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# **RISK ANALYSIS OF A FLATFISH STOCK COMPLEX**

K. McLeod

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# **RISK ANALYSIS OF A FLATFISH STOCK COMPLEX**

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# ABSTRACT

The New Zealand Ministry of Fisheries relies on fishery assessments to determine suitable catch quotas for exploited fisheries. Currently, 628 fish stocks are managed in New Zealand using the Quote Management System, which includes the 8 commercial flatfish species caught within the Exclusive Economic Zone. These eight species of flatfish, which includes four species of flounder, two species of sole, brill and turbot, are currently managed using a combined catch quota. Since these eight species are managed using a common catch quota, there is concern that some of the individual species may be under or over-fished.

This thesis describes work involving the flatfish species caught in the FLA3 management area, around the south island of New Zealand. The FLA3 management area contains three key species: New Zealand sole, lemon sole, and sand flounder. Due to the nature and limitations of the data available, simple biomass dynamic models were applied to these species. The maximum likelihood and Bayesian goodness of fit techniques were used to estimate the model parameters. Three models were used: the Fox model, the Schaefer model and the Pella-Tomlinson model with  $m = 3$ . As a mathematical/statistical exercise, these models were used to conduct a risk analysis to analyse the advantages and disadvantages of six management options for setting a TACC. However, because of issues over the way that the parameter  $K$  has been modelled (due to necessity caused by the lack of data), this should not be seen as an appropriate method for estimating the fish stock. Conclusions were drawn from the results regarding suitable future action for the assessment and management of flatfish stock in FLA3.



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# Contents

<b>1</b>	<b>BACKGROUND</b>	<b>1</b>
1.1	Flatfish Data . . . . .	1
1.1.1	Introduction . . . . .	1
1.1.2	Flatfish Biology . . . . .	3
1.2	Fishery Summary . . . . .	6
<b>2</b>	<b>PROBLEM</b>	<b>9</b>
2.1	Background . . . . .	9
2.1.1	Previous Research . . . . .	9
2.2	Mathematical Models . . . . .	13
2.2.1	Schaefer Model . . . . .	16
2.2.2	Pella-Tomlinson Model . . . . .	17
2.2.3	Fox Model . . . . .	17
2.2.4	Assumptions . . . . .	18
2.3	Review of Previous Research . . . . .	19
2.4	Concerns and Limitations . . . . .	20
2.5	Project Objectives . . . . .	22
<b>3</b>	<b>SIMULATION MODEL</b>	<b>25</b>
3.1	Introduction . . . . .	25
3.2	Model Analysis . . . . .	26
3.2.1	Schaefer Model . . . . .	26
3.2.2	Pella-Tomlinson Model with $m = 3$ . . . . .	28
3.2.3	Fox Model . . . . .	29
3.3	Simulation Models . . . . .	30

3.3.1	Model 1 . . . . .	30
3.3.2	Model 2 . . . . .	31
<b>4</b>	<b>PARAMETER ESTIMATION</b>	<b>33</b>
4.1	Introduction . . . . .	33
4.1.1	Model Choice . . . . .	33
4.1.2	Data for Flatfish . . . . .	34
4.1.3	Goodness of Fit . . . . .	34
4.2	Maximum Likelihood Calculation . . . . .	35
4.2.1	Introduction . . . . .	35
4.2.2	Implementation . . . . .	37
4.3	Maximum Likelihood for FLA 3 . . . . .	41
4.3.1	Maximum Likelihood using Schaefer Model . . . . .	41
4.3.2	Likelihood Profile . . . . .	44
4.3.3	Maximum Likelihood using Pella-Tomlinson Model with $m = 3$ . . . . .	48
4.3.4	Maximum Likelihood using Fox Model . . . . .	48
4.3.5	Summary of Maximum Likelihood Estimates . . . . .	49
4.4	Bayesian Goodness of Fit . . . . .	51
4.4.1	Introduction . . . . .	51
4.4.2	Biological Parameters from Fish Base . . . . .	52
4.4.3	Regression Analysis . . . . .	53
4.4.4	Implementation . . . . .	56
4.4.5	Bayesian Method using Schaefer Model . . . . .	57
4.4.6	Bayesian Method using Pella-Tomlinson Model with $m = 3$ . . . . .	58
4.4.7	Bayesian Method using Fox model . . . . .	62
4.5	Concluding Remarks . . . . .	66
<b>5</b>	<b>MANAGEMENT STRATEGY OPTIONS</b>	<b>69</b>
5.1	Introduction . . . . .	69
5.2	Option 1 . . . . .	70
5.3	Option 2 . . . . .	70
5.4	Option 3 . . . . .	70
5.5	Option 4 . . . . .	70

