

New Zealand Biomass Resource Atlas

Volume 2

Wastes and Effluents

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Scion
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Introduction

This report presents a set of data as maps and tables, showing the amounts and locations of energy that can be derived from municipal, farm and some industrial wastes and effluents as at 2005.

The resources included are major sources of biomass wastes derived from;

- municipal solid waste
- municipal biosolids
- farm dairy effluent
- pig farm effluent
- poultry farm waste
- dairy factory effluent
- meat processing effluent

These resources represent the major sources of effluents, and is not a comprehensive list of all effluents available.

This report provides a summary of data, as it is known at the time of writing, attempts to predict forward based on drivers such as population and stock numbers were not attempted due to large areas of uncertainty.

Methods

Data sources

Data was derived from a variety of sources, principally from summary data prepared for the Bioenergy Options for New Zealand study.

The data was put into spreadsheets, on a regional basis, with the following zones used;

Northland

Auckland

CNI (= Central North Island, includes Waikato and Bay of Plenty)

East Coast

Hawke's Bay

SNI (Southern North Island, includes Manawatu, Wellington and Wairarapa)

Nelson / Marlborough (= includes Tasman)

West Coast

Canterbury

Otago / Southland

Mapping

Mapping was done in ARC GIS, based of the data presented in the spread sheets.

The energy available was derived by calculating the amount of biogas that could be created from anaerobic digestion of the wastes available. The energy is express as petejoules (PJ) per annum for a region.

Glossary

t = tonnes

m³ = cubic metres

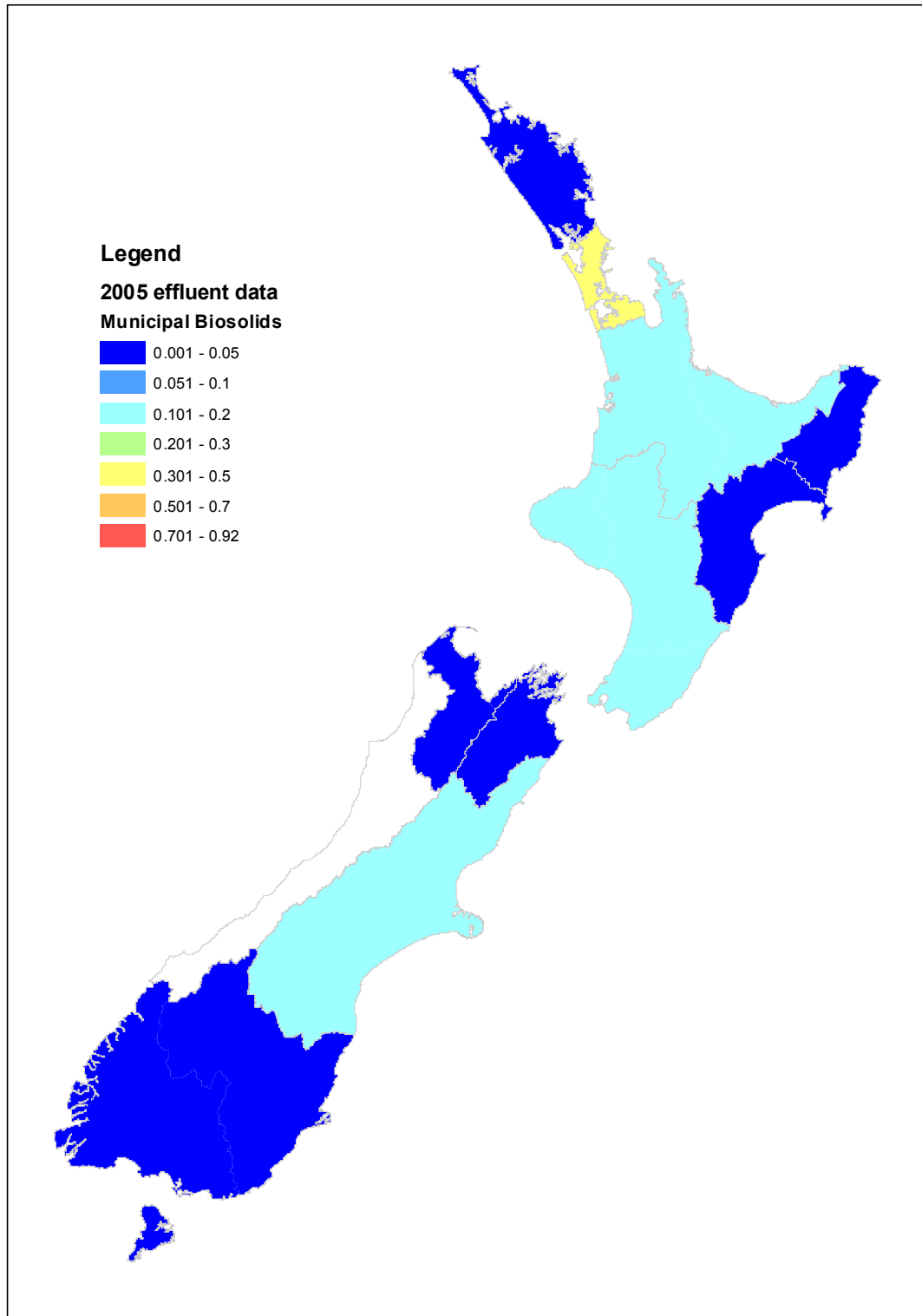
PJ = petajoules (peta = 1×10^9)

