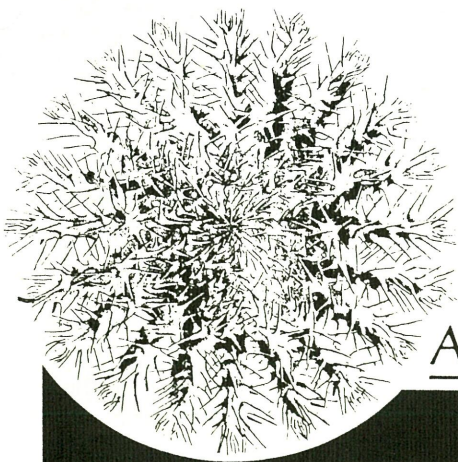


Proposed Allocation of COTSAC Funds
to Ecological Projects in 1988/89

Edited by P. Moran, Study Leader & C. Hughes, Administrator



Australian Institute of Marine Science
The Crown-of-thorns Study

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INTRODUCTION

The aim of this document is to provide a general overview of the budget of the Crown-of-thorns Study for the 1988/89 fiscal year. In particular, the following areas will be discussed:

1. Progress of projects and their likely duration.
2. Allocations to internal and external projects.
3. New projects.

As the overall research program (incorporating both management-related and ecological projects) is due to finish in 1988/89 (as recommended by COTSAC), this document also serves to provide a summary of the funds (and other support) which have been given to ecological projects since the end of 1985. This is to be found in Appendices 1-3. More detailed information on project budgets and progress of research is given in a recently published series of documents (see References).

PROGRESS OF RESEARCH

As this report is meant to summarise the administrative aspects of the Crown-of-thorns Study a detailed account of the progress of ecological projects is not given here. This information can be found in a recent publication (Moran & Hughes, 1988) which describes the progress of research up until the end of February 1988. Whilst further advancements have been made in many projects since then, the report serves to highlight the main achievements which have been gained in each project over the last year. It should be noted however, that most projects are now at a stage where field and laboratory work have been completed and the data are being analysed.

Recently, work has commenced on developing a database management system which will enable the results from previous AIMS surveys (involving both manta tows and line transects) to be made available "on-line" to managers and other scientists. This is being carried out as part of project 4(f)(Analyses and models of existing data). As the database now comprises a substantial number of records (approximately 500,000) this is a complex process requiring several months of work. It will involve the following tasks: standardisation of data tables, creation of appropriate database structures, and development of software utilities so that the data can be readily accessed via a computer terminal (in a similar fashion to the AIMS weather data). A graphics laser printer will be purchased this year so that hard copy printouts of the data (i.e. reef outlines, tow paths, graphical summaries) can be readily obtained (see Allocations to AIMS projects).

The ultimate aim of this exercise is to produce an on-line facility which can be accessed by non-specialists. A users guide to the database is being prepared which describes the data (i.e. how, when and where they were collected), the structure of the database and how the data can be accessed. This will be published during the latter half of 1988 as part of the Crown-of-thorns Study Report Series. The completion of this work will represent a substantial contribution to the research and management of the Acanthaster phenomenon. It also will greatly enhance the rate at which data are produced from the large scale survey program which is currently underway (project 3(a)).

To date, an impressive list of publications have emanated from the Study (both internal and external projects). They include:

- Approximately 18 publications in refereed scientific journals.
- The publication of a monograph on the Acanthaster phenomenon (this includes a scientific review, annotated bibliography and subject index).
- Crown-of-thorns Study Reports (8 volumes)(see References)
- Crown-of-thorns Study Technical Reports (3 volumes) (see References).

A much greater number of scientific publications are expected to be produced from the Study over the next few years as further projects are completed. As this new information accumulates it is essential that a synthesis is initiated which takes the results from different disciplines and melds them into a broad framework of understanding. For example, the results from juvenile recruitment studies (e.g. project 6(e)), broadscale surveys of adult populations (e.g. projects 3(a)(b)) and larval studies (e.g. projects 1(c)(d)(e)) should be considered in relation to those from hydrodynamic studies (e.g. projects 4(c)(d), 6(c)(j)).

At this stage such an approach is only being carried out at a superficial level (i.e. generally between similar projects). The wide distances separating researchers and the lack of funds to conduct regular workshops has prevented the development of a major synthesis. With the completion of many projects at the end of the year it is necessary that this be instigated. To this end, a workshop is being organised by Dr Roger Bradbury (AIMS) which seeks to review current models of the Acanthaster phenomenon and to begin to integrate our present understanding into a form which can be used by managers. This workshop is being hosted by AIMS (from 5-7 August 1988) and is partly supported by funds from the Study. It is to be hoped that this workshop is the first in a series of such endeavours which seek to bring together the many important results attained from the Study. If this does not happen then the Study will not have realised its full potential.