5.6	Option 5 . . . . .	71
5.7	Option 6 . . . . .	72
<b>6</b>	<b>RISK ASSESSMENT</b>	<b>73</b>
6.1	Introduction . . . . .	73
6.2	Option 1 . . . . .	73
6.2.1	Schaefer Model . . . . .	74
6.2.2	Fox Model . . . . .	74
6.3	Option 2 . . . . .	79
6.3.1	Schaefer Model . . . . .	79
6.3.2	Fox Model . . . . .	79
6.4	Option 3 . . . . .	84
6.4.1	Schaefer Model . . . . .	84
6.4.2	Fox Model . . . . .	84
6.5	Option 4 . . . . .	89
6.5.1	Schaefer Model . . . . .	89
6.5.2	Fox Model . . . . .	89
6.6	Option 5 . . . . .	94
6.6.1	Schaefer Model . . . . .	94
6.6.2	Fox Model . . . . .	94
6.7	Option 6 . . . . .	99
6.7.1	Schaefer Model . . . . .	99
6.7.2	Fox Model . . . . .	99
<b>7</b>	<b>CONCLUSION</b>	<b>105</b>
<b>8</b>	<b>DISCUSSION</b>	<b>109</b>
<b>9</b>	<b>FURTHER RESEARCH</b>	<b>111</b>

# List of Figures

1.1	New Zealand lemon sole (image obtained from [19] with permission from NIWA).	4
1.2	New Zealand sole (image obtained from Peter McMillan with permission from NIWA).	5
1.3	Sand flounder (image obtained from [18] with permission from NIWA).	6
1.4	Map of the five key flatfish management areas (obtained from <a href="http://www.fish.govt.nz">www.fish.govt.nz</a> )	8
2.1	Catch for individual species in the FLA 3 stock area	11
2.2	Catch (solid line) and CPUE (dotted line).	14
2.3	Catch (solid line) and CPUE (dotted line).	14
2.4	Catch (solid line) and CPUE (dotted line).	15
2.5	Catch (solid line) and CPUE (dotted line).	16
2.6	Surplus production curve for different $m$	18
2.7	Catch and TACC for all stock areas	21
2.8	Catch and TACC for the FLA 3 stock area.	22
4.1	Catch and CPUE for Namibia Hake.	38
4.2	The observed CPUE (dots) and the line of best fit for the Namibia Hake.	39
4.3	Likelihood profile for Namibia Hake for $r$ .	40
4.4	Likelihood profile for Namibia Hake for $K$ .	40
4.5	The observed CPUE (dots) and the line of best fit for FLA3 - All.	42
4.6	The observed CPUE (dots) and the line of best fit for New Zealand sole (ESO).	42

4.7	The observed CPUE (dots) and the line of best fit for lemon sole (LSO). . . . .	43
4.8	The observed CPUE (dots) and the line of best fit for sand flounder (SFL). . . . .	43
4.9	Likelihood profile associated with $r$ for New Zealand sole (ESO). . .	45
4.10	Likelihood profile associated with $K$ for New Zealand sole (ESO). . .	45
4.11	Likelihood profile associated with $r$ for lemon sole (LSO). . . . .	46
4.12	Likelihood profile associated with $K$ for lemon sole (LSO). . . . .	46
4.13	Likelihood profile associated with $r$ for sand flounder (SFL). . . . .	47
4.14	Likelihood profile associated with $K$ for sand flounder (SFL). . . . .	47
4.15	The observed CPUE (dots) and the line of best fit for FLA3 - All. . .	49
4.16	The observed CPUE (dots) and the line of best fit for New Zealand sole (ESO). . . . .	50
4.17	The observed CPUE (dots) and the line of best fit for lemon sole (LSO). . . . .	50
4.18	The observed CPUE (dots) and the line of best fit for sand flounder (SFL). . . . .	51
4.19	Log-normal fit of $r$ from the data obtained from Fish Base . . . . .	54
4.20	The relationship between the parameters of interest . . . . .	56
4.21	Graphs for ESO parameter estimates from WinBUGS . . . . .	59
4.22	Graphs for LSO parameter estimates from WinBUGS . . . . .	60
4.23	Graphs for SFL parameter estimates from WinBUGS . . . . .	61
4.24	Graphs for ESO parameter estimates from WinBUGS . . . . .	63
4.25	Graphs for LSO parameter estimates from WinBUGS . . . . .	64
4.26	Graphs for SFL parameter estimates from WinBUGS . . . . .	65
5.1	Landed Catch plotted with proposed TACC for management options 1,2 and 3 from recommendations from [7] . . . . .	71
5.2	Landed Catch plotted with proposed TACC for management options 4, 5 and 6 from bayesian estimates calculated in previous chapter . .	72
6.1	Option 1 - Simulation Model 1 (green line: stable converging, blue: decreasing towards zero, red: oscillating) . . . . .	75