pa = per annum

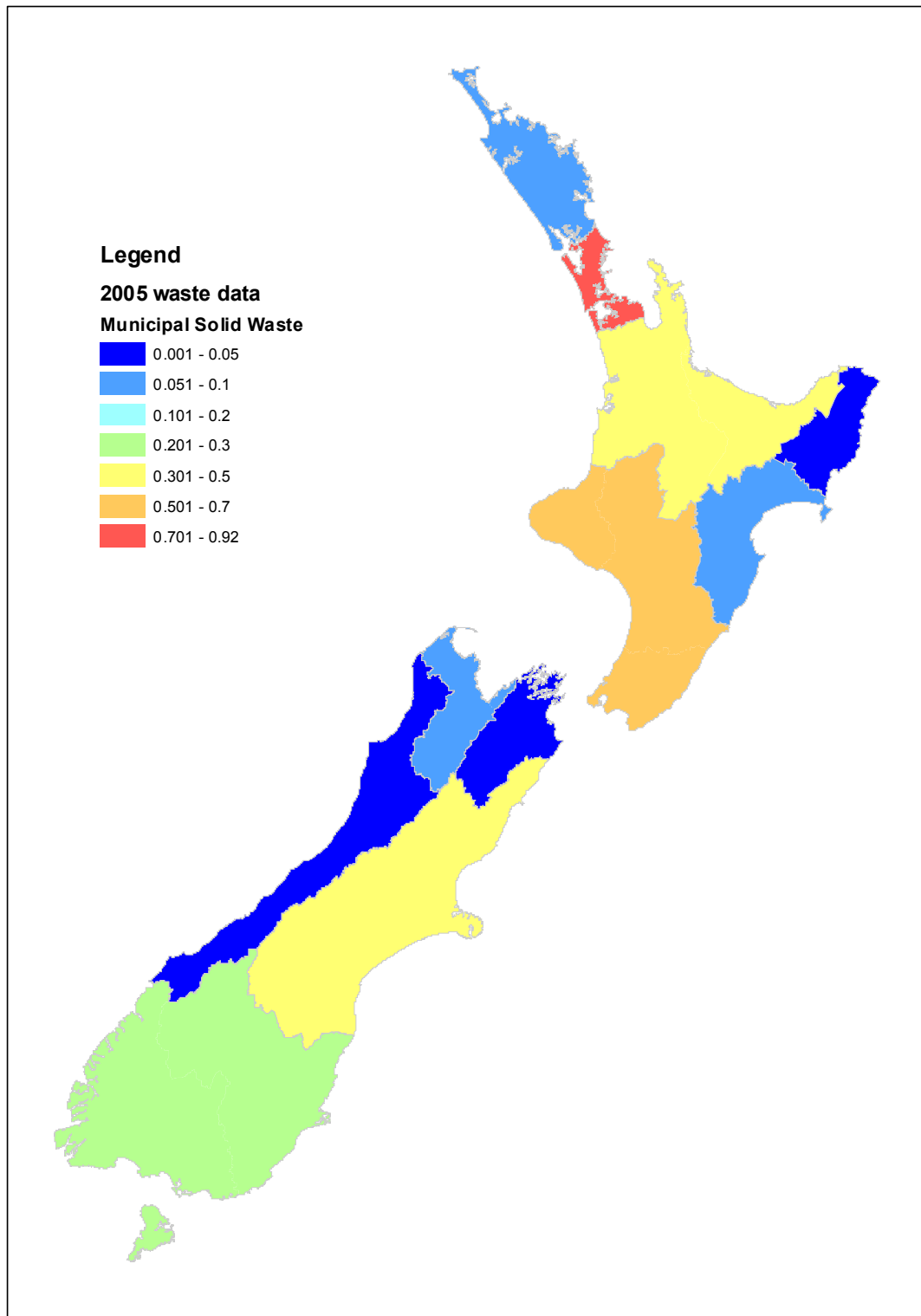
MAPS

Municipal Wastes

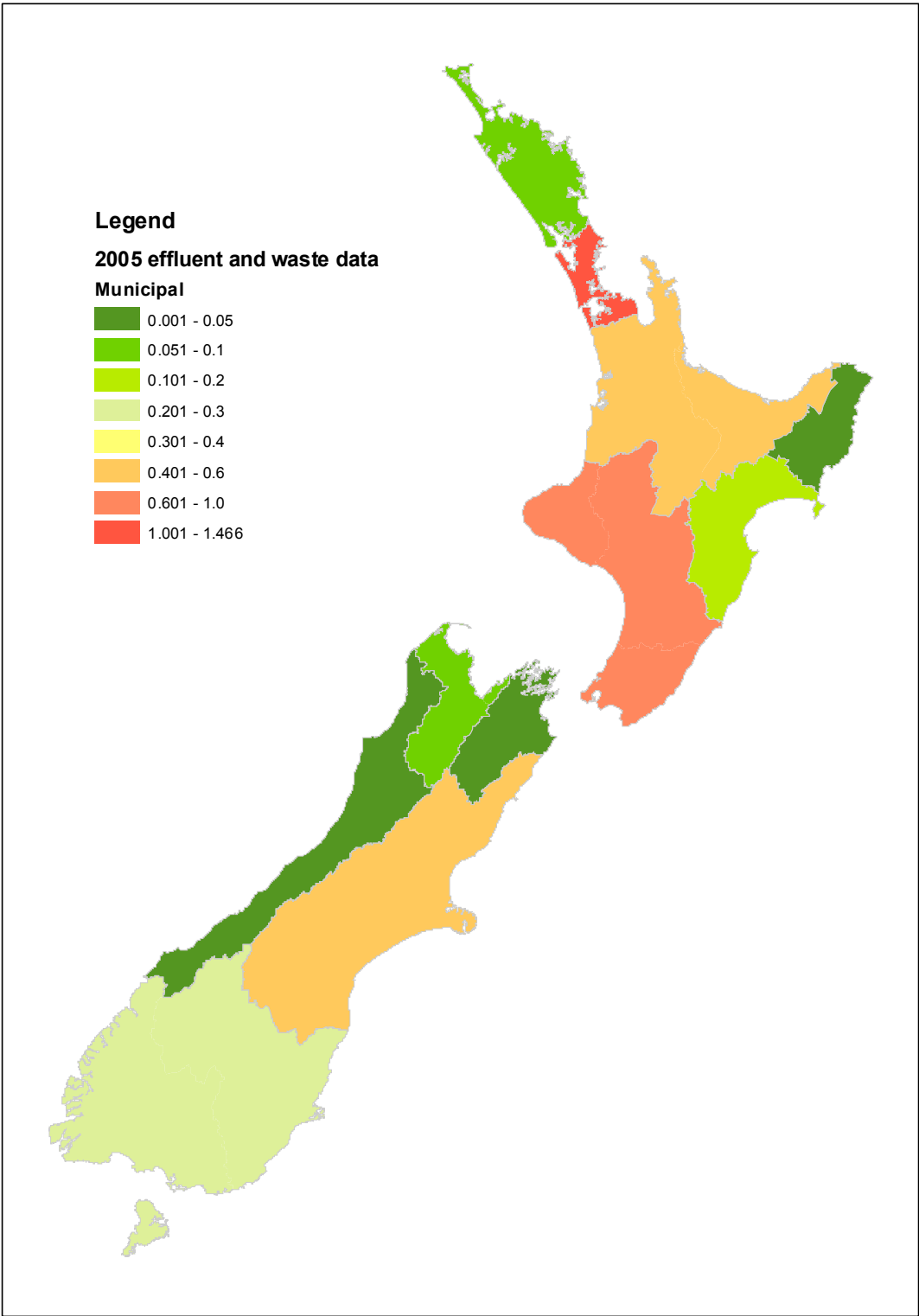
1. Municipal biosolids, 2005, PJ per annum by region



