

Management of the *Western Shield* program: *Western Shield* review—February 2003

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INTRODUCTION

This paper has been prepared to give an overview of the management of the Western Shield Program in terms of budget and technical planning, coordination and resourcing. In so doing it provides a background to the development of the program, the current management arrangements and some thoughts for the future on possible variations to the current management model. The thoughts for the future are based on experiences gained through the initial 6 years the program has been operating. They take into account the desirability of balancing the need for minimizing overhead costs, so as to maximise operational resources, while also providing sufficient management control to avoid waste of public and community resources.

INITIAL CONCEPT FOR WESTERN SHIELD

Targeted recovery of fauna

The initial proposal for the *Western Shield* Program (Burbidge *et al.* 1995) was essentially to take the experience gained from successful feral predator (fox) baiting projects and translate this into a broad scale baiting program that would recover a wide range of fauna species. A number of projects had been undertaken with fox baiting coinciding with population recovery of a range of native fauna species including black footed rock wallabies (*Petrogale lateralis lateralis*), numbats (*Myrmecobius fasciatus*) and woylies (*Bettongia penicillata*).

A particular focus of the proposal was the Critical Weight Range mammals (35 g to 5.5 kg; Burbidge and McKenzie, 1989) that had been significantly reduced in range and abundance in a pattern believed to be caused by fox predation. The broad scale of the program would allow economies of scale to maximise benefit/cost ratios. The program would include re-establishment of species that were locally extinct, where fox predation was considered to be the major cause of target species

population decline. This re-establishment would be achieved primarily through translocations.

Another key feature of the initial plan for *Western Shield* was its expansion to incorporate broad scale operational feral cat control once a proven technique that elicited population recovery in native fauna had been proven.

The essential elements of the initial *Western Shield* proposal were to recognize that the Department of Conservation and Land Management was in a unique position to conduct a broad scale fauna recovery program in the south-west and west of the State due to the following four key features of Western Australia.

- The very significant and largely contiguous system of State forests managed for conservation and other conservation reserves.
- The ready availability of a poison bait that was:
 - guaranteed for supply through the State's Agriculture Protection Board;
 - equivalent to a naturally occurring toxin that did not pose a threat to native fauna; and,
 - proven to be effective in fox control in a range of habitats such that Critical Weight Range mammals exhibited rapid population recovery in baited areas.
- The availability of source native mammal populations for restocking of areas depleted of natural biodiversity.
- A community that would not only tolerate, but embrace and support such a broadscale wildlife recovery project.

The 1995 proposal (Burbidge *et al.* 1995) had the following vision.

The fauna of south-western Australia has been severely fragmented. At the community level, many ecological communities have been virtually destroyed. At the species level some animals are extinct, some have been lost from the region and many others are endangered, surviving only as relict populations. The CWR mammals have been most affected. Almost all of this has happened during this century. However in the last decade CALM has turned the tide. We have been successfully recovering the endangered species. Now we have the ability and the will to reconstruct the fauna (excepting the species that are totally extinct).

In doing so we will be rescuing our heritage, re-starting the ecological processes that were driven by the 'lost' fauna, and setting Western Australia at the forefront of fauna conservation on a global scale.

Ecological knowledge of threatened species has increased enormously as a result of the many scientific projects that have taken place in recent years. Scientific research into the causes of the extinctions and operational fox control are now both sufficiently advanced for a major coordinated program of fox control and animal re-introductions to commence. Such a program will lead to the reconstruction, as far as is possible, of much of the original fauna of the south west of Western Australia, and ultimately, the rest of the State. For the first time in many decades, people will again be able to see almost extinct mammals, such as the Western Barred Bandicoot and Boodie, without having to travel to remote, fragile island nature reserves. Other threatened species, such as Western Ringtail Possums and Malleefowl should also increase in abundance.

Western Shield will lead to a major improvement in the conservation status of many animal species. It will dovetail with many other Western Australian nature conservation and economic initiatives - initiatives such as Landcare (embracing better management of remnant vegetation), and ecotourism and environmental education, including the Hills Forest and Landscape Expeditions. Spotlighting expeditions to view the south-west's native mammals can become a major tourist attraction, adding a further draw card for visitors to the State. Additional fox control will benefit farmers on adjoining agricultural lands through increased lamb survival and more effective and cheaper fox control will be possible on a regional scale.

In the largely agricultural south west of the State, where the great majority of the land is privately owned, the success of virtually all conservation programs, including the control of feral predators and the maintenance of remnant vegetation, will depend upon the support and involvement of landholders. Coordinated community programs to control feral predators have the potential to eliminate, or greatly reduce, target species, and so result in larger, more visible populations of threatened species over entire regional areas. These results provide great benefits both for nature conservation and for the landholders themselves.

The proposal (Burbidge *et al.* 1995) also listed the following principles to be followed in developing and implementing *Western Shield*:

1. Additional fox control projects will be based on a system of Fauna Reconstruction Sites (FRS) and

Species Recovery Sites (SRS) (CALM Policy Statement No 29) designed to provide protection for existing threatened mammals and to allow the re-introduction of species that are locally extinct. Fauna reconstruction sites are not only an effective means of achieving nature conservation; they are also the most cost-effective means of doing so. Costs for baiting, fire management and measuring species density will be minimised when many species are being managed in the one area.