6.2	Option 1 - Simulation Model 1 (green line: stable converging, blue: decreasing towards zero, red: oscillating) . . . . .	76
6.3	Option 1 - Simulation Model 2 (green line: stable converging, blue: decreasing towards zero, red: oscillating) . . . . .	77
6.4	Option 1 - Simulation Model 2 (green line: stable converging, blue: decreasing towards zero, red: oscillating) . . . . .	78
6.5	Option 2 - Simulation Model 1 (green line: stable converging, blue: decreasing towards zero, red: oscillating) . . . . .	80
6.6	Option 2 - Simulation Model 1 (green line: stable converging, blue: decreasing towards zero, red: oscillating) . . . . .	81
6.7	Option 2 - Simulation Model 2 (green line: stable converging, blue: decreasing towards zero, red: oscillating) . . . . .	82
6.8	Option 2 - Simulation Model 2 (green line: stable converging, blue: decreasing towards zero, red: oscillating) . . . . .	83
6.9	Option 3 - Simulation Model 1 (green line: stable converging, blue: decreasing towards zero, red: oscillating) . . . . .	85
6.10	Option 3 - Simulation Model 1 (green line: stable converging, blue: decreasing towards zero, red: oscillating) . . . . .	86
6.11	Option 3 - Simulation Model 2 (green line: stable converging, blue: decreasing towards zero, red: oscillating) . . . . .	87
6.12	Option 3 - Simulation Model 2 (green line: stable converging, blue: decreasing towards zero, red: oscillating) . . . . .	88
6.13	Option 4 - Simulation Model 1 (green line: stable converging, blue: decreasing towards zero, red: oscillating) . . . . .	90
6.14	Option 4 - Simulation Model 1 (green line: stable converging, blue: decreasing towards zero, red: oscillating) . . . . .	91
6.15	Option 4 - Simulation Model 2 (green line: stable converging, blue: decreasing towards zero, red: oscillating) . . . . .	92
6.16	Option 4 - Simulation Model 2 (green line: stable converging, blue: decreasing towards zero, red: oscillating) . . . . .	93
6.17	Option 5 - Simulation Model 1 (green line: stable converging, blue: decreasing towards zero, red: oscillating) . . . . .	95



6.18	Option 5 - Simulation Model 1 (green line: stable converging, blue: decreasing towards zero, red: oscillating) . . . . .	96
6.19	Option 5 - Simulation Model 2 (green line: stable converging, blue: decreasing towards zero, red: oscillating) . . . . .	97
6.20	Option 5 - Simulation Model 2 (green line: stable converging, blue: decreasing towards zero, red: oscillating) . . . . .	98
6.21	Option 6 - Simulation Model 1 (green line: stable converging, blue: decreasing towards zero, red: oscillating) . . . . .	100
6.22	Option 6 - Simulation Model 1 (green line: stable converging, blue: decreasing towards zero, red: oscillating) . . . . .	101
6.23	Option 6 - Simulation Model 2 (green line: stable converging, blue: decreasing towards zero, red: oscillating) . . . . .	102
6.24	Option 6 - Simulation Model 2 (green line: stable converging, blue: decreasing towards zero, red: oscillating) . . . . .	103

# List of Tables

3.1	Parameters for MSY . . . . .	28
4.1	Catch and CPUE for FLA, ESO, LSO and SFL . . . . .	35
4.2	Catch and CPUE for Namibia Hake . . . . .	38
4.3	Optimal parameter values for each of the three key species using maximum likelihood method for Schaefer model . . . . .	42
4.4	Optimal parameter values for each of the three key species using maximum likelihood method for Fox model . . . . .	48
4.5	Estimate of $r$ for each of the three key species . . . . .	53
4.6	Estimated $r$ data for sole and flounder from Fish Base . . . . .	55
4.7	Optimal parameter values for each of the three key species using Bayesian statistical methods with the Schaefer model. . . . .	57
4.8	Optimal parameter values for each of the three key species using Bayesian statistical methods with the Fox model. . . . .	62
5.1	Management Options with recommended TACC's . . . . .	72
6.1	Summary of results for option 1 . . . . .	74
6.2	Summary of results for option 2 . . . . .	79
6.3	Summary of results for option 3 . . . . .	84
6.4	Summary of results for option 4 . . . . .	89
6.5	Summary of results for option 5 . . . . .	94
6.6	Summary of results for option 6 . . . . .	99