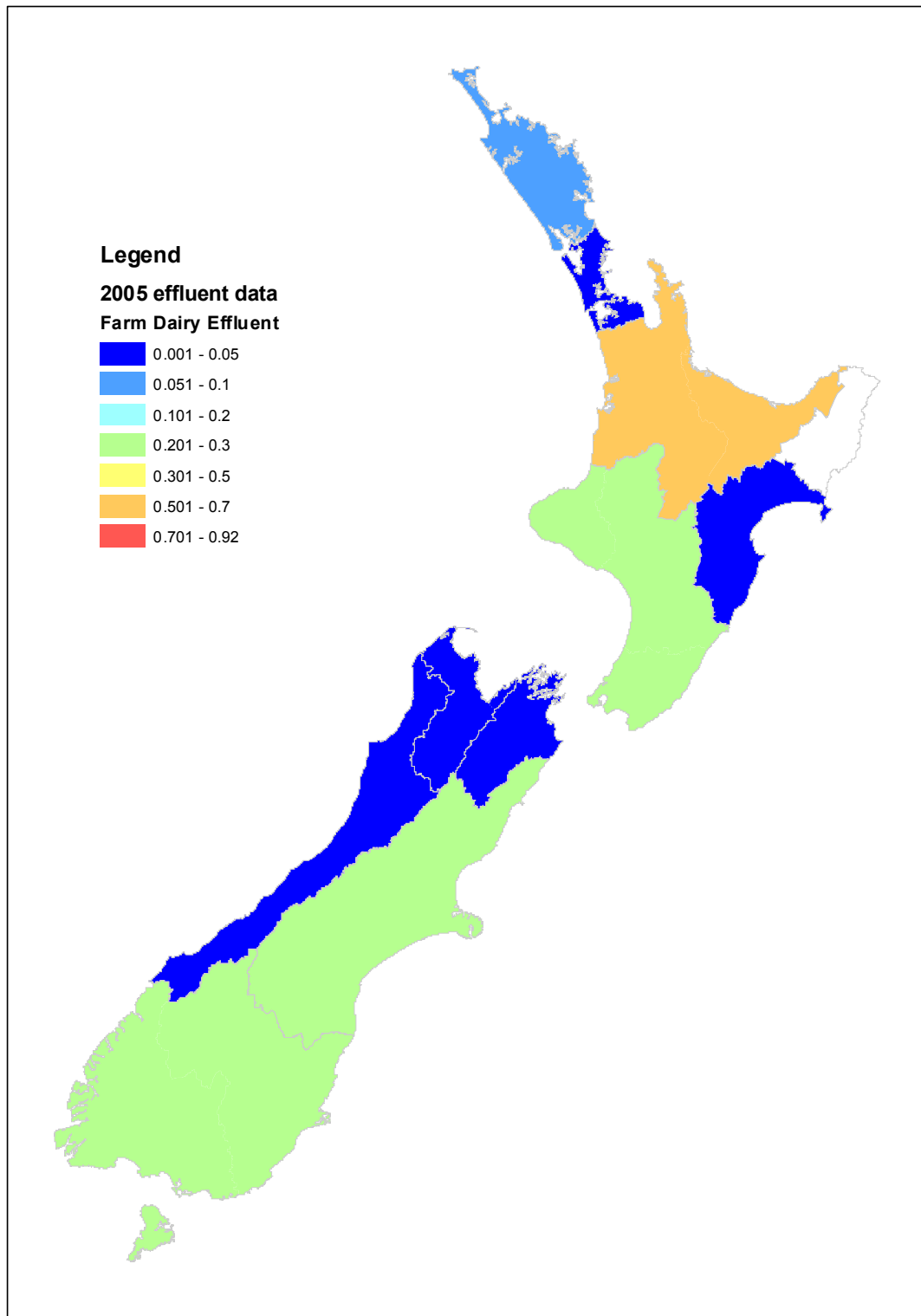
2. Municipal solid waste, 2005, PJ per annum by region



