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**Habitat Preferences
of Brown Mudfish
(*Neochanna apoda* Günther)**

A thesis presented in partial fulfilment of the
requirements for the degree of

Master of Science
in
Conservation Biology

at Massey University, Palmerston North, New Zealand

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2009

“Ironically, it is often not the big and beautiful creatures but the ugly and less dramatic ones which we need the most”

- Douglas Adams, *Last Chance To See*



Abstract

Brown mudfish (*Neochanna apoda*) are one of five non-diadromous mudfish species endemic to New Zealand. They are considered a 'vulnerable' species under human induced gradual decline (Hitchmough et al., 2007; IUCN, 2009). Brown mudfish are the most widely distributed *Neochanna* species in NZ, however, their populations within this range are patchy. A lowland swamp fish species, brown mudfish are historically noted to be found in forested wetland areas, such as kahikatea (*Dacrycarpus dacrydioides*) swamp-forest. Clearance, drainage and modification of around 90% of lowland wetland areas in NZ (McGlone, 2009) has resulted in habitat loss, with populations now found in the widest range of habitat types of all the NZ *Neochanna* species.

Habitat suitability is hard to assess for brown mudfish as they subsist in such a wide range of habitats. Habitat preferences were investigated to determine which habitat characteristics were most influential for brown mudfish. Geographic Information Systems (GIS) data and nationwide records from the New Zealand Freshwater Fish Database (NZFFD) were used for this analysis. Substrate type, rainfall, shading and low slopes were important aspects for sites with brown mudfish present. Sites without mudfish had steep slopes, high elevation catchments, a large substrate size and warm temperatures. Historical land cover and shading were also important in determining brown mudfish distribution. A local study found some GIS variables to be useful for predicting brown mudfish presence, but on-site measures of ephemerality and flowing water were the most important habitat features for brown mudfish.

Brown mudfish are not often found with other fish species and are considered poor competitors (O'Brien and Dunn, 2007), suggesting that presence of other fish species influences brown mudfish presence. Continued wetland modification increases the probability of brown mudfish encountering other species. The ability of brown mudfish to detect shortfin eels (*Anguilla australis*; a natural predator), and the response made once detection occurred, was investigated. Mudfish were presented with a choice between eel odour or neutrally odoured water. The response made varied with mudfish size. The varying responses indicate that brown mudfish are able to detect shortfin eels, and that this is likely to be a learned behaviour.



Acknowledgements

I would like to thank firstly my supervisor, Mike Joy, for providing guidance and input for this project. Also for all the help with statistics, which otherwise would have been completely incomprehensible.

This project could not have been completed without funding from the Nga Manu Trust and Julie Alley Bursary. Funding for the purchase of Gee-minnow traps was provided by the Department of Conservation.

Everyone who donated their time to help me with fieldwork: Steve and Lara Aiken, Stella McQueen, Shaun Nielsen, Irene Petrove, Hannah Rainforth, Sarah van Herpt and Asti. You provided me not only with help carrying stacks of fish traps over barbed wire fences, through mud, blackberry, supplejack and water that threatened to over-top our waders, but also made those times far more enjoyable than when I had to cope with all these things myself. Your help was invaluable, and made my work much easier; thank you.

To all the staff at Nga Manu, thank you for being so helpful to me while I was down there, and always being willing to lend a hand. This made all my work at the reserve so much easier and more enjoyable. Theo's Cottage was a wonderful place to stay when conducting trials, and saved me much time on the road.

Many people at Massey have provided help for various parts of this project, and I am very grateful to all of you. Thanks especially to Barbara Just, Paul Barrett and Erica Dahya.

Thank you to the Te Iwi o Ngati Tukorehe Trust for allowing me to undertake trapping at the Te Hakari wetland. Also to all others who have allowed me access to swampy areas on their land, aiding in my searches for mudfish.

Nadine Bott and Richard Gill at DOC, thank you for providing help, support and information for my research.

I received much help with editing of my chapters (often resulting in much re-writing) from the Ecology BEERS group. All your comments and suggestions have greatly improved my writing, and the content of this thesis, and for this I am extremely thankful. You also provided excellent company at the end of a Thursday afternoon. Thank you also to Eugenie Petrove for many proof-reads of my work.

Thank you to my Grandad, for love and support always, you have been a huge help in the completion of my masters.

Thank you also to all my family, friends and other assorted acquaintances who provided support and encouragement, listened to my general mudfish-y talk, and pretended to not be too bored by it all. You have all helped greatly in aiding me to reach the end of this project with some vestiges of sanity still remaining.

Finally, many thanks to all the fish – muddies and others – who donated their time and effort to aid in the research and completion of this thesis (to the mudfish especially, who actually gave me some *statistically significant* results), and without whom this project would not have been possible.

Approval for the trials undertaken as part of my research was gained from the Massey University Animal Ethics Committee (protocol number 08/83).