DURATION OF PROJECTS

The COTSAC recommended that a four year program of research be conducted on the crown-of-thorns starfish. Consequently, the 1988/89 period is thought to represent the fourth and final year of research in the present Study. Accordingly, plans have been made to wind down most ecological projects in this period (see Overview of funding for 1988/89).

A total of 10 projects have been completed (projects 1(c)(d)(e)(h)(i), 2(c), 4(a)(c), 6(b)(f)) in the Study to date. Whilst all research objectives were achieved some projects were finalised prematurely due to the relocation of senior scientists in the Study. Recently, Dr R. Olson obtained a permanent position (University of New Hampshire, USA) which has caused him to discontinue his important work on the larvae of the crown-of-thorns starfish (projects 1(c)(d)(e)). In addition, Dr J. Stoddart has taken up a position at the Bureau of Rural Resources (Canberra) which necessitated the completion of one of his research projects (project 2(c)). The availability of suitably qualified senior scientists will continue to have a major bearing on the type of research which is carried out on the crown-of-thorns starfish.

Most of the remaining projects will be completed in the forthcoming year. Some may continue with the support of other funding agencies during next year (e.g. Australian Research Council). Also, it is likely that several internal projects will continue as part of core research programs at AIMS (as was the case before the Study commenced). It is to be hoped that further funds for crown-of-thorns research become available in the following year which will allow scientists to complete the important and complex task which has been so successfully initiated within the present Study.

BALANCE OF FUNDS 1987/88

A financial statement for the budget of the Crown-of-thorns Study, for the year ending 30 June 1988, is given in Table 1. It will be noted that \$28,736 were unspent at the end of this period. Most savings were made in the area of Salaries and Allowances (Table 1) due to cutbacks in staff (see Moran and Hughes, 1988) and slower than anticipated rises in wages. This also reduced the total amount of funds (by almost \$4,800) paid as on-costs to the Institute (15% of salaries). It will be noted that overspending occurred in the areas of Travel, Vehicles and Ship Charter.

The balance of funds at the end of the 1987/88 fiscal year was about \$7,000 greater than that predicted in a recent administrative report (Moran and Hughes, 1988). Most of this amount has been committed (see Table 4). With the suspension of project 6(i) (see Moran and Hughes, 1988) approximately \$9,000 have been carried forward into the new fiscal year. The overall total of \$37,736 will be used to pay outstanding commitments as well as the costs associated with the modelling workshop, the publication of several new technical reports and the employment of part-time staff to assist with the development of the on-line database. A further amount (tentatively estimated at \$3,000) has been set aside (subject to the approval of COTSARC) for research on Green Island by James Cook University (see Table 2).

Table 1. Financial statement for fiscal year ending 30 June 1988. Brackets indicate funds overspent.

	TOTAL ALLOCATION	BALANCE JUNE 30
SALARIES & ALLOWANCES	307,400	35,654.27
TRAVELLING & SUBSISTENCE	13,670	(9,161.20)
STORES	15,787	2,383.40
FREIGHT & CARTAGE	1,000	389.18
OPERATION COSTS - VEHICLES	15,000	(2,644.89)
CHARTER OF SHIPS	24,500	(2,208.92)
COMPUTER OPERATIONS	-	(1,709.36)
INCIDENTALS	13,505	1,289.70
PUBLICATIONS	500	(33.00)
COLLABORATIONS/ON-COSTS	211,791	4,777.65
SUBTOTAL	603,153	28,736.86
Return of unspent funds	-	9,000.00
TOTAL (as at 30 June 1988)	-	37,736.86

OVERVIEW OF FUNDING FOR 1988/89

It is anticipated that \$356,000 will be allocated for ecological research on the crown-of-thorns starfish in the 1988/89 period. This amount is insufficient to enable all projects to continue until the end of the fiscal year. In order that projects are given adequate time in which to finish it is planned that funds for the majority of projects will cease at the end of December 1988. Because of the limited time remaining and the fact that the AIMS program involves the employment of approximately 10 staff, the allocations to projects have had to be made before COTSARC is due to meet. The funds requested by AIMS are sufficient only to employ staff (with the exception of the survey team) until the end of the year. The allocations for the 1988/89 period are given in Table 2.