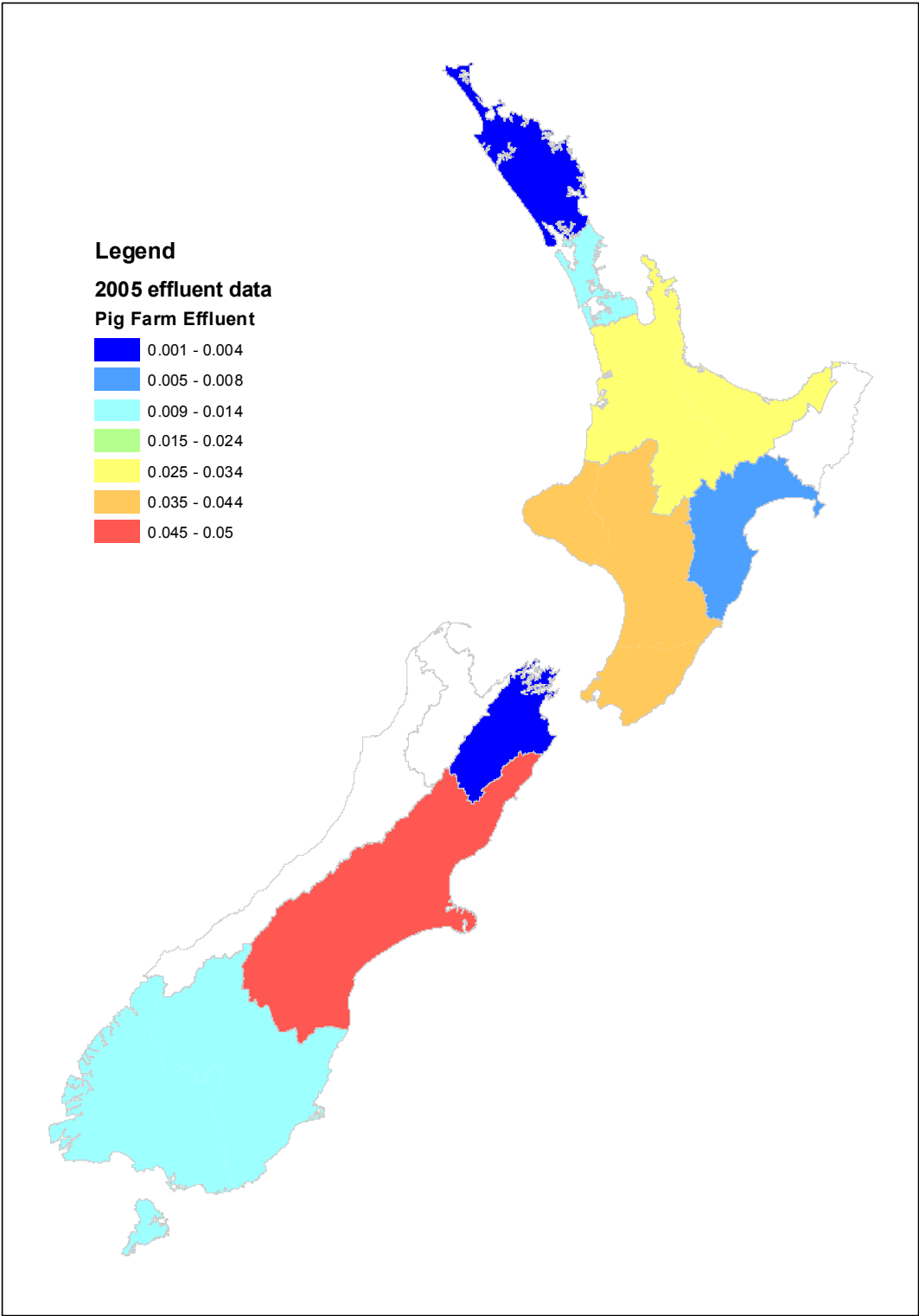
3. Total Municipal wastes, 2005, PJ per annum by region



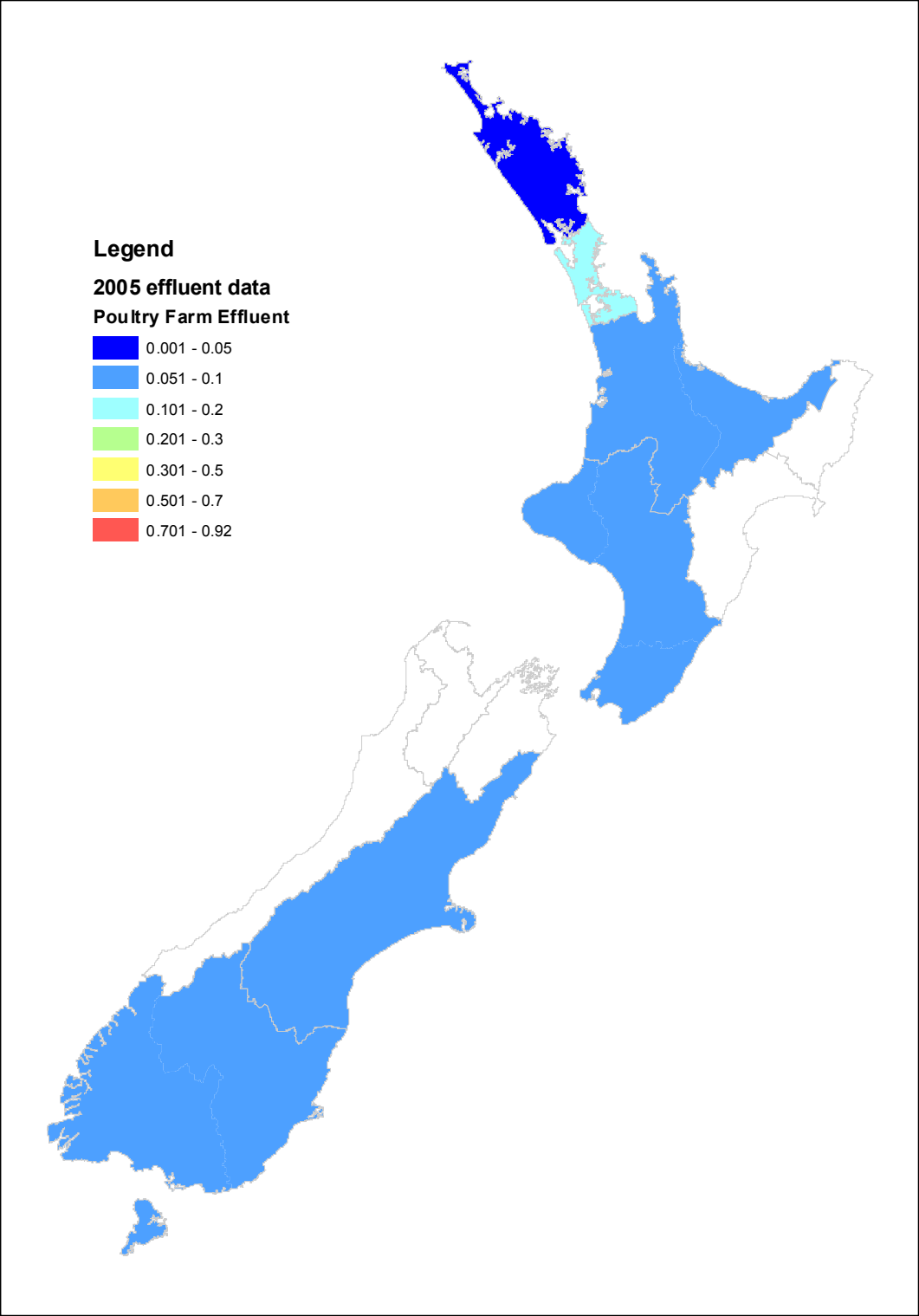
4. Farm dairy effluent, 2005, PJ per annum by region