2. Current fox control projects will be reviewed and those that are clearly beneficial to threatened species will be provided security of funding.
3. The involvement of local communities in fox control, and in reconstructing the fauna, will be promoted and facilitated, with the aim of eventual joint community / CALM ownership of *Western Shield*.
4. With some special exceptions, widespread fox control will be limited to areas of the south-west with an annual mean rainfall greater than 350 mm, where cats are not expected to present a significant problem. The 350 mm rainfall isohyet is set as a guide only; areas outside it may be considered for fox control if their vegetation is of a type in which cats are judged likely to have little effect on native prey species, and areas within it may not be suitable for species recovery.
5. Translocations will take place only after the approval of Recovery Plans or Interim Recovery Plans for the threatened species involved, and the approval and funding of Translocation Proposals, as laid down in CALM Policy Statement No. 29.

The proposal (Burbidge *et al.* 1995) also identified the following aims for fox control under *Western Shield*

1. To conserve those elements of the Western Australia fauna that are declining because of fox predation.
2. To reduce fox density on conservation lands and private property in Western Australia to a level that will allow the reconstruction of fauna that has become locally extinct because of fox predation.
3. To involve rural communities in fox control and in achieving the first two aims.

Recognising the need for government accountability and for measures of success or failure of the investment of considerable public funds, the initial proposal incorporated a fauna recovery monitoring program to involve:

1. Routine trapping and animal recording procedures carried out by CALM District operations staff as part of their normal work load.
2. Special monitoring undertaken by CALM scientific staff as part of the implementation of Recovery Plans, particularly where monitoring requires special techniques (e.g. the numbat).

The ambitious initial monitoring plan involved up to 40 fauna reconstruction and species recovery sites being incorporated in ongoing monitoring operations through the first 5-year phase of the program. These sites would

be areas where management priority is given to the reconstruction of a nominated suite of native fauna species, and in species recovery sites to nominated threatened fauna species.

As stated in the 1995 proposal:

Species Recovery Sites will complement the system of Fauna Reconstruction Sites, allowing particular mammal species to be conserved in areas that are either too small or have an insufficient range of habitats for the reconstruction of the original fauna, or where the special needs of Critically Endangered species take priority. Community involvement and ownership will be facilitated.

The initial proposal was very much focused on recovery of species that were already *in situ*, given that many species were still extant, but at very much reduced population densities. Where stocks were not available for recovery in local areas, priority would be given to natural recolonisation where possible, along with wild-to-wild translocation style reintroductions, where local populations did not exist.

The *Project Eden* proposal for reconstruction of the terrestrial fauna of Shark Bay had a focus of translocation of a range of mammal species found on nearby Bernier and Dorre islands, but extinct on the mainland including boodies (*Bettongia lesueur*), banded hare-wallabies (*Lagostrophus fasciatus fasciatus*) and western barred bandicoots (*Perameles bougainville bougainville*). There was a clear potential for these species to also be translocated to former habitat areas elsewhere in the State under the *Western Shield* program and indeed this was proposed in the initial list of Species Recovery Sites/Fauna Reconstruction Sites.

Initial resourcing and management

The initial resourcing concept for *Western Shield* was for the bulk of resources to be expended ‘on the ground’ and so minimal new resources were to be put into administration or staff positions. Instead the program was to incorporate a range of existing operations and staff resources, with a re-focus and re-direction under the overall umbrella of *Western Shield*. The existing operation in the northern Jarrah forest *Operation Foxglove* was to be totally incorporated into *Western Shield* along with the baiting operations for *Project Eden* (reconstruction of the mammal fauna of Peron Peninsula in Shark Bay) and Montebello Renewal (reconstructing the fauna of the Montebello Islands).

The key new position proposed was the fauna ‘monitoring coordinator’ to coordinate monitoring activities undertaken by regional staff in ‘fauna reconstruction sites’ and ‘species recovery sites’.

The initial proposal also included the incorporation of feral cat control research as an ongoing CALM Science Division commitment and component of *Western Shield*, with expansion of this research as resources became available.

The initial management concept for *Western Shield* was as follows:

- Management coordination, including budget accountability by the Director of Nature Conservation with all coordinating positions in Nature Conservation Division.
- Fox baiting to be managed by Environmental Protection Branch, responsible to the Director of Nature Conservation.
- Monitoring and translocations to be coordinated by the new Monitoring Coordinator within Nature Conservation Division, responsible to the Director of Nature Conservation.
- Monitoring of population responses to baiting through Regional Services staff.
- Specialist monitoring by Science Division staff.
- Community baiting facilitation to be coordinated by the possible establishment of a new community fox control coordinator within Nature Conservation Division, responsible to the Director of Nature Conservation.
- Program implementation monitoring through a proposed Western Shield Steering Committee.

The initial budget proposal was as listed in table 1.

TABLE 1
Initial proposed budget.

