

# CONTENTS

<b>SUMMARY</b> .....	1
<b>ACKNOWLEDGMENTS</b> .....	3
<b>INTRODUCTION</b> .....	4
<b>METHODS</b> .....	6
Study Site .....	6
Sampling by Line-fishing .....	7
Tag Type .....	8
Tagging Technique .....	8
Sampling Protocol .....	8
Sampling Schedule and Distribution of Effort .....	9
Analysis .....	10
Catch Composition .....	10
Catch Per Unit Effort .....	11
Size Structure .....	11
Tag Loss and Tag Comparison .....	12
Movement .....	12
<b>RESULTS</b> .....	13
Catch Composition .....	13
Catch Per Unit Effort .....	16
Effect of TRIP .....	16
Effect of REEF .....	16
Effect of BLOCK .....	17
Size Structure .....	17
Effect of TRIP .....	17
Effect of REEF .....	17
Effect of BLOCK .....	17
Length Frequency Distribution of <i>Plectropomus leopardus</i> .....	21
Tag Loss .....	21
Rate of Tag Loss of t-bar Anchor Tags .....	21
Comparison of Rates of Tag Loss of t-bar Anchor Tags and Dart Tags .....	28
Comparison of Frequency of Return of t-bar Anchor Tags and Dart Tags .....	28
Effect of Colour on the Frequency of Return of t-bar Anchor Tags .....	30
Movement .....	30
Distribution of Releases of <i>Plectropomus leopardus</i> .....	30
Distribution of Research Returns of <i>Plectropomus leopardus</i> .....	30
Distribution of Public Returns of <i>Plectropomus leopardus</i> .....	33
Per Cent Returns of <i>Plectropomus leopardus</i> by Trip by Reef .....	33
Patterns of Inter-reef Movement of <i>Plectropomus leopardus</i> from Research Returns .....	33
Patterns of Inter-reef Movement of <i>Plectropomus leopardus</i> from Public Returns .....	35
Patterns of Inter-block of <i>Plectropomus leopardus</i> from Research Returns .....	38
<b>DISCUSSION</b> .....	40
Catch Composition .....	40
Catch Per Unit Effort of <i>Plectropomus leopardus</i> .....	41
Size Structure of <i>Plectropomus leopardus</i> .....	43

Tag Loss and Comparison of Tag Type .....	43
Movement of <i>Plectropomus leopardus</i> .....	44
<b>REFERENCES</b> .....	46
<b>APPENDICES</b> .....	49
<b>FIGURES</b>	
1. Location of study area and study reefs for the large-scale movement study on the Great Barrier Reef .....	6
2. Location of sampling blocks within each reef of the cluster .....	7
3. Mosaic plot of species composition of catch by reef .....	11
4. Correspondence analysis of species composition of catch by reef .....	15
5. Mosaic plot of species composition of catch by trip .....	15
6. Correspondence analysis of species composition of catch by trip .....	16
7. Mean CPUE for <i>Plectropomus leopardus</i> by reef and trip .....	18
8. Mean CPUE for <i>Plectropomus leopardus</i> by block by reef by trip for back reef blocks only .....	19
9. Mean CPUE for <i>Plectropomus leopardus</i> by block by reef by trip for all blocks .....	20
10. Mean length to caudal fork for <i>Plectropomus leopardus</i> by reef and trip .....	22
11. Mean length to caudal fork for <i>Plectropomus leopardus</i> by block by reef and trip .....	23
12. Mean length to caudal fork for <i>Plectropomus leopardus</i> by block by reef and trip .....	24
13. Length frequency distributions for <i>Plectropomus leopardus</i> at Beaver and Taylor Reefs by trip (all blocks) .....	25
14. Length frequency distributions for <i>Plectropomus leopardus</i> at Farquharson and Little Potter Reefs by trip (all blocks) .....	26
15. Length frequency distributions for <i>Plectropomus leopardus</i> at Potter Reef by trip (all blocks) .....	27
16a. Natural logarithm of estimated proportion of t-bar anchor tags retained over time, for tags returned from the public and those returned during research recovery exercises .....	29
16b. Natural logarithm of estimated proportion of t-bar anchor tags retained over time, of pooled public and research returns for <i>Plectropomus leopardus</i> tagged with t-bar tags only .....	29
17a. Natural logarithm of estimated proportion of t-bar anchor tags retained over time, for pooled public and research returns of <i>Plectropomus leopardus</i> tagged with one t-bar and one dart tag .....	31
17b. Natural logarithm of estimated proportion of dart tags retained over time for pooled public and research returns of <i>Plectropomus leopardus</i> tagged with one t-bar and one dart tag .....	31
18. Mosaic plot from 6x2 contingency table analysis of proportion of fish returned with one and two tags by tag colour .....	32
19. Mosaic plot of frequency of movement among blocks by reef from 5x4 contingency table analysis .....	33
<b>TABLES</b>	
1 Starting date, duration, number of dories and tidal state for each research sampling trip .....	9
2 Distribution of sampling effort among blocks within reefs by trip .....	10
3. Response profiles of dominant taxa by trip from contingency table analysis .....	14
4. Response profiles of catch composition by reef from contingency table analysis .....	14
5. ANOVA table for 3-way mixed model ANOVA for effect of trip, reef and block on mean CPUE of <i>Plectropomus leopardus</i> .....	16

6.	ANOVA table for 3-way mixed model ANOVA for effect of trip, reef and block on the mean length to caudal fork of <i>Plectropomus leopardus</i> .....	21
7.	Summary of tag loss data for t-bar anchor tags from public and research tag returns of <i>Plectropomus leopardus</i> tagged with two t-bar anchor tags and returned up to 480 days following release .....	28
8.	Estimates of tag shedding parameters $p$ and $L$ from the Bayliff and Morbran (1972) tag shedding model for t-bar anchor tag returns from the public and research exercises, and for the common regression. ....	28
9.	Summary of tag loss data for t-bar anchor tags and dart tags from the pooled public and research tag returns of fish tagged with both tag types and returned up to 480 days following release .....	30
10.	Estimates of tag shedding parameters $p$ and $L$ from the Bayliff and Morbran (1972) tag shedding model for t-bar anchor tags and dart tags from the common regression for the pooled public and research returns of <i>Plectropomus leopardus</i> .....	32
11.	Number of <i>Plectropomus leopardus</i> tagged and released by trip by reef by block .....	34
12.	Distribution of research returns of <i>Plectropomus leopardus</i> by trip, reef and block ....	35
13.	Research recaptures of <i>Plectropomus leopardus</i> standardised by sampling effort by trip and reef .....	35
14.	Distribution of public tag returns of <i>Plectropomus leopardus</i> by time period and reef .....	36
15.	The rate of tag return of <i>Plectropomus leopardus</i> from each reef by the public, from the research recovery trips and from the two combined .....	36
16.	Pattern of inter-reef movement of <i>Plectropomus leopardus</i> from research returns. ....	37
17.	Pattern of inter-reef movement of <i>Plectropomus leopardus</i> from public returns.....	37
18.	Number and percentage of <i>Plectropomus leopardus</i> which moved from their reef of release for research and public returns by reef .....	37
19.	Percentage of inter-reef movements of <i>Plectropomus leopardus</i> from public returns to the 1st, 2nd and 3rd closest reef from reef of release .....	37
20.	Pattern of inter-reef movement of <i>Plectropomus leopardus</i> from returns from public source.....	38
21.	Response profiles from 5x4 contingency table analysis of frequency of inter-block movement of <i>Plectropomus leopardus</i> from research returns .....	39