Table 2. Allocation of funds to ecological projects for the 1988/89 fiscal year. N.B. Most projects will finish on the 31 December 1988, * subject to approval by COTSARC.

Chief Investigator	Institution	Allocation (\$)
Lucas <u>et al.</u>	James Cook University	10500
James <u>et al.</u>	James Cook University	11000
Choat*	James Cook University	3000
Doherty	Griffith University	6000
Hanna <u>et al.</u>	Deakin University	10500
Fisk	Reef Research and Information Services	8000
Program	AIMS	307000
TOTAL		356000

ALLOCATIONS TO EXTERNAL PROJECTS

Because severe funding cuts were imposed on almost all external projects during the 1988 calendar year it is planned to allocate additional funds to these projects to enable them to continue until at least the end of the year (see Table 3). These allocations were approved recently by the Chairman, Professor John Swan, on behalf of the COTSARC. The decisions were made before COTSARC is due to meet because several of the projects have very few funds remaining. It is planned to disseminate the funds to all the external projects as soon as AIMS receives its overall allocation. It will be noted that in most instances this will bring the total amount of funds given to each project for 1988 close to that originally requested.

Table 3. Proposed additional funding for external projects: June-December 1988.

Chief Investigator	1988 Requested	1988 Allocated	Additional funds	Total 1988
Lucas <u>et al.</u>	25764	13000	10500	23500
James <u>et al.</u>	5183	5183	-	5183
James <u>et al.</u>	28905	15000	11000	26000
Endean/Cameron	61863	22000	-	22000
Doherty	46403	38000	6000	44000
Hanna <u>et al.</u>	29959	16000	10500	26500
Fisk	25450	17000	8000	25000

ALLOCATIONS TO AIMS PROJECTS

A total of \$307,000 has been allocated to support internal projects for the 1988/89 period (see Tables 4,5 & 6). This includes the sum of \$24,740 which is designated for two new projects (projects 1(k)(l)). These funds will be allocated subject to favourable external reviews and the approval of COTSARC. Should approval not be given then the funds will need to be reallocated by COTSARC.

Whilst funds for the majority of internal projects will cease on 31 December 1988 several projects will continue to receive them until the end of the fiscal year. They are: projects 1(g)(j)(l) and 3(a)(c)(d). Projects 1(g)(j) involve Ph.D student projects which are due for completion in the middle of next year. In addition, projects 3(c)(d), which are investigating the biases associated with line transect and manta tow techniques, are likely to continue for a similar length of time. These projects have been underway for only a few months and have been initiated as a result of the recommendations of a joint working group formulated to review current monitoring methods (see Moran and Hughes, 1988). All four projects mentioned above involve a relatively small amount of funds.

A substantial allocation (see Tables 5 & 6) has been made to project 3(a) so that it can continue until at least 30 June 1989. This project is of vital importance to our understanding of the *Acanthaster* phenomenon because it is producing fundamental baseline data on the distribution and abundance of crown-of-thorns starfish on the Great Barrier Reef. It is essential that this project continue in the future, preferably over at least a 10 year period. This will allow the development of a sound database of knowledge upon which scientists and managers can make calculations and assessments of the *Acanthaster* phenomenon. This cannot be done when there are a large number of gaps (missing values) in the database.

As the funds for most internal projects are due to cease within the next 6 months a high proportion (about 70%) has been allocated to meet the cost of salaries (including termination payments and superannuation)(see Table 4). Other major items include: stores, publications, Ph.D stipends, on-costs and workshops. It will be noted that AIMS is supporting almost all the shiptime for projects (including project 3(a)). A list of the support given by AIMS to the Study over the last 3 years is given in Appendix 3.

Table 5 lists the funds which have been allocated to individual projects for the 1988/89 period. These figures have been further subdivided within each project budget in Table 6. It will be noted from these figures that approximately 40% of the funds have been allocated to project 3(a). In addition 21% of the funds have been divided amongst a further 4 projects (projects 1(a)(f)(J), 4(f). Most of the remaining funds have been allocated for administration of the Study (see Table 6).

Table 4. Breakdown of 1988/89 budget for AIMS projects by major headings of expenditure. N.B. includes funds for new projects: \$37,736 carried forward into 1988/89.

