et al. 2014).
23. Furthermore, the qualifiers of Conservation Dependant and Range Restricted apply for the threat classification for lowland longjaw galaxias "Waitaki". Conservation Dependant means 'the taxon is likely to move to a higher threat category if current management ceases' (Townsend et al. 2008, p 28). The next highest classification is Extinct. Range Restricted means 'taxa confined to specific substrates, habitats or geographic areas of less than 1000 km<sup>2</sup>' (Townsend et al. 2008, p 29).
24. I have estimated the total habitat area of lowland longjaw galaxias "Waitaki" as 36 ha across 12 known sub-population habitat fragments (Dunn unpublished data).
25. The habitats of lowland longjaw galaxias "Waitaki" as stated by Ravenscroft et al. (2010) "are generally spring-type habitat, with greater densities in riffle habitats mostly towards the head of springs where the water exits from the ground. Lowland longjaw galaxias have specialised habitat requirements; the substrate often has an absence or limited algae biomass, limited sediment and the substrate particles are loosely compacted. These components create wider interstitial spaces and it is within this zone that the lowland longjaw galaxias seeks refuge, feeds, and spawns".





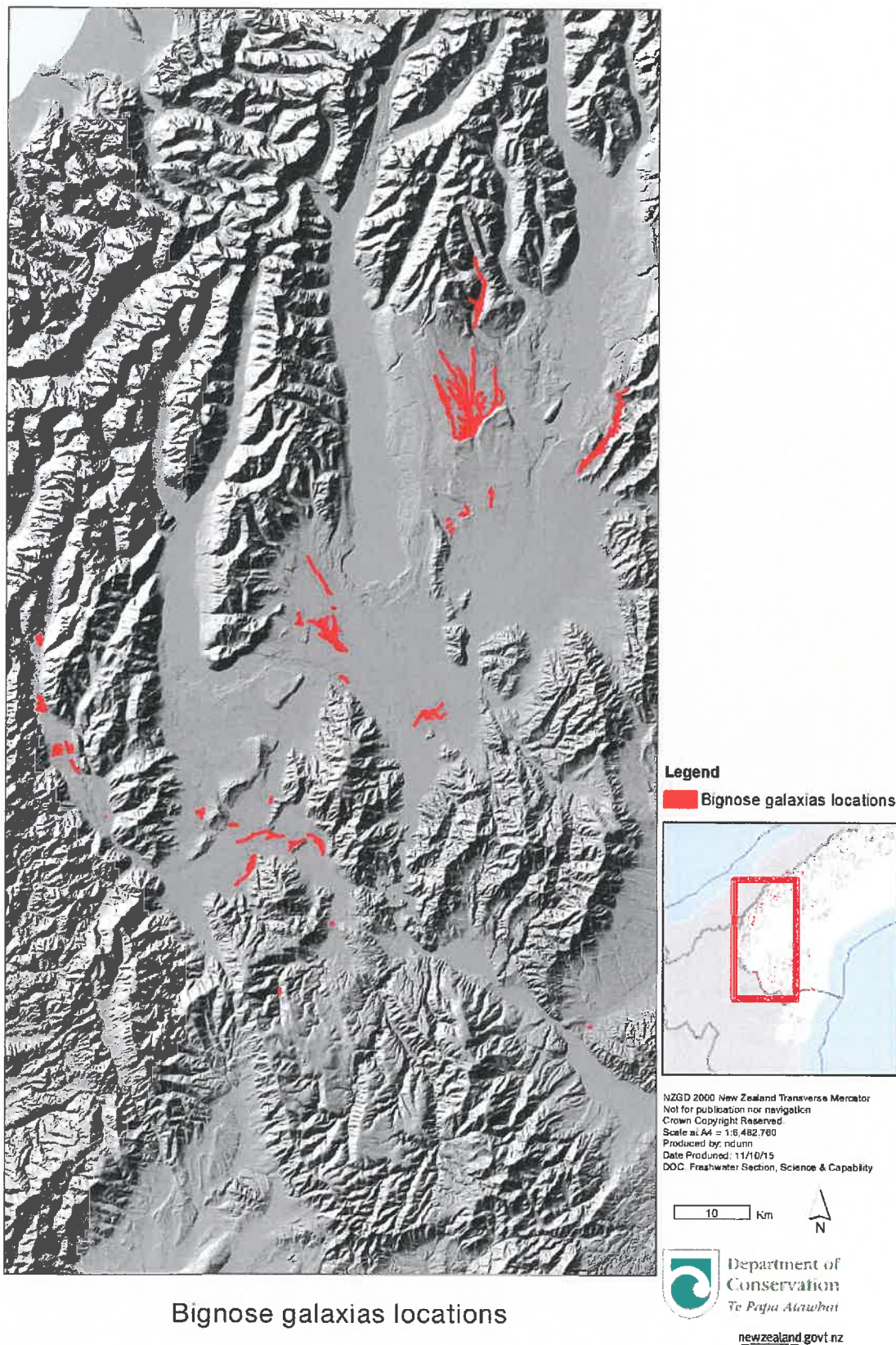
Lowland longjaw galaxias locations

Figure 2. Distribution of lowland longjaw galaxias “Waitaki”.



### **Bignose galaxias (*Galaxias macronasus*)**

26. Bignose galaxias is an indigenous freshwater fish species found only in the Waitaki River catchment (Figure 3; NZFFD).
27. Under the New Zealand Threat Classification System (Townsend et al. 2008), bignose galaxias has the conservation status of Threatened – Nationally Vulnerable, which is based on the criteria that it has a moderately sized population with a population trend that is declining (Goodman et. al. 2014).
28. Furthermore, the qualifier of Range Restricted applies for the threat classification for bignose galaxias. Range Restricted means ‘taxa confined to specific substrates, habitats or geographic areas of less than 1000 km<sup>2</sup>’ (Townsend et al. 2008, p 29).
29. I have estimated the total habitat area of lowland longjaw galaxias “Waitaki” as 88 ha across 26 known sub-population habitat fragments (Dunn unpublished data).
30. The habitat of bignose galaxias is typically associated with spring systems with mud substrate (Bowie 2004, Elkington & Charteris 2005). Further, McDowall & Waters (2003) described the habitat, as “small gravely riffles in the small streams” which have or had “associations with small wetlands, tended to have sandy-gravel substrates, but where small riffles formed owing to higher gradient, substrates were gravel/cobble”.



Bignose galaxias locations

Figure 3. Distribution of bignose galaxias.

## CONCLUSION

31. Canterbury mudfish, lowland longjaw galaxias "Waitaki", and bignose galaxias are threatened freshwater fish, they occur in small, discrete habitats.
32. Identification of the habitats of these species to create schedules is an important step in the protection of their habitats under Resource Management Act planning instruments.
33. Further consideration is required to develop rules to protect all aspects of the habitat requirements of all life stages of these species.



Nicholas Rex Dunn

18 December 2015

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