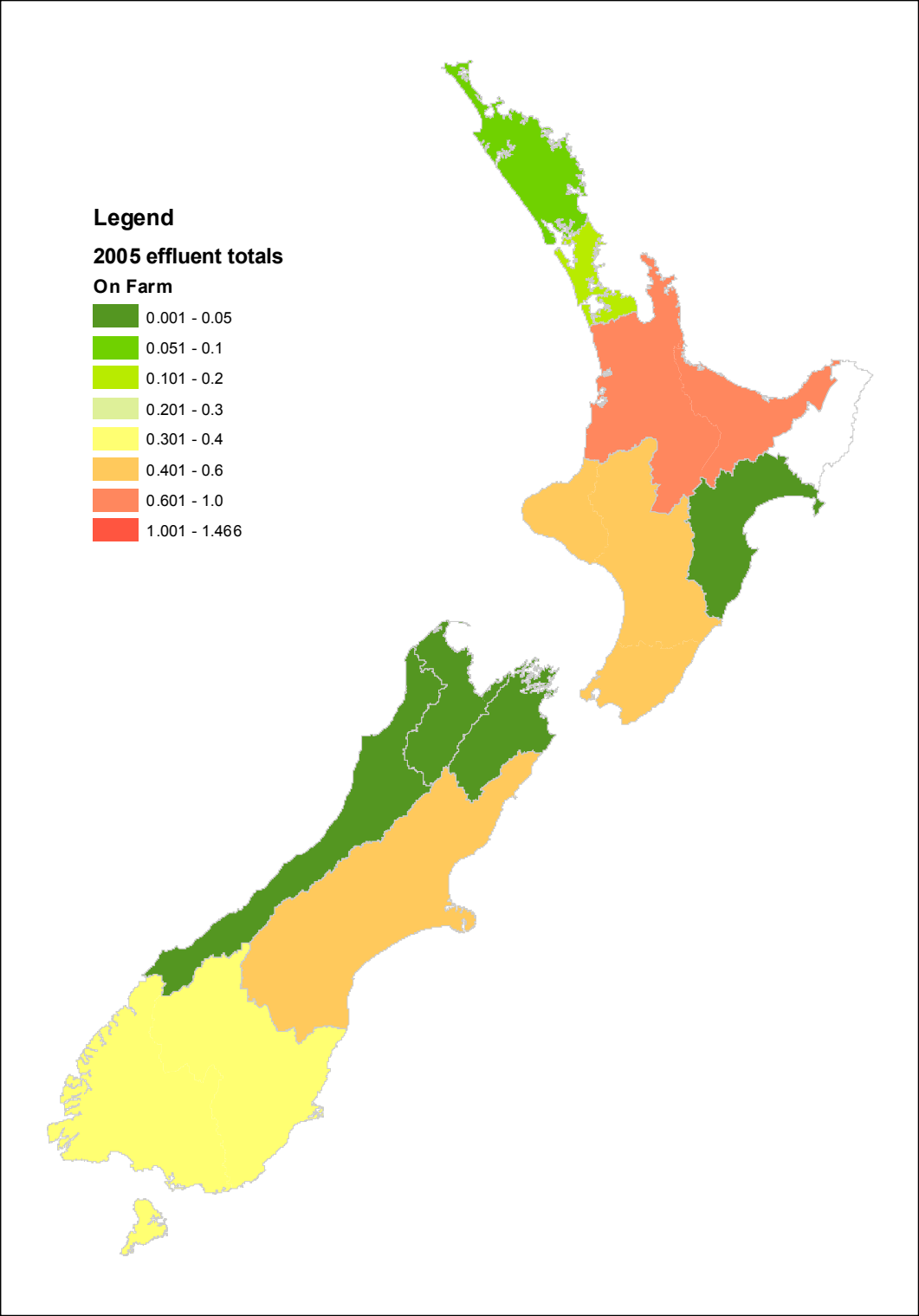
5. Pig Farm effluent, 2005, PJ per annum by region



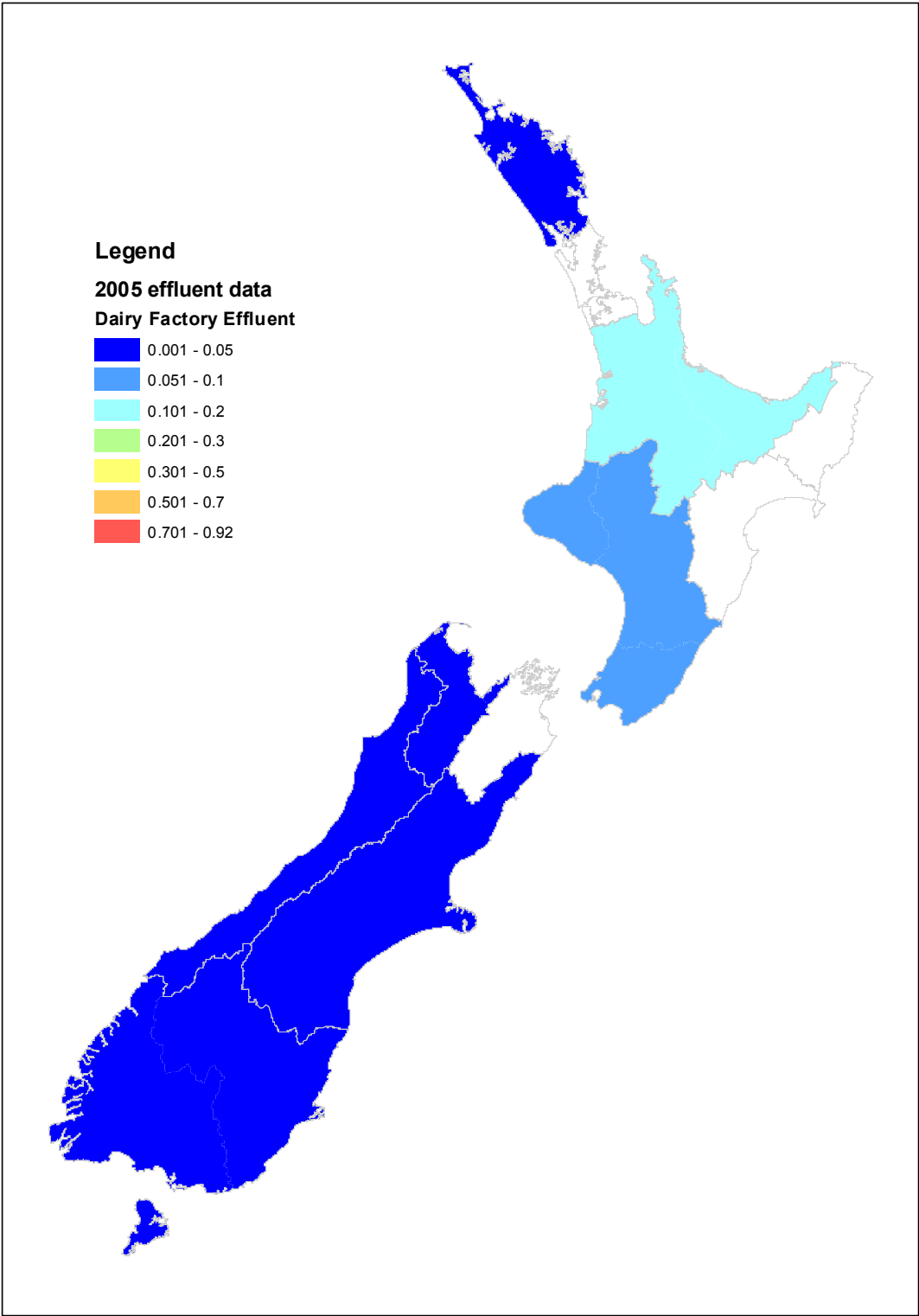
6. Poultry farm effluent, 2005, PJ per annum by region