	ESTIMATE	SUM COMMIT.	TOTAL ALLOCATION
SALARIES & ALLOWANCES	241,935		241,935
TRAVELLING & SUBSISTENCE			
Field Travel	5,560	160	5,720
Domestic Travel	2,700	1,617	4,317
A/Fare Entitlement	3,000	454	3,454
Conferences	300		300
STORES	18,940	155	19,095
FREIGHT & CARTAGE	2,500		2,500
OPERATION COSTS - VEHICLES			
Petrol for vehicles	3,500		3,500
Hire of rent-a-cars	400		400
CHARTER OF SHIPS	3,500		3,500
INCIDENTALS			
Dive Ops & Medicals	400		400
Fringe Benefit Tax	1,500		1,500
University Fees	600		600
Scientific Services	1,500		1,500
Misc - Manuals		196	196
PUBLICATIONS	6,000	5,071	11,071
COMPUTER SERVICES		68	68
NON-CONSUMABLE EQUIPMENT			
Scientific	2,000		2,000
Computer	5,000		5,000
COLLABORATIONS			
Fares & Travel Costs	600		600
Accommodation	200		200
Workshop	5,000		5,000
Salaries & On Costs - external	10,000		10,000
ON-COSTS - AIMS	21,880		21,880
TOTAL	337,015	7,721	344,736

Table 5. Funds allocated to AIMS projects for 1988/89: * funding subject to approval by COTSARC.

PROJECT NO.	SUM COMMITTED	EXPENDITURE 1988/89	TOTAL ALLOCATED 1988/89	
1A 221051	155	24,200	24,355	
1B 221052		---	---	
1C 221053		1,000	1,000	
1D 221054		---	---	
1E 221055		---	---	
1F 221056		21,700	21,700	
1G 221057	48	1,600	1,648	
1H 221058		---	---	
1I 221059		---	---	
1J 221060		11,000	11,000	
1K* 221077		7,000	7,000	
1L* 221083		17,740	17,740	84,443
2A 221061		---	---	
2B 221062		1,000	1,000	
2C 221063		---	---	
2D 221064		---	---	
2E 221065		700	700	1,700
3A 221068	16	137,570	137,586	
3B 221069		---	---	
3C 221066	16	300	316	
3D 221067	80	300	380	138,282
4A 221070		---	---	
4B 221071		---	---	
4C 221076		---	---	
4D 221072		1,332	1,332	
4E 221073	264	600	864	
4F 221074		15,600	15,600	
4G 221075		2,500	2,500	20,296
5A 221080	7,142	92,873	100,015	100,015
TOTAL	7,721	337,015	344,736	

Table 6. Allocation of funds within AIMS projects for 1988/89. Date in brackets indicates duration of COTSAC funding for project: * funding subject to approval of COTSARC.

	ESTIMATE	SUM COMMIT.	TOTAL ALLOCATION
PROJECT 1A - 221051 (12/88)			
Salaries & Allowances*	19,200		19,200
Stores (Chemicals)	2,500	155	2,655
Freight & Cartage			
Field Trips	2,500		2,500
	<hr/>		
* J. Benzie (6 mths)	24,200	155	24,355
PROJECT 1C - 221053 (12/88)			
Stores	200		200
Incidentals			
Scientific Services	800		800
	<hr/>		
	1,000		1,000
PROJECT 1F - 221056 (12/88)			
Salaries & Allowances*	20,200		20,200
Stores	1,500		1,500
	<hr/>		
* P. Dixon (1/2yr)	21,700		21,700
PROJECT 1G - 221057 (6/89)			
Travelling & Subsistence			
Field Travel	600	48	648
Stores	1,000		1,000
	<hr/>		
	1,600	48	1,648
PROJECT 1J - 221060 (6/89)			
Stores	1,000		1,000
Collaborations			
Salaries & On-costs	10,000	[B]	10,000
	<hr/>		
	11,000		11,000

Table 6 cont'd.

	ESTIMATE	SUM COMMIT.	TOTAL ALLOCATION
PROJECT 1K - 221077* (12/88)			
Travelling & Subsistence			
Field Travel	1,440		1,440
Stores	3,560		3,560
Non-Consumable Equipment			
Scientific	2,000		2,000
	7,000		7,000
PROJECT 1L - 221083* (6/89)			
Salaries & Allowances	14,920		14,920
Travelling & Subsistence			
Field Travel	240		240
Stores	1,880		1,880
Incidentals			
Scientific Services	700		700
	17,740		17,740
PROJECT 2B - 221062 (12/88)			
Travelling & Subsistence			
Domestic Travel	600		600
Stores	400		400
	1,000		1,000
PROJECT 2E - 221065 (12/88)			
Travelling & Subsistence			
Field Travel	200		200
Stores	500		500
	700		700
PROJECT 3A - 221068 (6/89)			
Salaries & Allowances*	128,790		128,790
Travelling & Subsistence			
Field Travel	2,880	16	2,896
Stores	2,000		2,000
Ship Charter	3,500		3,500
Vehicle Operations			
Hire of rent-a-cars	400		400
*1 yrs salary - 4 people	137,570	16	137,586

Table 6 cont'd.