EXPENDITURE ITEM	COST
Baiting costs	\$886,960
Monitoring/success criteria costs	\$93,950
Cat research (Algar; ANCA FPP money not renewed)	\$120,000
Community Fox Control Coordinator	\$63,500
TOTAL	\$1,164,410

THE APPROVED WESTERN SHIELD PROGRAM—1996

Overview

Western Shield was, from the outset, a grand plan developed under the personal guidance of the then Executive Director of the Department, Dr Syd Shea. The approved *Western Shield* program commenced in 1996. It was determined by the department’s Corporate Executive that the program would essentially be as proposed by Burbidge *et al.* 1995, with the only full new position being that of the Western Shield Zoologist’ (monitoring planning and coordination). Funding for the program was provided in the form of \$1,150,000 from the Department’s budget, with an additional \$120,000 from the ALCOA funds provided under the CALM ALCOA Forest Enhancement (CAFE) agreement relating

to bauxite mining in the northern jarrah forest. This gave an initial budget package of \$1,270,000.

It was determined that the component funding of the above for feral cat control research would total \$418,000 over the first three years of the program. It was further decided that liaison with community groups undertaking fox control programs would be facilitated at the regional level and through overall baiting planning and management undertaken by Environmental Protection Branch, as well as direct cooperation with the Agriculture Protection Board.

Overall management control of the program was the responsibility of the Director of Nature Conservation, with the Western Shield Steering Committee facilitated by the Manager of Wildlife Branch and the Senior Environmental Officer (Western Shield Manager) in Environmental Protection Branch.

The reporting arrangements for 1996 in Western Shield Management are presented in Figure 1.

Key reporting relationships and duties were as follows.

- Overall Program Direction, Coordination and Management
 - Director of Nature Conservation
- Program Implementation Monitoring, Standards and Procedure Specifications
 - Western Shield Steering Committee
- Program Implementation
 - Western Shield Manager, Operations Officer, Zoologist, Science Researchers and Field staff.

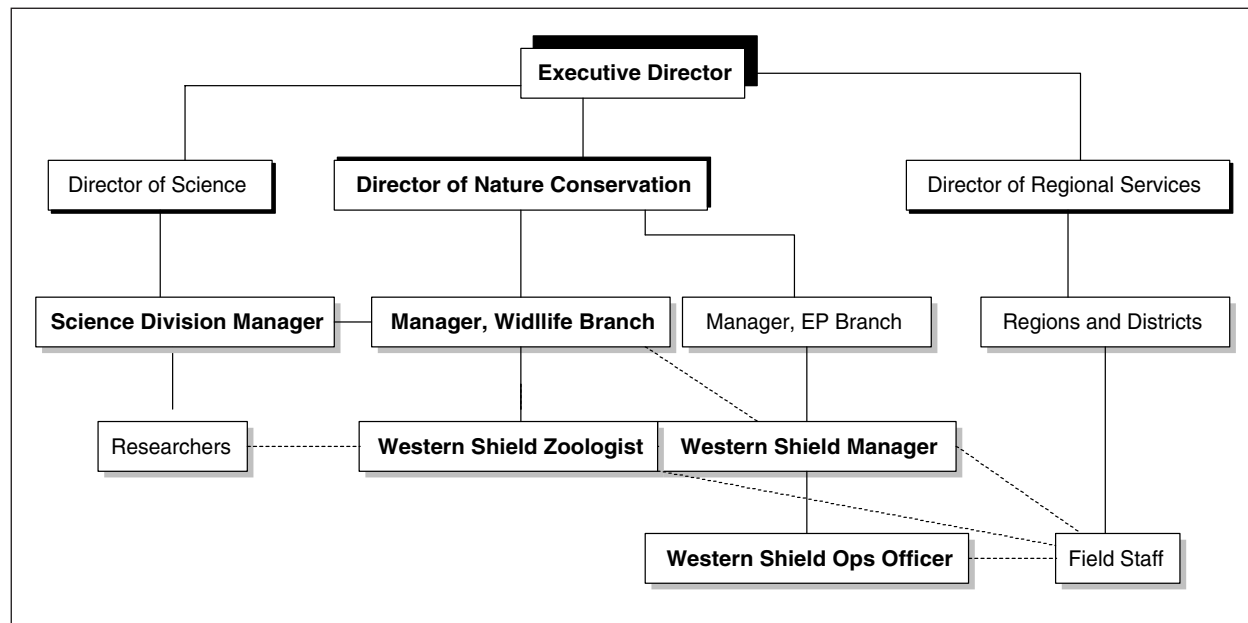
The initial Western Shield Steering Committee involved the following personnel:

- Director of Nature Conservation (or proxy, Manager, Wildlife Branch), overall program management.
- Manager, Fauna Conservation Research (Science Division), Science Division’s aspects of monitoring and translocation programs and standards.
- Senior Environmental Officer (Environmental Protection Branch), Western Shield Manager, Western Shield baiting and regional services coordination.
- Corporate Relations Officer, public notices, publications and publicity.
- Regional Services (operations) Representative.
- Other specialist staff as required for translocation planning etc.

A south-west operations management committee was also established. This committee involved regional and district staff engaged in planning field operations, with a particular focus on baiting. A key feature of the program has been the provision of some central *Western Shield* program funds to assist with such operations (c. \$150,000 p.a.). Coordination at this level has been consistently good throughout the entire operation of Western Shield.

The approved budget for 1996 is listed in Table 2. It is noteworthy that several existing positions were significantly changed with the advent of Western Shield. The most significant changes occurred in Environmental Protection Branch, where two staff took on the roles that became ‘Western Shield Program Manager’ and ‘Western Shield Operations Officer’ in addition to (and indeed in replacement for, their duties for feral animal control coordination and other related duties). These positional changes were not reflected in the Western Shield budget.