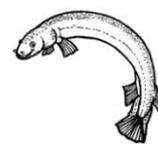
Top photo taken by Stella McQueen. All other photos taken by Natasha Petrove



Table of Contents

Abstract	iii
Acknowledgements	v
Table of Contents	vii
List of Tables	ix
List of Figures	x
Chapter 1: Introduction	1
1.1 Study Sites	6
1.1.1 Ashhurst Domain	6
1.1.2 Koputaroa	7
1.1.3 Koputaroa Kereru Conservation Covenant	8
1.1.4 Nga Manu Nature Reserve	8
1.1.5 Victoria Station	9
1.1.6 Lake Papaitonga / Preston's Farm	9
Chapter 2: Literature Review – General biology of the <i>Neochanna</i> species .	11
2.1 Galaxiids, <i>Neochanna</i> and distribution	13
2.2 General features of the <i>Neochanna</i> species	14
2.2.1 Morphological characteristics	15
2.2.2 Aestivation	16
2.2.3 Response to hypoxia	17
2.2.4 Spawning	17
2.2.5 Diet	18
2.3 The six mudfish species	18
2.3.1 The brown mudfish, <i>Neochanna apoda</i>	20
2.3.2 The black mudfish, <i>Neochanna diversus</i>	20
2.3.3 The Canterbury mudfish, <i>Neochanna burrowsius</i>	20
2.3.4 The Tasmanian mudfish, <i>Neochanna cleaveri</i>	21
2.3.5 The Northland mudfish, <i>Neochanna heleios</i>	22
2.3.6 The Chatham Islands mudfish, <i>Neochanna rekohua</i>	22
2.4 Typical features of <i>Neochanna</i> habitat	22
2.4.1 Hydrology	23
2.4.2 Vegetation	23
2.4.3 Water quality	24
2.4.4 Temperature	24
2.5 Threats to <i>Neochanna</i>	24

Chapter 3: Habitat	27
3.1 Introduction	29
3.1.1 <i>Historical findings</i>	30
3.1.2 <i>Recent scientific studies</i>	31
3.2 Methods	33
3.2.1 <i>Large scale habitat variables that may influence brown mudfish distribution</i>	33
3.2.2 <i>Local study of variables that may influence brown mudfish distribution</i>	34
3.3 Results	36
3.3.1 <i>Large scale habitat variables that may influence brown mudfish distribution</i>	36
3.3.2 <i>Local study of habitat variables that may influence brown mudfish distribution</i>	40
3.4 Discussion	43
3.4.1 <i>Summary of key habitat requirements for brown mudfish</i>	46
Chapter 4: Response of brown mudfish to the presence of eels	49
4.1 Introduction	51
4.2 Methods	53
4.3 Results	55
4.4 Discussion	58
Chapter 5: General Discussion	63
5.1 Mana Island	68
5.2 Suggested guidelines for determining habitat suitability	69
5.3 Recommendations for future work	70
References	75
Appendix A	81
Appendix B	85
Appendix C	87
Appendix D	89
Appendix E	91



List of Tables

Table		Page
2.1	The six <i>Neochanna</i> species, in order of discovery/inclusion to the genus, showing main distinguishing features	19
3.1	Number of observations and percent classified into each of two groups (mudfish present or mudfish absent) by the discriminant analysis, with crossvalidation of the data	36
3.2	R ² values and F statistics from canonical variate analysis	37
3.3	Coefficients for correlation between environmental variables with the first axis of the canonical variate analysis	39
3.4	Secondary determinate variables for brown mudfish presence or absence using J48 classification trees	41
4.1	Chi-square analysis of the number of mudfish present in each choice chamber	55
4.2	Chi-square analysis of the choices made by mudfish of each of three size classes	56
4.3	Chi-square analysis comparing responses made between size classes	57



List of Figures

Figure		Page
1.1	Adult brown mudfish in natural kahikatea swamp forest habitat, Nga Manu Nature Reserve	4
1.2	Location of the six sites where brown mudfish were trapped during the course of this study	6
1.3 a,b	Brown mudfish habitat at Ashhurst Domain	7
1.4 a,b	Brown mudfish habitat at Koputaroa	7
1.5 a,b	Brown mudfish habitat at Koputaroa Kereru Conservation Covenant	8
1.6 a,b	Brown mudfish habitat at Nga Manu Nature Reserve	8
1.7 a,b	Brown mudfish habitat at Victoria Station	9
1.8 a,b	Brown mudfish habitat at Lake Papaitonga	9
2.1	Map showing the distribution of the five NZ <i>Neochanna</i> species	21
3.1	Position of sites relating to their environmental variables, from the canonical variate analysis	38
3.2	Classification tree from analysis of brown mudfish presence/absence data	40
3.3	Classification tree after 'ephemeral' was removed from the data analysis	42
4.1 a,b	Diagrams showing the choice chamber set up for the trials	54
4.2	Graph showing the number of mudfish that made each of the three possible choices	55
4.3	Graph showing the average size of mudfish making each choice	56
4.4	Graph showing the percentage of fish in each size class that made each of the three choices	57