	ESTIMATE	SUM COMMIT.	TOTAL ALLOCATION
PROJECT 3C - 221066 (6/89)			
Travelling & Subsistence			
Field Travel	100	16	116
Stores	200		200
	300	16	316
PROJECT 3D - 221067 (6/89)			
Travelling & Subsistence			
Field Travel	100	80	180
Stores	200		200
	300	80	380
PROJECT 4D - 221072 (12/88)			
Salaries & Allowances*	1,332		1,332
* M. Jeffrey - rec leave & leave load.	1,332		1,332
PROJECT 4E - 221073 (12/88)			
Computer Services		68	68
Incidentals			
Misc - Manuals		196	196
Collaborations			
Fares & Travel Costs	600		600
	600	264	864
PROJECT 4F - 221074 (12/88)			
Salaries & Allowances*	14,500		14,500
Travelling & Subsistence			
Domestic Travel	600		600
Stores	500		500
* 1/2yr salary	15,600		15,600
PROJECT 4G - 221075 (12/88)			
Stores	2,500		2,500
	2,500		2,500

Table 6 cont'd.

	ESTIMATE	SUM COMMIT.	TOTAL ALLOCATION
PROJECT 5A - 221080 (12/88)			
Salaries & Allowances*	42,993		42,993
Travelling & Subsistence			
Domestic Travel	1,500	1,617	3,117
A.Fare Entitlement	3,000	454	3,454
Conferences	300		300
Stores	1,000		1,000
Operational Vehicle Costs	3,500		3,500
Incidentals			
Diving Ops & Medicals	400		400
Fringe Benefit Tax	1,500		1,500
University Fees	600		600
Collaborations			
Accommodation	200		200
Workshop	5,000		5,000
On-Costs - AIMS +	21,880		21,880
Publications (graphics)	6,000	5,071	11,071
Non-consumable equipment			
Computer	5,000		5,000
* C.Hughes (1/2yr \$14,550)	92,873	7,142	100,015
Inflation (8%)			
Super (\$3,000)			
Dive Pay (\$2,000)			
	337,015	7,721	344,736

+ Based on salaries of \$145,870
excludes - dive pay
- superannuation
- 6 mths salary (1989) for field team

NEW PROJECTS

Two new projects have been initiated during the last few months. A detailed account of these projects, including research objectives, experimental design and budget, is given in Moran and Hughes (1988). Both are concerned with investigating particular aspects of the methodologies currently used to monitor crown-of-thorns starfish populations and other benthic communities. Each is being conducted as part of a student program with supervision by members of the Department of Marine Biology, James Cook University. The projects also involve the collaboration of several AIMS personnel and the logistic support of AIMS (including shiptime). They were initiated as a result of the recommendations of an expert working group which was established (at the request of COTSARC) to discuss the methods used for monitoring coral reef populations. Considerable field work has already been undertaken in both projects and it is anticipated that reports of this research will be available in the near future.

A further two internal projects have been proposed for the coming fiscal year. One seeks to obtain broad data on the spawning and fertilization success of *Acanthaster* using both field and laboratory experiments. The other will attempt to investigate the mechanisms involved in the settlement of *Acanthaster* larvae. This involves studying the relationship between larval settlement and the bacteria produced from coralline algae. The research proposals for both projects have been sent out for external review. Funding for these projects will be determined by COTSARC. The latter project is being extensively supported by AIMS (see Appendix 3).

REFERENCES

The following publications form part of the Crown-of-thorns Study Report Series. They document the administration and research progress since the Study commenced in December 1985. These documents were published recently using COTSAC funds and are available from AIMS.

DeVantier, L.M. & G.J. Andrews. 1987. Report on surveys of the distribution, abundance and impact of *Acanthaster planci* on the fringing reefs of Lord Howe Island and the Solitary Islands, March to April 1987. Townsville: Australian Institute of Marine Science (The Crown-of-thorns study) 13p.