The budget also did not include significant resources for field site monitoring, the costs for which were borne by regions and districts through refocusing their nature conservation activities.



Note: key components in bold.

Figure 1. Initial Western Shield Program management structure.

TABLE 2

Western Shield initial approved budget and expenditure by operation categories; 1996–97 financial year.

OPERATIONS CATEGORY	BUDGET \$	ALLOCATION \$
Western Shield Source of Funds		
Departmental funds	1,150,000	
CAFE	120,000	
TOTAL	\$1,270,000	
Western Shield Operations		
Baits and bait production		440,150
Aircraft hire and fuel		242,500
Advertising and printing		61,500
Materials/services		151,950
Plant/vehicle		27,980
Staff training		3,000
Flying allowance		6,010
Travel allowance		9,630
Airfares		6,000
Radio		0
Overtime		0
TOTAL core baiting related activities		\$948,720
Other Operations		
Cat Research		158,000
Wildlife Zoologist & Monitoring		73,280
Monte Bello Renewal		64,000
Contingency		26,000
TOTAL	\$1,270,000	\$1,270,000

DEVELOPMENTS 1996–1999

Initial success

After the launch of the *Western Shield* Program, a review was completed on the populations and conservation status of the woylie. This review was completed in 1996 and concluded that the species was at that time no longer under significant threat. Soon after the completion of this review, the woylie was delisted from the State and national threatened species lists and also from the international IUCN Red Book list. It was officially ranked as Lower Risk, on the basis of demonstrated recovery (including re-established populations in South Australia) and ongoing fox control operations.

In 1998 the quenda and tammar wallaby were removed from the State's threatened species list on the basis of recovery under *Western Shield*.

The initial success set a benchmark for the program and has led to widespread expectation that not only will a range of fauna species be protected from further population declines, but that further species will also be removed from threatened species lists in the future. This has placed some pressure on the program to focus on selected species and to target areas where specific species can be recovered, which was a key part of the original plan.

A significant early initiative under the program was the development of the concept for a field-breeding centre at Dryandra Woodland. This was linked with the development of the Peron Captive Breeding Centre and

intensive breeding of numbats and chuditch at Perth Zoo in a plan to give the overall fauna recovery operations of the Department a full suite of animal source options. These were:

- on-site recovery, where the species persisted
- wild-to-wild translocation for species that were readily trappable in remote areas but unlikely to spread naturally to baited areas
- field breeding for species that could be kept in artificially high densities at the Dryandra Field Breeding Centre, with minimal intervention as a source for wild re-establishment
- intensive captive breeding at Peron and Perth Zoo for species which could tolerate such intervention and still have reasonable wild survival chances, or for which there was some urgency of recovery or significant difficulty in wild harvests or field breeding.

The expansion of breeding options provided a greater ability for the program to again target key threatened species and to also focus on species recovery.

Corporate Sponsorship

It was recognized by the department's Corporate Executive at the time of establishment of the Program that it would be attractive to corporate sponsorship and so from 1996 efforts were made to attract such sponsorship to fund additional operations or to meet cost pressure increases. These initiatives were coordinated by the Director of Nature Conservation and pursued by the Manager, Wildlife Branch, with assistance from the Manager, Environmental Protection Branch.

In addition to the CAFE/ALCOA funds, direct cash sponsorship was negotiated in the period 1996 to 1999 with Cable Sands Pty Ltd, and Westralian Sands (Iluka Resources) Pty Ltd. In addition non-cash/in kind assistance has been negotiated with a number of companies over the years of operation of the program

Corporate sponsorship provided for initiatives within specific areas that were related to the interests or area of operation of the sponsors. It also allowed for further central funds to be expended in research and development initiatives related to baiting, including the establishment of field and captive breeding populations.

Budget review 1998

The initial budget was very significant for a wildlife recovery operation and in planning the ongoing expenditure it was hoped that advances with feral cat control would be achieved within three years. For this reason it was determined that the cat research budget component would cease in 1998–99. This would progressively release the cat research budget component, which was \$158,000 in 1996–97, for use in operational baiting or to meet cost increases in other areas.

In 1998 the first detailed budget review was undertaken. This highlighted cost increase pressures and

also pressures being applied both from within the Department and externally for expansion of the baited areas and species to be targeted. Further details of these aspects are presented in other papers. These cost pressures have required very careful and deliberate targeting of expenditure and a greater level of budget support for basic field operations from regional and specialist Branch budgets, not necessarily allocated under the *Western Shield* budget.

Key cost pressures from 1997 have been attributed to increasing bait and aircraft costs, along with vehicle fleet costs. This is discussed further in Armstrong, this issue.

Bait prices have risen dramatically in response to full cost recovery requirements of the Agriculture Protection Board (APB), while aircraft costs have increased in keeping with fuel and general aviation charges. There has therefore been, from the very beginning, a strong incentive for the Department to develop means to reduce bait costs and streamline aircraft operations. The Department has also had an ongoing objective of 'increasing bait delivery precision', to ensure the effectiveness of baiting operations, and also to avoid wastage.