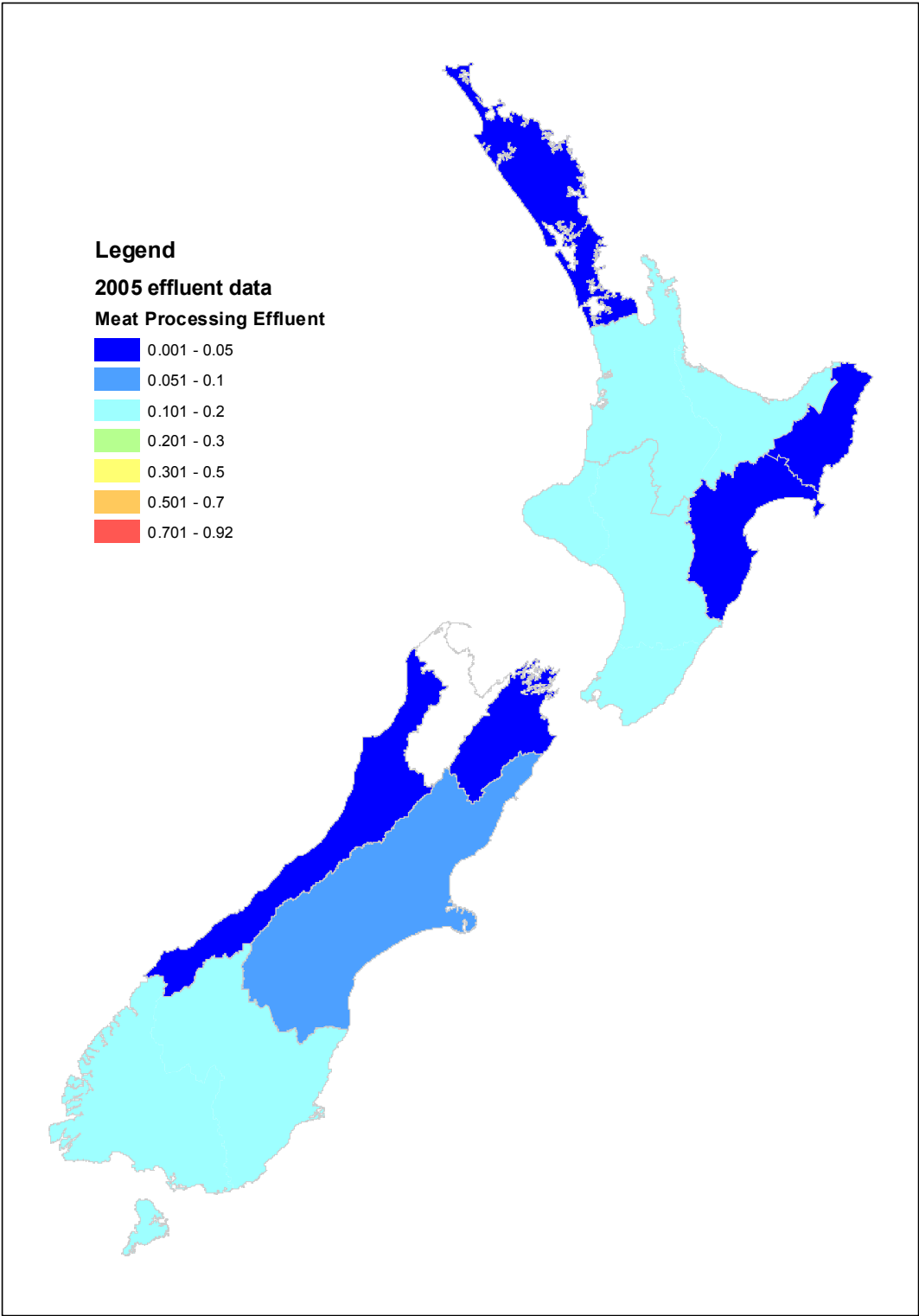
7. Total Farm Effluents, 2005, PJ per annum by region