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Moran, P. & C. Ridgwell. 1987. Progress report on research 1985/86. Townsville: Australian Institute of Marine Science (Crown-of-thorns study report 5) 25p.

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Moran, P. 1987. Priorities for ecological research in 1987/88: recommendations to Technical Subcommittee (COTSARC). Townsville: Australian Institute of Marine Science (Crown-of-thorns study report 8) 24p.

Moran, P. & C. Hughes (eds.). 1988. Status report 1987/88. Townsville: Australian Institute of Marine Science (Crown-of-thorns study report 9) 68p.

APPENDIX I

List of the funds allocated to ecological projects since 1985: * project funded by GBRMPA after first year: ** additional \$2795 allocated from AIMS funds: *** project suspended and approximately \$9600 returned to AIMS (1988).

Chief Investigator	1985/86 \$	1986/87 \$\$	1987/88 \$	1988/89
Hopley*	2000	-	-	-
Lucas <u>et al.</u>	19352	16000	13000	10500
Hartwick	5000	-	-	-
James <u>et al.</u>	32697	24360	5183	-
James <u>et al.</u>	-	-	15000	11000
Endean/Cameron	22000	15500**	22000	-
Doherty	49797	44000	38000	6000
Parslow/Gabrie	4000	-	-	-
Hanna <u>et al.</u>	16078	-	16000	10500
Fisk (Harriott)	12000	17000	17000	8000
Choat	-	10000***	-	3000
AIMS program	395076	378140	427277	307000
TOTAL	558000	505000	553460	356000

APPENDIX 2

List of funds allocated to AIMS projects since 1985. N.B. the totals for 1986/87 and 1987/88 are higher than the amounts received (see Appendix 1) due to the carry forward of funds: * projects not started due to insufficient funds: ** carry forward of \$134595 into 1986/87: *** carry forward of \$49693 into 1987/88

Project No.	1985/86 \$	1986/87 \$	1987/88 \$
1(a)	16356	39211	39585
(b)	1300	146	-
(c)	35238	68344	67030
(d)	-	1400	500
(e)	5000	500	500
(f)	20500	22265	1000
(g)	11000	22611	18652
(h)	4250	1242	800
(i)	-	100	-
(j)	17500	11659	11000
2(a)	4706	14450	12000
(b)	2200	1000	1000
(c)	4500	1941	300
(d)	-	-	-
(e)	793	2005	900
(f)	5404*		
(g)	13394*		
3(a)	34172	97770	121400
(b)	-	1360	400
4(a)	14844	-	-
(b)	500	3910	28320
(c)	6000	4000	7500
(d)	11144	29881	26300
(e)	500	1500	1438
(f)	13394	52494	15000
(g)	10540	3600	500
5(a)	161841	121046	110050
7(a)	-	10300	-
TOTAL	395076	512735**	464175***

APPENDIX 3

List of the notional support given to the Crown-of-thorns Study by AIMS since 1985: + new project; commencement subject to COTSARC approval: * project ends 31 December 1988: ** project continues to 30 June 1989: all other projects completed 30 June 1988.

Project No.	1985/86 \$	1986/87 \$	1987/88 \$	1988/89 \$
1(a)	1586	3920	2220	-*
(b)	714	2120	2220	-
(c)	26000	-	-	-*
(d)	-	-	-	-
(e)	-	-	-	-
(f)	-	-	-	-*
(g)	6534	5800	13740	12916**
(h)	5568	44700	30780	4080*
(i)	4267	4000	4380	-
(j)	72069	21705	69400	45300**
(k) ⁺	-	-	-	43200**
(l)	-	-	-	124864**
2(a)	5729	36900	16220	12320**
(b)	7695	30050	39500	32500**
(c)	4856	7300	24300	-
(d)	6545	14100	24200	6200**
(e)	42970	69700	61150	61150**
3(a)	8323	9000	49920	70200**
(b)	5568	19500	14100	7980*
(c)				14240**
(d)				9900**
4(a)	1534	940	1000	-
(b)	5767	21800	3300	3300*
(c)	-	-	-	-
(d)	13450	143400	102500	34250*
(e)	1534	6900	24300	13800**
(f)	36854	52100	47040	26040**
(g)	1534	3200	4080	4080*
TOTAL	259097	497135	534350	526320

COT:COTSAC RECOMM

**PROPOSED ALLOCATION OF COTSAC FUNDS
TO ECOLOGICAL PROJECTS IN 1988/89:**

P. Moran, Study Leader & C. Hughes, Administrator