A specific focus of the program has been expansion of baiting to key target areas where continued economies can be reached or where specific priority outcomes have been identified. In 1998 key target areas for future baiting expansion were the northern sandplains (north of Perth to Geraldton), Avon Valley and Walyunga National Parks (immediately north of Perth, and retaining rock wallaby habitat) and expansion of operations for rock wallabies at Cape Range (by 2003, these areas have largely been included in the baiting operations).

The principal result of this review was to raise awareness of the budget pressures on *Western Shield* and to provide a priority focus on what areas should be targeted in future. It reinforced the need for external funds for feral cat control program development and provided the incentive for a review of operational areas for baiting and species recovery over the next two years.

MANAGEMENT OF OPERATIONS: WESTERN SHIELD STRATEGIC PLAN 2000–2004

Operations 2000–2003

A number of major developments occurred for the Department over the period late 1999 through to mid-2001 that had impacts on the operations and management of the *Western Shield* Program. These included the departure of Dr Shea as Executive Director in 1999, the splitting-off of the commercial aspects of forest logging operations to the Forest Products Commission in 2000–01, the introduction of Output Purchaser Provider (OPP) budget management as an initiative of the new Executive Director, Dr Wally Cox in 2000–01, and the reductions in the departmental overall base budget over the period

2001–02 and 2002–03. Ongoing changes in plans for the APB's bait factory in terms of possible privatization, closure and cost structures, have also significantly influenced *Western Shield* planning. These issues are covered in Armstrong, this issue.

The change to OPP budgeting in place of program budgeting provided for greater central control of nature conservation budgets through the position of the Director of Nature Conservation. This initiative provided scope for the Director of Nature Conservation to set priorities for the new Nature Conservation Output expenditure across the Department (other outputs are Parks and Visitor Services, Sustainable Forest Management and the Perth Observatory). One positive feature of this move was the greater integration of *Project Eden* funding into the overall *Western Shield* planning as these projects were under more direct budget control of the Director. There will be further discussion on the *Project Eden* component of *Western Shield* elsewhere during this review. It will suffice to state here that there is further scope for integration of *Project Eden* into the *Western Shield* Program.

Under cost cutting initiatives of government the department's Nature Conservation Output was subjected to a 7.4% budget cut over the period 2001–02 to 2002–03. This equated to a total of a \$2,430,000 reduction in funding for nature conservation activities per annum from 2002–03. While the specifically identified Western Shield budget was 'quarantined' from the cuts, the resultant cuts to Regional Services, CALM Science and Nature Conservation Division activities and staffing inevitably impacted on the program.

In tandem with these cuts and changes in Departmental operations a number of key positions in the Department, including that of the Director of Nature Conservation and Manager, Wildlife Branch were filled only in an acting capacity (this continues). Also, the Environmental Protection Branch Manager's position was abolished and the Branch has since been amalgamated with another area of the Department (Wildlife Protection). Currently the part time positions of 'Western Shield Program Manager' and 'Western Shield Operations Officer' are effectively undertaken by a single officer, with direct assistance from other staff, including the Director of Nature Conservation. This is a temporary measure while a recent vacancy is filled, but is still having an impact on coordination of the program.

Western Shield Strategic Plan 2000–2004

As a result of the budget review in 1998 and ongoing pressures from a range of areas into 1999, the Western Shield Program Manager, prepared a Draft Western Shield Strategic Plan in 1999. This plan was considered internally within the then departmental management structure. It was unfortunate that the development of the plan coincided with the very significant changes to the Department outlined above. Nevertheless the strategic plan has proven to be a very significant document and one that can be a basis for the overall review of the management structure for the program for the next five

years. It has been accepted by the Director of Nature Conservation as an operational draft and has formed the basis of management of the program since 2000. It is anticipated that a revised strategic plan will be prepared for more widespread consideration following this review.

The draft strategic plan is an update of the original Western Shield proposal document (Burbidge *et al.* 1989) and has specific objectives and targets, performance indicators, a clarified management structure and associated roles and responsibilities.

In essence, the draft strategic plan brings the initial project proposal or 'blueprint' for the program forward by recognizing the progress made in fauna recovery and planning. Significantly, the draft plan has more specific operational guidelines. The key features of the draft strategic plan 1999–2004 are summarised in Table 3 and Figure 2.

Western Shield mission

- To conserve and enhance those elements of the Western Australian fauna that have declined as a result of predation by introduced predators (foxes and cats) and rats where applicable e.g. islands.
- To reconstruct the fauna that has become locally extinct because of predation by reducing the density of foxes and feral cats on conservation lands, and encourage their reduction on private lands.
- To inform the community of Western Australia of the aims and progress of *Western Shield* and involve them in its implementation.

Western Shield principles

- Controlling introduced predators for fauna conservation is a long-term commitment that cannot be diminished or abandoned once begun.
- Our fauna heritage belongs to all Western Australians and every effort should be made to involve them in its conservation.
- While much is known about introduced predator control and predator/fauna interaction, continuing research is needed to refine and add to the knowledge enabling cost effective operations to be developed and improved.

Western Shield priorities

Introduced predator control:

- Control of introduced predators will be undertaken in those areas where it can be demonstrated to be effective.
- Those areas with extant fauna vulnerable to predation will be given first priority for introduced predator control.

- Those areas that no longer contain fauna vulnerable to predation but which have suitable habitat will be given second priority for introduced predator control.