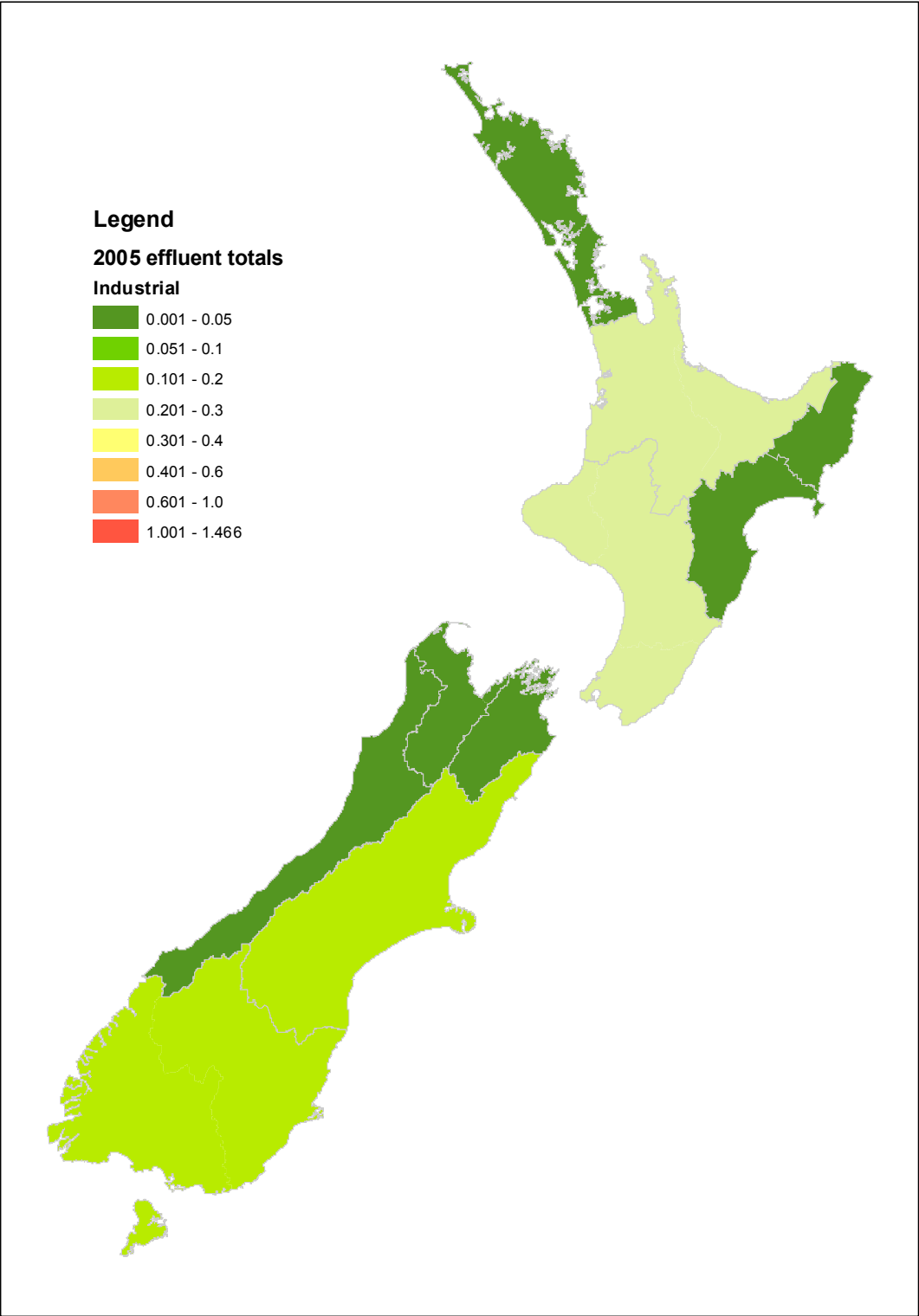
8. Dairy factory effluent, 2005, PJ per annum by region



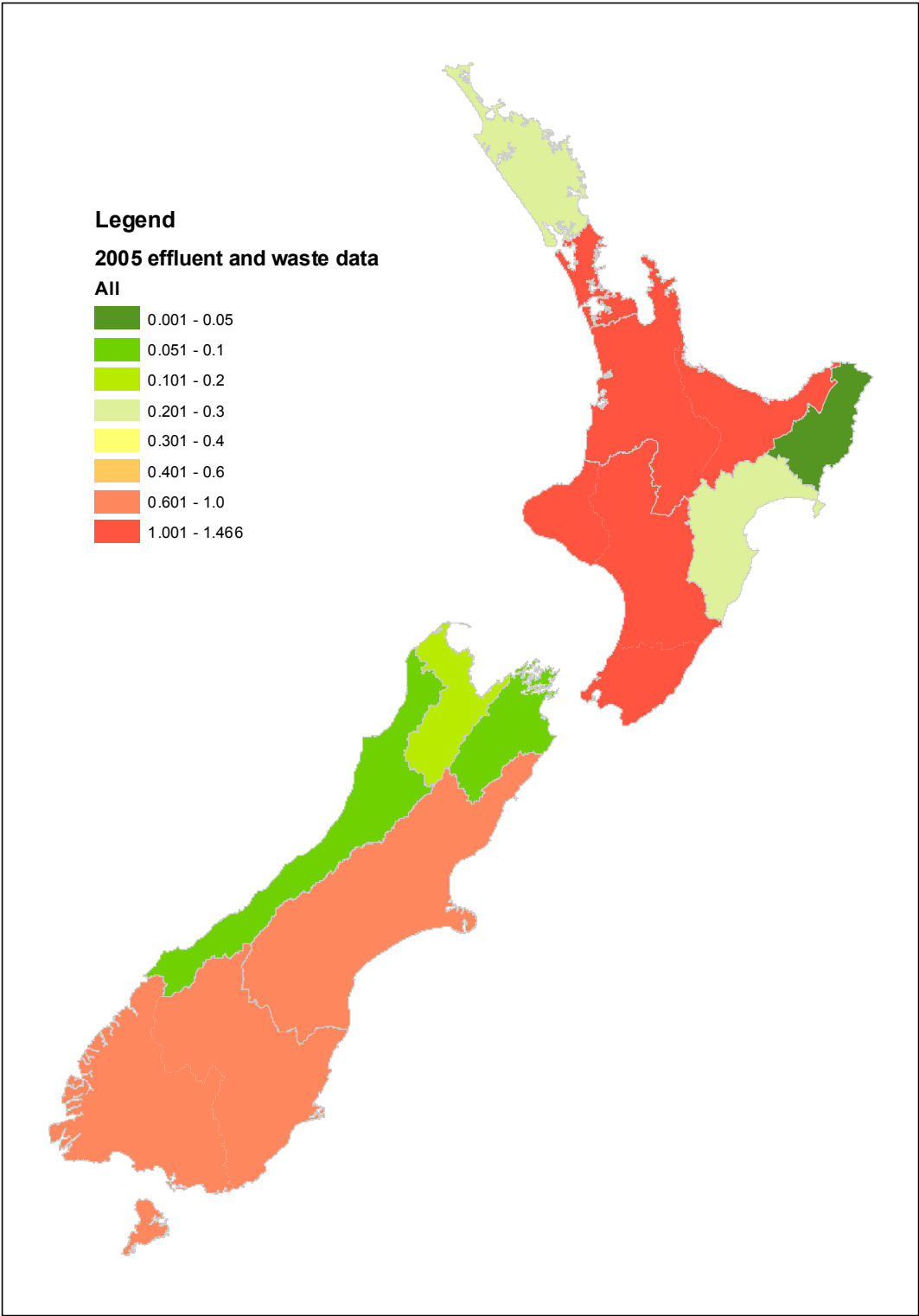
9. Meat processing effluent, 2005, PJ per annum by region



10. Total Industrial (dairy and meat processing) effluents, 2005, PJ per annum
by region



11. All wastes and effluents, 2005, PJ per annum by region



SUMMARY

Municipal

Farm

Industrial

Total

Information Gaps

Municipal

Farm

Industrial

Total

References

Hall P and Gifford G (2008). Bioenergy Options for New Zealand. Situation analysis – Biomass resources and conversion technologies.