Fauna Translocations:

- Translocations of native fauna will only be undertaken in situations where the native fauna species are not present and/or cannot colonize the treated area by natural spread.
- Species listed as 'threatened' will have a higher priority for translocation than other non-threatened species.
- The focus for translocations should be on fauna reconstruction sites.

Captive breeding:

- Only species that cannot be readily translocated from existing wild populations will be bred in captivity.
- Threatened species will be favoured over non-threatened species for captive breeding.
- Species will only be bred in captivity if release sites with suitable habitat are available.
- Captive breeding facilities will be maintained at several sites to manage risk of failure or loss.
- Species will be bred for release in Western Australia unless required by a species recovery plan to be released elsewhere.

Monitoring:

- Monitoring of translocated threatened species will continue until they are established.
- Monitoring of indicator species will be undertaken across the geographic extent of the *Western Shield* program.
- There will be a balance of long term monitoring of indicator species and short term monitoring of re-introduced species.

Objectives and targets:

- Maximise the recovery of sustainable populations of vulnerable native fauna by reducing the impact of predation by foxes and feral cats.
- Develop cost efficient and effective control techniques for foxes and feral cats.
- Through education and public relations programs increase the awareness of the effect of fox and feral cat predation on native fauna and what can be done to mitigate this effect (best practice).
- Link predator control and fauna recovery to complementary research projects.
- Develop and maintain partnerships with groups and organisations that maximise the efficiency and effectiveness of fauna recovery across Western Australia.

TABLE 3
Draft Key Performance Indicators for *Western Shield* (Draft Strategic Plan).

KEY PERFORMANCE INDICATOR	EFFECTIVENESS INDICATOR	EFFICIENCY INDICATOR
Establish and maintain predator control over CALM-managed lands where predation is a threatening process.	Hectares of CALM-managed lands that are subject to predator control operations.	The cost per ha per annum of undertaking such operations.
Recovery of fauna threatened by predation.	Extent to which indicator species recover in terms of percentage trap success or other appropriate measure. Number of threatened species allocated to more secure conservation categories under IUCN criteria.	The cost per ha per annum of undertaking predator control and fauna monitoring operations, per species down-listed.
Awareness of WA public to the threat that predation poses to native fauna.	Extent to which market research polling indicates public awareness.	Cost per annum of public relations and education programs.

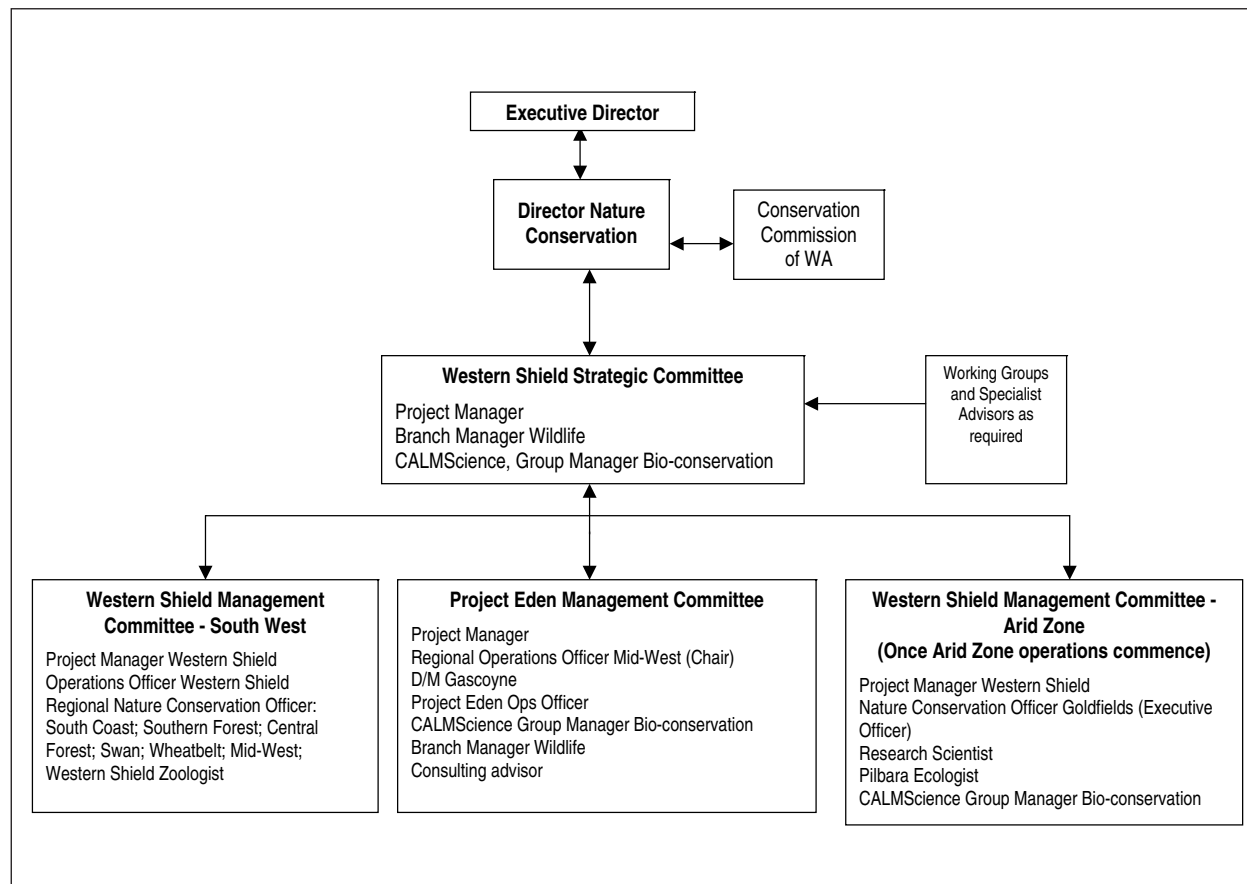


Figure 2: Management Structure 1999–2000 to 2003. Detailed responsibilities of the various parties are listed in the Appendix.

Current *Western Shield* management structure and budget

The overall direction and guidance of the draft strategic plan is an improvement on the original blueprint for the program. In particular, it has addressed problematic issues of resource allocation, while also maintaining faith with the original vision of an integrated broad scale program delivering demonstrable native fauna recovery.

The draft plan also proposed a minor reworking of the management and organisational structure for the entire program, including *Project Eden*. This is presented in Figure 2. The responsibilities of the various parties to this management structure are listed in the Appendix.

Budgeting has been a very significant management concern over the past six years, as outlined earlier. Over recent years cat control research has been funded under a very generous sponsorship package from the Wind over Water Foundation.

Along with cost cutting and the sponsorships received, essential budget requirements for the Program have been met, including increases of around 48% in the combined cost of baits and aircraft. This is demonstrated in Table 4.

TABLE 4

Comparison of budget expenditure for *Western Shield* from central funds 1996–97 and anticipated 2002–03.

WESTERN SHIELD OPERATIONS	1996–97 \$	2002–03 (ANTIC) \$
Baits and bait production	440,150	640,000
Aircraft hire & fuel	242,500	364,000
Advertising & printing	61,500	35,000
Materials/services/assistance	151,950	167,000
Plant/vehicle	27,980	15,000
Staff training	3,000	2,000
Flying allowance	6,010	0
Travel allowance	9,630	10,000
Airfares	6,000	1,000
Radio	0	500
Overtime	0	0
WS Zoologist	73,280	101,500
SUBTOTAL core baiting related activities	1,022,000	1,336,000
Other (cat research and contingency etc.)	248,000	18,000
SUBTOTAL	1,270,000	1,354,000
Project Eden	n/a	420,000
Grand Total	1,270,000	1,774,000

Possibilities for future management

The ongoing reviews of *Western Shield*, including the 1998 budget review and the preparation of the draft strategic plan in 1999, have identified a series of management issues for the program. These can be listed as follows:

- Planning and management of program budget and resources (day-to-day and overall)

- Ongoing monitoring and review of performance towards targets and objectives
- Review of appropriateness of targets and objectives
- Development of annual and bi annual works programs
- Reporting to the Executive Director and Corporate Executive on significant issues for the program

It is clear that the on-ground delivery of the program has been very successful and that the management of the program at that level has been good. The program has been managed within budget, with innovative developments realised in terms of management and refinement of aircraft contracts. Baiting and translocations have been well planned and conducted along with the required monitoring programs.

What has been lacking, however, is the high-level critical review and analysis of priorities. This has been partly due to a lack of a rapid and smooth two way transfer of information on the program between operational areas, specialist areas of the Department and senior management. This problem has largely arisen through inadequacies in the operation of the *Western Shield* Strategic Committee, which has not met as frequently as it should over the past four years. This has not been surprising given the resource and organisational changes experienced by the Department over this time.

The lesson learnt from this period is that a truly robust management system should be able to cope with organisational change and uncertainties. This requires both a clear statement of priorities and duties of those involved and a system to alert parties to any failures to meet these requirements.

Day-to-day program management and reporting

Over time the *Western Shield* program has become more clearly defined and its real resource requirements better known. Yet, six years after its commencement the true budget and resource costs of the program are not easily identified. The true costs of the program, taking into account sponsorships and related activities in Science Division and Regional Services areas, is well in excess of \$2 million per annum. With this operational expenditure it would seem appropriate to allocate a core full time management unit that would have the responsibility of ensuring that all communication channels operate and that there is adequate business and operational planning and review for the program. In this regard, the current part time positions of ‘*Western Shield* Program Manager’ and ‘*Western Shield* Operations Officer’ could be replaced with permanent counterparts. At the very least a full time ‘*Western Shield* Program Business Manager’, or the equivalent would seem to be appropriate. Full costs for a single permanent management position would be in the order of \$90,000 to \$100,000 per annum. An assistant position would add another \$50,000 or so to this cost.

This could be achieved within existing budgets by amalgamating the non Western Shield duties of the existing part time management positions and a relatively minor reallocation of existing Western Shield and other departmental budgets.

The Western Shield Business Manager and/or Business Management Unit would prepare and monitor annual business plans for the program, schedule and service meetings of the Strategic Committee and other coordination/operational committees and prepare an annual report on program performance for public consumption. This person/group would also have responsibility for ongoing review of the Program targets etc. as approved under the Strategic Plan.

As far as is possible, all Western Shield management, standard setting and training staff should be in the same administrative unit of the Department, and at least within the same Division.