Saggar S, Giltrap D, Forgie V, Renquist R. (2007). Review of Agricultural Resources. Report prepared for Bioenergy Options Programme.

Evanson T and Hall P (2007) Resource assessment of Municipal Wood Waste – green waste and untreated wood waste. Report prepared for Bioenergy Options Programme.

Thiele J. T. 2007. Bioenergy Resource assessment: Municipal biosolids and effluent and dairy factory, meat processing and wool processing waste.

APPENDICES

Data tables

APPENDIX I - Municipal wastes

Municipal bio-solids, 2005

	Municipal Biosolids, PJ per annum
Northland	0.01
Auckland	0.36
Waikato	0.06
Bay of Plenty	0.05
Gisbourne	0.01
Hawkes Bay	0.03
Taranaki	0.01
Manawatu	0.04
Wellington	0.12
Nelson	0.02
Marlborough	0.01
West Coast	0
Canterbury	0.12
Otago	0.03
Southland	0.01
New Zealand	

Municipal solid wastes, 2005

	Municipal Solid Waste, PJ per annum
Northland	0.09
Auckland	0.92
Waikato	0.22
Bay of Plenty	0.14
Gisbourne	0.03
Hawkes Bay	0.1
Taranaki	0.05
Manawatu	0.14
Wellington	0.47
Nelson	0.07
Marlborough	0.03
West Coast	0.02
Canterbury	0.32
Otago	0.15
Southland	0.1
New Zealand	

Total – Municipal, 2005

	Municipal wastes, PJ per annum
Northland	0.1
Auckland	1.28
Waikato	0.28
Bay of Plenty	0.19
Gisbourne	0.04
Hawkes Bay	0.13
Taranaki	0.06
Manawatu	0.18
Wellington	0.59
Nelson	0.09
Marlborough	0.04
West Coast	0.02
Canterbury	0.44
Otago	0.18
Southland	0.11
New Zealand	

APPENDIX II - Farm effluents

Farm Dairy effluent, 2005

	Dairy t / pa 2005	Dairy PJ gas 2005
Northland	270	0.08
Auckland	96	0.02
CNI	1,608	0.54
Gisborne	-	0
Hawke's Bay	65	0.03
SNI	885	0.27
Total North Island	2,924	0.94
Nelson / Marlborough	78	0.03
West Coast	112	0.04
Canterbury	477	0.27
Otago / Southland	400	0.24
Total South Island	1,067	0.58
Total New Zealand	3,991	1.52

Pig farm effluent, 2005

	Piggery t / pa 2005	Piggery PJ gas 2005
Northland	1	0
Auckland	-	0.01
CNI	5	0.03
Gisborne	-	0
Hawke's Bay	1	0
SNI	4	0.03
Total North Island	10	0.07
Nelson / Marlborough	-	0
West Coast	-	0
Canterbury	19	0.05
Otago / Southland	2	0
Total South Island	21	0.05
Total New Zealand	31	0.12

Poultry farm effluent, 2005

	Poultry t / pa 2005	Poultry PJ gas 2005
Northland	1	0.01
Auckland	19	0.11
CNI	15	0.09
Gisborne	0	0.00
Hawke's Bay	1	0.00
SNI	17	0.10
Total North Island	52	0.31
Nelson / Marlborough	-	-
West Coast	-	-
Canterbury	1	0.01
Otago / Southland	2	0.01
Total South Island	3	0.02
Total New Zealand	56	0.33

Total On Farm effluent, 2005

	All Farm PJ gas 2005
Northland	0.09
Auckland	0.14
CNI	0.66
Gisborne	0.00
Hawke's Bay	0.03
SNI	0.40
Total North Island	1.32
Nelson / Marlborough	0.03
West Coast	0.04
Canterbury	0.33
Otago / Southland	0.25
Total South Island	0.65
	-
Total New Zealand	1.97

APPENDIX III – Industrial Effluents

Dairy Factory effluent

	Methane	PJ gas
	t / pa	2005
	2005	2005
Northland	818	0.04
Auckland	-	0
CNI	4,939	0.25
Gisborne	11	0
Hawke's Bay	-	0
SNI	2,334	0.12
Total North Island	8,102	0.41
Nelson / Marlborough	185	0.01
West Coast	322	0.02
Canterbury	1,363	0.07
Otago / Southland	1,184	0.06
Total South Island	3,054	0.16
Total New Zealand	11,156	0.57

Meat processing effluent

	Methane	PJ
	t / pa	gas
	2005	2005
Northland	896	0.044
Auckland	503	0.022
CNI	3980	0.201
Gisborne	165	0.01
Hawke's Bay	1339	0.063
SNI	4330	0.023
Total North Island	11,213	0.363
Nelson / Marlborough	387	0.021
West Coast	248	0.011
Canterbury	2585	0.126
Otago / Southland	2890	0.145
Total South Island	6110	0.303
Total New Zealand	17,323	0.666

Total – Industrial

	Dairy and Meat PJ gas 2005
Northland	0.084
Auckland	0.022
CNI	0.451
Gisborne	0.01
Hawke's Bay	0.063
SNI	0.143
Total North Island	0.773
Nelson / Marlborough	0.031
West Coast	0.031
Canterbury	0.196
Otago / Southland	0.205
Total South Island	0.463
Total New Zealand	1.236

APPENDIX X – Total, All effluents and wastes

Total Wastes and Effluents, 2005

	All, PJ per annum
Northland	0.27
Auckland	1.44
CNI	1.58
Gisborne	0.05
Hawke's Bay	0.23
SNI	1.37
Total North Island	4.95
Nelson / Marlborough	0.19
West Coast	0.09
Canterbury	0.96
Otago / Southland	0.75
Total South Island	1.99
	-
Total New Zealand	6.94