Overall program management

The key improvement here would be to introduce a clear reporting and meeting schedule for the Strategic Committee, including reports to Corporate Executive and the community. Audited requirements for business planning and annual reports to Corporate Executive would help to refocus work plans of the various members of the Strategic Committee which should meet at least twice per year. This group would recommend to Corporate Executive any significant changes proposed for the program. Its task would be much easier once a clear position was established on activities and resources expended in areas within a true (and all inclusive) budget for the program.

Responsibility for this should continue to rest with the Director of Nature Conservation.

Review of appropriateness of targets and objectives

Now is an opportune time for the Department to undertake a review of Western Shield targets and objectives. The results from the *Western Shield* review should therefore include a definitive statement of the targets and objectives of the program (and also budget requirements) for the next five years. This would be the framework around which a new 5-year strategy for the program could be prepared. There should be ongoing minor annual reviews of targets and objectives, with major reviews scheduled for every 3–5 years.

Development of annual and biennial works programs

Annual and biennial works programs would be the responsibility of the Business Manager/group, as proposed above. While we currently prepare annual budgets and works programs, there is scope to extend the framework for such planning with a series of ‘what if’ scenarios linked to specific measurable targets under the overall Nature Conservation Output budget planning process.

Reporting to the Executive Director and Corporate Executive on significant issues for the program

There should be endorsement and auditing by Corporate Executive of the requirement for an ongoing reporting timetable, as discussed above. This would include as a minimum review of annual reports on targets and performance of the program.

Other management issues

There is a series of other management target issues that have been raised in papers prepared for this review. A key question among these is the relative priority between reconstruction of fauna in numerous areas and a more standard threatened species recovery focus. The management requirement relating to such issues is to ensure that there are mechanisms to adequately consider improvements to program delivery and to implement these efficiently. The structure and processes outlined above should provide this framework.

REFERENCES

- Burbidge AA, McKenzie NL (1989) Patterns in the modern decline of Western Australia’s vertebrate fauna: causes and conservation implications. *Biological Conservation* 50, 143–198.
- Burbidge AA, Start AN, Morris KD, Armstrong R (1995) ‘Western Shield—Bringing back our wildlife’. Department of Conservation and Land Management, Perth.

APPENDIX

Responsibilities of personnel in Figure 2

Director of Nature Conservation

- Supply guidance to Strategic Committee.
- Approve annual budget allocation to *Western Shield*.
- Approve *Western Shield* Strategic Plan.
- Approve major operational changes to *Western Shield*.
- Consider and endorse as appropriate recommendations from Strategic Committee.
- Report to Corporate Executive.

Western Shield Strategic Committee

- Advise on the target areas for predator control.
- Advise on priorities for *Western Shield*.
- Seek resources from sponsors.
- Allocate funds to Western Shield projects.
- Manage the *Western Shield* budget.
- Maintain a current Strategic Plan for Western Shield.
- Ensure best practice and CALM policy is applied to Western Shield operations.
- Recommend major changes to operational prescriptions or *Western Shield* programs to Director Nature Conservation
- Approve minor changes to operational prescriptions or *Western Shield* programs.
- In consultation with relevant CALM managers, recommend the re-introduction of fauna to Western Shield baiting areas.
- Ensure fauna monitoring protocols and reporting procedures are in place and utilised.
- Ensure appropriate training is available for personnel involved in *Western Shield*.
- Make recommendations to Director Nature Conservation regarding research requirements or research proposals affecting Western Shield operations.
- Report periodically to Director Nature Conservation

Western Shield Management Committees

- Determine the annual resource requirements to undertake Western Shield projects and inform the Western Shield Strategic Committee.
- Allocate available resources to undertake Western Shield projects.
- Coordinate the utilisation of CALM resources for baiting, fauna management and educational components of the *Western Shield* program.

- Ensure best practice is applied to Western Shield operations and CALM policy and procedures are complied with.
- Schedule operational components of Western Shield projects to achieve optimum effectiveness and efficiency.
- Vet proposals for changes to prescriptions and make recommendations to Western Shield Strategic Committee.
- Vet proposals for additions or deletions to the *Western Shield* program and make recommendations to Western Shield Strategic Committee.
- Identify opportunities for public education and public relations and convey these to the Project Manager.
- Determine training needs of personnel involved in Western Shield operations and communicate them to the Project Manager.
- Identify research requirements and comment on research proposals affecting Western Shield operations. Make recommendations to the Strategic Committee.
- Report periodically to Western Shield Strategic Committee.

Western Shield Project Manager

- Attends Strategic Committee and Management Committee meeting and acts as a communication bridge between them.
- Ensures Management Committees function to identify and resolve issues affecting the implementation of Western Shield projects.
- Ensures relevant training opportunities are available to personnel involved in Western Shield projects.
- Prepares, monitors and controls the Western Shield budget.
- Coordinates and integrates the implementation of *Western Shield*.
- Liaises with Director Nature Conservation, Strategic Committee, Management Committee and other relevant managers to implement Western Shield projects.
- Coordinates all introduced feral predator control operations.
- Encourages process improvement and productivity improvement in Western Shield operations.
- Facilitates opportunities for public relations and education.
- Prepares reports on behalf of Strategic Committee.